

**5-7 CARLTON GARDENS
LONDON SW1**

**OPERATING & MAINTENANCE
INSTRUCTIONS
for the
ELECTRICAL SERVICES**

**VOLUME 3
3.3.3 – Section H (H2 – H7)**

**THIS FOLDER WAS CHECKED BY
ARUP ON**

21.3.03

**The checking process was to ensure that 3 identical
sets of each Volume of the Operating and
Maintenance Manuals existed**

**5-7 CARLTON GARDENS
LONDON SW1**

**OPERATING & MAINTENANCE
INSTRUCTIONS
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ELECTRICAL SERVICES**

**VOLUME 3
3.3.3 – Section H (H2 – H7)**

*Collated By :
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CROSS REFERENCE INDEX

ITEM	GENERAL OPERATING INSTRUCTIONS	GENERAL MAINTENANCE INSTRUCTIONS	SPECIFIC SUPPLIER LITERATURE
FIRE ALARM SYSTEM & DETECTION & VOICE ALARM I.A.T. (Europe) Ltd.	D.1.3	E.1.7, E.1.2.1, E.1.3, E.1.5, E.2, E.3, E.7.3.1	H.8
STANDBY GENERATION AVK/SEG (UK) Ltd.	D.1.2, D.2, D.3, D4	E.1.2.1, E.1.3, E.1.5, E.2, E.3, E.7.1, E.7.1.1, E.7.1.2, E.7.1.3	H.3
L.V SWITCHGEAR & DIST. BOARDS (Anord Control Systems Ltd.)	D.1.1	E.1.1, E.1.2.1, E.1.3, E.1.5, E.2, E.3, E.7.1, E.7.1.1, E.7.1.2, E.7.1.3	H.1
SECURITY SYSTEM Blenheim Security Systems Ltd.	D.1.4	E.1.2.1, E.1.3, E.1.5, E.2, E.3, H.6	H.6

Building Services Operating and Maintenance Instructions
5-7 Carlton Gardens, London SW1

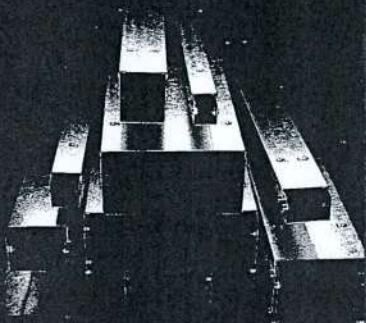
H.2

**Arena Cable Management Systems –
Containment System Ladderack, Cable Tray & Trunking**

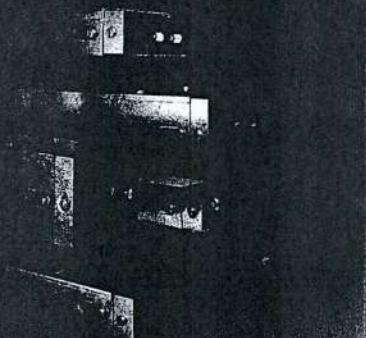
arena

CABLE MANAGEMENT SYSTEMS

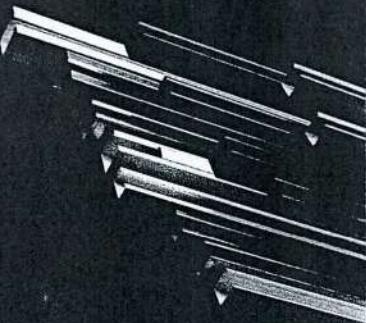
SURFACE CABLE TRUNKING



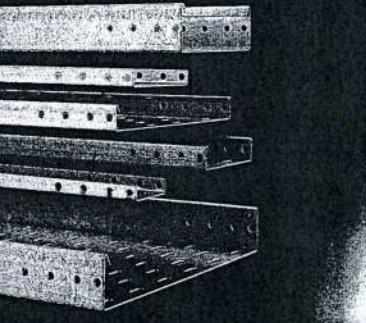
COMPARTMENT TRUNKING



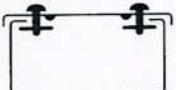
LIGHTING TRUNKING



CABLE TRAY



Certificate No FM 13948



Turnbuckle Lid Fixing

A comprehensive range of single compartment returned edge surface cable trunking and accessories in pre-galvanised sheet steel.

The trunking is supplied in 3 metre lengths as standard, complete with body, lid, coupler and all necessary fixing screws.

The body of the trunking and accessories is constructed with a returned edge and the lid is fixed using captive zinc die-cast turnbuckles. The couplers are secured with M5 zinc plated screws fixed into captive threaded bushes.

Accessories are generally of one-piece manufacture with integral couplers fitted with captive threaded bushes.

STANDARD SPECIFICATION

British Standard

Complies with BS 4678: Part 1: 1978 - unless otherwise stated.

Material

Hot dipped galvanised sheet steel to
BS EN10142:1991. Fe P02G Z275NAC. BS EN10143:1993.

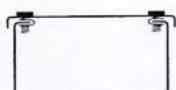
Finish

Self colour galvanise to Fe P02G Z275NAC. Complies with BS4678 Part 1 1978 -
Class 3 Heavy Protection Against Corrosion.

Quality

Complies with the Arena Quality Assurance Policy BS Certificate No FM 13948.

ALTERNATIVE SPECIFICATIONS



Clip Nut Lid Fixing

Length

Trunking can be supplied in lengths other than 3 metres.

Lid Fixing

Screwed lid fixing using captive bushes clipped onto the return edge of the body.

Finish

Epoxy polyester powder coat in a variety of colours.

Material

Alternative materials include zinc free steel, stainless steel and zintec.

Material Gauge

Manufacture in material of gauges other than standard.

ORDERING INFORMATION

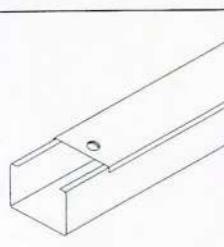
The following tables show the external dimensions and order codes for the standard range.
In all cases, the first number refers to the width of the trunking and the second number to the height of the side walls.

The table shows only the standard sizes, intermediate or larger sizes can be manufactured.

Please note

Earth links are not included and should always be ordered separately.

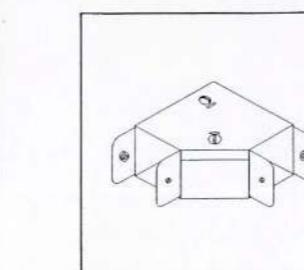
TRUNKING



Size	50 x 25	50 x 50	75 x 50	75 x 75	100 x 50	100 x 75	100 x 100	100 x 125	100 x 150	100 x 175	100 x 200	100 x 225	100 x 250
Order Code	GT21	GT22	GT32	GT33	GT42	GT43	GT44	GT62	GT63	GT64	GT66	GT68	GT82
Size	200 x 100	225 x 50	225 x 75	225 x 100	225 x 125	225 x 150	225 x 175	300 x 50	300 x 75	300 x 100	300 x 125	300 x 150	300 x 200
Order Code	GT84	GT92	GT93	GT94	GT96	GT99	GT122	GT123	GT124	GT126	GT129	GT1212	

When ordering with screw lid fixing add suffix /C to standard catalogue number - for example GT21/C.

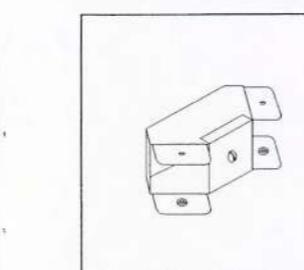
When ordering with white powder coating add suffix /W to standard catalogue number - for example GT21/W



GUSSET BEND TOP LID

Size	50 x 25	50 x 50	75 x 50	75 x 75	100 x 50	100 x 75	100 x 100	100 x 125	100 x 150	100 x 175	100 x 200	100 x 225	100 x 250
Order Code	GBT21	GBT22	GBT32	GBT33	GBT42	GBT43	GBT44	GBT62	GBT63	GBT64	GBT66	GBT82	
Size	200 x 100	225 x 50	225 x 75	225 x 100	225 x 125	225 x 150	225 x 175	300 x 50	300 x 75	300 x 100	300 x 125	300 x 150	300 x 200
Order Code	GBT84	GBT92	GBT93	GBT94	GBT96	GBT99	GBT122	GBT123	GBT124	GBT126	GBT129	GBT1212	

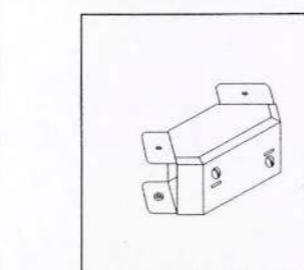
When ordering with screw lid fixing add suffix /C to standard catalogue number - for example GBT21/C
When ordering with white powder coating add suffix /W to standard catalogue number - for example GBT21/W



GUSSET BEND INSIDE LID

Size	50 x 25	50 x 50	75 x 50	75 x 75	100 x 50	100 x 75	100 x 100	100 x 125	100 x 150	100 x 175	100 x 200	100 x 225	100 x 250
Order Code	GBI21	GBI22	GBI32	GBI33	GBI42	GBI43	GBI44	GBI62	GBI63	GBI64	GBI66	GBI82	
Size	200 x 100	225 x 50	225 x 75	225 x 100	225 x 125	225 x 150	225 x 175	300 x 50	300 x 75	300 x 100	300 x 125	300 x 150	300 x 200
Order Code	GBI84	GBI92	GBI93	GBI94	GBI96	GBI99	GBT122	GBT123	GBT124	GBT126	GBT129	GBT1212	

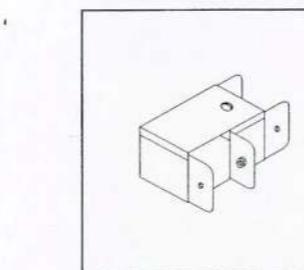
When ordering with screw lid fixing add suffix /C to standard catalogue number - for example GBI21/C
When ordering with white powder coating add suffix /W to standard catalogue number - for example GBI21/W



GUSSET BEND OUTSIDE LID

Size	50 x 25	50 x 50	75 x 50	75 x 75	100 x 50	100 x 75	100 x 100	100 x 125	100 x 150	100 x 175	100 x 200	100 x 225	100 x 250
Order Code	GBO21	GBO22	GBO32	GBO33	GBO42	GBO43	GBO44	GBO62	GBO63	GBO64	GBO66	GBO82	
Size	200 x 100	225 x 50	225 x 75	225 x 100	225 x 125	225 x 150	225 x 175	300 x 50	300 x 75	300 x 100	300 x 125	300 x 150	300 x 200
Order Code	GBO84	GBO92	GBO93	GBO94	GBO96	GBO99	GBT122	GBT123	GBT124	GBT126	GBT129	GBT1212	

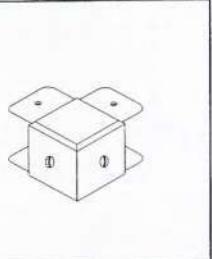
When ordering with screw lid fixing add suffix /C to standard catalogue number - for example GBO21/C
When ordering with white powder coating add suffix /W to standard catalogue number - for example GBO21/W



SQUARE BEND TOP LID

Size	50 x 25	50 x 50	75 x 50	75 x 75	100 x 50	100 x 75	100 x 100	100 x 125	100 x 150	100 x 175	100 x 200	100 x 225	100 x 250
Order Code	SBT21	SBT22	SBT32	SBT33	SBT42	SBT43	SBT44	SBT62	SBT63	SBT64	SBT66	SBT82	
Size	200 x 100	225 x 50	225 x 75	225 x 100	225 x 125	225 x 150	225 x 175	300 x 50	300 x 75	300 x 100	300 x 125	300 x 150	300 x 200
Order Code	SBT84	SBT92	SBT93	SBT94	SBT96	SBT99	SBT122						

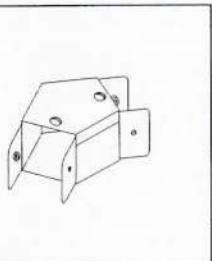
SQUARE BEND OUTSIDE LID



Size	50 x 25	50 x 50	75 x 50	75 x 75	100 x 50	100 x 75	100 x 100	150 x 50	150 x 75	150 x 100	150 x 150	200 x 50
Order Code	SBO21	SBO22	SBO32	SBO33	SB042	SB043	SB044	SB062	SB063	SB064	SB066	SB082
Size	200 x 100	225 x 50	225 x 75	225 x 100	225 x 150	225 x 225	300 x 50	300 x 75	300 x 100	300 x 150	300 x 225	300 x 300
Order Code	SBO84	SBO92	SBO93	SBO94	SB096	SB099	SB0122	SB0123	SB0124	SB0126	SB0129	SB01212

When ordering with screw lid fixing add suffix **/C** to standard catalogue number - for example SBO21/C
When ordering with white powder coating add suffix **/W** to standard catalogue number - for example SBO21/W

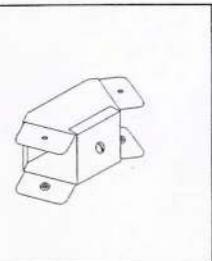
FORTY-FIVE DEGREE BEND TOP LID



Size	50 x 25	50 x 50	75 x 50	75 x 75	100 x 50	100 x 75	100 x 100	150 x 50	150 x 75	150 x 100	150 x 150	200 x 50
Order Code	FBT21	FBT22	FBT32	FBT33	FBT42	FBT43	FBT44	FBT62	FBT63	FBT64	FBT66	FBT82
Size	200 x 100	225 x 50	225 x 75	225 x 100	225 x 150	225 x 225	300 x 50	300 x 75	300 x 100	300 x 150	300 x 225	300 x 300
Order Code	FBT84	FBT92	FBT93	FBT94	FBT96	FBT99	FBT122	FBT123	FBT124	FBT126	FBT129	FBT1212

When ordering with screw lid fixing add suffix **/C** to standard catalogue number - for example FBT21/C
When ordering with white powder coating add suffix **/W** to standard catalogue number - for example FBT21/W

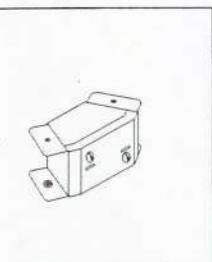
FORTY-FIVE DEGREE BEND INSIDE LID



Size	50 x 25	50 x 50	75 x 50	75 x 75	100 x 50	100 x 75	100 x 100	150 x 50	150 x 75	150 x 100	150 x 150	200 x 50
Order Code	FBI21	FBI22	FBI32	FBI33	FBI42	FBI43	FBI44	FBI62	FBI63	FBI64	FBI66	FBI82
Size	200 x 100	225 x 50	225 x 75	225 x 100	225 x 150	225 x 225	300 x 50	300 x 75	300 x 100	300 x 150	300 x 225	300 x 300
Order Code	FBI84	FBI92	FBI93	FBI94	FBI96	FBI99	FBI122	FBI123	FBI124	FBI126	FBI129	FBI1212

When ordering with screw lid fixing add suffix **/C** to standard catalogue number - for example FBI21/C
When ordering with white powder coating add suffix **/W** to standard catalogue number - for example FBI21/W

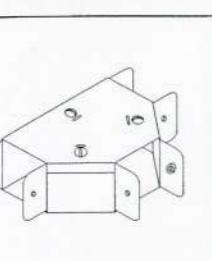
FORTY-FIVE DEGREE BEND OUTSIDE LID



Size	50 x 25	50 x 50	75 x 50	75 x 75	100 x 50	100 x 75	100 x 100	150 x 50	150 x 75	150 x 100	150 x 150	200 x 50
Order Code	FBO21	FBO22	FBO32	FBO33	FBO42	FBO43	FBO44	FBO62	FBO63	FBO64	FBO66	FBO82
Size	200 x 100	225 x 50	225 x 75	225 x 100	225 x 150	225 x 225	300 x 50	300 x 75	300 x 100	300 x 150	300 x 225	300 x 300
Order Code	FBO84	FBO92	FBO93	FBO94	FBO96	FBO99	FBO122	FBO123	FBO124	FBO126	FBO129	FBO1212

When ordering with screw lid fixing add suffix **/C** to standard catalogue number - for example FBO21/C
When ordering with white powder coating add suffix **/W** to standard catalogue number - for example FBO21/W

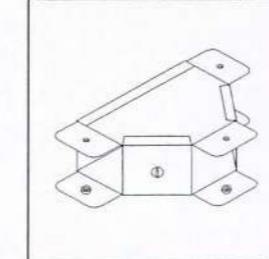
GUSSET TEE TOP LID



Size	50 x 25	50 x 50	75 x 50	75 x 75	100 x 50	100 x 75	100 x 100	150 x 50	150 x 75	150 x 100	150 x 150	200 x 50
Order Code	GTT21	GTT22	GTT32	GTT33	GTT42	GTT43	GTT44	GTT62	GTT63	GTT64	GTT66	GTT82
Size	200 x 100	225 x 50	225 x 75	225 x 100	225 x 150	225 x 225	300 x 50	300 x 75	300 x 100	300 x 150	300 x 225	300 x 300
Order Code	GTT84	GTT92	GTT93	GTT94	GTT96	GTT99	GTT122	GTT123	GTT124	GTT126	GTT129	GTT1212

When ordering with screw lid fixing add suffix **/C** to standard catalogue number - for example GTT21/C
When ordering with white powder coating add suffix **/W** to standard catalogue number - for example GTT21/W

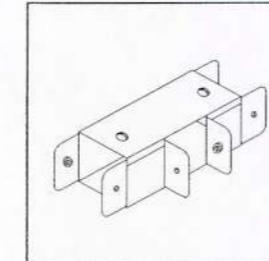
GUSSET TEE INSIDE/OUTSIDE LID



Size	50 x 25	50 x 50	75 x 50	75 x 75	100 x 50	100 x 75	100 x 100	150 x 50	150 x 75	150 x 100	150 x 150	200 x 50
Order Code	GTI021	GTI022	GTI032	GTI033	GTI042	GTI043	GTI044	GTI062	GTI063	GTI064	GTI066	GTI082
Size	200 x 100	225 x 50	225 x 75	225 x 100	225 x 150	225 x 225	300 x 50	300 x 75	300 x 100	300 x 150	300 x 225	300 x 300
Order Code	GTI084	GTI092	GTI093	GTI094	GTI096	GTI099	GTI1022	GTI1023	GTI1024	GTI1026	GTI1029	GTI101212

When ordering with screw lid fixing add suffix **/C** to standard catalogue number - for example GTI021/C
When ordering with white powder coating add suffix **/W** to standard catalogue number - for example GTI021/W

SQUARE TEE TOP LID



Size	50 x 25	50 x 50	75 x 50	75 x 75	100 x 50	100 x 75	100 x 100	150 x 50	150 x 75	150 x 100	150 x 150	200 x 50
Order Code	STT21	STT22	STT32	STT33	STT42	STT43	STT44	STT62	STT63	STT64	STT66	STT82

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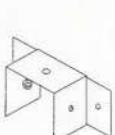
BLANK END



Size	50 x 25	50 x 50	75 x 50	75 x 75	100 x 50	100 x 75	100 x 100	150 x 50	150 x 75	150 x 100	150 x 150	200 x 50
Order Code	BE21	BE22	BF32	BE33	BE42	BE43	BE44	BE62	BE63	BE64	BE66	BE82
Size	200 x 100	225 x 50	225 x 75	225 x 100	225 x 150	225 x 225	300 x 50	300 x 75	300 x 100	300 x 150	300 x 225	300 x 300
Order Code	BE84	BE92	BE93	BE94	BE96	BE99	BE122	BE123	BE124	BE126	BE129	BE1212

When ordering with screw lid fixing add suffix /C to standard catalogue number - for example BE21/C
 When ordering with white powder coating add suffix /W to standard catalogue number - for example BE21/W

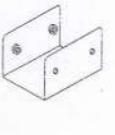
FLANGED END PLATE



Size	50 x 25	50 x 50	75 x 50	75 x 75	100 x 50	100 x 75	100 x 100	150 x 50	150 x 75	150 x 100	150 x 150	200 x 50
Order Code	FP21	FP22	FP32	FP33	FP42	FP43	FP44	FP62	FP63	FP64	FP66	FP82
Size	200 x 100	225 x 50	225 x 75	225 x 100	225 x 150	225 x 225	300 x 50	300 x 75	300 x 100	300 x 150	300 x 225	300 x 300
Order Code	FP84	FP92	FP93	FP94	FP96	FP99	FP122	FP123	FP124	FP126	FP129	FP1212

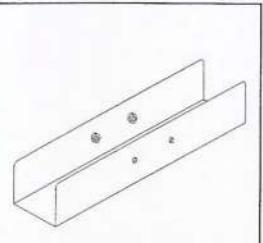
When ordering with screw lid fixing add suffix /C to standard catalogue number - for example FP21/C
 When ordering with white powder coating add suffix /W to standard catalogue number - for example FP21/W

SHORT COUPLER



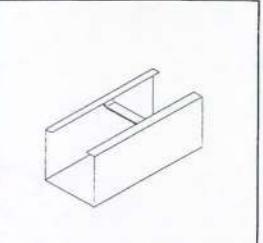
Size	50 x 25	50 x 50	75 x 50	75 x 75	100 x 50	100 x 75	100 x 100	150 x 50	150 x 75	150 x 100	150 x 150	200 x 50
Order Code	SCC21	SCC22	SCC32	SCC33	SCC42	SCC43	SCC44	SCC62	SCC63	SCC64	SCC66	SCC82
Size	200 x 100	225 x 50	225 x 75	225 x 100	225 x 150	225 x 225	300 x 50	300 x 75	300 x 100	300 x 150	300 x 225	300 x 300
Order Code	SCC84	SCC92	SCC93	SCC94	SCC96	SCC99	SCC122	SCC123	SCC124	SCC126	SCC129	SCC1212

LONG COUPLER



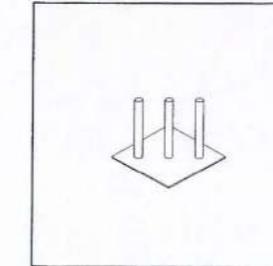
Size	50 x 25	50 x 50	75 x 50	75 x 75	100 x 50	100 x 75	100 x 100	150 x 50	150 x 75	150 x 100	150 x 150	200 x 50
Order Code	LCC21	LCC22	LCC32	LCC33	LCC42	LCC43	LCC44	LCC62	LCC63	LCC64	LCC66	LCC82
Size	200 x 100	225 x 50	225 x 75	225 x 100	225 x 150	225 x 225	300 x 50	300 x 75	300 x 100	300 x 150	300 x 225	300 x 300
Order Code	LCC84	LCC92	LCC93	LCC94	LCC96	LCC99	LCC122	LCC123	LCC124	LCC126	LCC129	LCC1212

CABLE RETAINER



Size	50 x 25	50 x 50	75 x 50	75 x 75	100 x 50	100 x 75	100 x 100	150 x 50	150 x 75	150 x 100	150 x 150	200 x 50
Order Code	CR21	CR22	CR32	CR33	CR42	CR43	CR44	CR62	CR63	CR64	CR66	CR82
Size	200 x 100	225 x 50	225 x 75	225 x 100	225 x 150	225 x 225	300 x 50	300 x 75	300 x 100	300 x 150	300 x 225	300 x 300
Order Code	CR84	CR92	CR93	CR94	CR96	CR99	CR122	CR123	CR124	CR126	CR129	CR1212

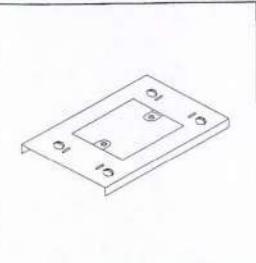
PIN RACK



Size	50 x 25	50 x 50	75 x 50	75 x 75	100 x 50	100 x 75	100 x 100	150 x 50	150 x 75	150 x 100	150 x 150	200 x 50
Order Code	PR21	PR22	PR32	PR33	PR42	PR43	PR44	PR62	PR63	PR64	PR66	PR82
Size	200 x 100	225 x 50	225 x 75	225 x 100	225 x 150	225 x 225	300 x 50	300 x 75	300 x 100			

arena SURFACE CABLE TRUNKING

SINGLE SOCKET PLATE

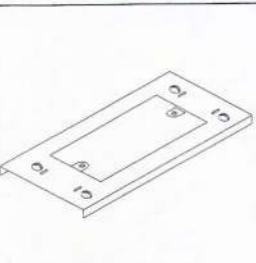


Size	50 x 25	50 x 50	75 x 50	75 x 75	100 x 50	100 x 75	100 x 100	150 x 50	150 x 75	150 x 100	150 x 150	200 x 50
Order Code					SSP4	SSP4	SSP4	SSP6	SSP6	SSP6	SSP6	SSP8
Size	200 x 100	225 x 50	225 x 75	225 x 100	225 x 150	225 x 225	300 x 50	300 x 75	300 x 100	300 x 150	300 x 225	300 x 300
Order Code	SSP8	SSP9	SSP9	SSP9	SSP9	SSP12	SSP12	SSP12	SSP12	SSP12	SSP12	SSP12

When ordering with screw lid fixing add suffix **/C** to standard catalogue number - for example SSP4/C

When ordering with white powder coating add suffix **/W** to standard catalogue number - for example SSP4/W

TWIN SOCKET PLATE

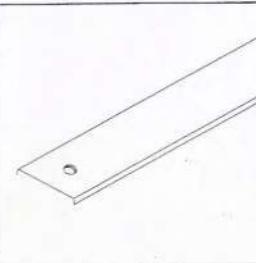


Size	50 x 25	50 x 50	75 x 50	75 x 75	100 x 50	100 x 75	100 x 100	150 x 50	150 x 75	150 x 100	150 x 150	200 x 50
Order Code					TSP4	TSP4	TSP4	TSP6	TSP6	TSP6	TSP6	TSP8
Size	200 x 100	225 x 50	225 x 75	225 x 100	225 x 150	225 x 225	300 x 50	300 x 75	300 x 100	300 x 150	300 x 225	300 x 300
Order Code	TSP8	TSP9	TSP9	TSP9	TSP9	TSP12	TSP12	TSP12	TSP12	TSP12	TSP12	TSP12

When ordering with screw lid fixing add suffix **/C** to standard catalogue number - for example TSP4/C

When ordering with white powder coating add suffix **/W** to standard catalogue number - for example TSP4/W

TRUNKING LID

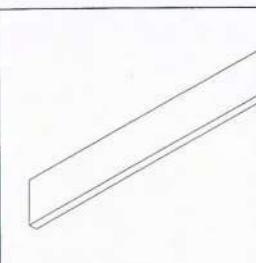


Size	50 x 25	50 x 50	75 x 50	75 x 75	100 x 50	100 x 75	100 x 100	150 x 50	150 x 75	150 x 100	150 x 150	200 x 50
Order Code	LID2	LID2	LID3	LID3	LID4	LID4	LID4	LID6	LID6	LID6	LID6	LID8
Size	200 x 100	225 x 50	225 x 75	225 x 100	225 x 150	225 x 225	300 x 50	300 x 75	300 x 100	300 x 150	300 x 225	300 x 300
Order Code	LID8	LID9	LID9	LID9	LID9	LID9	LID12	LID12	LID12	LID12	LID12	LID12

When ordering with screw lid fixing add suffix **/C** to standard catalogue number - for example LID2/C

When ordering with white powder coating add suffix **/W** to standard catalogue number - for example LID2/W

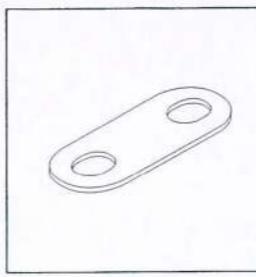
LOOSE DIVIDER



Size	50 x 25	50 x 50	75 x 50	75 x 75	100 x 50	100 x 75	100 x 100	150 x 50	150 x 75	150 x 100	150 x 150	200 x 50
Order Code	DIV21	DIV22	DIV32	DIV33	DIV42	DIV43	DIV44	DIV62	DIV63	DIV64	DIV66	DIV82
Size	200 x 100	225 x 50	225 x 75	225 x 100	225 x 150	225 x 225	300 x 50	300 x 75	300 x 100	300 x 150	300 x 225	300 x 300
Order Code	DIV84	DIV92	DIV93	DIV94	DIV96	DIV99	DIV122	DIV123	DIV124	DIV126	DIV129	DIV1212

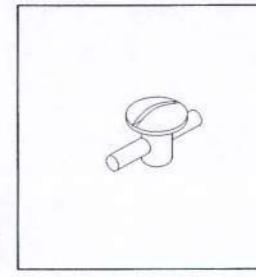
arena SURFACE CABLE TRUNKING

EARTH LINK



One Size Only
Order Code EL

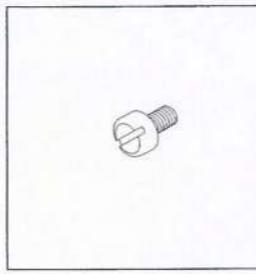
TURNBUCKLE FASTENER



Size	50 x 50	75 x 50 - 300 x 300
Order Code	LTL	LTL LTS

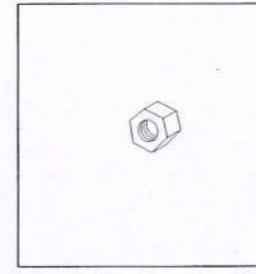
When ordering with white powder coating add suffix **/W** to standard catalogue number - for example LTL/W

M5 SCREWS



One Size Only
Order Code M5S

M5 NUTS



One Size Only
Order Code M5N

TECHNICAL INSTALLATION INFORMATION - Selecting Trunking Size

Selecting Trunking Size

To determine the required trunking size, multiply the number of each size of conductor by the factor appropriate to their size as given in Table A, sum the results for all conductors and select the trunking by comparing this sum with the maximum capacity units given in Table B.

This method is based on theoretical calculation and is useful as a general guide.

Other factors such as whether cables will cross or whether future changes will require the trunking to accept additional cabling must be taken into account into in selection.

Table A	
Cable Size mm ²	Factor* Copper or Aluminum
1.0	8.1
1.5	9.1
2.5	11.4
4.0	16.6
6.0	21.3
10.0	33.1
16.0	45.5
25.0	68.0
35.0	90.0
50.0	123.1
70.0	158.0
95.0	214.0

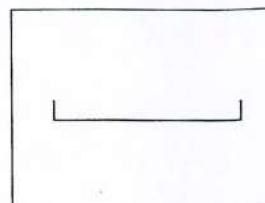
* 600 - 1000 P.V.C. Metric Cable
based on metric data to
BS6004:1969.

Table A	
Trunking Size mm	Capacity Units
50 x 50	1080
75 x 50	1620
75 x 75	2450
100 x 50	2170

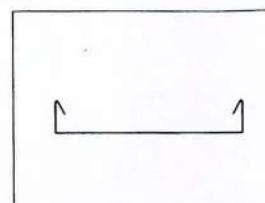
DESCRIPTION

A comprehensive range of high quality light duty, medium duty return flange and heavy duty return flange cable tray and accessories with standard profiles as shown.

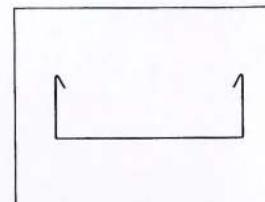
The standard length is 3 metres with tray widths varying from 50mm to 900mm.

Light Duty Tray

The height on the Light Duty Tray is 15mm as standard.

Medium Duty Tray

The height on the Medium Duty Tray is 25mm as standard.

Heavy Duty Tray

The height on the Heavy Duty Tray is 50mm as standard.

STANDARD SPECIFICATION**Material**

Hot dipped galvanised sheet steel to
BS EN10142:1991. Fe P02G Z275NAC. BS EN10143:1993.

Finish

Self colour galvanise to Fe P02G Z275NAC.

Quality

Complies with the Arena Quality Assurance Policy
BS Certificate No FM 13948.

ALTERNATIVE SPECIFICATIONS**Finish**

Post galvanising to BS729 : 1971 (using a base material of cold reduced mild steel).

Stainless steel to BS1449 : Part 2: 1983 Type 304 or 316.

Epoxy polyester powder coat in a variety of colours.

ORDERING INFORMATION

When ordering, specify the type of tray, ie light, medium or heavy duty, and the width required.
The gauge of the metal is shown in the following tables.

Please note:

Couplers and fixing screws and nuts are not provided as standard and should always be ordered separately. The only exception to this rule are reducers which are supplied with their own couplers.

When ordering with Post Galvanised Finish:

Add suffix /G to standard catalogue number - for example LD2/G

When ordering with Powder Coat Finish:

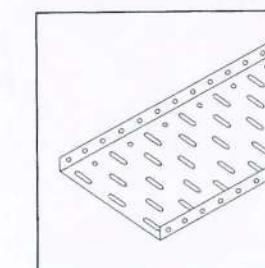
Add suffix /P and add BS or RAL number to standard catalogue number - for example LD2/P: RAL9010

When ordering in Stainless Steel:

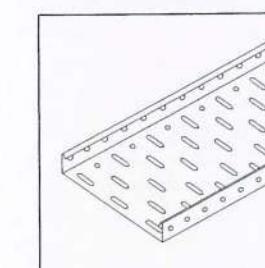
Add suffix /SS304 or /SS316 to standard catalogue number - for example LD2/SS304

When ordering with a Plastic Finish:

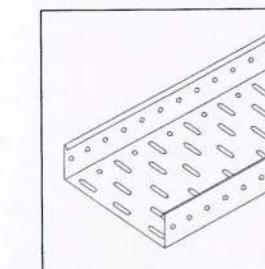
Add suffix /N to standard catalogue number - for example LD2/N

LIGHT DUTY TRAY

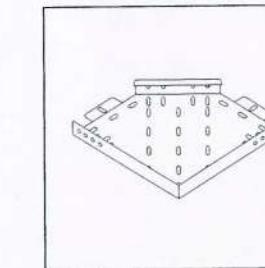
Size	50mm	75mm	100mm	150mm	225mm	300mm	450mm	600mm	750mm	900mm
Gauge	1.0mm	1.0mm	1.0mm	1.0mm	1.5mm	1.5mm	1.5mm	2.0mm	2.0mm	2.0mm
Order Code	LD2	LD3	LD4	LD6	LD9	LD12	LD18	LD24	LD30	LD36

MEDIUM DUTY TRAY

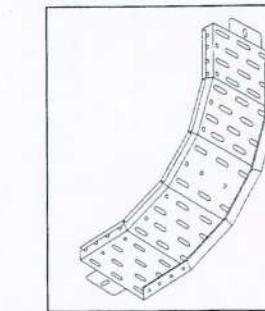
Size	50mm	75mm	100mm	150mm	225mm	300mm	450mm	600mm	750mm	900mm
Gauge	1.0mm	1.0mm	1.0mm	1.0mm	1.5mm	1.5mm	1.5mm	2.0mm	2.0mm	2.0mm
Order Code	MD2	MD3	MD4	MD6	MD9	MD12	MD18	MD24	MD30	MD36

HEAVY DUTY TRAY

Size	50mm	75mm	100mm	150mm	225mm	300mm	450mm	600mm	750mm	900mm
Gauge	1.0mm	1.0mm	1.0mm	1.0mm	1.5mm	1.5mm	1.5mm	2.0mm	2.0mm	2.0mm
Order Code	HD2	HD3	HD4	HD6	HD9	HD12	HD18	HD24	HD30	HD36

FLAT BEND 90°

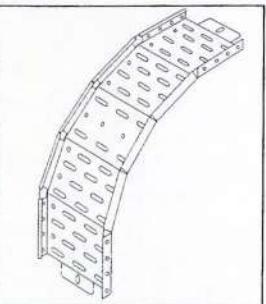
Size	50mm	75mm	100mm	150mm	225mm	300mm	450mm	600mm	750mm	900mm
Light Duty	LDB2	LDB3	LDB4	LDB6	LDB9	LDB12	LDB18	LDB24	LDB30	LDB36
Medium Duty	MDB2	MDB3	MDB4	MDB6	MDB9	MDB12	MDB18	MDB24	MDB30	MDB36
Heavy Duty	HDB2	HDB3	HDB4	HDB6	HDB9	HDB12	HDB18	HDB24	HDB30	HDB36

INSIDE BEND

Size	50mm	75mm	100mm	150mm	225mm	300mm	450mm	600mm	750mm	900mm
Light Duty	LDI2	LDI3	LDI4	LDI6	LDI9	LDI12	LDI18	LDI24	LDI30	LDI36
Medium Duty	MDI2	MDI3	MDI4	MDI6	MDI9	MDI12	MDI18	MDI24	MDI30	MDI36
Heavy Duty	HDI2	HDI3	HDI4	HDI6	HDI9	HDI12	HDI18	HDI24	HDI30	HDI36

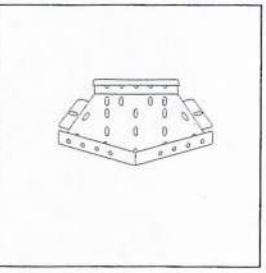
arena CABLE TRAY

OUTSIDE BEND



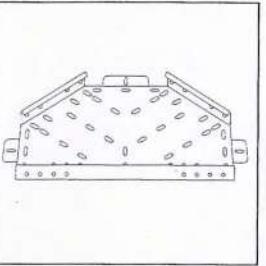
Size	50mm	75mm	100mm	150mm	225mm	300mm	450mm	600mm	750mm	900mm
Light Duty	LDO2	LDO3	LDO4	LDO6	LDO9	LDO12	LDO18	LDO24	LDO30	LDO36
Medium Duty	MDO2	MDO3	MDO4	MDO6	MDO9	MDO12	MDO18	MDO24	MDO30	MDO36
Heavy Duty	HDO2	HDO3	HDO4	HDO6	HDO9	HDO12	HDO18	HDO24	HDO30	HDO36

FLAT BEND 45°



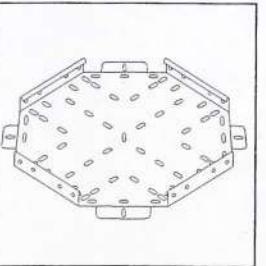
Size	50mm	75mm	100mm	150mm	225mm	300mm	450mm	600mm	750mm	900mm
Light Duty	LDF2	LDF3	LDF4	LDF6	LDF9	LDF12	LDF18	LDF24	LDF30	LDF36
Medium Duty	MDF2	MDF3	MDF4	MDF6	MDF9	MDF12	MDF18	MDF24	MDF30	MDF36
Heavy Duty	HDF2	HDF3	HDF4	HDF6	HDF9	HDF12	HDF18	HDF24	HDF30	HDF36

TEE



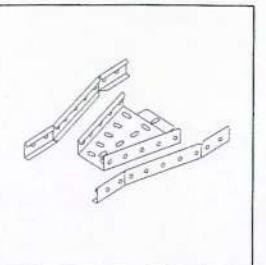
Size	50mm	75mm	100mm	150mm	225mm	300mm	450mm	600mm	750mm	900mm
Light Duty	LDT2	LDT3	LDT4	LDT6	LDT9	LDT12	LDT18	LDT24	LDT30	LDT36
Medium Duty	MDT2	MDT3	MDT4	MDT6	MDT9	MDT12	MDT18	MDT24	MDT30	MDT36
Heavy Duty	HDT2	HDT3	HDT4	HDT6	HDT9	HDT12	HDT18	HDT24	HDT30	HDT36

INTERSECTION



Size	50mm	75mm	100mm	150mm	225mm	300mm	450mm	600mm	750mm	900mm
Light Duty	LDN2	LDN3	LDN4	LDN6	LDN9	LDN12	LDN18	LDN24	LDN30	LDN36
Medium Duty	MDN2	MDN3	MDN4	MDN6	MDN9	MDN12	MDN18	MDN24	MDN30	MDN36
Heavy Duty	HDN2	HDN3	HDN4	HDN6	HDN9	HDN12	HDN18	HDN24	HDN30	HDN36

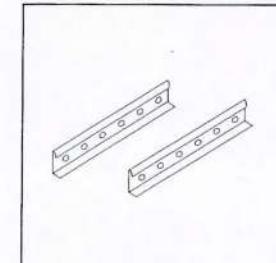
REDUCER - including couplers



Size	50mm	75mm	100mm	150mm	225mm	300mm	450mm	600mm	750mm	900mm
Light Duty	LDR2	LDR3	LDR4	LDR6	LDR9	LDR12	LDR18	LDR24	LDR30	LDR36
Medium Duty	MDR2	MDR3	MDR4	MDR6	MDR9	MDR12	MDR18	MDR24	MDR30	MDR36
Heavy Duty	HDR2	HDR3	HDR4	HDR6	HDR9	HDR12	HDR18	HDR24	HDR30	HDR36

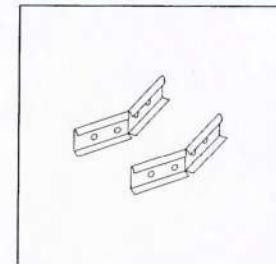
arena CABLE TRAY

COUPLER STRAIGHT (PER PAIR)



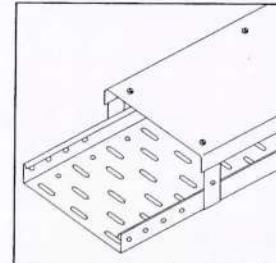
Size	50mm	75mm	100mm	150mm	225mm	300mm	450mm	600mm	750mm	900mm
Light Duty	LDCS	LDCS	LDCS	LDCS	LDCS	LDCS	LDCS	LDCS	LDCS	LDCS
Medium Duty	MDCS	MDCS	MDCS	MDCS	MDCS	MDCS	MDCS	MDCS	MDCS	MDCS
Heavy Duty	HDCS	HDCS	HDCS	HDCS	HDCS	HDCS	HDCS	HDCS	HDCS	HDCS

COUPLER ANGLED (PER PAIR)



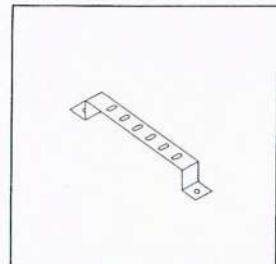
Size	50mm	75mm	100mm	150mm	225mm	300mm	450mm	600mm	750mm	900mm
Light Duty	LDACS									
Medium Duty	MDACS									
Heavy Duty	HDACS									

VENTILATED LID



Size	50mm	75mm	100mm	150mm	225mm	300mm	450mm	600mm	750mm	900mm
Light Duty	LVLID2	LVLID3	LVLID4	LVLID6	LVLID9	LVLID12	LVLID18	LVLID24	LVLID30	LVLID36
Medium Duty	MVLID2	MVLID3	MVLID4	MVLID6	MVLID9	MVLID12	MVLID18	MVLID24	MVLID30	MVLID36
Heavy Duty	HVLID2	HVLID3	HVLID4	HVLID6	HVLID9	HVLID12	HVLID18	HVLID24	HVLID30	HVLID36

STAND - OFF BRACKET



Size	50mm	75mm	100mm	150mm	225mm	300mm	450mm	600mm	750mm	900mm
Order Code	SOB2	SOB3</								

arena

CABLE TRAY

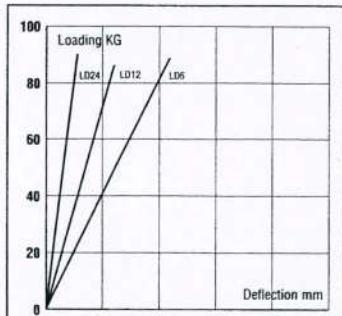
TECHNICAL INSTALLATION INFORMATION

Deflection under uniformly distributed load.

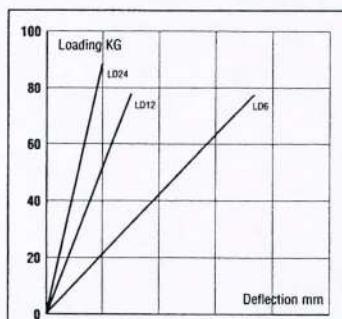
Deflections were measured using a number of lengths of tray coupled together and comprising at least four spans. A uniformly distributed load was applied and the deflection measured at the mid-point of the middle spans. The information given should be taken as a guide only.

However, if the structural stability of the tray run is a particular concern, more detailed data can be made available.

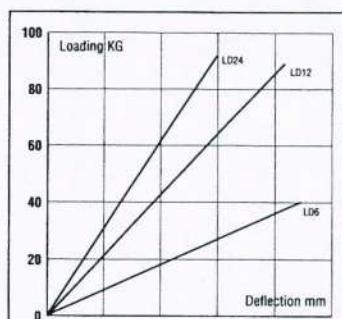
LIGHT DUTY TRAY - DEFLECTION UNDER UNIFORMLY DISTRIBUTED LOAD



Span - 1 metre

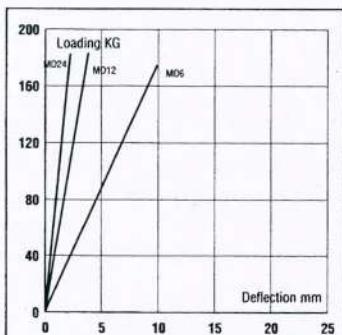


Span - 1.5 metres

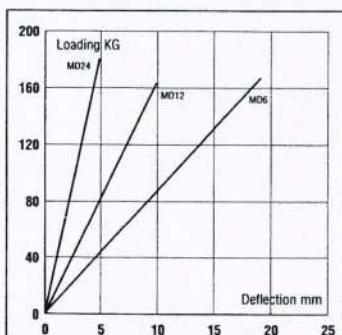


Span - 2 metres

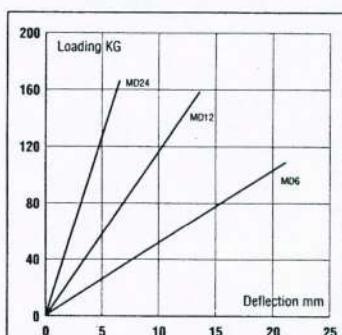
MEDIUM DUTY TRAY - DEFLECTION UNDER UNIFORMLY DISTRIBUTED LOAD



Span - 1 metre

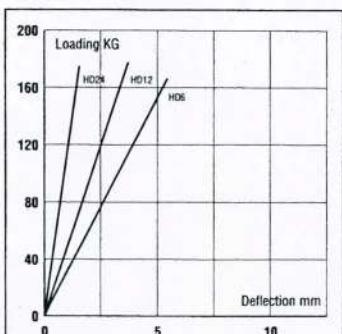


Span - 1.5 metres

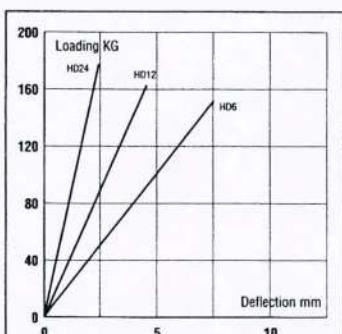


Span - 2 metres

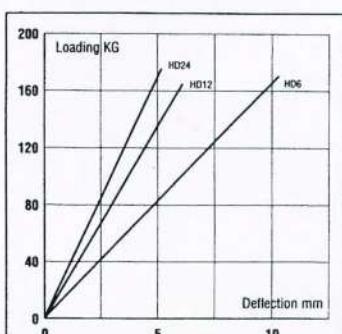
HEAVY DUTY TRAY - DEFLECTION UNDER UNIFORMLY DISTRIBUTED LOAD



Span - 1 metre



Span - 1.5 metres



Span - 2 metres

USER'S INSTRUCTIONS

**MICS
PROGRESS
A400-A500**

© Publication : ref G.P.A.O.33502003001

**GROUPES ÉLECTROGÈNES - GENERATING SETS
GRUPOS ELECTROGENOS - GERADORES ELÉCTRICOS
STROMERZEUGER - GRUPPI ELETTOGENI - GENERATORANLÆG
DIESEL-GENERATORAGGREGAT - AGGREGATER - AGGREGATEN
DIESELAGGREGAATIT - RAFSTÖÐVAR - ԱՅԵԿՈՐԴՄԱՆ ԸՐՅՈՒԹԻՒՆ**

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Administrateur : Sce Doc.

SAFETY SYMBOLS



Caution : danger



Caution : risk of electric shock



Caution : toxic materials



Caution : under pressure fluids



Caution : high temperature
(risk of burns)



Caution : rotating or moving parts
(risk of entanglement)



Caution : risk of corrosion



Caution : risk of explosion



Authorised staff only



Publications supplied with the generating set must be consulted.



Protective clothing must be worn



Eyes and ears must be protected



Periodic maintenance required



Battery charge check required



Compulsory lifting point



Compulsory stacking point



Naked flame and unprotected lighting forbidden.
No smoking



Water based fire extinguishers forbidden

APPLICATION OF MACHINERY DIRECTIVE 89/392/EEC TO GENERATING SETS

- Access strictly reserved to staff authorised under the legislation in force.
- Live installation, automatic start-up possible.



This equipment has been configured for a specific application. It is forbidden to modify the system configuration without written consent from a person authorised by our company. In the event of not respecting this procedure, our company disclaims all responsibility on the consequences that could result from such action..

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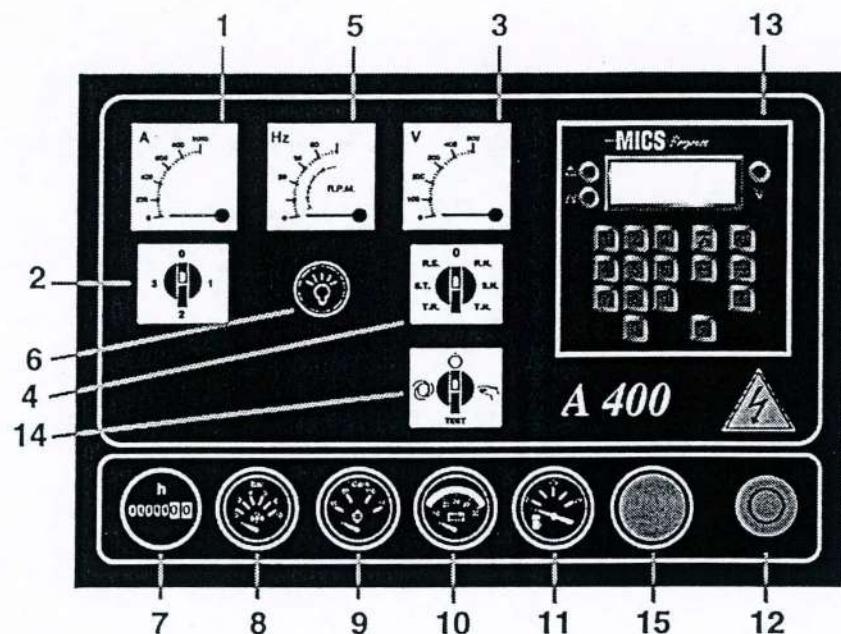
Design and production : Publication Department

from the following documents :

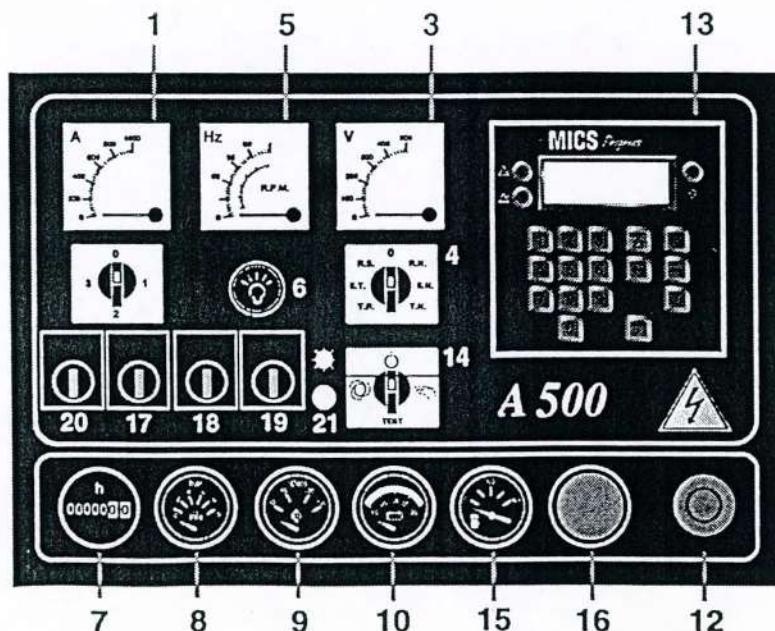
Generating sets manufacturer's source documents + Electrical Design Office documentation

Progress can be factory configured in several ways.
Any further changes will have to be submitted to our company prior consent.

CONTROL EQUIPMENT

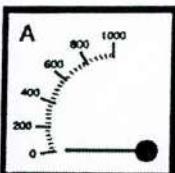


- | | |
|------------------------------|--|
| 1. Ammeter | 12. Emergency stop button (remote in Version IV & V) |
| 2. Ammeter switch | 13. MICS Progress |
| 3. Voltmeter | 14. 4-position function switch |
| 4. Voltmeter switch | 15. Oil temperature gauge |
| 5. Frequency/RPM meter | 16. Battery ammeter gauge |
| 6. Front lighting | 17. Shutdown extractor light |
| 7. Hours counter | 18. MDEC synthesis alarm light |
| 8. Oil pressure gauge | 19. Lack of water preheating light |
| 9. Coolant temperature gauge | 20. Retention tank warning light |
| 10. Battery voltage gauge | 21. Test lamps push button |
| 11. Fuel level gauge | |



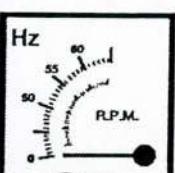
A - DESCRIPTION

The control racks are fitted with various standard or optional instruments and gauges. Depending on the options selected, the positioning of these instruments on the front may vary. The figures below define their functions



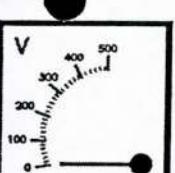
- AMMETER :

Shows the current, in Amps, on one phase.



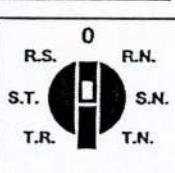
- FREQUENCY/RPM METER :

Shows the frequency, in Hz, delivered by the genset as well as the engine speed, in RPM.



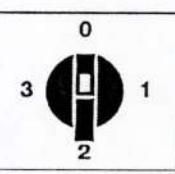
- VOLTMETER :

Shows the voltage, in Volts, supplied by the generating set.



- VOLTMETER SWITCH :

Various positions giving, on the voltmeter, phase/phase or phase/neutral voltage readings.



- CAMMETER SWITCH :

Various positions giving, on the ammeter, readings of current supplied by each phase.



- FUNCTION SELECTOR SWITCH :

This switch has 4 positions :

OFF : In this position, the genset does not start in the event of mains failure.

ON : This operating mode is used to check the proper off load operation of the genset

“TEST” : For test purposes, this operating mode enables you to check the automatic start-up facility as it simulates a mains failure. The genset starts automatically and delivers power to the installation.

 : In this mode, the genset is ready to start on a mains failure or external command. The start-up is interlocked with a time delay that avoids any start-up should the mains failure last for less than a few seconds.

NOTE : On positions  (during mains failures),  and "TEST", the gauges and battery voltmeter are powered up and indicate the state of the various components under control. Also, the power supply indicator lamp is lit during start-up.



- OIL PRESSURE GAUGE :

Indicates the amount of oil pressure in the engine lubricating system.



- ENGINE TEMPERATURE GAUGE :

Indicates the coolant temperature in the engine.



- BATTERY VOLTMETER :

Indicates the voltage, in Volts, of the starting battery(ies).



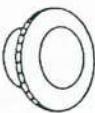
- FUEL LEVEL GAUGE :

Indicates the amount of fuel in the tank.



- HOURS COUNTER :

This totals the genset running hours as soon as it starts.



- EMERGENCY STOP BUTTON :

To be pushed in the event of an accident or problem, it will immediately stop the generating set from functioning. It must be reset when the genset is returned to service.

 : Push/pull or push/twist release type.



- RACK LIGHTING

It will light the front of the rack as soon as the genset starts.

- MICS PROGRESS



This is the A 400 main component.
It ensures the following :

- Automatic start-up and shutdown of the genset,
- Control of the engine main safety devices.

It also ensures :

- Automatic synchronisation function : genset/genset or genset/mains,
- Paralleling function : genset/genset or genset/mains,
- Load distribution function between gensets.

- SCREEN



The screen allows you to view :

- all alarms and faults,
- the genset operating states,
- various parameters which can be modified (with access code).

- KEYPAD



The keypad ensures modification of the following :

- delays,
- set-up thresholds,
- genset general parameters (basics)
- access to the various configuration screens (checks, control, set-up).



- RESET :

Pressing this key will erase the message indicating a fault.



- STOP :

Pressing this key will immediately shut down the generating set and will light the fault lamp. Restarting the genset will not be possible until the fault has been RESET.



- ARROWS :

In a window, the Left and Right arrows enable access to the various options offered (see next page for list of screens).



- ESCAPE :

Pressing this key enables access to the higher level screen (see next page for list of screens).



- ENTER :

Pressing this key enables :
1 - Access to the value of a parameter,
2 - Validation of a command or the value of a modified parameter.



- GREEN LED :

Signals that the Progress is powered up (green flashing).



- ORANGE LED :

Signals an alarm (orange blinking).



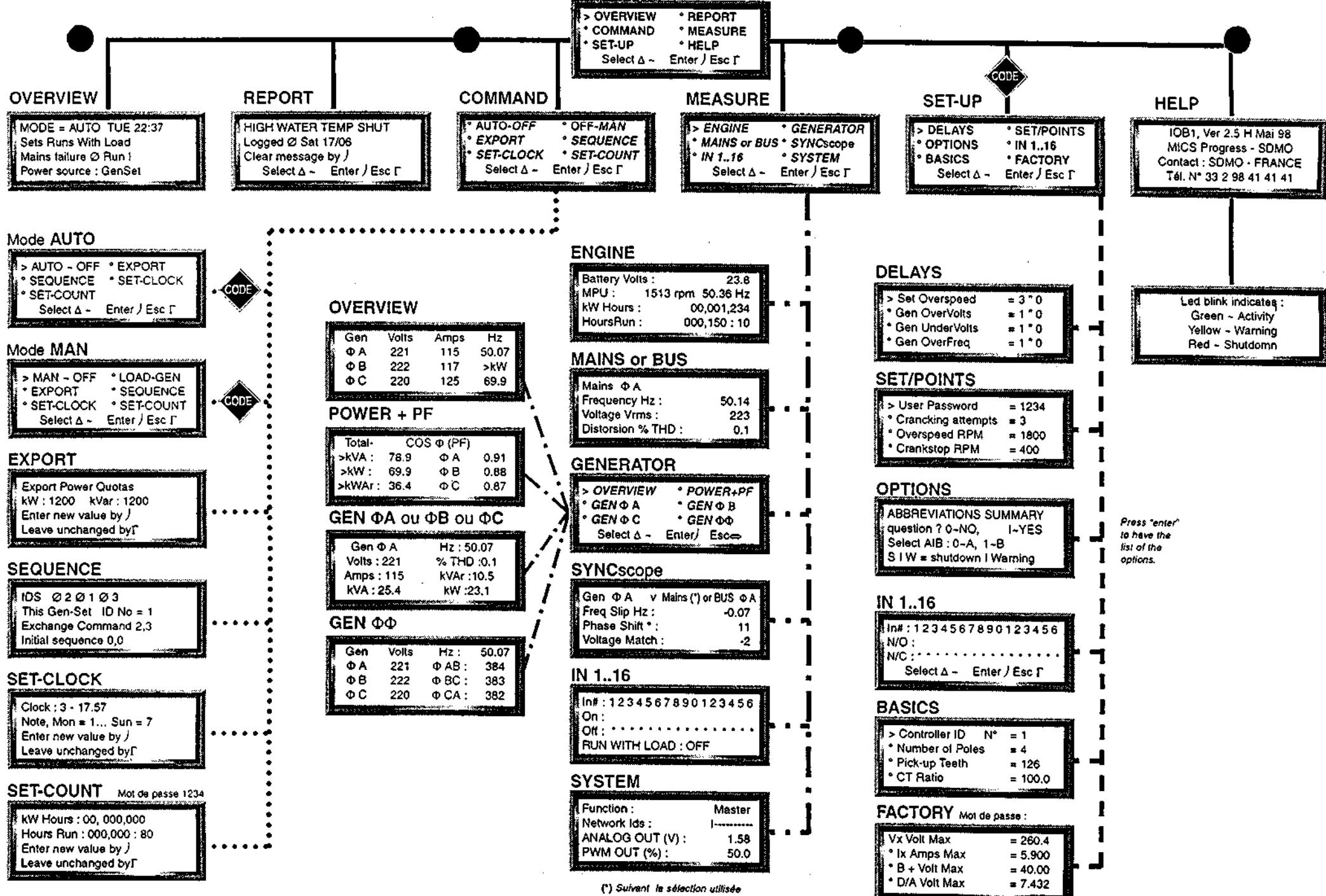
- RED LED :

Signals a fault (red blinking).

Perform the initial commissioning of the battery(ies) 20 minutes before any start-up attempts (see Maintenance Manual).

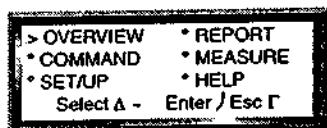


Minimum voltage : 8 V for a 12 V battery
18 V for a 24 V battery



B – DESCRIPTION OF DISPLAY PANELS

I – GENERAL PANEL :



- The option selected is indicated by the cursor >
- Use the arrows ▲ ▼ to select the option required
- Press Enter ↴ to call the selected option
- Press Esc ⌂ to return to the higher level menu. (main menu?)

OVERVIEW

MODE = AUTO TUE 22:37
Sets Runs With Load
Mains failure Ø Run !
Power source : GenSet

Press "Esc" to return to the higher level menu

REPORT

HIGH WATER TEMP SHUT
Logged Ø Sat 17/06
Clear message by /
Select Δ - Enter / Esc Γ

Press "Esc" to return to the higher level menu

COMMANDES

> AUTO-OFF • OFF-MAN
• EXPORT • SEQUENCE
• SET-CLOCK • SET-COUNT
Select Δ - Enter / Esc Γ

Press "Esc" to return to the higher level menu

Mode MANuel

CODE
> MAN - OFF • LOAD-GEN
• EXPORT • SEQUENCE
• SET-CLOCK • SET-COUNT
Select Δ - Enter / Esc Γ

Press "Esc" to return to the higher level menu

OVERVIEW

This panel indicates the Progress operating mode and also enables you to know which state the genset is in.

Example : mains failure, genset start-up – speed stabilisation – voltage – synchronisation – load transfer – Shut down, cooling,

...

REPORT

This panel displays the various messages (alarms and faults) recorded with their associated time. A maximum of 8 messages can be recorded and viewed.

COMMAND

When the letters "OFF" are placed in front of "AUTO" and "MAN", the Progress is stopped.

In the example, the Progress is in "AUTO" mode.

- MANual mode

Selecting "OFF - MAN" (see previous screen) enables you to go to "MAN - OFF" mode. The genset starts immediately regardless of the position of the 4-position function switch.

Pressing "Enter" enables you to go from MAN → OFF to "OFF ~ MAN" and shuts down the genset after a cooling period..

Load-GEN

This function enables the genset to take the load.

The user password is required. It leads to the automatic closure of the contactor. The message "OFF-LOAD" then appears.

OFF-LOAD

This function has the effect of opening the contactor.



AUTOmatic Mode

> AUTO - OFF * EXPORT
• SEQUENCE * SET-CLOCK
• SET-COUNT
Select Δ - Enter / Esc Γ

Press "Esc" to return to the higher level menu



- AUTOMATIC MODE

When the password has been entered, the generating set :

- Starts immediately if the 4-position function switch is placed in
and if the mains is not available (information V4) (after lack of mains has been confirmed).

(○)- Starts immediately if the 4-position function switch is placed in
and if an external command activates input In#1.

- Starts immediately if the 4-position function switch is placed in "TEST".

Validating the command "AUTO - OFF", after the password has been entered, shuts down the genset after a cooling down period and makes the message go from AUTO ~ OFF to OFF ~ AUTO (shut down).

The 4-position switch is operative only if the Progress is in AUTO mode.

EXPORT

Export Power Quotas
KW : 1200 kVar : 1200
Enter new value by ↗
Leave unchanged by ↘

Password 1234
Press "Esc" to return to the higher level menu



- EXPORT

This screen can only be accessed in configurations #4, #5 and #6 (connection to mains network). If the genset has not been configured for these applications, the following message appears: "NOT APPLICABLE".

(The entry of the 2 values, in kW and kVA, must be compatible with the values of the genset power, in kW and kVA). See REGLAGES BASE.

These 2 values define the power quotas exported by the genset to the mains or installation (configuration function).

SEQUENCE

IDS Ø 2 Ø 1 Ø 3
This Gen-Set ID No = 1
Exchange Command 2,3
Initial sequence 0,0

Press "Esc" to return to the higher level menu



- SEQUENCE

This function applies to the MICS Progress in configuration #3 (production station, no mains) and when option "Parall auto start" is selected.

It enables the order in which the gensets must start to be displayed and modified.

The first line indicates the starting sequence.

example : Genset No 2, then Genset No 1, then Genset No 3.

The second line indicates the MICS Progress No on which the display is made.

The third line is used for any possible change of sequence.

example : 2,3 enables to get sequence 3'1'2 from sequence 2'1'3.

The fourth line provides aid during sequence changes.

SET-HEURE

Clock : 3 - 17.57
Note, Mon = 1... Sun = 7
Enter new value by ↗
Leave unchanged by ↘

Press "Esc" to return to the higher level menu



- SET-HEURE

Time is not stored. It is therefore necessary to set the clock (hour and day) when the MICS Progress is powered up in order to get the messages time stamped.

SET-COMPTE

1 kW Hours : 00,000,000
 Hours Run : 000,000 : 80
 Enter new value by ↴
 Leave unchanged by ←

Press "Esc" to return to the higher level menu

The first digit indicates the day (from 1 to 7). The next four digits indicate the time (**Caution** : AM and PM are never displayed).

- SET-COMPTE

This function is used to change the kW Hours and Hours Run counters. The password must be entered to modify the values displayed.

MEASURE

• ENGINE • GENERATOR
 • MAINS • SYNCscope
 • IN 1..16 • SYSTEM
 Select Δ - Enter ↴ Esc ←

Press "Esc" to return to the higher level menu

MEASURE

Main panel enabling viewing of the various possible readings on the engine, alternator, mains or bus, synchronisation, logic status of the various I/O, signal level on speed and voltage regulation outputs.

ENGINE

Battery Volts :	23.8
MPU :	1513 rpm 50.36 Hz
kW Hours :	00,001,234
HoursRun :	000,150 : 10

Press "Esc" to return to the higher level menu

- ENGINE- This screen indicates :

- Battery voltage, 40V maximum,
- Engine speed in RPM and frequency in Hz,
- Energy supplied in kWh (stored),
- Genset Hours Run (stored)

MAINS or BUS

Mains Φ A	Frequency Hz :	50.14
Voltage Vrms :		223
Distortion % THD :		0.1

Press "Esc" to return to the higher level menu

- MAINS or BUS – This screen indicates:

- Frequency in Hz (*),
- Phase/neutral voltage in Volts (*),
- Total harmonic distortion % (*).

(* depending on the value of {mains control INS = 0 or 1}, the values measured come from the mains or bus.

GENERATOR

• OVERVIEW • POWER+PF
 • GEN Φ A • GEN Φ B
 • GEN Φ C • GEN Φ D
 Select Δ - Enter ↴ Esc ←

Press "Esc" to return to the higher level menu

- GENERATOR

Main panel to view the electric variables relating to the alternator.

OVERVIEW

Gen	Volts	Amps	Hz
Φ A	221	115	50.07
Φ B	222	117	>kW
Φ C	220	125	69.9

Press "Esc" to return to the higher level menu

OVERVIEW

This screen indicates :

- Phase/neutral effective voltage and current for Phase A,
- Phase/neutral effective voltage and current for Phase B,
- Phase/neutral effective voltage and current for Phase C,
- Frequency in Hz, total active power.

POWER + PF

Total	COS Φ (PF)
>kVA : 78.9	Φ A 0.91
>kW : 69.9	Φ B 0.88
>kWAr : 36.4	Φ C 0.87

POWER + PF

This screen indicates :

- Total apparent power in kVA,
- Total active power in kW,
- Total reactive power in kVar,
- Power factor on each phase (A, B and C).

GEN φA ou φB ou φC

Gen φ A	Hz : 50.07
Volts : 221	% THD : 0.1
Amps : 115	KVar : 10.5
kVA : 25.4	kW : 23.1

Press "Esc" to return to the higher level menu

GEN φA ou φB ou φC

This screen indicates for Phase A :

- Frequency in Hz,
- Effective voltage in Volts,
- Total harmonic distortion in %,
- Total active power in kW,
- Reactive power in KVar,
- Apparent power in kVA.

Note: it is possible to view the screens for phases B and C (from screen GENERATOR)

GEN φφ

Gen	Volts	Hz :	50.07
Φ A	221	Φ AB :	384
Φ B	222	Φ BC :	383
Φ C	220	Φ CA :	382

Press "Esc" to return to the higher level menu

GEN φφ

This screen indicates for the three phases :

- Phase A/neutral effective voltage in Volts,
- Phase B/neutral effective voltage in Volts,
- Phase C/neutral effective voltage in Volts,
- Phases A/B, B/C and C/A effective voltages in Volts.

SYNCSCOPE

Gen φ A v Mains φ A
Freq Slip Hz : -0.07
Phase Shift * : 11
Voltage Match : -2

Press "Esc" to return to the higher level menu

SYNCSCOPE

This screen gives information on the synchronisation status between the genset between the genset and the bus or the genset and the mains.

- Voltage match : V1 – V4 (Volts) (line 4),
- Phase shift between these 2 voltages, in degrees (line 3),
- Frequency slip: frequency V1 – frequency V4 (line 2).

IN 1..16

Int# : 1234567890123456
On :
Off : -----
RUN WITH LOAD : OFF

Press "Esc" to return to the higher level menu

IN 1..16

This screen enables the status of each Progress logic input to be viewed.

The cursor on the first line indicates the input title.

BASICS

Function :	Master
Network Ids :	-----
ANALOG OUT (V) :	1.58
PWM OUT (%) :	50.0

Press "Esc" to return to the higher level menu

BASICS

This screen indicates whether the Progress concerned is "master" or "slave". It also indicates the controller No (when there are several networked Progresses) and the values for the speed and voltage regulation outputs.



CODE

SET UP

> DELAYS	* SET/POINTS
* OPTIONS	* IN 1..16
* BASICS	* FACTORY
Select Δ ~	Enter ↴ Esc ↵

Press "Esc" to return to the higher level menu

DELAIS

> Set Overspeed = 3 * 0
* Gen OverVolts = 1 * 0
* Gen OverVolts = 1 * 0
* Gen OverVolts = 1 * 0

Press "Esc" to return to the higher level menu

SETPOINTS

> User Password = 1
* Cranking attempts = 3
* Overspeed RPM = 1650
* Crankstop RPM = 600

Press "Esc" to return to the higher level menu

OPTIONS

ABBREVIATIONS SUMMARY
question ? 0-NO, 1-YES
Select AIB : 0-A, 1-B

S I W = shutdown | Warning

Press "Esc" to return to the higher level menu

IN 1..16

Inf : 1234567890123456
N/O :
N/C : -----
Select Δ ~ Toggle) Esc ↵

Press "Esc" to return to the higher level menu

BASICS

> Controller ID N° = 1
* Number of Poles = 4
* Pick-up Teeth = 126
* CT Ratio = 100.0

Press "Esc" to return to the higher level menu

FACTORY

Vx Volt Max = 260.4
* Ix Amps Max = 5.900
* B + Volt Max = 40.00
* D/A Volt Max = 7.432

Press "Esc" to return to the higher level menu

SET/UP

This screen shows all adjustable parameters, enabling Progress to operate properly.

- DELAIS

This screen enables you to view and possibly modify the various delays taken into account by Progress.
To scroll through, use the arrows ▲ and ▼. To modify, use □ and the keypad.

- SETPOINTS

This screen enables you to view and possibly modify the various set-points taken into account by Progress.
To scroll through, use the arrows ▲ and ▼. To modify, use □ and the keypad.

- OPTIONS

This screen enables you to view and possibly modify the various options offered by Progress.
An intermediate screen explains the various possible choices and their abbreviations.
To scroll through the various options, press □ and use the arrows ▲ and ▼.

- IN 1..16

This screen enables you to change the logic status of the 16 inputs :

- normally open N/O
- normally closed N/C

- BASICS

This screen enables you to view and possibly modify the general parameters.

To scroll through, use the arrows ▲ and ▼. To modify, use □ and the keypad.

- FACTORY

This screen is available only after entry of the factory code. It defines the factory-set parameters.

HELP

IOB1, Ver 2.5 H Mai 98
 MICS Progress - SDMO
 Contact : SDMO - FRANCE
 Tél. N° 33 2 98 41 41 41

HELP

This screen indicates the type of I/O interface that is connected to Progress, the software version used and a telephone number in the event of an operating problem.

Press  to bring up the meaning of the LEDs on the front panel.

Led blink indicates :
 Green ~ Activity
 Yellow ~ Warning
 Red ~ Shutdown

Special push-button
 STOP - Shutdown set
 RESET - Stop alarm
 RESET - Clear fault

Press this key again and you will get to this screen which gives the function of buttons  and .

SHORTCUTS :

To quickly access some menus, the 10 keys on the keypad, from version 2.5f, can be used if the system is not being used for set-ups.

KEY	DESCRIPTION
0	General panel for generator (voltage, current, frequency for the 3 phases)
1	Direct access to screen "REPORT" to view faults and alarms.
2	Direct access to screen "OVERVIEW" giving single voltage and current for each phase as well as frequency and total active power.
3	Direct access to screen "GEN ΦΦ" giving the 3 single voltages, the 3 phase-to-phase voltages and frequency.
4	Direct access to screen "POWER + PF" giving total active, reactive, apparent powers and power factor on each phase.
5	Direct access to screen "MAINS or BUS" giving the bus or mains main parameters (depending on configuration chosen).
6	Direct access to screen "SYNCscope" giving information on the synchronisation status of the genset onto another genset or the mains.
7	Direct access to screen "SYSTEM" giving indications on Progress: master, slave, number as well as values of the speed and voltage analogue outputs.
8	Direct access to screen "ENGINE" giving the engine general parameters.
9	Direct access to screen "HELP" giving indications on the software version used and the type of I/O interface.

III - LIST OF PARAMETERS



The equipment has been configured for a specific application. It is forbidden to modify the system configuration without written consent of a person authorised by our company.
In the event of not respecting this procedure, our company disclaims all responsibility on the consequences that could result from such action.

A - DELAYS

Set Overspeed :

Overspeed delay.

GEN OverVolts :

Alternator overvoltage delay

GEN UnderVolts :

Alternator undervoltage delay

GEN OverFreq :

Alternator over frequency delay

GEN UnderFreq :

Alternator under frequency delay

G 2x OvCurr :

Delay assigned to the genset before overload triggering

G Revrse kW :

Delay assigned to the genset before triggering on an active reverse power

G Rvrs kVAR :

Delay assigned to the genset before triggering orse power

G Over % THD :

Delay assigned to the genset before triggering caused by a harmonic distortion rate higher than the set point.

SyncTimeout :

Delay assigned to the genset to synchronise on the mains or bus.

Sync Dwell Time :

Delay assigned to the parallel device to observe synchronisation, voltage equality, frequency equality and phase shift.

kw Surge Enable :

Not used.

Test Delay :

Time the genset runs in test mode.

V4 Volts Status :

Delay to observe bus or voltage stability depending on the voltage configuration on V4.

Standby On :

Delay after mains failure before the genset starts in automatic mode with (control INS = 1).

Stanby Off :

Delay after mains return before load is removed from genset, in automatic mode with (control INS = 1).

Eng Preglow :

Delay for preheating of air intake glow plug(s) before start-up.

Engine crank :

Time for starter to trigger (period of one attempt).

CrankFail Rest :

Time between two start-up attempts.

Set Stabil Max :

Maximum delay assigned to the genset from starter throw-out to complete stabilisation in speed and voltage.

GE stabil min :

Minimum delay assigned to the genset from starter throw-out to closing of genset power delivery.

Coolin Down :

Engine cooling delay after genset is delivering power.

Stoppin Max :

Time limit for closure of fuel solenoid to reach genset shut down conditions.

Alarm On Max :

Delay of R#3 relay activation (external audible alarm).

LubPump On :

Operating time of pre-lubricating pump.

LubPump Off :

Delay between 2 operations of the pre-lubricating pump..

LoadBreak >> Make :

ATS delay.

Contactor Delay :

Delay assigned to contactor between time of closure and return of information on Progress.

K # 7 On >> K # 8 On :

Use in configuration #3. Delay of closure which exists between commands K#7 and K#8 (outputs IOB1).

KW Quota ++ :

When Progress is in configuration #4 (mains paralleling) and In#16 not activated; time before the export quota in kW increases.

KW Quota - :

When Progress is in configuration #4 (mains paralleling) and In#16 not activated; time before the export quota in kW decreases.

kVAr Quota ++ :

When Progress is in configuration #4 (mains paralleling) and In#16 not activated; time before the export quota in kVAr increases.

kVAr Quota - :

When Progress is in configuration #4 (mains paralleling) and In#16 not activated; time before the export quota in kVAr decreases.

R # 1 Off >> On :

When option R#1 : Trip\kW Load is at 1, it is the time before relay #1 is excited.

R # 1 On >> Off :

When option R#1 : Trip\kW Load is at 1, it is the time before relay #1 is de-excited.

Parall Start :

When option Parall Auto Start is at 1, it is the delay assigned to the genset before its start-up on a load increase.

Parall Stop :

When option Parall Auto Start is at 1, it is the delay assigned to the genset before its shutdown on a load decrease.

LS Settling :

When option Parall Auto Start is at 1, it is the delay for 2 gensets to shut down after a significant decrease of load.

B - SET POINTS

User Password :

The user must enter a 4-digit password to change the operating mode or to change parameters.

Cranking Attempts :

Number of start-up attempts.

Overspeed RPM :

Overspeed threshold depending on the engine rating.

CrankStop RPM :

Threshold of starter throw out depending on the type of starter used.

Bat OvVoltage :

Threshold of battery overvoltage authorised.

Bat UnVoltage :

Threshold of battery undervoltage authorised.

GEN OvVoltage :

Threshold of overvoltage applied to phase/neutral voltage.

GEN UnVoltage :

Threshold of undervoltage applied to phase/neutral voltage.

GEN OvFrequen :

Threshold of alternator over-frequency authorised above the rated value.

GEN UnFrequency :

Threshold of alternator under-frequency authorised below the rated value.

GEN OvCurrent :

Threshold of alternator overload authorised above the rated value.

GEN Revrse kW :

Threshold of active reverse power authorised (1 phase value).

GEN Rvrs kVar :

Threshold of reactive reverse power authorised (1 phase value).

GEN over % THD :

Authorised threshold of total harmonic distortion.

V4 Ov Voltage :

Threshold of overvoltage on mains or bus side, applied to the phase/neutral voltage.

V4 Un Voltage :

Threshold of undervoltage on mains or bus side, applied to the phase/neutral voltage.

V4 Ov Frequen :

Threshold of over-frequency on mains or bus side which is authorised above the rated value.

V4 Un Frequen :

Threshold of under-frequency on mains or bus side which is authorised below the rated value.

Mains kW Surge :

Not used (to be set to a value higher than the genset power).

Bus kW Surge :

Reference analogue voltage for the rated speed.

Gov Volt Bias :

Phase shift authorised for the paralleling of V1 and V4 (V1 = genset phase 1 voltage – V4 = mains or bus phase 1 voltage).

SYNC Window V :

Voltage difference authorised for the paralleling of V1 and V4 (V1 = genset phase 1 voltage – V4 = mains or bus phase 1 voltage).

SYgain V/180° :

Value of off load synchronisation gain.

>> SYg V/180° :

Value of on load synchronisation gain.

SYstbl V/Hz :

Value of stability in off load synchronisation.

>> SYs V/Hz :

Value of stability in on load synchronisation.

SYgain %P/V :

Value of synchronisation gain in off load voltage.

>> SYg %P/V :

Value of synchronisation gain in on load voltage.

LSgain V/Xre :

Value of gain in distribution of active load.

LSstbl V/Xre :

Value of stability in distribution of active load.

LSgain % P/Xap :

Value of gain in distribution of reactive load.

LSstbl % P/Xap :

Value of stability in distribution of reactive load.

Ramp +kW/Sec :

Value in kW/sec which is imposed on the generator during load transfer phases from the mains to the genset or between gensets. Adjustment kW by kW is possible.

Ramp -kW/Sec :

Value in kW/sec which is imposed on the generator during load transfer phases from the genset to the mains or between gensets. Adjustment kW by kW is possible.

Ramp +kVAr/Sec :

Value in kVAr which is imposed on the generator during load transfer phases from the mains to the genset or between gensets. Adjustment kVAr by kVAr is possible.

Ramp -kVAr/Sec :

Value in kVAr which is imposed on the generator during load transfer phases from the genset to the mains or between gensets. Adjustment kVAr by kVAr is possible.

kW Quota ++ :

Value, on external request, of power in kW/sec which is imposed on the generator.

kW Quota -- :

Value, on external request, of power in kW/sec which is imposed on the generator.

In # 00 >> kW Quota ++ :

By replacing In#00 by 06, 08, 09 or 12, and if it has not been already allocated, the chosen input enables to make a dynamic check of the power (kW).

In # 00 >> kW Quota -- :

By replacing In#00 by 06, 08, 09 or 12, and if it has not been already allocated, the chosen input enables to make a dynamic check of the power (kW).

kVAr Quota ++ :

Value, on an external request, of power in kVAr/sec which is imposed on the generator.

kVAr Quota -- :

Value, on an external request, of power in kVAr/sec which is imposed on the generator.

In # 00 >> kVAr Quota ++ :

Replacing In#00 by 06, 08, 09 or 12, and if it has not already been allocated, the chosen input enables to make a dynamic check of the power (kVAr).

In # 00 >> kVAr Quota -- :

By replacing In#00 by 06, 08, 09 or 12, and if it has not already been allocated, the chosen input enables to make a dynamic check of the power (kVAr).

% kW / Xre >> R # 1 On :

Not used.

% kW / Xre >> R # 1 Off :

Not used.

+ % kW / Xre >> Start :

Value expressed as a percentage of the genset power that allows the next genset to start-up in a sequence (only used in configuration #3 with automatic program "Parall Auto Start"). See "Standard applications".

+ % kW / Xre >> Stop :

Value expressed as a percentage of the genset power that allows the next genset to shut down in a sequence (only used in configuration #3 with automatic program "Parall Auto Start"). See "Standard applications".

Exclude Net IDs :

Allows the exclusion from the network of a certain number of gengsets according to the ID Nos (number of gengsets).

In # 06 Excludes :

Option at (1) enables to isolate a genset from the RS 485 network by activating input In#6.

Option at (0) enables to use input In#6 in a standard way.

In # 08 Excludes :

Option at (1) enables to isolate a genset from the RS 485 network by activating input In#8.

Option at (0) enables to use input In#8 in a standard way.

In # 09 Excludes :

Option at (1) enables to isolate a genset from the RS 485 network by activating input In#9.

Option at (0) enables to use input In#9 in a standard way.

In # 12 Excludes :

Option at (1) enables to isolate a genset from the RS 485 network by activating input In#12.

Option at (0) enables to use input In#12 in a standard way.

C - OPTIONS - IDENTIFYING BY {.....}

Write Protect...!?

Selection (0) : all parameters defined in SET-UP are accessible to read and to modify.

Selection (1) : all parameters defined in SET-UP are only accessible to read.

RMS use Harmonics ? :

Selection (0) : calculation of root mean square values (current and voltage) is made by only taking into account the fundamental frequency.

Selection (1) : the calculations use the whole harmonic content.

Not in auto warn ? :

Energize Run/Stop : Corresponds to the control mode of the fuel solenoid.

(0) : for a de-energised solenoid.

(1) : for an energised solenoid.

Cool after NoLoad ? :

(0) : puts the engine into forced cooling.

(1) : puts the engine into forced cooling if, and only if, the genset contactor is closed, when the opening command is requested.

Bat OverVolts S/W :

(0) : The battery overvoltage is configured as a fault (engine shut down).

(1) : The battery overvoltage is configured as an alarm (no engine shut down).

GEN UnderVolt S/W :

(0) : The alternator undervoltage is configured as a fault (engine shut down).

(1) : The alternator undervoltage is configured as an alarm (no engine shut down).

GEN UnderFreq S/W :

(0) : The alternator under frequency is configured as a fault (engine shut down).

(1) : The alternator under frequency is configured as an alarm (no engine shut down).

LowWaterLevel S/W : On activation of input IN#10, LOW WATER LEVEL, the option at :

(0) : leads to engine shut down (fault).

(1) : does not lead to engine shut down (alarm).

Ext. Overload S/W : On activation of input IN#14, "External overload", the option at :

(0) : leads to engine shut down (fault).

(1) : does not lead to engine shut down (alarm).

GENCON low DC S/W : On sensing a low level of supply voltage :

(0) : leads to engine shut down (fault).

(1) : does not lead to engine shut down (alarm).

Generic configure ? : Choosing this option allows to make specific applications which are not defined in the document "Standard Applications", No 33502002401.

Parallel System ? : The option configured at (1) enables the use of all synchronisation functions for paralleling and distribution.

Mains Standby ATS ? : The option configured at (1) enables the use of applications requiring a MAINS/STANDBY changeover.

Cogeneration Mode ? :

The option configured at (1) enables the operation in "resell" mode.

Parall auto Start ? :

The option configured at (1) is used in configuration #3 for the start-up of the gensets depending on the level of power on the installation.

Engine Diesel/Gaz :

(0) : use for diesel engines.

(1) : use for gas engines.

Generator Syn /Asy :

(0) : use for synchronous generators (self excited).

(1) : use for asynchronous generators.

In # 3 Sleep / Bypass :

(0) : activating input IN#3 in automatic mode stops the genset.

(1) : activating input IN#3 inhibits the safety devices which stop the genset (except for overspeed) (use for safety gensets).

Sleep clears faults ? : The option at :

(1) : When going from AUTO mode to SLEEP mode, activating input IN#3 has the effect to cancel the faults.

Check contactors ? :

(0) : controlling the closure of mains and genset contactors in relation to the command is not made.

(1) : controlling the closure of mains and genset contactors in relation to the command is made.

Motor contactors ? : The option at :

- (0) : indicates that the power component(s) are controlled in a classic way (e.g. contactor).
- (1) : indicates that the power component(s) are controlled by an electric motor with shut-off solenoid and open solenoid (motorized switch or motorized open-type breaker).

1 Shunt/kw load :

- (0) : relay R#1 is used to signal a fault.
- (1) : relay R#1 is used for load control applications.

R # 2 Alarm/ Useable :

- (0) : luminous alarm.
- (1) : optional use.

K # 6 Engine/GEN on :

Output K#6 is supplied in the two following cases :

- (0) : when the engine is running : speed • 60 rpm or frequency • 15 Hz.
- (1) : when the generator voltage is high, i.e. V1, V2 and V3 • Gen Unvoltage.

K # 8 Delay/neutral : This option is only used in configuration #3 :

- (0) : relay K#8 (IOB1 interface) is activated after relay K#7 (IOB1 interface) depending on the preset delay. Relay K#8 is deactivated at the same time as K#7.
- (1) : Not used.

kW Drop=LoadSurge :

Not used.

Smooth Mains>>GEN ? :

Not used.

In # 06 Aux Shutdn ? :

Enables the use of alarm inputs for unused optional faults.

In # 08 Aux Shutdn ? :

Enables the use of alarm inputs for unused optional faults.

In # 09 Aux Shutdn ? :

Enables the use of alarm inputs for unused optional faults.

In # 12 Aux Shutdn ? :

Enables the use of alarm inputs for unused optional faults.

D - BASICS - GENERAL PARAMETERS

Controller ID No :

Progress ID, between 1 and 8. A unique value must be allocated to each Progress that is connected to the RS 485 communication bus (use in configuration #3 only).

Number of poles :

Number of pairs of rotor poles (always an even number).

PickUP Teeth :

Number of teeth on the flywheel. This value is used to calculate the engine rotation speed (for display).

CT Ratio :

Transformation ratio of the current transformers. For example, a 160 ratio corresponds to a 800A/5A current transformer.

Pt Ratio :

Transformation ratio of the potential transformers for use with average voltage. The minimum value to enter is 16.

Xap : Rated kVA :

The genset power expressed in kVA.

Xre : Rated kW :

The genset power expressed in kW.

Adj Sec/Week :

Real time clock adjustment specified in seconds per week.

E – FACTORY PARAMETERS

These various parameters are not accessible to the user. They are factory set: An access code is required to read and modify them.

IV – ALARM AND FAULT MESSAGES

This chapter lists all the alarm and fault messages by alphabetic order. To access the alarms and faults, whether or not they led to the genset shut down, use the menu "REPORT".

AIR DAMPER CLOSED

This message signals that the air damper is closed. Input In#13 is then activated. A manual action is therefore required to reopen it.

AUX I/OBoard ERROR-check

This message indicates :

- a connection error between Progress and the IOB1 interface board, or
- a DC voltage not available on the IOB1 interface board.

BATTERY CHARGER FAULT

This message indicates that the battery charger is faulty. Input In#12 is activated.

CONTACTOR(s) FAILURE

This message indicates that a conflict is detected between the state of auxiliary contacts on the mains and genset contactors (inputs In#15 and In#16) and the state of the outputs on relays K#7 & K#8 (control of coils).

EMI (noise) DETECTED

This message indicates that Progress has detected an electromagnetic interference that can alter its operation.

ENGINE OVERCRANK

This message indicates that all start-up attempts have failed.

ENGINE SHUT DOWN FAIL

This message indicates that the fuel solenoid is not being supplied.

ENGINE SLOWCRANK

This message indicates that the genset speed is below 60 rpm, 2 seconds after the starter has been activated.

EXTERNAL OVERLOAD

When input In#14 is activated, this indicates an overload or a short-circuit leading to the opening of the circuit breaker.

FREQENCYNOT BUILT

This message indicates that the genset frequency has not reached the nominal threshold of use.

GEN EXCITATION LOSS

A negative reactive power is detected.

GEN HIGH HARMONICS

This message indicates :

- a non linear load too high
- a size of alternator not suitable for the application
- a short-circuited stator.

GEN OVER FREQUENCY

The alternator frequency is above the preset threshold, and this during a preset period.

GEN OVERCURRENT

This message indicates that Progress has detected an overload exceeding the setting made. Depending on how the input was programmed, this is an alarm or a fault.

GEN OVERVOLTAGE

This message indicates that the alternator voltage has exceeded the preset threshold, and this during a preset period.

GEN REVERSE POWER

This message indicates that the reverse power on the alternator has exceeded the preset threshold, and this during a preset period.

GEN UNDER FREQUENCY

This message indicates that the alternator frequency has exceeded the preset threshold, and this during a preset period.

GEN UNDERTENSION

This message indicates that the alternator voltage is lower than the preset threshold, and this during a preset period.

GENCON LOW DC DANGER

This message indicates that Progress is supplied by too low a voltage. Depending on how the input was preset, the message is an alarm or a fault.

GENCON MEMORY ERROR

This message indicates that a software problem occurred while loading the parameters into the EEPROM memory.

GENCON PROGRAM ERROR

This message indicates that a software problem occurred while loading the program into the Flash memory.

GENCON UP : SET CLOCK

This message indicates that the user has not set the clock after powering up Progress.

GENERIC CONFIG ERROR

Message specific to the generic configuration #0 (outside standard applications).

HIGH BATTERY VOLTAGE

This message indicates that the battery voltage is higher than the preset threshold, for at least one second.

HIGH WATER TEMP SHUT

This message indicates that the engine coolant temperature is too high. The engine will immediately shut down (fault), when input In#7 (IOB1) is activated.

HIGH WATER TEMP WARN

This message indicates that the engine coolant temperature is too high. The engine will not shut down (alarm), when input In#8 is activated.

ALL GEN PHASE ORDER

This message indicates that the phase order between the generator and the bus or mains is incorrect. This is an alarm.

LOW BATTERY VOLTAGE

This message indicates that the battery voltage is lower than the preset threshold, for at least one second (start-up not included).

LOW FUEL LEVEL WARN (IOB1)

When input In#11 is activated, this indicates a low fuel level which does not lead to engine shut down (alarm).

LOW OIL PRESS SHUTDN (OB1)

When input In#5 is activated, this indicates a low oil pressure which leads to immediate engine shut down (fault).

LOW OIL PRESS WARNIN (OB1)

When input In#6 is activated, this indicates a low oil pressure which does not lead to engine shut down (alarm).

LOW WATER LEVEL

When input In#10 is activated, this indicates a low water level in the radiator, which may lead or not to engine shut down, depending on how the input was programmed (alarm or fault).

LOW WATER TEMP WARN

When input In#9 is activated, this indicates too low a coolant temperature which does not lead to engine shut down (alarm).

NETWORK RS-485 ERROR

This message indicates a data transmission or reception error on the RS 485 serial link.

Several causes are possible :

- short-circuit in the network cable or polarity reversal (connections).
- electromagnetic interference
- cut cable
- cable length too long (max 1200 meters).

NETWORK SET-UP ERROR

This message indicates that 2 Progresses have the same ID No.

NOT IN AUTO MODE

The controller is not in AUTO mode.

OIL PRESS NOT BUILT

This message indicates that the oil pressure has not reached its nominal threshold.

PARALLEL LOAD SURGE

This message indicates that the mains voltage has disappeared while operating in permanent paralleling.

PARALLEL MAINS FAIL

When the genset is paralleled with the mains, this message indicates that the voltage measured by V4 (mains) is 50% lower than the genset rated voltage. Progress isolates the genset from the mains.

REMOTE EMERGENCY STOP

When input In#4 is activated, this message appears. The engine will stop immediately.

REVISE SETPOINTS

Depending on parameters changes in SET-UP/BASICS, the user must consult all the parameters defined in SET-UP/SET-POINTS.

RPM OVERSPEED SHUTDN

The engine speed is above the preset threshold. The engine will shut down immediately.

RPM v FREQUENCY ERRO

This message indicates that there is a conflict between the engine speed and the alternator speed. This means that the number of teeth (parameter in BASICS) is incorrect.

SHUTDOWNS BYPASS ON !

This message indicates that most of the safety devices have been configured as alarms.

STOP BUTTON PRESSED

This message indicates that the red button STOP on Progress has been activated, leading to immediate engine shutdown.

SYNCHRONIZER TIME OUT

This message indicates that the synchronisation delay assigned to the genset has been exceeded.

UNEXPECTED BUS VOLTS

This message indicates that voltage is available on the bus while logically it should not be.

VOLTAGE NOT BUILT

This message indicates that the alternator voltage has not been stabilised, even after a preset period.

V – STARTING AND STOPPING THE GENSET(S) DEPENDING ON THE CONFIGURATION

To identify your equipment configuration, consult the table below :

SET-UP/OPTION PARAMETERS	Generic Configuration	Paralleling System	Mains Stand-By ATS	Cogeneration Mode (resell)	Paralleling Start
Configuration # 1	0	0	0	0	0
Configuration # 2	0	0	1	0	0
Configuration # 3	0	1	0	0	0 or 1
Configuration # 4	0	1	0	1	0
Configuration # 5	0	1	1	0	0
Configuration # 6	0	1	1	1	0

1 - Starting Procedure

• Powering up :

When powering up, screen "HELP" appears (see page 6). If there is a fault or an alarm (e.g. emergency shut down triggered), screen "REPORT" will appear and depending on the type of problem, the red and orange LEDs will flash.

- If there is no fault, press "ESC" and enter the day and time.
- Press "ENTER" to validate, menu "COMMAND" will appear (see page 6).
- Press "ESC" to get the main menu :



Move the cursor using keys and to get screen "OVERVIEW".

- As Progress is usually factory set in automatic mode, the following screen will appear (in the case of a genset with a mains network) :



Note: the messages may differ according to the configuration and the status of the genset.

Note : the 4-position function switch is still in position "STOP".

• Manual operation :

Move the 4-position function switch to "MANU". The genset starts instantly. 2 cases can then arise :

- 1 – Configurations #1, #2, #3 (modes 1, 2 and 3), #4, #5 and #6.
- 2 – Configurations #3 (mode 4).

In case (1), the genset contactor or motorised circuit-breaker does not close. The genset runs off load.

In case (2), the genset contactor or motorised circuit-breaker closes and the genset takes the load.

Pressing "STOP" (Progress button) shuts the genset down instantly. Using the 4-position function switch to go from "MANU" to "STOP" will shut the genset down after a cooling period. An adjustable delay in menu "SET-UP/DELAYS" sets the time during which the genset will run manually.

• Automatic operation :

To start in automatic mode, the 4-position function switch must be moved to "AUTO". The genset is on stand-by and Progress awaits a command to start. This command comes from :

- information V4 (mains or bus) (mains failure or bus available), or
- external information.

In both cases, the genset starts and takes the load.

Pressing "STOP" (Progress button) will stop the genset instantly. Using the 4-position function switch to go from "AUTO" to "STOP" will shut the genset down after a cooling period. An adjustable delay in menu "SET-UP/DELAYS" sets the time during which the genset will run in manual mode.

• Test operation :

To start in "TEST" mode, the 4-position function switch must be moved to "TEST". The genset starts immediately and takes the load. Pressing "STOP" (Progress button) will stop the genset instantly. Using the 4-position function switch to go from "AUTO" to "STOP" will shut the genset down after a cooling period. An adjustable delay in menu "SET-UP/DELAYS" sets the time during which the genset will run in test mode.

- **Automatic operation (according to the selected configuration):**

To find out the operating mode of the selected configuration, consult the document no. 335 02 002 401.

This document shows in detail the operation of the various standard configurations applicable to the MICS Progress.

MAINTENANCE MANUAL AND SCHEMATICS VOLVO PENTA SERIES

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SAFETY SYMBOLS



Caution, danger



Caution, refer to the publications supplied with the Genset



Caution, risk of electric shock



Protective clothing required



Warning, toxic materials



Eye and hearings protection
Necessary



Warning, liquids under pressure



Periodic Maintenance Necessary



Warning high temperature
(risk of burns)



Check battery charge



Warning, rotating or moving parts
(risk of entanglement)



Recommended Lifting point



Caution, risk of corrosion



Absolutely no stacking



Caution, risk of explosion



No naked flames
Do not smoke



Entry forbidden to unauthorised personnel



Do not use water based fire extinguishers

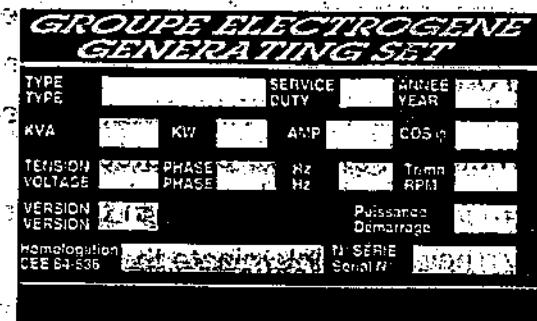
MACHINERY DIRECTIVE 89/932/EC INSTRUCTION FOR GENERATING SETS

- Access prohibited to unauthorized personnel.
- Live installation, potential-automatic starting.

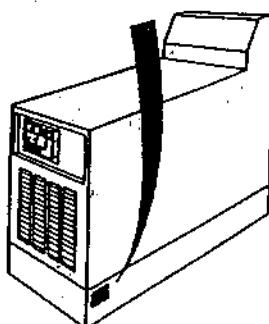
C. GENERATING SETS IDENTIFICATION

In the event of a query, an order for spare parts or a request for a service, you must always indicate to our service agent the serial number of the generating set.

Example:



Location of the manufacturer's name plate



The engine type is indicated on the manufacturer's name plate located on the engine.
The alternator type is indicated on the manufacturer's name plate located on the alternator.

TECHNICAL IDENTIFICATION TABLE

Tipo	r.p.m.	KVA cos * 0.8	kW Motor	MOTORES				Versión carrocería	Versión emergencia	Potencia emergencia	ALTERNADOR				
				VOLVO	Cilindro	Diametro x Carrera mm	Cilindrada L				Tipo	Regulador de tensión			
200	1500	200	180	TD	6 L	98.4 x 120	5.5	M 404	230 S	230	LEROY SOMER	R448			
	1800	235	203							260	461 M 5				
250	1500	250	217	TD	6 L	120.6 x 140	9.6	M 405	300 S	265	LEROY SOMER	R448			
	1800	290	250							300	461 L 8				
300	1500	300	262	TWD	6 L	130 x 150	12	M 405	330 S	330	LEROY SOMER	R448			
	1800	320	275							350	461 VL 12				
325	1500	325	282	TWD	6 L	130 x 150	12	M 405	350 S	350	LEROY SOMER	R448			
	1800	345	300							380	471 M 4				
360	1500	360	309	TAD	6 L	130 x 150	12	M 405	400 S	400	LEROY SOMER	R448			
	1800	400	335							350	471 M 4				
400	1500	400	353	TWD	6 L	144 x 165	16.1	M 405	450 S	450	LEROY SOMER	R448			
	1800	410	391							450	471 M 6				
450	1500	450	398	TAD	6 L	144 x 165	16.1	M 406	510 S	510	LEROY SOMER	R448			
	1800	510	433							560	471 L 9				
500	1500	500	430	TAD	6 L	144 x 165	16.1	M 406	550 S	550	LEROY SOMER	R448 or			
	1800	570	484							610	471 LT 10 OR NEWAGE HCK 544 D SX 440				

A - INTRODUCTION

Thank you for buying our Company's generating set.

This manual has been written for you in order to help you maintain and operate your generating set properly.

For maximum efficiency and to extend the life of the generating set, maintenance procedures must be performed according to the intervals indicated in the general preventive maintenance schedule. If you operate the generating set under dusty or unfavourable conditions, more frequent maintenance intervals will be required.

The inside of the engine must be kept clean by regularly changing the filter element and lubricating oil.

Make sure that all adjustments and repairs are performed by suitably trained staff. Our agents are suitably qualified and can answer all your questions. They can also provide you with spare parts and other services.

Left and right sides of the generating set are seen from the rear (the radiator being at the front).

Carefully read the safety precautions to avoid accidents, incidents or damage to the generating set. This advice must rigorously be applied.

The design of our generating sets allow for the replacement of worn or damaged parts by new or refurbished ones thus reducing to a minimum the down time. For any part replacement, please contact our company's nearest agent because he has the necessary equipment and properly trained and informed staff to ensure either maintenance, components replacement or complete repair of the generating sets. Please contact the nearest agent to obtain the available repair manuals and to arrange for staff training.

ABBREVIATIONS USED IN THE MANUAL

API	American Petroleum Institute
ASTM	American Society of Testing and Materials
C	Celsius
DCA	Diesel Coolant Additive
F	Fahrenheit
ft-lb	Foot - Pound
H ² O	Water
Kg	Kilograms
KW	Kilowatts
L/h	Litre per hour
L/s	Litre per second
m	Metre
mm	Millimetre
m ³ /s	Cubic Metre per second
mm H ² O	millimetres of water
Nm	Newton-metre
psi	Pound per square inch
P	Power
S.A.E.	Society of Automotive Engineers
r/min	Revolution per minute
%	Temperature x/100

SYMBOLS

Get used to the symbols used throughout this manual to identify the required action or operation



WARNING - Personal safety is at risk when performing the operation.



Indicates a **REMOVAL** or **DISASSEMBLY** step.



Indicates an **INSTALLATION** or **ASSEMBLY** step.



INSPECTION is required.



CLEAN the part or assembly.



PERFORM a mechanical or time measurement.



LUBRICATE the part or the assembly.



Indicates that a **SPANNER** or **TOOL SIZE** will be given.



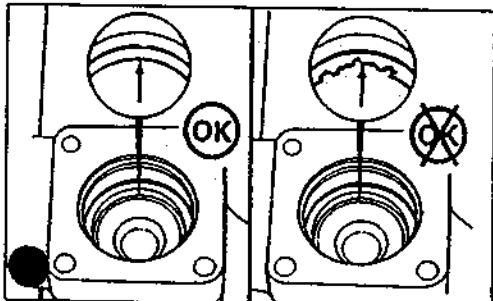
TIGHTEN to a specific torque.



PERFORM an electrical **MEASUREMENT**.



Refer to another location in this manual or another publication for additional information



ILLUSTRATIONS

Use the illustrations in this manual as a guide to perform the operation described. Many illustrations are generic and will not look exactly like the engine or the parts used in your application. In order to provide clarity to illustrations, some of them show parts removed that are not related to the specific parts given in the text.

Most of the illustrations contain symbols to indicate an action required or to indicate an acceptable (OK) or unacceptable (not OK) condition.

B - SAFETY INSTRUCTIONS

THESE SAFETY PRECAUTIONS ARE IMPORTANT

If you do not understand or have any doubts about any point in this instruction manual, please contact your agent who can explain or give you a demonstration.

A list of risks and precautions to follow is given below.

Please also refer to the local and national rules applicable to your region or country.

- Read carefully the manuals supplied with the generating set.
- Do not modify the engine.
- Do not smoke when filling the tank with fuel.
- Always wipe off fuel spillage and store impregnated cloths in a safe place.
- Avoid filling the tank with fuel when the engine is running (except if absolutely necessary).
- Never clean, lubricate or adjust a running engine (unless you are qualified to do so, in which case you should take great care to avoid accidents).
- Do not try and perform adjustments unknown to you.
- Ensure that the engine is placed in such a way so as to avoid toxic gas accumulation.
- Warn the people around to keep their distance during the operation.
- Do not wear loose-fitting clothing and do not go near operating machines. Note that fan blades are not clearly visible when the engine is running.
- Do not run the engine without installing the protective canopy.
- Do not remove the radiator cap when the engine is hot or when the coolant is under pressure to avoid scalding.
- Do not touch hot parts such as the exhaust pipe and do not put combustible materials on or near them.
- Never use sea water or any other electrolytic or corrosive product in the cooling system.
- Never allow sparks or naked flames near the batteries because the electrolyte gases are inflammable (mostly when the battery is being charged). Their acid is equally dangerous in contact with the skin and particularly in the eyes.
- The generating set must stay under the supervision of only one person.
- Always operate the generating set from the control panel.
- If your skin is exposed to high pressure fuel (injector), consult a doctor immediately.
- Diesel fuel can, in some people, cause a skin reaction. Use protective gloves or a hand cream.
- Do not move a mobile machine without checking first if the brakes are operational.
- Disconnect the battery and the pneumatic starting motor (if any) before beginning any repair works to prevent accidental engine starting. Place a notice forbidding any starting attempts on the controls.
- ONLY use the correct engine barring methods for manually rotating the crankshaft. Do not attempt to rotate the crankshaft by pulling or levering on the fan. This method can cause serious personal injury, property damage or damage to the fan blade(s) causing premature fan failure.

- Relieve all pressure in the air, oil and cooling systems before any lines, fittings, hoses or related items are removed or disconnected. Beware of possible pressure when disconnecting any device from a system under pressure. Do not check for pressure leaks with your hand. High pressure oil or fuel can cause serious personal injury.
- Corrosion inhibitors contains alkali. Do not get this substance in your eyes. Avoid any prolonged or repeated contact with your skin. Do not swallow. In case of contact with the skin, thoroughly wash with water and soap. In case of contact with the eyes, immediately and thoroughly rinse with water for at least 15 minutes. IMMEDIATELY CALL A DOCTOR. KEEP OUT OF REACH OF CHILDREN.
- Always use tools that are in good condition. Make sure that you understand how to use them before performing any service work.
- Never use petrol or inflammable substances to clean the parts. Only use approved cleaning solvents.
- Only install original parts.
- Any service work on the equipment should be performed when the installation or the equipment is switched off.
- Electrical connections will be carried out according to the norms and regulations in force in your country.
- Do not use faulty, badly insulated or temporary connections.
- Engines with a turbocharger: Never start the engine without the air filter. The rotating compressor blades in the turbocharger can lead to serious personal injury. Foreign bodies in the inlet pipe can lead to mechanical damage.
- Engines with an air heater (starting element): Never use starting spray or another similar product as a starting aid. Contact with the starting element can cause an explosion in the intake manifold and lead to personal injury.
- Lubrication oil is toxic and dangerous if swallowed. Avoid prolonged or repeated contact with the skin. Avoid inhaling these oil vapours. Read the instructions on the packaging.
- Anti-rust products are toxic and dangerous if swallowed. Avoid contact with the skin and the eyes. Read the instructions on the packaging.
- Glycol is toxic and dangerous if swallowed. Avoid contact with the skin and the eyes. Read the instructions on the package.
- Some preserving oils are inflammable. Also, some of them are dangerous if inhaled. Ensure good ventilation. Use a protective mask for the injection.
- Hot oil can scald. Avoid contact with hot oil. Before performing any service works, ensure that the system is no longer under pressure. Do not start or run the engine with the oil filler cap off to avoid splashing.
- Do not reverse the positive and negative battery connections. Reversing can lead to serious damage to the electrical system. Refer to the electrical diagram.
- Use the lifting lugs to lift the generating set. Always check that the lifting equipment is in good condition and has a sufficient capacity for lifting.
- To work safely and to avoid damage to the components mounted on the top edge of the engine,

the engine should be lifted with an adjusting shaft. All chains and cables must be parallel to one another and as perpendicular to the top edge of the engine as possible.

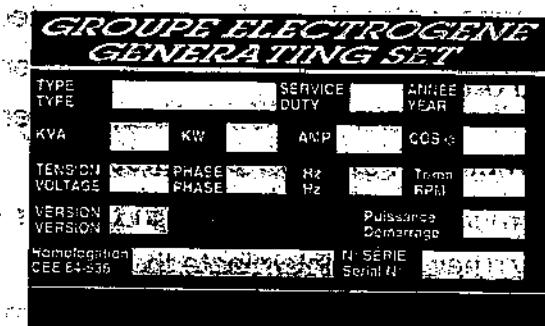
- If other equipment is mounted on to the generating set, change its centre of gravity, special lifting devices may be necessary to maintain correct balance and safe working conditions.
 - Never carry out any work on the generating set which is only supported by a lifting device.
- WARNING!** The engine must not be operated in rooms containing explosive products. As not all the electrical components are armour-plated, sparks can be emitted.
- The replacement of the fuel filter should be carried out on a cold engine to avoid any risk of fire due to spillage of the fuel onto the exhaust manifold. Always cover the alternator if it is placed under the fuel filters. Spillage of fuel can damage the alternator.
 - Always protect your hands when checking for leaks. High pressure liquids can penetrate body tissues and cause severe injury. They can contaminate the blood.
 - Always use recommended fuels. Using poor quality fuels can damage the engine. On a diesel engine, incorrect fuel can lead to seizure of the control rod and engine overspeed with risks of personal injuries and mechanical damage. Poor quality fuels can also lead to higher maintenance costs.
 - Do not use high pressure cleaners to clean the engine and equipment. The radiator, flexible hoses, electrical components, etc. can be damaged.
 - Engine exhaust gases are toxic. Do not operate the generating set in rooms which are not ventilated. When installed in a well ventilated room, extra requirements must be followed concerning the protection against fire and explosions.
 - The electrical equipment (including connecting wires and plugs) must be defect free.
 - The generating set must not be connected to other power sources such as the public electricity distribution network. In particular cases where the connection of the genset to the electric network is allowed, it should only be carried out by a qualified electrician. He will take into account the various appliances used, whether each is used with the distribution network or with the generating set.
- Protection against electric shock will depend on the circuit breakers specially installed for the generating set. If they need to be replaced, the new ones must be of the same nominal rating and characteristics.
- Due to high mechanical constraints, only use strong and flexible cables, with rubber insulation, which comply with the standard CEI 245-4 or equivalent.
 - Use tools suitable for the work to be performed.
 - Respect the maintenance schedule and its instructions.

CAUTION: This generating set is air cooled by a liquid filled radiator or a remote fan assisted liquid filled radiator.

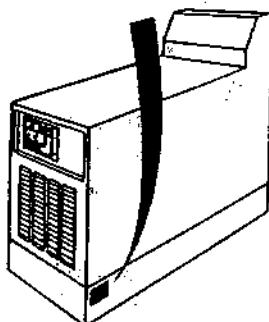
C. GENERATING SETS IDENTIFICATION

In the event of a query, an order for spare parts or a request for a service, you must always indicate to our service agent the serial number of the generating set.

Example:



Location of the manufacturer's name plate



The engine type is indicated on the manufacturer's name plate located on the engine.
The alternator type is indicated on the manufacturer's name plate located on the alternator.

TECHNICAL IDENTIFICATION TABLE

Tipo	r.p.m.	KVA cos * 0.8	kW Motor	MOTORES				Versión carrocería	Versión emergencia	Potencia emergencia	ALTERNADOR	
				VOLVO Tipo	Cilindro	Diametro x Carrera mm	Cilindrada L				Tipo	
200	1500	200	180	TD	6 L	98.4 x 120	5.5	M 404	230 S	230	LEROY SOMER	R448
	1800	235	203	1010 G						260		
250	1500	250	217	TD	6 L	120.6 x 140	9.6	M 405	300 S	265	LEROY SOMER	R448
	1800	290	250	1210 G						300		
300	1500	300	262	TWD	6 L	130 x 150	12	M 405	330 S	330	LEROY SOMER	R448
	1800	320	275	1210 G						350		
325	1500	325	282	TWD	6 L	130 x 150	12	M 405	350 S	350	LEROY SOMER	R448
	1800	345	300	1211 G						380		
360	1500	360	309	TAD	6 L	130 x 150	12	M 405	400 S	400	LEROY SOMER	R448
	1800	400	335	1230 G						350		
400	1500	400	353	TWD	6 L	144 x 165	16.1	M 405	450 S	450	LEROY SOMER	R448
	1800	410	391	1630 G						450		
450	1500	450	398	TAD	6 L	144 x 165	16.1	M 406	510 S	510	LEROY SOMER	R448
	1800	510	433	1630 G						560		
500	1500	500	430	TAD	6 L	144 x 165	16.1	M 406	550 S	550	LEROY SOMER	R448 or 471 LT 10 OR NEWAGE HICK 541 D 3 RSX 440
	1800	570	4843	1631 G						610		

D - CONSUMABLE SPECIFICATIONS AND CAPACITIES

I - FUEL SPECIFICATIONS

Warning: do NOT mix petrol or alcohol with engine diesel. This mixture can cause an explosion. Volvo Engine Company recommends the use of ASTM - D 975 - No 1 D or No 2 D engine diesel. Using No 2 engine diesel will result in maximum engine performance. At operating temperatures below 0°C (32°F), performance will be acceptable with a mixture of No 2 D and No 1 D. Using lighter fuels can increase consumption.

The lowest possible sulphur content shall be strived for (< 0.5%) as it has an effect on the oil drain frequency (see maintenance schedule).

In the event of extreme cold, use a special winter quality fuel, marketed by the petrol companies.

II - RECOMMENDED OIL SPECIFICATIONS

The use of quality engine lubricating oils combined with appropriate lubricating oil drain and filter change service intervals is a critical factor in maintaining engine performance and durability.

Volvo Engine Company recommends the use of high quality heavy duty engine oil which complies with the performance classification CD or CE (American Petrol Institute - API), VDS * (Volvo Drain Specifications) and MIL - L - 2104 D (U.S. Government's Military Spec.).

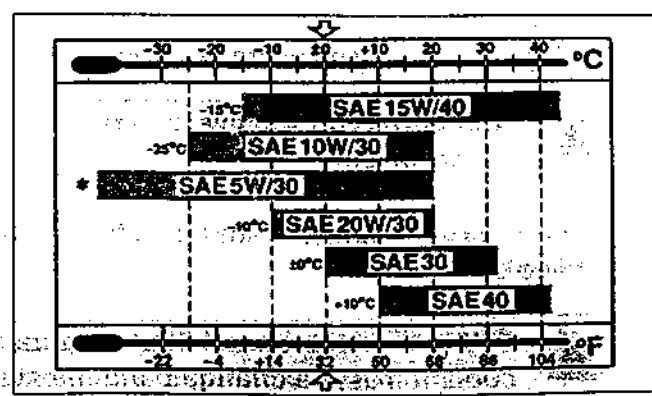
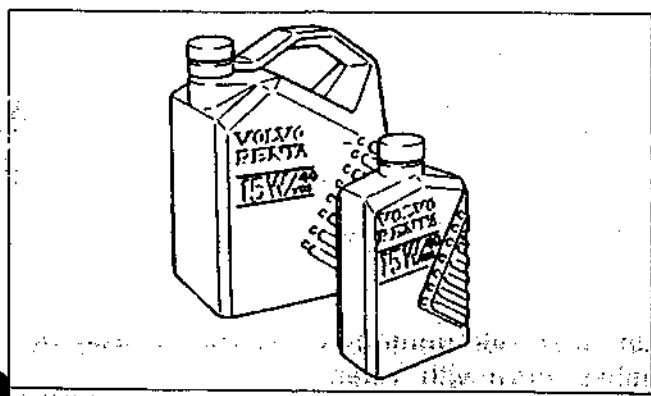
* If longer oil change intervals are applied, a VDS oil must be used. (See maintenance schedule).

The use of an oil of a quality which does not comply with the above stated requirements is a high risk solution, both with a view to economy and operating reliability.

VISCOSITY RECOMMENDATIONS

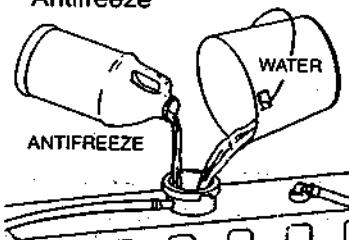
Oil viscosity is a measure of its flow resistance. The Automobile Engineers Company has classified the engine oils in viscosity qualities. Oils which meet the low temperatures requirements (-18°C [0°F]) are quality labelled with a W suffix. Oils which meet both high and low temperatures requirements are known as being multi-grade or multi-viscosity oils.

Our company has found that the use of multi-grade lubricating oils improves the control of oil consumption and improves engine starting in low temperature operating conditions whilst maintaining lubrication at high operating temperatures and can contribute to better fuel consumption.



III - COOLANT SPECIFICATIONS

50% Antifreeze 50 % Water

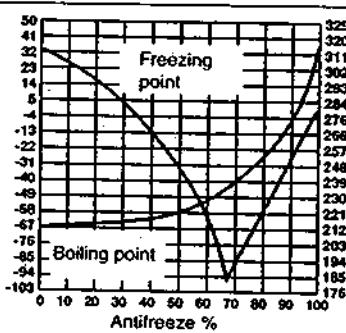


Heavy duty fuel engines need the use of heavy duty coolants.

The coolant has a double purpose. On the one hand it protects the cooling system from freezing, on the other hand it prevents corrosion.

WATER QUALITY

	Max. 170° 10 ⁻⁴ (Parts/million) as (CaCO ₃ + MgCO ₃)
Calcium Magnesium (hardness)	
Chlorides	Max. 40 PPM as (Cl)
Sulphides	Max.: 100 PPM as (SO ₄)
Density of solids	Max.: 500 PPM



WATER

The water quality is important in the performance of a cooling system. Too much calcium or magnesium will contribute to scaling problems, and excessive levels of chlorides and sulphates will lead to corrosion of the cooling system.

ANTIFREEZE

When there is freeze risk, use a mixture of 50% VOLVO Penta antifreeze (Glycol) and 50% pure water.

The mixture provides protection from freezing down to approx. -40°C and should be used all year round.

Note: at least 40% antifreeze shall be used in the system to ensure satisfactory corrosion protection.

Mix the glycol with water in a separate container prior to filling the cooling system.



Glycol is hazardous to health (dangerous to consume).

BASE

ETHYLENE GLYCOL

PROPYLENE GLYCOL

freeze protection

40%: -23°C
50%: -37°C
60%: -54°C

40%: -21°C
50%: -33°C
60%: -49°C

ANTI-CORROSION PROTECTION ADDITIVES

When there is no freeze risk, water with the addition of Volvo Penta anti-corrosion agent (Part No. 1141526-2) must be used where a mixture of water/glycol is not used all year round.
Mixing ratio: 1:30.

After filling, run the engine warm to ensure maximum protection from this anti-corrosion additive.



Anti-corrosion additive is hazardous to health (dangerous to consume).

Note: never mix anti-corrosion additive with antifreeze (glycol). The formation of foam can seriously diminish the cooling effect.



The anti-corrosion additive must be topped up every 400 running hours. Once a year, the coolant must be changed and the system flushed down with water.

IV - CAPACITY OF COOLING AND LUBRICATING SYSTEMS AND FUEL TANKS

TYPE		200	250	300	325	360	400	450	500
ENGINE		TD 1010 G	TD 1210 G	TWD 1210 G	TWD 1211 G	TAD 1230 G	TWD 1630 G	TAD 1630 G	TAD 1631 G
OIL	Oil Sump	25 l	38 l	38 l	38 l	38 l	64 l	64 l	64 l
	Oil Auto-fill *	100 l	100 l	100 l	100 l	100 l	100 l	100 l	100 l
FUEL	Version II	350 l	360 l	360 l	360 l	360 l	235 l	235 l	235 l
	Canopy	330 l	290 l	290 l	290 l	290 l	290 l	490 l	490 l
WATER	Radiator	43 l	50 l	53 l	60 l	50 l	69 l	62 l	66 l
	Remote Radiator*	AH 12 40 litres	AH 16 64 litres	AH 16 64 litres	AH 16 64 litres	-	-	-	-

* Optional.

E - COMMISSIONING PROCEDURE

CAUTION

BEFORE CARRYING OUT ANY OPERATION ON THE GENERATING SET, IT IS ESSENTIAL TO TURN THE POWER OFF, I.E. TO ENSURE THAT THE MAINS IS NOT PRESENT ON THE GENSET.

IF THE GENSET HAS GONE THROUGH A STORAGE PROCEDURE, IT IS ADVISABLE TO FOLLOW THE AFTER STORAGE PROCEDURE.

IT IS ADVISABLE TO FULLY FOLLOW THE INSTRUCTIONS BELOW IN ORDER TO AVOID PROBLEMS DURING THE COMMISSIONING OF THE GENERATING SET. ANY FAILURE TO COMPLY WITH THESE INSTRUCTIONS COULD LEAD TO ACCIDENTS OR SERIOUS DAMAGE.

THE VARIOUS CAPACITIES OF THE SYSTEMS CONTAINING FLUIDS ARE INDICATED IN THE MAINTENANCE MANUAL.

I - ENGINE

⚠ Generating sets intended for the French market are delivered filled with oil and coolant.
Generating sets intended for export markets are delivered dry (they will need filling).

A. COOLANT

Check the coolant level and top up or fill completely with the specified coolant if necessary (see Chapter D.III).

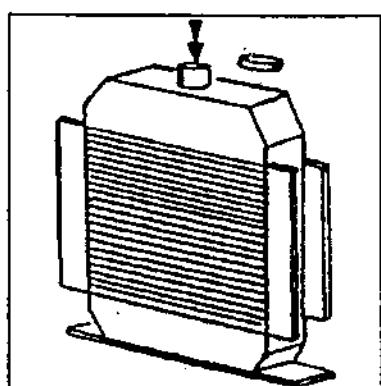
Check hoses and pipes for leaks.

The coolant level must be at about 5 cm below the sealing surface of the filling cap.

IMPORTANT: Filling the cooling system.

Particular care should be taken during this operation. Note, during filling, the air which was trapped in the system can indicate that the system is full. Therefore filling should be done in stages. After the 1st stage, continue to top up until the level stays visible at the filling hole even after a few minutes of observation.

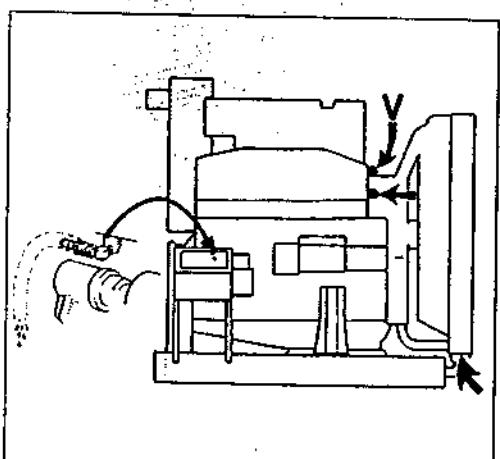
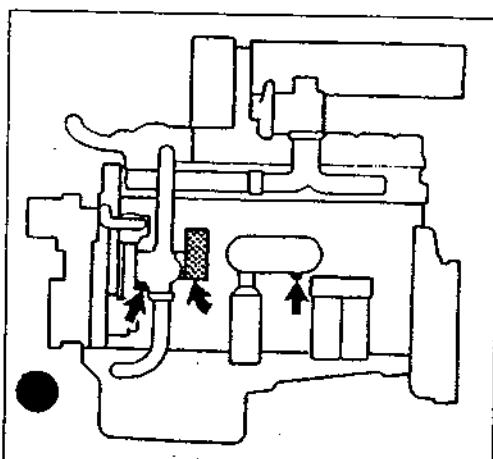
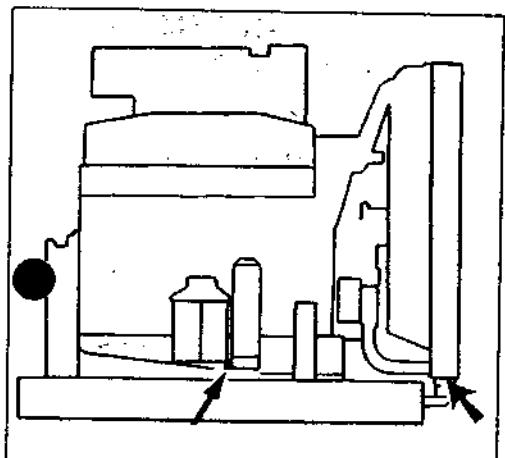
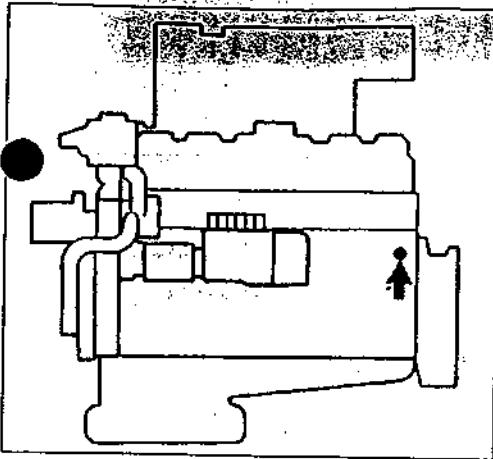
Operate the engine for 2 to 3 minutes and rest for 30 minutes, then check the level again and top up if necessary.



Venting the Cooling System

TD 1010 G - TD 1210 G - TWD 1210 G - TWD 1211 G and TAD 1230 G ENGINES :

With the filling cap open, open the engine and radiator drain cocks one after the other, starting from the lowest to the higher point. Let the coolant drain out until no air escapes from the openings. Close the drain cocks one after the other and top up with coolant. Refer to the illustrations opposite and check the installation for other drain cocks.



TWD 1630 G - TAD 1630 G - TAD 1631 G ENGINES

With the filling cap open, open the venting cock "V" (TW engines), then operate in the same way as for TD 1010 G - TD 1210 G - TWD 1210 G - TWD 1211 G and TAD 1230 G engines.

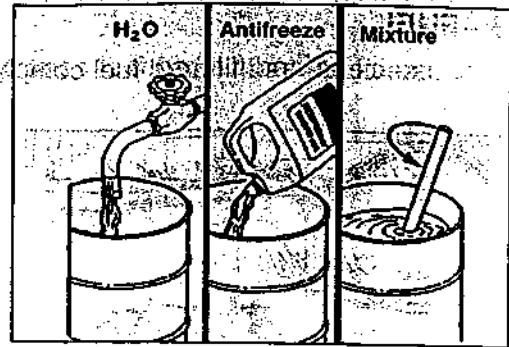
Note : if a heater is connected to the cooling system, the isolating tap(s) must be opened and the installation vented before start-up.

2. Mixing

The coolant requires a specific mixture as recommended and set out in Chapter D.III and in the quantities required in Chapter D.IV.

A mixture of the correct dosage requires the following procedure:

1. Pour the water into a container
2. Add the antifreeze
3. Stir them thoroughly.

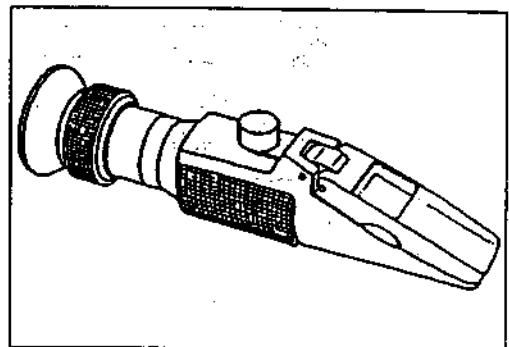


USE OF THE ANTIFREEZE:

The mixture of antifreeze and water is carried out using the proportions recommended in Chapter D.III according to the freeze protection desired.

ANTIFREEZE CONCENTRATION TEST:

The antifreeze concentration must be checked by using a refractometer. Floating bulb hydrometers are not precise enough.

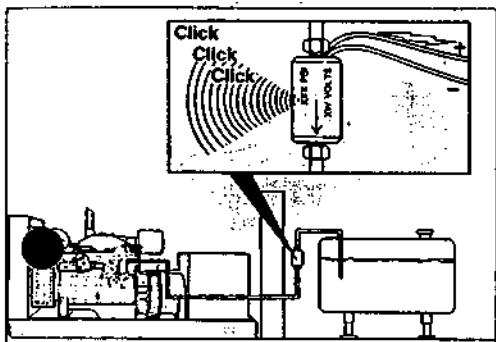
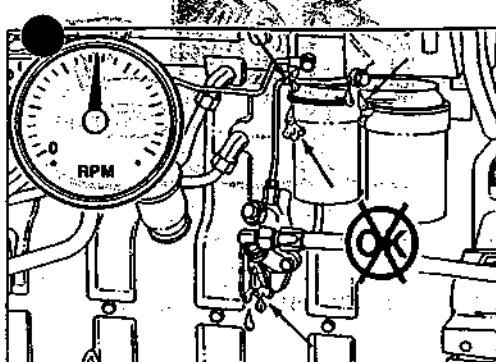


B - FUEL

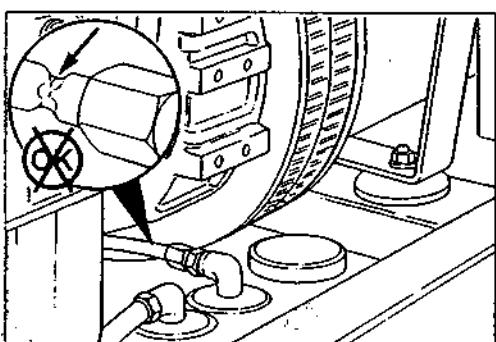
Only use clean and filtered fuel complying with the specifications (see Chapter D.I).

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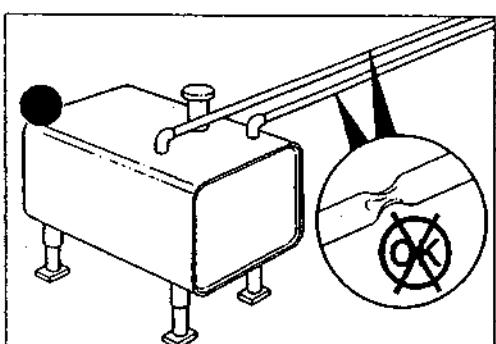
Fill up the tanks (see Chapter D.IV) and check the lines and gaskets for leaks.



Check that the electric fuel transfer pump is in good working order as necessary (option).

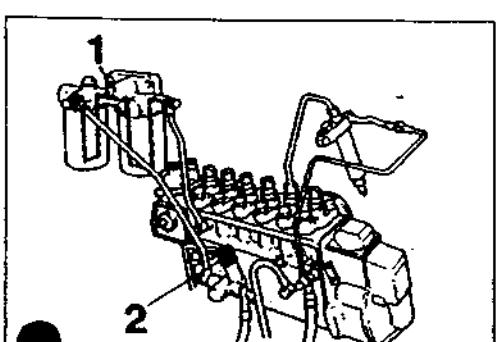


Check for any obstruction in the fuel lines.



Vent the fuel system by unscrewing the vent-screw (1) and by pressing the plunger (2) until the fuel continuously flows out of the vent-screw (1).

Retighten the vent-screw (1) while still pressing the plunger (2).



C. OIL

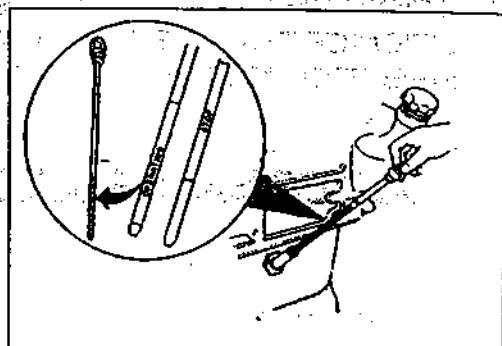
Check the oil level in the engine oil sump and if appropriate in the oil auto-fill reservoir (optional).

Top up or fill if necessary using an approved oil with a SAE grade suitable for the ambient temperature conditions (see Chapter D.II).

- Filling the crankcase:

Fill the oil sump through the engine filler neck to the top level of the dipstick.

- Once the engine is filled (with coolant, oil and fuel) and the checks have carried out, start the generating set and let it run for a few minutes.
- Stop the engine and let it cool down.
- Top up the oil to the top level of the dipstick and check the filter and draining system for leaks.



NOTE : the dipstick can be removed either during operation (side marked "OPERATING"), or when the engine is stopped* (side marked "STOP"). * Wait 3 minutes after the engine has been stopped to read the oil level.

Filling the Oil Auto-fill Reservoir (optional):

Once the correct level in the oil sump is reached, fully fill the oil auto-fill reservoir with the oil previously selected.

- Open the cock located under the reservoir.

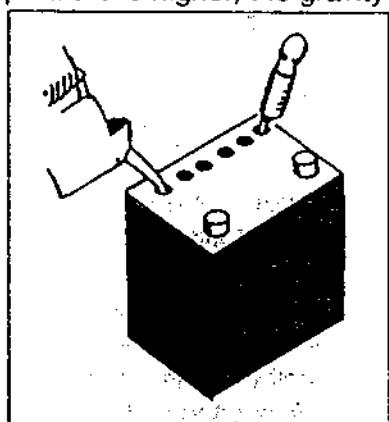
D. BATTERIES

Commissioning :

- Remove the seals (washers, adhesive bands or discs if any,...).
- Fill the cells with a sulphuric acid solution, specifically for batteries, of the following gravity:
 - Mild climate countries g = 1.25 to 1.27
 - Tropics g = 1.21 to 1.23

The gravities indicated above will suit a temperature of around 20°C. If the temperature is higher, the gravity will decrease by 0.01% for every 15°C. And vice versa, if the temperature is lower, the gravity will increase in the same proportions.

Example : Acid at g = 1.26 at 20°C
will give at 5°C, g = 1.27
will give at 35°C, g = 1.25.



- Leave the battery to stand for 20 minutes to allow the plates and plate separators to soak (1 hour if the electrolyte temperature is lower than 5°C). After standing, shake the battery a little, readjust the levels to the base of the marks or, failing that, to 10 mm above the separators by adding if necessary some filling electrolyte.

The battery is then ready for use.

It is advisable to recharge the battery during commissioning:

- if after standing, the gravity falls by 0.02 or more, or if the electrolyte temperature rises by more than 4°C,
 - if the starting procedure is carried out in cold weather (below 5°C).
-
- Adjust the current to between 5 and 10% of its rating (e.g.: 2 to 4 A for a 40 Ah battery) and extend the charge time until the end-of-charge indicators appear (approximate time: 4 to 6 hours). The indicators are:

- bubbling in all cells
- gravity of each cell equal to the minimum gravity of the filling electrolyte and constant over 2 consecutive hours.

Reconnect the battery cables.

CAUTION: FOR AUTO-STARTING GENSETS, ENSURE THAT THE START SWITCH IS IN THE " **0** " POSITION OR THAT THE FUNCTION SELECTOR SWITCH IS IN THE " **O** " POSITION OR THAT THE PUSH BUTTON "OUT OF SERVICE" IS ACTIVATED, OTHERWISE THE GENSET COULD START INSTANTLY.

II - ALTERNATOR AND CONTROL PANEL

IMPORTANT :

For auto-starting gensets, do not connect to the mains without checking first that the cooling system is full. Not following this precaution can lead to damage to the water heater or to spoiling of the residual oil in the sump.

Check the insulation of the alternator between the LIVE and EARTH and between the supply wires. The regulator (AVR) must be unplugged for this operation. The latter is carried out with a megohmeter (500 V DC). Insulation should normally be $>10\text{ M}\Omega$ when cold.



CAUTION: It strictly prohibited to commission an alternator, whether new or not, if insulation is lower than $1\text{ M}\Omega$ for the stator and $100\text{K}\Omega$ for the other coils.

It is possible to find lower values during extended shutdown periods or when stored. If the machine is used in a high humidity region (seaside or tropical regions) or if it is subject to water or sea spray etc.

To recover the above minimum values, 2 methods may be used :

- a) Blow warm air over the air inlet, ensuring that the machine turns, windings disconnected.
- b) Run short-circuited (disconnect the voltage regulator).
 - short-circuit the three output terminals (power) using leads capable of carrying the rated current (do not exceed 6A/mm^2 if possible)
 - using an ammeter, check the current going through the short-circuit.
 - connect the windings to a 48V battery (note the polarity) through a 10 ohm (50W) series rheostat
 - gain access to the alternator: terminal box, protection grille, etc.
 - operate the alternator at its rated speed and adjust its output, using the rheostat, to obtain the rated current through the short-circuit.
 - check that the electrical connections are made with appropriate cables (considering current rating, temperature, routing).
 - check that the various electrical connections are well made.
 - check that the genset is earthed.
 - before connecting the load, check the voltage and polarity at the terminals.

III - INSTALLATION

- Ensure that the generating set chassis rests evenly on the ground or that it has been securely wedged. An unbalanced genset can be damaged due to unwanted vibrations.
- Check that the exhaust is ducted out of the building and that it is of a sufficient diameter (never smaller than the muffler diameter). The pipe must be suitably suspended and must not, for any reason, be linked to the generating set in a rigid way (unless agreement from us is obtained or is the original fitting). Check that a flexible pipe has been properly fitted between the exhaust and the genset.
- Check that the cooling system complies with our instructions and that an adequate air inlet has been made.
- Following these checks does not exempt the user or the fitter from complying with the regulations, requirements and maintenance procedures described in the manuals provided with the genset, or with the standards and regulations specific to the installation of the generating sets.

"If in doubt, contact your Technical Service"

F. "RUNNING IN" PERIOD

A progressive "running in" of new engines is not necessary. Prolonged use under a low load during the initial period of the engine and prolonged use under a full load during the first 10 hours are not advisable.

CAUTION

- NEVER OPERATE THE ENGINE WITHOUT LOAD FOR A PROLONGED PERIOD.
- CHECK THE LUBRICATING OIL LEVEL DAILY.
- CHECK THE ENGINE, WITHOUT FAIL, BEFORE EACH USE ACCORDING TO THE INSTRUCTIONS IN THE PERIODIC MAINTENANCE SCHEDULE OF THIS MANUAL.
- WHEN STARTED, LET THE ENGINE WARM UP FOR 5 MINUTES BEFORE CONNECTING THE LOAD (EXCEPT WITH A PRE-HEATED ENGINE).
- FOLLOW SCRUPULOUSLY THE INSTRUCTIONS CONCERNING THE CHECKING AND THE MAINTENANCE GIVEN THROUGHOUT THIS MANUAL.
- NEVER OVERLOAD THE ENGINE.
- NEVER USE ANY "RUNNING IN" LUBRICATING OIL.
- NEVER RUN THE ENGINE OFF LOAD FOR MORE THAN 5 MINUTES.
- MAXIMUM LOAD CAN BE APPLIED TO A NEW ENGINE AFTER THE STARTING PROCEDURE AND AS SOON AS THE COOLING SYSTEM TEMPERATURE HAS REACHED 60C.

MAINTENANCE

Valve clearance must be checked every :

- 100 ~ 200 running hours for engines
TD 1010 G - TD 1210 G - TWD 1210 G - TWD 1211 G
- 300 running hours for engines
TAD 1230 G - TWD 1630 G - TAD 1630 G - TAD 1631 G

Take advantage of this maintenance to retighten the injectors(50 Nm / 5 m.kg)

G. CHECKS, ADJUSTMENTS AND MAINTENANCE PROCEDURES TO BE CARRIED OUT AFTER THE FIRST 50 HOURS.

Note: this is the first compulsory maintenance call (except daily and monthly inspections) to be carried out by our After Sales Service. See Guarantee book. Remember to warn your Service Centre well in advance.

CAUTION:

Before performing any operation on the generating set, ensure that it cannot be started. To avoid an unwanted start, put the Start Switch in the "  " position, or the Function Selector Switch in the "  " position, or press the "Shut Down" push-button. Then switch off the circuit-breaker of the engine water heater (beside the control panel or in the power compartment).

The stages of these operations are explained in Section H of this manual.

I - ENGINE

• Cold Engine (or warm for auto-starting gensets)

- Check that the engine is warm.
- Check and adjust the play of the rocker levers.
- Check the tension of the fan and the alternator drive belts.
- Check the tightness of the screws and particularly the air and exhaust manifolds and engine support.
- Check the water level and top up if necessary.

• Warm Engine

- Start the genset, bring it to its normal running temperature, then stop it.
- Drain the oil.
- Replace the oil filter cartridge and fill up with new, clean and approved lubricating oil to the top mark of the dipstick.
- Restart the genset and ensure that the coolant, the oil, the fuel or the exhaust gas do not leak.
- Stop the genset and after a few minutes check the oil level. Top up if necessary.

II - ALTERNATOR

Tighten the connections.

III - CONTROL PANEL

Tighten the connections.

IV - STARTING BATTERY

Check the electrolyte level and top up if necessary.

Check the charge level and recharge if necessary.

Check the tightness of the lead connections.

V - CANOPY

Grease the door hinges.

● the locks.

Coat the seals with a silicone grease.

Check for any peeling of the soundproof lining (soundproof canopy).

Check for unrestricted air flow in the noise attenuators (if fitted).

VI - TRAILER

Tighten roadwheel nuts.

Check the tyre pressures and inflate if necessary (without forgetting the spare wheel if provided).

Grease the handbrake compensator and the control system.

Check that all the lights are operational.

Adjust the brakes.

Check for the good operation of the braking system by doing a test drive.

Note: our After Sales Service Centre reserves the right to modify this schedule, and on the basis of the data that they have on your generating set.

H. PREVENTIVE MAINTENANCE

I - GENERAL MAINTENANCE INSTRUCTIONS

MAINTENANCE SCHEDULE

Although regular maintenance operations have been given in the maintenance schedule, you are reminded that it is the environment in which the engine operates which establishes the maintenance schedule. You must therefore realise that, if the engine works in extreme conditions, you should shorten the intervals between operations. Use the schedule in the next page to establish your own schedule and adapt it to your particular conditions of use. (Schedule to be approved by your After Sales Service Centre).

After the first 50 hours of service, perform the operations described in the previous Chapter.

CAUTION:

BEFORE ANY MAINTENANCE OPERATION ON THE GENERATING SET, PUT THE START SWITCH IN THE " GO " POSITION OR THE FUNCTION SELECTOR SWITCH IN THE " O " POSITION OR PRESS THE "SHUT DOWN" PUSH-BUTTON (DISABLE START). THEN SWITCH OFF THE CIRCUIT BREAKER OF THE WATER HEATER (BESIDE THE CONTROL PANEL OR IN THE POWER COMPARTMENT).

NOTE:

Our After Sales Service Centre reserves the right to modify any part of the schedule, according to the data they have on your generating set.

II - GENERAL MAINTENANCE SCHEDULE

● or every month - ▲ or every 6 months - ■ or every year - ♦ or every 2 years

Every DAY or 8 hours	Every 200 hours	Every 300 to 600 hours	Every 800 hours	Every 1,200 hours	Every 2,400 hours	Every 6 mths	Every year	OPERATIONS TO BE PERFORMED	Page
	X							Check the position of the start switch and circuit breaker (auto-starting gensets)	31
	X							Check for oil, fuel and coolant leaks	31
	X							Check the levels of oil, fuel and coolant	31
	X							Check for unrestricted air flow	33
	X							Check the absence of unusual vibration	
	X							Check the engine fan or the remote fan	34
								Check the level of clogging in the air filters	34
	X							Check the condition of the drive belts	34
	X							Check that the water heater is operational (auto-starting gensets)	34
	X							Check that the fuel gauge and transfer pump are operational (optional)	35
every month								Carry out a running test on the generating set (stand-by gensets)	35
	X							Change the engine oil (see following table)	36
	X							Check the tension of the belts	37
		X						Replace the oil filters	37
		X						Check the general condition of the oil, fuel and coolant pipes and fittings	38
		♦						Clean the outside of the radiator or remote radiator	38
		X						Complete the anti-corrosion protection	39
		X						Grease the belt tensioner	39
		X						Check the air filtration and exhaust systems for leaks	39
		▲						Check the condition of the exhaust bellows	39
		▲						Check the electrolyte level of the starting battery	40
		X						Check the electrical cables and connections	40
		X						Check the generating set mountings and supports	40
		X						Check the alternator electrical connections	40

Every DAY or 8 hours	Every 200 hours	Every 300 to 600 hours	Every 800 hours	Every 1,200 hours	Every 2,400 hours	Every 6 mths	Every year	OPERATIONS TO BE PERFORMED		Page
								GENERAL INSPECTION	MAINTENANCE AND MAINTENANCE DURING THE DAY	
	X							Check that the exhaust flap is operational		40
		▲						Grease the hinges and lubricate the locks		40
		▲						Coat gaskets with silicone grease and check fixing of the canopy soundproof lining		40
								Check that the battery charger or charge alternator is operational		41
			X					Replace the fuel filters		341
			X					Vent the fuel supply system		41
				■				Check the charge level of the battery and the condition of its connections		42
				■				Check the condition of cables and connections to the power system		43
				■				Retighten the lifting system (mobile gensets)		43
				■				Check that the safety LEDs/indicators are operational		43
				■				Drain the condensation water from the exhaust system (local)		43
				■				Drain the auto-fill oil reservoir (optional) (1)		
				■				Clean the generating set and check the alternator insulation		44
				■				Clean the alternator and the control panel or control panel with doors		44
				■				Perform any paint touch-up and maintain the steel sheet canopy		45
				■				Check the generating set main circuit-breaker		45
			X					Check the valve clearance (3)		45
	X	X		X				Check the injectors		45
				X				Check the general condition of the turbo charger		46
				◆				Perform a full-load test		46
				X				Check the outlet, mountings and supports of the exhaust pipework		46
					X			Replace the coolant filter		46
					◆			Replace the coolant (2)		47

(1) If your generating set is fitted with an oil auto-fill reservoir, the oil (in the oil sump) needs only be checked at 200 hours for an oil drain at 400 hours.

(2) The service interval is extended to 2 years for TWD1630 G - TAD1630 G - TAD1631 G engines.

(3) See running-in period (Chapter F).

Oil Change Intervals

Depending on running hours, sulphur content of the fuel and quality of the lubricating oil.

Note: If longer oil change intervals than those given here are required, the condition of the oil must be checked by the manufacturer by regular lubricating oil tests.

ENGINES

TD 1010 G

TD 1210 G

TWD 1210 G

TWD 1211 G

TAD 1230 G VDS

and TAD 1631 G

Oil Quality	Sulphur Content of Fuel, in % by weight		
	< 0.5%	from 0.5 to 1.0%	> 1.0%
Oil Change Interval: first reached during operation			
VDS	24 mths or 400 hrs	24 mths or 200 hrs	12 mths or 100 hrs
API: CD or CE	12 mths or 200 hrs	12 mths or 100 hrs	12 mths or 50 hrs

ENGINES

TWD 1630 G

and TAD 1630 G

Oil Quality	Sulphur Content of Fuel, in % by weight		
	< 0.5%	from 0.5 to 1.0%	> 1.0% *
Oil Change Interval: first reached during operation			
VDS	24 mths or 600 hrs	24 mths or 300 hrs	12 mths or 150 hrs
API: CD or CE	12 mths or 300 hrs	12 mths or 150 hrs	12 mths or 75 hrs

* Lubricating oil with TBN > 15 is recommended when using fuel with sulphur content higher than 1.0% by weight. (TBN = Total Base Number).

III - TRAILERS GENERAL MAINTENANCE SCHEDULE

Every month	At the first 100 km	Every 1,000 km	Every 1,500 km	Every 20,000 km	OPERATIONS TO BE PERFORMED	Page
					Grease the roadwheel axles	48
					Adjust the brakes	48
					Tighten the roadwheel nuts	
					Check the tyre pressure and inflate if necessary	
					Check the brake parts and their movements	
					Check the tightness of the roadwheel nuts	
					Check the tyre pressures and inflate if necessary	
					Check the light signals are operational	
					Grease the overrun brake mechanism	
					Grease the hand brake control system	
					Grease the hub bearings	48

IV - MAINTENANCE RECORD

This summary will allow you to keep a record of the maintenance performed on your generating set. It must be filled in by the engineer undertaking the service work in accordance with the

Running Hours	Date	Maintenance Performed	Engineer	Running Hours	Date	Maintenance Performed	Engineer	Running Hours	Date	Maintenance Performed	Engineer
200				400				800			
1000				1200				1400			
1600				1800				2000			
2200				2400				2600			
2800				3000				3200			
3400				3600				3800			
4000				4200				4400			
4600				4800				5000			
5200				5400				5600			
5800				6000				6200			
6400				6600				6800			
7000				7200				7400			
7600				7800				8000			
8200				8400				8600			
8800				9000				9200			
9400				9600				9800			
10000				10200				10400			
10600				10800				11000			
11200				11400				11600			
11800				12000				12200			
12400				12600				12800			
13000				13200				13400			
13600				13800				14000			
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19200				19400				19600			
19800				20000							

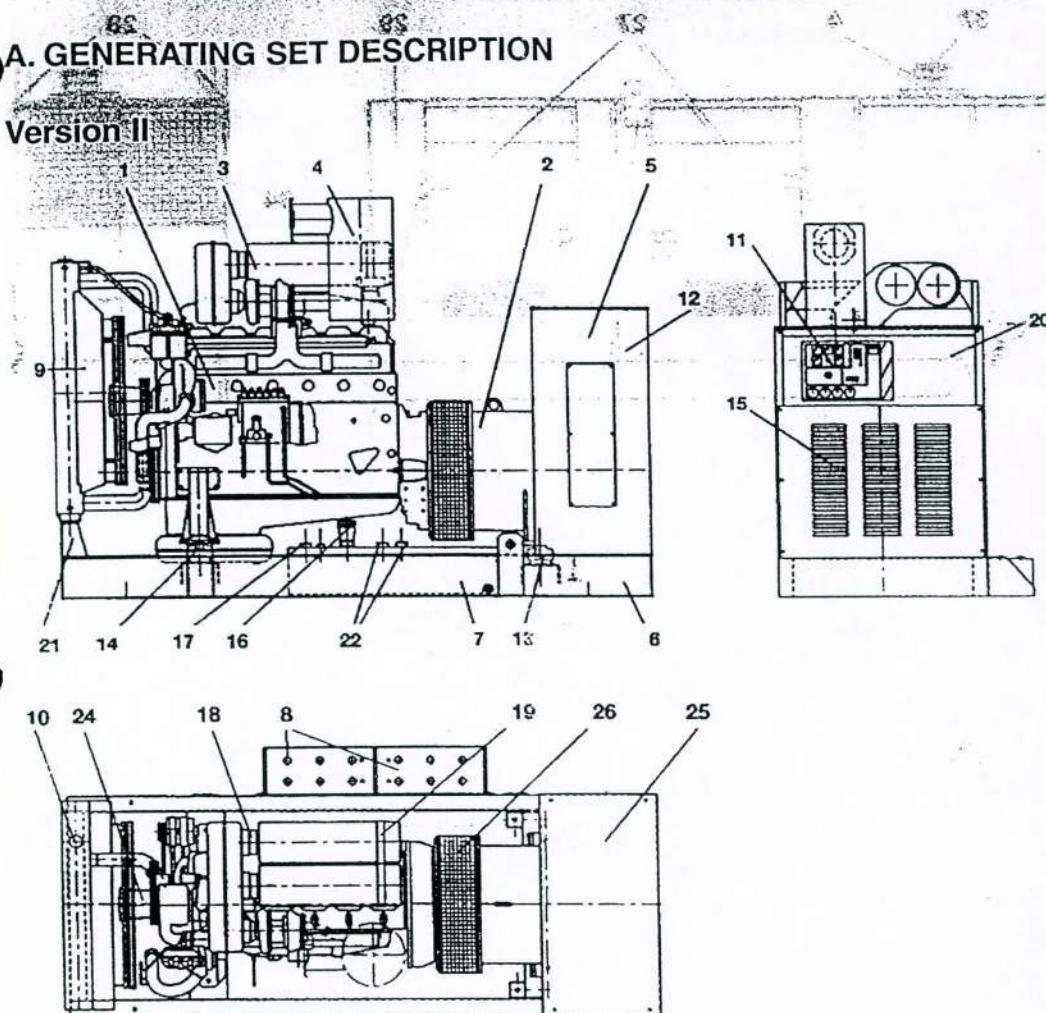
Start a new table from 20,200
running hours

Spare Parts Changed (except Maintenance Parts) **СРОЧНАЯ ЗАКАЗКА - У**

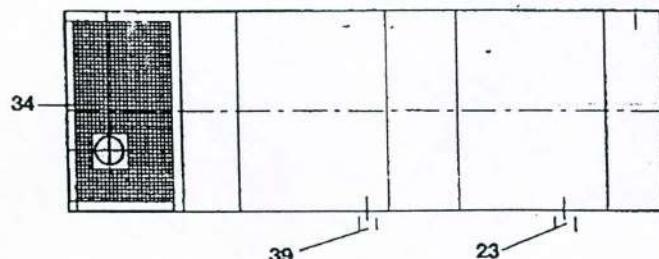
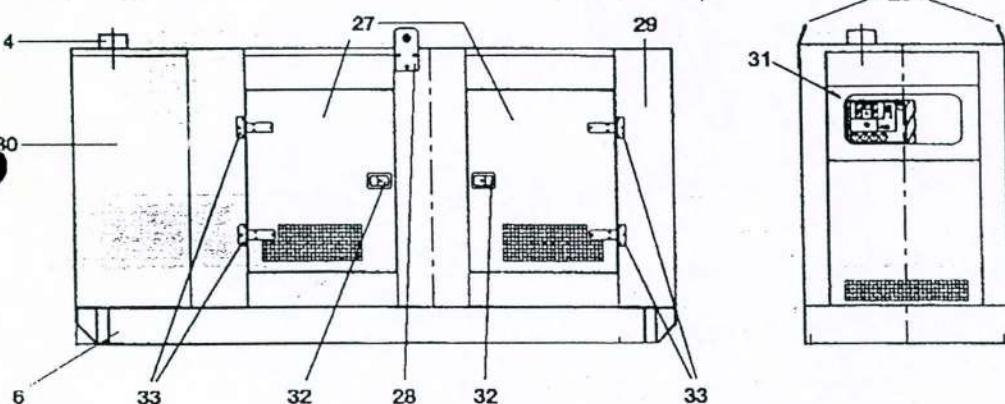
V - DETAILS OF PREVENTIVE MAINTENANCE OPERATIONS

A. GENERATING SET DESCRIPTION

Version II

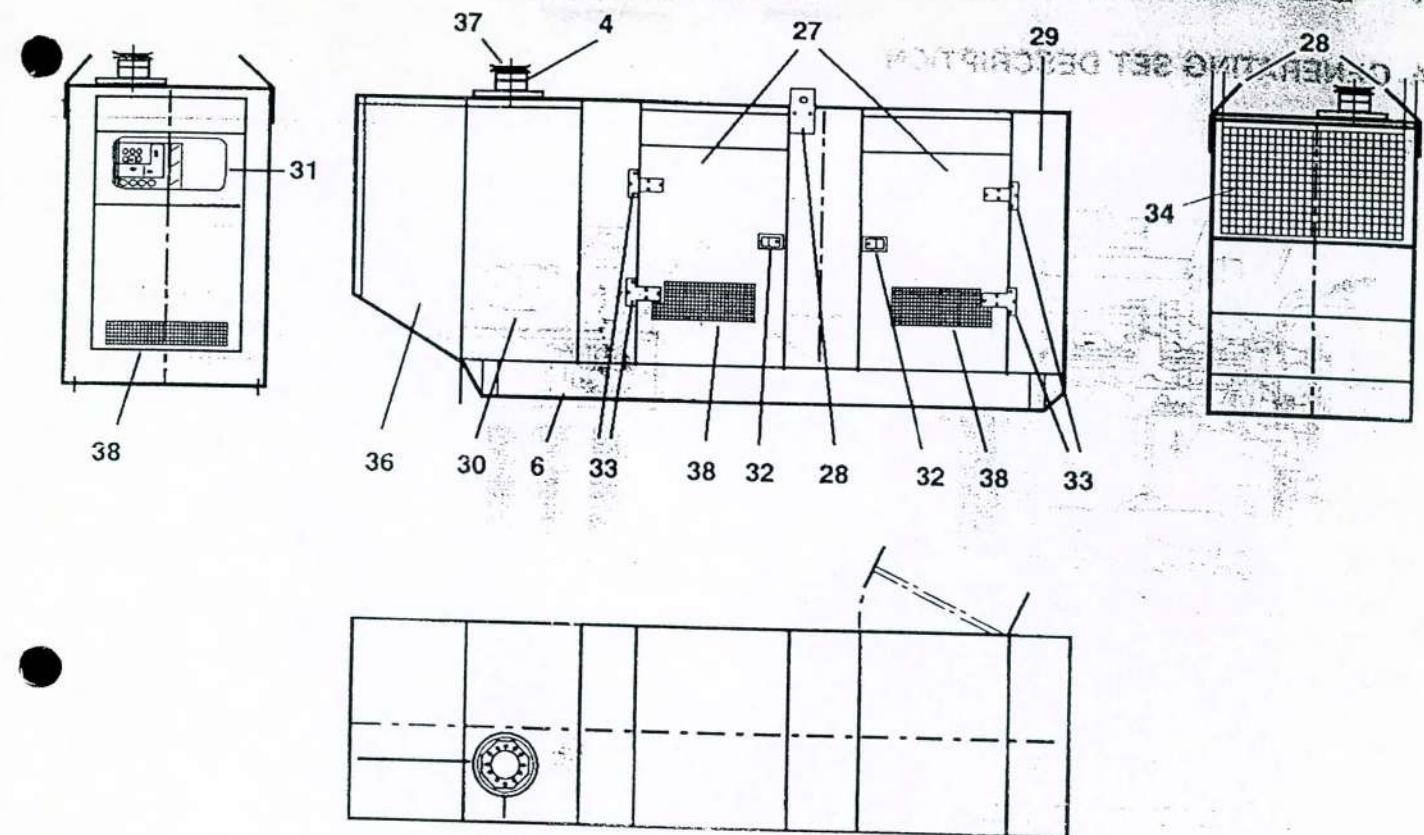


Basic Canopy

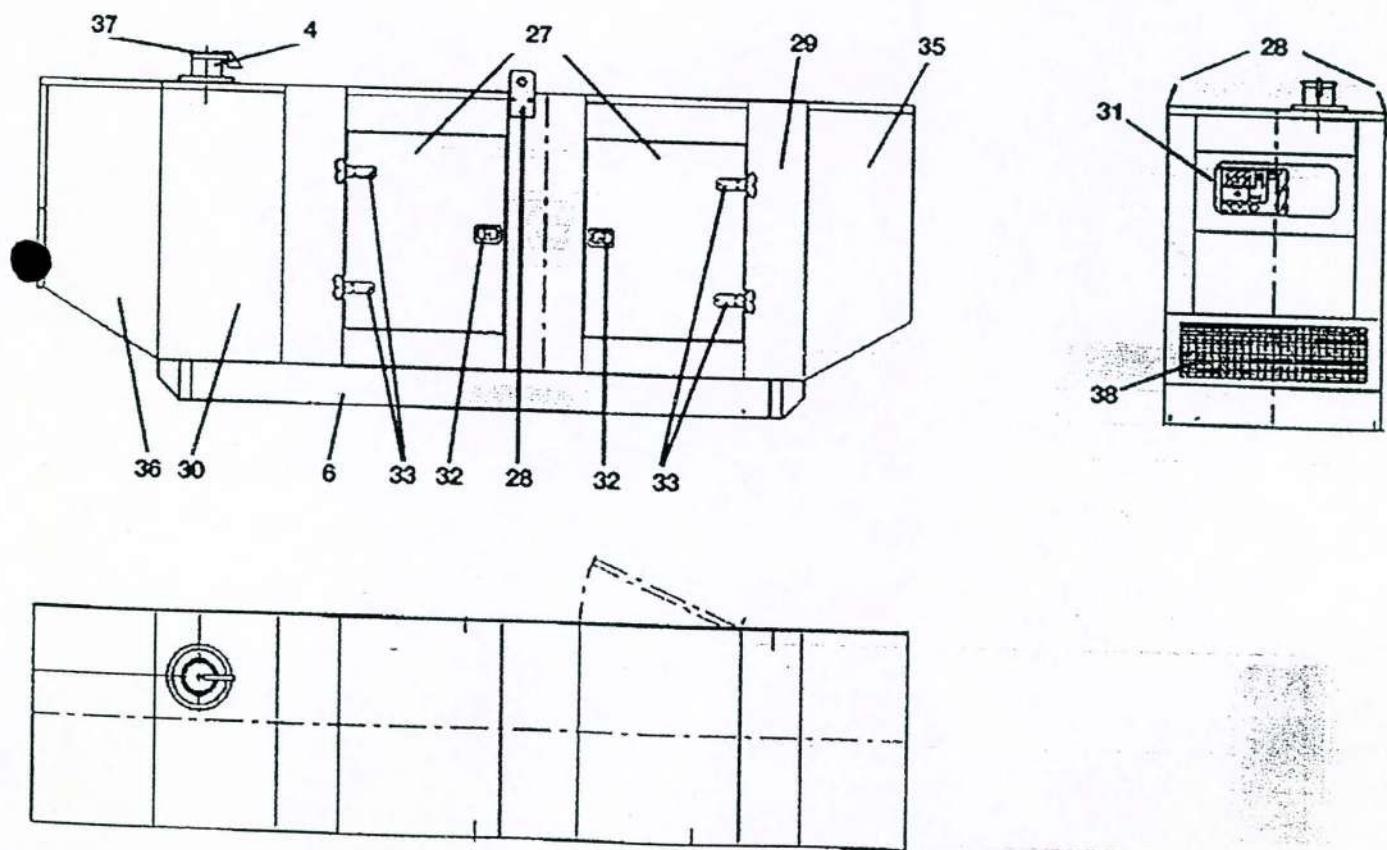


- 1 - Engine
- 2 - Alternator
- 3 - Air Filter
- 4 - Muffler
- 5 - A.V.R. Steel Sheet
- 6 - Chassis
- 7 - Fuel Tank
- 8 - Starting Battery
- 9 - Radiator
- 10 - Radiator Filler Cap
- 11 - Control Panel
- 12 - Alternator Side Panel
- 13 - Alternator Suspension Point
- 14 - Engine Suspension Point
- 15 - Air Intake
- 16 - Fuel Filler Neck
- 17 - Fuel Gauge
- 18 - Air Filter Pipe
- 19 - Air Filter Support
- 20 - Front Plate
- 21 - Radiator Support
- 22 - Fuel Tank Pipes
- 23 - Separate Auto-fill Fuel Pipes
- 24 - Fan
- 25 - Alternator Top Panel
- 26 - Alternator Fan Grille
- 27 - Doors
- 28 - Lifting Lugs
- 29 - Front Casing
- 30 - Rear Casing
- 31 - Control Panel Door
- 32 - Locks
- 33 - Hinges
- 34 - Air Outlet Grille
- 35 - Soundproof Front Casing
- 36 - Soundproof Rear Casing
- 37 - Exhaust Flap
- 38 - Air Inlet Grille
- 39 - External Tank Pipes

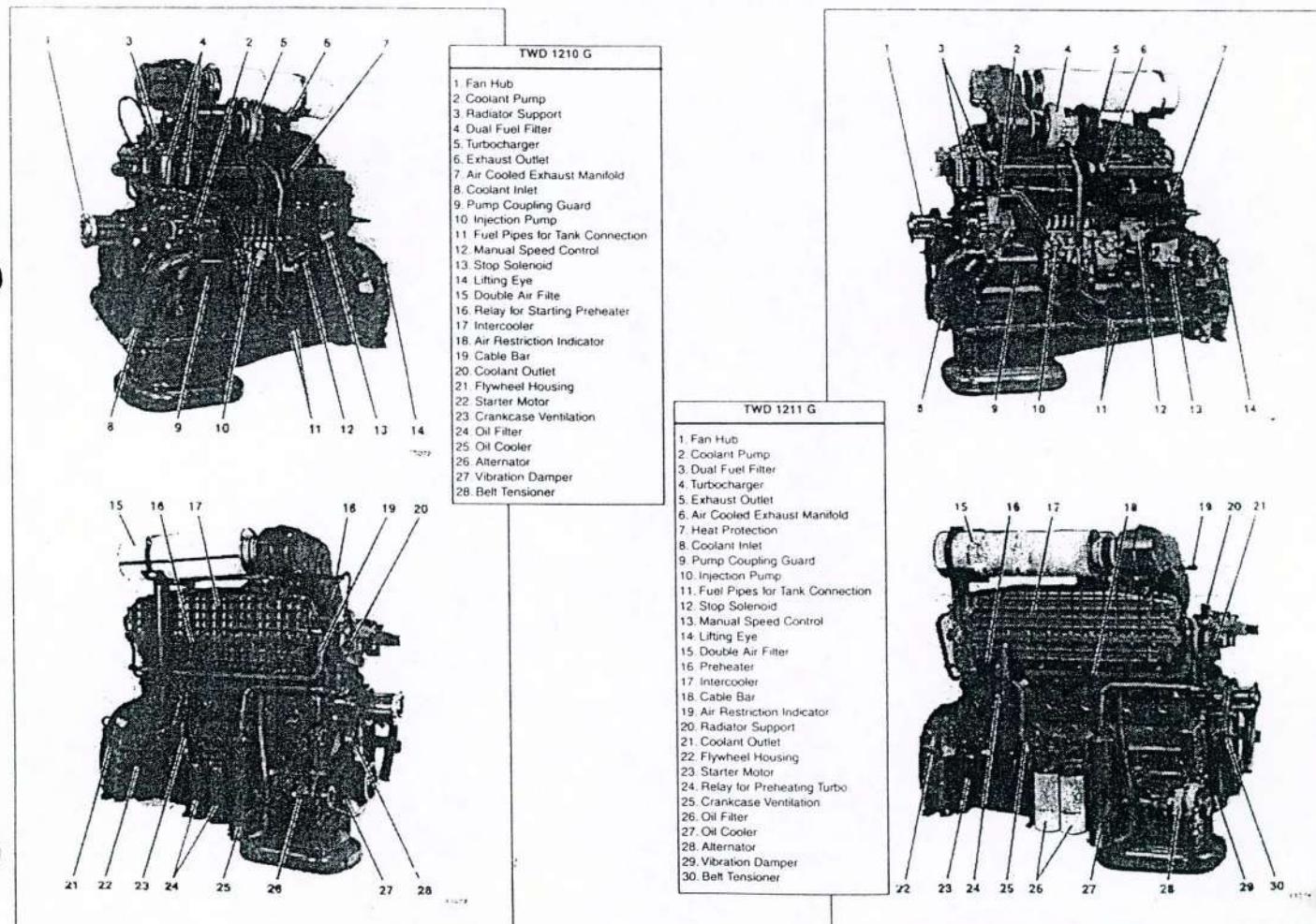
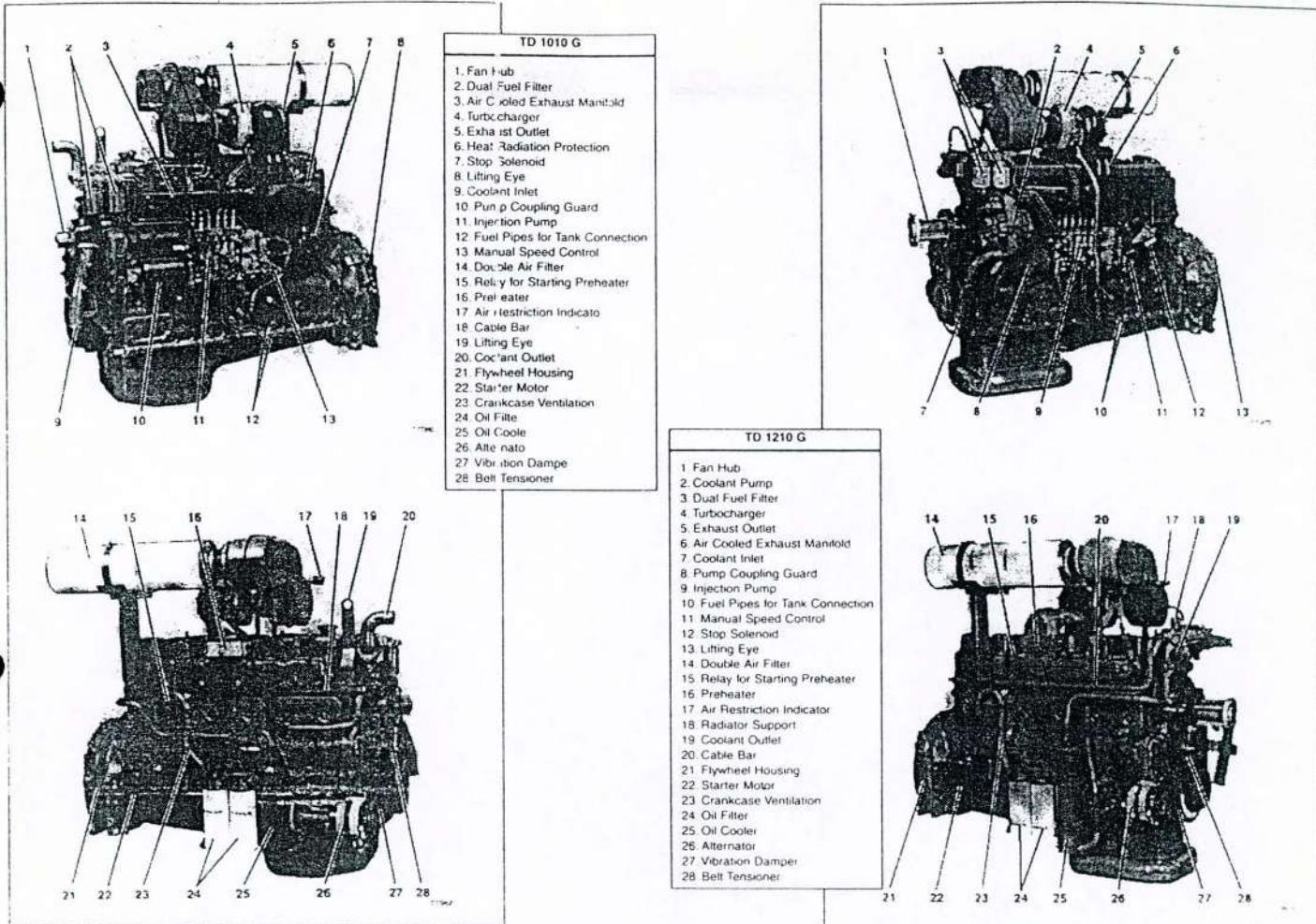
SSI Canopy
APPENDIX A - DETAILS OF PREVENTIVE MAINTENANCE

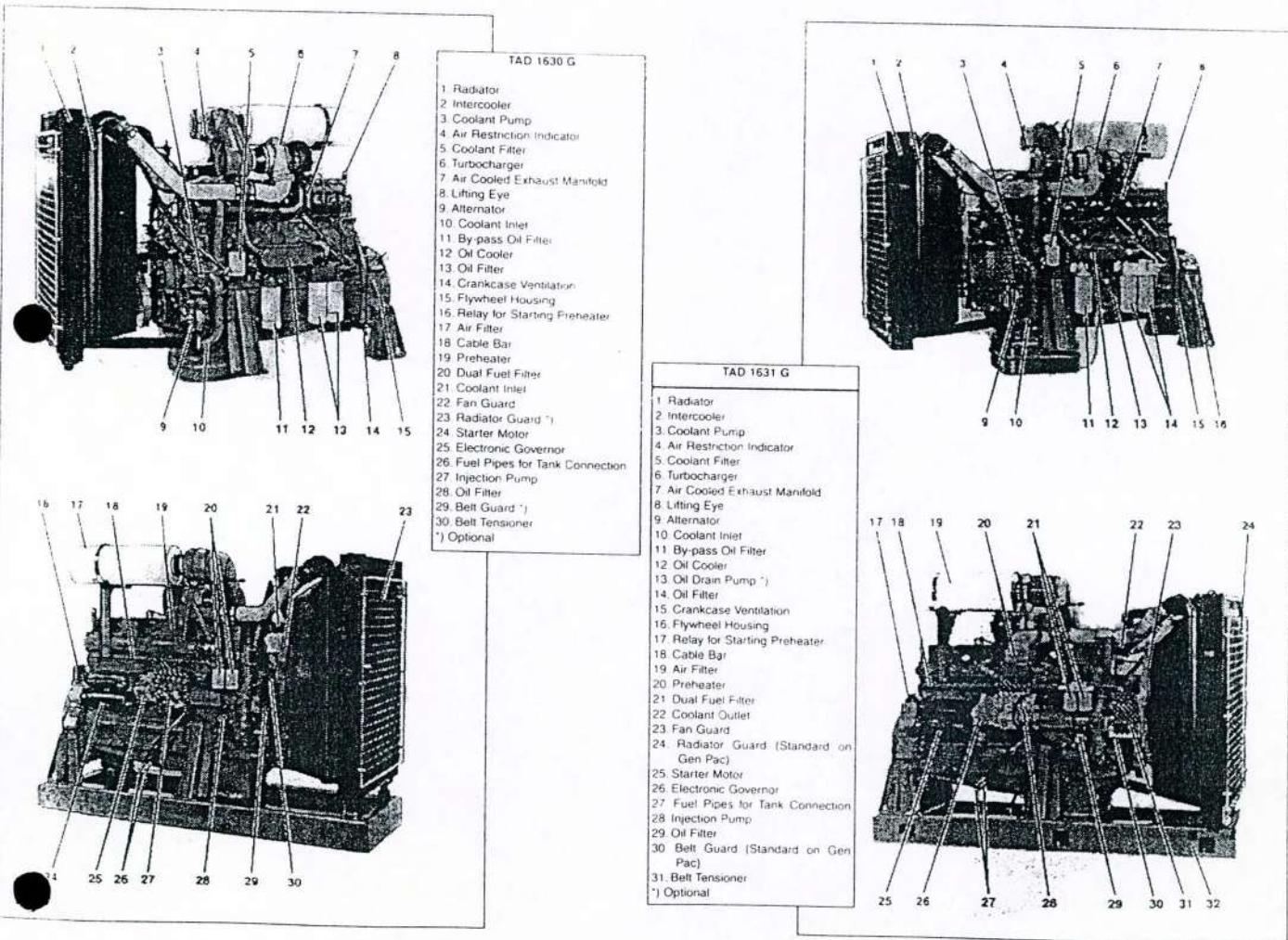
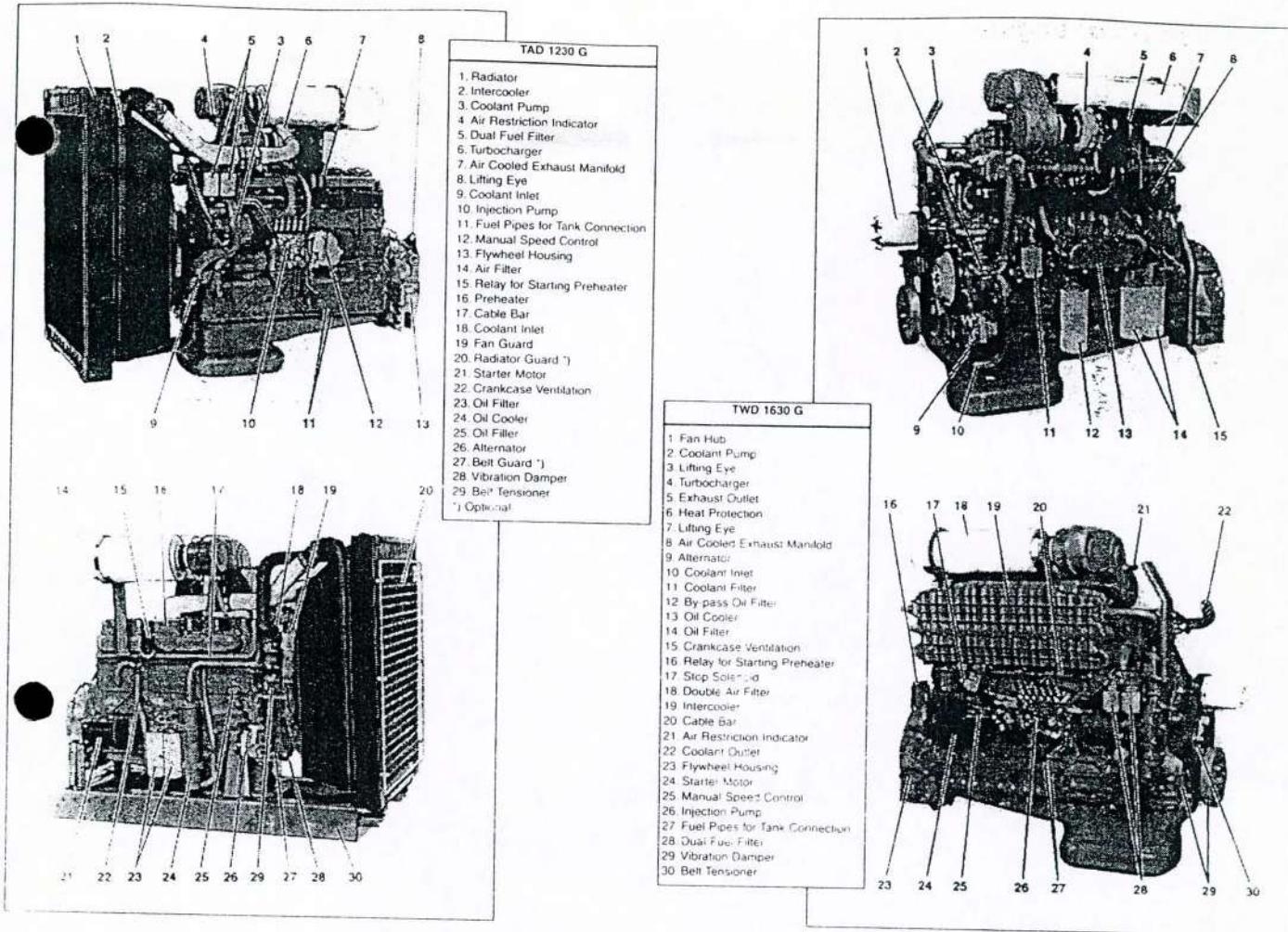


SSI Canopy



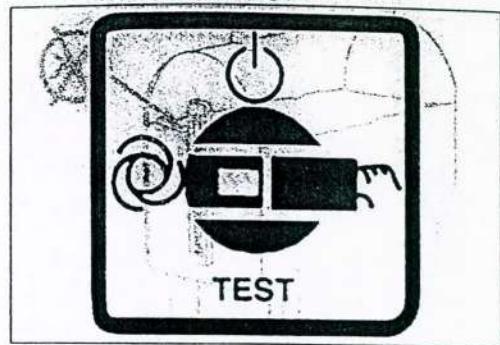
1. Description of engines





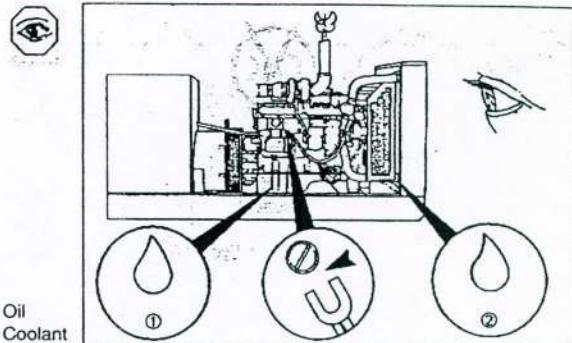
2. Checking the Position of the Start Switch and Circuit Breaker

- Ensure that the start switch is situated in position "ON" or "AUTO" and that the main circuit breaker is in position "ON", "NORMAL" or "I" (ready to deliver power to the installation).



3. Checking for Oil, Fuel and Coolant Leaks

- Visually check that there are no leaks or deterioration in the system.
- Repair and/or replace as necessary.

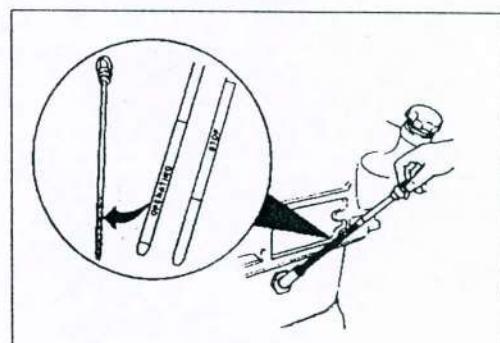


4. Checking the Oil, Fuel and Coolant Levels

- Oil :

- ⚠** - Never run the engine when the oil level is below the low mark or above the high mark of the dipstick.
- If necessary stop the generating set and wait at least 3 minutes for the oil to go down into the oil sump before checking the level.
- The correct oil level is situated between the two marks of the dipstick.
- If the level is incorrect, top up with oil through the filler neck until a correct level is reached.

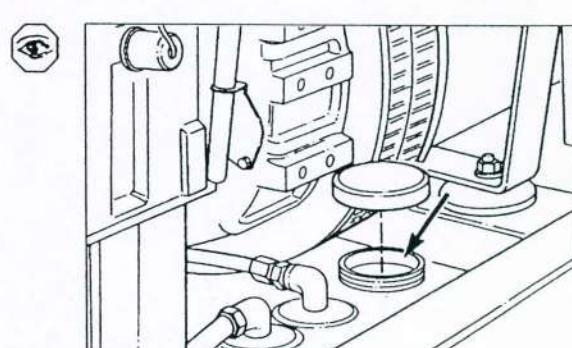
NOTE: The dipstick can be removed either during operation (side marked "OPERATING"), or when the engine is stopped (side marked "STOP").

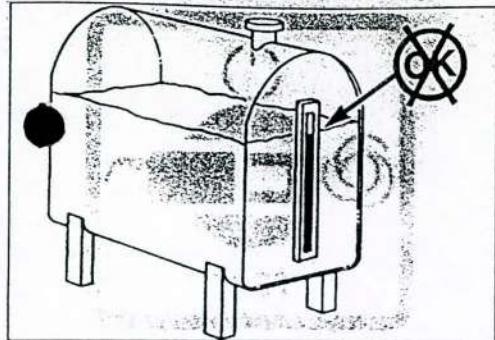


- Fuel:

- Read the direct reading gauge or remove the fuel cap to check the level.
- If the level is insufficient for the service required, remove the fuel filler cap and top up then reinstall the cap.

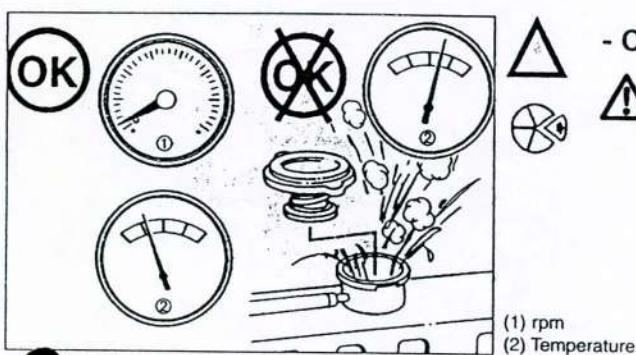
The procedure is identical for a chassis tank or day tank.





NOTE: If your installation is fitted with a fuel automatic transfer from the main tank to the chassis or day tanks, check the level in the main tank. The two tanks will be filled automatically via a transfer pump and gauges.

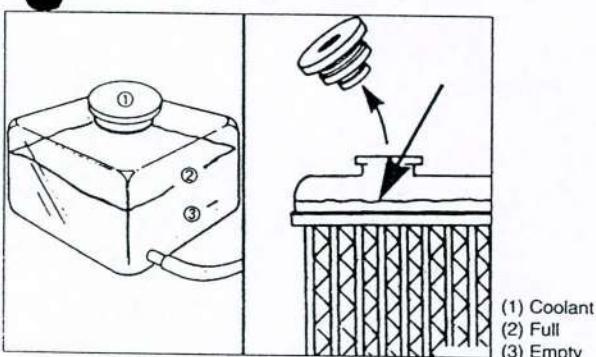
© 1997 Daimler-Benz AG



- **Coolant:**

Warning: Always stop the engine before checking the coolant level. Wait until temperature has dropped below 70°C (160°F) before removing the cap. Otherwise, you could be injured by the hot coolant spray.

- Slowly unscrew the cap in order to depressurize the cooling system and visually check the coolant level (correct level: lower edge of the filler neck).
- If the level is insufficient, pour prepared coolant through the filler neck to the lower edge and reinstall the cap.



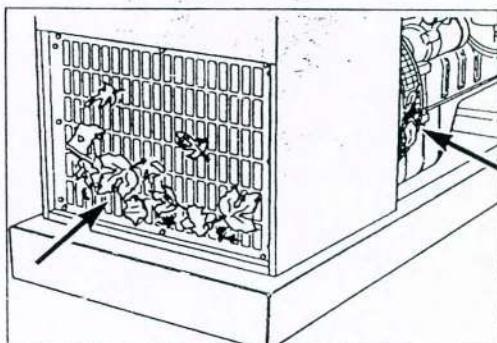
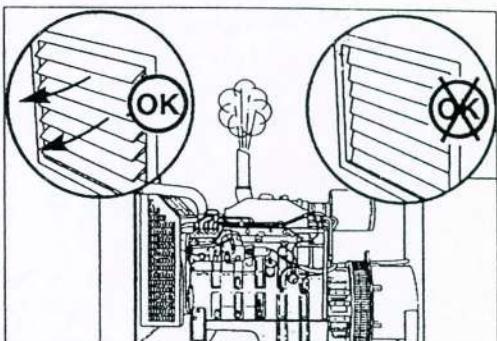
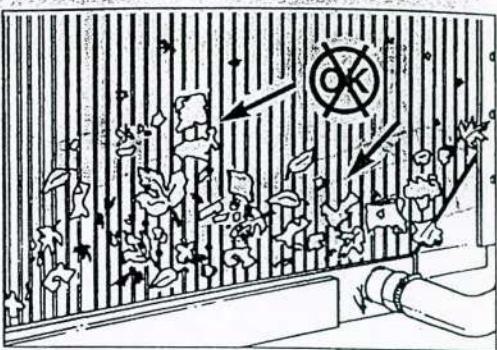
(1) Coolant
(2) Full
(3) Empty

NOTE: Never use any additives to stop the cooling system from leaking. This could block the cooling system and reduce the coolant flow.

5. Checking for Unrestricted Air Flow

Check that air flow is not restricted or blocked.

- Check that the radiator or remote motorised radiator core is not obstructed or covered with debris or dirt and clean if necessary.
- Check the operation of the air inlet and outlet louvres when starting the generating set.
- Check that the air flow is not restricted in the noise attenuators or the grilles/louvres and clean or remove obstruction if necessary.
- Check that the generating set air suction grilles are not obstructed by debris or dirt and clean if necessary.

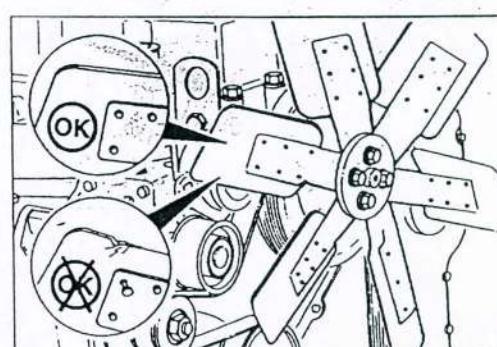
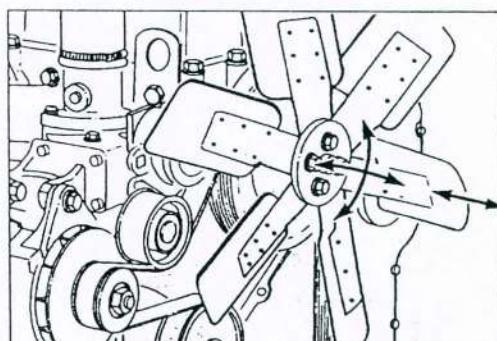


6 . Checking the Engine Fan or Remote Fan

- Check that the fan blades are not damaged or loose.
- Check that the blades are securely mounted.
- Replace or remount if necessary.

If incorrect operating is suspected :

- Remove the drive belt.
- Check the fan hub bearing (the fan hub must spin freely without rubbing or excessive axial play).
 - Maximum axial play: 0.15 mm.
- Reinstall the drive belt.



B
A



7. Checking the Level of Clogging in the Air Filters.

Check that the filters are not clogged. Replace the filters when the indicator remains in fully red sector (1) after the engine is stopped. Reset the indicator after changing the filters by pressing button (2).

CAUTION! Do not touch the filters before the indicator shows red sector. Scrap the old filters. Not to be cleaned or reused.

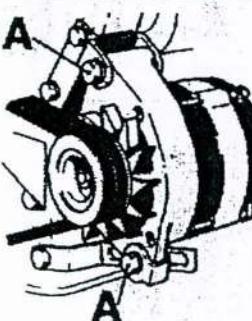
Note: For operating in extremely dirty environments (e.g. coal mines), a special air filter is required (not marketed by Volvo Penta).

* Every 8 hours during continuous operation.

Replacing the air filters:

Loosen clamps A and B then remove the air filter

Install the new filters et retighten clamp A then clamp B.



8. Checking the Belts

Check the general condition of the belts and replace if they are frayed or cut.

NOTE: Adjust the tension of the belts which show a dull or shiny surface, because this indicates slip on the pulley. Belts properly installed and tensioned will show an equal and regular wear.

Deterioration of the drive belts is caused by the following:

- Incorrect tension
- Incorrect size and length
- Misaligned pulley
- Incorrect installation
- Dusty environment
- Presence of oil or lubricant

NOTE: see "Checking the Tension of the Belts" in Chapter 12.

9. Checking the Operation of the Water Heater (auto-starting gensets)

- Check that the generating set is heated by touching the engine block. It will feel warm.

(Non heated genset: engine at ambient temperature).



(You cannot perform this check until the genset has been stopped for at least 24 hours.

10. Checking the Operating of the Fuel Gauge and Transfer Pump (using the STOP/START key)

Fuel Gauge

This check only applies to mechanical gauges which activate the start or stop of a transfer pump.

Normally, this check can be performed visually and audibly.

- When reaching the low level limit of the gauge, the transfer pump will start and the tank will fill.
- When reaching the high level limit of the gauge, the transfer pump will stop.

If these gauges do not function properly, the tank can either run dry (empty the fuel system) or overfill (overflow the tank). In each case, repair or replace the faulty gauge(s).

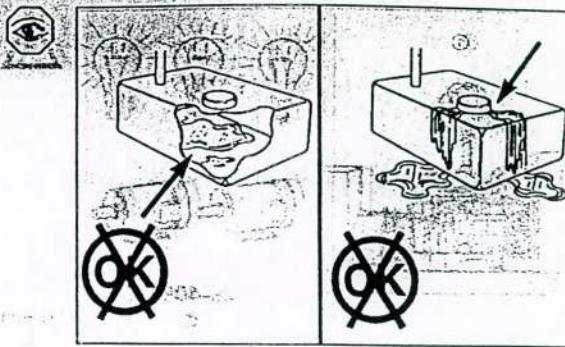
- Fuel Transfer Pump :

Visually check that the pump is running. The pump is triggered by the fuel gauge when the "low" level is reached.

NOTE: if a visual check is not sufficient to locate the faulty component, an electrical check can be performed.

To do this, use a multi-meter and check the pump when the tank is empty.

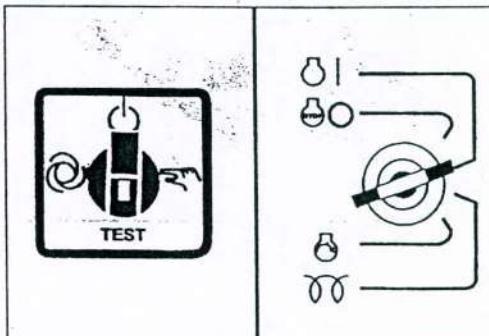
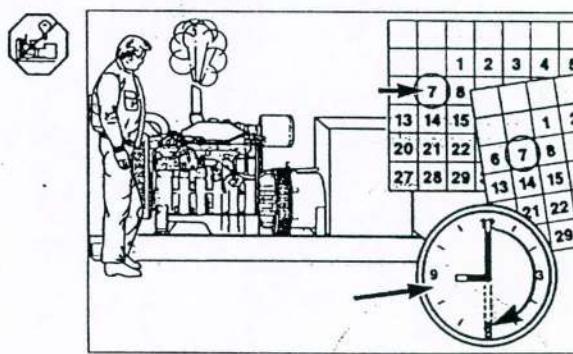
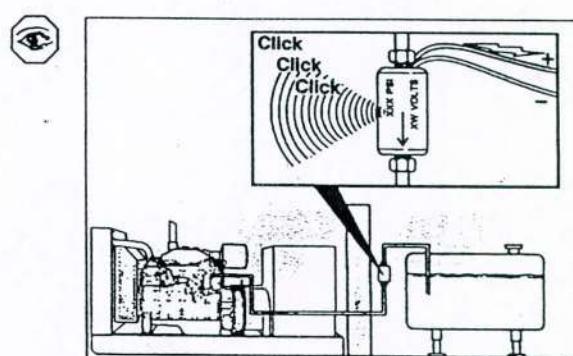
(Probable causes: broken wires, unplugged connections, jammed pump or gauge arm, etc.)

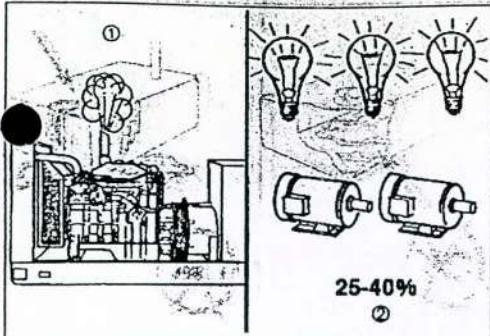


11. Carrying out a Running Test on the Generating Set (Stand-by or EJP Gensets)

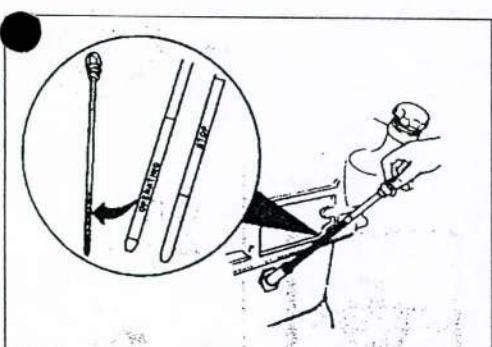
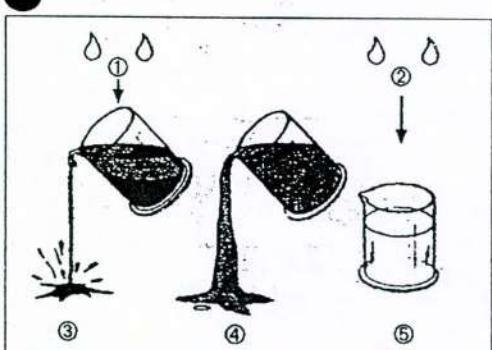
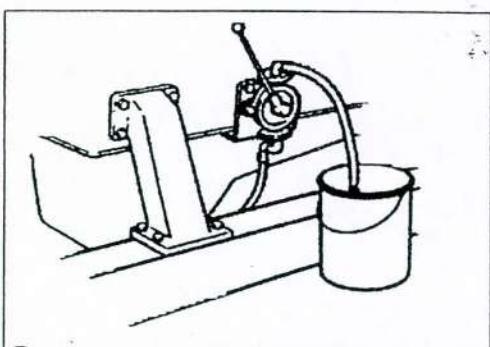
- Start the generating set by moving the function selector switch to "TEST" (auto-starting gensets) or the start key to "ON" or "MARCHE/RUN" (manual start gensets).
- The operator must remain during the test to check that the generating set is functioning properly.

⚠ It recommended to operate the generating set at a minimum of 25 to 40% of its maximum load.





- Let the engine run for 1/2 hour and stop it by moving the function selector switch to " (auto-starting gensets) or the start key to " STOP/ARRET" (manual starting gensets).



- Operate the engine until the water temperature reaches 60°C. Shut the engine off.
- Place the free end of the flexible hose inside a suitable pan that can hold at least 64 litres of oil and make secure.
- Pump the used oil with the hand pump until the sump is empty.

Note: Oil Auto Fill (optional): before pumping out the used oil, close the oil auto fill cock situated under the tank, in order to prevent the stored oil from refilling the sump.

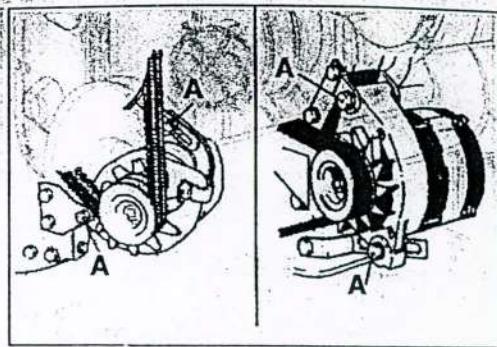
- Check the condition of the used oil :
 - a black and very fluid oil indicates a dilution by fuel
 - a milky oil indicates a dilution by coolant.
- Fill the engine with clean and approved oil to the correct level (see Chapter V.A.4)
- Operate the generating set to look for filter leaks.

Note: Oil Auto Fill (optional): Once the oil sump is filled up, reopen the cock situated under tank and top up with oil until the correct level is reached.

Drain the oil auto-fill tank once a year.

13. Checking the Tension of the V-Belts

Loosen screws (A) before tightening the alternator belts. The belts must be able to be pushed in by 10 mm between the pulleys. Worn belts working in pairs must both be replaced. Fan belts have an automatic belt tensioner.



14. Replacing the Oil Filters

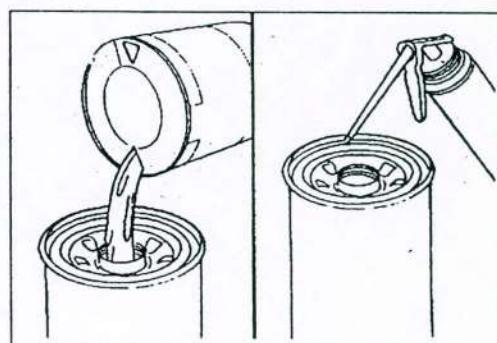
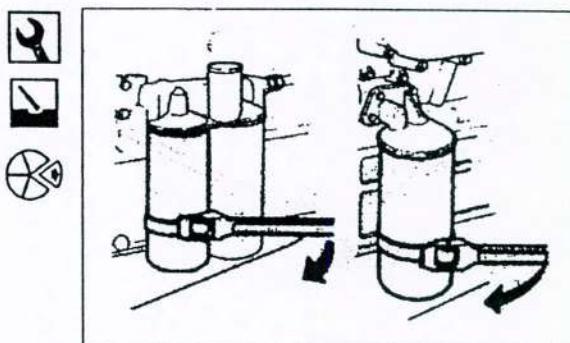
This operation must be carried out during the engine oil change (see Chapter V.A.11).

- Clean the area around the oil filter head.
- Unscrew the filter with a filter spanner.
- Clean the gasket surfaces of the filter heads.

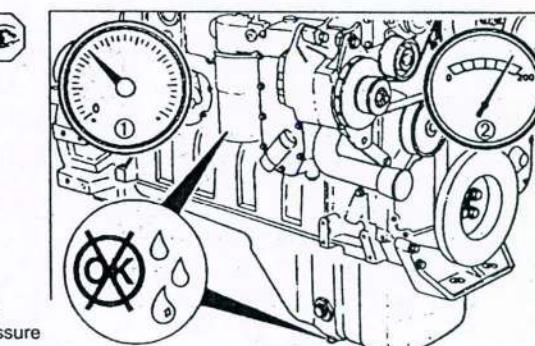
Note: The o-ring may stick to the filter head. Make sure it is removed.

- Fill the filters with clean and approved lubricating oil.
- Apply a light film of lubricating oil to the gasket sealing surfaces.
- Screw the new filters onto their supports by hand and give an extra 3/4 turn once the gaskets have touched the filter heads.

⚠ Mechanical over-tightening may distort the threads or damage the lubricating oil filter element seal.



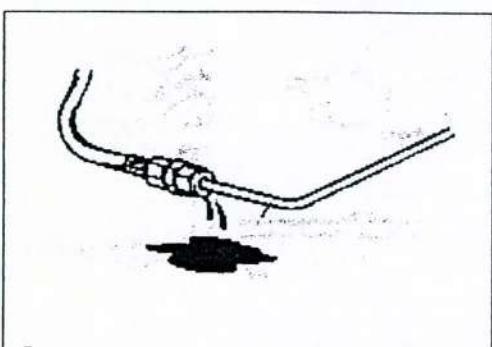
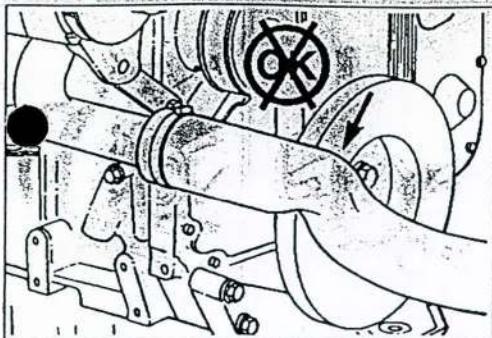
- Operate the generating set to inspect for leaks.





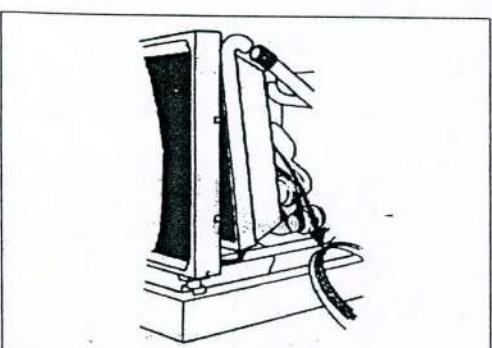
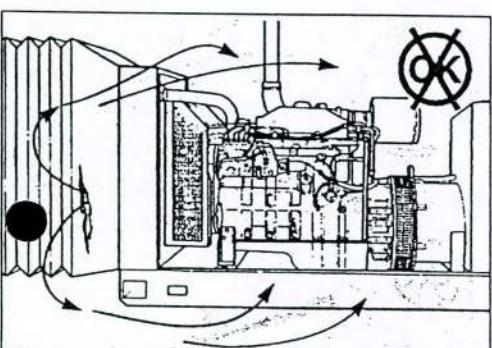
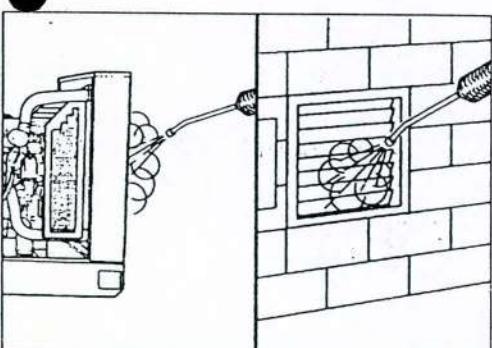
15. Checking the General Condition of the Oil, Fuel and Coolant Pipes and Fittings

- Visually check the condition of the pipes and fittings.



16. Cleaning the Outside of the Radiator or Remote Radiator

- Clean the outside of the radiator or remote radiator and air louvres.



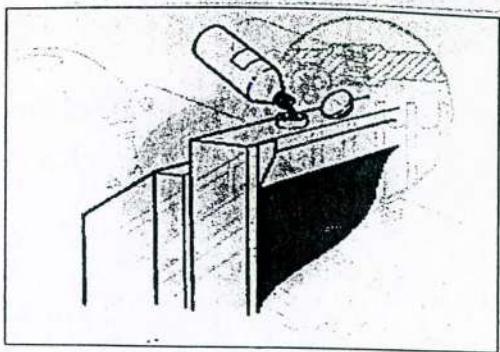
TAD Engines: In the event of severe fouling, release the intercooler. Remove the fan guard. Release the intercooler pipes from the intercooler. Release the intercooler from the radiator and tip up backwards. Clean with water and mild detergent. Observe caution so that the radiator fins are not damaged.

Note: Do not use high-pressure wash. Reinstall the parts.

Note: The need to clean depends greatly on the operating conditions, this is why frequency must be adapted according to the experience acquired for each engine after a certain operating time.

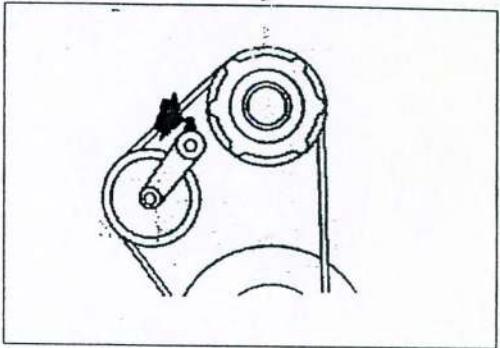
17. Anti-corrosion Protection

- Complete the cooling system anti-corrosion protection by adding half a litre of anti-corrosion agent 114526.2 (anti-corrosion protection only applies if antifreeze is not used).



18. Greasing the Belt Tensioner

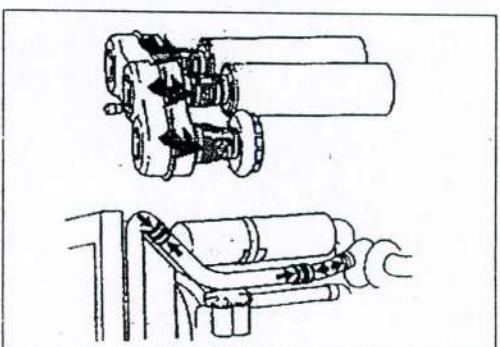
- Grease the belt tensioner taking care not to put grease on the belts.
- Check that the tensioner wheel rotates freely without any stiffness by manual turning.



19. Checking the Air Filtration and Exhaust Systems for Leaks

Air Filtration :

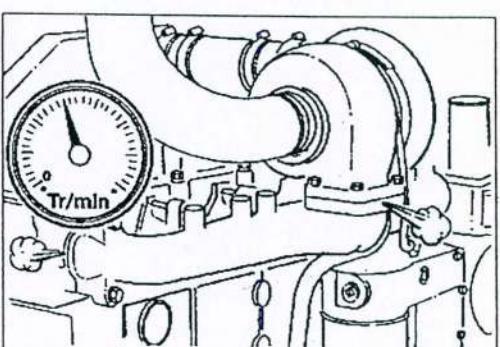
- Check that the flexible hoses are not cracked, that there are no holes on the air intake manifold and that the clamps are well tightened. Replace and/or tighten if necessary.
- Check that there is no corrosion on the manifold, under the clamps and flexible hoses. Corrosion can lead to a penetration of corroded particles and dirt into the air intake system. Remove and clean if necessary.



Never run the engine without an air filter.

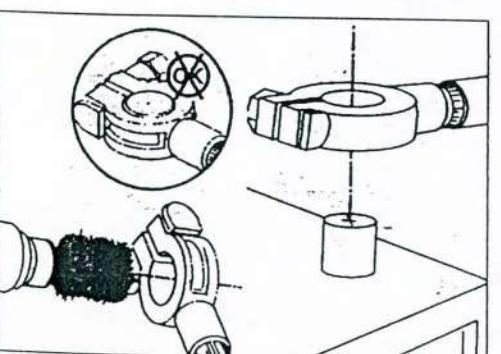
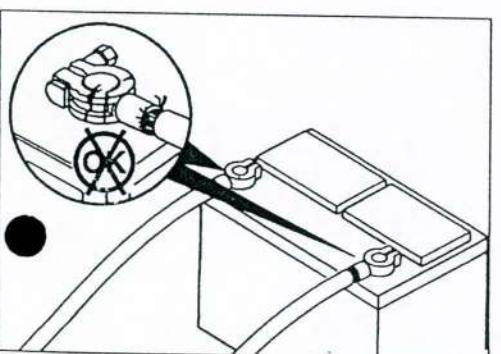
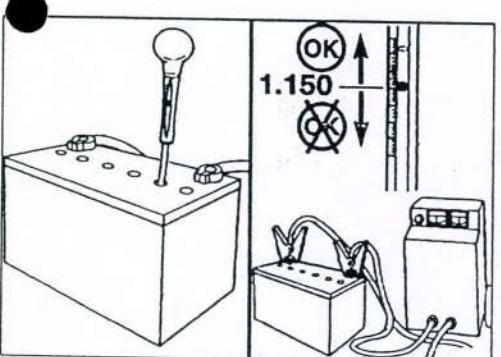
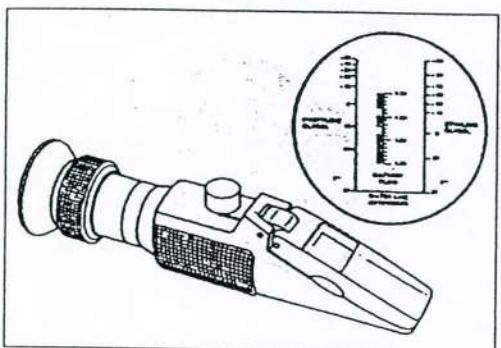
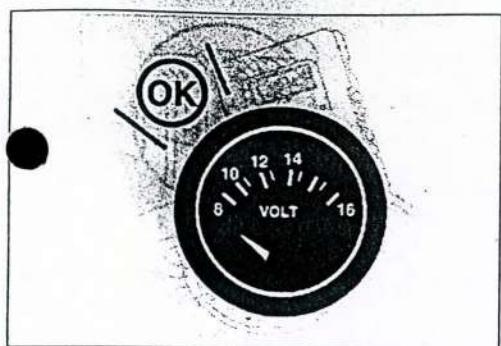
Exhaust :

- Check the outside of the exhaust pipe for leaks.
- Tighten or replace as necessary.



20. Checking the Exhaust Bellows

- Visually check that there are no leaks or deterioration of the exhaust bellows. Leaks or deterioration are indicated by the presence of black soot around it.



30. Checking the Charge Level of the Battery and Condition of its Connections

- Battery Charge Level:

- Check the state of the battery charge by either:
 - checking the electrolyte gravity in each cell with a refractometer and by referring to the documentation provided with the instrument.
 - using a traditional hydrometer and checking the electrolyte gravity in each cell according to the values shown in the table below.

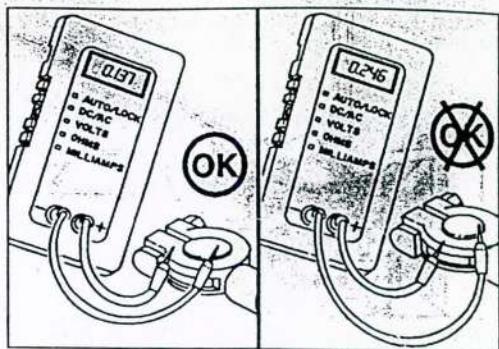
CHARGE %	GRAVITY @ 27°C (80°F)
100%	1.260-1.280
	1.230-1.250
50%	1.200-1.220
25%	1.170-1.190
Discharged	1.110-1.130

- If your measurements are lower than these values, an additional charge is necessary. Check the operation of the battery charger or charge alternator.
- Check the condition of the battery connections and cables (see this Chapter).
- Replace the battery if it does not recharge or if it does not hold its charge.
- Never leave a battery discharged.
- Never remove the electrolyte from the battery.
- Perform these checks with care. If you get any electrolyte on your skin, eyes or cloths, rinse thoroughly with water.

- Condition of the Battery Connections:

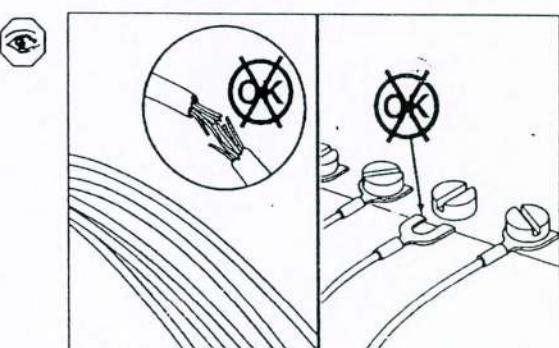
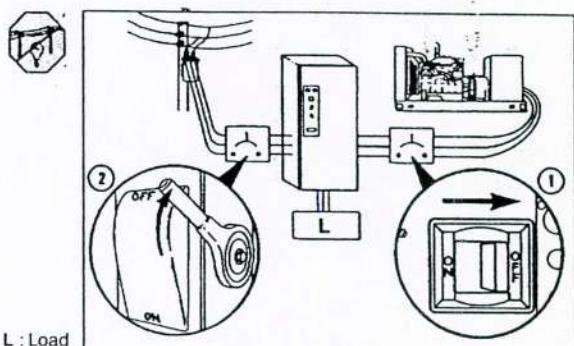
- Undo the lugs and check that they are not broken, corroded or damaged.
- Check that the cables are not cut, damaged or discoloured.
- Clean the battery terminals and lugs with a metal brush and a clean cloth.
- Refit the lugs onto the battery terminals and check with a multi-meter that the current goes through them properly. The voltage drop must not exceed 0.2 V.
- Replace the lugs if necessary.

ent. Coat the lugs with some silicone grease (Insel 0.68
position 3 silicon 100 g/100 ml) to prevent
- Tighten the lugs with a spanner and wipe off the
excess with a clean cloth.



31. Checking the Condition of Cables and Connections to the Power System

- Move the function selector switch to "O" or the start key to "GO" or to "STOP".
- Open all electrical circuits in the order indicated in the picture opposite and then use a voltmeter to check there is no voltage between the terminals of the main circuit breaker.
- Check the tightness of the terminals and check for damaged or disconnected wires.



32. Retightening the Lifting System

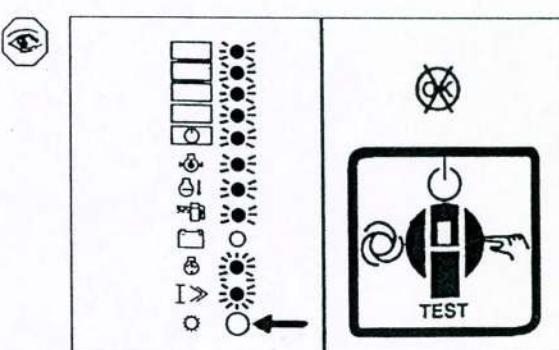
- Check and retighten, if necessary, the mountings of the lifting lugs.

33. Checking the Safety LEDs/Indicators

- Check that the safety indicators are operational by pressing the push-button ("Test LEDs or indicators").

Normally unlit, the LEDs or indicators come on and indicate that they are operational (except for the battery charge LED or indicator).

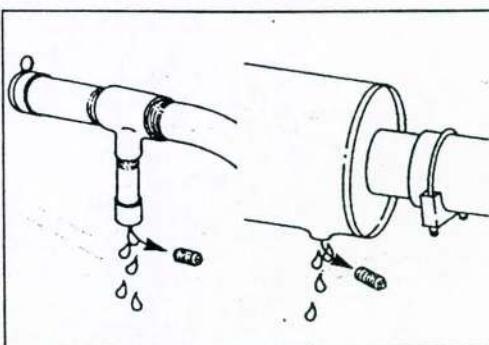
This operation cannot be performed if the function selector switch is in position "O" or "STOP".

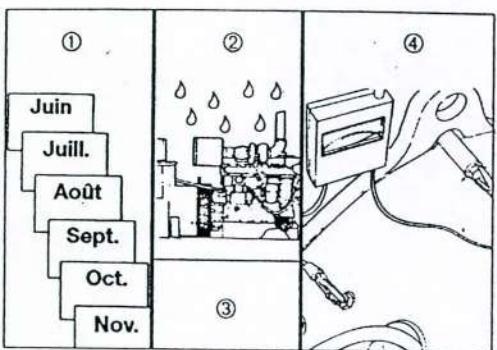
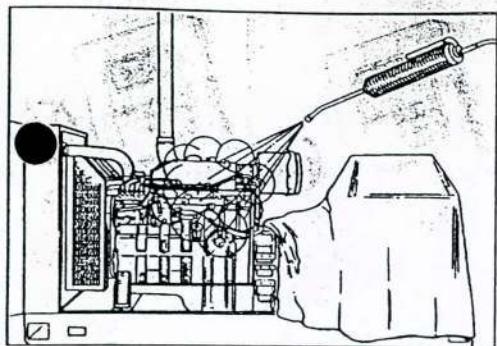


34. Draining the Condensation Water from the Exhaust System (local)

- Some exhaust systems are fitted with condensation draining points.
- These points are used to drain the condensation water from the system.

Drain the condensation through the point(s).





1. Age over 6 months
2. Temperature Change
3. High Humidity
4. Insulation Check

35. Cleaning the Generating Set and Checking the Insulation of the Alternator and its Electrical Connections

- Cleaning:

Note: Cover the engine orifices and cover the electrical components.

- Clean the generating set with a high pressure steam cleaner avoiding the covered openings and parts.

- Check the insulation of the machine between live and earth and between the supply wires. The regulator (AVR) must be unplugged for this operation. This latter is carried out with a megohmeter (500 VDC). Insulation should normally be $> 10 \text{ M}\Omega$ when cold.

Caution: it is strictly prohibited to commission an alternator, whether new or not, if the insulation is lower than $1 \text{ M}\Omega$ (for the stator and $100 \text{ k}\Omega$ for the other windings).

- It is possible to find lower values after extended shutdown periods or when stored, if the machine is used in a high humidity region (seaside or tropical regions) or if it is subject to water or sea spray etc.

- To recover the above minimum values, 2 methods may be used :

a) blow warm air over the air intake, ensuring that the machine turns, windings disconnected

b) run short-circuited (disconnect the voltage regulator) :

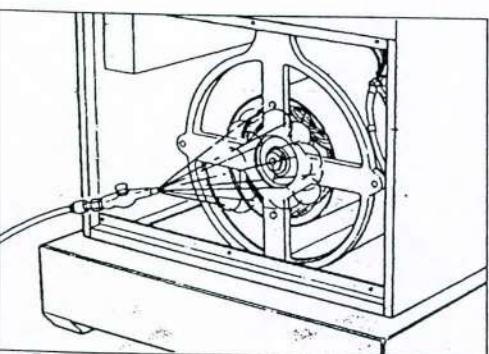
- short-circuit the three output terminals (power) using leads capable of carrying the rated current (do not exceed 6A/mm^2 if possible)

- using an a.c. current clip-on ammeter, check the current going through the short-circuit

- connect the coil to a 48V battery (note the polarity) through a 10 ohm (50W) series rheostat set the rheostat to its mid position

- gain access to the alternator: terminal box, protection grille, etc.

- turn the alternator at its rated speed and adjust its output, using the rheostat, to obtain the rated current through the short-circuit.



36. Cleaning the Alternator and Control Panel (or Control Panel with Doors)

- Alternator :

- Remove the generating set rear steel sheet plates and clean the inside of the alternator with a small compressed air line.

- Control Panel or Control Panel with Doors

- Unbolt the control panel or open the doors and clean the inside with a clean cloth.

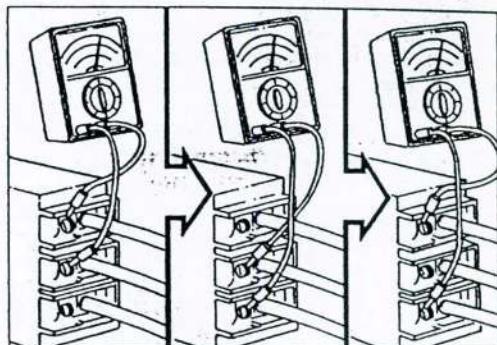
37. Paint Touch-up and Maintenance of the Canopy

Sheet Steel

- These operations must be carried out by a specialist.
- Please contact us for the names of our agents nearest to your site.

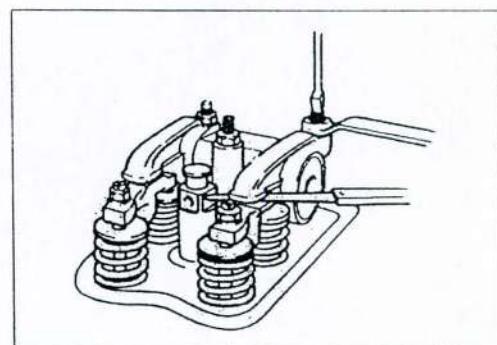
38. Checking the Generating Set Main Circuit Breaker

- Open the generating set main circuit breaker and start the engine.
- Check with a voltmeter that there is no voltage between terminals L1-L2, L2-L3 and L1-L3 of the circuit breaker.
- Note:** Voltage cannot be present between the terminals if the circuit breaker is open.
- Close the circuit breaker.
- Check with a voltmeter that voltage is present between terminals L1-L2, L2-L3 and L1-L3 of the circuit breaker.
- Note:** Voltage must be present between the terminals if the circuit breaker is closed.
- Repair or change if necessary after checking the cables and connections.
- Reopen the circuit breaker and shut off the genset after it has been operating off load for 5 minutes.



39. Checking the Valve Clearance

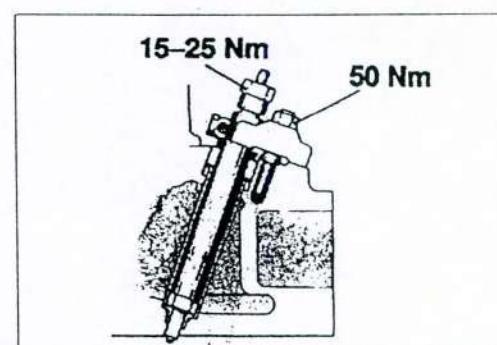
- This operation must be performed by a specialist. Please contact us for the names of our agents nearest to your site.



40. Checking the Injectors

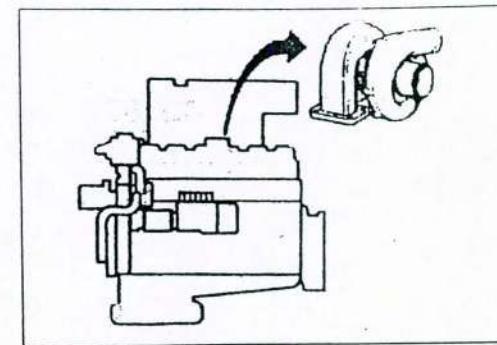
- This operation must be performed by a specialist. Please contact us for the names of our agents nearest to your site.
- Replace and possibly adjust the injectors.

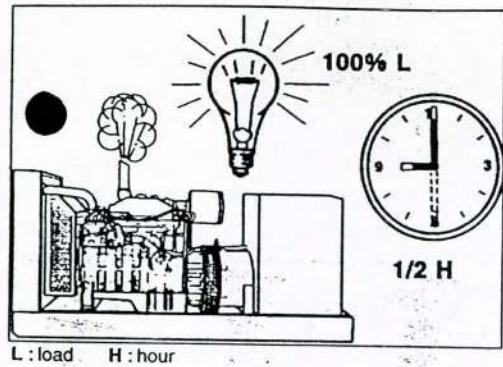
Tightening torque : Injector: 50 Nm
 Pipework: 15 to 25 Nm.



41. Checking the General Condition of the Turbocharger

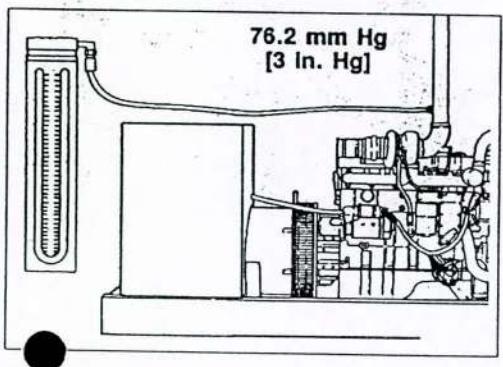
- This operation must be performed by a specialist. Please contact us for the names of our agents nearest to your site.
- Check the general condition of the generating set.





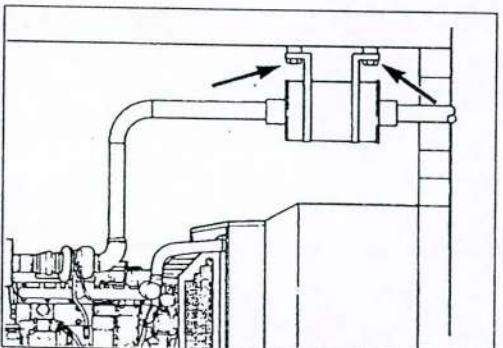
42. Full Load Test

- Operate the engine at full load for half an hour and check that the gенset delivers the required power.
- This operation must be carried out by a specialist. Please contact us for the names of our agents nearest to your site.



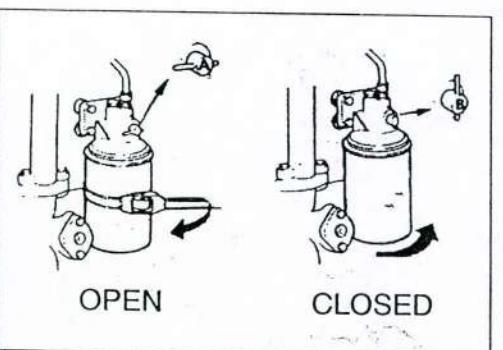
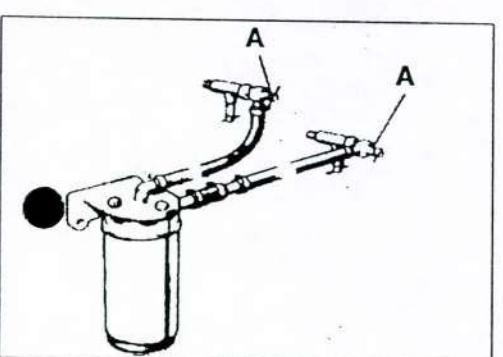
43. Checking the Outlet, Mountings and Supports of the Exhaust Pipework

- Start the generating set and apply maximum load.
- Exhaust restriction must be measured as near to the turbocharger as possible.
- Visually check that the exhaust mountings and supports are in good condition and well secured, that the suspension points are not collapsed or torn and that the exhaust bellows is not compressed, stretched or misaligned.



44. Replacing the Coolant Filter (Optional)

- Close the cock(s) (A) then remove the filter.
- Install a new filter proceeding in the same way as for oil filters.
- Open the cock(s) (A) then start the generating set and check for leaks.
- Check the coolant level.



45. Replacing the Coolant

Draining the Coolant :

Before draining, stop the engine et unscrew the
filler cap.

Warning ! When the engine is warm, open the filler
cap with great care. Steam or boiling coolant can
spray out.

- Now open the drain cock(s) and remove the drain plugs.

TWD 1630, TWD 1210 and TWD 1211 engines: also open
the venting cock.

- Possibly also remove the coolant filter (optional) and empty
it.

Note: Deposits inside the cock/plug must be cleaned.

- Check that all coolant actually runs out in order to avoid
freeze damage where Volvo Penta antifreeze is not used in
the system.

Filling the Coolant :

Note: Check that the drain cocks are closed and that the
drain plugs are fitted and tightened before filling the coolant
system.

Filling shall be carried out when the engine is stopped.
(TWD 1630, TWD 1210 and TWD 1211).

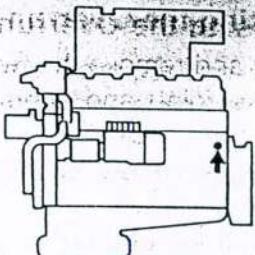
- Open the venting cock (V), see the picture. Do not fill too
quickly to avoid air-locks in the system. The air shall be
enabled to pass out through the venting cock (TWD 1210,
TWD 1211 and TWD 1630) or filler opening.
- If an electric heater is connected to the engine's cooling
system, the isolating tap(s) will be opened and the system
vented during filling.
- Fill with coolant to approx. 5 cm under the sealing surface
of the filler cap.

**The engine must not be started before the system is
fully vented and filled.**

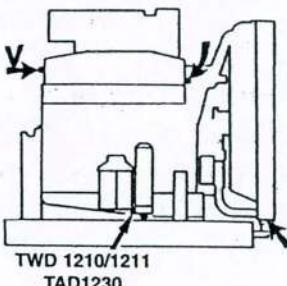
- Start and run the engine warm. TWD 1630, TWD 1210 and
TWD 1211 engines: open the venting cock for a moment
after starting for the venting of any remaining air. Check the
coolant level, and fill as necessary.

Fill with the same mixture as the one already used in the
cooling system.

TD 1010, TD 1210, TWD 1210, TWD 1211
TWD 1211, TAD 1230

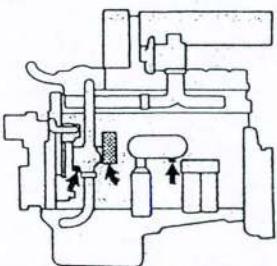


Drain cock on the cylinder block.

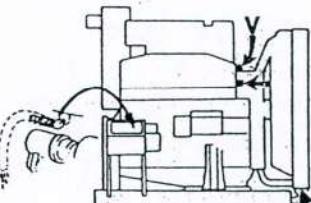


Drain cock/plug on the radiator, oil cooler, intercooler
(TWD 1210/1211). Venting cock "V" (TWD 1210/1211)

TWD 1630, TAD 1630 and TAD 1631



Drain cock under the coolant pump. Drain plug under
the oil cooler. Unscrew and empty the coolant filter



Drain cock on the cylinder block. Drain plugs on the
radiator.
TWD 1630: Drain cock and venting cock "V" on the
intercooler

1 - Greasing the Overrun Coupling

- Unscrew and remove the two overrun coupling bolts, clean the threads as well as the support sides (ball-and-socket joints and levers).
- Lightly lubricate and install.
- Tightening is carried out in two stages:
 - a) manually
 - b) then with a hammer, tighten by 1/4 turn.

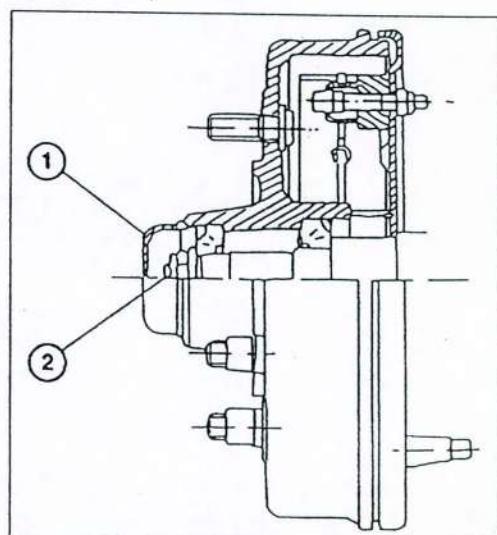
Never leave any clearance in the ball-and socket joints.

2 - Adjusting the Brakes

- Perform this operation on a secure level surface.
- Apply the hand brake and chock the roadwheels.
- With a jack (or other lifting device), lift one side of the trailer until the roadwheel does not touch the ground.
- Place some axle stands under the chassis (ensure that they and the ground are strong enough).
- Repeat the operation on the other side of the trailer.
- Release the handbrake.
- Turn the square adjusters located on the plate of each brake drum, until the brake shoes touch. To check the contact of the brake shoes on the drum, slightly turn the roadwheel.
- Loosen by 1/4 turn.
- Repeat the operation on the other roadwheel.
- Adjust the operating rods until the drums are held; then loosen by 1/4 turn.
- Operation complete.

3 - Greasing the Hubs

- This operation requires the removal of the roadwheels.
- Apply the handbrake and chock the opposite roadwheel.
- Slacken the roadwheel retaining bolts.
- Jack up the trailer (with a jack or other lifting device) until the wheel is clear of the ground. Place an axle stand on each side of the wheel and lower the jack.
- Unscrew and remove the bolts and remove the roadwheel.
- Release the handbrake.
- Dislodge the cap (1) with a little chisel and a hammer.
- Remove the pin from the castellated bolt (2).
- Unscrew and remove the bolt.
- Remove the drum.
- Clean the shaft, the housing, the cap and the bearings with petrol.
- Dry with compressed air.
- Check the condition of the bearings and replace them if necessary.
- Lubricate with new special bearing grease, the shaft and the bearings. Fill the drum housing with it too.
- Reassemble.
- Turn the bolt to remove completely the axial play. The drum must rotate freely.
- Fill the cap with new grease. Fit it back in place.
- Repeat the operation on the other roadwheel.



I - TROUBLESHOOTING

I - ENGINE SYSTEM DIAGRAMS

The following drawings show the fluid flow through the engine systems. Although parts can change between different applications and installations, the flow remains the same. The systems shown are:

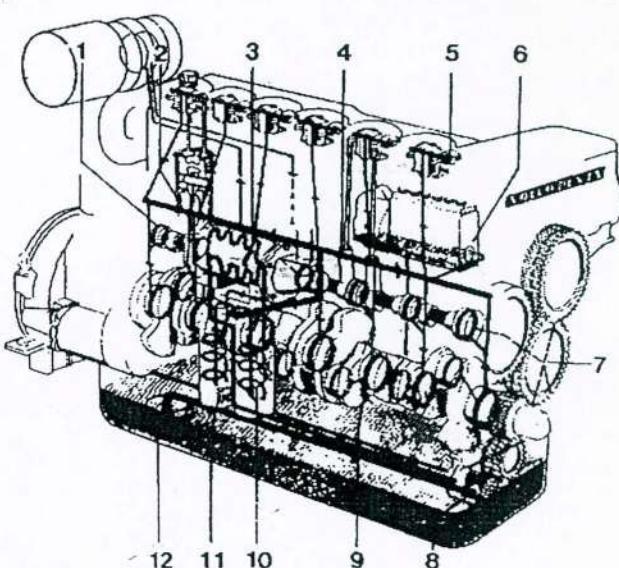
- Lubricating Oil System
- Coolant System
- Fuel System
- Air System

Knowledge of the engine systems can help you in troubleshooting and general maintenance of your engine.

A. LUBRICATING OIL SYSTEM

TD 1010 and TD 1210 ENGINES

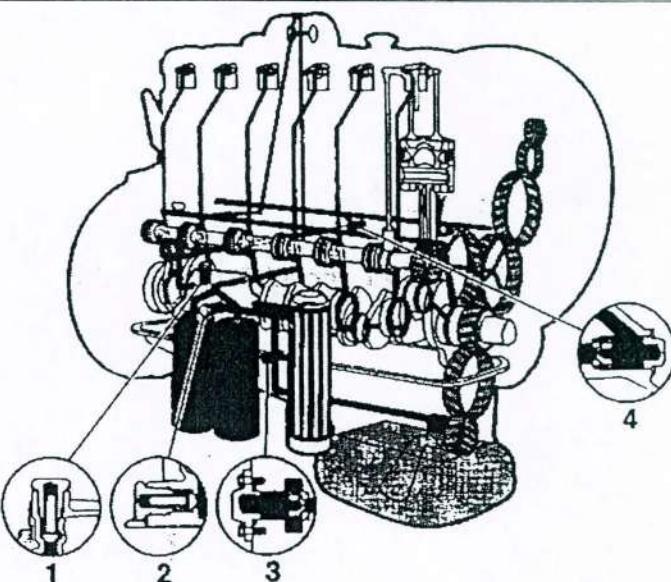
1. Camshaft
2. Pipework in the Connecting Rod
3. Oil Radiator
4. Push Rods
5. Rocker Lever Shaft
6. Injection Pump
7. Distribution Pinion
8. Oil Sump
9. Crankshaft
10. Oil Filter
11. Pressure Relief Valve
12. Oil Strainer



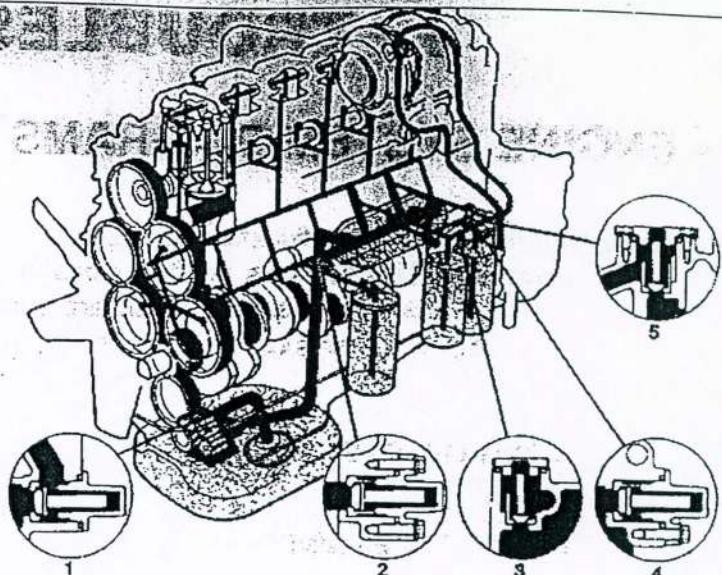
TWD 1210, TWD 1211, TAD 1230 ENGINES

The system comprises four valves :

1. By-pass Valve for the Oil Filters
2. By-pass Valve for the Oil Cooler (marked SIDE)
3. Pressure Relief Valve
4. Piston Cooling Valve



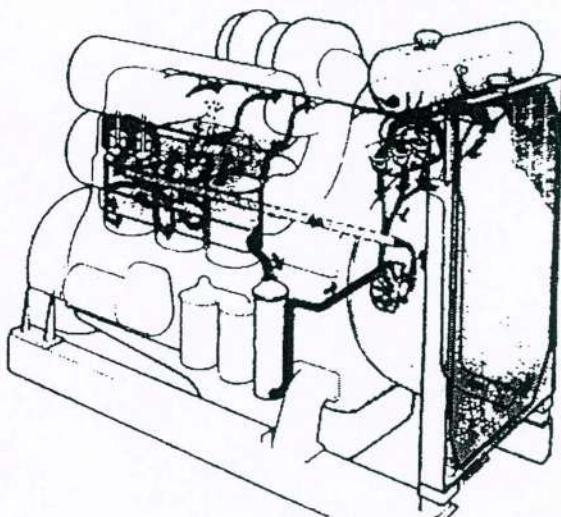
TWD 1630 - TAD 16030 - TAD 1631 ENGINES



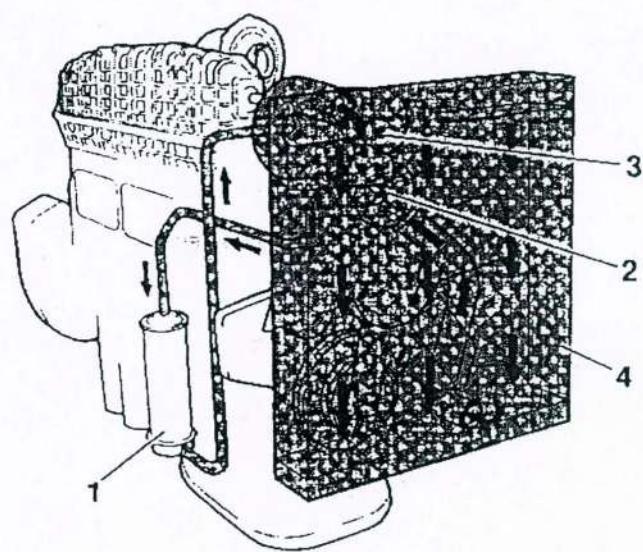
- 1. Safety Valve
- 2. By-pass Valve for Oil Cooler
- 3. Pressure Relief Valve
- 4. Piston Cooling Valve

B. COOLING SYSTEM

TD 1010 and TD 1210 ENGINES



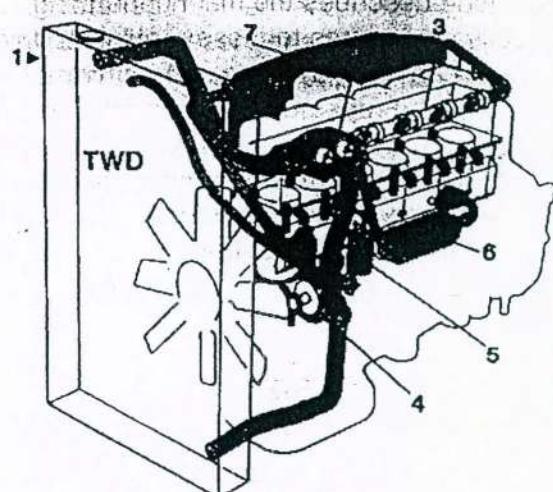
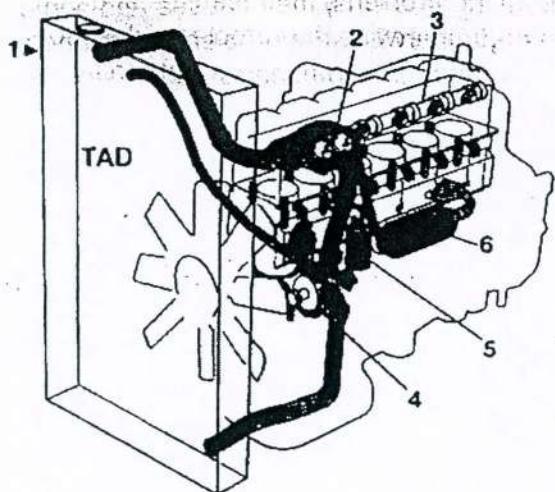
TWD 1210, TWD 1211 and TAD 1230 ENGINES



- 1. Oil Cooler
- 2. Coolant Pump
- 3. Thermostat Housing
- 4. Radiator

TWD 16030 - TAD 1630 - TAD 1631 ENGINES

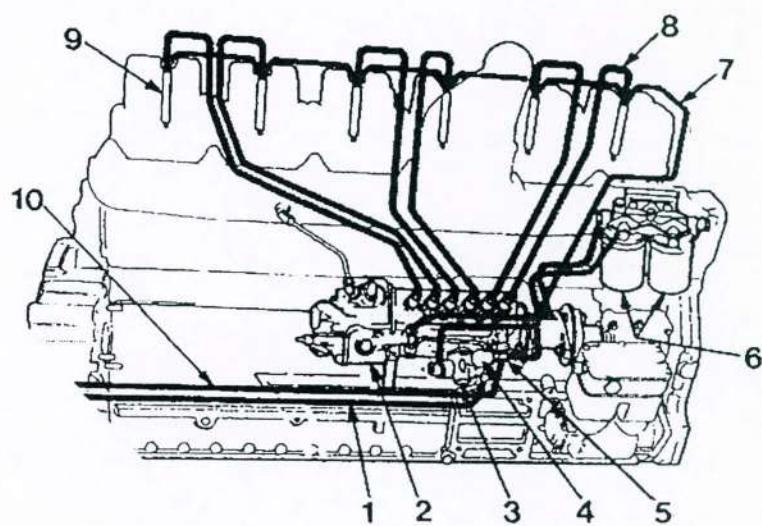
1. Radiator
 2. Thermostat
 3. Distribution Pipe
 4. Water Pump
 5. Water Filter
 6. Oil Cooler
 7. Air Cooler



C. FUEL SYSTEM

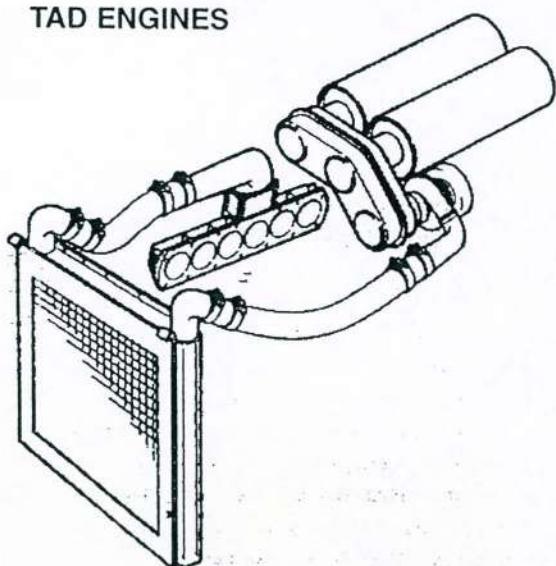
GENERAL

- 1 . Fuel Intake Pipe from Tank
 2 . Injection Pump
 3 . Supply Pump
 4 . Hand Pump
 5 . Discharge Valve
 6 . Fuel Filter
 7 . Injector Fuel Pipe
 8 . Injector Fuel Leakoff Pipe
 9 . Injector
 10 . Fuel Return Pipe to Tank

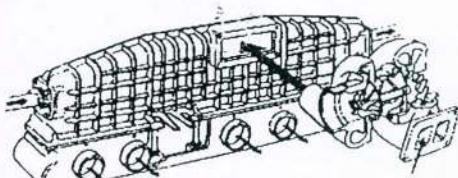


D. AIR SYSTEM

TAD ENGINES



TWD ENGINES



II - TROUBLESHOOTING FOR THE OPERATOR

This guide describes the main generating set operating problems, their causes and some acceptable corrective measures to these problems. Unless stated otherwise, the problems described are those that an operator can diagnose and correct himself. Contact one of our Company's Authorised Repair Locations for diagnosis and repair of problems not listed.

Follow the suggestions below before performing any repairs:

- study the problem thoroughly before acting,
- do the easiest and most obvious things first,
- find and correct the root cause of the problem.

A. GENERATING SET

This section is for reference only. In the event of problems, contact our Agent or our After Sales Service Centre. (These indicators are not all available on all control panels.)

		Oil Pressure Indicator: (see Section II: Engine)	This indicator comes on in the event of an abnormal decrease in oil pressure. It indicates an operating fault such as a lack of oil, a lubricating oil system malfunction, etc. This fault stops the generating set instantly.
		Coolant System Temperature Indicator: (see Section II: Engine)	This indicator comes on in the event of an abnormal increase in engine temperature. It indicates an operating fault such as a lack of coolant or oil, an overload, etc. This fault stops the generating set instantly.
		Fuel Level Indicator:	This indicator comes on when the fuel low level in the tank is reached. It indicates a lack of fuel. This fault does not stop the generating set.
		Battery(ies) Charge Indicator: (see Section IV: Starting Battery)	This indicator comes on in the event of a problem affecting the battery charge when the generating set is running. It indicates a fault in the battery-charging system. This fault does not stop the generating set. This indicator is lit when starting the generating set but goes off as soon as the alternator has reached its rated speed.
		No-Start Indicator: (see Section II: Engine)	This indicator comes on after 3 to 6 unsuccessful genset starting attempts.
		"OVERLOAD" Indicator and Contactor/Circuit Breaker tripped:	This indicator comes on if the rated load is exceeded or if a short circuit occurs. The contactor or circuit breaker trips, thus freeing the genset from its load. When the fault appears, reduce the load by disconnecting several appliances or eliminate the short-circuit, then reclose the thermal protection device or the circuit breaker.

B. ENGINE

RECOMMENDED
PRACTICES

TECHNICAL

RECOMMENDED PRACTICES FOR MAINTAINING AND OPERATING AIRCRAFT ENGINES

Engine Difficult to Start:

Inadequate lubricating oil (too heavy)

Incorrect fuel.

No fuel in the tank.

Blocked fuel filter.

Air trapped in the fuel system.

Discharged battery.

Bad battery connections.

Excessive Carbon Residues:

Air filter clogged

Exhaust system clogged

Inadequate fuel.

Inadequate lubricating oil.

Exhaust Smoke:

White smoke - usually from water penetration into the cylinders.

Light blue smoke - usually when using the engine with light loads.

Thick blue smoke - caused by the passage of lubricating oil past the piston rings due to: stuck, worn or broken rings, a worn cylinder, an overfilled oil sump.

Black smoke due to incomplete fuel combustion which could be caused by: an overload, a blocked air filter, too high an air intake temperature, inadequate fuel or the presence of water in the fuel.

The Engine Stops:

Lack of fuel.

Presence of air or water in the fuel system.

Air or fuel filter blocked.

Overload.

Overheating.

Loss of compression.

Lack of lubricating oil.

Loss of Power:

Loss of compression.

Air filter clogged.

Exhaust system clogged.

Fuel injector blocked.

Fuel filter clogged.

Worn engine.

Overheating:

Axial fan or radiator belt too slack.

Overload.

Lubricating oil level too low.

Obstruction of radiator.

Recycling of exhaust gases or cooling air.

Radiator cooling fins blocked.

Low coolant level.

Obstruction of the cooling system.

C. ALTERNATORS

1. EROY SOMER

External physical defects (overheating, vibrations, noises)

	Fault	Action	Origin of Fault
A	Bearing(s) Excessive Overheating (temp. > 80°C on the bearing caps with or without abnormal noise)	Disassemble the bearing(s)	<ul style="list-style-type: none"> - Replace the ball bearing if it has turned blue or the grease is carbonised. - Bearing race not secure (moving in its housing) - Incorrect bearing alignment (endshields do not fit into each other properly)
B	Alternator Frame Excessive Overheating (over 40°C above ambient temperature)	Check: <ul style="list-style-type: none"> - alternator air inlets and outlets - measuring equipment (voltmeter, ammeter) - ambient temperature 	<ul style="list-style-type: none"> - Air system (inlet-outlet) partially obstructed or hot air is being recycled from the alternator or prime mover - Alternator operating at too high a voltage (> 105% of rated voltage under load) - Alternator overloaded
C	Excessive Vibration	Check the equipment coupling and mountings	<ul style="list-style-type: none"> - Incorrect alignment (coupling) - Faulty damper or play in the coupling - One of the shaftline elements is imbalanced
D	Excessive Vibration with noise (humming noise from the alternator)	Shut off the genset immediately. Check the installation	- Alternator runs single phase (single phase load or faulty switch or faulty installation)
		Start up off load if the noise persists	- Short-circuit in the alternator stator
E	Violent Shock, possibly followed by humming noise and vibration	Shut off the generating set immediately	<ul style="list-style-type: none"> - Short-circuit in the installation - Incorrect paralleling (paralleling out of phase) • Possible consequences (according to importance of fault): <ul style="list-style-type: none"> - Break or deterioration of coupling - Break or torsion of shaft ends - Shifting and short-circuiting of main field winding - Bursting or unlocking of the fan - Failure of rotating diodes and AVR
F	Smoke, Sparks or Flames from Alternator & Humming Noise and Vibration	Shut off the genset immediately	<ul style="list-style-type: none"> - Short-circuit in the installation (including between the alternator and the circuit breaker) - Object fallen into the machine - Short-circuit or flash in the stator

Voltage Faults

	Fault	Action	Measure	Check
G	Absence of voltage off load when starting	Connect a new 4 to 12 V battery across E- and E+, respecting polarities	The alternator builds up and its voltage stays normal after battery removal.	- Lack of residual magnetism - Check voltage between E- and E+ (around 10 V) - V > 15 V: faulty diode or exciter
			The alternator builds up but its voltage does not reach the rated value after battery removal.	- Check the connection of the sensing leads to the AVR. - Reset the AVR voltage potentiometer (P2)
			The alternator builds up but its voltage disappears after battery removal.	- Faulty AVR.
				- Check connection to the AVR* (possibly faulty AVR) - Exciter field windings open circuit - Rotating diodes blown - Main field winding open circuit - Check the resistance
H	Voltage Too High	Adjust the AVR voltage potentiometer (P2)	Adjustment ineffective, measure voltage between E+ and E-	- Voltage between E+ and E- > 20V - Check that the voltage sensing leads are connected Faulty AVR
I	Voltage Oscillation	Adjust the stability potentiometer (P3)	If no result: try the standard/fast modes (ST2)	- Check the speed: possibility of cyclic irregularities - Terminals badly secured - Faulty AVR
				Speed too low under load (or LAM set too high) - A rotating diode is open circuit - Tripping of stator auxiliary winding - Short-circuit on loaded main field - Exciter armature faulty under load
J (1)	Correct Voltage off load but too low under load	Disconnect load and check the voltage between E+ and E- on the AVR	Voltage between E+ and E- < 15 V	- Check the speed (or LAM set too low) - Faulty rotating diodes - Short-circuit in the main field. Check the resistance - Faulty exciter armature
(1) Caution: when operating single phase, check that the sensing wires from the AVR are correctly connected to the installation terminals				
K (2)	Voltage disappears when operating	Check the AVR, the varistor, the rotating diodes and replace the faulty component	Voltage does not return to the rated value	- Exciter field winding cut - Main field cut or short-circuited - Faulty exciter armature - Faulty AVR
(2) Possible action of the internal protection (overload, tripping, short-circuit).				

2. NEWAGE

WITH SX 440 A.V.R.		WITH MX 321 A.V.R. (Optional)		WITH MX 341 A.V.R. (Optional)	
No voltage build-up when starting the genset	1. Check link K1-K2 2. Check the speed 3. Check the residual voltage	No voltage build-up when starting the genset	1. Check link K1-K2 on the auxiliary terminals	No voltage build-up when starting the genset	1. Check link K1-K2 on the auxiliary terminals
Unstable voltage off load or on load	1. Check speed stability 2. Check stability setting	Voltage loss during genset operation	1. Stop and restart the genset	Voltage loss during genset operation	1. Stop and restart the genset
High voltage off load or on load	1. Check the speed 2. Check that the alternator charge is not capacitive (leading power factor)	High alternator voltage followed by a drop	1. Check the voltage sensing wires of the A.V.R.	High alternator voltage followed by a drop	1. Check the voltage sensing wires of the A.V.R.
Reduced voltage off load	1. Check speed 2. Check continuity of link 1-2 or fine setting external trimmer	Unstable voltage off load or on load	1. Check speed stability 2. Check the potentiometer STABILITY setting	Unstable voltage off load or on load	1. Check speed stability 2. Check the potentiometer STABILITY setting
Reduced voltage on load	1. Check the speed 2. Check the potentiometer UFRO setting	Reduced voltage on load	1. Check the speed	Reduced voltage on load	1. Check the speed 2. If OK, check the potentiometer UFRO setting
		Excessive voltage/speed drop when load applied	1. Check the engine governor recovery time. Check the potentiometer DIP setting	Excessive voltage/speed drop when load applied	1. Check the engine governor recovery time. Check the potentiometer DIP setting
		Slow pick-up when load applied	1. Check the engine governor recovery time. Check the potentiometer DWELL setting	Slow pick-up when load applied	1. Check the engine governor recovery time.

D. STARTING BATTERY

FAULTS	CAUSES	ACTIONS
Starting Battery Discharged	<ul style="list-style-type: none"> - Electrolyte level too low - Faulty cabling - Slack fan belt - Faulty battery - Faulty charge regulator - Faulty charge alternator 	<ul style="list-style-type: none"> - Top up with demineralised water and recharge - Clean or repair cabling and recharge battery - Tighten or change belt and recharge battery - Replace the battery and charge battery Replace regulator and recharge battery Replace alternator and recharge battery

J.TECHNICAL SPECIFICATIONS

S1 Continuous service • Temp. = 27°C • Compact II - radiator 55°C

Engine Type	
Engine	Cummins
Speed	rpm
Dry Weight	kg
Wet Weight	kg
Radiator Dry Weight (separate)	kg
Engine Power	kW
Heat to Ambient	kW
Heat to Water	kW
Heat to Exhaust	kW

200 kVA		250 kVA	
TD1010	TD1010	TD1210	TD1210
1500	1800	1500	1800
990	990	1110	1110
1027,8	1027,8	1165,68	1165,68
78,5	78,5	84	84
180	203	217(239)	227(250)
14,5	17	17	18
107	123	124	132
160	184	181	207

Consumption 4/4 + 1	l/h
Consumption 4/4	l/h
Consumption 3/4	l/h
Consumption 1/2	l/h
Max. Fuel Pump Flow	l/h
Max. Suction Lift	m

44	49,5	52	56
33	37,5	39	43
23	26,4	27	30
115	130	115	130
2	2	2	2

Air For Combustion	l/s
Max. Back Pressure	mmH ₂ O

212	280	272	333
500	500	500	500

Exhaust Gas Flow	l/s
Exhaust Gas Temperature	°C
Max. Exhaust Back Pressure	mmH ₂ O

622	775	765	885
575	530	555	520
500	500	500	500

Engine Water Capacity	l
Thermostat	°C
Maximum Water Temperature	°C
Water Flow	l/s
Radiator	
Radiator Water Capacity	l
Air flow at Back Pressure =0	m ³ /s
Available Back Pressure	mmH ₂ O
Corresponding Air Flow	m ³ /s

16,3	16,3	12,3	12,3
75-88	75-88	75-88	75-88
103	103	103	103
4,9	5,8	6,4	7,7
26	26	26	26
5,95	7,15	5,45	6,55
46	66	30	45
2,8	3,25	3,35	4,05

Oil Capacity	l
Min. Oil Pressure	bar
Normal Oil Pressure	bar
Max. Oil Pressure	bar
Normal Oil Temperature	°C
Max. Oil Temperature	°C
Max. Oil Consumption	l/h

25	25	38	38
0,7	0,7	0,7	0,7
3 to 5	3 to 5	3 to 5	3 to 5
95	95	105	105
120	120	120	120
0,13	0,14	0,38	0,39

LEROY SOMER Alternator	LSA
Weight	kg
Efficiency	%
Heat to Ambient	kW

461M5	461M5	461L8	461L8
620	620	775	775
90,7	91,5	92,92,5	91,5
16,4	17,5	17,4	18,8

NEWAGE Alternator	UC
Weight	kg
Efficiency	%
Heat to Ambient	kW

444C	444C	444C	444C
860	860	860	860
92,4	92,4	92,4	92,4
13,2	15,5	16,5	19,1

Engine Type	Cummins
Speed	rpm
Dry Weight	kg
Wet Weight	kg
Radiator Dry Weight (separate)	kg
Engine Power	kW
Heat to Ambient	kW
Heat to Water	kW
Heat to Exhaust	kW

Consumption 4/4 + 1	l/h
Consumption 4/4	l/h
Consumption 3/4	l/h
Consumption 1/2	l/h
Max. Fuel Pump Flow	l/h
Max. Suction Lift	m

Air For Combustion	l/s
Max. Back Pressure	mmH ² O

Exhaust Gas Flow	l/s
Exhaust Gas Temperature	°C
Max. Exhaust Back Pressure	mmH ² O

Engine Water Capacity	l
Thermostat	°C
Maximum Water Temperature	°C
Water Flow	l/s
Radiator	
Radiator Water Capacity	l
Air flow at Back Pressure =0	m ³ /s
Available Back Pressure	mmH ² O
Corresponding Air Flow	m ³ /s

Oil Capacity	l
Min. Oil Pressure	bar
Normal Oil Pressure	bar
Max. Oil Pressure	bar
Normal Oil Temperature	°C
Max. Oil Temperature	°C
Max. Oil Consumption	l/h

LEROY SOMER Alternator	LSA
Weight	kg
Efficiency	%
Heat to Ambient	kW

NEWAGE Alternator	UC
Weight	kg
Efficiency	%
Heat to Ambient	kW

300 kVA		325 kVA	
TD1210	TD1210	TD1211	TD1211
1500	1800	1500	1800
1140	1140	1140	1140
1198,88	1198,88	1198,88	1198,88
87	87	87	87

262	275	282	
20	22,5	21,3	
147	161	158	
220	256	251	

63	68	69	
47	51,8	51,4	
32,5	35,8	35,4	
115	130	115	
2	2	2	

350	438	342	
500	500	500	500

948	1097	988	
530	500	585	
500	500	500	500

26,2	26,2	26,2	26,2
75-88	75-88	75-88	75-88
103	103	103	103
6,4	7,7	6,4	7,7
26	26	33	33
5,95	6,55	4,15	
16	24	19	
4,4	5,2	3,6	

38	38	38	38
0,7	0,7	0,7	0,7
3 to 5	3 to 5	3 to 5	3 to 5
105	105	105	105
120	120	120	120
0,42	0,45	0,43	0,43

461VL12	461VL12	471M4	471M4
895	895	820	820
92,3	92,7	90,5	91,2
20	20,2	27,3	26,6

444E	444E	444 F	444 F
1035	1035	1170	1170
93,3	93,1	93	92,9
17,2	19	19,6	21,1

Engine Type	
Engine	Cummins
Speed	rpm
Dry Weight	kg
Wet Weight	kg
Radiator Dry Weight (separate)	kg
Engine Power	kW
Heat to Ambient	kW
Heat to Water	kW
Heat to Exhaust	kW

360kVA	400 kVA	360kVA	400 kVA
TAD1230	TAD1230	TWD1630	TWD1630
1500	1800	1500	1800
1250	1250	1506	1506
1330,68	1330,68	1623	1623
Included	Included	Included	Included

309(322)	335(349)	353	391
20	20,6	22	24
125	137,5	209	236
296	332	308	373

Consumption 4/4 + 1	l/h
Consumption 4/4	l/h
Consumption 3/4	l/h
Consumption 1/2	l/h
Max. Fuel Pump Flow	l/h
Max. Suction Lift	m

75	81,8	85,9	98,4
57	61	62,8	72,8
39,5	42,2	44	50,2
145	165	150	170
2	2	2	2

Air For Combustion	l/s
Max. Back Pressure	mmH ² O

396	471	450	535
500	500	500	500

Exhaust Gas Flow	l/s
Exhaust Gas Temperature	°C
Max. Exhaust Back Pressure	mmH ² O

1062	1164	1160	1385
490	460	520	530
500	700	500	700

Engine Water Capacity	l
Thermostat	°C
Maximum Water Temperature	°C
Water Flow	l/s
Radiator	
Radiator Water Capacity	l
Air flow at Back Pressure =0	m ³ /s
Available Back Pressure	mmH ² O
Corresponding Air Flow	m ³ /s

23	23	38	38
82-95	82-95	75-88	75-88
103	103	103	103
6,1	7,3	9,1	10,9
25	25	29	29
5,7	6,85	9	10,7
28	33	15	25
4,45	5,65	7,35	8,4

Oil Capacity	l
Min. Oil Pressure	bar
Normal Oil Pressure	bar
Max. Oil Pressure	bar
Normal Oil Temperature	°C
Max. Oil Temperature	°C
Max. Oil Consumption	l/h

38	38	64	64
0,7	0,7	0,7	0,7
3 to 5	3 to 5	3 to 5	3 to 5
105	105	105	105
120	120	120	120
0,18	0,21	0,13	0,14

LEROY SOMER Alternator	LSA
Weight	kg
Efficiency	%
Heat to Ambient	kW

471M4	471M4	471M6	471M6
820	820	960	960
90,5	91,2	92,2	92,7
30,2	30,9	27,1	31,5

NEWAGE Alternator	UC
Weight	kg
Efficiency	%
Heat to Ambient	kW

444 F	444 F	544C	544C
1170	1170	1265	1265
93	92,9	94,1	93,9
21,7	24,5	20,1	23,6

Engine Type	CUMMINS
Speed	rpm
Dry Weight	kg
Wet Weight	kg
Radiator Dry Weight (separate)	kg
Engine Power	kW
Heat to Ambient	kW
Heat to Water	kW
Heat to Exhaust	kW
Consumption 4/4 + 1	l/h
Consumption 4/4	l/h
Consumption 3/4	l/h
Consumption 1/2	l/h
Max. Fuel Pump Flow	l/h
Max. Suction Lift	m
Air For Combustion	l/s
Max. Back Pressure	mmH ₂ O
Exhaust Gas Flow	l/s
Exhaust Gas Temperature	°C
Max. Exhaust Back Pressure	mmH ₂ O
Engine Water Capacity	l
Thermostat	°C
Maximum Water Temperature	°C
Water Flow	l/s
Radiator	
Radiator Water Capacity	l
Air flow at Back Pressure = 0	m ³ /s
Available Back Pressure	mmH ₂ O
Corresponding Air Flow	m ³ /s
Oil Capacity	l
Min. Oil Pressure	bar
Normal Oil Pressure	bar
Max. Oil Pressure	bar
Normal Oil Temperature	°C
Max. Oil Temperature	°C
Max. Oil Consumption	l/h
LEROY SOMER Alternator	LSA
Weight	kg
Efficiency	%
Heat to Ambient	kW
NEWAGE Alternator	UC
Weight	kg
Efficiency	%
Heat to Ambient	kW

450 kVA		500 kVA	
TAD1630	TAD1630	TAD1631	TAD1631
1500	1800	1500	1800
1538	1538	1538	1538
1653,04	1653,04	1650	1650
Included	Included	Included	Included
398	435	430	484
24	27	26	30
179	204	180	211
354	399	369	415
98,5	110	104,5	119,3
71,5	81,5	76,8	87,8
49	56	52,5	60,2
145	165	205	215
2	2	3	3
533	652	530	655
500	500	500	500
1361	1525	1505	1750
490	455	550	520
500	700	500	700
35	35	35	35
82-95	82-95	82-95	82-95
103	103	103	103
8,7	10,5	8,7	10,5
25	25	29	29
6,35	7,65	7,5	10
14	14		
5,8	5,9		
64	64	64	64
0,7	0,7	0,7	0,7
3 to 5	3 to 5	3 to 5	3 to 5
105	105	105	105
120	120	120	120
0,18	0,17	0,12	0,16
471L9	471L9	471L10	471L10
1110	1110	1120	1120
93,2	93,6	93,3	93,7
26,3	27,9	28,7	30,7
544D	544D	544E	544E
1395	1395	1545	1545
94,4	94,3	94,8	94,6
21,4	24,7	21,9	26

K . RECOMMENDED SPARE PARTS

Type	Hours	Description	Partno.	Qty
500 (TD1010 Engine)	500	MAINOILFILTER	466634	330050047
		INJECTOR NOZZLE	1545153 (=04331710)	330050061
		FANBELT(set)	96639821	330050097
		ALTERNATORBELT (set)	96699121	330050105
		WATER FILTER WITHOUT DCA	366822	330050179
		VALVE COVER GASKET	424694	330050180
		INJECTOR GASKET	469455	330050181
		FUEL FILTER	3825133EX466987	330050254
		DIODE	86HFR800x1701	330410034
		DIODE	86HFR800x1702	330410035
1000	1000	MAINOILFILTER	466634	330050047
		INJECTOR NOZZLE	1545153 (=04331710)	330050061
		AIRFILTER	823701	330050091
		FANBELT(set)	96639821	330050097
		TEMPERATURE SWITCH 103	848829	330050123
		OIL PRESSURE SWITCH	863169	330050152
		ALTERNATORBELT (set)	96699121	330050105
		WATER FILTER WITHOUT DCA	366822	330050179
		VALVE COVER GASKET	424694	330050180
		INJECTOR GASKET	469455	330050181
2000	2000	FUEL FILTER	3825133EX466987	330050254
		DIODE	86HFR800x1701	330410034
		DIODE	86HFR800x1702	330410035
		THERMOSTAT GASKET	1544710	330050003
		MAINOILFILTER	466634	330050047
		INJECTOR NOZZLE	1545153 (=04331710)	330050061
		AIRFILTER	823701	330050091
		FANBELT(set)	96639821	330050097
		ALTERNATORBELT (set)	96699121	330050105
		VALVE COVER GASKET	424694	330050179

Type	Hours	Description	Partno.	Qty
500 (TD1010 Engine)	500	A.V.R.	R448	330410089
		MAINOILFILTER	466634	330050047
		FANBELT(set)	96639821	330050097
		INJECTOR NOZZLE	468826 (=04331710)	330050141
		VALVE COVER GASKET	424692	330050151
		WATER FILTER WITHOUT DCA	366822	330050179
		INJECTOR GASKET	469455	330050181
		FUEL FILTER	3825133EX466987	330050254
		ALTERNATORBELT (set)	978556	330050264
		DIODE	86HFR800x1701	330410034
1000	1000	DIODE	86HFR800x1702	330410035
		MAINOILFILTER	466634	330050047
		AIRFILTER	823701	330050091
		FANBELT(set)	96639821	330050097
		TEMPERATURE SWITCH 103	848829	330050123
		INJECTOR NOZZLE	468826 (=04331710)	330050141
		VALVE COVER GASKET	424692	330050151
		OIL PRESSURE SWITCH	863169	330050152
		WATER FILTER WITHOUT DCA	366822	330050179
		INJECTOR GASKET	469455	330050181
250 (TD1010 Engine)	250	FUEL FILTER	3825133EX466987	330050254
		ALTERNATORBELT (set)	978556	330050264
		DIODE	86HFR800x1701	330410034
		DIODE	86HFR800x1702	330410035
		THERMOSTAT GASKET	1544710	330050003
		MAINOILFILTER	466634	330050047
		AIRFILTER	823701	330050091
		FANBELT(set)	96639821	330050097
		VALVE COVER GASKET	1544410	330050107
		TEMPERATURE SWITCH 103	848829	330050123
2000	2000	TEMPERATURE SWITCH 103	468826 (=04331710)	330050141
		INJECTOR NOZZLE	424692	330050151
		OIL PRESSURE SWITCH	863169	330050152
		WATER FILTER WITHOUT DCA	366822	330050179
		INJECTOR GASKET	469455	330050181
		FUEL SUPPLY PUMP	244625	330050183
		WATER PUMP KIT	875842	330050186
		STOP SOLENOID SAFETY RELAY	872933	330050194
		RELAY FOR ELECTRIC HEATER	1088170	330050205
		FUEL FILTER	3825133EX466987	330050254
TD1010 Engine	TD1010 Engine	ALTERNATORBELT (set)	978556	330050264
		STOP SOLENOID	876830x873674	330050293
		THERMOSTAT	814918. 8nd6763	330050294
		DIODE	86HFR800x1701	330410034
		DIODE	86HFR800x1702	330410035
TD1010 Engine	TD1010 Engine	A.V.R.	R448	330410089

Type	Hours	Description	Partno.	Ocy
500 (TWD1210 el)	500	MAINOILFILTER	466634	330050047 4
		INJECTOR NOZZLE	849683	330050092 1
		FANBELT(set)	96639821	330050097 1
		VALVE COVER GASKET	424692	330050151 6
		WATER FILTER WITHOUT DCA	366822	330050179 2
		INJECTOR GASKET	469455	330050181 1
		FUEL FILTER	3825133EX466987	330050254 4
		ALTERNATORBELT (set)	978556	330050264 1
		DIODE	864FR800x1701	330410034 3
		DIODE	864FR800x1702	330410035 3
1000	1000	MAINOILFILTER	466634	330050047 10
		AIRFILTER	823701	330050091 2
		INJECTOR NOZZLE	849683	330050092 2
		FANBELT(set)	96639821	330050097 1
		TEMPERATURE SWITCH 103	848629	330050123 1
		VALVE COVER GASKET	424692	330050151 6
		OIL PRESSURE SWITCH	863169	330050152 1
		WATER FILTER WITHOUT DCA	366822	330050179 4
		INJECTOR GASKET	469455	330050181 2
		FUEL FILTER	3825133EX466987	330050254 6
3000	3000	ALTERNATORBELT (set)	978556	330050264 1
		DIODE	864FR800x1701	330410034 3
		DIODE	864FR800x1702	330410035 3
		THERMOSTAT GASKET	1544710	330050003 1
		MAINOILFILTER	466634	330050047 20
		AIRFILTER	823701	330050091 4
		INJECTOR NOZZLE	849683	330050092 6
		FANBELT(set)	96639821	330050097 1
		THERMOSTAT GASKET	1544410	330050107 1
		TEMPERATURE SWITCH 103	848629	330050123 1
2000	2000	VALVE COVER GASKET	424692	330050151 6
		OIL PRESSURE SWITCH	863169	330050152 1
		WATER FILTER WITHOUT DCA	366822	330050179 8
		INJECTOR GASKET	469455	330050181 6
		FUEL SUPPLY PUMP	244825	330050183 1
		WATER PUMP KIT	875842	330050186 1
		STOP SOLENOID SAFETY RELAY	872933	330050194 1
		RELAY FOR ELECTRIC HEATER	1086170	330050205 1
		FUEL FILTER	3825133EX466987	330050254 8
		ALTERNATORBELT (set)	978556	330050264 1
325 (TWD1211 Engine)	325	STOP SOLENOID	876030xnd13674	330050293 1
		THERMOSTAT	814918.8nd16763	330050294 1
		DIODE	864FR800x1701	330410034 3
		DIODE	864FR800x1702	330410035 3
		A.V.R.	9449	330410089 1
		THERMOSTAT GASKET	1544710	330050003 1
		MAINOILFILTER	466634	330050047 20
		AIRFILTER	823701	330050091 4
		INJECTOR NOZZLE	849683	330050092 6
		FANBELT(set)	96639821	330050097 1
2000	2000	THERMOSTAT GASKET	1544410	330050107 1
		TEMPERATURE SWITCH 103	848629	330050123 1
		VALVE COVER GASKET	424692	330050151 6
		OIL PRESSURE SWITCH	863169	330050152 1
		WATER FILTER WITHOUT DCA	366822	330050179 8
		INJECTOR GASKET	469455	330050181 6
		FUEL SUPPLY PUMP	244825	330050183 1
		WATER PUMP KIT	875842	330050186 1
		STOP SOLENOID SAFETY RELAY	872933	330050194 1
		RELAY FOR ELECTRIC HEATER	1086170	330050205 1
2000	2000	FUEL FILTER	3825133EX466987	330050254 8
		ALTERNATORBELT (set)	978556	330050264 1
		STOP SOLENOID	876030xnd13674	330050293 1
		THERMOSTAT	814918.8nd16763	330050294 1
		DIODE	864FR800x1701	330410034 3
		DIODE	864FR800x1702	330410035 3
		A.V.R.	9449	330410089 1

Type	Hours	Description	PartNo.	Qty
360 (TAD1230 Engine)	500	MAINOILFILTER	466634	330050047 4
		VALVE COVER GASKET	424692	330050151 6
		ALTERNATORBELT (set)	9669982	330050177 1
		FANBELT (set)	9663912	330050178 1
		WATER FILTER WITHOUT DCA	366822	330050179 2
	1000	INJECTOR GASKET	459455	330050181 1
		INJECTOR NOZZLE	866193	330050203 1
		FUELFILTER	3825133EX466987	330050254 4
		DIODE	86497800x1701	330410034 3
		DIODE	86497800x1702	330410035 3
	2000	MAINOILFILTER	466634	330050047 10
		TEMPERATURE SWITCH 103	848829	330050123 1
		VALVE COVER GASKET	424692	330050151 6
		OIL PRESSURE SWITCH	863169	330050152 1
		AIRFILTER	865152	330050166 2
		ALTERNATORBELT (set)	966999	330050177 1
		FANBELT (set)	9663992	330050178 1
		WATER FILTER WITHOUT DCA	366822	330050179 4
		INJECTOR GASKET	459455	330050181 2
		INJECTOR NOZZLE	866193	330050203 2
	(TWD1630 Engine)	FUELFILTER	3825133EX466987	330050254 6
		DIODE	86497800x1701	330410034 3
		DIODE	86497800x1702	330410035 3
		THERMOSTAT GASKET	154470	330050003 1
		MAINOILFILTER	466634	330050047 20
		THERMOSTAT GASKET	1544410	330050107 1
		TEMPERATURE SWITCH 103	848829	330050123 1
		VALVE COVER GASKET	424692	330050151 6
		OIL PRESSURE SWITCH	863169	330050152 1
		AIRFILTER	865152	330050166 4
	400	ALTERNATORBELT (set)	9669992	330050177 1
		FANBELT (set)	9663992	330050178 1
		WATER FILTER WITHOUT DCA	366822	330050179 8
		INJECTOR GASKET	459455	330050181 6
		FUEL SUPPLY PUMP	853474	330050192 1
		STOP SOLENOID SAFETY RELAY	872906	330050195 1
		INJECTOR NOZZLE	866193	330050203 6
		STOP SOLENOID	872905	330050204 1
		RELAY FOR ELECTRIC HEATER	1088170	330050205 1
		WATER PUMP KIT	276014	330050206 1
	2000	FUELFILTER	3825133EX466987	330050254 8
		THERMOSTAT	814910_0nd.6763	330050294 1
		DIODE	86497800x1701	330410034 3
		DIODE	86497800x1702	330410035 3

Type	Hours	Description	PartNo.	Qty
500	1000	A.V.R.	R448	330410089 1
		MAINOILFILTER	466634	330050047 4
		VALVE COVER GASKET	1543581	330050146 6
		FANBELT (set)	9672633	330050147 1
		ALTERNATORBELT (set)	9669742	330050148 1
	2000	WATER FILTER	1699800	330050169 2
		INJECTOR GASKET	1543574	330050187 1
		INJECTOR NOZZLE	3825001	330050202 1
		FUELFILTER	3825133EX466987	330050254 6
		DIODE	86497800x1701	330410034 3
400	2000	DIODE	86497800x1702	330410035 3
		MAINOILFILTER	466634	330050047 10
		AIRFILTER	82701	330050091 2
		TEMPERATURE SWITCH 103	848829	330050123 1
		VALVE COVER GASKET	1543581	330050146 6
		FANBELT (set)	9672633	330050147 1
		ALTERNATORBELT (set)	9669742	330050148 1
		OIL PRESSURE SWITCH	863169	330050152 1
		WATER FILTER	1699800	330050169 4
		INJECTOR GASKET	1543574	330050187 2
2000	400	INJECTOR NOZZLE	3825001	330050202 2
		FUELFILTER	3825133EX466987	330050254 6
		DIODE	86497800x1701	330410034 3
		DIODE	86497800x1702	330410035 3
		A.V.R.	R448	330410089 1

Type	Hours	Description	PartNo.	Qty
500 500 500 500 500 500 500 500 500 500	500 500 500 500 500 500 500 500 500 500	MAINOILFILTER	466634	330050047
		BYPASSOILFILTER	477566	330050134
		VALVECOVERGASKET	1543581	330050146
		FANBELT(set)	967269(3)	330050147
		ALTERNATORBELT (set)	966974(2)	330050148
		WATER FILTER	1699830	330050169
		INJECTOR GASKET	1543574	330050187
		INJECTOR NOZZLE	3825001	330050202
		FUEL FILTER	3825133EX466987	330050254
		DIODE	864FR80cr1701	330410034
1000 1000 1000 1000 1000 1000 1000 1000 1000 1000	1000 1000 1000 1000 1000 1000 1000 1000 1000 1000	DIODE	864FR80cr1702	330410035
		MAINOILFILTER	466634	330050047
		TEMPERATURE SWITCH 103	848829	330050123
		BYPASSOILFILTER	477566	330050134
		VALVE COVER GASKET	1543581	330050146
		FANBELT(set)	967269(3)	330050147
		ALTERNATORBELT (set)	966974(2)	330050148
		OIL PRESSURE SWITCH	863169	330050152
		AIRFILTER	865152	330050166
		WATER FILTER	1699830	330050169
450 (TAD1630 Engine)	2000 2000 2000 2000 2000 2000 2000 2000 2000 2000	INJECTOR GASKET	1543574	330050187
		INJECTOR NOZZLE	3825001	330050202
		FUEL FILTER	3825133EX466987	330050254
		DIODE	864FR80cr1701	330410034
		DIODE	864FR80cr1702	330410035
		THERMOSTAT GASKET	1544710	330050003
		MAINOILFILTER	466634	330050047
		THERMOSTAT GASKET	1544410	330050107
		TEMPERATURE SWITCH 103	848829	330050123
		BYPASSOILFILTER	477566	330050134
500 500 500 500 500 500 500 500 500 500	500 500 500 500 500 500 500 500 500 500	VALVE COVER GASKET	1543581	330050146
		FANBELT(set)	967269(3)	330050147
		ALTERNATORBELT (set)	966974(2)	330050148
		OIL PRESSURE SWITCH	863169	330050152
		AIRFILTER	865152	330050166
		WATER FILTER	1699830	330050169
		INJECTOR GASKET	1543574	330050187
		WATER PUMP KIT	276636	330050193
		STOP SOLENOID SAFETY RELAY	872903	330050194
		INJECTOR NOZZLE	3825001	330050202
2000 2000 2000 2000 2000 2000 2000 2000 2000 2000	2000 2000 2000 2000 2000 2000 2000 2000 2000 2000	STOP SOLENOID	872905	330050204
		RELAY FOR ELECTRIC HEATER	1088170	330050205
		FUEL FILTER	3825133EX466987	330050254
		ALTERNATORBELT (set)	978236	330050265
		INJECTOR NOZZLE	866546	330050266
		THERMOSTAT	814918.0nd16763	330050294
		DIODE	864FR80cr1701	330410034
		DIODE	864FR80cr1702	330410035
		A.V.R.	R448	330410089

Type	Hours	Description	PartNo.	Qty
500 500 500 500 500 500 500 500 500 500	500 500 500 500 500 500 500 500 500 500	MAINOILFILTER	466634	330050047
		BYPASSOILFILTER	477566	330050134
		VALVECOVERGASKET	1543581	330050146
		FANBELT(set)	967269(3)	330050147
		WATER FILTER	1699830	330050169
		INJECTOR GASKET	1543574	330050187
		FUEL FILTER	3825133EX466987	330050254
		ALTERNATORBELT (set)	978236	330050265
		INJECTOR NOZZLE	866546	330050266
		DIODE	864FR80cr1701	330410034
1000 1000 1000 1000 1000 1000 1000 1000 1000 1000	1000 1000 1000 1000 1000 1000 1000 1000 1000 1000	DIODE	864FR80cr1702	330410035
		MAINOILFILTER	466634	330050047
		TEMPERATURE SWITCH 103	848829	330050123
		BYPASSOILFILTER	477566	330050134
		VALVE COVER GASKET	1543581	330050146
		FANBELT(set)	967269(3)	330050147
		OIL PRESSURE SWITCH	863169	330050152
		AIRFILTER	865152	330050166
		WATER FILTER	1699830	330050169
		INJECTOR GASKET	1543574	330050187
500 500 500 500 500 500 500 500 500 500	500 500 500 500 500 500 500 500 500 500	FUEL FILTER	3825133EX466987	330050254
		ALTERNATORBELT (set)	978236	330050265
		INJECTOR NOZZLE	866546	330050266
		THERMOSTAT	814918.0nd16763	330050294
		DIODE	864FR80cr1701	330410034
		DIODE	864FR80cr1702	330410035
		A.V.R.	R448	330410089

L . STORAGE & RECOMMISSIONING

● - STORAGE

A. ENGINE UP TO 2 MONTHS

- Start the engine and run it warm approximately once every fortnight.
- Check/complete the antifreeze protection of the cooling system.

B. ENGINE OVER 2 MONTHS

- Run the engine to its normal operating temperature.
- Stop the engine and pump out the lubricating oil from the oil sump.
- **Max. inhibition period of 8 months:** replace the oil filter and fill the engine to the normal level with lubricating oil. Run the engine warm after the oil change.
- **Inhibition period of more than 8 months:** fill inhibiting oil in the engine to just over the lower mark on the dipstick. Inhibiting oils are marketed by the oil companies.
- Connect the fuel lines (suction and return lines) to a can filled with 1/3 inhibiting oil and 2/3 fuel. Certain oil companies have a ready-mixed oil for this purpose.

● Vent the fuel system. Start the engine and run until approx. 2 litres have been consumed from the can.

- Stop the engine and pump out the inhibiting oil from the oil sump. Reconnect the standard fuel lines.
- Check that the coolant has a sufficient freeze protection, top up if necessary. Alternatively, the coolant can be drained off. Improve where necessary the external anti-corrosion protection by applying anti-corrosion oil. The surfaces shall be clean and dry before they are treated.

⚠ CAUTION ! Some inhibiting oils are inflammable and can give out toxic vapours. Ensure good ventilation. Use a safety mask during spraying.

- Attach a note to the engine stating the date, type of inhibiting and the inhibiting oil used.
- Cover the air inlet to the engine, the exhaust pipe and the engine, if so required.

C. ALTERNATOR

- Remove the fan grills and place some desiccant bags inside the alternator.
- Hermetically seal all the openings with strong paper and adhesive tape.

D. STARTING BATTERY

- Disconnect the battery and store in a clean and airy site, once it has been fully charged.
- Coat the terminals with silicone grease.
- During storage, regularly check the charge level and recharge if necessary.

**Never store a discharged battery.
Never remove the electrolyte from the battery.**

E. CONTROL PANEL

- Unplug the input to the mains if it connected to the genset.
- Place desiccant bags inside then hermetically. Cover all the openings with airtight and waterproof adhesive tape.
- Lubricate the locks and hinges.

F. ENCLOSURE

- Cover the openings with plastic film and make air and watertight with adhesive tape.
- Coat with silicone grease all the door seals, hinges and lock latches.
- Oil the locks.
- Wedge the genset.

G. TRAILER

- Lift the whole trailer and let it rest on sufficiently strong wedges. The roadwheels must not touch the ground.
- Deflate the tyres down to 1 bar and protect them from direct sunlight with wooden panels and strong cardboard.
- Heavily grease the overrun brake and handbrake controls (if equipped), the coupling ring and the front jockey wheel control.
- Remove the signalling lights and store in a dry place.
- During storage, check the tyre pressure.

H. GENERATING SET

- Spray or brush a rust inhibition compound which complies with the MIL-C-16173C, Type P-2, quality 1 or 2 specification, on the surfaces exposed to air or not painted.
- Cover all the openings with greased paper and adhesive tape.
- Keep the site where the generating set is stored, dry and of constant temperature.
- Put up a notice board indicating the state of the storage and forbidding any starting attempts.

II - RECOMMISSIONING

A. ENGINE OVER 2 MONTHS

- Remove covers from engine, air inlet and exhaust pipe.
- Wash off external inhibiting agent with white spirit.
- If the coolant has been drained, close the drain cocks and install the drain plugs.
- Fill the cooling system.
- Fill where necessary with lubricating oil of the correct quality in the engine. Fit a new filter if the filter was not changed in connection with the oil change during inhibition.
- Fit new fuel filters and vent the fuel system.

B. ALTERNATOR AND CONTROL PANEL

- Remove the desiccant bags and adhesive tapes.
- Connect the mains cables and check the phase rotation.

C. ENCLOSURE

- Remove the plastic films, placed in the opening during storage, and the wedges under the chassis.

D. TRAILER

- Remove the protection boards from the roadwheels.
- Inflate the tyres to the normal operating pressure.
- Lift the trailer and remove the wedges.
- Place the trailer on the ground.
- Install the signalling lights.
- Operate the handbrake a few times.
- Connect the road signalling lights electric plug to the vehicle and check that they are operational.

E. GENERATING SET

- Entirely clean the generating set.
- Commissioning a genset after storage is an important operation which must be performed with great care.
- If anything abnormal happens when starting the genset, shut it off immediately (possibly by unplugging one of the solenoid wires).
- Start the genset and let it warm up for 10 minutes without applying any load (refer to the normal starting procedures).
- Check the engine for any leaks.
- Progressively apply the load.



Use clean and approved fuel.

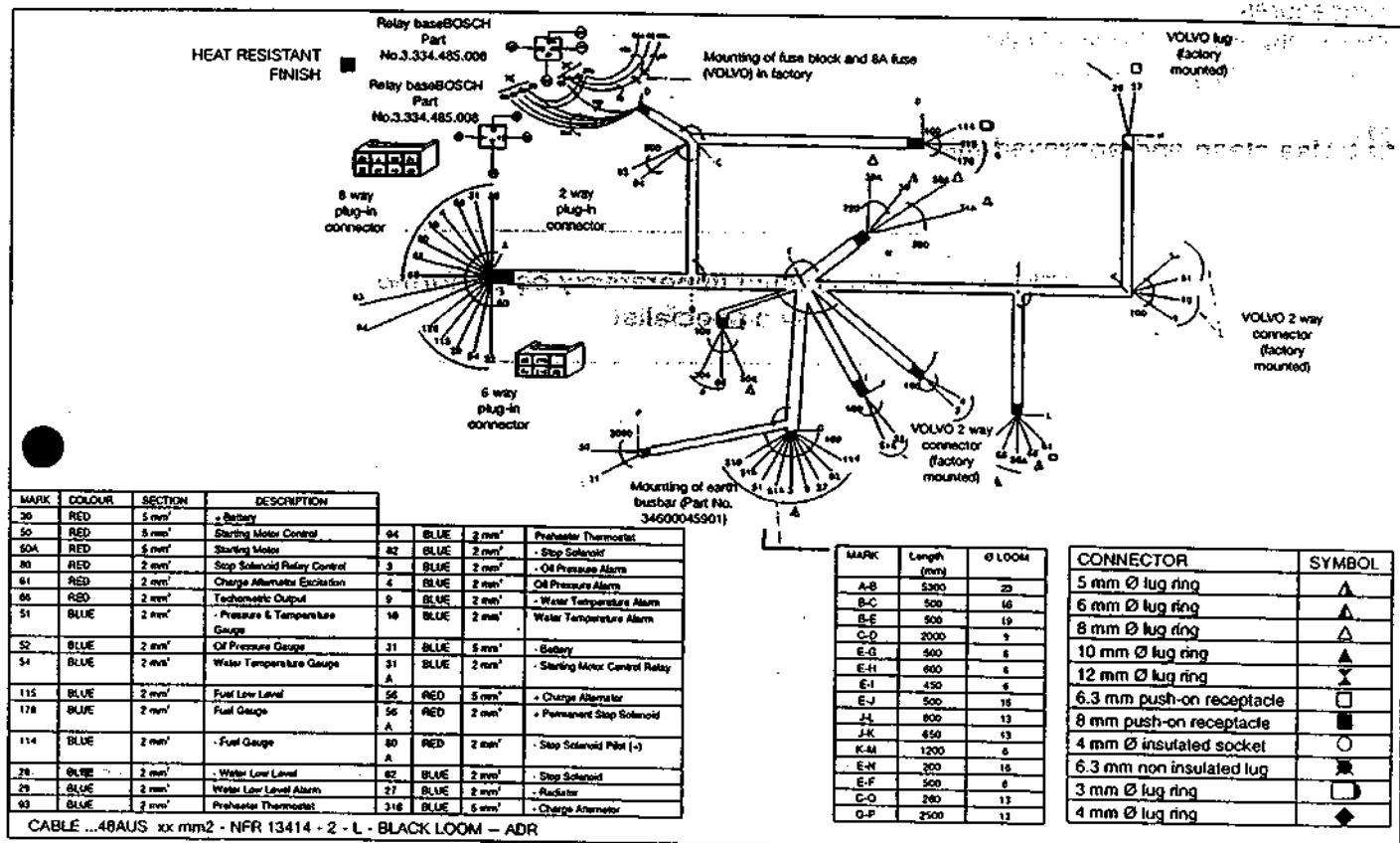
**These operations must imperatively be performed
by a specialist.**

M. DIAGRAMS

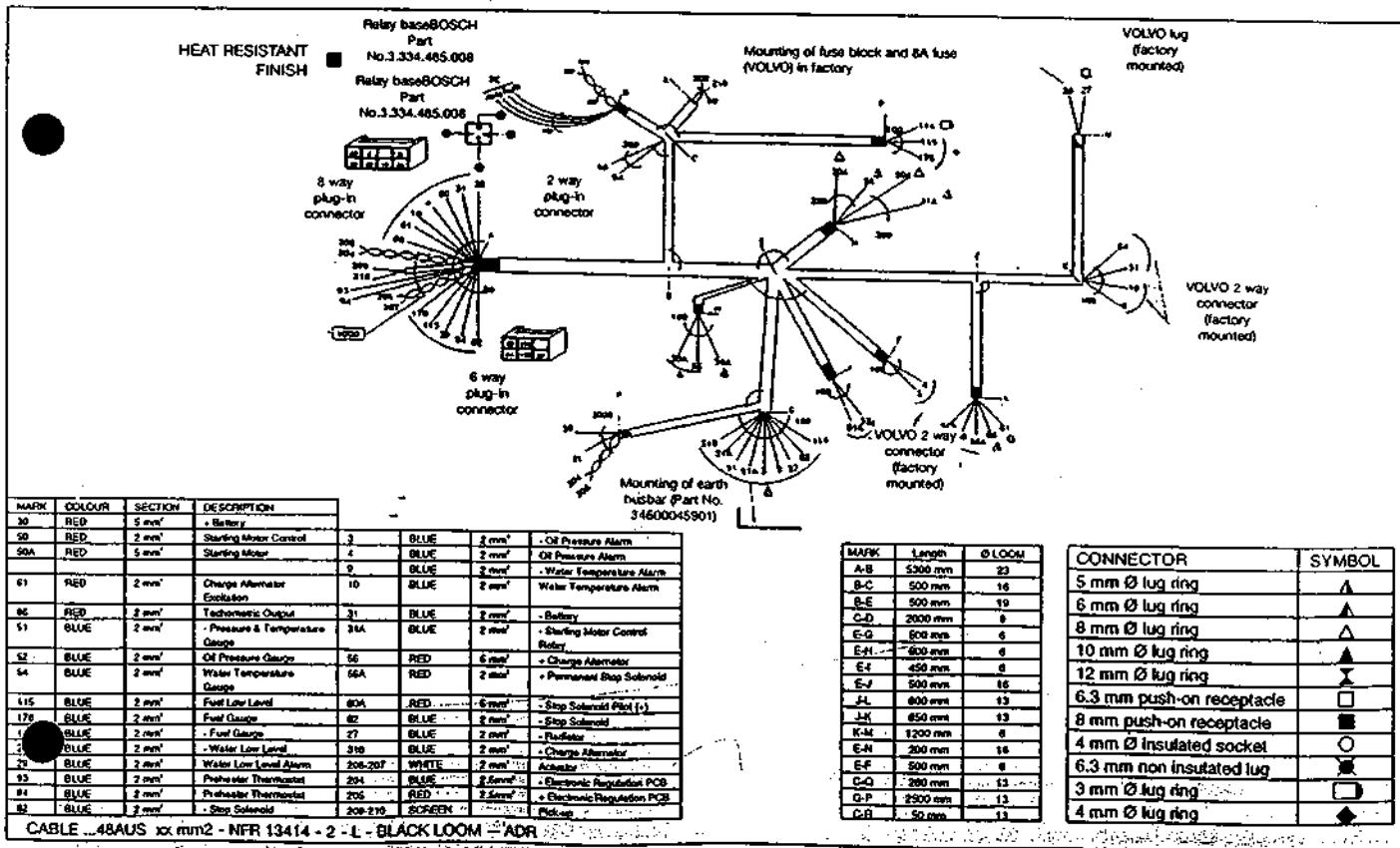
ELECTRICAL SYSTEMS

P-ENGINE

A. TD 1010, TD 1210, TWD 1201 and TWD 1211 ENGINES

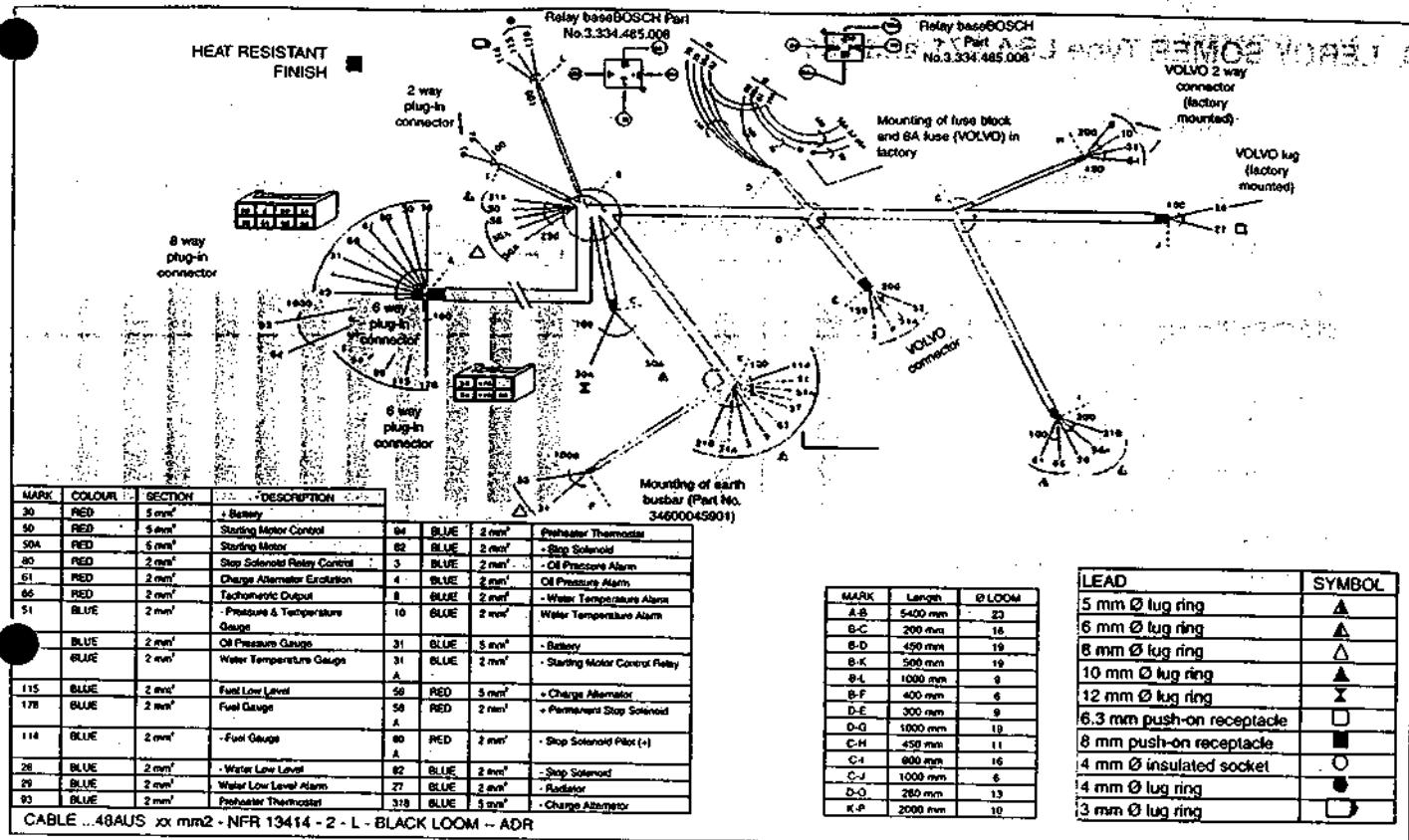


B. TAD 1230 ENGINES

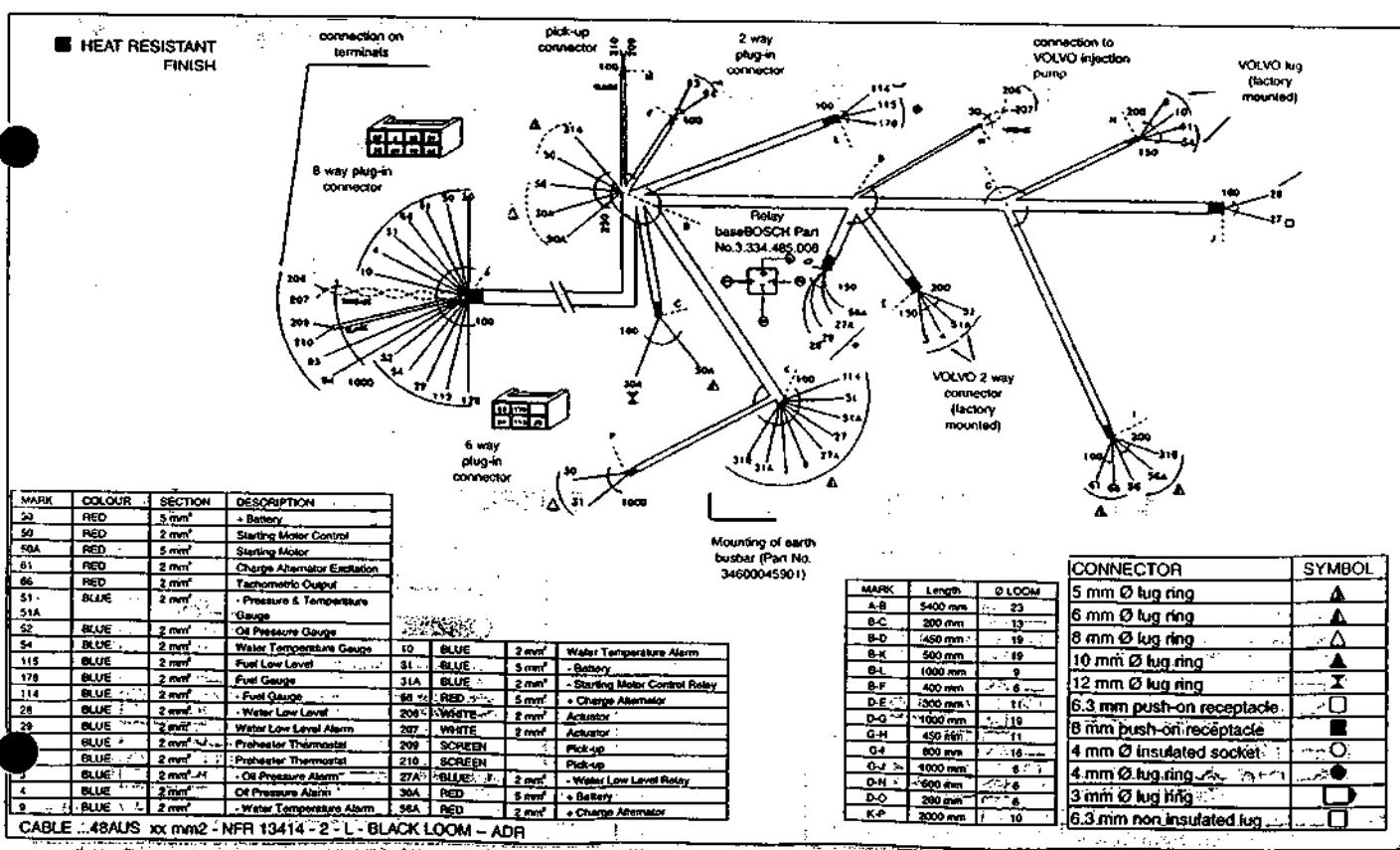


C. TWD 1630 ENGINES

SHOTAKARSTTAN



D. TAD 1630 & 1631 ENGINES

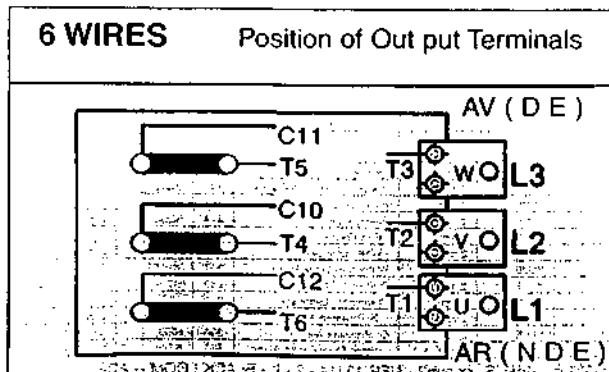
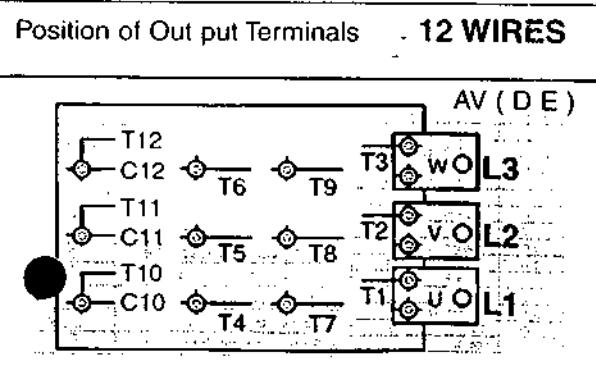
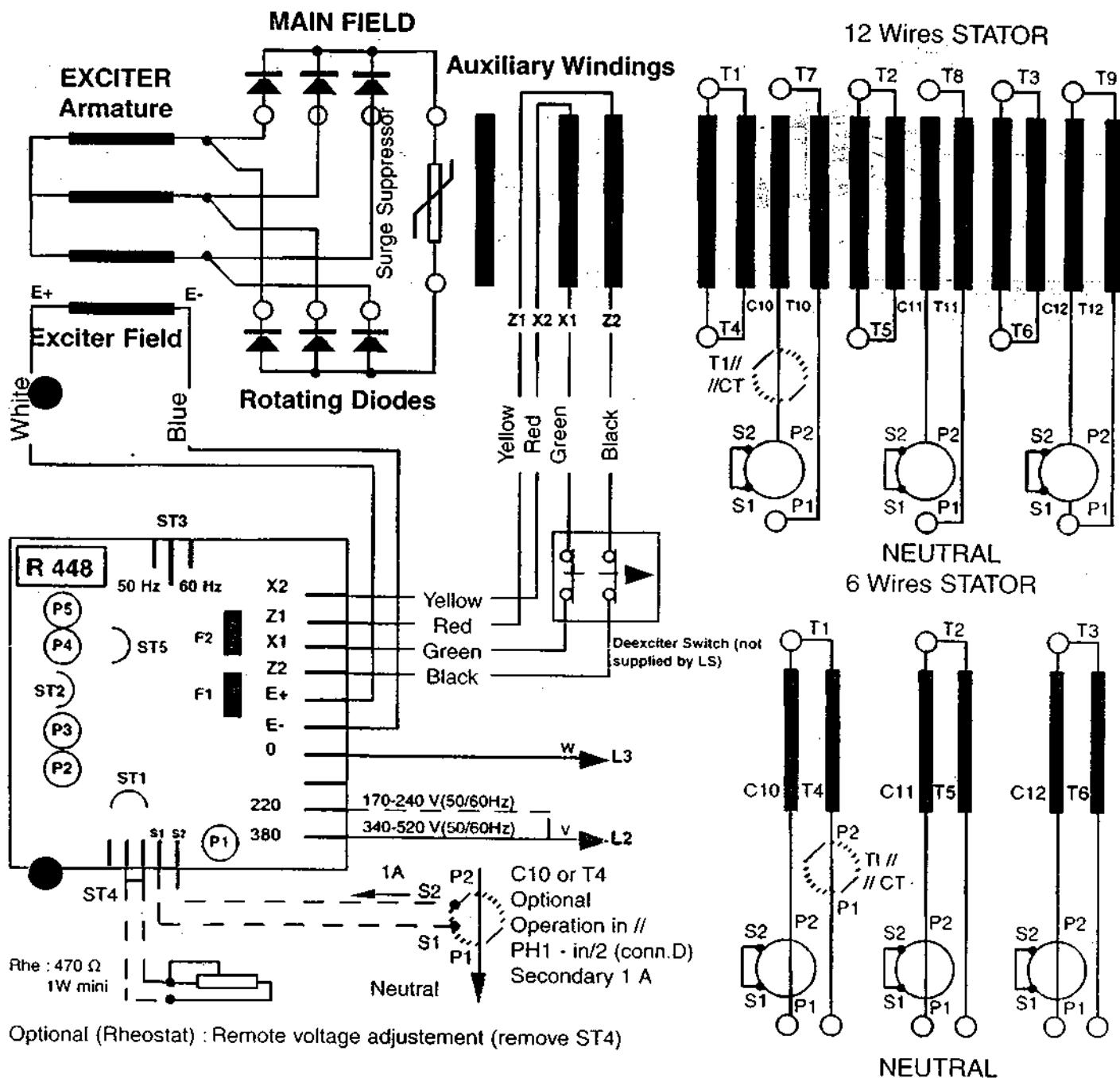


II - ALTERNATORS

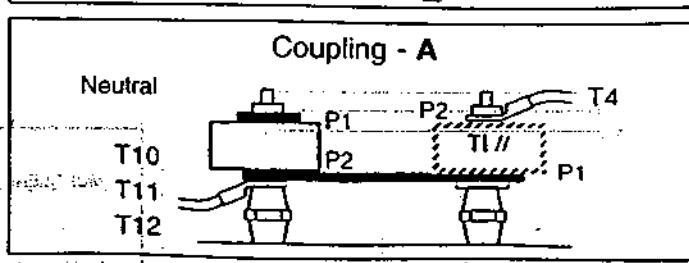
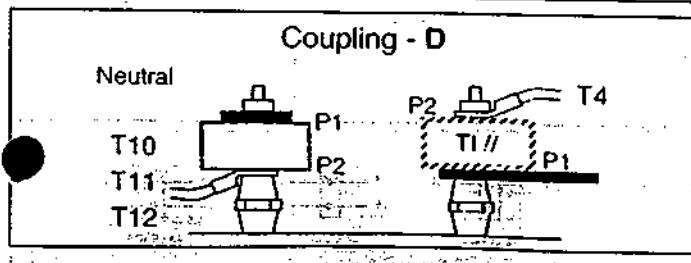
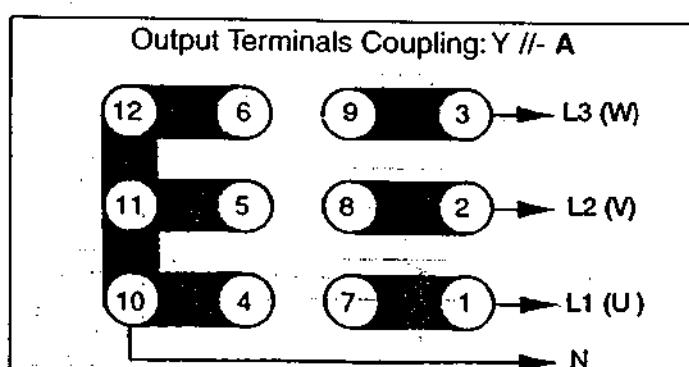
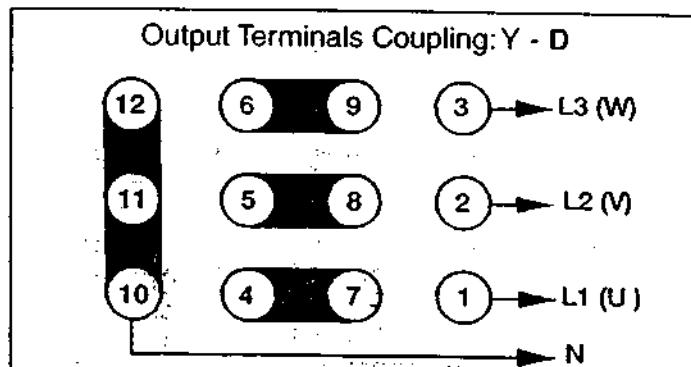
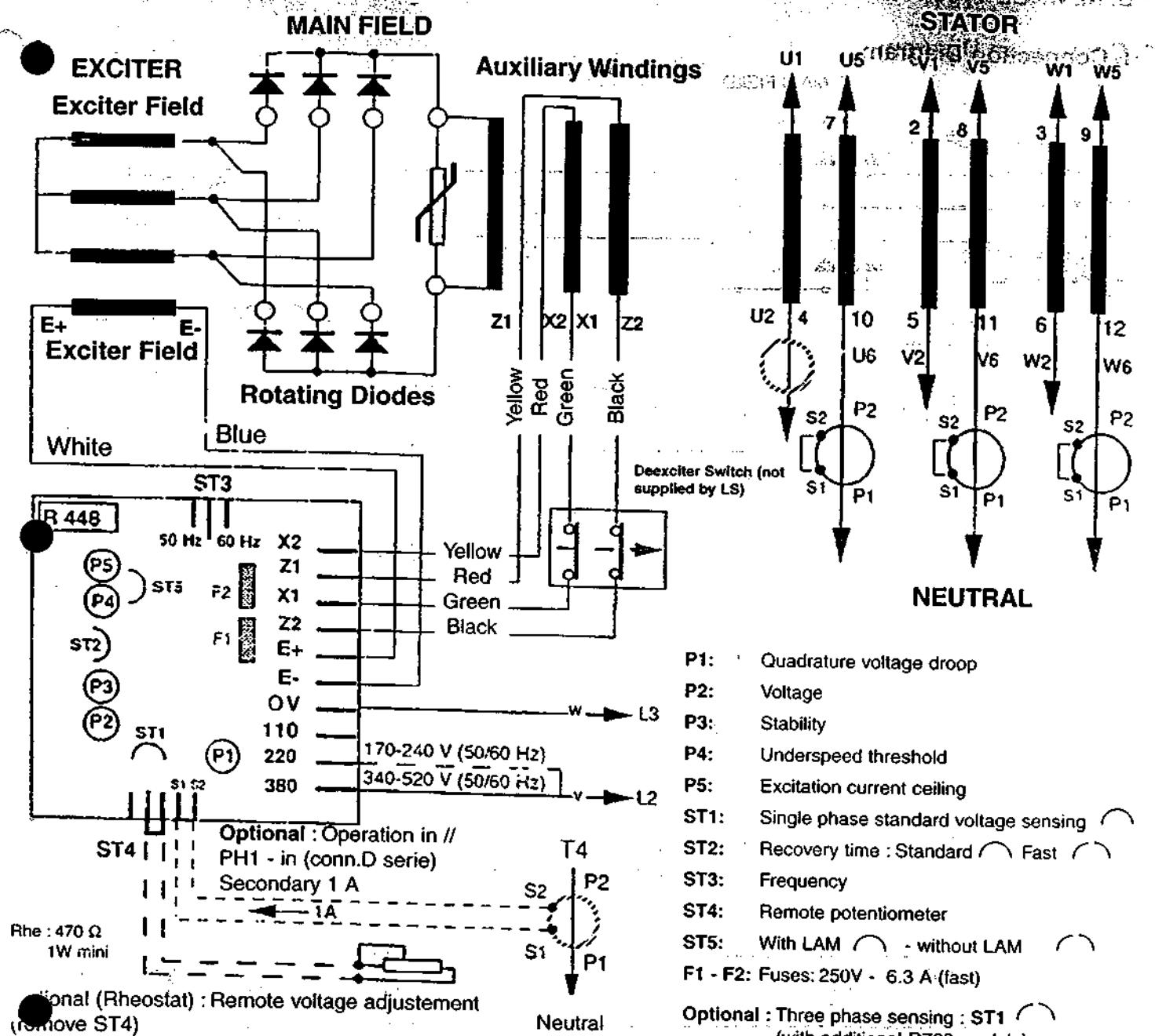
ABBEY SOMER LSA 471 and 461

ABBEY SOMER Type LSA 471 and 461

1. LSA 471 Connection Diagram



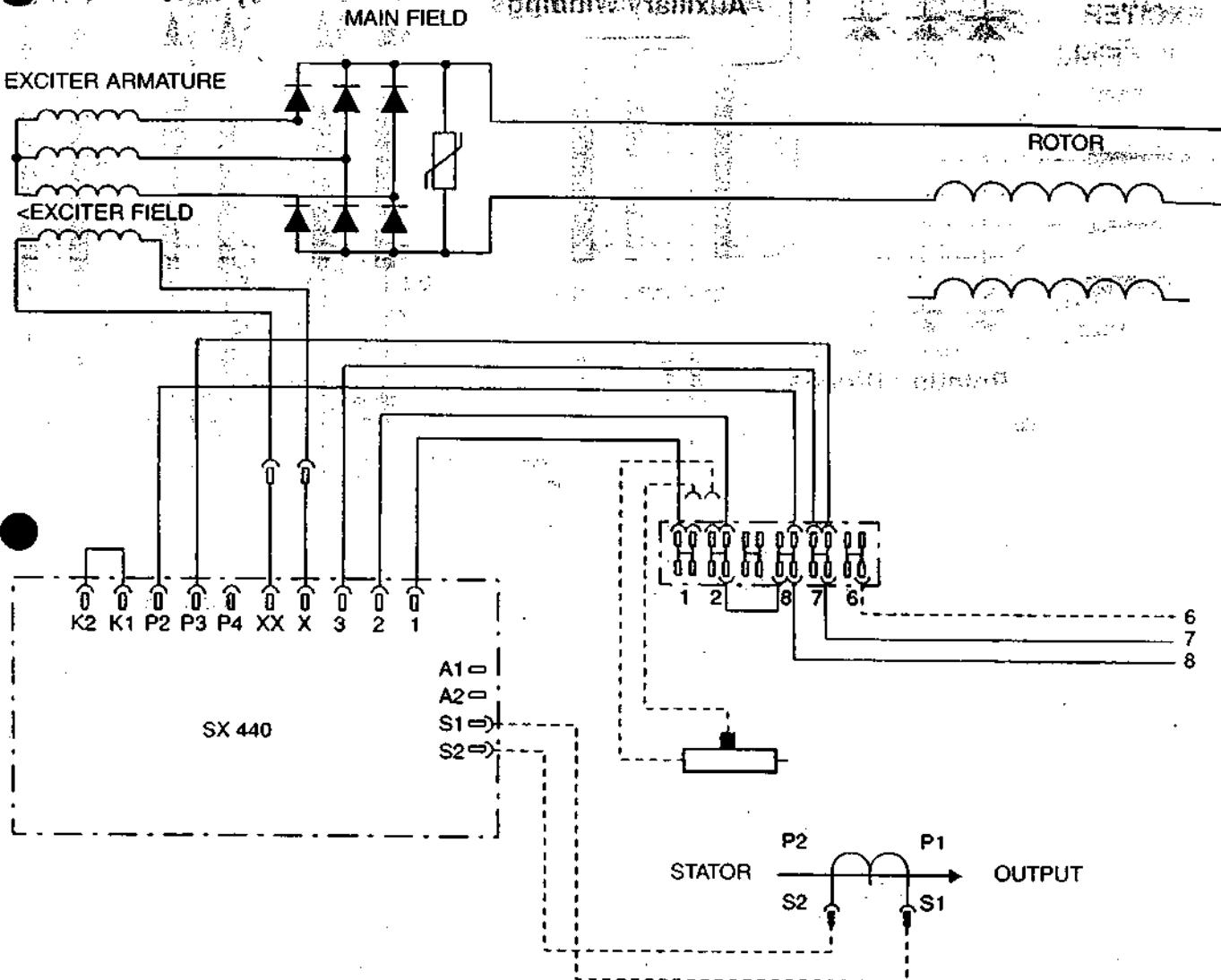
2. LSA 461 Connection Diagram



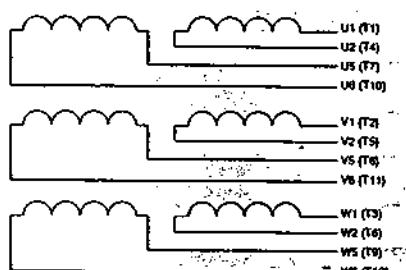
B. NEWAGE Type HC4 and HC5

ROTATE

Connection Diagram

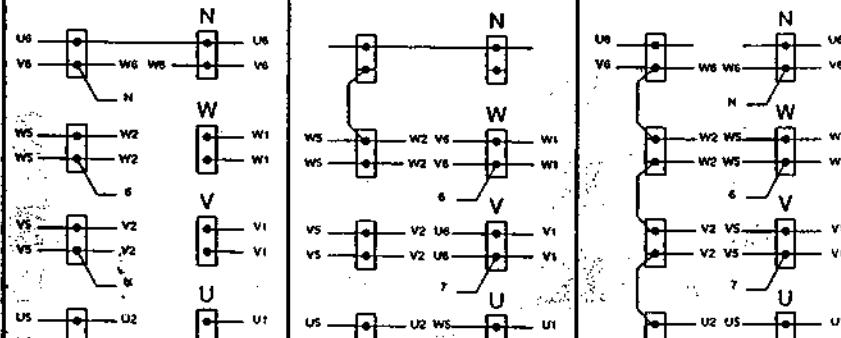


STATOR (12 WIRES)



CONNECTION OF OUTPUTTERMINALS

Series Star Series Delta Paralleling



MULTILEAD STATORS

12 LEADS

36 LEADS

48 LEADS

III - ELECTRICAL CONTROL PANEL

(see documentation accompanying the generator or the electrical control panel).

BRUNN TYPE: MITSUBISHI

3000 KW G
1600 KW G
600 KW G
400 KW G

1000 KW G

1000 KW G

N • AVAILABLE LITERATURE AND TRAINING

DESCRIPTION	PART NUMBER
Spare Parts Catalogues VOLVO Engine TD 1010	150 VOL 030008
TD 1210 - TWD 1210 - TWD 1211 - TAD 1230	150 VOL 030010
TAD 1630 - TWD 1630	150 VOL 030013
TAD 1631	150 VOL 030011
Maintenance and Spare Parts Manual LEROY SOMER LSA461-471	150 GE 010067
Maintenance and Spare Parts Manual Newage HC4 - HC5	150 STAM 010003
Speed Governor	150 VOL 01007
Workshop Manual VOLVO Engines TD 1010 - TD 1210 - TWD 1210 - TWD 1211 TAD 1230 TWD 1630 - TAD 1630 - TAD 1631	150 VOL 050008 150 VOL 050009 150 VOL 050011

CAUTION

Training for the operation, service and maintenance of your generating sets and installations is available within our company. Please contact our information centre or one of our agents.



ELECTRONIC SPEED GOVERNOR

VOLVO TYPE GAC

GROUPES ÉLECTROGÈNES - GENERATING SETS
GRUPOS ELECTRÓGENOS - GERADORES ELÉCTRICOS
STROMERZEUGER - GRUPPI ELETTROGENI - GENERATRICE
DIESELGENERATORAGGREGAT - AGGREGATER
DIESELAGGREGAATIT - RAFSTÖÐVAR - MEKTPÖTT

Electronic Speed Governor

Function – Installation – Fault-tracing

This booklet only covers the ACB225 and ACB275
actuators and the ESD5500 control unit.

Contents

General description	2
Function	3
Installation	6
Electromagnetic compatibility	7
Setting and Adjusting	8
Running	10
Fault-tracing	12

Engine speed pickup

The engine speed pickup is an electromagnet fitted in the flywheel housing directly above the flywheel ring gear. As the teeth of the ring gear pass under the electromagnet an **alternating current** is induced (one cycle per tooth).

The pulse's voltage is between 1V AC to 30V (AC. RMS.)

The pickup's threads is 5/8"-18 UNF-2A.

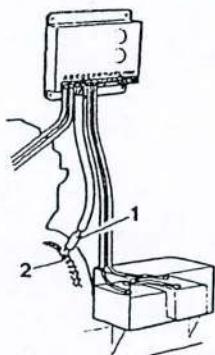


Fig. 2. Location of engine speed pickup

1. Engine speed pickup
2. Flywheel ring gear

Control unit

The electronic control Unit (fig 3) compares the incoming signals with the pre-set values, and a correcting signal or an unchanged signal is transmitted to the actuator.

The control unit has a number of adjustment possibilities which are described below. Adjustments can be made after first removing the round rubber plugs from the Control Unit.

1. **Adjusting the idling speed** (marked "IDLE"), (4, fig. 3) is done with a single turn potentiometer. The idling speed can be adjusted with a jumper between the terminals "L" and "M" installed.

The adjustment range is 1200–4100 Hz below the frequency for the set engine speed. Turning the potentiometer **clockwise will increase** the idling speed.

2. **Adjusting the operating speed ("SPEED")**, (1, fig. 3) is done with a 22 turn potentiometer.

The frequency range is 100–6000 Hz. Turning the potentiometer **clockwise will increase** the engine speed.

The frequency from the magnetic pickup (engine speed pickup) is dependent on the number of teeth on the flywheel ring gear and the desired engine speed, i.e. the engine speed in r/s (revs per second) multiplied by the number of teeth on the ring gear.

Engine	No. of teeth
6/7 Ltr. engines	140
10/12 Ltr. engines	156
16 Ltr. engines	153

Exemple: Engine TWD1630 set on 1500 r/min. (25 r/s):

$$25 \times 153 = 3825 \text{ Hz.}$$

3. **Governor sensitivity.** The governor's sensitivity is adjusted by a single turn potentiometer ("GAIN"), (2, fig 3). A small change of frequency can be noticed when adjusting the sensitivity. This can be adjusted by the "SPEED" potentiometer (1).
4. **Stability control.** The governor's time constant is adjusted by the single turn potentiometer ("STABILITY"), (3, fig 3).

The time constant is the time required by the engine to return to the set operating speed after there has been a change in load.

5. **Droop.** The droop control (5, fig 3), marked "DROOP" is working when terminals "K" and "L" are connected. The adjustment range is 1 - 5%. Turning **clockwise** will **increase** the value.

With a jumper between terminals "G" and "H", an increased droop can be obtained.

6. **Starting fuel adjustment.** Turning the "STARTING FUEL" adjustment clockwise will increase the amount of fuel delivered to the engine during cranking. With the adjustment **full counter-clockwise**, the fuel amount will be very low or zero depending on the actuator linkage. With the adjustment **full clockwise**, starting fuel is unlimited and the actuator will move to 100% fuel during cranking.

7. **Speed Ramping Adjustment.** Turning the "SPEED RAMPING" adjustment **clockwise** will slow the acceleration of the engine speed. With the adjustment **full clockwise**, the acceleration can be as long as 20 seconds depending on the speed range selected. With the adjustment **full counter-clockwise**, the ramping will be effectively eliminated.

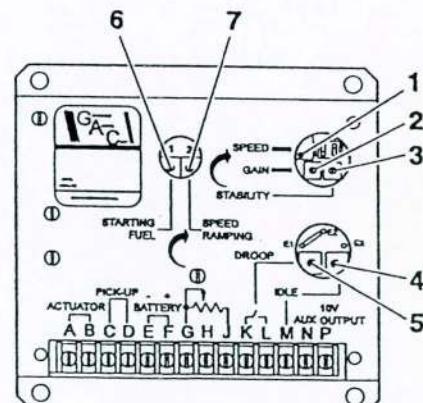


Fig. 3. Control unit ESD5500 with the rubber plugs removed.

- | | |
|-----------------------------|-----------------------------|
| 1. Operating speed, setting | 5. Droop control |
| 2. Sensitivity, setting | 6. Starting fuel adjustment |
| 3. Stability control | 7. Speedramping adjustment |
| 4. Idle adjustment | |

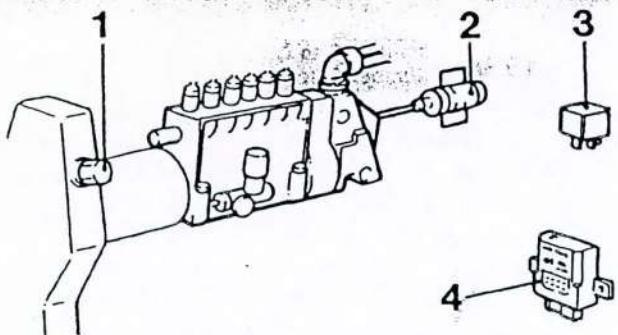


Fig. 4. Engine with electronic overspeed protection

- 1. Engine speed pickup
- 2. Stop solenoid
- 3. Relay for stop solenoid
- 4. Overspeed protection

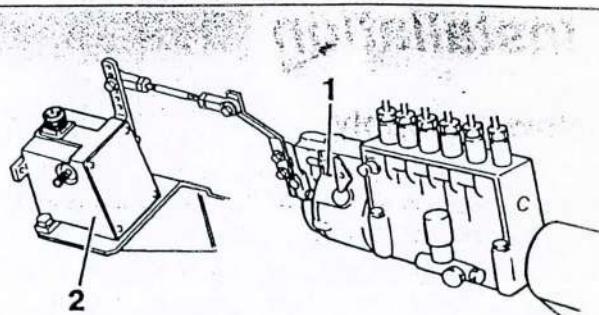


Fig. 6. Engine with mechanical overspeed protection

- 1. RQ governor
- 2. Separately installed actuator

Overspeed protection

As an extra safety protection against overspeed and consequent damage, a separate overspeed protection must be included in the electronic governor system.

The engine speed pickup for the overspeed protection is fitted in the timing gear casing. The overspeed protection should be set so that the operating speed can be exceeded by approx. 15%. The adjustment is done using the trim potentiometer (C/D, fig 5).

At the pre-set shut-down point, the stop solenoid is activated which pulls the injection pump's stop lever to the zero fuel position thus stopping the engine.

If the engine is fitted with a RQ governor, then this will function as an overspeed protection. The RQ governor limits the engine speed mechanically.

An overspeed protection must always be installed for safety reasons.

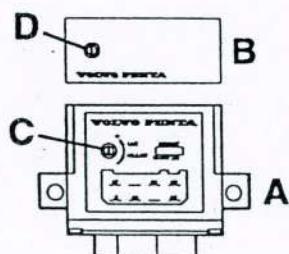


Fig. 5. Electronic overspeed protection

- A. Version 1
- B. Version 2
- C, D. Adjuster screws for setting the shut-down point*

*One turn of the adjuster screw "C" corresponds to approx. 70 r/min for the 16 liter range (or approx. 85 r/min for other engines that have later been equipped with the overspeed protection).

The adjustment sector (270°) for screw "D" corresponds to approx. 1560-2700 r/min.

Actuator

The actuator is an electromagnet. The actuator, type ACB275, is fitted to the rear of the injection pump and replaces the usual mechanical governor.

On certain injection pumps there is an RQ governor fitted as an overspeed protection. For these cases, an actuator type ACB225 is fitted separately.

The control signals, which the control unit transmits to the actuator, are transferred to the injection pump's fuel rack via a linkage system.

The actuator converts the control signals from the control unit to controlling forces.

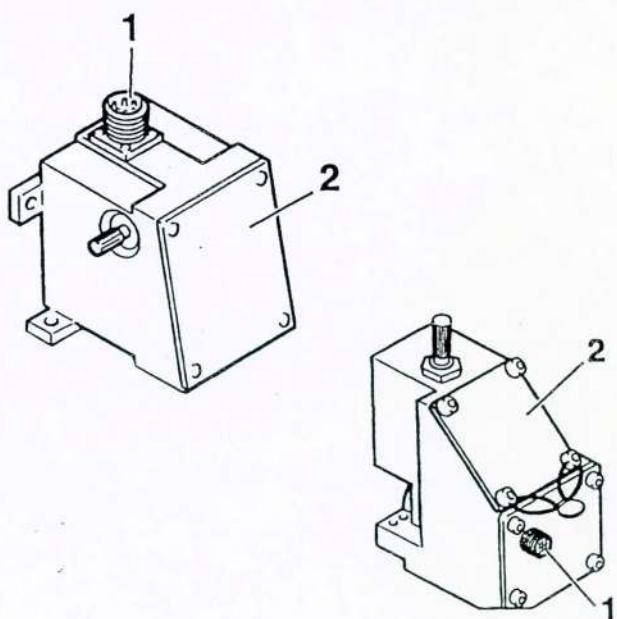


Fig. 7. Actuators, type ACB 225 and ACB 275

- 1. Connection to the control unit
- 2. Inspection cover

Wiring

The 6 basic wires should have the following min. crossection in mm²:

Terminal	12V		24V	
	up to 6 Meters (19.7 feet)	over 6 Meters (19.7 feet)	up to 6 Meters (19.7 feet)	over 6 Meters (19.7 feet)
A - B to actuator	2,5	4,0	1,5	2,5
E - F to battery	2,5	4,0	1,5	2,5
C - D to speed sensor	Use shielded cable 2 x 0,75 or 2 x 1,0. Shield at pick-up open, at control unit at D. If shielded cable is not available, then twist the two leads all the way.			
Other terminals (if used)	Conduct only millamps, hence 1,0mm ² is sufficient. In case of strong electromagnetic fields use only shielded cables. Shield to terminal "G".			

Electromagnetic compatibility

In order to be in compliance with the EMC directives, the installer is obligated to install the equipment in strict accordance with the following special instructions and guidelines:

1. The speed control unit must be mounted against a metal ground plane with four bolts which make positive electrical connection between the control unit casing and the back plane or a backing plate.
2. The magnetic pickup must be connected to the control unit using shielded cable as shown in the wiring diagram, fig. 11.
3. All shielded cable connections to the control unit must be connected to the casing.

4. The battery minus connection to terminal "E" must also be additionally jumpered to the control unit casing. For isolated ground systems use a 0.01 µF capacitor. The capacitor should be a good quality ceramic type that withstand the required isolation voltage (500V - 1kV).
5. Shielded cable for the actuator is recommended to minimise the actuator's slight movement during fast high voltage transients. The installer's choice of not using shielded cable may cause the actuator to move more than slightly during these transients. However, no failures should be experienced.
6. The installer must refer to the wiring diagram below.

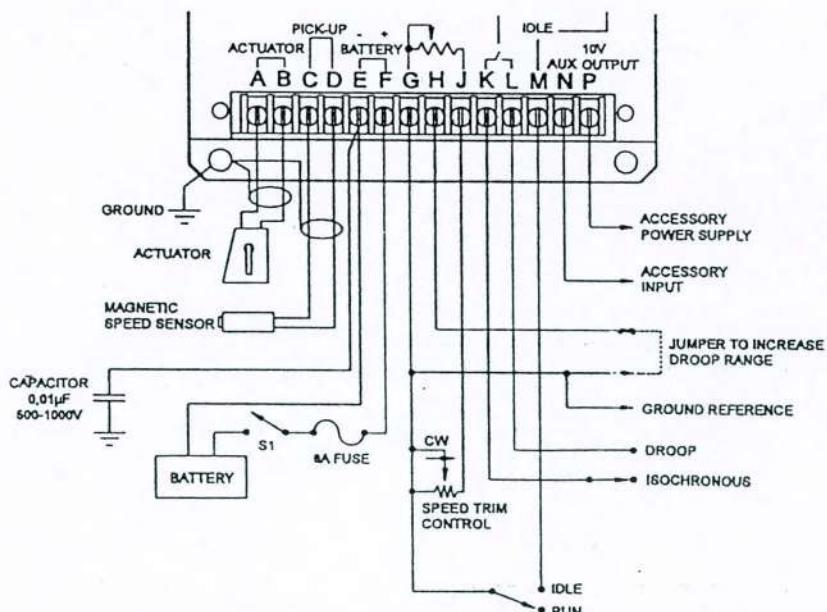


Fig. 11

Actuator ACB225

Max. angle travel of the actuator's lever is 25°.

1. **Basic setting:** Adjust the length of the link arm between the actuator and the injection pump's speed control lever.

The distance between the actuator flap and its stop should be approx. 10mm (3/8") (A, fig 14).

2. **Fine setting:** Use the same method/values as for the ACB275 actuator. See point 3 in the previous section.

Check that the actuator does not go to its end position at full output.

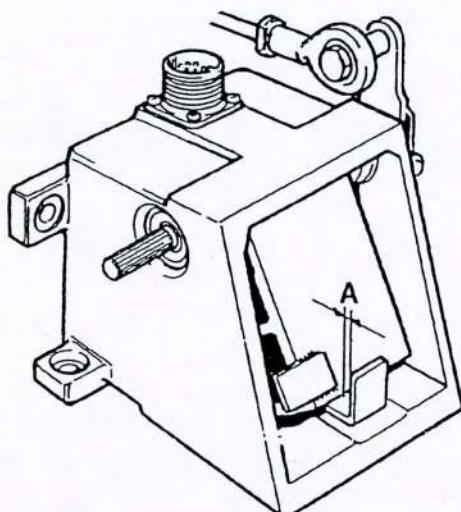
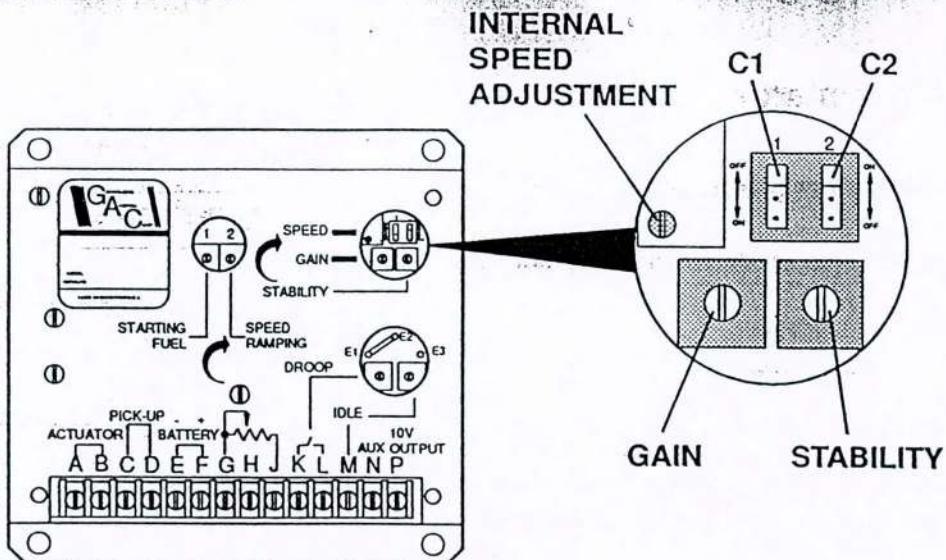


Fig. 14. Actuator ACB225

Basic setting
A=10 mm (3/8")



Setting the dip switches C1 and C2:

The **left hand switch** (C1) replaces and functions as the jumper E6 to E7 found in the old control unit. The normal position is ON, corresponding the jumper in position on the old unit. Move the switch to the OFF position if there is fast instability in the system.

The **right hand switch** (C2) controls an additional circuit affecting the sensitivity of the control unit. With the switch in the ON position the sensitivity is being reduced. This function has been added in order to eliminate fast erratic engine behaviour which can be caused by a very soft or worn coupling in the power train between engine and driven object.

Note: when switch C1 is in the ON position, and switch C2 is in the OFF position, the ESD 5131 operates exactly like an ESD 5111.

Parallel Operation

For good load sharing when two or more generators are used in parallel operation, there are two suitable methods.

1.

As the electronic governor system works very exact and fast, its advantages can be used for parallel operation by using a load sharing system. If more information is required, contact Volvo Penta.

2.

The simplest method for load sharing is to use droop as used by mechanical governors.

For 4.5% droop at 1500 r/min (adjusted by Volvo Penta), terminals "K" and "L" on the control unit should be connected.

To run two engines together in parallel it must be possible to adjust the engine speed. A external speed trim potentiometer connected between terminals "G" and "J" on the control unit gives this possibility (fig 8, pos. 4).

Note. A $5\Omega/2W$ potentiometer will give an adjustment range of ± 200 r/min.

Before the generators are connected for parallel operation, each generator should be tested individually. This is done so that the droop is the same (4.5%) for all the connected generators.

The droop method is working well when two generators are run in parallel. The settings become more difficult when more generators are used.

If three or more generators are to be run in parallel, or when there are very high demands (e.g. operation of a radar or telecommunication plants) the method as described under point 1 should be considered.

C. The pickup

Connect a voltmeter between terminals "C" and "D" on the control unit. Crank the engine using the starter motor and read off the voltage. It should be min. 1.0V (AC, RMS).

If there is no voltage: Disconnect the wires to terminals "C" and "D" and crank the engine again. If voltage is measured from the pickup then the control unit is faulty.

If there is still no signal from the pickup: Measure the resistance across terminals "C" and "D" on the control unit. The resistance should be between 50 and 250 Ohms. Otherwise, check the wiring and connections. If these are correct then the distance between the pickup and the flywheel ringgear must be checked. The distance should be 0.6 - 1.0 mm (0.024 - 0.039") (3/4 turn from the bottom position).

A reduction in distance will give a stronger signal (higher voltage) from the pickup.

D. The control unit

1. Check the basic setting.
 2. Check the voltage between terminals "G" (-) and "P" (+) on the control unit using a voltmeter. Check the meter's polarity.

The correct value is 10V DC (applies to engines with both 12V and 24V system voltage).

An incorrect value can be caused by a short-circuit at terminal "P" or a faulty "SPEED" potentiometer.

3. Connect a voltmeter between terminal "A" (-) and "F" (+) on the control unit. Check the meter's polarity.

Crank the engine using the starter motor and with the stop solenoid engaged. Check the voltmeter. The correct value is 1.5-2.5V DC (applies to engines with both 12v and 24V system voltages).

An incorrect value can be caused by:

- "SPEED" potentiometer set too low.
 - Wiring incorrect to the actuator.
 - "SPEED" potentiometer faulty.

2. Engine overspeeds

1. Connect the power supply to the control unit. The actuator flap moves the fuel rack forward to max. fuel position.
 2. Measure the voltage between terminals "A"(-) and "F"(+) on the control unit according to point 2, previous section.

Note! Do not crank the engine.

If the voltage is 1.5-2.5V DC, it's OK.

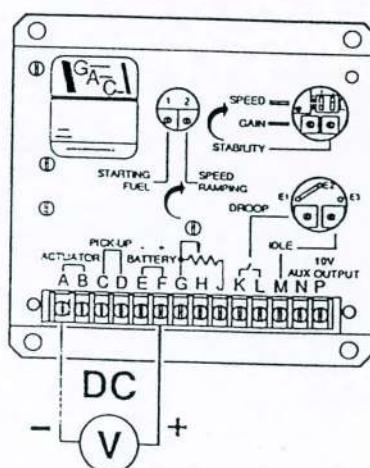
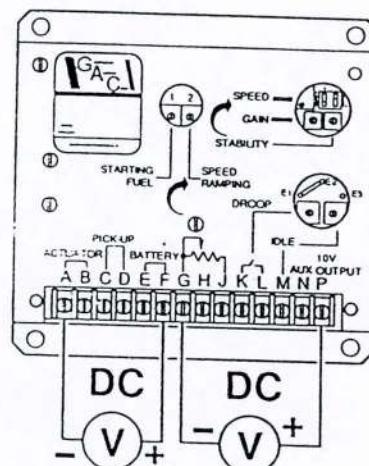
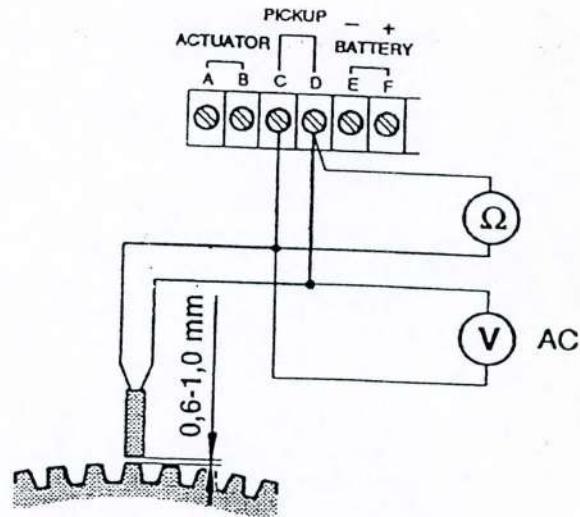
- "SPEED" adjustment is set too high.
 - Control Unit is faulty.

If the voltage is at or above 5V DC.

- Friction is too high in the actuator or in the linkage system

If the voltage is below 1.5V DC, then the:
– Control unit is faulty

- Note.** The above values apply to engines with both 12V and 24V system voltages.



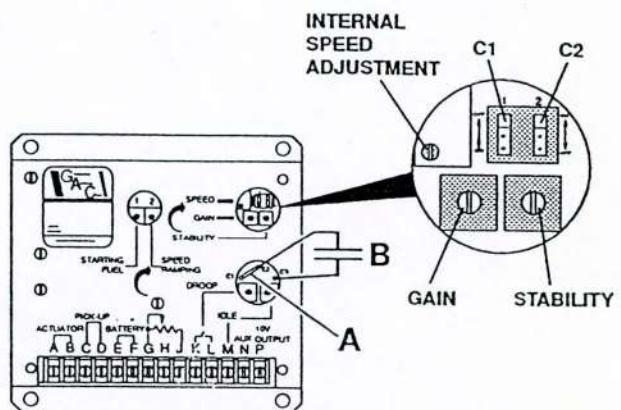
4. Hunting or unstable control

Hunting and unstable control are two problems which require special attention. If they should occur there could be many different, possible reasons of the problems.

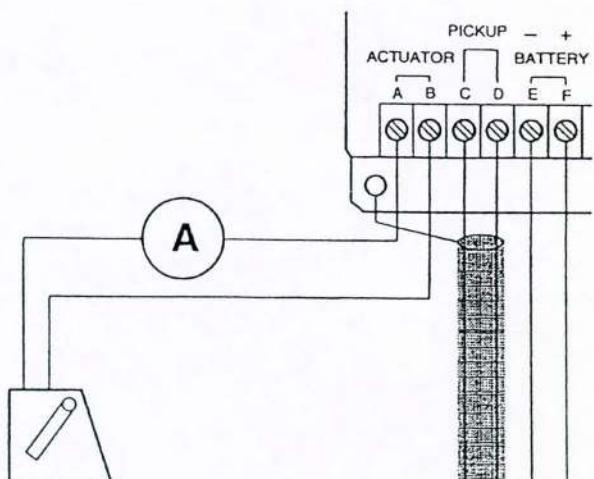
If the system does not work satisfactory despite fault-tracing has been done as per sections 1 - 3, then contact the nearest GAC representative or Volvo Penta.

To provide fault-tracing assistance, the following questions must be answered:

1. What is the approximate frequency of the instability? (slow or fast)
2. What are the positions of the "GAIN" and "STABILITY" potentiometers in the control unit?
3. Does the instability frequency increase when the "GAIN" potentiometer is turned clockwise?
4. Does the instability disappear if the engine speed is temporarily increased or decreased?
5. Does the instability increase or decrease when the engine is loaded?
6. What happens if the jumper "A" between E1 and E2 on the control unit is cut?
7. What happens if an additional capacitor ("B") , value $10\mu F$, is connected between terminals E2 and E3 according to the figure? NOTE! E3 is plus (+).
8. Does the complete governor system, including the stop lever, linkage rod and control rod, move freely without the slightest sign of sticking?
9. Has the actuator current been measured from zero load to full load according to the figure?



A. Jumper (connection)
B. Capacitor ($10\mu F$)



Checking the actuator current

Depending on the answers to the above questions, the instability can be caused by:

1. "GAIN" and/or "STABILITY" potentiometers adjusted too high.
2. Too high sensitivity in the control unit in relation to the mass and inertia of the driven units.
3. If a flexible coupling is fitted, stiffness, clearance or torsional vibrations.
4. The injection pump.
5. The linkage system.
6. The alternator unit's voltage regulator.
7. The signal from the pickup.

GENERATING SET

DESK A400
P:550KVA
415V TRI + N
CONTROL VOLTAGE 24VDC

REVISION NUMBER	DATE	SUBJECT	CONTACT EFFECTED	CHECKED	APPROVED
2	19-10-98	UPDATING AFTER TEST IN FACTORY	P.M	P.M	
1	09-10-98	UPDATING AFTER TEST	MARUA Y.	COUBRAULT B.	
0	09-09-98	FIRST ISSUE	RICHOU D.	COUBRAULT B.	

ELECTRIC DIAGRAM

TERMINAL LAY OUT

LIST OF EQUIPMENT

CLIENT REFERENCE

Ctrl :A9838445/17

OM : AVP28874

NB CONTROL PANEL : 380799.01

SCALE :

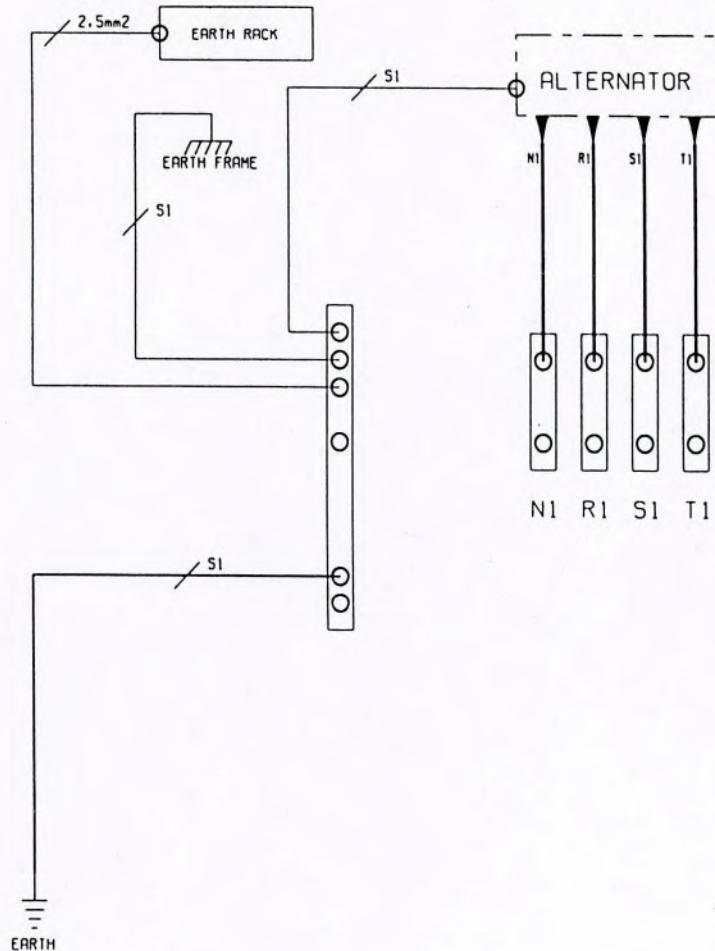
SIZE
B4

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
DIAGRAM																			TERMINAL					
																			CONTROL PANEL NUMBER 380799.01					
																			LAY OUT DIAGRAM					
<p>RELY NAME COIL POSITION (EX: SHEET 10 - COLUMN 13)</p> <p>WIRE NUMBER → 201</p> <p>TRANSFER SHEET TO SHEET FROM SHEET 4 - COLUMN 20</p> <p>004.20</p> <p>R1 -002KRB R2 -002KRB</p> <p>F/C NB</p> <p>003.13 13.14 015.14 21.22 31.32 43.44</p> <p>SHEET NUMBER (ORIGIN OF WIRE NUMBER) HIRE NUMBER</p> <p>004.111 006.01</p> <p>TRANSFER SHEET TO SHEET TO SHEET 6 - COLUMN 1</p> <p>CONTACTS FOR 2KRB</p> <p>F/C = REFERENCE SHEET/COLUMN NB = RELAY TERMINAL NUMBER</p> <p>EX: FIRST CONTACT SHEET 3 - COLUMN 13 TERMINAL 13 AND 14 2nd CONTACT SHEET 15 - COLUMN 14 TERMINAL 21 AND 22 CONTACTS FOR TERMINALS 31-32 & 43-44 ARE SPARE</p>																			<p>010.106 ← WIRE NUMBER ← SHEET NUMBER (ORIGIN OF WIRE NUMBER)</p> <p>X1 61 ← TERMINAL NAME ← TERMINAL NUMBER</p>					
- WIRE COLOUR -																								
- CIRCUIT -		- COLOUR -		- CIRCUIT -		- COLOUR -		- CIRCUIT -		- COLOUR -														
POWER		NEUTRAL PHASE 1 PHASE 2 PHASE 3		LIGHT BLUE BROWN BLACK BLACK		UNCUT CIRCUIT WITH CUTTING FIXTURE		COLOUR SIMILAR TO THE SWITCH TAIL CIRCUIT + WARNING LABEL		LOW VOLTAGE CIRCUIT 4-20mA 0-20mA PICK UP WIRING RHEOSTAT WIRING		VIOLET ARMoured ARMoured												
ALTERNATIVE VOLTAGE CONTROL CIRCUIT		NEUTRAL PHASE 1 PHASE 2 PHASE 3		LIGHT BLUE BROWN BLACK BLACK		CONTINUOUS VOLTAGE CONTROL CIRCUIT		-		BLUE RED		WIRING OF THE MICS INPUTS		BICOLOUR SPINNING FRAME X BICOLOUR BOX COUPLING FORM THE 5TH CARD										
ALTERNATIVE VOLTAGE CONTROL CIRCUIT ISOLATED				BLACK		CHARGING ALTERNATOR EXCITATOR		+		RED		CONNECTION ON TERMINALS FREE OF POTENTIAL		WHITE										
						TRANSMITTER'S SIGNAL		-		BLUE														
						COURANT CIRCUIT		+		ORANGE														
						100V CIRCUIT		-		GREY														
						ACTUATOR WIRING		+		ORANGE														
																			MODIFICATION SHEET 002					

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

EARTH NEUTRAL NO NEUTRAL ISOLATED NFC15-100

S1 : 0 125A 16mm²
160A 630A 25mm²
>630A 35mm²



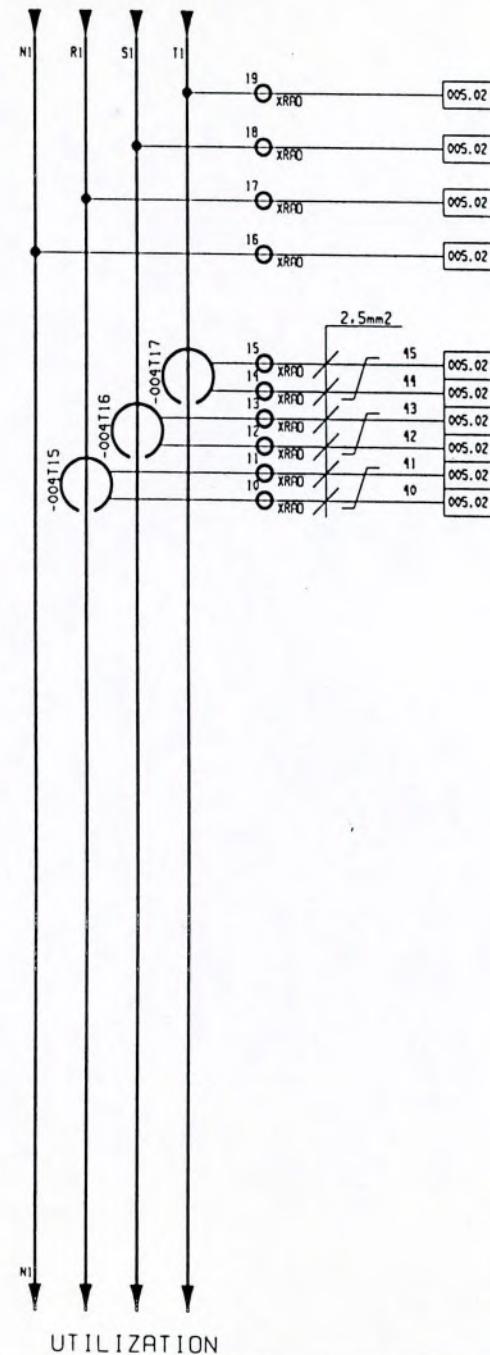
CONTROL PANEL NUMBER
380799.01

EARTH NEUTRAL

MODIFICATION
SHEET
003

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

ALTERNATOR INPUT

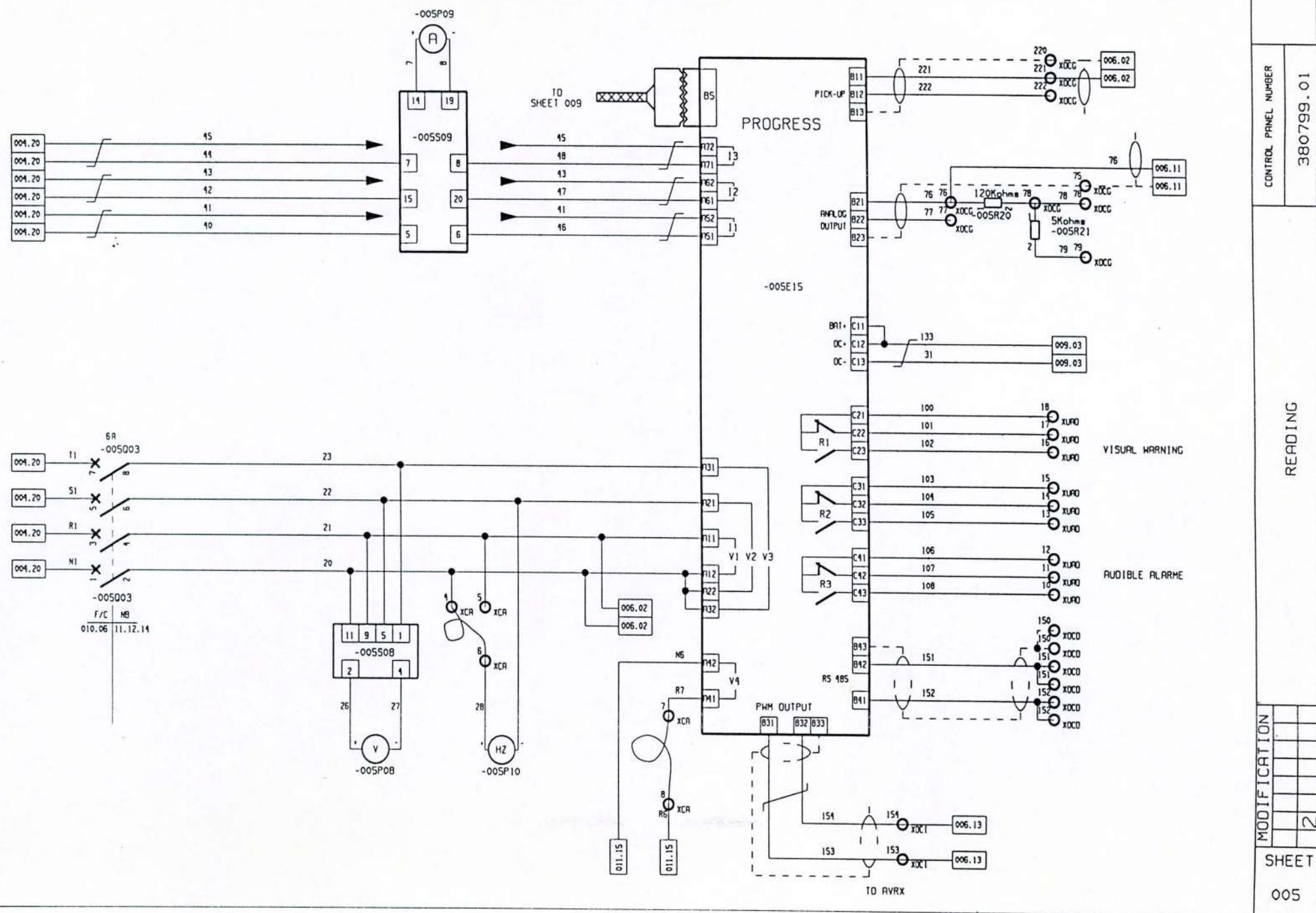


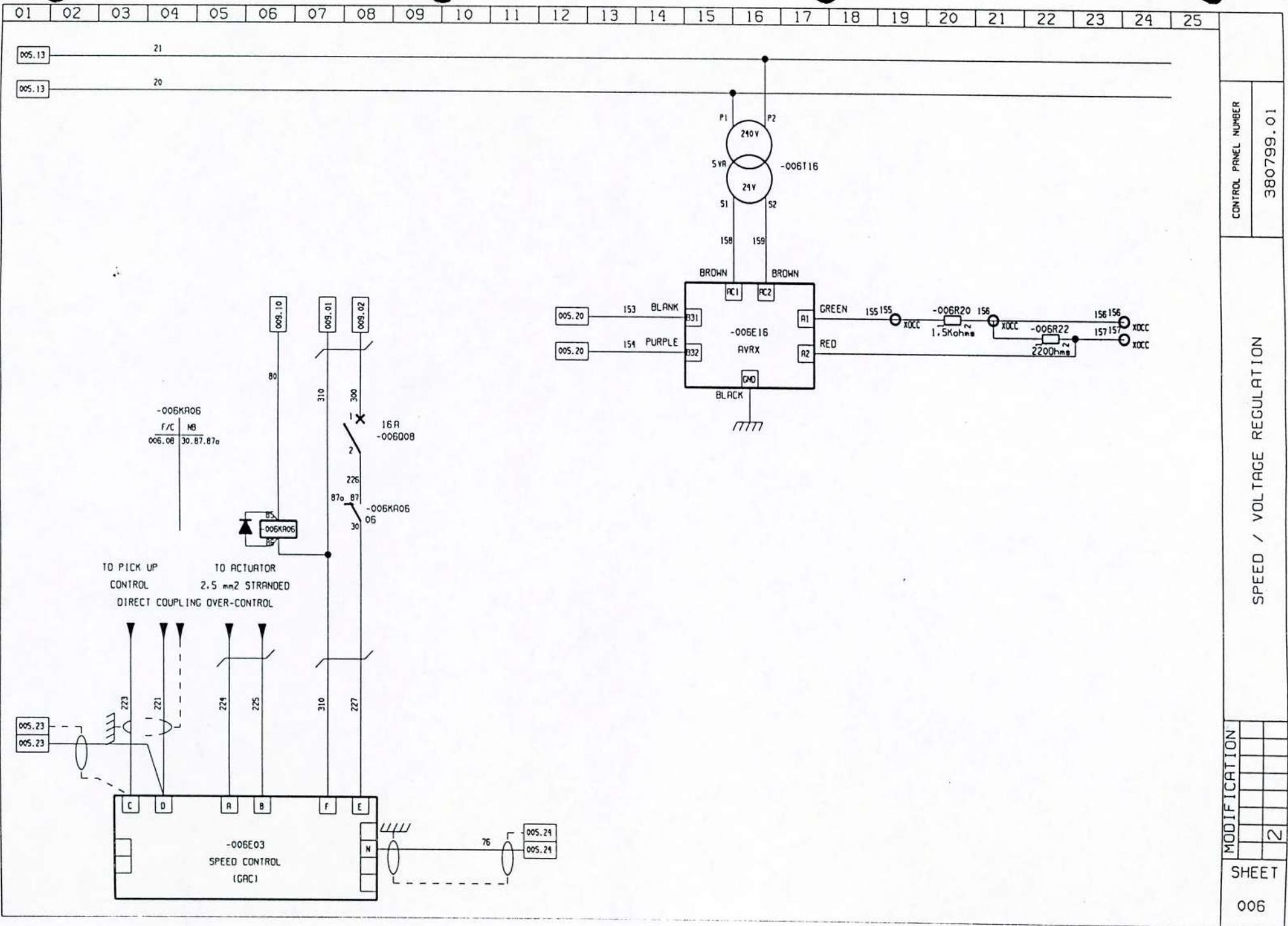
CONTROL PANEL NUMBER
380799.01

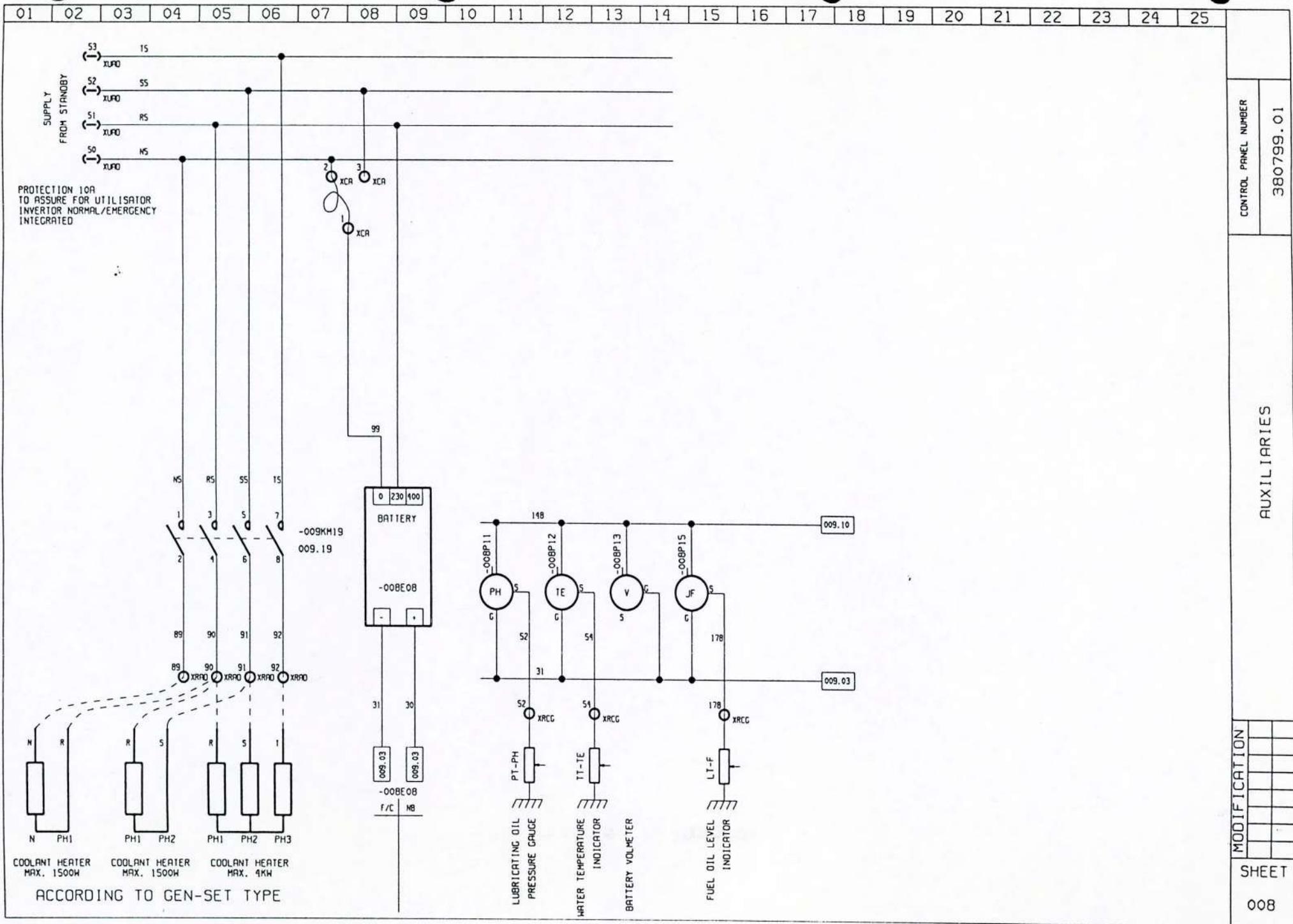
POWER

MODIFICATION
SHEET
004

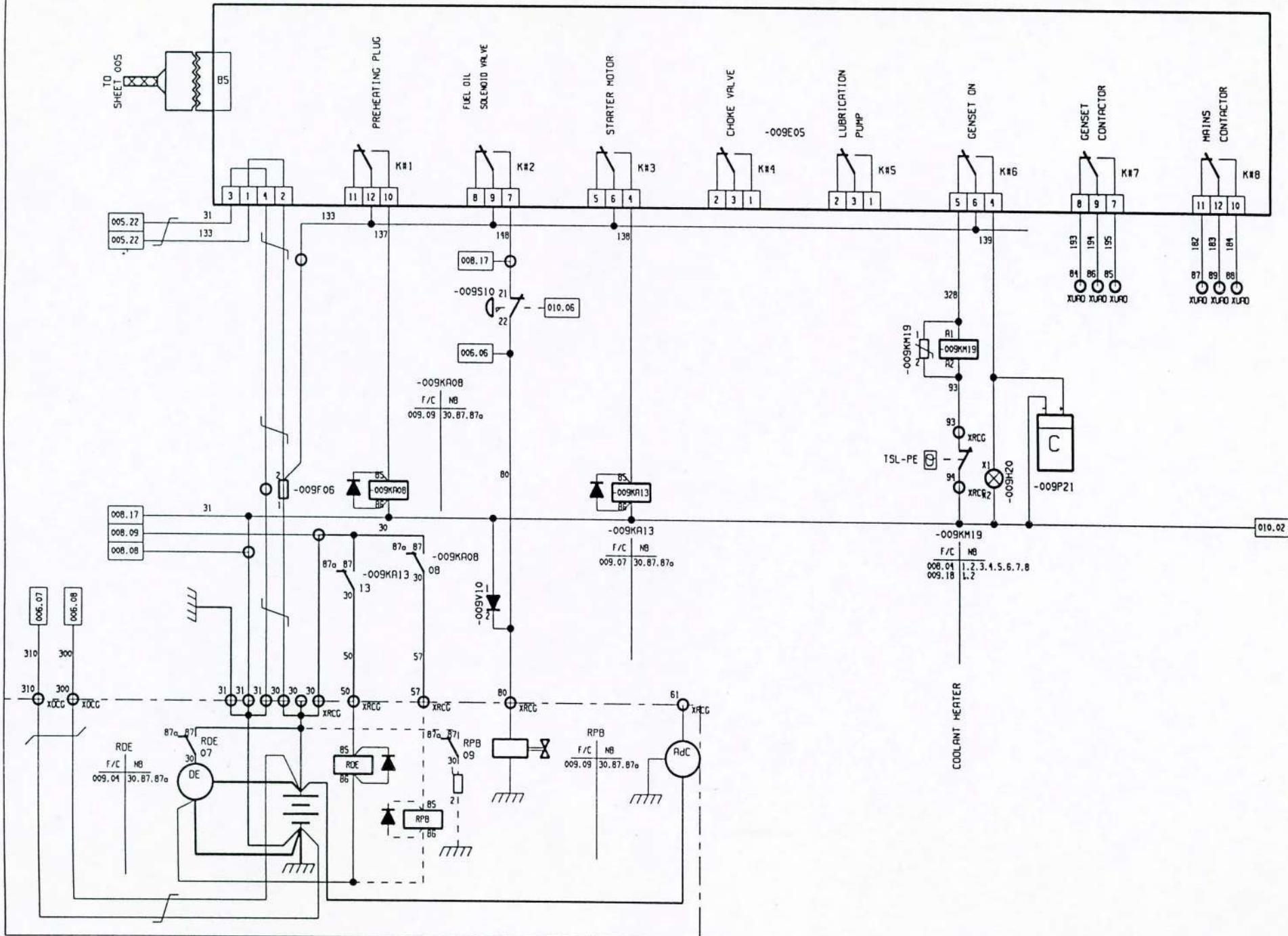
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01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

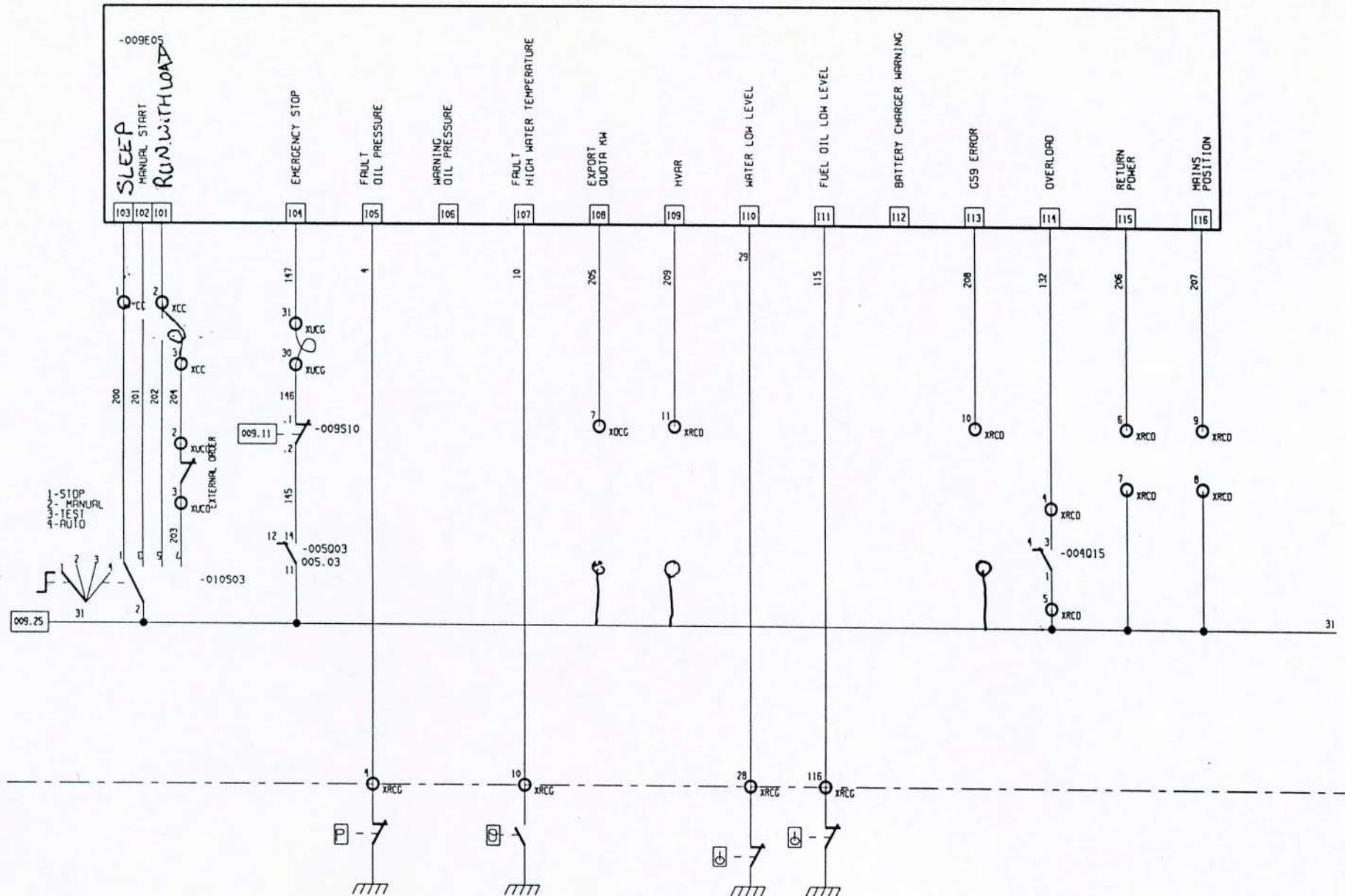


380799.01

OUTPUT PROGRESS

MODIFICATION
SHEET
009

01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

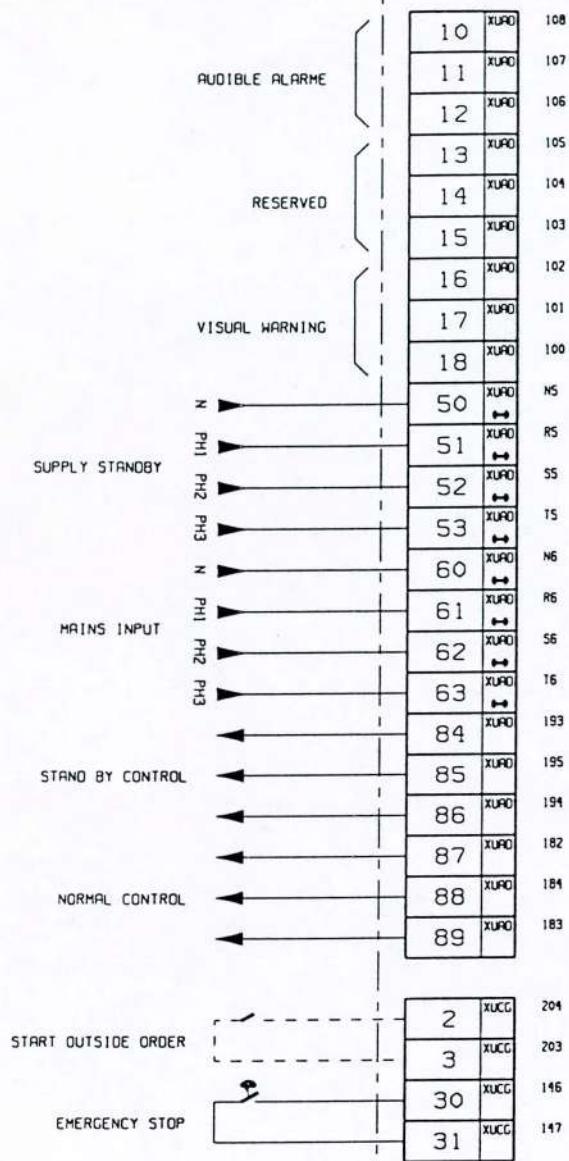


CONTROL PANEL NUMBER
380799.01

INPUTS PROGRESS

MODIFICATION
SHEET 12
010

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
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UTILIZER JUNCTION TERMINAL

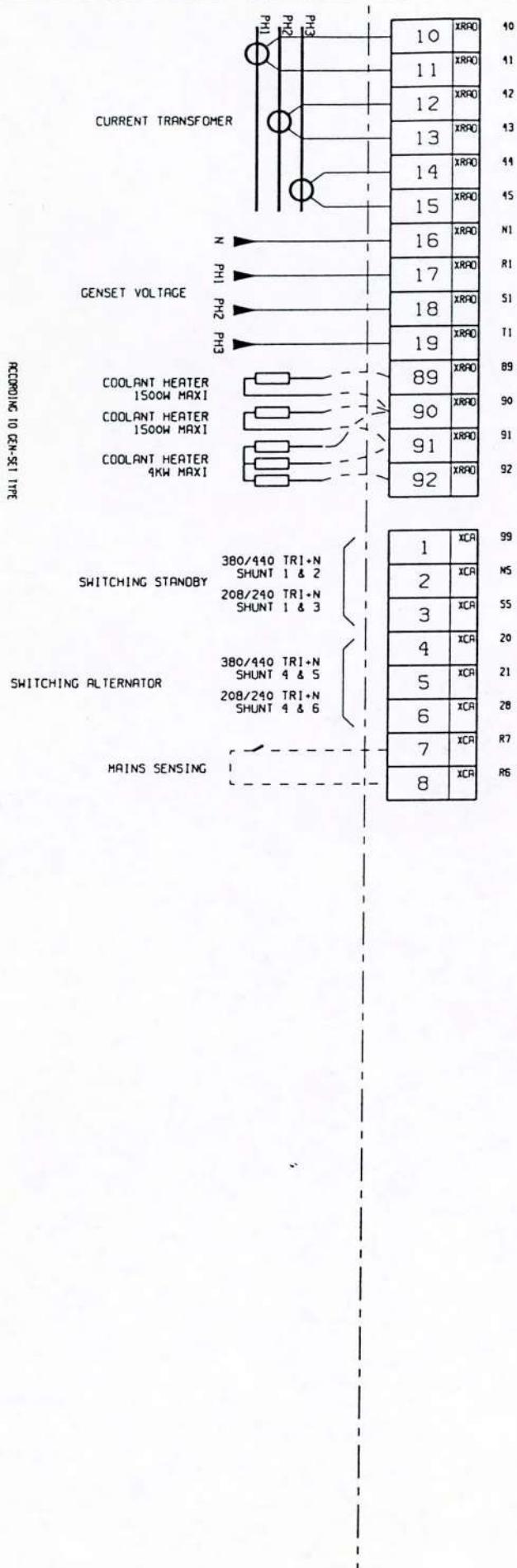
CONTROL PANEL NUMBER

380799.01

MODIFICATION							

013
SHEET

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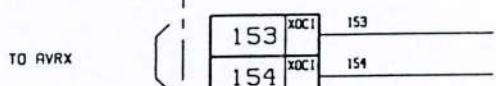
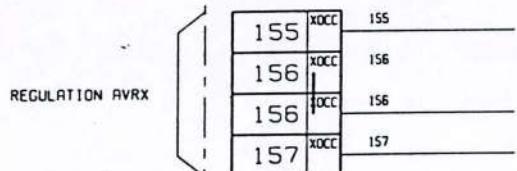
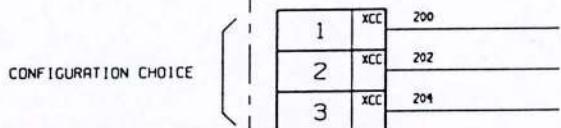
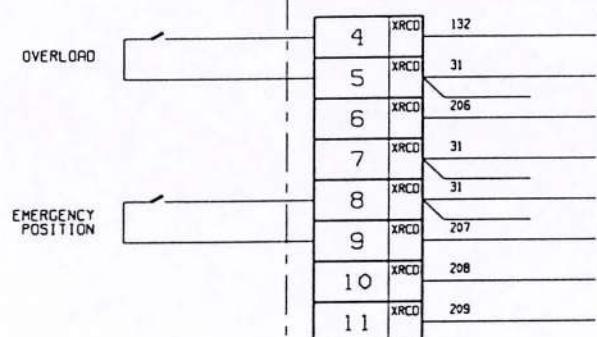
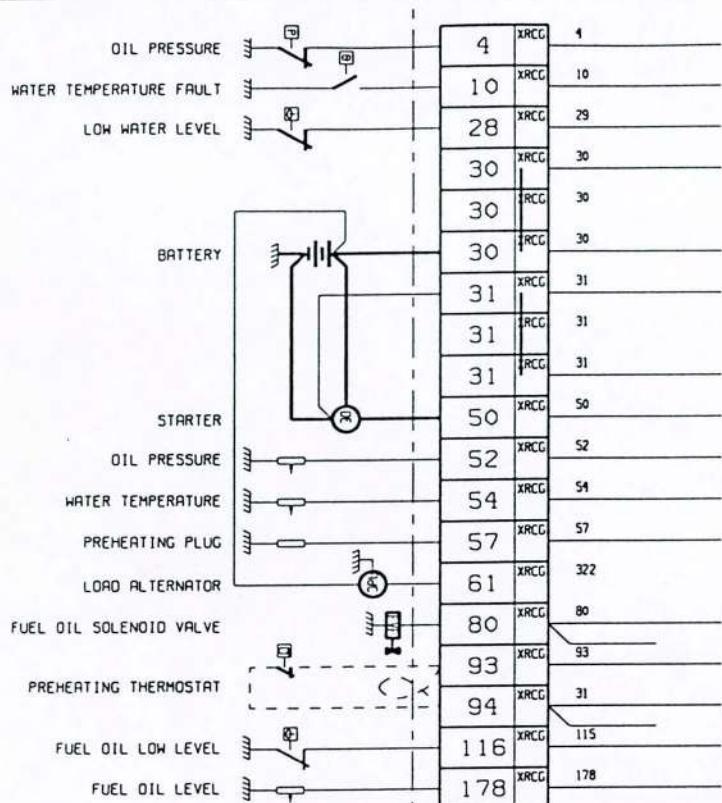


ALTERNATIVE CURRENT
TERMINAL AND CONNECTOR

CONTROL PANEL NUMBER
380799.01

MODIFICATION	
SHEET	014

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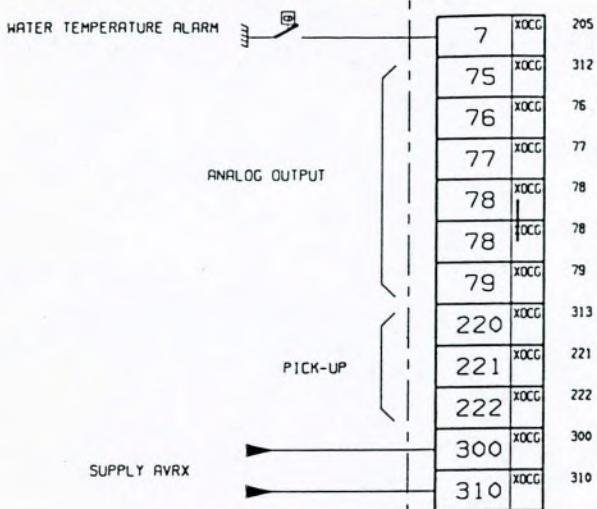
CONTINUOUS CURRENT
TERMINAL AND CONNECTOR

CONTROL PANEL NUMBER

380799.01

MODIFICATION				

015
SHEET



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CONTINUOUS CURRENT
TERMINAL AND CONNECTOR

CONTROL PANEL NUMBER
380799.01

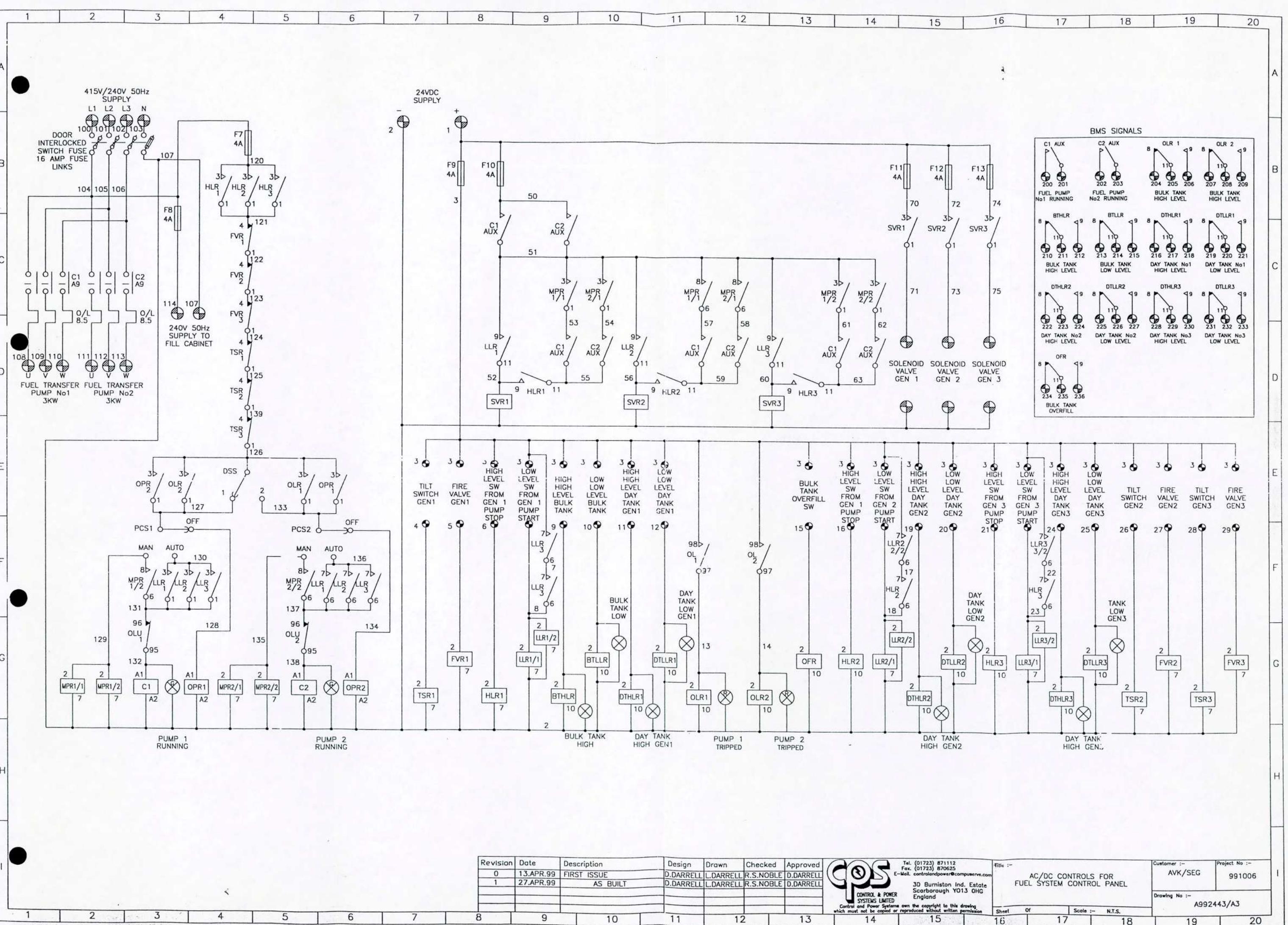
MODIFICATION		
016	SHEET	

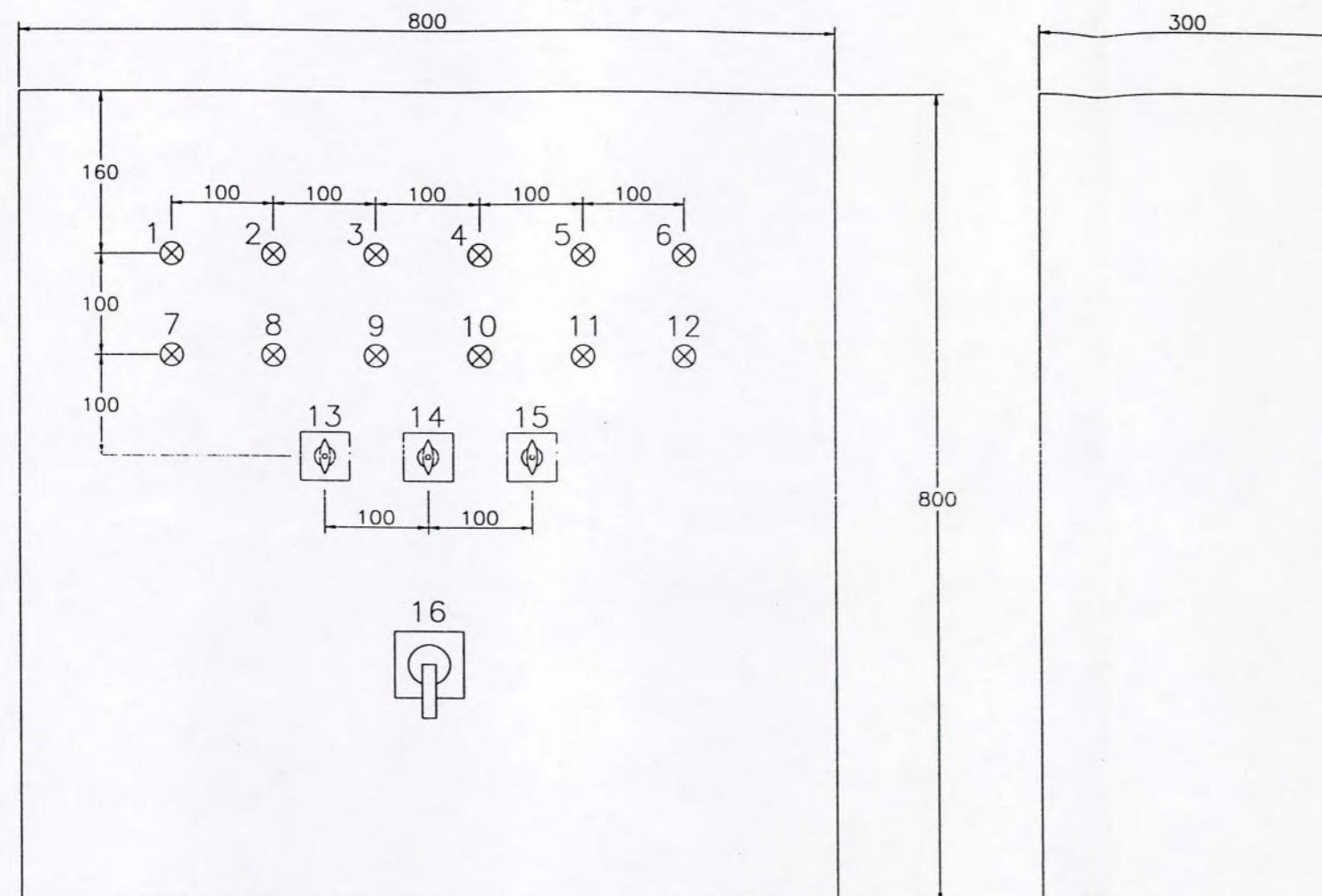
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POSI.	SET	MARK	REF/CR MASTER	REF/CR SLAVE								DESIGNATION						REFERENCE	SUPPLIER LAY OUT						
		-004015		010.19								MINI MAXI VOLTAGE RELAY 12V												AC111WRTU-12VDC	ACINC
PUIS		-004115		004.16																					
PUIS		-004116		004.17																					
PUIS		-004117		004.17																					
ARM		-005E15		005.16								MICS PROGRESS 240V												SOM31613066601	WEXLER
ARM		-005P08		005.08								VOLTMETER 72DIN 0-500V												IME10071107	IMESYS
ARM		-005P09		005.09								AMMETER SCALE 72DIN 0-800A												IME10010326	IMESYS
ARM		-005P10		005.10								REED FREQUEN. 72DIN 220V 45to65Hz												IME10085222	IMESYS
ARM		-005003	005.03	010.06								CIRCUIT BREAKER C60N CURVE C 4x6A												MCN24226	HERLIN GERIN
ARM		-005003										AUXILIARY CONTACT BLOCK 1"NC/NO" C60												MCN26924	HERLIN GERIN
ARM		-005R20		005.21								RESISTANCE 121 KOHMS 1/4W												SORRES-121K-1-1/	SOREEL
ARM		-006R21		005.21								RESISTANCE 5 KOHMS 1/4W												SORRES-5K-1-1/4	SOREEL
ARM		-005S08		005.08								3PH+N VOLTMETER SWITCH												SOM42900117	SONTHEIMER
ARM		-005S09		005.09								3PH AMMETER SWITCH												SOM432Z/BZ/ZB/B	SONTHEIMER
ARM		-006E03		006.03								AVRX MODULE												SOM31613067301	SOMO
ARM		-006KA06	006.06	006.08								RELAY NCNO 24VDC												CARNR03576	CARTIER
ARM		-006Q08	006.08									CIRCUIT BREAKER C60N CURVE C 1x16A												MCN23679	HERLIN GERIN
ARM		-006R20		006.20								RESISTANCE 1.5 KOHMS 1/4W												SORRES-1.5K-1-1/	SOREEL
ARM		-006R22		006.22								RESISTANCE 220 OHMS 1/4W												SORRES-220-1-1/4	SOREEL
ARM		-006T16		006.16								SINGLE PHASE TRANSFO 240/24V 5VA												TRST00238077B.01	TRS
ARM		-008E08	008.08									BATTERY CHARGER 24V 5A												REECND05-24N4	REES
ARM		-008P11	008.11									OIL PRESSURE GAUGE 24VCC												SOM31101000101	SOMO
ARM		-008P12	008.12									OIL TEMPERATURE GAUGE 24VCC												SOM31101000601	SOMO
ARM		-008P13	008.13									VOLTMETER 24VCC												SOM31101001101	SOMO
ARM		-008P15	008.15									GASOIL GAUGE												SOM31101001501	SOMO
ARM		-009E05	009.05	010.03								IOBI 24VCC												SOM31613067001	WEXLER
ARM		-009F06		009.06								FUSE BASE 1P 5x20												ENT115657	ENTRELEC
ARM		-009H20		009.19	009.20							WHITE INDICATOR D:22mm												BACS20SB30EC02	BACO
ARM		-009KA08	009.08	009.09								RELAY NCNO 24VDC												CARNR03576	CARTIER
ARM		-009KA13	009.13	009.07								RELAY NCNO 24VDC												CARNR03576	CARTIER
ARM		-009KM19	009.19	008.04	009.18							FOUR POLES CONTACTOR 24VDC												SNS3RT131618840	SIEMENS
ARM		-009KM19										VARISTANCE 12-70VDC												SNS3RT191618800	SIEMENS
ARM		-009P21		009.21								HOUR RECORDER D:52 10 to 80VDC												BRE587.2-10..80VDC	BAUSER KG
ARM		-009S10		009.10	009.10	010.06						EMERGENCY STOP D=40 1"NC" + 1"NO"												SNS35B3201-1H420	SIEMENS
ARM		-009S10										CONTACT NC FOR BODY CONTROL UNIT												SNS35B34000C	SIEMENS
ARM		-009V10		009.10								DIODE 3A 1300V												FAGBY255	FAGOR
ARM		-010S03	010.03	010.03								4 POSITIONS 1POLES SWITCH												SOM42900841	SONTHEIMER
EXT		AdC		009.14																					
EXT		DE		009.04																					
EXT		EVF		009.10																					
EXT		LSL-NBE		010.14																					
EXT		LT-F		008.16																					
EXT		NBG		010.15																					

MODIFICATION
SHEET
022

OPERATION DIAGRAM

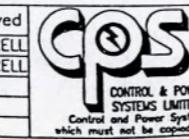
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20





1)	PUMP No1 RUNNING LAMP	22.50
2)	PUMP No1 TRIPPED LAMP	22.50
3)	PUMP No2 RUNNING LAMP	22.50
4)	PUMP No2 TRIPPED LAMP	22.50
5)	BULK TANK LOW LEVEL LAMP	22.50
6)	BULK TANK HIGH LEVEL LAMP	22.50
7)	DAY TANK No1 LOW LEVEL LAMP	22.50
8)	DAY TANK No1 HIGH LEVEL LAMP	22.50
9)	DAY TANK No2 LOW LEVEL LAMP	22.50
10)	DAY TANK No2 HIGH LEVEL LAMP	22.50
11)	DAY TANK No3 LOW LEVEL LAMP	22.50
12)	DAY TANK No3 HIGH LEVEL LAMP	22.50
13)	PLANT CONTROL SWITCH PUMP No1	22.50
14)	DUTY SELECTOR SWITCH	22.50
15)	PLANT CONTROL SWITCH PUMP No2	22.50
16)	DOOR INTERLOCKED SWITCH FUSE	

Revision	Date	Description	Design	Drawn	Checked	Approved
0	13.APR.99	FIRST ISSUE	D.DARRELL	L.DARRELL	R.S.NOBLE	D.DARRELL
1	27.APR.99	AS BUILT	D.DARRELL	L.DARRELL	R.S.NOBLE	D.DARRELL



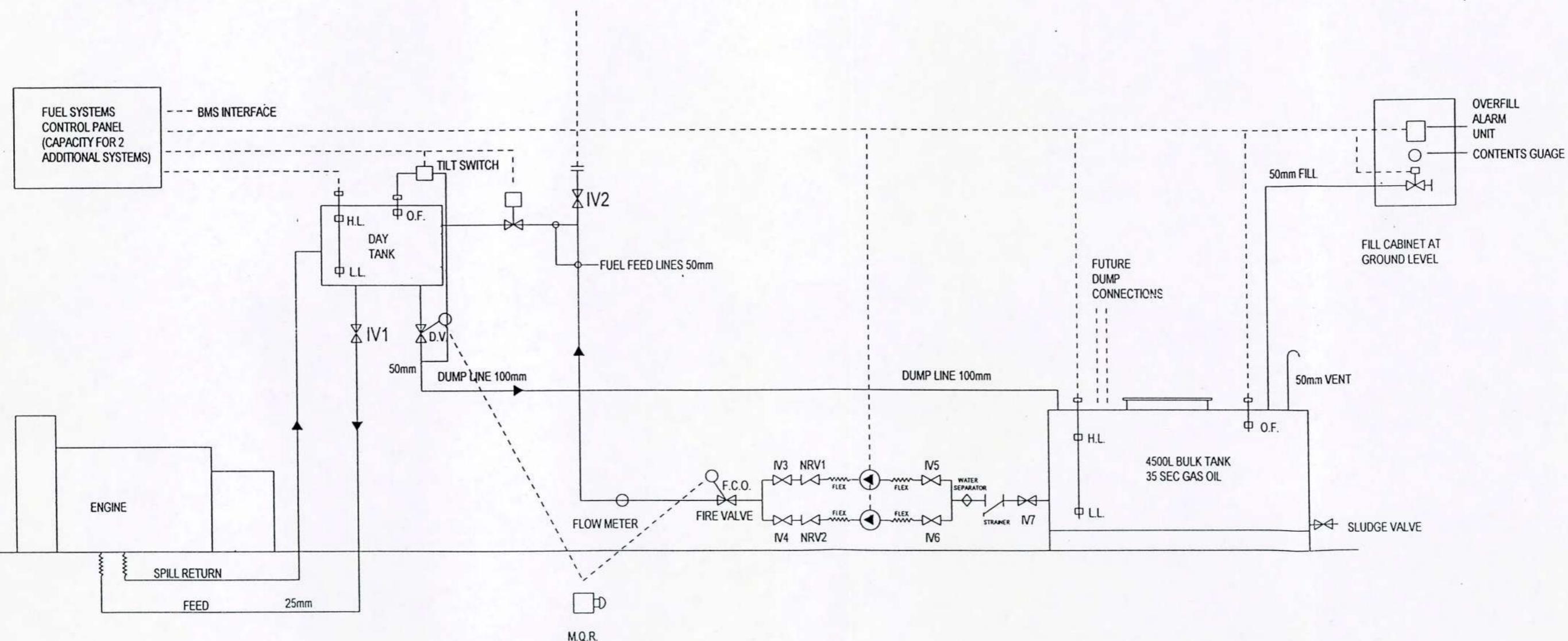
Tel. (01723) 871112
Fax. (01723) 870625
E-Mail. controlandpower@compuserve.com
30 Burniston Ind. Estate
Scarborough YO13 0HG
England

Title :- GENERAL ARRANGEMENT FOR
FUEL SYSTEM CONTROL PANEL

Customer :- AVK/SEG Project No :- 991006
Drawing No :- A992443/A3
Sheet 16 Of 17 Scale :- N.T.S.

 D.V. DUMP VALVE
 F.C.O. FUEL CUT OFF
 O.F. OVER FILL
 M.Q.R. MANUAL QUICK RELEASE FIRE LANYARD WIRE

FUTURE SETS



Issue	Approved	Date
3		03/06/99

AVK SEE (UK) LTD

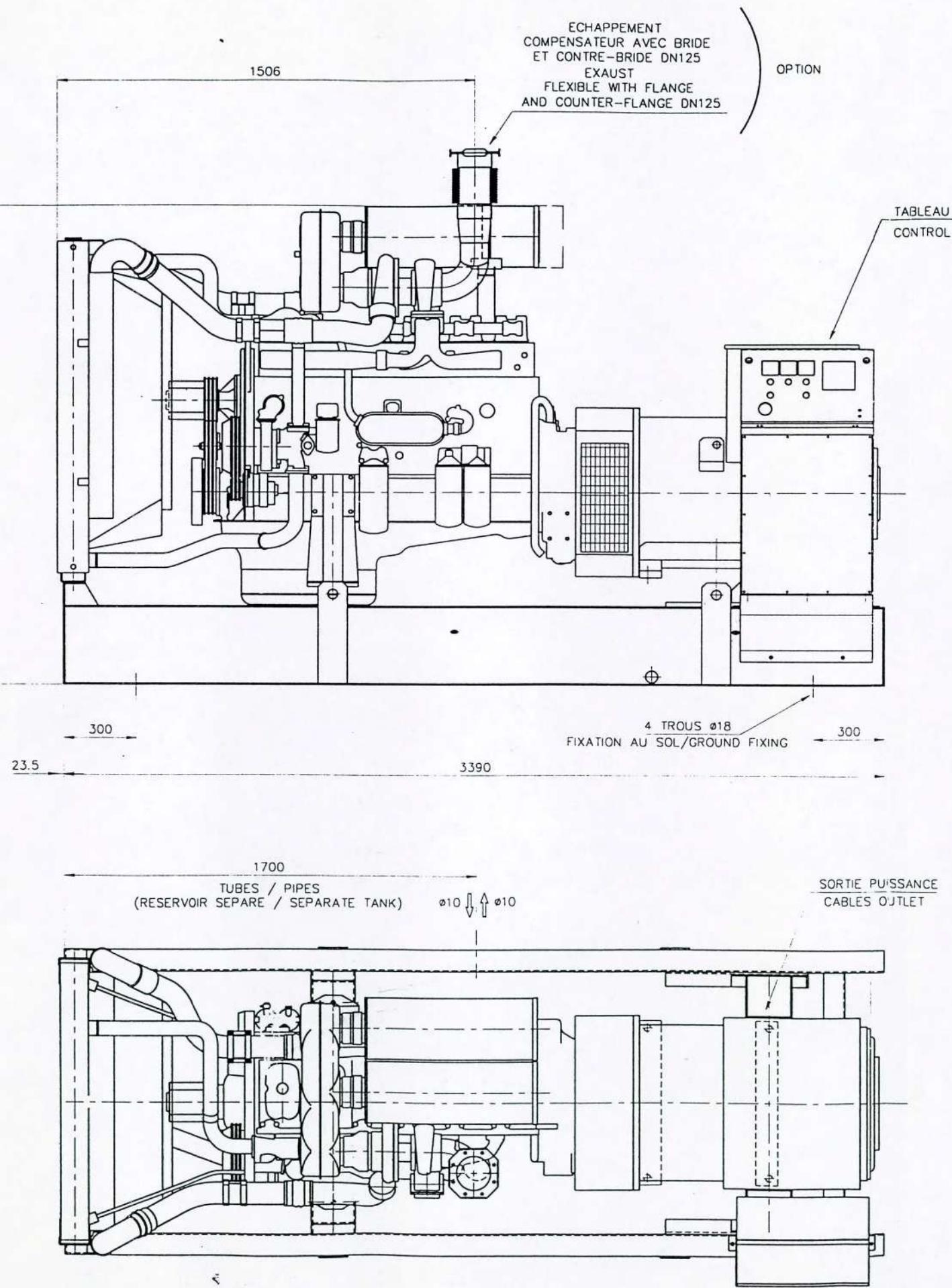
UNIT 9, MINISTRY WHARF, SAUNDERTON
HIGH WYCOMBE, BUCKINGHAMSHIRE HP14 4HW

Title

FUEL SCHEMATIC
CARLTON GARDENS

Drawn FR	Checked NTS	Scale NTS	Date 03/06/99
Drawing No. 98255.001			Sheet 1 of 1

1991



MOTEUR/ENGINE	ALTERNATEUR/GENERATOR	A vide/Dry	OdM/Wet
TAD 1631 G	LSA 471 L10	3270	3810

A FIRST ISSUE IND.	MODIFICATION DESIGNATION	14/12/98 P.I.E CALL DATE NAME DATE NAME DRAWN DRAWN CHECKED
MATERIE : REVETEMENT : TOLERANCE : JS13/J13 sauf Indication Particulière DESIGNATION : GENERATING SET LAYOUT GS550S		FORMAT : A1 ECHELLE : 1/10 FOUD : 1/1 MASSE (Vide/Plein) kg
AVP28874-01-011000 A		ESDOMO GROUP ELECTRIC
		12 Rue de la Winouze 29272 BREST - Tel : 02.98.41.41.41 - Fax : 040757 - Telex : 02.98.41.83.07 CE PLAN EST LA PROPRIETE DE LA SOCIETE ; IL NE PEUT ETRE REPRODUIT, VENDU OU COMMUNIQUE SANS SON AUTORISATION

Ce plan vous est remis à titre indicatif et peut être révisé sans préavis

SDMO INDUSTRIES
Siège Social
12, bis rue de la Villeneuve
B.P. 241 - 29272 BREST CEDEX
Tél. 02 98 41 41 41 - Fax 02 98 41 63 07
SIRET 548 202 985 00022



Feuille
Sheet

.../...

ER-P32-02-A

Compte-rendu de réception usine
Report of factory test for customer

Date : 8/10/93

Client : SDMO ENERGY
Customer

Affaire : AVP 28844
Order

ID :

Moteur : Volvo

Engine

Type : TA01634

Type

N° : 2160030726

Alternateur : LEROY SOMER

Alternator

Type : 67-1210

Type

N° : 9096712

Armoire : Socel P

Control panel

Type : A600

N° : 4983844517

Con fig. 6
cf

Essais réalisés
Tests carried out

Secuities -

Sync TEST without ATS PANEL.

LOAD TESTS

IMPACT LOAD TESTS

Réserve N° : Reservation N°	Action proposée Suggested action
CHARGE MESSAGE TO SDMO ENERGY REQUIRE G59 ERROR MESSAGE & INPUT REQUIRE RAMPDOWN INPUT QUITATH -- (IN #3)	

Action effectuée Action carried out	Par (Nom/Date/Visa) By (Name/Day/signature)	Responsable (Nom/Date/Visa) Responsible (Name/Day/signature)
		Contrôle final (Nom/Date/Visa) Final control (Name/Day/signature)

Lot conforme sans réserves Order in compliance without exceptions	<input checked="" type="checkbox"/>	SDMO :
	<input type="checkbox"/>	Client : Customer
	<input type="checkbox"/>	ou réceptionnaire : or receiving agent

AS File

FICHE D'ESSAIS STANDARD
TEST RECORDS

N° LOT : AVP28876
ID : 1009033

DATE : 7/10/98

CLIENT : Customer SORRY ENERGY

Code Contrôleur : 09

Plateforme : 61

MATÉRIEL	MARQUE	TYPE	N°
MOTEUR / CPL. Engine	VOLVO	TAD-163-1	2160030726
REFROIDISSEMENT Cooling system	VOLVO	3825456	
POMPE A INJECTION Engine regulator			
REGULATION VITESSE Speed control	VOLVO	873747	
ALTERNATEUR Alternator	CEROT SORIER	6711-10	9096717
REGULATEUR TENSION Alternator regulator	LS	R668	3844
COFFRET Control panel	SORREL	A400	A9838445117

P : 550 KVA P : 660 Kw Vitesse : 1500 Tr/mn Intensité : 765 A
U : 615 V F : 50 Hz Service : SE Cos φ : 0,8

Régime de neutre : TNS TNC TT IT Autres Label CE Oui Non

Voyants Lamps	Couleur Color	FCT Operat.	B.P. - Commutateur Commutator - P.B.	FCT Operat.	Appareil de contrôle Control equipment	FCT Operat.
Charge batterie Batteries charge	Orange	<input checked="" type="checkbox"/>	Commutateur de sélection Selector switch	<input checked="" type="checkbox"/>	Voltmètre Voltmeter	<input checked="" type="checkbox"/>
Pression d'huile 2 ^e seuil T° d'eau 2 ^e seuil	Rouge	<input checked="" type="checkbox"/>	Marche / préchauffage groupe Start / Preheating gensem	<input type="checkbox"/>	Fréquencemètre Frequency meter	<input checked="" type="checkbox"/>
2 ^e threshold oil pressure 2 ^e threshold water temp.	Red	<input checked="" type="checkbox"/>	Cles de démarrage Keys start gensem	<input type="checkbox"/>	Ampèremètre Ammeter	<input checked="" type="checkbox"/>
2 ^e threshold oil temp. Survitesse / Sous-vitesse Overspeed / Underspeed	Rouge	<input checked="" type="checkbox"/>	Marche contacteur alternateur Alternator contactor on	<input type="checkbox"/>	Compteur horaire Hour counter	<input checked="" type="checkbox"/>
Surcharge Overload	Rouge	<input checked="" type="checkbox"/>	Arrêt contacteur alternateur Alternator contact off	<input type="checkbox"/>	Tachymètre Tachometer	<input type="checkbox"/>
Non démarrage No starting	Rouge	<input checked="" type="checkbox"/>	Commutateur voltmètre Voltmeter switch	<input checked="" type="checkbox"/>	Voltmètre batteries Batteries voltmeter	<input checked="" type="checkbox"/>
Arrêt d'urgence enclenché Emergency stop on	Rouge	<input checked="" type="checkbox"/>	Commutateur ampèremètre Ammeter switch	<input checked="" type="checkbox"/>	Ampèremètre batterie Batteries ammeter	<input type="checkbox"/>
Niveau bas gasoil Tank low fuel level	Orange	<input type="checkbox"/>	Arrêt d'urgence Emergency stop	<input checked="" type="checkbox"/>	Indicateur T° eau Water temp. indicator	<input checked="" type="checkbox"/>
Défaut différentiel Earth leakage	Orange	<input type="checkbox"/>	Cles E.J.P. E.J.P. Switch	<input type="checkbox"/>	Indicateur P. huile Oil pressure indicator	<input checked="" type="checkbox"/>
Défaut mesure Reading fault	Rouge	<input type="checkbox"/>	Ajustement tension Adjust voltage	<input type="checkbox"/>	Indicateur T° huile Oil temp. indicator	<input type="checkbox"/>
Top EJP Peak shaving	Red	<input type="checkbox"/>	Ajustement vitesse Adjust speed control	<input type="checkbox"/>	Indicateur fuel Fuel indicator	<input type="checkbox"/>
	Jaune	<input type="checkbox"/>	Essais lampes Lamps test	<input type="checkbox"/>		<input type="checkbox"/>
	Yellow	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>

Points contrôlés Check points	Résultats Result	Points contrôlés Check points	Résultats Result	Contrôle Control
Intensité préchauffage eau Water preheating current	<input checked="" type="checkbox"/>	Chargeur batterie Charger	<input checked="" type="checkbox"/>	Disjoncteur puissance Breaker circuit
Intensité préchauffage air Air preheating current	<input type="checkbox"/>	Sens de rotation Phase rotation	<input checked="" type="checkbox"/>	I nom : / lo : / Ir : / Im : /
Intensité préchauffage huile Oil preheating current	<input type="checkbox"/>	Jeu latéral Side clearance	<input checked="" type="checkbox"/>	Mains on : / lo : / Ir : / Im : /
Intensité Aéro Aero current	<input type="checkbox"/>	Calibre TC mesure Current transformer	<input checked="" type="checkbox"/>	Relais report : Pack remote contacts
Intensité pompe fuel Fuel pump current	<input type="checkbox"/>	Calibre différentiel Differential breaker	<input checked="" type="checkbox"/>	Réserve
			<input type="checkbox"/>	Réserve

Référence normative ISO 8528-6

Paramètres mécaniques voir documents constructeurs

Paliers	F Hz	U Volt	I Amps	Cos φ PF	P. élec. KW Elec. Power	T° Amb	T° Filt	T° Ent Aéro	T° Sort Aéro	T° Eau	P. Huile	T° Huile
0 %	50	615	0	-	0							
25 %	50	615	153	1	410							
50 %	50	415	306	1	220							
75 %	50	615	459	1	330							
100 %	50	615	612	1	440	12	95	23	61	85	3,2	
160 %	50	615	612	1	440	-13	27	24	64	88	4	

Impacts de charge. / Load impact

Tension conforme
Voltage according : OUI NON

Fréquence conforme
Frequency according : OUI NON

Référence normative ISO 8528-5-G2

ESSAIS CONFORME
Test according

ESSAIS NON CONFORME
Test no according

20

30

40

50

60

70

80

90

50 Hz

615 V

20

30

40

50

60

70

0

600 Hz

DATE 8/10/98
O.M. ADF 98
DEFILEMENT 102 MM/S
FREQUENCE 1,2 HZ par CM

SDMO ENERGY

AVP 28874

10.100.90.35
Configs Progress Pro 2Config: 5
PROGRESS.XLS

TAD 1631

415V

550 kVA 52

couplage Réservé fugitif.

Version 25H

Set points

User password =	1234
Cranking attempts	3
Overspeed RPM	1800
Crankstop RPM	600
Bat over voltage	28.4
Bat under voltage	21.8
Gen over voltage	26.3
Gen under voltage	9.15
Gen over frequency	55
Gen under frequency	45
Gen over current	86.2
Gen reverse KW	64
Gen reverse KVAR	64
Gen over % TDH	2
V/A over voltage	963
V/A over frequency	915
V/I under frequency	55
Mains kW surge	45
Bus kW surge	660
Governor volt bias	660
Sync window "	1.67
Sync window V	5
SY gain V/180°	0.0366
>> SY gain V/180°	0.0134
SY std V/HZ	0.0756
>> SY std V/HZ	0.0134
SY gain % P/V	+0.1
S gain V/Xre	0.768
S std V/Xre	0.0360
S gain % P/Xap	1.1355
S std % P/Xap	1.658
amp - KW/sec	7
tamp - KW/sec	7
tamp + KVAR/sec	7
tamp - KVAR/sec	7
W quota ++	7
W quota --	7
#00>> KW Quota ++	
#00>> KW Quota --	
/AR Quota ++	
/AR Quota --	
/00>> KVAR Quota ++	
/00>> KVAR Quota --	
KW/Xre>>R#1on	75
KW/Xre>>R#1off	25
KW/Xre>> Start	20
KW/Xre>> Stop	40
clude Net IDs	
06 Excludes	
08 Excludes	
09 Excludes	
12 Excludes	

days						
Set Overspeed	34					
Gen Overvolts	11					
Gen Undervolts	5"					
Gen Over Freq	1"					
Gen Under Freq	5"					
G 2X 0v Curr	0'13"21					
G Reverse KW	10"					
G Reverse KVar	10"					
G Over %TDH	11					
Synch Timeout	11					
Sync Dwell time	0"5					
Kw surge enable	0"2					
Test Delay	15'					
VI Volts Status	11					
Standby on	05"					
Standby off	11					
Eng Preglow	5"					
Engine Crank	5"					
CrankFail rest	5"					
Set Stabil max	10"					
Set Stabil min	5"					
Coolin Down	3'					
Stopping max	30"					
Alarm on max	5'					
Lub Pump on	2'					
Lub Pump Off	30'					
Load Break>>Make	1"					
Contractors Delay	11					
K# 7 on >> K# 8 on	0"5					
KW Quota ++	11					
KW Quota --	1"					
Kvar Quota ++	1"					
Kvar Quota --	1"					
R#1 Off>>On	5"					
R#1 On>>Off	5"					
Parallel Start	5"					
Parallel Stop	3'					
LS Setting	11					

Basics

Controller ID n°	1					
Number of Poles	4					
Pick-up Teeth	153					
CT Ratio	800/15	160				
Xap : Rated Kva	550					
Xan : Rated Kw	660					
Adj Sec/Week						

Factory

Vx Volt Max						
Ix Amps Max						
B+ Volt Max						
D/A Volt Max						
Check Phase order						

<i>Options</i>			
Write Protect			
RMS use armonics			
Not in Auto Warn			
Energize Run/Stop			
Cool After No Load			
Bal Over Volts S/W			
Gen Under Volts S/W			
Gen Under Freq S/W			
Low Water Level S/W			
Ext. Overload S/W			
Progress LWDC S/W			
Generic Configure			
Parallel System	✓		
Mains Standby ATS	✓		
Cogeneration Mode	✓		
Parallel Auto Start			
Engine Diesel / Gas			
Generator Syn/Asy			
IN#3# Sleep/Bypass			
Sleep Clears Faults			
Check Contactors			
Motor Contactors			
R#1 Shunt/Kw Load			
R#2 Alarm/Useable			
K#6 Engine/Cen on			
K#8 Delay/Neutral			
KW Droop=Load Surge			
Smooth Mains>>Gen			
IN#06 Aux Shutdn			
IN#08 Aux Shutdn			
IN#09 Aux Shutdn			
IN#12 Aux Shutdn			

→ Installation

Building Services Operating and Maintenance Instructions
5-7 Carlton Gardens, London SW1

H.3

AVK/SEG (UK) Ltd. – Stand-by Generation

5-7 CARLTON GARDENS

GENERATOR O & M MANUAL

INDEX

1. A400 CONTROLLER MANUAL
 2. GENERATOR AND ALTERNATOR MAINTENANCE MANUAL
 3. ELECTRONIC GOVERNOR MANUAL
 4. ELECTRICAL DRAWINGS
 5. SCHEMATIC AND LAYOUT DRAWINGS
 6. WITNESS TEST
 7. COMMISSIONING SHEETS AND WARRANTY
- NB. SITE COMMISSIONING SHEET TO BE RE-ISSUED FOLLOWING
REPEATED LOAD TEST

Warranty

AVK|SEG warrants that the materials used in the manufacture of its Equipment are of suitable quality for the purpose made known to AVK|SEG and that all precautions which are usual and reasonable have been taken by AVK|SEG.

If within 18 months from the date of despatch, or 12 months from the commissioning date or a total of 2000 hours operation, whichever is the sooner, any defect has been caused by faulty design on AVK|SEG part or faulty materials or workmanship and not caused by fair wear and tear, damage in transit, accident or misuse or neglect, AVK|SEG shall supply free of charge such new or repaired parts as may be required to make good such defect subject to the following:

- (i) Notice of any defect has been given to AVK|SEG by the Purchaser within seven days of discovery.
- (ii) In respect of spare parts the warranty period will be 6 months from date of despatch by AVK|SEG or on fitment whichever is the sooner.
- (iii) AVK|SEG warranty is not assignable upon resale by the original Purchaser.
- (iv) AVK|SEG shall not be liable for the cost of fitting replacement parts and any defective parts replaced by AVK|SEG shall become AVK|SEG property. AVK|SEG may choose the method of delivery of such replacement parts at its sole discretion.
- (v) Any warranty claim must contain full details of the defect, description of goods, date of despatch, name and address of vendor, and serial number of machines or for spares parts order reference under which the goods were supplied.

This warranty does not extend to:

- (i) Equipment which has not been installed (where applicable), operated, stored or maintained in accordance with AVK|SEG recommendations or specifications.
- (ii) Equipment which has not been operated at rated output
- (iii) Failure to use approved lubricants and consumable components such as, but not limited to oil or air filters.
- (iv) Equipment which has been repaired or altered without AVK|SEG written approval.
- (v) Equipment on which identification numbers have been altered or removed.
- (vi) Equipment run under conditions detrimental to successful running or likely to cause excessive wear and tear.
- (vii) Proprietary parts/components on Equipment supplied by AVK|SEG and not of AVK|SEG manufacture subject only to the maker's warranty (if any).

Where the Equipment is manufactured in accordance with designs, specifications, drawings, documents and/or data supplied by the Purchaser AVK|SEG shall in no circumstances be liable for any costs, charges, damages, losses (including loss of profit) or expenses of any kind incurred as a result of any defects or insufficiency in such designs, specifications, drawings or data.

AVK|SEG liability under this condition is limited to the Tender price of the equipment in which it is alleged a defect exists and save as set out in this condition all other terms, conditions, warranties, representations and guarantees, whether express or implied by statute common law or otherwise and whether in relation to the Equipment or its installation are hereby excluded provided that nothing in these Conditions excludes the conditions implied by Section 12 Sale of Goods Act, 1979.

Diesel Generator Load Test
Sheet Number 00101

"The Power People"

AVK SEE (UK) LTD

16 Manor Courtyard

Hughenden Avenue

High Wycombe

Bucks

Tel: 01494 435600 Fax: 01494 435610

Customer	T. Clarkes	Diesel Generator Rating	525kVA
Site Address	Carlton Gardens London SW1	Engine Type	Volvo TAD16/3G
		Serial Number	Z160 030726
		Alternator Type	A47, 1L10C6/4
		Serial Number	F6090964/07
		Manufacture	SDMO
		Engine Operating Time	00005.3 at end of day
Site Reference No.		Type of Load	Inductive (Hired in)

Check Oil Level	Check Engine Shutdown Protection	Pass	Fail
Check Water Level	Low Oil Pressure		
Check Fuel Levels	High Engine Temp.		
Check Manifolds	Other		
Check Connections	1		
Check Battery Charger	2		
Check Engine Heaters	3		
Check Emergency Power Off	4		
Check Cooling Run Time	5		
Check Auto Start	6		

Load Test Start Time					Load Test Finish Time					
Op. Time	Volts	R - Amps	Y - Amps	B - Amps	Hz	Oil Press.	Oil Temp.	Water Temp.	Batt CHG A	Total KW
10.39	415	365	365	365	50.1	4 BAR	N/A	76°C	28	210
10.45		550	550	550	50.1	"	"	80	28	315
10.50		730	730	730	50.1	"	"	84	28	420
11.03		730	730	730	50.1	"	"	90	28	420
11.13		730	730	730	50.1	"	"	90	28	420
11.15		730	730	730	50.1	"	"	88	28	420
12.25		Loud reduced & set shutdown due to excess room heat & fumes at T. Clarkes request.								400
12.35		Loud test re-started after MAPC placed temporary shunting to seal room.								
12.36		365	365	365	50.1	4.2	N/A	80	28	210
12.37		550	550	550	50.1	4.2	"	82	28	315
12.38		730	730	730	50.1	4.2	"	84	28	420
12.44		730	730	730	50.1	4.1	"	90	28	420
13.03		730	730	730	50.1	4.1	"	92	27	420
13.15		730	730	730	50.1	4.1	"	97	27	420
13.16		Loud reduced to 300kw due to continuing engine temperature, temp dropped to 90°C								
13.19		Loud removed set run off load for 5 minutes then shutdown.								

Comments & Recommendations Air inlet problem very little air movement through high level alternator, room needs to be sealed, recommend inlet air taken from opening at low level behind generator via new attenuator.

Engineer	R. CHNA	I accept that the above works have been completed
Time On Site	0815	Travel
Time Off Site	1430	Mileage
Date	24/6/99	Site Time
		Date
		24/6/99

Diesel Generator Load Test
Sheet Number 00201

"The Power People"



16 Manor Courtyard
Hughenden Avenue
High Wycombe
Bucks
Tel: 01494 435600

F.A.D. C.M.C./F. CLARK
ROBIN AVE

Tel: 01494 435600 Fax: 01494 435610

Customer T. DAWKE	40 CARLTON GARDENS	Diesel Generator Rating	
Site Address	CARLTON GARDENS	Engine Type	Volvo TAD1631 G
PALL MALL	LONDON	Serial Number	Z1G0020726
		Alternator Type	A471L10C6/4
		Serial Number	F6090984/07
		Manufacture	Spmo
		Engine Operating Time	6.5
Site Reference No.	JM 98255	Type of Load	RESIDENTIAL/RECREATIONAL

Task	Status	Description	Pass	Fail
Check Oil Level	✓	Check Engine Shutdown Protection		
Check Water Level	✓	Low Oil Pressure		
Check Fuel Levels	✓	High Engine Temp.		
Check Manifolds	✓	Other		
Check Connections	✓	1 EMERGENCY STOP		
Check Battery Charger	✓	2		
Check Engine Heaters	✓	3		
Check Emergency Power Off	✓	4		
Check Cooling Run Time	3 min	5		
Check Auto Start	✓	6		

Comments & Recommendations TEST ENDED ON T. CLARKE INSTRUCTIONS:
TEMPERATURE STABILITY ACHIEVED TRANSIENT WAVEFORMS TO FOLLOW

Engineer	K. COFFET		I accept that the above works have been completed <small>SIGN NOT AVAILABLE</small>	
Time On Site		Travel	Customer Name	
Time Off Site		Mileage	Customer Signature	
Date	12/8/99	Site Time	Date	

T. CLARKE PLC

16 AUG 1999

RECEIVED
ANSWERED

AVK|SEG (UK) LTD
UNINTERRUPTIBLE POWER SUPPLIES & TOTAL ENERGY SYSTEMS FOR BUSINESS & INDUSTRY

12.8.99

FA 9 CYL

ROB IN AVKS T. CLARKE

Power Systems House
Minor Countryard, Hightornton Avenue
High Wycombe, Bucks HP10 5RE

Tel. 01494 425600

Fax: 01494 435810

Email: power.systems@avkseg.co.uk

Internet: www.avkseg.co.uk

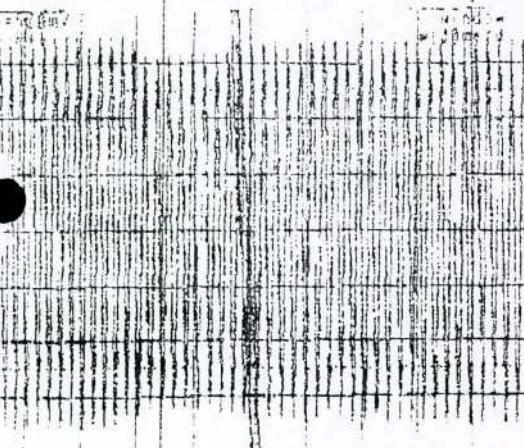
Registered in England No. 2412510

Registered Office: as above

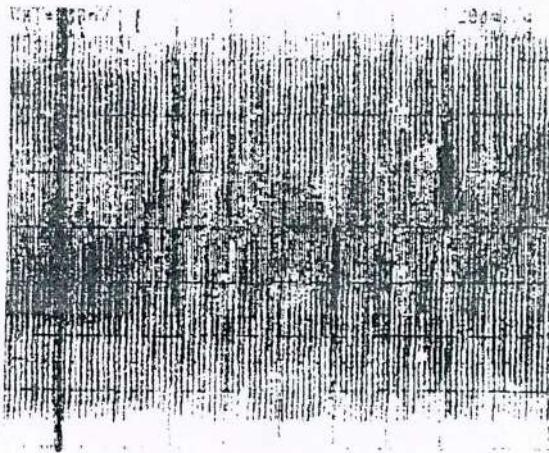
CARLTON GARDENS TRANSIENT TESTS ON DIESEL GEN

COLD START. OUTPUT VOLTS (R-N)
0-50% LOAD (210kW) 9% DROP

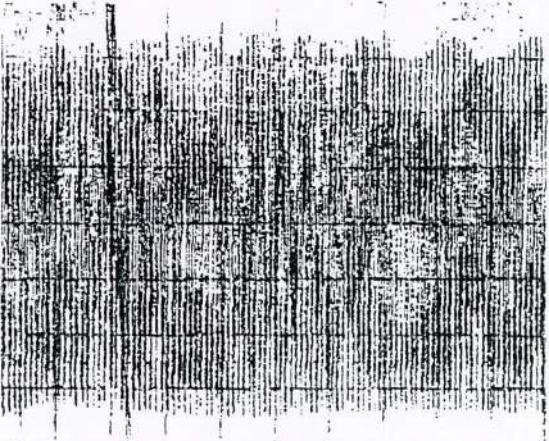
D-25% 105kW 5% drop



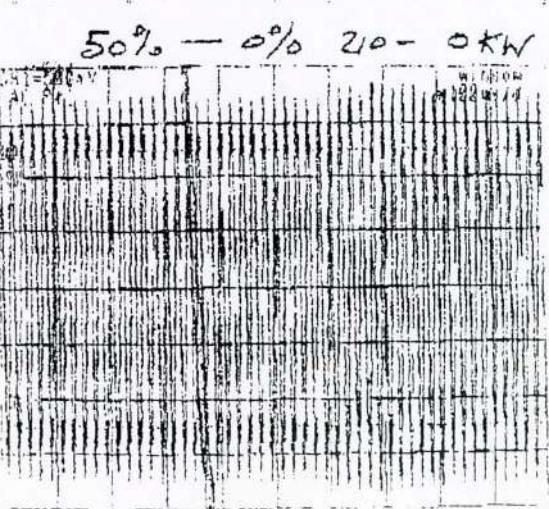
25-50% 105-210kW 3.5% drop



50 - 75% 210 - 315kW 5.5% drop



75-100% 315-420kW 6% drop



50% - 0% 210 - 0kW 6.5%
GAIN
(JUMP)

AEG

1/2 SCALE 500mV x 200

00100

A MEMBER OF THE
AVK GROUP
OF COMPANIES

Building Services Operating and Maintenance Instructions
5-7 Carlton Gardens, London SW1

H.4

WM & RW Bacon Ltd. – Lightning Protection

INFORMATION

TO

FOLLOW

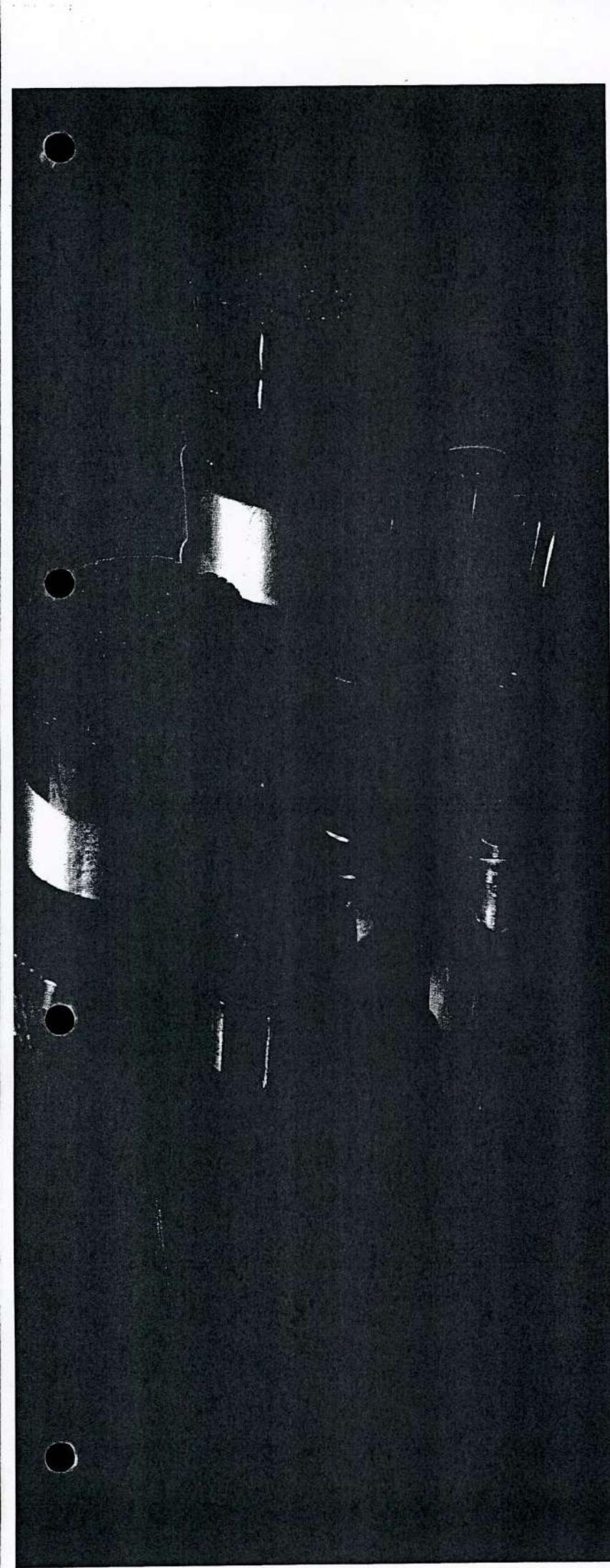
5

Building Services Operating and Maintenance Instructions
5-7 Carlton Gardens, London SW1

H.5

B.I.C.C. Plc –

Distribution Cables XLPE/SWA, S.C./LSF & MICC



BICC Cables

**XLPE insulated
Power Cables**

Low Voltage Cables

600/1000V & 1900/3300V

Cross-linked polyethylene (XLPE) is a thermosetting compound which, by comparison with PVC which it is gradually replacing, has superior resistance to deformation at higher temperatures. This property enables the conductors of XLPE insulated cables to operate at the higher maximum continuous temperature of 90°C, imparting an important advantage when considering current ratings and therefore of particular significance when the cable is to operate in countries and situations where the ambient temperature is relatively high.

XLPE insulated, PVC oversheathed cables (to BS5467) are used for power supply and distribution in industrial and other environments.

Electric cables themselves do not present a serious primary fire hazard. We must however be concerned with their behaviour in fires where other material is already burning. In such situations, cables may propagate flames and produce noxious smoke and fumes which endanger life and hinder fire-fighting.

BICC LSF (Low Smoke and Fume) armoured cables comply fully with the requirements of BS 6724, combining the excellence of cross-linked polyethylene

(XLPE) insulation with a Low Smoke and Fume material as the bedding and oversheath. This material is notable for the absence of smoke-generating constituents, particularly halogens (fluorine, bromine, chlorine), thus avoiding the hazards of corrosive and noxious fumes emitted by standard materials such as PVC when exposed to flames.

All the cables described can be used both indoors and outdoors, but some reservations are necessary concerning cables which are to be buried in the ground – or for use in sustained wet conditions – as follows:

- i) Unarmoured cables are not recommended for installations other than in air.
- ii) For installations where water logging exists, or where it is likely to occur, advice should be obtained from our technical department since it may be desirable for an alternative type of cable to be recommended.

The conductors are stranded copper or solid aluminium as standard, although stranded aluminium can also be supplied. All conductors comply with BS 6360:1991 'Conductors in insulated cables and cords'.

At these voltages, multicore cables of 50mm² and above have sector shaped conductors.

TYPICAL EXAMPLES OF DESIGN & CONSTRUCTION 600/1000V, 1900/3300V CABLES TO BS 5467 & BS 6724

Four core cable, single wire armoured

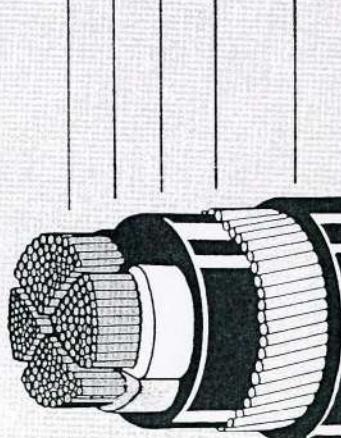
Shaped stranded copper conductor

XLPE insulation

Extruded bedding*

Galvanised steel wire armour

Extruded oversheath*



Single core cable, aluminium wire armoured

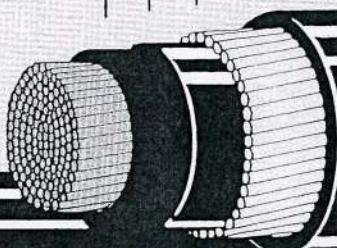
Circular stranded copper conductor

XLPE insulation

Extruded bedding*

Aluminium wire armour

Extruded oversheath*



*PVC for BS 5467 cables, LSF for cables to BS 6724

600/1000V

STRANDED COPPER CONDUCTORS

Unarmoured and single wire armoured

Nominal area of conductor	Unarmoured		Armoured*			Approx cable weight		
	Approx. cable diameter overall	Approx. cable weight kg/km	Approx. diameter#			PVC sheathed kg/km	LSF sheathed kg/km	
			Under armour mm	Over armour mm	Overall mm			
mm ²	mm	kg/km						
SINGLE CORE	50	13.6	540	12.2	14.7	17.7	800	710
	70	15.6	750	14.1	16.6	19.6	1030	940
	95	17.5	1010	15.8	18.3	21.5	1220	1220
	120	19.2	1250	17.5	20.0	23.2	1490	1480
	150	21.3	1530	19.7	22.9	26.3	1870	1870
	185	23.4	1900	21.9	25.1	28.7	2290	2280
	240	26.3	2470	24.6	27.8	31.4	2880	2880
	300	29.0	3080	27.1	30.3	34.1	3520	3520
	400	32.7	3890	30.9	34.9	38.9	4520	4520
	500	36.6	4970	34.6	38.6	42.8	5680	5640
TWIN CORE SHAPED	630	41.3	6370	38.9	42.9	47.3	7120	7110
	800	46.3	8150	44.1	49.1	53.9	9220	9310
	1000	51.3	10090	48.8	53.8	58.8	11270	11440
	16 †	17.4	490	15.1	17.6	20.6	900	940
	25 †	20.9	660	18.6	21.1	24.3	1060	1250
	35 †	23.2	880	21.3	24.5	27.9	1490	1720
	50	20.4	1100	18.5	21.7	25.3	1800	1800
	70	23.1	1520	21.1	24.3	28.1	2320	2330
	95	25.9	2040	23.9	27.9	31.9	3160	3170
	120	29.1	2570	26.9	30.9	35.1	3790	3810
THREE CORE SECTOR SHAPED	150	32.3	3130	29.8	33.8	38.2	4500	4530
	185	35.8	3920	33.5	38.5	43.3	5820	5860
	240	41.0	5050	38.3	43.3	48.3	7220	7300
	300	45.1	6350	42.4	47.4	52.6	8710	8790
	400	50.6	8000	47.4	52.4	58.0	10650	10770
	16 †	18.5	640	16.1	18.6	21.8	1070	1180
	25 †	22.3	920	20.3	23.5	26.9	1550	1720
	35 †	24.7	1190	22.8	26.0	29.6	1940	2130
	50	23.5	1580	21.6	24.8	28.4	2360	2380
	70	27.2	2220	25.0	28.2	32.0	3120	3150
FOUR CORE SECTOR SHAPED	95	30.5	2980	28.5	32.5	36.7	4310	4320
	120	33.8	3730	31.6	35.6	40.0	5160	5200
	150	37.7	4580	35.5	40.5	45.1	6610	6630
	185	42.0	5740	39.5	44.5	49.3	7920	7980
	240	47.2	7450	44.3	49.3	54.5	9930	9960
	300	52.1	9230	49.1	54.1	59.5	11970	12060
	400	58.4	11730	55.0	60.0	65.8	14770	14980
	16 †	20.2	820	17.9	20.4	23.6	1300	1410
	25 †	24.4	1170	22.5	25.7	29.1	1880	2090
	35 †	27.2	1550	25.3	28.5	32.1	2350	2590
FOUR CORE SHAPED	50	26.5	2050	24.3	27.5	31.3	2950	2990
	70	30.6	2900	28.6	32.6	36.8	4230	4240
	95	34.4	3920	32.2	36.2	40.6	5390	5410
	120	38.4	4940	36.2	41.2	45.8	6980	6980
	150	42.7	6040	40.1	45.1	49.9	8300	8320
	185	47.6	7580	44.7	49.7	54.9	10070	10080
	240	53.5	9860	50.6	55.6	61.0	12680	12690
	300	59.1	12280	55.7	60.7	66.5	15380	15420
	400	66.2	15560	62.7	69.0	75.4	19950	20150

† Circular conductors

These dimensions are for PVC sheathed cables. For LSF sheathed cables they should be **reduced** by 0.2mm for single core types, and **increased** by 0.2mm for 2, 3 and 4 core types.

- * Single core: aluminium wire armoured
- 2, 3 and 4 core: steel wire armoured

CURRENT RATINGS (ac)

Installed in free air

Nominal area of conductor mm ²	Single core								Two core			Three & Four core		
	Two cables spaced†				Three cables trefoil touching				Current rating	Approx. volt drop per amp per metre	Current rating	Approx. volt drop per amp per metre		
	Current rating		Approx. volt drop per amp per metre		Current rating		Approx. volt drop per amp per metre							
	Unarm'd	Arm'd	Unarm'd	Arm'd	Unarm'd	Arm'd	Unarm'd	Arm'd	Unarm'd	Arm'd	Unarm'd	Arm'd	Unarm'd	Arm'd
amp	amp	amp	mV	mV	amp	amp	mV	mV	amp	amp	mV	amp	amp	mV
16	—	—	—	—	—	—	—	—	115	115	2.90	100	99	2.50
25	—	—	—	—	—	—	—	—	149	152	1.90	127	131	1.65
35	—	—	—	—	—	—	—	—	185	188	1.35	158	162	1.15
50	246	266	1.0	1.0	209	222	0.87	0.87	225	228	1.00	192	197	0.87
70	318	337	0.73	0.75	270	285	0.61	0.62	289	291	0.69	246	251	0.60
95	389	412	0.56	0.60	330	346	0.45	0.47	352	354	0.52	298	304	0.45
120	453	477	0.47	0.51	385	402	0.37	0.39	410	410	0.42	346	353	0.37
150	524	539	0.41	0.45	445	463	0.31	0.33	473	472	0.35	399	406	0.30
185	600	614	0.36	0.40	511	529	0.26	0.28	542	539	0.29	456	463	0.26
240	711	714	0.31	0.35	606	625	0.22	0.24	641	636	0.24	538	546	0.21
300	824	805	0.29	0.32	701	720	0.195	0.21	741	732	0.21	621	628	0.185
400	994	889	0.27	0.30	820	815	0.175	0.195	865	847	0.195	741	728	0.170
500	1150	989	0.26	0.29	936	918	0.160	0.180	—	—	—	—	—	—
630	1338	1092	0.25	0.27	1069	1027	0.150	0.170	—	—	—	—	—	—
800	1485	1115	0.25	0.27	1214	1119	0.145	0.165	—	—	—	—	—	—
1000	1671	1238	0.24	0.25	1399	1214	0.140	0.155	—	—	—	—	—	—

^t Adjacent cable surfaces separated by one cable diameter.

Laid direct in ground/run in single-way ducts – single wire armoured cables

Nominal area of conductor	Single core								Two core			Three & Four core		
	Two cables/ducts touching				Three cables/ducts trefoil touching				Current rating	Approx. volt drop per amp per metre	Current rating	Approx. volt drop per amp per metre		
	Current rating		Approx. volt drop per amp per metre		Current rating		Approx. volt drop per amp per metre							
	In ground	In duct	In ground	In duct	In ground	In duct	In ground	In duct	In ground	In duct	In ground	In duct	In ground	In duct
mm ²	amp	amp	mV	mV	amp	amp	mV	mV	amp	amp	mV	amp	amp	mV
16	—	—	—	—	—	—	—	—	141	115	2.90	119	96	2.50
25	—	—	—	—	—	—	—	—	183	148	1.90	152	124	1.65
35	—	—	—	—	—	—	—	—	219	178	1.35	182	149	1.15
50	274	252	1.0	1.10	231	231	0.87	0.93	259	211	1.00	217	177	0.87
70	337	305	0.71	0.80	284	278	0.62	0.70	317	260	0.69	266	218	0.60
95	403	360	0.55	0.65	340	327	0.47	0.56	381	313	0.52	319	263	0.45
120	458	404	0.45	0.55	386	366	0.39	0.48	433	357	0.42	363	300	0.37
150	510	439	0.38	0.50	431	396	0.33	0.43	485	401	0.35	406	338	0.30
185	574	486	0.33	0.45	485	437	0.28	0.39	547	455	0.29	458	382	0.26
240	661	546	0.28	0.40	558	489	0.24	0.35	632	527	0.24	529	442	0.21
300	739	597	0.25	0.37	623	534	0.21	0.32	708	592	0.21	592	496	0.185
400	820	638	0.22	0.35	691	567	0.195	0.30	799	669	0.195	667	570	0.170
500	910	694	0.21	0.33	765	615	0.180	0.28	—	—	—	—	—	—
630	1001	752	0.195	0.30	841	664	0.170	0.26	—	—	—	—	—	—
800	1055	788	0.190	0.29	888	692	0.165	0.25	—	—	—	—	—	—
1000	1115	839	0.180	0.28	942	735	0.155	0.24	—	—	—	—	—	—

Ambient air temp. 30°C. Ground thermal resistivity 1.2K

Ambient air temp 30°C
Ground temp 15°C

*Ground temp 15°C Depth of laying 0.5m
All circuits thermally independent*

All circuits thermally independent
Single core cables solidly bonded

Customer Care

For more than a century BICC has been satisfying the cable requirements of customers large and small from almost every industry in every part of the world . . . a lot of customers with many different needs.

In recent years we have led the way in fibre optic and fire performance cable technology for all spheres of industrial activity including public utilities and defence . . . a lot more customers with still more special needs!

How can we possibly 'care' for everyone at the same time?

It is not easy but BICC Cables is dedicated and totally committed to product reliability and safety. WE WILL NOT COMPROMISE ON THIS STANCE.

To begin with, there are certain standards to attain:

BS5750 – Quality Systems

BICC Cables manufacturing units at Leigh, Hebburn, Wrexham, Warrington, Melling and Prescot have been awarded a Certificate of Assessed Quality Management by the British Approvals Service for Electrical Cables.

This certificate is only awarded to manufacturers who meet the requirements of British Standard 5750, and serves to independently confirm their ability to produce goods consistently to specification.

Following the issue of a certificate, inspectors conduct regular follow-up visits to ensure that the requirements of BS5750 continue to be upheld.

BASEC – Certification Marking

The British Approvals Service for Cables (BASEC) is an independent, non-profit making, Government-nominated body, operating a certification marking scheme for electric cables. The scheme was established to benefit all branches of the electrical industry, by giving an assurance as to the quality of cables supplied by the manufacturers to the wholesalers, cable specifiers and contractors. BASEC has also been nominated by the UK Government under the Low Voltage Directive of the EEC as the UK organisation responsible for licensing the use of Marks and the issuing of reports and certificates for cables, flexible cords and wires.

Licensees can use Marks to indicate that they are complying with the safety provisions of the Directive, and these marks are recognised throughout the Community.

Those BICC cables which are BASEC approved will bear the famous BASEC symbol on the packaging or label.

Any reference to BASEC on literature, packaging or the cable ensures that:

1. The cable has been manufactured and tested to British Standards.
2. The cable has been produced to the British Standards which are specified in the IEE Wiring Regulations.
3. The manufacturer's quality control procedures have been checked by independent inspectors.
4. The cable complies with the safety provisions of the Low Voltage Directive of the EEC.

But there is more to it than that! It comes down basically to CABLE PEDIGREE, exemplified by three characteristics –

- Performance
- Reliability
- Safety

– all of which are incorporated in every BICC cable.

Performance

Our experienced Technical staff exist to serve you in overcoming any application problem. Skilled design resources and project management capability enable us to become closely involved with any such queries and thus ensure that you get the right cable for the job – a cable that will continuously carry the required current at the specified voltage in the prevailing conditions.

Where necessary it will incorporate features enabling it to have improved fire performance characteristics and to resist damage from threats such as vibration, chafing, flexing, impact or pressure.

For hostile environments, cables can be designed to resist attack from oils, solvents or corrosive chemicals.

This class of cable performance can be achieved only by a company working in harmony with developments in conductor, insulation and protective materials technology. A company which has acquired extensive knowledge of application requirements through experience with a worldwide network of cable users in almost every type of industry.

Field-intelligence and experience, coupled with innovative cable design are the sturdy bases assuring the optimum performance of a BICC cable.

Reliability

Specifying the right cable for a particular application is the first step of course. The key to reliability however, is in the manufacturing process. The cable must be free from material and manufacturing defects, and weaknesses that will be revealed in service.

BICC Cables constantly monitor all manufacturing processes and operate the most stringent Quality Assurance procedures to give you that kind of reliability. It is a factor which assumes vital significance where cables are to be installed in locations where future access would be difficult. That is when BICC Cables reputation and resources give peace of mind.

At the same time we recognise that modern commercial and industrial activities create even greater demands on performance and reliability. Consequently our manufacturing units are under constant review to ensure that the control and monitoring of materials and processes becomes even more stringent, fully automatic and precisely documented.

Safety

BICC Cables maintains a continuing watch on world developments in cable technology and regulations concerning their implementation, so that our products are designed and constructed to be hazard-free under prescribed conditions of use.

We employ only tried and tested materials and processes in full compliance with all relevant UK and International standards and directives.

Our cables are manufactured for safe use without risk to health on the understanding that users will exercise the same degree of care in their selection and application.

Technical Details

Construction

Conductors

The conductors of these fixed power cables are of high conductivity copper, or high purity aluminium, meeting the requirements of BS 6360 and IEC 228.

Up to and including 3300V, the conductors are either stranded copper or solid aluminium. At 6600V and above all conductors will be stranded.

Conductor screen

As stipulated by the various standards – cables at 6600V and above need to incorporate a screen of semi-conducting compound extruded on to the conductor to eliminate discharges at the inner surface of the dielectric.

Insulation

XLPE is a clean, easy to handle material with good electrical characteristics, reasonably resistant to a range of possible contaminants such as water, oils and chemicals. It is suitable

at low voltage it may be possible to use a smaller conductor size compared to PVC insulated cables.

Core identification

Up to and including 3300V cables the XLPE insulation is coloured:-

Number of cores	Colour of Insulation
Single	Red
Two	Red, black
Three	Red, yellow, blue
Four	Red, yellow, blue, black

** other colours can be provided on request*

Black denotes the neutral and the other colours the phase cores in two, three or four core cable.

XLPE cables of 6600V and above have natural coloured insulation. Identification is provided by means of longitudinally applied marker tapes coloured red, yellow or blue for the three cores.

Insulation Screen

XLPE insulated cables 6600V and above require core screens comprising an extruded layer and a metallic layer, to eliminate discharges:-

The extruded semi-conducting cross-linked layer is easily strippable without the need for special tools or a heat source, and is applied at the same time as the conductor screen and the XLPE insulation.

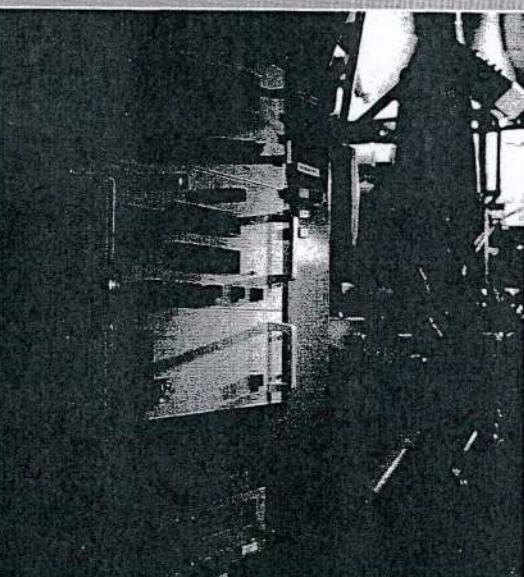
The single core cables have either a helically applied copper wire screen and are unarmoured, or a copper tape screen applied with an overlap and aluminium wire armoured. The three core cables are copper tape screened and steel wire armoured (the three copper tapes being in direct contact with each other).

Bedding

All armoured cables have an extruded sheath over the core or core assembly – providing a secure bedding for the armour layer. The bedding layer is usually of PVC, but other sheathing materials are available, (see outer covering section).

Armour

Armour is provided for the mechanical protection of the cable. Three core cables are usually armoured with a single layer of galvanized steel wire, and single core cables with a single layer of aluminium wire.



for a maximum continuous conductor operating temperature of 90°C. The superior qualities of polyethylene are retained at high temperatures, with the toughness and physical properties being improved. In particular there is greatly enhanced resistance to thermal deformation and degradation.

As previously mentioned, XLPE can operate at 90°C continuously and can accept 250°C as a final conductor temperature at the end of a short circuit. Consequently, in situations where conductor size is governed by current carrying capacity rather than voltage drop (ie.

Installation

Environment

All the cables described in this publication can be used indoors or outdoors, but some reservations are necessary concerning cables without metal sheaths for direct burial e.g.:

- (i) Unarmoured cables are not recommended for laying direct in the ground;
- (ii) For installations where there is water-logging or where it is likely to occur, advice should be obtained from our technical department. It may be desirable to recommend an alternative type of cable.

Temperature

To avoid risk of damage during handling, cables should only be installed when both they and the ambient temperatures are above 0°C and have been so kept for 24 hours, or when special precautions have been taken to maintain the cable above this temperature.

Sheath damage

Care should be taken to ensure that the oversheath is not damaged during installation. This is especially important where aluminium armour is used since ingress of moisture could lead to corrosion and ultimate loss of earth continuity.

Cable support spacing

For all HV cables, recommendations should be obtained from BICC Cables Limited.

Overall cable diameter mm	Support spacing			
	Copper Conductor Cable		Aluminium Conductor Cable	
	Horizontal mm	Vertical mm	Horizontal mm	Vertical mm
Up to 15	350	450	-	-
15 to 20	400	550	1200	550
20 to 40	450	600	2000	600
40 to 60	700	900	3000	900
Over 60	1100	1300	4000	1300

Minimum bending radius

Cables should not be bent during installation to a radius smaller than that recommended below.

Wherever possible larger radii should be used.

(D = Overall diameter of cable).

Type of Cable	Overall Diameter mm	Minimum Bending Radius	
		During installation	Adjacent to joints and terminations
BS 5467 + BS 6724 Circular Copper Conductor Non-Armoured	10-25 above 25	4D 6D	4D 6D
Circular Copper Conductor Armoured	Any	6D	6D
Solid Aluminium or Shaped Copper conductors	Any	8D	8D
Armoured or Non-Armoured			
IEC 502 + BS6622 Single Core - Unarmoured	Any	20D 15D	15D
- Armoured	Any	15D	12D
Three Core - Unarmoured	Any	15D 12D	12D
- Armoured	Any	10D	10D

Minimum internal diameter of pipes or ducts

Where cables are required to be installed in pipes or ducts, e.g. at road crossings, the internal diameter of the pipe or duct should not be less than that given in the following table.

Overall diameter of cable mm	Minimum internal diameter of pipe or duct mm
Up to and including 65	100
Above 65 up to and including 90	125
Above 90 up to and including 115	150

Sealing of cable ends

It is most important that cable ends are sealed immediately after cutting. If left exposed, even for a short period, there is a danger that moisture could enter the cable end.

Storage of cable drums

If drums of cable are left standing for any period of time e.g. prior to shipment, or installation, the following points should be noted:

1. The site for storage of drums should be well drained, hard packed soil or preferably a concrete surface, which will not allow the drums to sink and so give rise to damage due to the extreme difficulty in moving the drums when they have sunk into the ground.
2. All drums should be stored with the battens intact, and in such a manner as to leave sufficient space between drums for air circulation. It is important that the nuts on all tie-bolts are checked for tightness at regular intervals (particularly in warm climates).
3. Tier stacking of drums is not recommended. In no circumstances should drums be stored 'on the flat' i.e. with the flanges horizontal.
4. All drums during installation (i.e. when the battens have been removed) should be 'wedged' so that there is no danger of the flanges of drums coming into accidental contact with unprotected cable on other drums. The cable should not be left unprotected.

Cable accessories

BICC can supply a full range of accessories for use with XLPE insulated power cables -

Connectors Compression-type connectors are recommended since soldered types limit short circuit temperature to 160°C and reduces the final short circuit by 30%.

Glands A wide range in brass, steel or aluminium alloy with a choice of entry thread forms to suit all needs.

Terminations For screened cables it is necessary to incorporate stress control in terminations and joints. Our BIWRAP, BITHERM, BIMOLD cold shrink system kits provide a total solution, adapted for indoor or outdoor use.

Joints BICAST and BITHANE cold-pour resin joints with pre-moulded PVC shells and high-permittivity tapes for stress control. Also, a range of transition joints enabling XLPE cables to be jointed to PILC or aluminium sheathed types.

Health and Safety

- the need for care and planning



continuing watch on world developments in the field of cables to ensure that so far as is reasonably practicable our products are so designed and constructed as to be safe and without risk to health.

It is important that the type of cable specified when ordering is suitable for the intended usage. The Company will be pleased to advise on the most suitable design and protection for the intended operating and environmental conditions.

The cables produced by this Company should be installed by, or under the supervision of, competent personnel in accordance with good engineering practice, established codes of practice, statutory requirements and the IEE Wiring Regulations as applicable and, where appropriate, in accordance with any instructions specifically advised by the Company.

The melting, heating, burning or welding of cables can give rise to certain health and safety risks. During cable jointing and terminating and the disposal of scraps by burning, all reasonable care must be taken to avoid undue concentrations of corrosive and/or toxic fumes. These fumes can arise from the heating of plastic and elastomeric insulating and sheathing compounds, from lead sheaths and from fluxes, solders and plumbing metal used in jointing operations.

BICC electric cables are designed to operate within well defined electrical, mechanical and environmental tolerances. If applied as they are intended to be applied they will perform well and will not present a safety hazard.

Their use is, however, subject to other factors which might in themselves present a secondary hazard, e.g. bending, flexing, terminating, transporting, being exposed to physical pressure and knocks and not least exposure to chemicals and solvents. Above all, electricity can be dangerous and extreme care should be taken to follow established guidelines and BICC recommendations in this respect.

Health and Safety at Work Act 1974

Having regard to the provisions of Section 6 of the Health and Safety at Work Etc. Act 1974, the following information is given with the object of augmenting other information readily available to you, such as in British Standards, IEE Wiring Regulations and, where appropriate, Company catalogues and jointing instructions, so that the obligations to all concerned with the handling and use of our products in terms of the above Act may be met as fully as is reasonably practicable

You are requested in accordance with the provisions of the Act to take such steps as are necessary to ensure that the appropriate information on the proper use and handling of our cables, is made available by you to all those concerned. Similarly, this information must be provided to anyone who may purchase or otherwise acquire from you such products for use in his own workplace.

If, exceptionally, any specific hazard is associated with a particular cable, advice on the necessary precautions will be provided.

Notes on hazards of health and safety associated with the use of electric cables

The products with which this notice is concerned are Electric Cables. As far as we are aware, the correct use of such cables does not give rise to any risk to health. We do, however, maintain a

6

Building Services Operating and Maintenance Instructions
5-7 Carlton Gardens, London SW1

H.6

Blenheim Security Systems Ltd. – Security System

O & M MANUALS

5 - 7 CHARLTON GARDENS

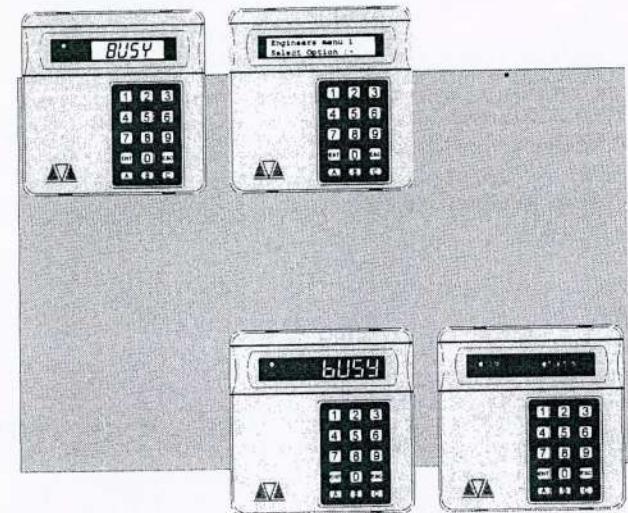
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- 2 CCTV
- 3 ACCESS CONTROL
- 4 METHOD STATEMENT
- 5 HEALTH AND SAFETY
- 6 CABLE SPECIFICATIONS

1 INTRUDER ALARM

 Networker

TS2500

Intruder Alarm Control System



Managers Operating Manual

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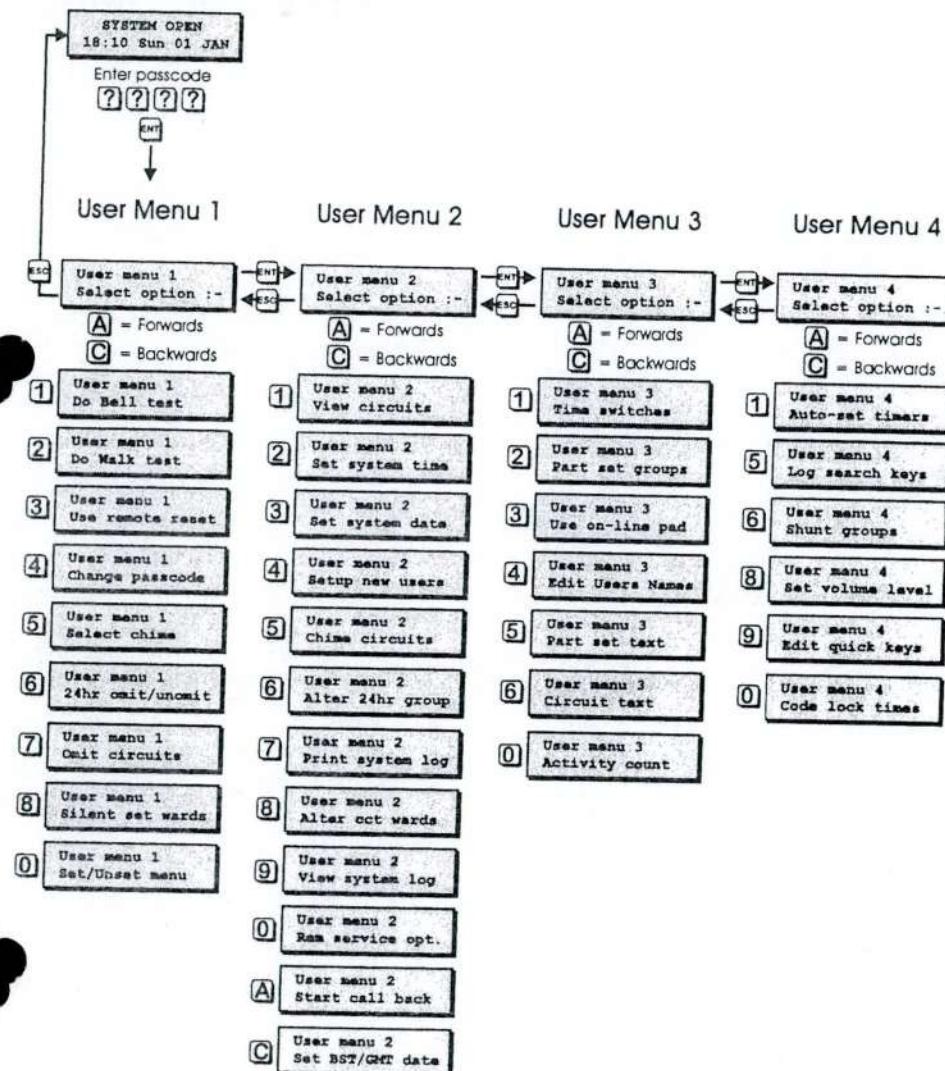
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Additional

System Records (Cont.)

Quick Set Keys	
Key	Uses Part Set Group (1 - 9)
A	
B	
C	

Shunt Groups				
Group	Circuit 1	Circuit 2	Circuit 3	Circuit 4

Code lock Timer 1									
Timer	On at	Off at	Mon	Tue	Wed	Thu	Fri	Sat	Sun
1									
2									
3									

Users:

Code lock Timer 2									
Timer	On at	Off at	Mon	Tue	Wed	Thu	Fri	Sat	Sun
1									
2									
3									

Users:

Code lock Timer 3									
Timer	On at	Off at	Mon	Tue	Wed	Thu	Fri	Sat	Sun
1									
2									
3									

Users:

Overview

Alarm Receiving Centre (ARC)

A permanently manned monitoring station used to receive alarm signals from an alarm system.

Chime

A facility which allows selected detection circuits to generate a two-tone sound when triggered.

Detection Circuit

All detection devices, (e.g. magnetic contacts, movement sensors) are connected to detection circuits. Each circuit is allocated a number which identifies the detection device. For example , a room protected by a movement sensor may be "Circuit 1001", while a door protected by a magnetic contact may be "Circuit 1002".

Digital Communicator

A signalling device fitted to the system which will transmit alarm information via the telephone line to the alarm receiving centre.

Downloading

A process which allows the alarm system to be remotely interrogated and programmed using a computer and modem.

Duress

A means of entering a passcode which generates a silent alarm via the signalling device (if fitted) to the ARC.

Entry Time

A pre-set time delay to allow the user to enter the protected area and access the remote keypad without causing an alarm.

Event Log

A record of system activity which is stored in memory (maximum of 4000 events).

Exit/Entry route

The route which must be used when entering or leaving the protected area when the alarm system is being set.

Exit Terminator

An external push button switch used to complete the setting of the alarm system.

Exit Time

A pre-set time delay to allow the user to leave the protected area after initiating the setting procedure.

Final Exit

The door or detector used when leaving and entering the protected area.

Full Set

The state of the alarm system when it is protecting all areas of the premises.

Glossary of Terms

Overview

Master User

Glossary of Terms

The user(s) who has the authority for assigning new users to the alarm system.

Modem

A device for transmitting and receiving data to and from a computer via the telephone line.

Omit

To intentionally exclude the monitoring of one or more detection circuits when setting the alarm system.

P.A. (Panic Alarm)

An emergency push button switch used to activate an alarm. The alarm signal will also be transmitted to the alarm receiving centre if a signalling device is fitted to the alarm system.

Part Set

The state of the alarm system when it is protecting part of the premises.

Passcode

A unique number which must be entered before the alarm system can be operated.

Remote Keypad

A device located away from the main control panel used to operate the alarm system.

Reset

The action required to return the alarm system to its normal state after the alarm has activated.

Set

To arm one or more wards.

System Open

The status of the system when all wards are unset.

Tamper Alarm

An alarm caused by the system being physically interfered with.

24hr Circuit

A circuit that is monitored at all times.

Unset

To disarm one or more wards.

Users

Persons allocated a passcode which allows them to operate the alarm system.

Wards

A group of detection circuits that can be set or unset independently of each other.

Additional

System Records (Cont.)

Auto-Set Timer 1

Timer	Set at	Unset at	Mon	Tue	Wed	Thu	Fri	Sat	Sun
1									
2									
3									

Set Wards:

Auto-Set Timer 2

Timer	Set at	Unset at	Mon	Tue	Wed	Thu	Fri	Sat	Sun
1									
2									
3									

Set Wards:

Auto-Set Timer 3

Timer	Set at	Unset at	Mon	Tue	Wed	Thu	Fri	Sat	Sun
1									
2									
3									

Set Wards:

Log Search Keys

Key	Event 1	Event 2	Event 3	Event 4	Event 5
1					
2					
3					
4					
5					
6					
7					
8					
9					

Additional

System Records

24 Hour Group	
Wards	Description

Remote Servicing (Downloading)		
Site	Telephone No.	Details
1		
2		
3		

User Authorised Engineer Authorised

Time Switch 1										
Timer	On at	Off at	Mon	Tue	Wed	Thu	Fri	Sat	Sun	
1										
2										
3										

Time Switch 2										
Timer	On at	Off at	Mon	Tue	Wed	Thu	Fri	Sat	Sun	
1										
2										
3										

Time Switch 3										
Timer	On at	Off at	Mon	Tue	Wed	Thu	Fri	Sat	Sun	
1										
2										
3										

Part Set Groups					
Group	Text	Wards	Group	Text	Wards
1			6		
2			7		
3			8		
4			9		
5		0			

Overview

Introduction

This manual describes the more advanced operating procedures for your alarm system and is normally used by the master or manager users. For details of the basic operating procedures refer to the "Operators Manual".

User Menus

The TS2500 has four separate user menus and each menu has between 9 and 12 options. User menus 2, 3 and 4 are covered by this manual. User menu 1 is covered in the *Operators Manual*. Access to user menus and options will depend on your user access level. For details on setting user levels, see "Setup New Users" on page 8.

User Menu 2

Introduction

User menu 1 Select option :-
User menu 2 Select option :-
[A] = Forwards [C] = Backwards
1 User menu 2 View circuits
2 User menu 2 Set system time
3 User menu 2 Set system date
4 User menu 2 Setup new users
5 User menu 2 Chime circuits
6 User menu 2 Alter 24hr group
7 User menu 2 Print system log
8 User menu 2 Alter cct wards
9 User menu 2 View system log
0 User menu 2 Rem service opt.
A User menu 2 Start call back
C User menu 2 Set BST/GMT date

To access user menu 2 enter your passcode, then press [ENT] to select user menu 1. Now press [ENT] again to select user menu 2. There are 12 menu options and access to these options will depend on your access level.

Each option has a "hot-key" which allows you to select the required option by pressing the relevant hot-key number, e.g. the "View circuits" option is assigned to key [1], so to select this option press [1] followed by [ENT].

Alternatively you can use the [A] and [C] keys to scroll forwards and backwards through the available options. As you press the [A] and [C] keys the bottom line of the display will show the selected menu option. When you have found the required option press the [ENT] key to perform the option.

To leave user menu 2 and return to user menu 1 simply keep pressing the [ESC] key until the display shows "User menu 1".

Additional

- 1** = A
- 3** = O
- 7** = Move cursor left
- ENT** = Accept text
- A** = Up the alphabet

- 2** = E
- 5** = U
- 8** = Change case
- 0** = Space
- B** = Change cursor type
- 3** = I
- 4** = 0 (zero)
- 9** = Move cursor right
- esc** = Abandon text editing
- C** = Down the alphabet

Text Editing Keys

Cursor	Function
^	Normal text cursor. Use text editing keys as shown above.
	Number cursor. Use numbered key to enter numeric details.
+	Insert text cursor. Use text editing keys as shown above to insert text.
-	Delete text cursor. Use [7] to delete from the left or [9] to delete from the right.

Cursor Types

Character	Key sequence	Character	Key sequence	Character	Key sequence
A	1	N	4C	:	1CCCCCCC
B	1A	O	4	;	1CCCCCC
C	1AA	P	4A	<	1CCCCC
D	2C	Q	4AA	=	1CCCC
E	2	R	4AAA	>	1CCC
F	2A	S	5CC	?	1CC
G	2AA	T	5C	@	1C
H	3C	U	5	!	0A
I	3	V	5A	"	0AA
J	3A	W	5AA	#	0AAA
K	3AA	X	5AAA	\$	0AAAA
L	3AAA	Y	5AAAA	%	0AAAAA
M	4CC	Z	5AAAAA	&	0AAAAAA

Key sequences for common characters

User Menu 4

Code Lock Times (Cont.)

Code lock group 1
Select option :-

[ENT]

01, 010 Colin

Enter code lock
user 01 - 10
e.g. 02

02, 999 Not Used

[ENT] to edit

Enter user No.
02, 999 Not Used

Enter user No.
001 - 199
e.g. 011

[ENT] to accept

02, 011 Mark

Repeat for other
code lock users
or

[ESC]

Code lock group 1
Select option :-

Assigning users to a code lock timer
To select which users (max. 10) are assigned
to the code lock timers, proceed as follows:

1. Ensure that the required code lock timer is selected.
2. Press [ENT] to select users.
3. The display will show the first code lock user, the user number (999= Not used) assigned and user name (if programmed).
4. Enter the code lock user number 01 - 10 or use the [A] and [C] keys to scroll up and down.
5. Press [ENT] to edit, enter the user number 001 -199 or 999 for "Not Used".
6. Press [ENT] to accept, repeat for other code lock users if required or press [ESC] to return to the main code lock menu.

User Menu 2

View Circuits

This option allows you to ascertain the status of each detection circuit. The status for each circuit may be as follows:

Healthy - This is the normal status of a detection circuit, i.e. door closed or detector healthy.

Active - This is the alarm status of a detection circuit, i.e. door open or detector in alarm.

Tamper - This is the tamper open circuit status of a detection circuit, i.e. alarm cable cut or a cover removed from a detector.

Shorted - This is the short circuit status of a detection circuit, i.e. alarm cable shorted or damaged.

SYSTEM OPEN
18:10 Sun 01 JAN
? ? ? ? [ENT] [ENT]

User menu 2
Select option :-

[1]

User menu 2
View circuits

[ENT]

Front Door
0001 Healthy

Enter circuit No.

or

[A] = Next circuit

[C] = Previous circuit

e.g. 2002

Office window
2002 Active

[ESC] [ESC] [ESC]

SYSTEM OPEN
18:10 Sun 01 JAN

1. At the remote keypad enter your passcode then press [ENT] twice to select user menu 2.
2. Press [1] followed by [ENT] to select the view circuits option.
3. The display will show circuit 0001 and its current status.
4. Select the circuit you require to view by either entering the circuit number or by pressing the [A] and [C] keys to scroll up and down through the circuits.
5. Press [ESC] three times to return the system to its original state.

User Menu 2

Setting the System Time

This option allows you to set the system time. The system can also be programmed to automatically add and subtract an hour when British Summer Time starts and ends, see "Set BST/GMT Dates" on page 26.

SYSTEM OPEN
00:00 Sun 01 JAN

ENT ENT

User menu 2
Select option :-

2

User menu 2
Set system time

ENT

Enter new time:-
00:00 BST

Enter new time
e.g. 1810 for 6:10 pm

Enter new time:-
18:10 BST

B

to alternate between
BST & GMT

Enter new time:-
16:05 GMT

ENT

User menu 2
Select option :-

ESC ESC

SYSTEM OPEN
18:10 Sun 01 JAN

User Menu 4

Code Lock Times (Cont.)

Programming the days of operation

To program the days of operation for the first, second and third on/off timers, proceed as follows:

- At the remote keypad enter your passcode then press [ENT] twice to select user menu 2.
- Press [2] followed by [ENT] to select the set system time option.
- The display will show the current time. Enter the new time in a 24hr format, e.g. 1810 for 6:10 pm.
- The display also shows the current time zone, i.e. BST or GMT. Press [B] to alternate between BST and GMT.
- When the display shows the correct time and time zone, press [ENT] to accept.
- Press [ESC] twice to return the system to its original state.

Codelock group 1
Select option :-

7 = Operation of 1st

8 = Operation of 2nd

9 = Operation of 3rd

1 Operates on :-
> Su.....

Enter days by pressing

[1] to [7]

e.g. press [1] to select
Sunday

ENT

Codelock group 1
Select option :-

ENT

- Ensure that the required code lock timer is selected.
- Press [7] for the first timer, [8] for the second timer and [9] for the third timer.
- The display will show the current days of operation. Enter the required days of operation by pressing [1] - [7] to select or deselect the days of the week.
- When the display shows the required days of operation press [ENT] to accept.

Manually overriding the timer

Each code lock timer can be manually switched on or off as follows:

- Ensure that the required code lock timer is selected.
- Press [0], the display will show the current state of the selected code lock timer.
- Press [B] to alternate between ON and OFF.
- When the display shows the required days of operation press [ENT] to accept.

Codelock group 1
Select option :-

0

Codelock group 1
> output is OFF

B

to alternate between
ON and OFF

ENT

Codelock group 1
Select option :-

User Menu 4

Code Lock Times (Cont.)

Programming the on-times

To program the first, second and third on-times proceed as follows:

1. Ensure that the required code lock timer is selected.
2. Press [1] for the first on-time, [2] for the second on-time and [3] for the third on-time.
3. The display will show the current on-time setting. Enter the required time in a 24hr format, e.g. 08:00 for 8:00 am.
4. When the display shows the required time press [ENT] to accept.

Programming the off-times

To program the first, second and third off-times proceed as follows:

1. Ensure that the required code lock timer is selected.
2. Press [4] for the first off-time, [5] for the second off-time and [6] for the third off-time.
3. The display will show the current off-time setting. Enter the required time in a 24hr format, e.g. 23:00 for 11:00 pm.
4. When the display shows the required time press [ENT] to accept.

Codelock group 1
Select option :-

- [1] = On-time 1
[2] = On-time 2
[3] = On-time 3

Codelock group 1
On-time 1 08:00

Enter On-time
e.g. 08:00

ENT

Codelock group 1
Select option :-

Codelock group 1
Select option :-

- [4] = Off-time 1
[5] = Off-time 2
[6] = Off-time 3

Codelock group 1
Off-time 1 23:00

Enter Off-time
e.g. 23:00

ENT

Codelock group 1
Select option :-

User Menu 2

Setting the System Date

This option allows you to set the system date. It is displayed in a day/date/month format on all LCD remote keypads.

1. At the remote keypad enter your passcode then press [ENT] twice to select user menu 2.
2. Press [3] followed by [ENT] to select the set system date option.
3. The display will show the current date. Enter the new date in a date/month format, e.g. 2804 for the 28th April.
4. When the display shows the correct date press [ENT] to accept. The display will show the current day setting, Sunday - Saturday.
5. To change the day press [1] for Sunday, [2] for Monday, [3] for Tuesday etc.
6. When the display shows the correct day press [ENT] to accept.
7. Press [ESC] twice to return the system to its original state.

SYSTEM OPEN
18:10 Sun 01 JAN

██████████ ENT ENT

User menu 2
Select option :-

3

User menu 2
Set system date

ENT

Enter new date:-
01/01

Enter new date
e.g. 2804 for 28 April

Enter new date:-
28/04

ENT

Today is :-
>Su.....

Select the day
[1] =Sunday
[7] =Saturday
e.g. 3 for Tuesday

ENT

User menu 2
Select option :-

ESC

ESC

SYSTEM OPEN
18:10 Tue 28 APR

User Menu 2

Setup New Users

The TS2500 allows up to 199 users to operate the alarm system, each user is assigned a user type, passcode and ward access. User 001 is the master user which has a default setting of 5678.

User Types

Master

This user type has access to all four user menus and options. A master user is also a global user which allows the user to set and unset their assigned wards from any remote keypad.

Manager

This user type has access to "User menu 1" and "User menu 2". A manager user is also a global user which allows the user to set and unset their assigned wards from any remote keypad.

Standard Global

This user type has access to "User menu 1". A standard global user is also a global user which allows the user to set and unset their assigned wards from any remote keypad.

Standard Ward

This user type has access to "User menu 1". A standard ward user can only set and unset their assigned wards from a remote keypad that is assigned to the same ward(s) that they are trying to set/unset. For example if the user is assigned to wards A and B, and operates the system from a keypad assigned only to ward B, the user would only have the option to set/unset ward B.

Reset Only

This user type allows 24hr alarms to be reset and access to "User menu 1" options 1 to 9. A reset only user is also a global user type which allows the user to reset 24hr alarms from any remote keypad.

User Menu 4

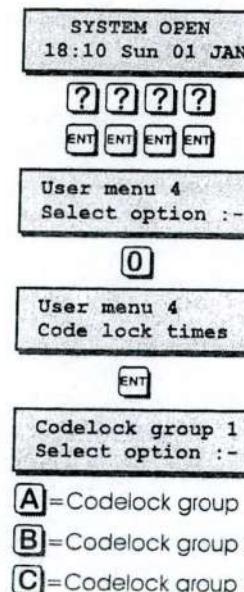
Code Lock Times

The TS2500 alarm system has three programmable code lock timers. Each timer can be programmed with up to three separate on/off times and made to operate on any day of the week. Up to ten users can be assigned to each code lock timer. If a user is assigned to a code lock timer their passcode can only be used when the code lock timer is off. If the user attempts to use their passcode whilst the timer is on the display will show "Sorry. Your code is locked out".

Selecting code lock timers

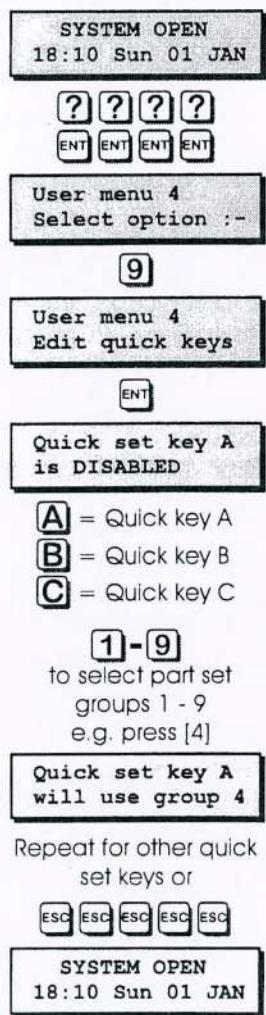
When you select the code lock timers option from user menu 4, "Codelock group 1" is automatically selected. To select other code lock timers proceed as follows:

1. At the remote keypad enter your passcode then press [ENT] four times to select user menu 4.
2. Press [0] followed by [ENT] to select the code lock timers options.
3. The display will show "Codelock group 1" is selected.
4. Press [A] to select "Codelock group 1", [B] to select "Codelock group 2" and [C] to select "Codelock group 3".
5. When the required code lock timer is selected you may now configure it as desired.



User Menu 4

Edit Quick Keys



This option allows you to configure the [A], [B] and [C] keys on the remote keypads to perform quick set functions. For example, key [A] could be programmed to follow part set group 1, whereas key [B] could be programmed to follow part set group 8.

Once defined the quick set keys do not require the user to enter their passcode, they simply press the relevant "Quick Set Key" and the system will perform the function assigned to that key.

1. At the remote keypad enter your passcode then press [ENT] four times to select user menu 4.
2. Press [9] followed by [ENT] to select the edit quick keys option.
3. The display will show the status of "Quick set key A".
4. To select a different quick set key press [A], [B] or [C] as appropriate.
5. Press [1] - [9] to assign the selected quick set key to part set group 1 - 9 or press [0] to disable the selected quick set key.
6. Repeat steps 4 - 5 for the other quick set keys or press [ESC] five times to return the system to its original state.

User Menu 2

Setup New Users (Cont.)

Panic Code

This user type does not have access to any user menus nor can it be used to set and unset the system. When this user code is entered a "Panic Alarm" is transmitted to the alarm receiving centre and the external sounder(s) and strobe light(s) are also activated.

Duress Code

This user type operates in the same way as a standard global user, but when the passcode is used a silent "Panic Alarm" is transmitted to the alarm receiving centre.

NOTE: If enabled by your alarm company all users can generate a "Duress" alarm by entering their passcode with the first two digits reversed (e.g., for a passcode of 2580 enter 5280 to generate a "Duress" alarm).

Access

This user type does not have access to any user menus nor can it be used to set and unset the system. When this user code is entered it will operate specific outputs which in turn can be used to operate an electric door strike or similar.

Shunt

This user type does not have access to any user menus nor can it be used to set and unset the system. When this user code is entered it will isolate a pre-defined group of detection circuits. When the code is re-entered it will reinstate the group.

Set Only

This user type operates in the same way as a standard global user, except that it only allows setting of wards.

Not in use

This user type does not perform any operation. Select this user type to delete an existing user.

User Menu 2

Setup New Users (Cont.)

User Wards

Each user must be assigned to wards. Once assigned to wards the user can then set, unset and reset the wards they have been given access to.

Auto Sets Wards

Wards that are assigned as auto set will automatically be selected for setting when choosing the "SET WARDS" option. If a ward is not assigned as auto set the user is given the choice to select the ward at the time of setting.

Auto Unset Wards

Wards that are assigned as auto unset will automatically be selected for unsetting when choosing the "UNSET WARDS" option. If a ward is not assigned as auto unset the user is given the choice to select the ward at the time of unsetting.

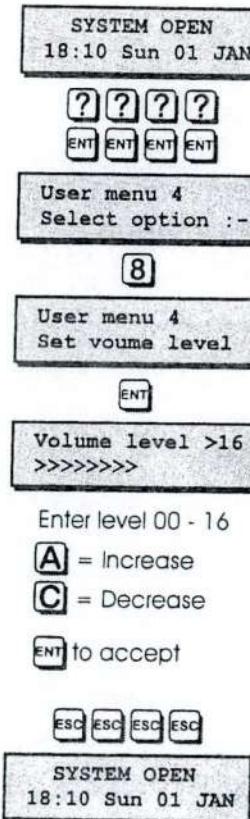
Customising Users

Access to user menus is initially defined by the user type, e.g. the manager user has access to user menus 1 and 2, and a standard global user has access to user menu 1 only. However, each user can be customised so that individual options within user menus are available or restricted, e.g. user 002 could be given the initial type of standard ward, then customised to allow the user to access all user menus and options. This would effectively create a master user that can only set and unset their assigned wards from a remote keypad that is assigned to the same ward(s) that they are trying to set/unset.

User Menu 4

Set Volume Level

This option allows you to adjust the volume level of internal sounders. This will only affect internal sounders connected to the control panel.



1. At the remote keypad enter your passcode then press [ENT] four times to select user menu 4.
2. Press [8] followed by [ENT] to select the set volume level.
3. The display will show the value of the volume level 00 - 31.
4. Enter the new level or use the [A] and [C] to adjust the level. As you enter a new value the internal sounders will generate a two-tone sound at the new volume setting.
5. When the display shows the required volume level, press [ENT] to accept.
6. Press [ESC] four times to return the system to its original state.

User Menu 4

Shunt Groups

SYSTEM OPEN
18:10 Sun 01 JAN



User menu 4
Select option :-

6

User menu 4
Shunt groups

ENT

Group 00< 9999
9999 9999 9999

Enter group 00 - 49
e.g. 20

Group 20< 9999
9999 9999 9999

ENT to edit

Group 20 >9999
9999 9999 9999

Enter circuit No.
e.g. 2001

ENT to accept

Group 20 2001
>9999 9999 9999

Repeat for other
circuits, if required

or

ESC ESC ESC ESC ESC

SYSTEM OPEN
18:10 Sun 01 JAN

The TS2500 alarm system has 50 shunt groups, each group can have up to 4 circuits assigned to it. The group can then be allocated to a user passcode (type "Shunt"). When the passcode is entered the selected group of circuits are shunted (isolated). When the passcode is re-entered, the selected group of circuits are reinstated.

- At the remote keypad enter your passcode then press [ENT] four times to select user menu 4.
- Press [6] followed by [ENT] to select the shunt group options.
- Enter the group number or use the [A] and [C] keys to scroll up and down through the groups.
- When the display shows the required group, press [ENT] to edit the assigned circuits.
- The cursor (>) will point at the first circuit in the group. Enter the circuit number, e.g. 2001. (9999 = No Circuit).
- Press [ENT], the cursor (>) will move to the next circuit. Repeat for remaining circuits. If a circuit is not required in the group set it to 9999.
- Repeat steps 3 - 6 for other shunt groups or press [ESC] five times to return the system to its original state.

User Menu 2

Setup New Users (Cont.)

SYSTEM OPEN
18:10 Sun 01 JAN



User menu 2
Select option :-

4

User menu 2
Setup new users

ENT

Define new users
User no. 002

Enter user No.

ENT

Enter new code

Enter new passcode

ENT

User 002 is type
Not in use

Select new user type:

- 1** =Master
- 2** =Manager
- 3** =Standard Global
- 4** =Standard Ward
- 5** =Reset Only
- 6** =Panic Code
- 7** =Duress code
- 8** =Access
- 9** =Shunt
- 0** =Set Only
- B** =Not Used

ENT

- At the remote keypad enter your passcode then press [ENT] twice to select user menu 2.
- Press [4] followed by [ENT] to select the setup new users option.
- The display will show the next available user number. If required enter the user number you require or press [ENT] to accept the next available user.
- The display will prompt you to enter a new passcode. Enter the code followed by [ENT].
- If the new code is not accepted the display will show "NOT ACCEPTED try a different code". Enter a different passcode followed by [ENT].
- The display will show the selected user and its current user type. Press [1] - [9] or use the [A] and [C] keys to scroll through the user types.
- When the display show the required user type, press [ENT] to accept.

(Continued Over)

User Menu 2

Setup New Users (Cont.)

User 002 wards
A, *, *, *.....→

1 - 8

Select/deselect wards

ENT

002 Auto sets:-
A,.....→

1 - 8

Select/deselect wards

ENT

002 Auto unset:-
A,.....→

1 - 8

Select/deselect wards

ENT

[ENT] to
customise user

ESC

Define new users
User no. 003

Repeat for other users

or

ESC **ESC** **ESC**

SYSTEM OPEN
18:10 Sun 01 JAN

8. The display will now show the wards assigned to the selected user. To select/deselect wards A - H press [1] - [8]. To select/deselect wards I - P press [A] then [1] - [8].

9. When you have the required wards displayed press [ENT] to accept.

10. The display will now show the auto set wards assigned to the selected user. To select or deselect wards A - H press [1] - [8]. To select wards I - P press [A] then [1] - [8].

11. When you have the required auto set wards displayed press [ENT] to accept.

12. The display will now show the auto unset wards assigned to the selected user. To select or deselect wards A - H press [1] - [8]. To select wards I - P press [A] then [1] - [8].

13. When you have the required auto unset wards displayed press [ENT] to accept.

14. The display will prompt you to press [ENT] to customise the user. If required the user can be customised by pressing [ENT], otherwise press [ESC]. For details on customising a user see page 13.

15. The display will show the next available user number. If required repeat for other users or press [ESC] three times to return the system to its original state.

User Menu 4

Log Search Keys (Cont.)

SYSTEM OPEN
18:10 Sun 01 JAN

?

?

?

?

ENT

ENT

ENT

ENT

User menu 4
Select option :-

5

User menu 4
Log search keys

ENT

Key 1,1 search:-
ALARM xxxx

Enter key & event No.
e.g. 34

Key 3,4 search:-
FIRE ALARM xxxx

ENT to edit

Key 3,4 event is
FIRE ALARM xxxx

A = Scroll forward
C = Scroll backwards

ENT to accept

Key 3,4 search:-
ALARM xxxx

Repeat for other
search keys, if required

or

ESC **ESC** **ESC** **ESC** **ESC**

SYSTEM OPEN
18:10 Sun 01 JAN

1. At the remote keypad enter your passcode then press [ENT] four times to select user menu 4.

2. Press [5] followed by [ENT] to select the log search keys options.

3. Enter the required key and event number, e.g. 34 for key 3 event 4.

4. Press [ENT] to edit the search event. Use the [A] and [C] keys to scroll through the available search events. The search events are the same as the log event codes, see "Log Event Codes" on page 20.

5. When the display shows the required search event, press [ENT] to accept.

6. Repeat steps 3 - 5 for other search keys or press [ESC] five times to return the system to its original state.

User Menu 4

Log Search Keys

This option allows you to configure the nine log search keys. When viewing the event log you would normally use the [A] and [C] keys to scroll backwards and forwards through the event log. The log search keys allow you to scroll backwards through the log, but will only display events that meet the search key criteria. Each search key can have up to 5 search events assigned to it.

For example, log search key [1] could be set up to search for alarms, set wards and unset wards. When viewing the log and pressing [1] the display would show the next event that met the search key criteria, i.e. it would display the next logged alarm, set wards or unset wards.

If you only want to search for a single event type then assign all 5 events as the same type. The table below shows the default log search key setting.

Key	Event 1	Event 2	Event 3	Event 4	Event 5
1	ALARM xxxx				
2	24Hr ALARM xxx				
3	FIRE ALARM xxxx				
4	PA ALARM xxxx				
5	TAMPER xxxx				
6	ENTRY xxxx				
7	PASSCODE xxx				
8	SET WARDS:-				
9	UNSET WARDS:-				

User Menu 2

Setup New Users (Cont.)

Customising a user code

When setting up a new user code it is possible to customise the user so that options for user menus are added or removed for the selected user. The table below shows all four user menus and the options available.

Key	User Menu 1	User Menu 2	User Menu 3	User Menu 4
0	Set/Unset Menu	Rem service opt.	Activity count	Code lock times
1	Bell Test	View circuits	Time switches	Auto-set timers
2	Walk Test	Set system time	Part set groups	
3	Remote Reset	Set system date	Use on-line pad	
4	Change code	Setup new users	Edit User Names	
5	Enable Chime	Chime circuits	Part set text	Log search keys
6	24hr Omit	Alter 24hr group	Circuit text	Shunt groups
7	Omit Zones	Print system log		
8	Silent Set	Alter cct wards		Set volume level
9		View system log		Edit quick keys
A		Start call back		
B				
C		Set BST/GMT date		

From step 14 on previous page.

1. Press [ENT] when the display shows "[ENT] to customise user".
2. The display will show the options available in user menu 1.
3. Press [0] - [9] to select or deselect the individual options. Press [ENT] to accept.

[ENT] to
customise user

ENT

Menu 1 options:-
> 0123456789...

0 - 9

Select/deselect user
menu 1 options

ENT

(Continued Over)

User Menu 2

Setup New Users (Cont.)

Menu 2 options:-
> 0123456789A.C

0 - 9, A or C

Select/deselect user menu 2 options

ENT

Menu 3 options:-
> 012*456.....

0 - 6

Select/deselect user menu 3 options

ENT

Menu 4 options:-
> 01...567*....

0 - 8

Select/deselect user menu 4 options

ENT

Define new users
User no. 003

Repeat for other users

Or

ESC **ESC** **ESC**

SYSTEM OPEN
18:10 Sun 01 JAN

4. The display will show the options available in user menu 2.
5. Press [0] - [9], [A] or [C] to select or deselect the individual options. Press [ENT] to accept.
6. The display will show the options available in user menu 3.
7. Press [0] - [6] to select or deselect the individual options. Press [ENT] to accept.
8. The display will show the options available in user menu 4.
9. Press [0] - [8] to select or deselect the individual options. Press [ENT] to accept.
10. The display will show the next available user number. If required repeat for other users or press [ESC] three times to return the system to its original state.

User Menu 4

Auto-Set Timers (Cont.)

Auto-set timer 1
Select option :-

ENT

Auto-set timer 1

ENT

to edit

Auto-set timer 1
,,*,*,*,*,*,*

1 - 8

to select & deselect wards
e.g. press [1] & [2] to select wards A & B

Auto-set timer 1
A,B,*,*,*,*,*,*

ENT

Auto-set timer 1

AB.....

ESC

Auto-set timer 1
Select option :-

Selecting the wards that will set/unset
Each auto-set timer must be assigned wards as follows:

1. Ensure that the required auto-set timer is selected.
2. Press [ENT], the display will show the wards assigned to the selected timer.
3. Press [ENT] to edit the ward assignment.
4. Press [1] - [8] to select or deselect wards. Press [A] and [C] to alternate between wards A - H and I - P.
5. When the display shows the required wards, press [ENT] to accept.
6. Press [ESC] to return to the main auto-set menu.

User Menu 4

Auto-Set Timers (Cont.)

Auto-set timer 1
Select option :-

7 = Operation of 1st

8 = Operation of 2nd

9 = Operation of 3rd

1 Operates on :-
> Su.....

Enter days by pressing
[1] to [7]
e.g. press [1] to select
Sunday
ENT

Auto-set timer 1
Select option :-

Auto-set timer 1
Select option :-

0

Auto-set timer 1
> output is OFF

B

to alternate between
ON and OFF

ENT

Auto-set timer 1
Select option :-

Programming the days of operation
To program the days of operation for the first, second and third set/unset times, proceed as follows:

1. Ensure that the required auto-set timer is selected.
2. Press [7] for the first, [8] for the second and [9] for the third set/unset times.
3. The display will show the current days of operation. Enter the required days of operation by pressing [1] - [7] to select or deselect the days of the week, e.g. press [1] to select Sunday.
4. When the display shows the required days of operation press [ENT] to accept.

Manually overriding the timer

Each timer can be manually overridden as follows:

1. Ensure that the required auto-set timer is selected.
2. Press [0], the display will show the current state of the selected timer.
3. Press [B] to alternate between ON and OFF.
4. When the display shows the required days of operation press [ENT] to accept.

User Menu 2

Chime Circuits

SYSTEM OPEN
18:10 Sun 01 JAN

? **?** **?** **?** **ENT** **ENT**

User menu 2
Select option :-

5

User menu 2
Chime circuits

ENT

Front Door
0001 Disabled

Enter circuit No.

or

A = Next circuit

C = Previous circuit

e.g. 2001

Office door
2001 Disabled

ENT

Office door
2001>Disabled

1 = Chime 1

2 = Chime 2

3 = Chime 3

0 = Disabled

e.g. press 1

Office door
2001>Chime 1

ENT to accept

Office door
2001 Chime 1

Repeat for other
circuits, if required
or

ESC **ESC** **ESC**

SYSTEM OPEN
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This option allows you to select which circuits will cause a chime tone if triggered when unset. Three types of chime tone are available:

Chime 1: A single two-tone sound.

Chime 2: A double two-tone sound.

Chime 3: A triple two-tone sound.

1. At the remote keypad enter your passcode then press [ENT] twice to select user menu 2.
2. Press [5] followed by [ENT] to select the chime circuits option.
3. The display will show circuit 0001 and its current chime status.
4. Select the circuit you require to put on chime by either entering its number or by pressing the [A] and [C] keys to scroll up and down through the circuits.
5. When the display shows the required circuit, press [ENT] to edit.
6. Press [1] - [3] to select chime 1 - 3 or [0] to disable chime.
7. When the display shows the required setting press [ENT] to accept.
8. Repeat steps 4 - 7 for other circuits or press [ESC] three times to return the system to its original state.

User Menu 2

Alter 24hr group

SYSTEM OPEN
18:10 Sun 01 JAN
[?] [?] [?] ENT ENT

User menu 2
Select option :-

[6]

User menu 2
Alter 24hr group

ENT

Wards 24hr group
,,*,*,.....→

[1] - [8]

to select & deselect
wards

e.g. press [1] to
select ward A

Wards 24hr group
A,*,*,*,...,..,→

ENT

User menu 2
Select option :-

ESC ESC

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This option allows you to define which wards are allocated to the 24hr group. Once a ward is assigned to the group all "24hr" and "Auxiliary" circuits within the ward(s) can be isolated by any user that has access to user menu 1 option 6 (24hr Omit).

For example, your site may have several loading bay doors within the warehouse area. Each door is then protected by 24hr circuit. The warehouse area is assigned to ward A. Therefore, if ward A was assigned to the 24hr group, all 24hr circuit within ward A would be isolated when a user selected the "24hr Omit" option (see Operators Manual).

- At the remote keypad enter your passcode then press [ENT] twice to select user menu 2.
- Press [6] followed by [ENT] to select the alter 24hr group option.
- The display will show which wards are currently assigned to the 24hr group.
- Press [1] - [8] to select or deselect wards. Press [A] and [C] to alternate between wards A - H and I - P.
- When the display shows the required wards, press [ENT] to accept.
- Press [ESC] twice to return the system to its original state.

User Menu 4

Auto-Set Timers (Cont.)

Programming the set times

To program the first, second and third setting times proceed as follows:

- Ensure that the required auto-set timer is selected.
- Press [1] for the first set time, [2] for the second set time and [3] for the third set time.
- The display will show the current setting time. Enter the required time in a 24hr format, e.g. 17:00 for 5:00 pm.
- When the display shows the required time press [ENT] to accept.

Programming the unset times

To program the first, second and third unset times proceed as follows:

- Ensure that the required auto-set timer is selected.
- Press [4] for the first unset time, [5] for the second unset time and [6] for the third unset time.
- The display will show the current unsetting time. Enter the required time in a 24hr format, e.g. 07:00 for 07:00 am.
- When the display shows the required time press [ENT] to accept.

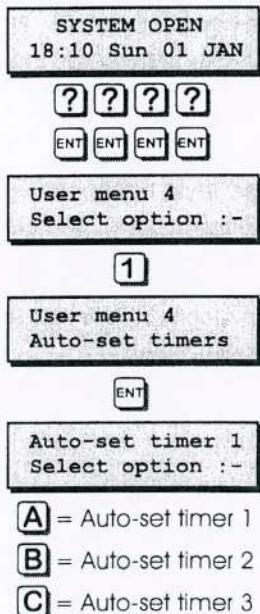
User Menu 4

Auto-Set Timers

The TS2500 alarm system has three programmable auto set timers. Each timer can be programmed with up to three separate on/off times and made to operate on any day of the week. Each timer can be assigned to any combination of wards so that they are automatically set and unset at pre-programmed times.

Selecting auto-set timers

When you select the auto-set timers option from user menu 4, "Auto-set timer 1" is automatically selected. To select other auto-set timers proceed as follows:



- At the remote keypad enter your passcode then press [ENT] four times to select user menu 4.
- Press [1] followed by [ENT] to select the auto-set timers options.
- The display will show "Auto-set timer 1" is selected.
- Press [A] to select "Auto-set timer 1", [B] to select "Auto-set timer 2" and [C] to select "Auto-set timer 3".
- When the required timer is selected you may now configure it as desired.

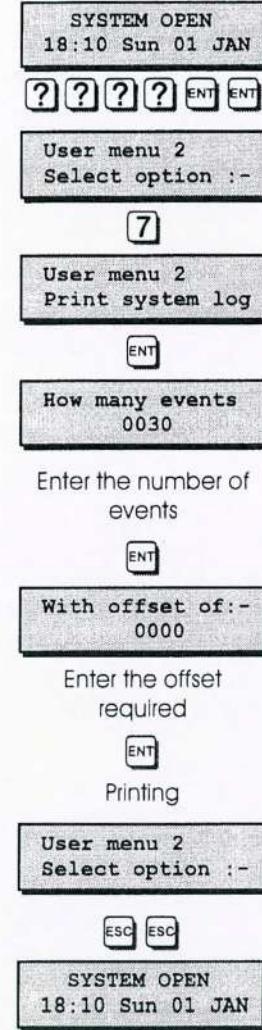
User Menu 2

Print System Log

The system log stores 4000 events. If a printer is connected to your alarm system it is possible to print any number of log events.

When you select a number of events to be printed, the panel starts at event 4000 (the most recently logged event) and works backwards. For example if you request a printout of 100 events, the printer will print events 3900 - 4000.

By specifying an offset you can print the selected number of events from the offset point rather than event 4000. For example, if you specify 100 events with an offset of 1000, the printer will print events 2900 - 3000.



- At the remote keypad enter your passcode then press [ENT] twice to select user menu 2.
- Press [7] followed by [ENT] to select the print system log option.
- The display will prompt you to enter how many events you require to be printed. Enter the number you require.
- The display will now prompt you to enter an offset. Enter the offset value if required.
- Press [ENT] to start printing.
- To cancel printing select 0000 at step 3.
- Press [ESC] twice to return the system to its original state.

User Menu 2

Alter Circuit Wards

SYSTEM OPEN
18:10 Sun 01 JAN

?

?

?

?

ENT

ENT

User menu 2
Select option :-

8

User menu 2
Alter cct wards

ENT

0001 Night
A.....

Enter circuit No.
or

A = Scroll up
C = Scroll down
e.g. 2001

2001 Night
B.....

ENT

2001 Night
,,*,*,*,*,*,*

1 - 8

to select & deselect
wards

e.g. press [1] to
select ward A

2001 Night
A,B,.....

ENT

2001 Night
AB.....

Repeat for other
circuits, if required

or

ESC ESC ESC

SYSTEM OPEN
18:10 Sun 01 JAN

Normally your alarm company will assign detection circuits in to wards. It is advised that you only use this option if you are very familiar with your alarm system and the concept of wards. When selecting this option you can only affect wards that are assigned to your passcode.

- At the remote keypad enter your passcode then press [ENT] twice to select user menu 2.
- Press [8] followed by [ENT] to select the alter circuit wards option.
- The top line of the display will show circuit 0001 and its circuit type. The bottom line will show the wards that the circuit is assigned to.
- Select the circuit you require to alter by either entering its number or by pressing the [A] and [C] keys to scroll up and down through the circuits.
- When the display shows the required circuit, press [ENT] to edit.
- Press [1] - [8] to select or deselect wards. Press [A] and [C] to alternate between wards A - H and I - P. Press [B] to select/deselect all wards.
- When the display shows the required wards, press [ENT] to accept.
- Repeat steps 4 - 7 for other circuits if required or press [ESC] three times to return the system to its original state.

User Menu 4

Introduction

User menu 3
Select option :-

ENT

User menu 4
Select option :-

A = Forwards

C = Backwards

User menu 4
Auto-set timers

5 User menu 4
Log search keys

6 User menu 4
Shunt groups

8 User menu 4
Set volume level

9 User menu 4
Edit quick keys

0 User menu 4
Code lock times

User menu 4 is accessed by pressing the [ENT] key whilst user menu 3 is selected. There are 6 menu options and access to these options will depend on your access level.

Each option has a "hot-key" which allows you to select the required option by pressing the relevant hot-key number, e.g. the "Set volume level" option is assigned to key [8], so to select this option press [8] followed by [ENT].

Alternatively you can use the [A] & [C] keys to scroll forwards and backwards through the available options. As you press the [A] & [C] keys the bottom line of the display will show the selected menu option. When you have found the required option press the [ENT] key to perform the option.

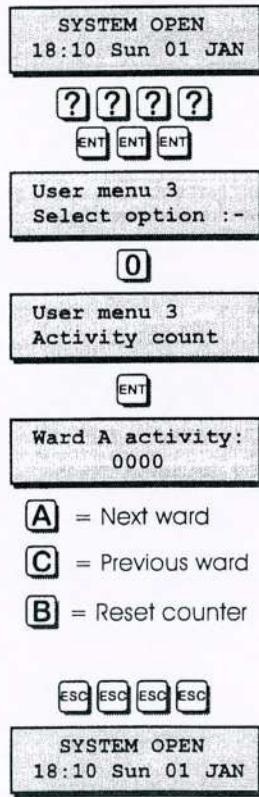
To leave user menu 4 and return to user menu 3 simply keep pressing the [ESC] key until the display shows "User menu 3".

Menu options 2, 3 and 4 are only available to the alarm company engineer.

User Menu 3

Activity Count

Detection circuits programmed by your alarm company with the "Activity" attribute will increase the activity counter by one for the selected ward. This counter could be used to count the number of persons entering a particular area, e.g. shop entrance door etc. This option allows you view the activity counter per ward.



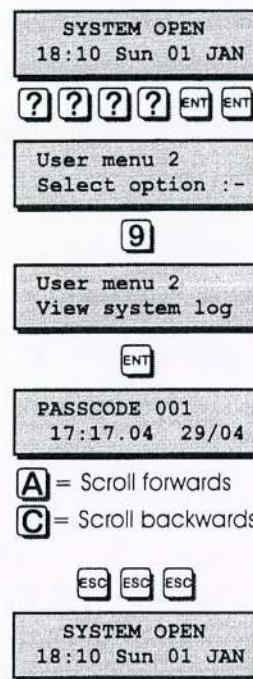
1. At the remote keypad enter your passcode then press [ENT] three times to select user menu 3.
2. Press [0] followed by [ENT] to select the activity count option.
3. The display will show the activity count for ward A. To view the activity count for other wards, press [A] and [C] to scroll up and down through the wards.
4. To reset a counter press [B] when the required activity counter is displayed.
5. Press [ESC] four times to return the system to its original state.

A = Next ward
C = Previous ward
B = Reset counter

User Menu 2

Viewing the System Log

This option allows you view the system log. The [A] and [C] keys allow you to scroll backwards and forwards through the log events. The log event codes are shown on pages 20 - 23.



1. At the remote keypad enter your passcode then press [ENT] twice to select user menu 2.
2. Press [9] followed by [ENT] to select the view log option.
3. The display will show the most recent event.
4. Use the [A] and [C] keys to scroll through the log. The [B] key is used to display additional event information, e.g. if the event is a ward related event, pressing [B] will display the ward information.
5. When finished viewing the log, press [ESC] three times to return the system to its original state.

When viewing the system event log you can use the log search keys to display specific events that meet a certain criteria. The log search keys are configured in user menu 4, see page 44.

User Menu 2**Log Event Codes**

Event	Description
— NO EVENT —	No event
##### ACTIVATED	Monitored circuit activated
#,## LEC LOST	Network #, device No. ## is a LEC that has been removed
### LEC or REM'S	The number of LEC or REM's logged on to system after a re-learn
#,## NODE ADDED	Network #, device No. ## is a TS900 Node that has been added to the system
#,## NODE LOST	Network #, device No. ## is a TS900 Node that has been removed
### NODE'S	The number of TS900 Nodes logged on to the system after a re-learn
#### OFF TEST	Circuit number ##### taken off test
#### OMITTED	Circuit number ##### omitted
#,## XNODE ADDED	Network #, device No. ## is an XNode that has been added to the system
#,## XNODE LOST	Network #, device No. ## is an XNode that has been removed
## XNODE'S	The number of XNodes logged on to the system after a re-learn
#,## REM ADDED	Network #, device No. ## is a remote keypad that has been added
#,## REM LOST	Network #, device No. ## is a remote keypad that has been removed
#### REINSTATED	Circuit number ##### reinstated
#### SHUNTED	Circuit number ##### shunted
24Hr ALARM #####	24hr alarm from circuit number #####
ABORT ON WARDS:-	Alarm aborted on wards:- A - P
ABORTED ERRORS	Remote service errors
ACCESS ####	Access passcode #### entered
ACCESS FAILED	Access failed due to code lock in operation
ALARM #####	Alarm from circuit number #####
ALARM WARDS:-	Alarm in wards:- A - P
AUTOSET # OFF	Autoset timer 1-3 off
AUTOSET # ON	Autoset timer 1-3 on
AUXILIARY #####	Auxiliary alarm from circuit number #####
AUXILIARY # TAMP	Auxiliary 1 or 2 in tamper alarm
AUXILIARY FUSE	Auxiliary fuse failed
BATTERY FAULT	Battery disconnected or voltage level below 9.5V
BATTERY RESTORE	Battery restored to healthy condition
BEAM PAIR #####	First activation of a beam pair circuit number #####
BELL BOX TAMPER	External sounder/bell tamper
BELL TESTED:-	Bell tested for wards:- A -P
BELLS ACTIVE:-	Bell active for wards:- A - P

User Menu 3**Circuit Text Library (Cont.)**

108	Panic	130	Purchasing	152	Stairwell
109	Partition	131	Reception	153	Station
110	Passive	132	Refectory	154	Store room
111	Patio	133	Research	155	Stores
112	Penthouse	134	Restaurant	156	Surgery
113	Perimeter	135	Roller	157	Swimming pool
114	Personal	136	Room	158	Technical
115	Personnel	137	Safe	159	Technician
116	Physics lab	138	Sales door	160	Theatre
117	Passive in	139	Sales office	161	Toilet
118	PIR in	140	Sales PIR	162	Transport
119	Plumbers	141	Secretaries	163	Ultrasonic
120	Porch	142	Secretary	164	Upstairs PIR
121	Power	143	Security	165	Upstairs Window
122	Power supply	144	Sensor	166	Ventilator
123	Pressure	145	Service door	167	Warehouse
124	Processing lab	146	Service PIR	168	Window
125	Production	147	Showroom	169	Woodwork shop
126	PSU Battery Fail	148	Shutter	170	Workshop door
127	PSU Fuse Blown	149	Side	171	Workshop PIR
128	PSU Mains Fall	150	Sliding	172	Workshop Window
129	Public	151	Squash court	173	X-Ray department

User Menu 3**Circuit Text Library**

000	Above	036	Cafe	072	History
001	Access	037	Canteen door	073	House
002	Accountant	038	Canteen PIR	074	Industrial
003	Accounts	039	Cashier	075	Information
004	Admin office	040	Ceiling	076	Infra-red
005	Animal	041	Cellar	077	Interior
006	Annexe	042	Changing	078	Isolation
007	Arch	043	Chemistry lab	079	Junior
008	Area	044	Church	080	Kitchen PIR
009	Assembly	045	Classroom	081	Kitchen window
010	Assistant	046	Cleaners	082	Landing PIR
011	Attack	047	Collection	083	Landing window
012	Attic	048	Communicator	084	Laundry
013	Automatic	049	Computer	085	Lavatory
014	Auxiliary	050	Computer room	086	Library
015	Back	051	Conservatory	087	Loading bay door
016	Baggage	052	Contact	088	Loading bay PIR
017	Bakery	053	Dark-room	089	Lobby
018	Balcony	054	Detector	090	Lounge
019	Ballroom	055	Dining room PIR	091	Lounge PIR
020	Bank	056	Director	092	Lounge window
021	Banking	057	Dispatch	093	Magnetic
022	Bar	058	Door	094	Managers
023	Barn	059	Double doors	095	Master
024	Basement	060	Entrance	096	Medical
025	Bathroom	061	Factory floor	097	Mezzanine
026	Bay	062	Fire door	098	Microwave
027	Beam	063	Floor	099	Middle
028	Bedroom	064	Front	100	Monitor
029	Bedroom PIR	065	Garage	101	Movement
030	Bell	066	Geography	102	Nursery
031	Biology Lab	067	Grocery	103	North
032	Board room	068	Ground	104	Office
033	Bottom	069	Guard	105	Outside
034	Break glass	070	Hall PIR	106	P.A. Button
035	Cabinet	071	Heater	107	Panel

User Menu 2**Log Event Codes (Cont.)**

Event	Description
CALL ABORTED	Remote service call aborted
CALLED No. #	Remote service call initiated via panel to remote PC 1, 2 or 3
CALLING BACK No. #	Remote service call requested via PC to "Call back No" 1, 2 or 3
CCT TESTED #####	Circuit number ##### tested during walk test routine
CCTS REINSTATED	Circuits reinstated with a shunt code
CIRCUITS SHUNTED	Circuits shunted with a shunt code
CODE LOCK # OFF	Code lock number # is off
CODE LOCK # ON	Code lock number # is on
CODE LOCKED ####	User number #### attempted to use their passcode whilst locked-out
COMMS FAILED	Plug-on digicom failed to communicate with ARC
COMMS SUCCESSFUL	Plug-on digicom communicated successfully with the ARC
DATE CHANGED	System date changed
DEFAULT USER ####	User 001 defaulted to 5678 or user 000 (engineer) defaulted to 1234
DEFERRED SET:-	Deferred set on wards:- A - P
DIGI-COM FITTED	Plug-on digicom fitted
DIGI/MODEM LOST	Plug-on digicom or modem removed
DIGI/MODEM RESET	Plug-on digicom or modem reset
DURESS CODE ####	Duress alarm from user number ####
ENGINEER ARRIVES	Engineer is logged on the system
ENGINEER DEPARTS	Engineer is logged off the system
ENTRY #####	Entry mode started from circuit number #####
ENTRY TIME-OUT:-	Entry mode timed out for wards:- A - P
EXIT CANCELLED:-	Exit mode cancelled for wards:- A - P
EXIT STARTED:-	Exit mode started for wards:- A - P
FACTORY RESTART	Factory default loaded
FIRE ALARM #####	Fire alarm from circuit number #####
FIRST KNOCK #####	First activation of circuit number ##### (circuit with Double-Knock attribute)
Hi Security SET:	Wards A - P set using "High Security" feature
LEC #,## TAMPER	Network #, LEC number ## lid tamper alarm
LINE RESTORE	Telephone line restored to healthy
MAINS POWER OFF	Mains power removed from control panel
MAINS POWER ON	Mains power applied to control panel
MENU TIMEOUT ####	User number #### entered their passcode and did not selected any functions
MODEM FITTED	Plug-on digi-modem fitted

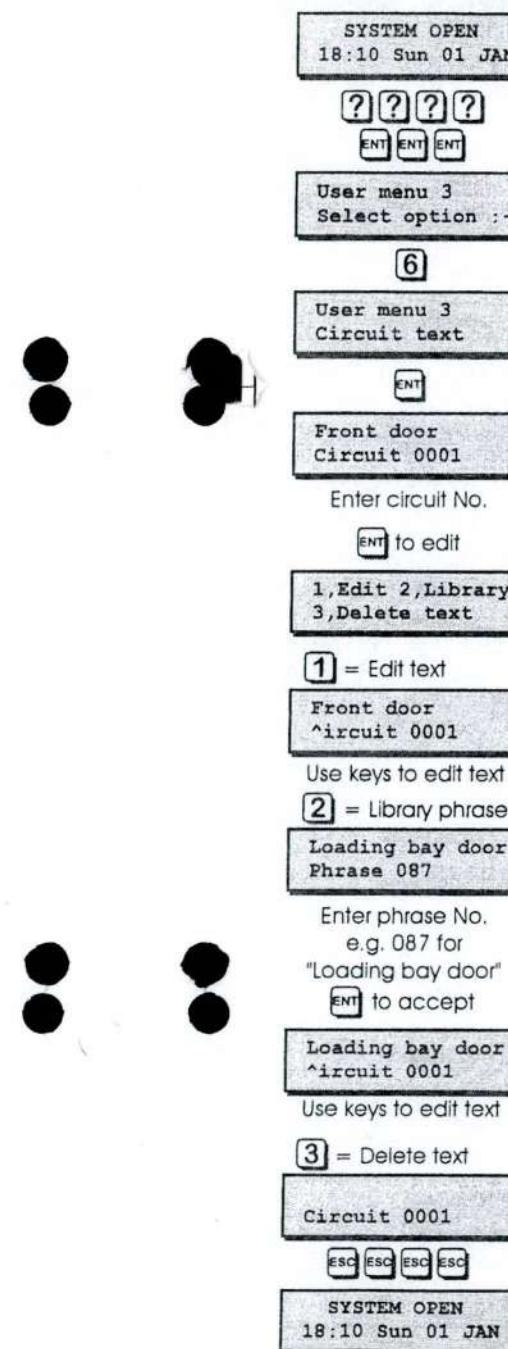
User Menu 2

Log Event Codes (Cont.)

Event	Description
MODEM LOCK-OUT	Modem locked-out (four failed attempts made using Lineload software)
NODE ### R# ADD	Remote keypad added to XNode
NODE ### R# LOST	Remote keypad removed from XNode
NODE ### R# TAMP	Remote keypad lid tamper from remote on XNode
NODE #,## FUSE	TS900 Node fuse failed
NODE #,## TAMPER	TS900 Node lid tamper
NODE SHUNT #####	Circuits shunted on a Node
ON-LINE ENDED	Remote service call ended (PC and Lineload)
ON-LINE TO No.#	On-line to remote PC
ON-SITE RESTART	On-site restart
PA ALARM #####	PA alarm from circuit number #####
P.A CODE ####	PA code from user number ####
PANEL LID TAMPER	Control panel lid tamper
PASSCODE ####	User number #### entered their passcode
PAYMENT EXPIRED	System payment timer has expired
PC CONNECTED	PC connected to control panel (PCI/DCI)
PC DISCONNECTED	PC disconnected from control panel (PCI/DCI)
PHONE LINE FAULT	Telephone line fault detected
QUICK SET KEY #	Quick set key A, B or C activated
REARM ONWARDS:-	Wards A - P rearmed
REINSTATED WARDS	Wards A - P reinstated
REM #,## TAMPER	Remote keypad lid tamper
REM RESET ACTIVE	Remote reset via the REM RESET input terminal
REM RESET FAILED	Remote reset failed
REM SERVICE CALL	Remote service call in progress
RESETWARDS:-	User or engineer has reset wards:- A -P
SEC. KEY #####	Security key operated on circuit number #####
SERVICE CALL END	Remote service finished
SERVICE REQUIRED	System requires a service visit (Service Timer expired)
SET FAIL WARDS:-	Set fail for wards:- A - P
SET NO ACTIVITY	System was set with inactive circuits (circuits with the activity attribute)
SETWARDS:-	Wards set:- A - P
SET WITH L.FLT:-	Wards A - P set with a line fault present
SETTING DEFERRED	Setting deferred
SHUNT CODE ####	Shunt code number #### enter their passcode

User Menu 3

Circuit text



This option allows you to assign up to 16 characters of text to each detection circuit. When programming circuit text you can use phrases from the library or create your own phrases, or use a combination of both.

- At the remote keypad enter your passcode then press [ENT] three times to select user menu 3.
- Press [6] followed by [ENT] to select the circuit text option.
- The display will show the circuit 0001 and its current text. Enter the required circuit number or press [A] and [C] to scroll up and down through the circuits.
- When the display shows the required circuit press [ENT] to edit.
- You will be prompted to press [1], [2] or [3].
 - Press [1] to edit the selected text and use the keys to enter/edit text.
 - Press [2] to select a phrase from the library. Enter the phrase number (see tables over).
 - Press [3] to delete the selected text.
- When the display shows the required text press [ENT] to accept.
- Repeat steps 3 - 6 for other users or press [ESC] four times to return the system to its original state.

User Menu 3

Part set text

SYSTEM OPEN
18:10 Sun 01 JAN

?? ?
ENT ENT ENT

User menu 3
Select option :-

5

User menu 3
Part set text

ENT

PART SET GROUP 0

Enter group No.

ENT to edit

PART SET GROUP 0

Use keys to enter/edit text

SALES
PART^SET GROUP 0

e.g. to enter the word
"SALES" press:

"S" = 5CC then 9

"A" = 1 then 9

"L" = 3AAA then 9

"E" = 2 then 9

"S" = 5CC

ENT to accept

ESC ESC ESC ESC

SYSTEM OPEN
18:10 Sun 01 JAN

This option allows you to assign 16 characters of text to each of the part set groups. When selecting the part set options during setting, the top line of the display will show the text and the bottom line will show the wards assigned to the part set group.

- At the remote keypad enter your passcode then press [ENT] three times to select user menu 3.
- Press [5] followed by [ENT] to select the part set text option.
- The display will show "PART SET GROUP 0" and its text. Enter the required part set group or press [A] and [C] to scroll up and down through the part set groups.
- When the display shows the required part set group press [ENT] to edit the text.
- Use the keys to enter/edit text, see page 53 for details on text edit keys.
- When the display shows the required text press [ENT] to accept.
- Repeat steps 3 - 6 for other part set groups or press [ESC] four times to return the system to its original state.

User Menu 2

Log Event Codes (Cont.)

Event	Description
SHUNT KEY #####	Shunt key circuit ##### operated
SYSTEM RELEARN	A system relearn has been performed
T.SWITCH # OFF	Time switch number # off
T.SWITCH # ON	Time switch number # on
TAMPER #####	Tamper alarm from circuit number #####
TEST FAIL #####	Circuit number ##### failed whilst on test
TEST TOTAL #####	Total number of circuit tested during walk test
TIME CHANGED	System time changed
UNSETWARDS:-	Wards:- A - P unset
USER #### DELETED	User number #### deleted
WALK TESTED:-	Wards:- A - P walk tested
WARD KEY #####	Ward key circuit ##### operated
WARDS LOCKED:-	Wards:- A - P locked via security key circuit
WARDS UNLOCKED:-	Wards:- A - P unlocked via security key circuit
XNODE #,## FUSE	XNode fuse failed
XNODE #,## TAMP	XNode lid tamper

User Menu 2

Remote Service Options

If your alarm system has been fitted with a modem, the alarm company can dial into the system and remotely read and write data from the control panel. For added security your alarm system can be programmed so that a user has to authorise any write commands. When the "Remote service call" option is set to "ENABLED" the alarm company can dial into the system at any time and read and write data from the control panel. When the "Remote service call" option is set to "DISABLED" the alarm company can still dial into the system at any time but can only read data from the control panel. Once a user has enabled the "Remote service call" option the system will automatically revert it to disabled at 3:00 am. If your alarm company has programmed the system such that remote servicing is enabled at all times the display will show "ENG. ENABLED" when selecting this menu option.

SYSTEM OPEN
18:10 Sun 01 JAN

ENT ENT

User menu 2
Select option :-

0

User menu 2
Rem service opt.

ENT

Rem service call
is ENABLED

B

to alternate between
ENABLED & DISABLED

ENT

User menu 2
Select option :-

ESC ESC

SYSTEM OPEN
18:10 Sun 01 JAN

User Menu 3

Edit User Names

This option allows you to assign a name to each user. When using the view system log option you can press the [B] key to alternate between displaying the user number or user name.

- At the remote keypad enter your passcode then press [ENT] three times to select user menu 3.
- Press [4] followed by [ENT] to select the edit user names option.
- The display will show the user 001 and their current name. Enter the required user number or press [A] and [C] to scroll up and down through the users.
- When the display shows the required user press [ENT] to edit text.
- Use the keys to enter/edit text, see page 53 for details on text edit keys.
- When the display shows the required text press [ENT] to accept.
- Repeat steps 3 - 6 for other users or press [ESC] four times to return the system to its original state.

SYSTEM OPEN
18:10 Sun 01 JAN

ENT ENT ENT ENT

User menu 3
Select option :-

4

User menu 3
Edit User Names

ENT

User 001

Enter user No.

ENT to edit

ser 001

Use keys to enter/edit
text, e.g. to enter
the name "Ian"

I
User 001

Press [3] to select "I"
then [9] to cursor right

IA
Us^r 001

Press [1] to select "A"
then [9] to cursor right

IAN
Us^r 001

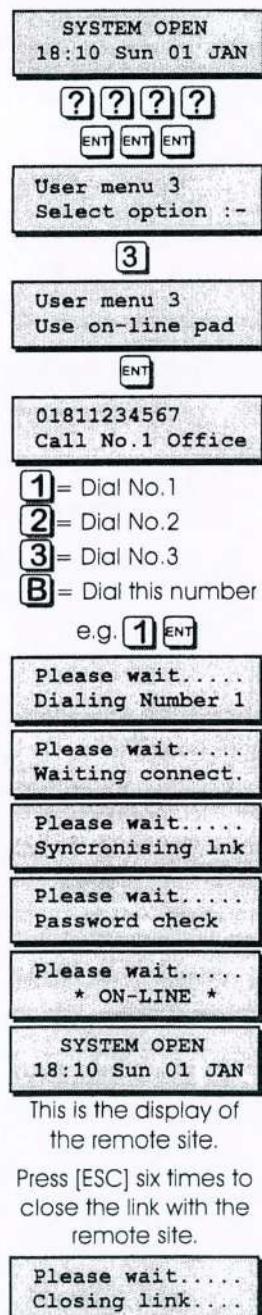
Press [4] to select "O"
then [C] to go down
through the alphabet.

ENT to accept

ESC ESC ESC ESC

SYSTEM OPEN
18:10 Sun 01 JAN

User Menu 3



Use On-line Pad

If your alarm system has been fitted with a modem, you can use this option to connect to another TS2500 alarm system (providing the system also has a modem fitted). Once a connection has been established your own remote keypad will behave as if it were connected to the remote site. For example you could use this option to connect to another TS2500 alarm system and once on-line you can use your own keypad to set the remote system.

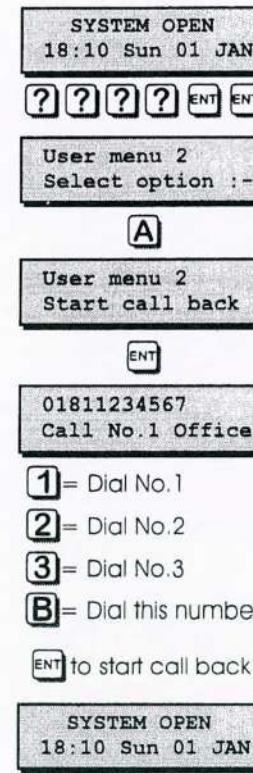
1. At the remote keypad enter your passcode then press [ENT] three times to select user menu 3.
2. Press [3] followed by [ENT] to select the use on-line pad option.
3. Pressing [1] - [3] will display the remote site(s) telephone number(s). If the number is not listed, press [B] and enter the telephone number required.
4. When the display shows the required telephone number press [ENT] to start.
5. The system will attempt to connect to the remote site. Once connected the display will show the display of the remote site. You can use your keypad to control the remote site, e.g. if you enter a valid passcode for the remote site you can set/unset the remote site.
6. To abandon on-line keypad mode press [ESC] six times. The display will show "User menu 3". Press [ESC] three times to return the system to its original state.

User Menu 2

Initiate Remote Service Call

If your alarm system is fitted with a modem, it is possible for an authorised user to initiate an upload sequence to a remote site (normally the alarm company or central station). Once the communication link is established, the remote site can read and write data from the control panel. This feature is only compatible with Menvier Lineload software version 2.1 or above.

Only select this option when requested by your alarm company. If this option is selected without authorisation from the alarm company the modem may not connect with the remote site.

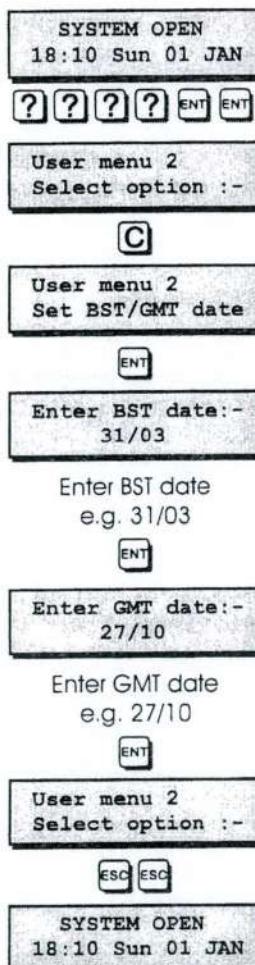


1. At the remote keypad enter your passcode then press [ENT] twice to select user menu 2.
2. Press [A] followed by [ENT] to select the start call back option.
3. Pressing [1] - [3] will display the remote site(s) telephone number(s). You will be advised by your alarm company as to which number to select. If the number is not listed, press [B] and enter the telephone number required.
4. When the display shows the required telephone number press [ENT] to start the call back sequence.
5. The system will automatically return to its original state.

User Menu 2

Set BST/GMT Dates

This option allows you to specify the dates at which British Summer Time (BST) starts and ends. The system will then add one hour to the system time at 2:00 am on the BST date and subtract one hour at 2:00 am on the Greenwich Mean Time (GMT) date. These dates are set by the government and do vary from year to year. The dates can be found in most good diaries.

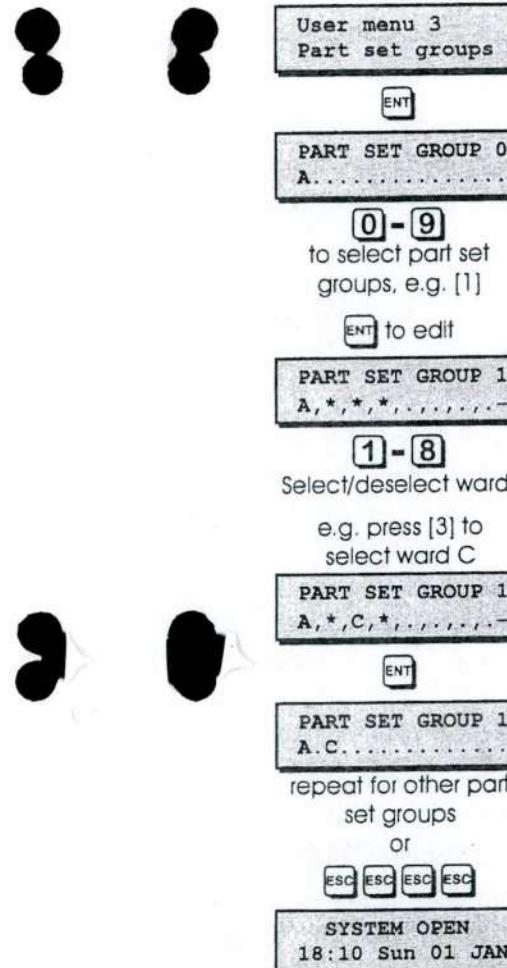


1. At the remote keypad enter your passcode then press [ENT] twice to select user menu 2.
2. Press [C] followed by [ENT] to select the set BST/GMT date option.
3. The display will prompt you to enter the BST date. Enter the date in a date/month format, e.g. 31/03 for the 31 March.
4. When the display shows the required BST date press [ENT] to accept.
5. The display will prompt you to enter the GMT date. Enter the date in a date/month format, e.g. 27/10 for the 27 October.
6. When the display shows the required GMT date press [ENT] to accept.
7. Press [ESC] twice to return the system to its original state.

User Menu 3

Part Set Groups

This option allows you to configure up to 10 part set groups and each group can be programmed so that it sets any combination of wards. For example "PART SET GROUP 1" could be allocated wards A and C, whereas "PART SET GROUP 2" could be allocated wards A and B.



1. At the remote keypad enter your passcode then press [ENT] three times to select user menu 3.
2. Press [2] followed by [ENT] to select the part set groups option.
3. The display will show "PART SET GROUP 0" and the current ward configuration.
4. Press [1] - [9] or [0] to select part set groups 1 - 9 or 10.
5. When the display shows the required part set group, press [ENT] to edit.
6. Press [1] - [8] to select or deselect wards. Press [A] and [C] to alternate between wards A - H and I - P. Press [B] to select/deselect all wards.
7. When the display shows the required wards, press [ENT] to accept.
8. Repeat steps 4 - 7 for the other part set groups.
9. Press [ESC] four times to return the system to its original state.

User Menu 3

Time Switches (Cont.)

Programming the days of operation

To program the days of operation for the first, second and third on/off timers, proceed as follows:

1. Ensure that the required time switch is selected.
2. Press [7] for the first timer, [8] for the second timer and [9] for the third timer.
3. The display will show the current days of operation. Enter the required days of operation by pressing [1] - [7] to select or deselect the days of the week, e.g. press [1] to select Sunday.
4. When the display shows the required days of operation press [ENT] to accept.

Manually overriding the timer

Each time switch can be manually switched on or off as follows:

1. Ensure that the required time switch is selected.
2. Press [0], the display will show the current state of the selected time switch.
3. Press [B] to alternate between ON and OFF.
4. When the display shows the required days of operation press [ENT] to accept.

User Menu 3

Introduction

User menu 3 is accessed by pressing the [ENT] key whilst user menu 2 is selected. There are 7 menu options and access to these options will depend on your access level.

Each option has a "hot-key" which allows you to select the required option by pressing the relevant hot-key number, e.g. the "Part set text" option is assigned to key [5], so to select this option press [5] followed by [ENT].

Alternatively you can use the [A] & [C] keys to scroll forwards and backwards through the available options. As you press the [A] & [C] keys the bottom line of the display will show the selected menu option. When you have found the required option press the [ENT] key to perform the option.

To leave user menu 3 and return to user menu 2 simply keep pressing the [ESC] key until the display shows "User menu 2".

Menu options 7, 8 and 9 are only available to the alarm company engineer.

User menu 2
Select option :-

[ENT]

User menu 3
Select option :-

[A] = Forwards
[C] = Backwards

1 User menu 3
Time switches

2 User menu 3
Part set groups

3 User menu 3
Use on-line pad

4 User menu 3
Edit Users Names

5 User menu 3
Part set text

6 User menu 3
Circuit text

0 User menu 3
Activity count

Time switch 1
Select option :-

[7] = Operation of 1st

[8] = Operation of 2nd

[9] = Operation of 3rd

1 Operates on :-
> Su.....

Enter days by pressing
[1] to [7]
e.g. press 1 to select

Sunday

[ENT]

Time switch 1
Select option :-

0

Time switch 1
> output is OFF

B

to alternate between
ON and OFF

[ENT]

Time switch 1
Select option :-

The TS2500 alarm system has three programmable time switches. Each time switch can be programmed with up to three separate on/off times and made to operate on any day of the week. The time switches can be assigned to outputs which in turn can be used to control internal or external lighting (or similar).

Selecting time switches

When you select the time switch option from user menu 3, "Time switch 1" is automatically selected. To select other time switches proceed as follows:

1. At the remote keypad enter your passcode then press [ENT] three times to select user menu 3.
2. Press [1] followed by [ENT] to select the time switch options.
3. The display will show "Time switch 1" is selected.
4. Press [A] to select "Time switch 1", [B] to select "Time switch 2" and [C] to select "Time switch 3".
5. When the required time switch is selected you may now configure it as desired.

SYSTEM OPEN
18:10 Sun 01 JAN

[?] [?] [?] [?]
ENT ENT ENT

User menu 3
Select option :-

1

User menu 2
Time switches

ENT

Time switch 1
Select option :-

A = Time switch 1
B = Time switch 2
C = Time switch 3

Programming the on-times

To program the first, second and third on-times proceed as follows:

1. Ensure that the required time switch is selected.
2. Press [1] for the first on-time, [2] for the second on-time and [3] for the third on-time.
3. The display will show the current on-time setting. Enter the required time in a 24hr format, e.g. 21:00 for 9:00 pm.
4. When the display shows the required time press [ENT] to accept.

Time switch 1
Select option :-

- 1** = On-time 1
2 = On-time 2
3 = On-time 3

Time switch 1
On-time 1 21:00

Enter On-time
e.g. 21:00

ENT

Time switch 1
Select option :-

Time switch 1
Select option :-

- 4** = Off-time 1
5 = Off-time 2
6 = Off-time 3

Time switch 1
Off-time 1 23:00

Enter Off-time
e.g. 23:00

ENT

Time switch 1
Select option :-

Programming the off-times

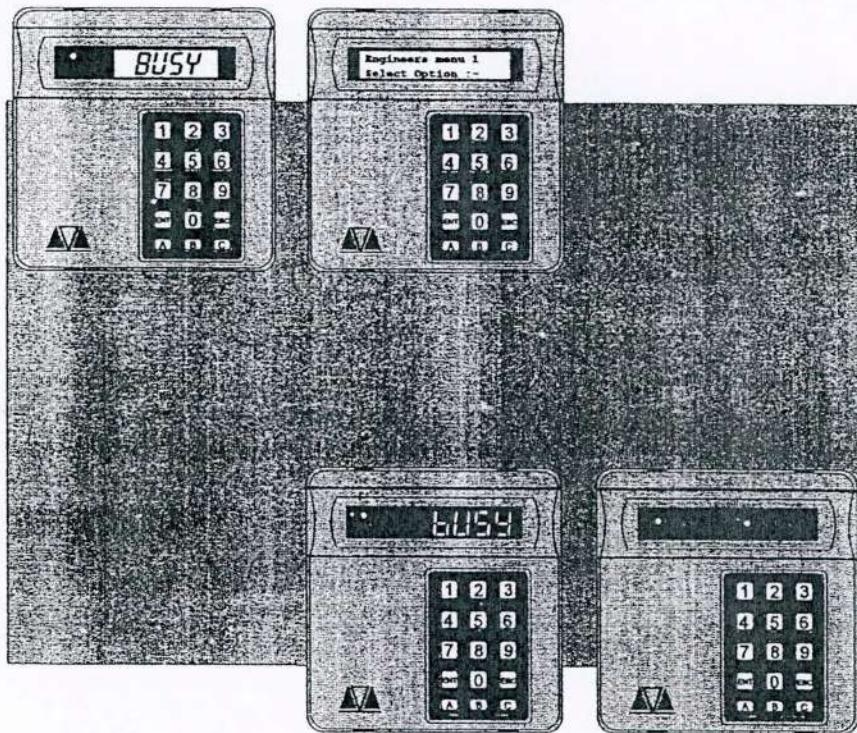
To program the first, second and third off-times proceed as follows:

1. Ensure that the required time switch is selected.
2. Press [4] for the first off-time, [5] for the second off-time and [6] for the third off-time.
3. The display will show the current off-time setting. Enter the required time in a 24hr format, e.g. 23:00 for 11:00 pm.
4. When the display shows the required time press [ENT] to accept.



TS2500

1040 Zone Intruder Alarm Control System



Installation & Programming
Manual

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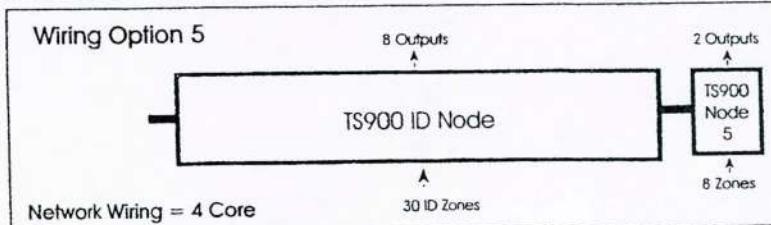
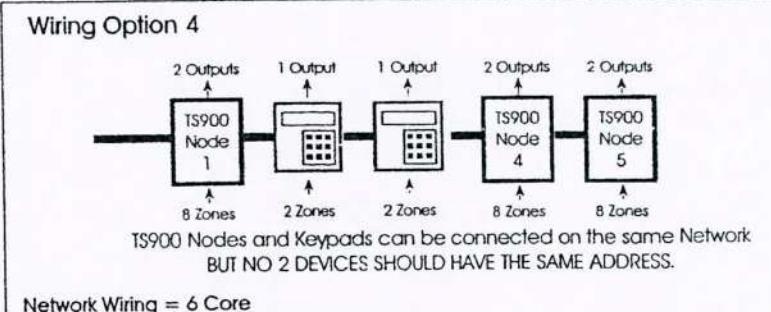
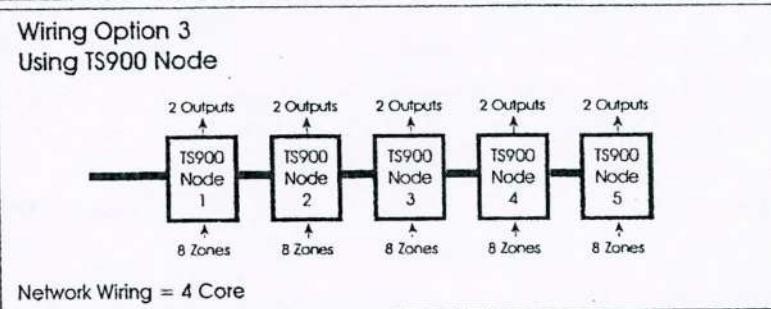
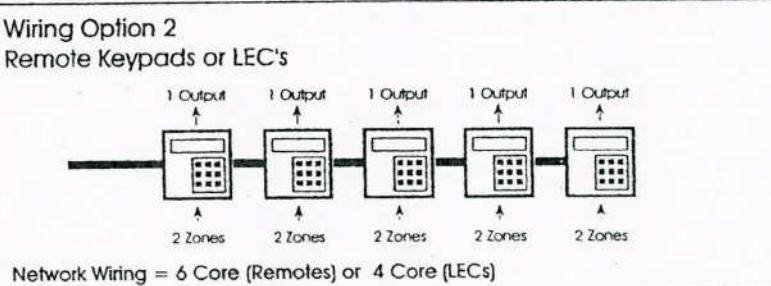
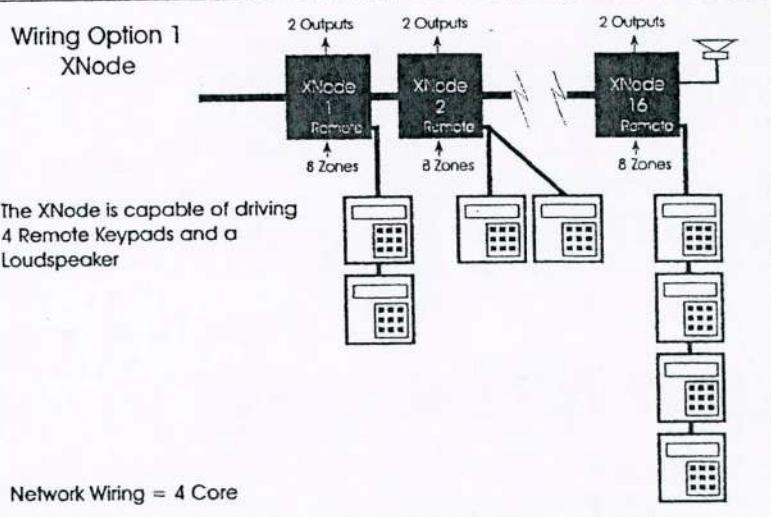
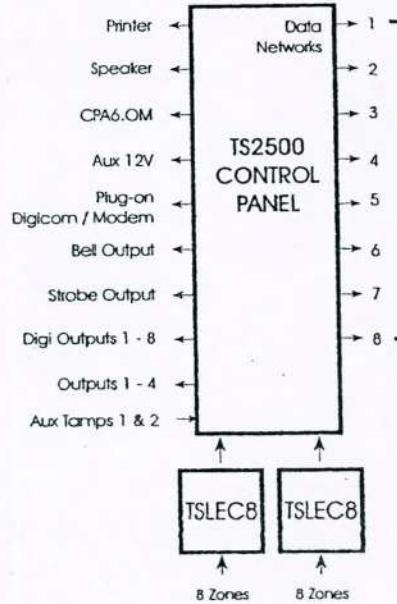
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System Overview

System Architecture



Introduction

The TS2500 intruder alarm control system has been designed to suit medium to large installation sites. The TS2500 system can be expanded up to 1040 zones. The system is capable of "up" and "down" line loading, allowing remote programming and interrogation via the telephone line and a P.C.

Complex site requirements such as multi-ward setting can be achieved, as the system is capable of being broken down into 16 separately controlled areas (Wards) so that the premises or parts of the premises can be controlled independently.

The TS2500 system is a true multi-tasking system, which allows up to maximum of eight users operating the system simultaneously.

Control Panel

The control panel is the controlling unit for the system, it has a power supply and connections for a standby battery. It has the following facilities:

- 8 networks for connecting remote keypads and Nodes
- Connections for two 8 zone local expansion cards (TSLEC8)
- Two auxiliary tamper zones
- Bell and strobe outputs
- 4 programmable outputs (1 x Voltage free contacts and 3 high current transistorised)
- 8 programmable digicom/RedCARE outputs
- A connector for a Menvier plug-on digicom or digi-modem
- A connector for a printer via the MPA or DCI printer adaptor
- A connector for mimic modules (CPA6.0M)
- Extension loudspeaker output
- All system program information and the 4000 event log is stored in two removable non-volatile memory (NVM) devices

Remote Keypads

Up to 5 remote keypads can be connected when directly wired to the network. The XNode also provides the facility to connect up to 4 remote keypads giving a system total of 512 remote keypads. Each remote keypad has two detection circuits and a single switched -ve output. The four types are:

32 Character LCD (TS900.REM)

The TS900 remote keypad has a back-lit 32 character super-twist Liquid Crystal Display (LCD) and a back-lit tactile rubber keypad. All system programming must be carried out from a TS900 remote keypad.

8 Character Starburst (TS790.STAR)

The TS790 remote keypad has a back-lit 8 character starburst display (LCD) and a back-lit tactile rubber keypad. This type of remote keypad is limited to setting and unsetting only, and cannot be used to program the system.

 The display will always show the system time.

4 Character LED (TS700.REM)

The TS700 remote keypad has a 4 character 7-segment LED display and back-lit tactile rubber keypad. This type of remote keypad is limited to setting and unsetting, and cannot be used to program the system.

 The display will always show the system time.

Remote Arming Station (TS700.ARM)

The Remote Arming Station only allows setting and unsetting of the system. The unit has two indicator LED's, the "Power LED" and a programmable "Function LED" (the "Function LED" may be programmed as "Fault" or "Area Set" etc.).

Expansion Devices

There are several options for expanding the system:

TS700 LEC

The Local Expansion Card (LEC) provides two programmable detection circuits and one programmable switched -ve output. Up to 5 TS700 LECs can be connected on any one network.

TS900 Node

The TS900 Node provides eight programmable detection circuits and two programmable outputs (one switched +ve and one switched -ve). Up to 5 TS900 Nodes can be connected on any one network.

XNode

The XNode provides eight programmable detection circuits, two programmable outputs (one switched +ve and one switched -ve) and a loudspeaker output for driving a 16 Ohm loudspeaker. Each XNode can also drive up to 4 remote keypads. Up to 16 XNodes can be connected on any one network.

TSLEC8

The TSLEC8 Local Expansion Card (LEC) is designed to be fitted inside the control panel it provides 8 programmable detection circuits. The control panel will accept two TSLEC8s.

TS900 ID Node

The TS900 ID Node can be used as an alternative to the standard TS900 Node. It provides a single ID Detector Loop for connection to 30 ID devices and 8 programmable outputs. Several configuration options allow it to be used on its own or with existing TS900 Nodes.

Other Devices

Printer

A DATAC printer or any standard RS232 printer can be connected to the control panel to obtain system and log print-outs.

CPA6.OM Output Module

Each output module provides eight switched -ve outputs, the output modules can be daisy-chained together to provide multiples of eight outputs. The outputs can be used to indicate ward status information and/or circuit alarm/mimic indications.

DC54/58/58M Digicom and Digi-modem

A 4-channel DC54 or 8-channel DC58 digital communicator can be plugged onto the control panel to allow alarm status information to be transferred to a dedicated Alarm Receiving Centre. The 8 channel DC58M digi-modem can be plugged onto the control panel, which functions as a digital communicator and V21 modem. The modem facility is required when using the up/down loading feature.

TSNIB Networker Interface Board

A driver and receiver board that allows Nodes or remotes to be driven up to 3 Km.

Technical Specifications

Control Panel

Part No:	TS2500
Input Supply:	230V ±10% 50Hz
Current:	220mA (normal) 300mA (alarm) with speaker
Power Supply:	1.5A
Standby Battery:	2 x 7.0Ah or 1 x 17Ah
Zones	2 to 1040
Panel Outputs:	1 = voltage free changeover 2 = Switched -ve @500mA 3 = Switched +ve @500mA 4 = Switched +ve @500mA +ve removed Source 5mA in 12V condition Sink 100mA in 0V condition
Digi Outputs 1-8:	16 Ohms
Speaker Output:	Switched -ve @500mA
Bell Trigger:	Switched -ve @500mA
Strobe Trigger:	440(W) x 265(H) x 85(D) mm
Dimensions:	1.2mm mild steel
Material:	4.7 Kg
Weight:	-10 to 55°C
Environment:	

LCD Remote Keypad

Part No:	TS900.REM
Display:	32 character Liquid Crystal
Current:	50mA (normal) 60mA (alarm)
Zones:	2
Output:	Switched -ve @100mA
Dimensions:	130(W) x 130(H) x 30(D) mm
Material:	3mm Polycarbonate
Weight:	280g
Environment:	-10 to 55°C

Starburst Remote Keypad

Part No:	TS790.STAR
Display:	8 character Liquid Crystal
Current:	50mA (normal) 60mA (alarm)
Zones:	2
Output:	Switched -ve @100mA
Dimensions:	130(W) x 130(H) x 30(D) mm
Material:	3mm Polycarbonate
Weight:	280g
Environment:	-10 to 55°C

LED Remote Keypad

Part No:	TS700.LED
Display:	4 character seven segment
Current:	60mA (normal) 70mA (alarm)
Zones:	2
Output:	Switched -ve @100mA
Dimensions:	130(W) x 130(H) x 30(D) mm
Material:	3mm Polycarbonate
Weight:	280g
Environment:	-10 to 55°C

Arming Station

Part No:	TS700.ARM
Display:	Power LED
	Programmable function LED
Current:	30mA (normal) 40mA (alarm)
Zones:	2
Output:	Switched -ve @100mA
Dimensions:	130(W) x 130(H) x 30(D) mm
Material:	3mm Polycarbonate
Weight:	280g
Environment:	-10 to 55°C

TS700 LEC

Part No:	TS700.LEC
Current:	30mA (normal) 40mA (alarm)
Zones:	2
Output:	Switched -ve @100mA
Dimensions:	142(W) x 82(H) x 36(D) mm
Material:	3mm Polycarbonate
Weight:	213g
Environment:	-10 to 55°C

TSXNode

Part No:	TSXNODE
Current:	60mA (normal) 60mA (alarm)
Zones:	8
Outputs:	A = Switched +ve @100mA B = Switched -ve @100mA
Speaker Output:	16Ohms
Dimensions:	128(W) x 182(H) x 34(D) mm
Material:	3mm Polycarbonate
Weight:	370g
Environment:	-10 to 55°C

TS900 Node

Part No:	TS900.NODE
Current:	60mA (normal) 60mA (alarm)
Zones:	8
Outputs:	A = Switched +ve @100mA B = Switched -ve @100mA
Dimensions:	128(W) x 182(H) x 34(D) mm
Material:	3mm Polycarbonate
Weight:	370g
Environment:	-10 to 55°C

TS900 ID Node

Part No:	TS900.IDNODE
Current:	80mA (with 1 device) 160mA (with 30 devices)
Zones:	30 (ID)
Outputs:	A = Switched +ve @100mA B = Switched +ve @100mA C = Switched +ve @100mA D = Switched +ve @100mA E = Switched -ve @100mA F = Switched -ve @100mA G = Switched -ve @100mA H = Switched -ve @100mA
Dimensions:	128(W) x 182(H) x 34(D) mm

Material:	3mm Polycarbonate
Weight:	370g
Environment:	-10 to 55°C

TSLEC8

Part No:	TSLEC8
Current:	20mA (normal) 20mA (alarm)
Zones:	8
Dimensions:	89(W) x 71(H) x 15(D) mm
Weight:	69g
Environment:	-10 to 55°C

System Design

System Wiring

The TS2500 system uses standard 7/0.2 un-screened alarm cable to inter-connect devices within the system. The number of cores will vary depending on the device being connected.

Cable Segregation

All cables for the alarm system should be segregated from any other cables and wiring services like mains supply cables, telephone cables, computer network cables and R.F. cables. In addition to this the network and detection circuit cables should be kept clear of cables supplying sounders or extension loudspeakers. It is also advisable to avoid running more than one network down a single multi-core cable.

Calculating Voltage Drop

In order for the system work correctly the voltage at each device must NOT drop below 10.5V even when running on the standby battery. Standard 7/0.2 alarm cable has a resistance of 8 Ohms per 100 metres per core. The voltage drop is calculated using the following formula:

$$\text{V Drop} = \text{Current drawn} \times \text{cable length} \times 0.08 \times 2$$

The table below shows the expected voltage drop against the current drawn and cable length:

Current Drawn	Cable Length (Standard 7/0.2 alarm cable)									
	10m	20m	30m	40m	50m	60m	70m	80m	90m	100m
60mA	0.10V	0.19V	0.29V	0.38V	0.48V	0.58V	0.67V	0.77V	0.86V	0.96V
80mA	0.13V	0.26V	0.38V	0.51V	0.64V	0.79V	0.90V	1.02V	1.15V	1.28V
100mA	0.16V	0.32V	0.48V	0.64V	0.80V	0.96V	1.12V	1.28V	1.44V	1.60V
120mA	0.19V	0.38V	0.58V	0.79V	0.96V	1.15V	1.34V	1.54V	1.74V	1.92V
140mA	0.22V	0.45V	0.67V	0.90V	1.12V	1.34V	1.57V	1.79V	2.02V	2.24V
160mA	0.26V	0.51V	0.77V	1.02V	1.28V	1.54V	1.79V	2.05V	2.30V	2.56V
180mA	0.29V	0.58V	0.86V	1.15V	1.44V	1.73V	2.02V	2.30V	2.59V	2.88V
200mA	0.32V	0.64V	0.96V	1.28V	1.60V	1.92V	2.24V	2.56V	2.88V	3.20V
220mA	0.35V	0.70V	1.06V	1.41V	1.76V	2.11V	2.46V	2.82V	3.17V	3.52V
240mA	0.38V	0.79V	1.15V	1.54V	1.92V	2.30V	2.69V	3.07V	3.46V	3.84V
260mA	0.42V	0.83V	1.25V	1.66V	2.08V	2.50V	2.91V	3.33V	3.74V	4.16V
280mA	0.45V	0.90V	1.34V	1.79V	2.24V	2.69V	3.14V	3.58V	4.03V	4.48V
300mA	0.48V	0.96V	1.44V	1.92V	2.40V	2.88V	3.36V	3.84V	4.32V	4.80V
320mA	0.51V	1.02V	1.55V	2.05V	2.56V	3.07V	3.58V	4.10V	4.61V	5.12V
340mA	0.54V	1.09V	1.63V	2.18V	2.72V	3.26V	3.81V	4.35V	4.90V	5.44V
360mA	0.58V	1.15V	1.73V	2.30V	2.88V	3.46V	4.03V	4.61V	5.18V	5.76V
380mA	0.61V	1.22V	1.82V	2.43V	3.04V	3.65V	4.26V	4.86V	5.47V	6.08V
400mA	0.64V	1.28V	1.92V	2.56V	3.20V	3.84V	4.48V	5.12V	5.76V	6.40V
420mA	0.67V	1.34V	2.02V	2.69V	3.36V	4.03V	4.70V	5.38V	6.05V	6.72V
440mA	0.70V	1.41V	2.11V	2.82V	3.52V	4.22V	4.93V	5.63V	6.34V	7.04V
460mA	0.74V	1.47V	2.21V	2.94V	3.68V	4.42V	5.15V	5.89V	6.62V	7.36V
480mA	0.79V	1.54V	2.30V	3.07V	3.84V	4.61V	5.38V	6.14V	6.91V	7.68V
500mA	0.80V	1.60V	2.40V	3.20V	4.00V	4.80V	5.60V	6.40V	7.20V	8.00V
520mA	0.83V	1.66V	2.50V	3.33V	4.16V	4.99V	5.82V	6.66V	7.49V	8.32V
540mA	0.86V	1.73V	2.59V	3.46V	4.32V	5.18V	6.05V	6.92V	7.78V	8.64V
560mA	0.90V	1.79V	2.69V	3.58V	4.48V	5.38V	6.27V	7.17V	8.06V	8.96V
580mA	0.93V	1.86V	2.78V	3.71V	4.64V	5.57V	6.50V	7.42V	8.35V	9.28V
600mA	0.96V	1.92V	2.88V	3.84V	4.80V	5.76V	6.72V	7.68V	8.64V	9.60V

Voltage Drop Table

Voltage Drop Example 1

Example 1 in the figure below shows two Nodes connected to the control panel, the first Node is 20 metres from the panel and has 120mA being taken from its auxiliary supply to power detectors. The second Node is 20 metres from the first and also has 120mA being taken from its auxiliary supply to power detectors.

The voltage at each Node is calculated as follows:

1. The total current being drawn at the first Node = $180\text{mA} + 180\text{mA} = 360\text{mA}$.
2. Voltage drop to the first Node = $360\text{mA} @ 20\text{m} = 1.15\text{V}$ (see table).
3. Voltage at first Node = control panel voltage - voltage drop = $13.60 - 1.15 = 12.45\text{V}$.
4. The total current being drawn at the second Node = 180mA .
5. Voltage drop to the second Node = $180\text{mA} @ 20\text{m} = 0.58\text{V}$ (see table).
6. Voltage at second Node = first Node voltage - voltage drop = $12.45 - 0.58 = 11.87\text{V}$.

The example clearly demonstrates that the voltage levels at both Nodes is acceptable.

Voltage Drop Example 2

The second example shows what happens when a third Node is connected 20 metres from the second Node.

The voltage at each Node is calculated as follows:

1. The total current being drawn at the first Node = $180\text{mA} + 180\text{mA} + 180\text{mA} = 540\text{mA}$.
2. Voltage drop to the first Node = $540\text{mA} @ 20\text{m} = 1.73\text{V}$ (see table).
3. Voltage at first Node = control panel voltage - voltage drop = $13.60 - 1.73 = 11.87\text{V}$.
4. The total current being drawn at the second Node = $180\text{mA} + 180\text{mA} = 360\text{mA}$.
5. Voltage drop to the second Node = $360\text{mA} @ 20\text{m} = 1.15\text{V}$ (see table).
6. Voltage at second Node = first Node voltage - voltage drop = $11.87 - 1.15 = 10.77\text{V}$.
7. The total current being drawn at the third Node = 180mA .
8. Voltage drop to the third Node = $180\text{mA} @ 20\text{m} = 0.58\text{V}$ (see table 1).
9. Voltage at third Node = second Node voltage - voltage drop = $10.77 - 0.58 = 10.19\text{V}$.

The second example demonstrates that when the third Node is added to the network the current drawn at each device is increased and therefore the voltage drop at each device is increased. The voltage level at the third Node is now below the 10.5V threshold and may cause problems.

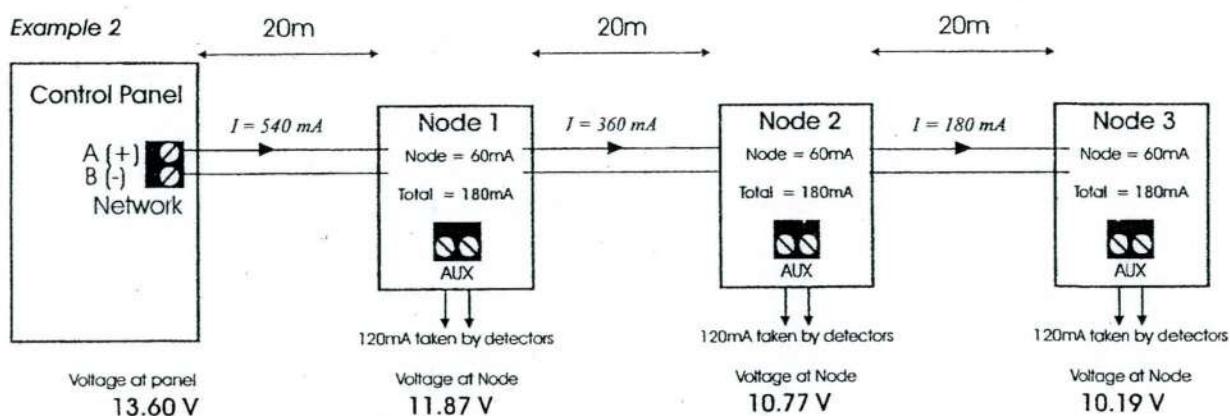
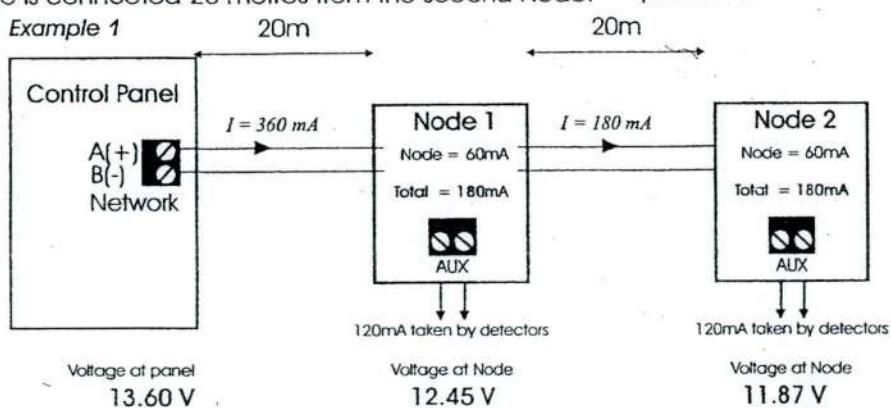


Figure 1. Voltage Drop Examples 1 & 2

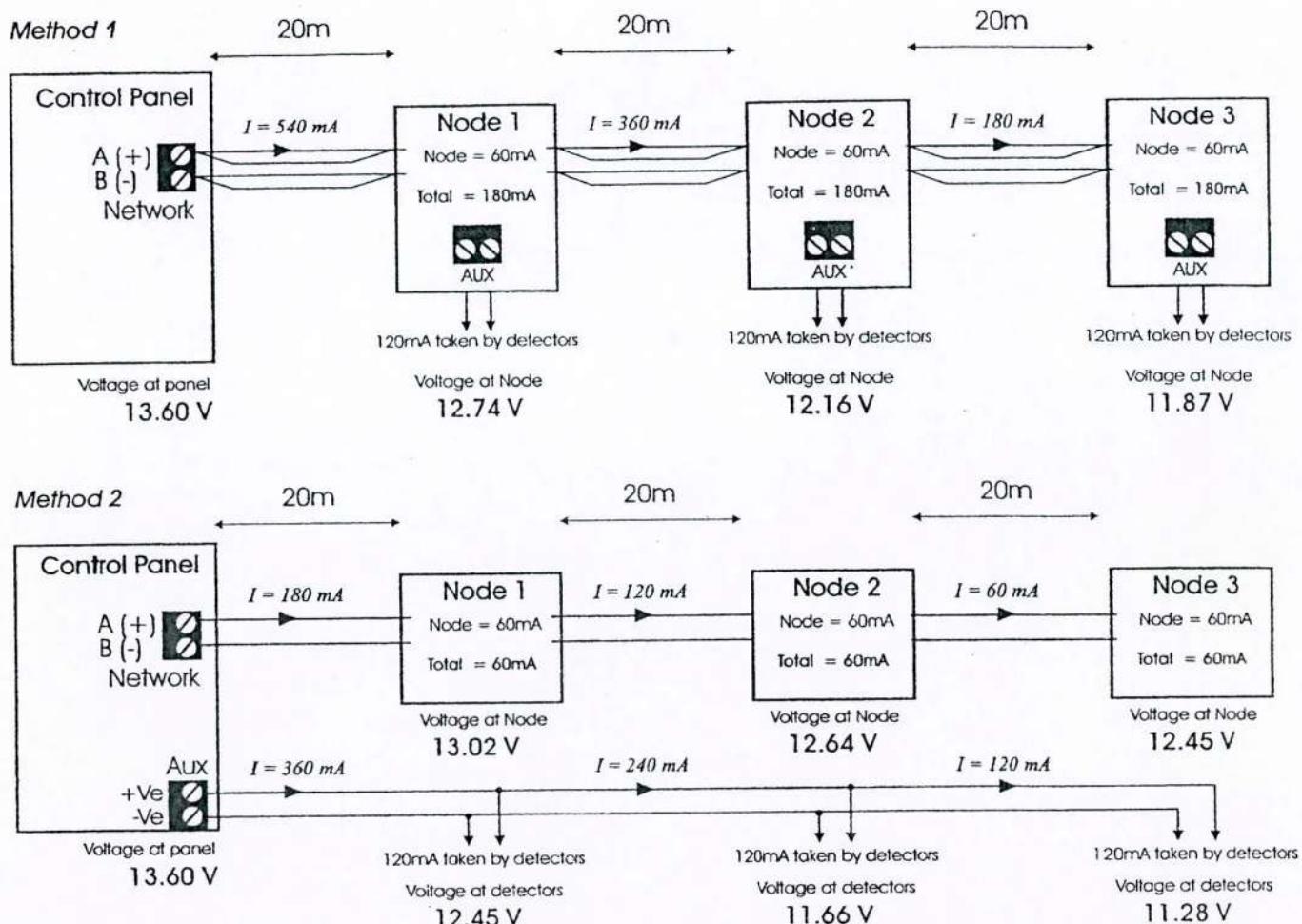


Figure 2. Reducing Voltage Drop - Methods 1 & 2

Reducing Voltage Drop - Method 1

The simplest way to reduce voltage drop is to double up the supply connections (A & B), this will half the resistance on each core, which will half the voltage drop. When using the voltage drop table to calculate the expected voltage drop, simply divide the voltage drop by two. Figure 2 above shows the same 3 Nodes used in the previous example. The A and B network connections have been doubled up, in order to do so the network cable must have 2 spare cores. This method clearly shows that voltage levels at all Nodes is at a sufficient level.

Reducing Voltage Drop - Method 2

The second way to reduce voltage drop is to supply the detection devices from separate cores. This is the preferred method of reducing voltage drop as detectors generally operate at lower voltages (9.5V). When using this method the network cable must have 2 spare cores. This method clearly shows that voltage levels at all Nodes is at a sufficient level.

Remote Power Supplies

When voltage drops cannot be overcome by using the two methods previously described or the demand on the control panel power supply is going to be exceeded (1.5A max.), one or more remote power supplies will need to be installed. It is recommended that the Menvrier 519XB is used in these instances as it can be monitored using the 519FM. When installing a remote power supply it should be installed close to the equipment it is powering.

Figure 3 shows two methods of installing a remote power supply. When connected as shown in method 1, only the last two Nodes have sufficient voltage levels. If the power supply is repositioned so that it is next to Node 3 the voltage levels at each Node is increased because the current being drawn is split into two separate paths and therefore the voltage drop in each path is reduced. Method 2 is the preferred connection method.

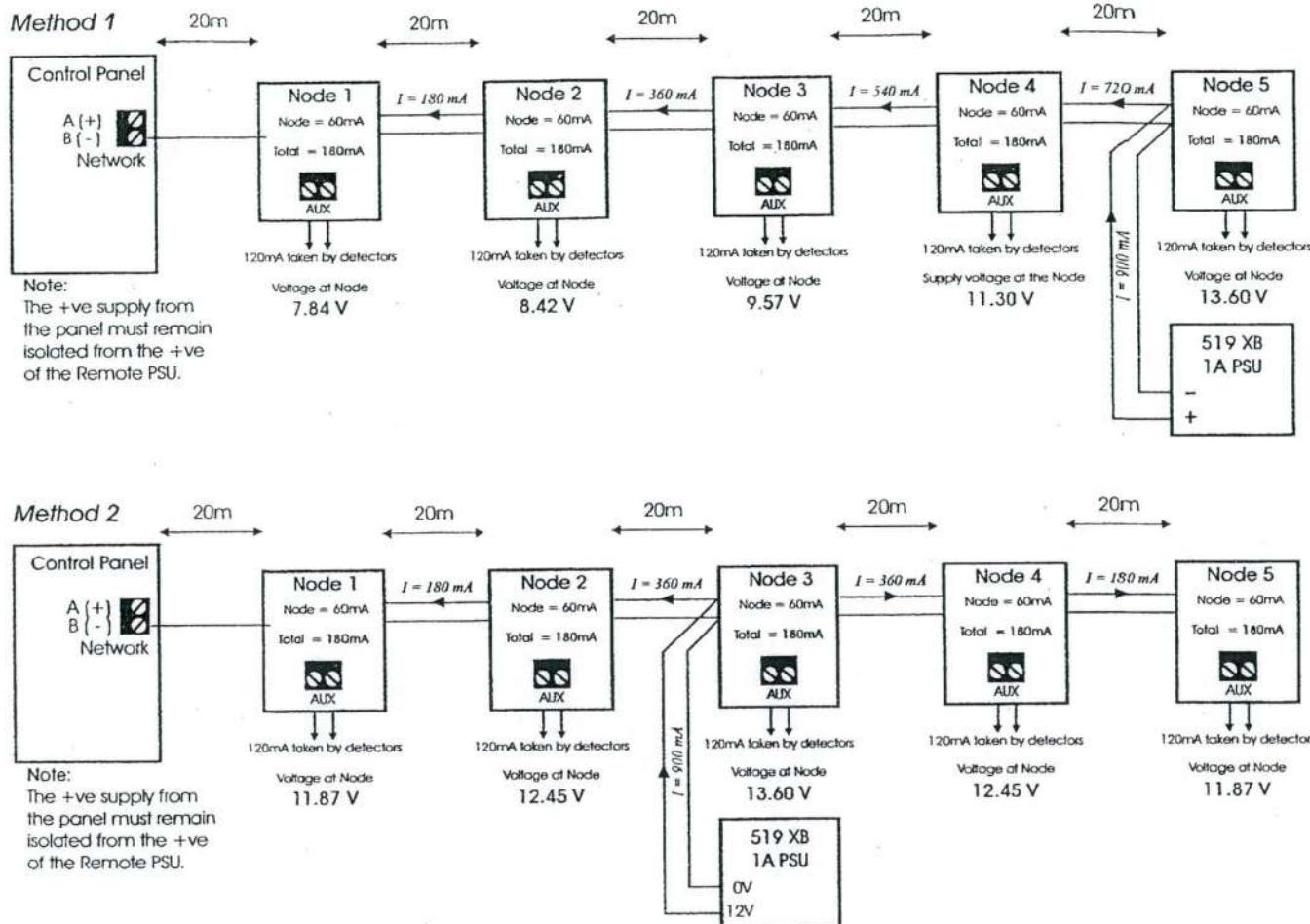


Figure 3. Connecting Remote Power Supply Units

Screened Cable

Screened cable may prove necessary if the installation site has equipment that produces high levels of R.F. (Radio Frequencies), e.g. heavy industrial plant like welding equipment etc. If screen cable is required you should adhere to the following guidelines:

1. The screen on the cable should only be connected to mains earth at the control panel.
2. The continuity of the cable screen is most important and screening MUST be continuous along the full length of the network.
3. If the network cable enters any metal enclosures, make sure the screen remains isolated from the case.

1. External cables must be connected using cable entries or knockouts provided.
2. When routing external cables inside the product they must be:
 - (a) Kept as short as possible.
 - (b) Routed close to the housing.
 - (c) Kept as far as possible from the electronics.
3. Any modifications other than those stated in this manual, or any other use of this product may cause interference and it is the responsibility of the installer to comply with the EMC and Low Voltage Directives.

XNode Wiring

The XNode requires a 4 core cable for interconnection, and up to 16 may be connected in a "daisy-chain" or "star" configuration. The distance between each XNode must not exceed 100 metres. The total distance to last XNode must not exceed 1000 metres. Power for detectors is provided by the Aux. +/- terminals.

Electromagnetic Compatibility

When used as intended this product complies with EMC Directive (89 /336 /EEC) by meeting the limits set by the standards BS4737, EN50082-1 1992 and EN50130-4 1993. The following installation guidelines must be followed.

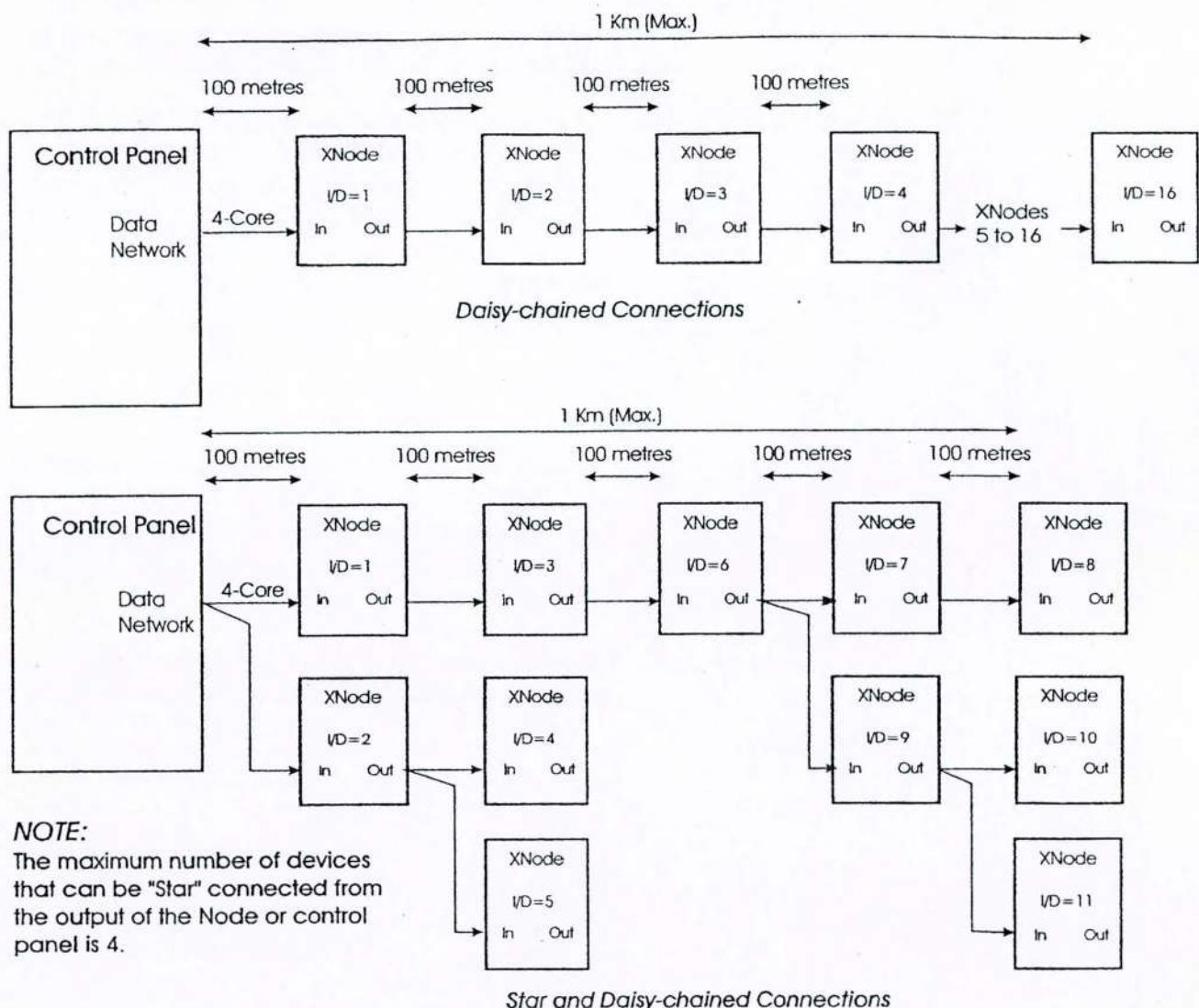


Figure 4. XNode Connection Methods

Wiring Remote keypads to an XNode

Up to four remote keypads can be connected to each XNode, they can be connected in either a "star" or "daisy-chain" configuration. The distance to the furthest remote keypad from the XNode must not exceed 100 metres. Power for detectors are provided by the A(+) and B(-) terminals.

The detection circuits in the XNode can either be mapped to the XNode or to the remote keypads by setting the 4-way "Remote Zone Enable" switch as shown in the table below:

Switch	OFF	ON
1	XNode circuits A & B enabled	Remote keypad 1 circuits A & B enabled
2	XNode circuits C & D enabled	Remote keypad 2 circuits A & B enabled
3	XNode circuits E & F enabled	Remote keypad 3 circuits A & B enabled
4	XNode circuits G & H enabled	Remote keypad 4 circuits A & B enabled

- ☞ Remote keypads cannot be multi-tasked between each other when connected to the XNode, i.e. if remote keypad 1 is in operation, remote keypads 2, 3 and 4 are locked-out and will show "SYSTEM IS BUSY PLEASE WAIT."
- ☞ The remote keypads follow the ward assignment of the XNode, i.e. if the XNode is assigned to ward A then remote keypads 1-4 connected to that XNode are also assigned to ward A.
- ☞ The loudspeaker and remote keypad sounders will follow the ward assignment of the XNode.
- ☞ The programmable output on the remote keypads are mapped as follows: Remote keypads 1 and 3 follow XNode output A and remote keypads 2 and 4 follow XNode output B.

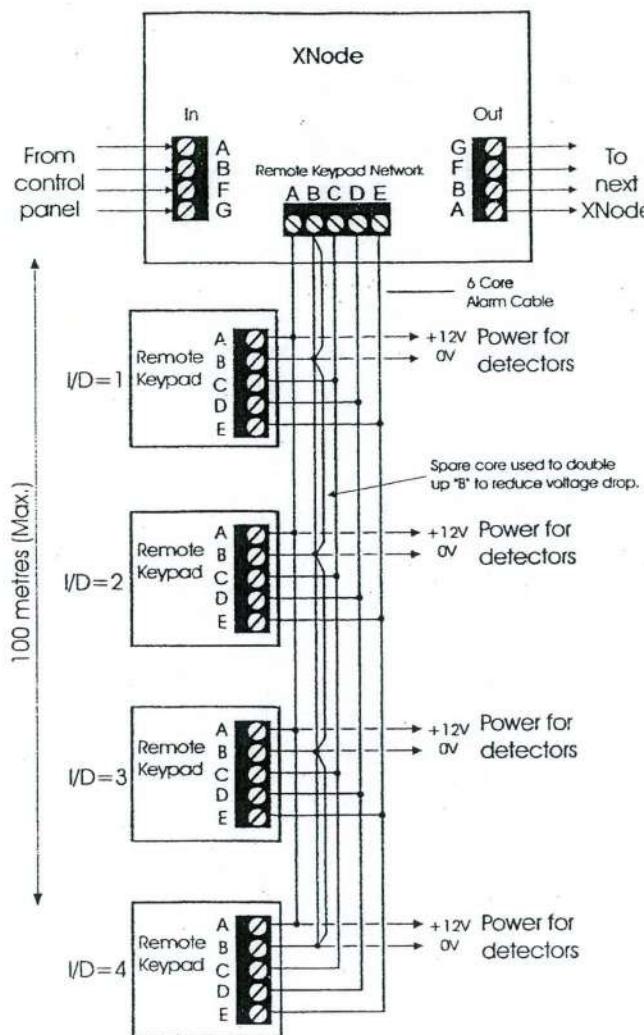


Figure 5. Wiring Remote Keypads to an XNode

Wiring a Loudspeaker to an XNode

The XNode has a set of terminals for connecting up to two 16Ω extension loudspeakers. It is recommended that a remote power supply is connected to the XNode to provide the additional power for the loudspeaker.

Wiring an Output Module to an XNode

The XNode has a connector for a CPA6 Output Module, this can be used to provide eight switched -ve outputs to drive LED's, relays etc. The outputs will mimic the operation of the detection circuits, i.e. circuit [A] active = output 1 active, circuit [A] healthy = output 1 inactive.

Programmable Outputs on the XNode

The XNode has two programmable outputs, each rated at 100mA, output [A+] is a switched +ve output and output [B-] is a switched -ve. The outputs can be used to drive sounders or relays etc.

TS900 Node Wiring

TS900 Nodes require a 4 core cable for interconnection, and up to 5 may be connected in a "daisy-chain" or "star" configuration to any one network. The distance between each Node must not exceed 100 metres and the total distance to last Node must not exceed 500 metres. Power for detectors is provided by the Aux. +/- terminals.

The TS900 Node has two programmable outputs, each rated at 100mA, output [A+] is a switched +ve output and output [B-] is a switched -ve. The outputs can be used to drive sounders or relays etc.

- No two devices should have the same address (I/D).
- The maximum number of devices is five.
- TS900 Nodes and XNodes cannot be connected on the same network.

Wiring Nodes and Remote Keypads

The TS900 Node and remote keypads can be connected on the same network. The network must be wired in 6-core cable to allow the remote keypad internal sounders to operate.

- No two devices should have the same address (I/D).
- This method of connection is designed for networks 1 and 2. Although it can be used on other networks, the "D" connection for the remote keypads will have to be taken from networks 1 or 2.
- The sounder on the remote keypads will follow the control panel sounder.
- Remote keypads cannot be multi-tasked between each other on the same network when using this method of connection.
- The maximum number of devices is five.

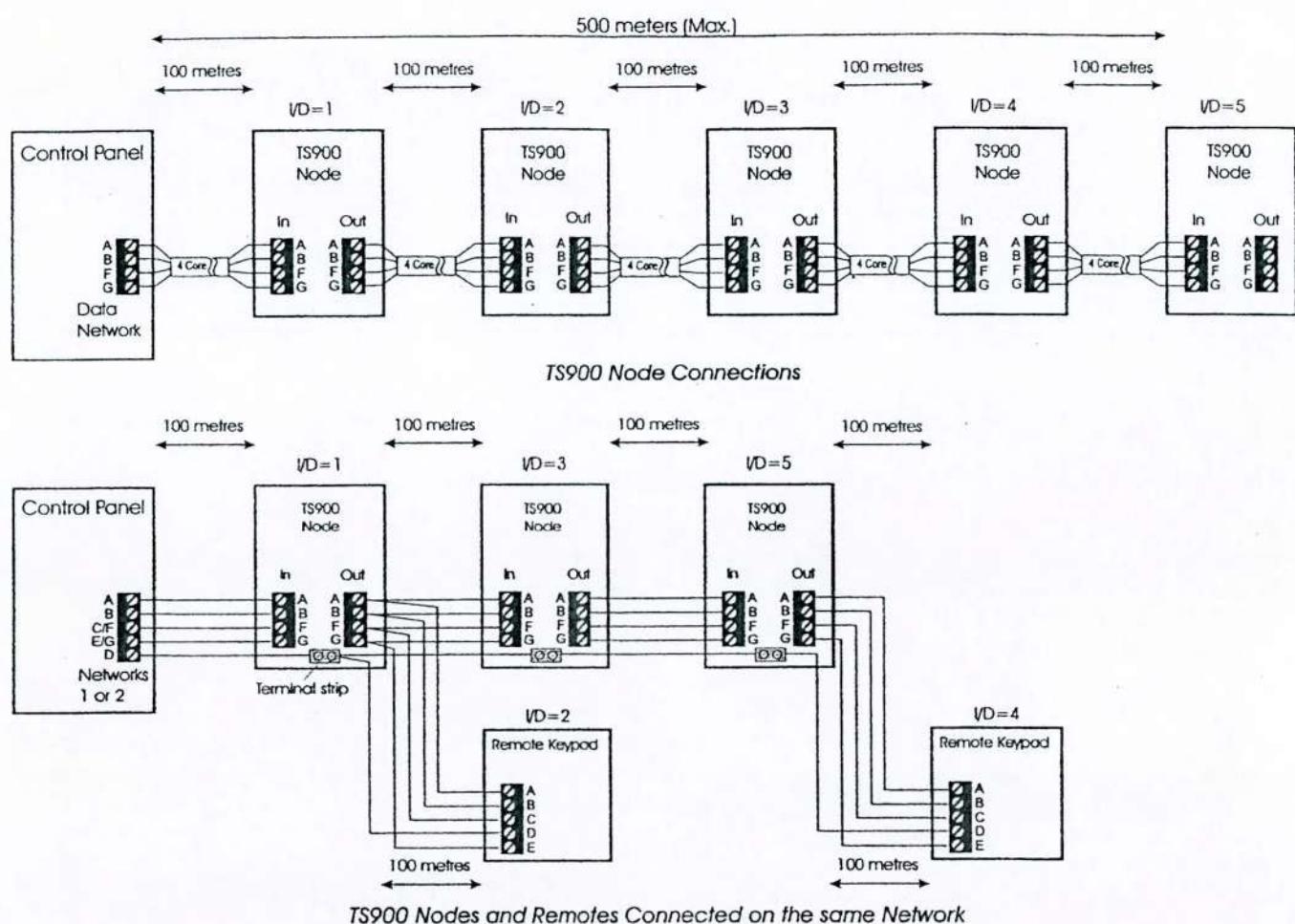


Figure 6. TS900 Node Wiring Options

Remote Keypads and TS700.LECs

Up to 5 remote keypads or TS700.LECs can be connected on any one network. The devices may be wired in a "daisy-chain" or "star" configuration. When using remote keypads the network must be wired in 6-core cable. If all devices on the network are TS700.LECs the network can be wired in 4-core as the "D" connection is not required.

- ☞ No two devices should have the same address (I/D).
- ☞ This method of connection is designed for networks 1 and 2. Although it can be used on other networks, the "D" connection for the remote keypads will have to be taken from networks 1 or 2.
- ☞ The sounder on the remote keypads will follow the control panel sounder.
- ☞ Remote keypads cannot be multi-tasked between each other on the same network when using this method of connection.

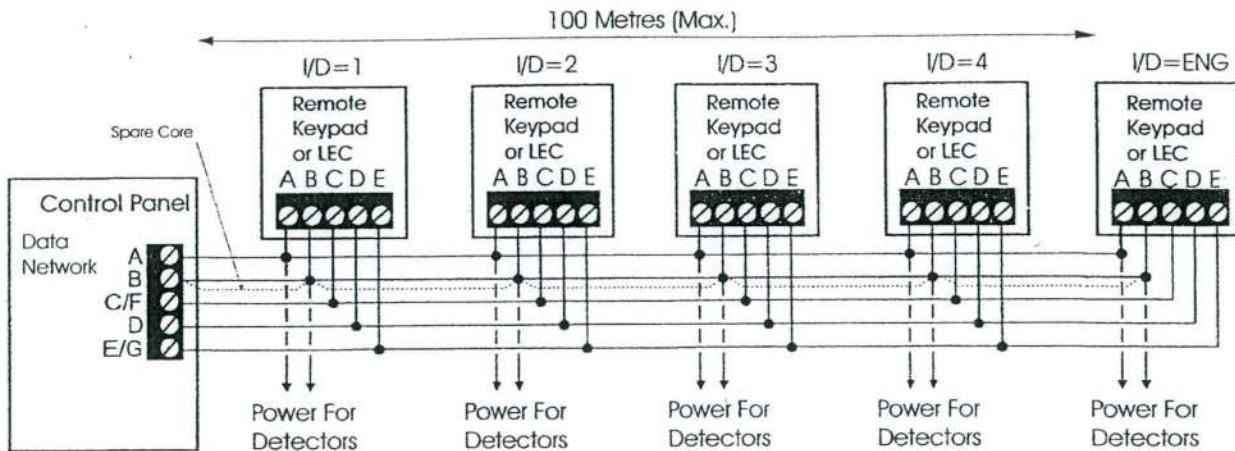


Figure 7. Wiring Remote Keypads or TS700.LECs

TSLEC8

Up to two TSLEC8s can be installed inside the control panel. Each LEC provides an additional 8 detection circuits. The LEC is supplied with its own connector lead which simply plugs onto the control panel PCB.

Detection Circuits

All detection circuits can be wired either in "Double Pole" or "End of Line". When using the "Double Pole" method, 4-core cable is required for non powered devices such as magnetic contacts and 6-core is required for powered devices such as movement sensors. When using the "End of Line" method, 4-core cable can be used for both non powered and powered devices.

Battery

The control panel must be fitted with an adequate battery in order for the system to function for eight hours in the event of a mains failure. 17Ah capacity can be provided from one single 17Ah battery or 14Ah capacity can be provided by fitting two 7Ah batteries connected in parallel.

If the mains power to the control panel fails, the standby battery will take over and maintain the system. In order to safeguard the battery from full discharge the control panel automatically isolates the standby battery when its voltage falls below 9.5V. When the mains power is restored the system will power-up and reconnect the battery, then continue to recharge.

Mains Supply

The mains supply is connected to a 3 way "Euro Type" fused terminal block, which is fitted with a 315mA fuse. To comply with BS4737 the supply should be fed from an un-switched fused spur fitted with a 3A fuse. All mains electrical connections should be carried out by a qualified electrician and must comply with the current IEE regulations.

Panel Outputs

The control panel has four programmable outputs, output [1] is a set of voltage free changeover contacts, output [2-] is a switched -ve @500mA and outputs [3+] & [4+] are switched +ve @500mA. The outputs can be used to drive relays etc.

Extension loudspeakers

Extension loudspeakers can be connected to the control panel or any XNode (not TS900 Node). The speaker output is designed to drive up to two 16Ω loudspeakers, however it is recommended that when using two speakers that they are wired in series to reduce current draw. Each loudspeaker output can also be programmed to one or more wards so that the sounder only operates under the relevant conditions.



Extension loudspeaker MUST NOT be wired in the same multi-core as network or detection circuit cabling.

External Sounders

The control panel has one external sounder output to drive standard SAB or SCB modules, additional external sounders can be driven from Nodes using a relay interface RM3A. When using a Node to drive an external sounder it is recommended that a remote power supply is fitted next to the Node to provide the power for the external sounder. The tamper for the external sounder can be monitored using one of the Node detection circuits.

Plug-on Digital Communicator

The DC54 (4 channel) or DC58 (8 channel) can be plugged onto the control panel so that alarm status information can be transferred to an Alarm Receiving Centre (ARC). The DC58 also offers the additional facility of reporting separate account numbers per ward. All data for the digital communicator can be programmed via the control panel.

Plug-on Digi-modem

The DC58M is a combined 8 channel digital communicator and V21 modem. The digital communicator also offers the additional facility of reporting separate account numbers per ward. If required the digicom can be disabled so that only the modem facilities are provided. The V21 modem is required to allow uploading and downloading of system data via a PC using Menvier Lineload software.

RedCARE or Stand-alone Digicom

Eight programmable switched -ve @100mA outputs are provided on the control panel to allow connection to a stand-alone RedCARE unit such as the Versus 3GSTU or DA BlueSTU. The STU can be mounted inside the control panel underneath the main PCB.

Printer

A DATAC printer or any serial RS232 printer can be connected to the control panel via a MPA or DCI (printer adaptor). The printer can be used to obtain a full printout of the system programming or event log. It can also be left connected and used as an on-line printer, i.e., all system events are printed as and when they occur.

Output Modules

An output module (CPA6.OM) provides eight switched -ve outputs @ 100mA, which can be used to drive LED's or relays. The control panel has a connector which allows one or more output modules to be daisy-chained together. The output modules can then be programmed to give ward status information and/or circuit alarm/mimic indications.

The XNode also has a connector for a single output module, but the outputs will only mimic the eight detection circuits of the XNode.

Networker Interface Boards

The Networker Interface Boards (NIBs) can be used when cable runs between Nodes or remote keypads exceed 100 metres. The NIBs are supplied as a driver unit and receiver unit. The driver unit connects to the output of the control panel or Node and the receiver unit can be connected up to 3 kilometres away. A separate remote power supply unit will be required to power the receiver unit and the remainder of equipment on the network.

System Installation

TS2500 Control Panel

Installation Procedure

1. Open the control panel by removing two screws from the front cover. Remove the cover by sliding it up slightly to disengage the bottom clip, disconnect the earth bonding cable from the spade connection on the front cover, then lift clear.
2. Note the position of the cable entries as follows:
 - (a) Plastic cable entries and 20mm knockouts top and bottom for trunking.
 - (b) Twenty 20mm cable entries for detection, alarm and remote keypad cables.
 - (c) A 20mm cable entry for mains (240V) above the mains input terminal block on the right hand side of the control panel back box.
3. Hold the control panel back box in the required position (keyhole to the top) and mark the centre of the keyhole position. Remove the back box, drill and plug the hole.

 *The mains cable must enter the control panel through its own cable entry and must not be mixed with other cables.*

4. Screw a No 10 screw into the plugged hole. Re-position the back box and mark the remaining four securing holes. Remove the back box, drill and plug the holes.
5. Re-position the back box and pass all cables into the base via the trunking holes or knockouts, grommeting as appropriate.
6. Secure the back box using not less than 30mm x No 10 screws through the four dished 5mm holes.
7. If required install and connect the following:
 - (a) Stand alone digicom or RedCARE STU or other signalling device.
 - (b) Plug-on digicom type DC54, DC58 or DC58M.
 - (c) Output modules type CPA6.OM.
 - (d) Printer type DATAC or serial RS232 via a printer adaptor (DCI/MPA).
 - (e) Relay module type RM3A.

 When replacing the cover, always ensure that the earth bonding lead is connected to the spade connection on the front cover.

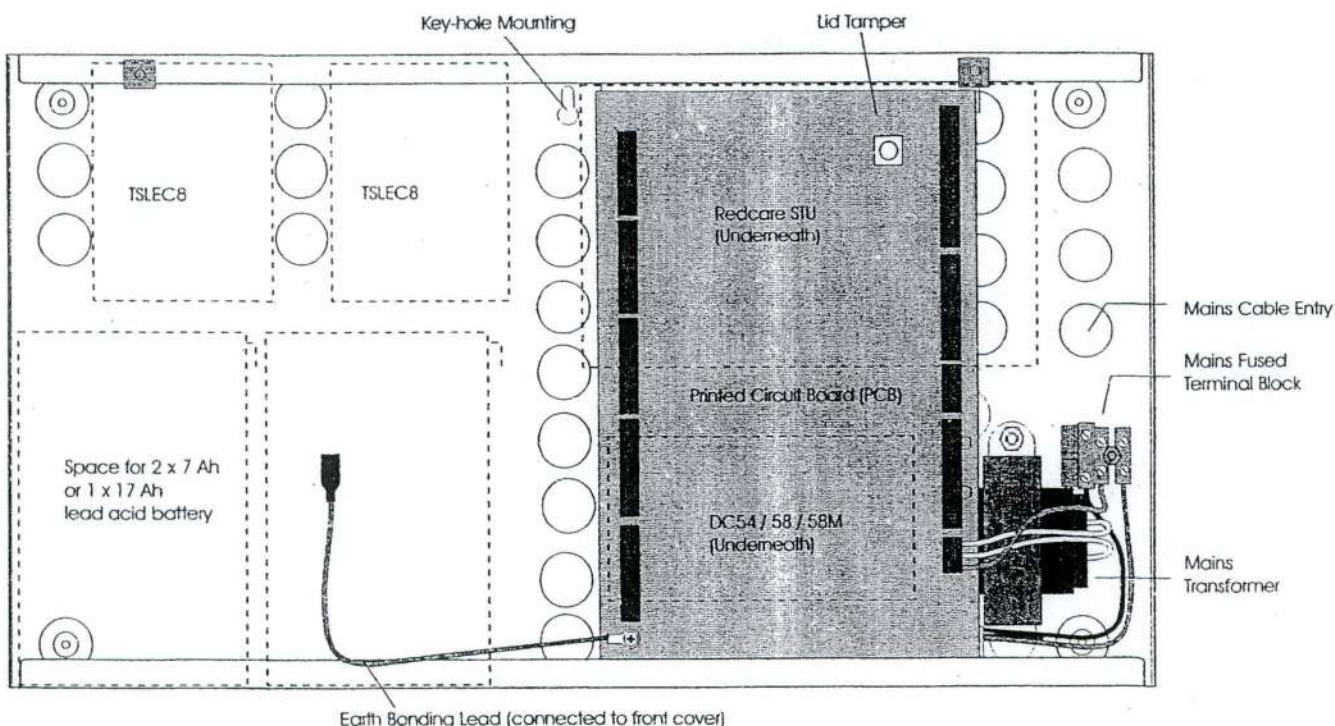


Figure 8. TS2500 Control Panel Layout

Mains Connection

The mains supply is connected to a 3 way "Euro Type" fused terminal block, which is fitted with a 315mA fuse.

- ☛** All electrical connections should be carried out by a qualified electrician and must comply with the current IEE regulations.
- ☛** To comply with European regulations the supply should be fed from a readily accessible disconnect device, e.g. un-switched fused spur.
- ☛** When making mains connections it should be ensured that if the cable slips in such a way as to place a strain on the conductors, the protective earthing conductor will be the last to take the strain.

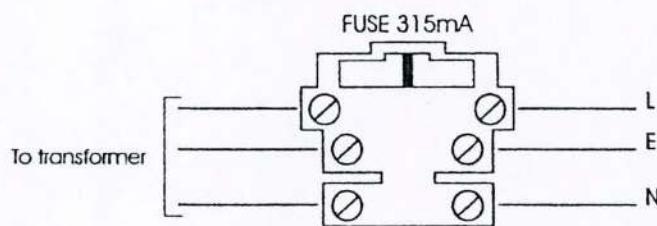


Figure 9. Mains Supply Connections

Battery Connections

A single 17Ah battery or two 7Ah batteries can be installed inside the control panel to provide continuous system operation in the event of a mains failure. A set of battery leads are provided in the spares pack to allow connection between the battery and control panel.

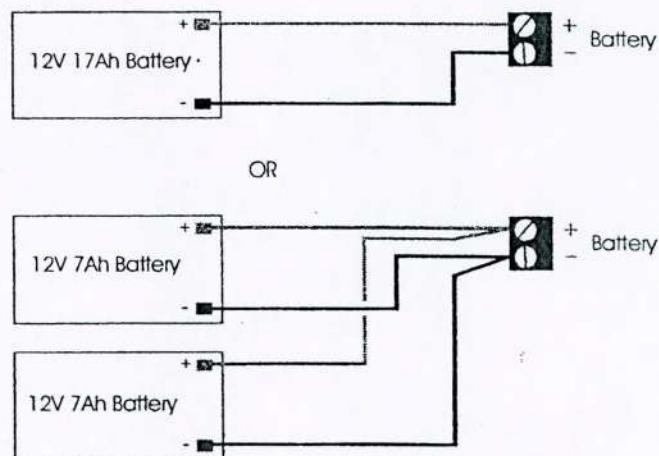


Figure 10. Battery Connections

If the mains power to the control panel fails, the standby battery will take over and maintain the system. In order to safeguard the battery from full discharge the control panel automatically isolates the standby battery when its voltage falls below 9.5V. When the mains power is restored the system will power-up and the reconnect the battery, then continue to recharge. If the system is to be tested using only the battery (no mains supply available) then the "Kick Start" pins must be momentarily shorted to enable the battery.

Main PCB Layout

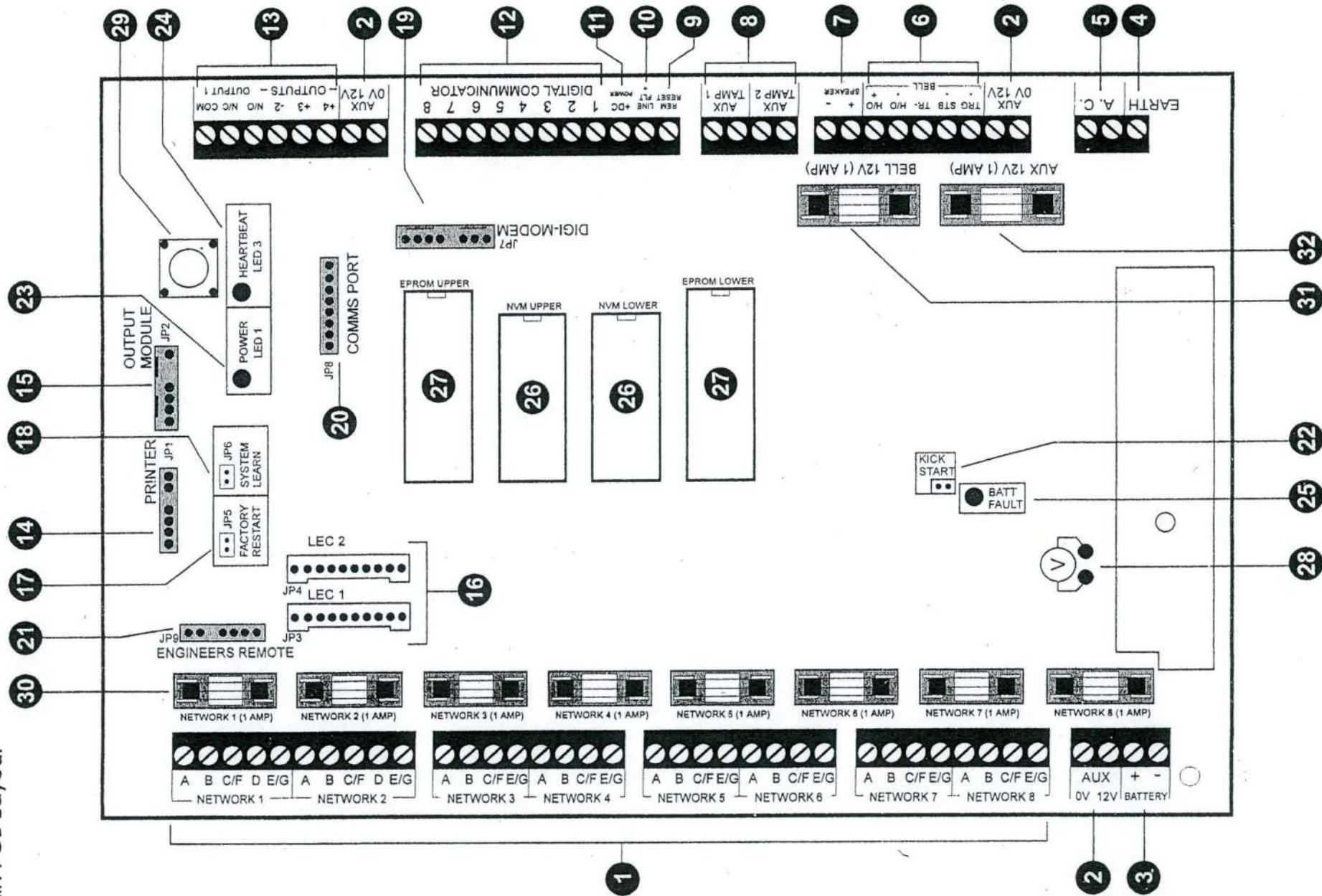


Figure 11. Main PCB Layout

Connection Terminals, Plugs & Indicators

The main PCB has the following connectors etc.

- 1 **Networks 1-8**
Data networks for connecting nodes, remote keypads and LECs. Each network is protected by its respective fuse (30), the fuse is in-line with the [A] connection of the network
- 2 **Auxiliary 12V**
Three sets of auxiliary 12V terminals are provided on the main PCB, each set provides dc power for detectors etc. These outputs are protected by a 1A fuse (32).
- 3 **Battery Terminals**
Connection terminals for the red and black battery leads supplied inside the spares pack.
- 4 **Earth Terminal**
Connection to mains earth.
- 5 **AC Input Terminals**
The output from the mains transformer is connected into these two terminals.
- 6 **External Sounder Terminals**
This group of terminals are used for connection to an external sounder, for full details of their function see page 25.
- 7 **Speaker Terminals**
Up to two 16Ω extension loudspeakers can be connected across these two terminals. The volume is controlled via a programming option, see "Set Volume Level" on page 81.
- 8 **Auxiliary Tamers 1 & 2**
These terminals provide tamper protection to auxiliary devices such as remote power supplies, extension loudspeakers etc. If they are not used they must be linked out.
- 9 **Remote Reset Input**
After a full alarm the system will require resetting, normally this is done by the engineer or via coded remote reset. By applying a -ve to this input terminal it will cause the system to reset after a full alarm. This input could be connected to the "Control" output on a RedCARE STU so that the central station can provide a "Remote Reset" facility.
- 10 **Line Fault Input**
When this input is applied with a +ve signal the system will generate a "Line Fault" condition. In the unset condition the system will generate a "Chime" tone every minute. In the set condition any programmed bell delay is cancelled.
- 11 **+DC Power**
This terminal provides the +12V power to the stand-alone digital communicator or RedCARE STU. This output is un-fused and therefore must only be used if the device is fitted inside the control panel housing.
- 12 **Digicom Outputs 1 to 8**
These are programmable outputs and are normally connected to the input channels on a stand-alone digital communicator or RedCARE STU. The outputs are normally at +12V and switch to 0V when active. The outputs can be inverted so that they switch from 0V to +12V when active, see "Configuration" on page 44. Each output will source 5mA in the +12V condition and sink 100mA in the 0V condition.
- 13 **Panel Outputs 1 to 4**
These are programmable outputs that can be used to drive relays and auxiliary equipment. Output [1] is a set of voltage free change over contact rated at 1Amp. Output [-2] is a switched negative output rated at 500mA. Outputs [+3] and [+4] are switched positive outputs rated at 500mA.
- 14 **Printer Output Port (JP1)**
This 6-pin plug is used for connecting to either a CPA6 printer or a standard RS232 printer via the DCI/MPA printer adaptor.
- 15 **Output Module (JP2)**
Output modules type CPA6.OM can be connected to this 5-pin plug, and are used to provide switched -ve outputs to LED's/relays etc. The outputs can be programmed such that they give ward status information and/or circuit mimic/alarm indications.
- 16 **LEC 1 (JP3) / LEC 2 (JP4)**
Two TSLEC8 PCBs can be connected via an interface lead to these connectors. The interface lead is provided with the TSLEC8.
- 17 **Factory Restart (JP5)**
If these pins are shorted during power-up all system parameters are reset to their factory default settings. If the engineer's passcode is lost or forgotten it can be reset to 1234 without losing any other program data as follows:
 - (a) Ensure that the system is fully unset and a master user passcode is available.
 - (b) Remove the cover from the control panel, this will cause a panel lid tamper alarm.
 - (c) Enter the master user passcode to silence the alarm.
 - (d) Place the blade of a small screwdriver between the "FACTORY RESTART" pins. A multi-tone sound indicates that the engineer's passcode has been reset. This action will be recorded in the system log.

18 System Learn (JP6)

If these pins are shorted whilst the system is powered, the control panel will re-learn all devices on all eight networks. If after a system learn the number of devices or device types have changed the display will show "RELEARN REQUIRED". In order to clear this message you must confirm the number of network device using the "Confirm Network Devices" option, see page 67.

19 Digi-Modem Plug (JP7)

A plug-on digicom or digi-Modem may be connected to this 7-pin plug to allow panel alarm information to be transferred to an alarm receiving centre. The digi-Modem is used for remote communication and programming via a P.C. A PCI/DCI lead also is also available which connects to this plug when using a P.C. with Lineload software for direct communication with the control panel.

20 Comms Port (JP8)

High speed serial communications port COM1 (for future use).

21 Engineer's Remote Keypad Plug (JP9)

Normally all system programming will be carried out from one of the installed remote keypads. However, an engineers remote keypad can be temporarily connected to this 6-pin plug to allow programming and testing to be carried out at the control panel. This feature can only be used if Network 1 does not have any XNodes connected to it, any keypads addressed as 'ENG' or LECs addressed as 'NULL'.

22 Kick Start (JP10)

If the system is to be powered only from the battery (no mains supply available) then the "Kick Start" pins must be momentarily shorted to enable the battery.

23 Power LED

This LED indicates that the system power (mains or battery) is healthy.

24 Heartbeat LED

When the system is functioning correctly this LED will continually flash on and off. If a fault occurs on the main PCB this LED will stop flashing.

25 Battery Fault

If the system battery is incorrectly connected to the control panel the "Battery Fault" LED will illuminate. The fault LED will only extinguish when the battery has been correctly connected or replaced.

26 NVM Upper & Lower

Two removable non-volatile memory (NVM) devices that store all system program parameters and the 4000 log events.

27 EPROM Upper & Lower

Two removable memory devices that store the operating software for the TS2500 system.

28 System Current Measurement (V)

The system current consumption can be calculated by measuring the voltage across this test point on the main PCB. Using a Voltmeter set to a low Voltage range measure the Voltage across the test point and multiply the reading by 10 to give the Total system current consumption i.e., a reading of 70mV = 700mA.

29 Tamper Switch

The lid tamper protection for the control panel.

30 Network Fuses 1 to 8

The supply voltage across [A] and [B] terminals each network is protected by its own fuse (1Amp).

31 Bell Fuse

The supply voltage across the [H/O+] and [H/O-] terminals that supply the external sounder is protected by this 1 Amp fuse.

32 Aux 12V Fuse

The supply voltage across the auxiliary 12V terminals are protected by this 1 Amp fuse.

Remote Keypads

Four types of remote keypads can be used on the system, however, only the TS900 remote keypad can be used for programming as all others are limited to setting, unset and part-setting.

TS900 LCD Remote Keypad

The TS900 remote keypad has a 32 character back-lit Liquid Crystal Display (LCD). The system must have at least one TS900 remote keypad fitted in order for system programming to be carried out.

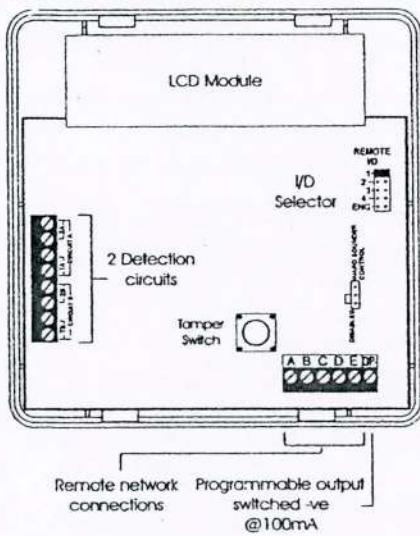


Figure 12. TS900 Remote Keypad Layout

TS790 Star Remote Keypad

The TS790 remote keypad has a 8 character back-lit starburst Liquid Crystal Display (LCD).

The TS790.STAR remote keypad is limited to setting, unset and part-setting, and cannot be used for system programming. The display will always show the system time.

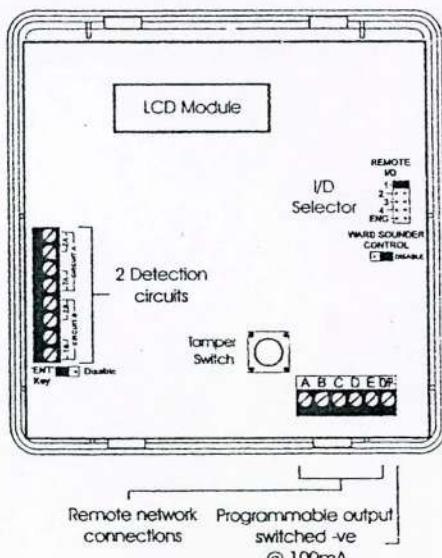


Figure 13. TS790 Star Remote Keypad Layout

TS700 LED Remote Keypad

The TS700 remote keypad has a 4 character LED display.

The TS700 remote keypad is limited to setting, unset and part-setting, and cannot be used for system programming. The display will always show the system time.

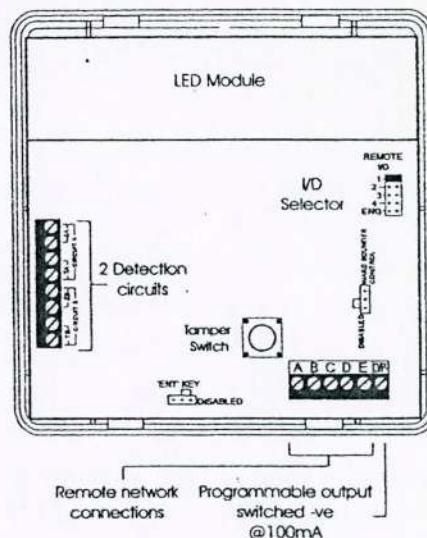


Figure 14. TS700 Remote Keypad Layout

TS700 Remote Arming Station

The TS700 remote arming station only has two indicator LED's, a power LED and a programmable function LED which follows the programmable output.

The TS700 remote arming station is limited to setting, unset and part-setting, and cannot be used for system programming.

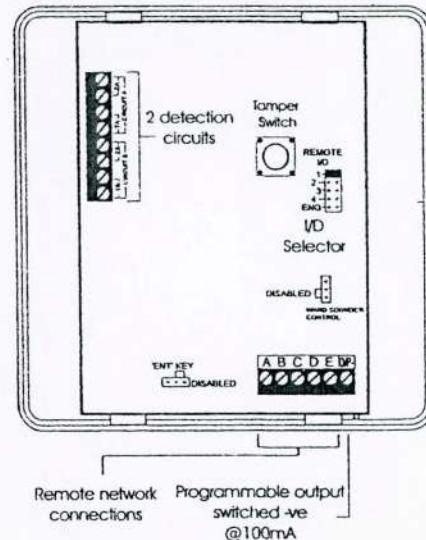


Figure 15. TS700 Remote Arming station Layout

Installing a Remote Keypad on the XNode

1. Separate the cover and base of the remote keypad by using a screwdriver to push 2 of the clips (top or bottom) inward from the base indents, then lift the cover assembly, noting that the PCB is fixed to the under side of the cover.
2. Hold the base in position (keyhole to the top) and mark the three securing holes, drill and plug the wall as required. Pass all the cables into the base via the cable entry points as appropriate and secure the base to the wall.
3. Connect the network cables to the appropriate terminals.
4. Set the I/D jumper link to the required position, see table below, ensuring no two remote keypads on the same Node have the same I/D.
5. Set the "Remote Zone Enable" switch on the XNode to enable zones in the remote keypads as required.
6. If installing the TS700.ARM/STAR, it is recommended that LK1 is cut so that the keypad functions are limited to setting and unsetting, see *Figure 15*.
7. Finally clip the remote keypad cover onto the base being careful not to trap any cables or to obstruct the tamper switch.

Remote Keypads connected to XNodes			
I/D	Circuit A	Circuit B	Output
1	Node Circuit A	Node Circuit B	Node Output A
2	Node Circuit C	Node Circuit D	Node Output B
3	Node Circuit E	Node Circuit F	Node Output A
4	Node Circuit G	Node Circuit H	Node Output B
ENG	N/A	N/A	N/A

Installing a Keypad on to the Network

1. Separate the cover and base of the remote keypad by using a screwdriver to push 2 of the clips (top or bottom) inward from the base indents, then lift the cover assembly, noting that the PCB is fixed to the under side of the cover.
2. Hold the base in position (keyhole to the top) and mark the three securing holes, drill and plug the wall as required. Pass all the cables into the base via the cable entry points as appropriate and secure the base to the wall.
3. Connect the cables to the appropriate terminals.
4. Set the I/D selector jumper link to the required position, see table below, ensuring no two remote keypads, LECs or nodes have the same I/D.
5. Finally clip the remote keypad cover onto the base being careful not to trap any cables or to obstruct the tamper switch.

Remote Keypads connected to the Network			
I/D	Circuit A	Circuit B	Output
1	N001	N002	N01A
2	N009	N010	N02A
3	N017	N018	N03A
4	N025	N026	N04A
ENG	N033	N034	N05A

N = Network Number (1 - 8)

XNode

The XNode is very similar to that of TS900 Node in that it provides the facility to add an extra eight programmable detection circuits and two programmable outputs. However, the XNode can also drive extension loudspeakers, up to 4 remote keypads and an output module. The maximum number of XNodes that can be connected to any one network is 16.

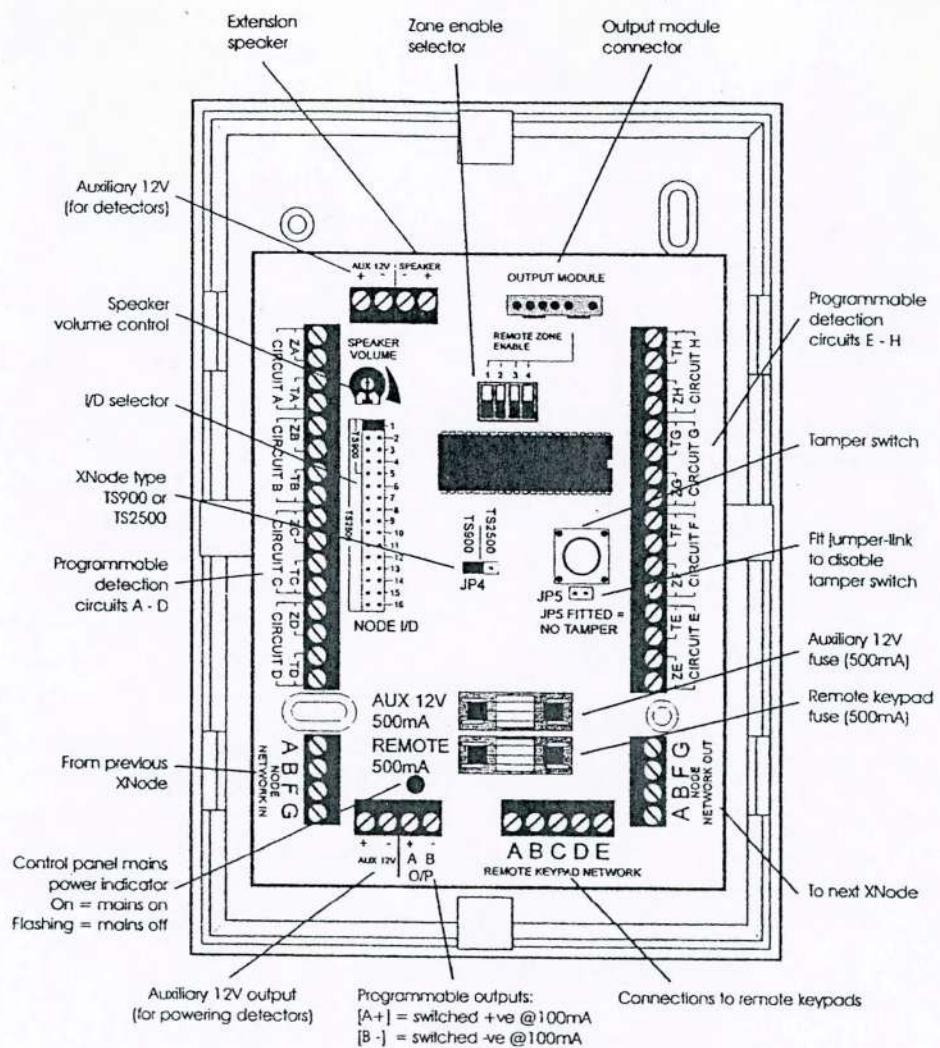


Figure 16. XNode Layout

I/D	Detection Circuits								Node Outputs	
	A	B	C	D	E	F	G	H	A+	B-
1	N001	N002	N003	N004	N005	N006	N007	N008	N01A	N01B
2	N009	N010	N011	N012	N013	N014	N015	N016	N02A	N02B
3	N017	N018	N019	N020	N021	N022	N023	N024	N03A	N03B
4	N025	N026	N027	N028	N029	N030	N031	N032	N04A	N04B
5	N033	N034	N035	N036	N037	N038	N039	N040	N05A	N05B
6	N041	N042	N043	N044	N045	N046	N047	N048	N06A	N06B
7	N049	N050	N051	N052	N053	N054	N055	N056	N07A	N07B
8	N057	N058	N059	N060	N061	N062	N063	N064	N08A	N08B
9	N065	N066	N067	N068	N069	N070	N071	N072	N09A	N09B
10	N073	N074	N075	N076	N077	N078	N079	N080	N10A	N10B
11	N081	N082	N083	N084	N085	N086	N087	N088	N11A	N11B
12	N089	N090	N091	N092	N093	N094	N095	N096	N12A	N12B
13	N097	N098	N099	N100	N101	N102	N103	N104	N13A	N13B
14	N105	N106	N107	N108	N109	N110	N111	N112	N14A	N14B
15	N113	N114	N115	N116	N117	N118	N119	N120	N15A	N15B
16	N121	N122	N123	N124	N125	N126	N127	N128	N16A	N16B

N = Network number (1 - 8)

Installing an XNode

1. Separate the cover and base by using a screwdriver to push 2 of the clips (left or right) inward from the base indents, then lift the cover clear.
2. If the XNode is being fitted inside the control panel you may remove the XNode PCB from its base and secure it to the base of the control panel using self adhesive feet. If required, the tamper switch can be disabled by fitting the jumper link across JP5, see *Figure 16*.
3. If the XNode is being fitted outside the control panel, hold the base in position and mark the four securing holes. Drill and plug the wall as required, then pass all cables into the base via the cable entry points as appropriate. Secure the base to the wall using the appropriate fixing screws.
4. Connect the network data cables to the appropriate terminals.
5. If required, connect the remote keypad network cables to the appropriate terminals.
6. If required, connect the extension loudspeaker to the appropriate terminals. The volume of the speaker is controlled by the speaker volume control, see *Figure 16*.
7. Set the I/D selector jumper link to the required position, see the table below, ensuring no two XNodes on the same network have the same I/D.
8. Set the "Remote Zone Enable" switch on the XNode to enable or disable the zones in the remote keypads as required.
9. Set JP4 to the TS2500 position.
10. Finally clip the XNode cover onto the base being careful not to trap any cables or to obstruct the tamper switch.

TS900 Node

The TS900 Node allows the facility to add an extra eight programmable detection circuits and two programmable outputs. Up to five can be connected to any one network.

 *TS900 Nodes and XNodes cannot be connected on the same network.*

Installing a TS900 Node

1. Separate the cover and base of the Node by using a screwdriver to push 2 of the clips (left or right) inward from the base indents, then lift the cover clear.
2. If the Node is being fitted inside the control panel you may remove the Node PCB from its base and secure it to base of the control panel using self adhesive feet. If required, the tamper switch can be disabled by fitting the jumper link across JP2, see *Figure 17*.
3. If the Node is being fitted outside the control panel, hold the base in position and mark the four securing holes. Drill and plug the wall as required, then pass all cables into the base via the cable entry points as appropriate. Secure the base to the wall using the appropriate fixing screws.
4. Connect the network data cables to the appropriate terminals.
5. Set the I/D selector jumper link to the required position, see the table below, ensuring no two nodes, remote keypads or LEC's on the same network have the same I/D.
6. Finally clip the Node cover onto the base being careful not to trap any cables or to obstruct the tamper switch.

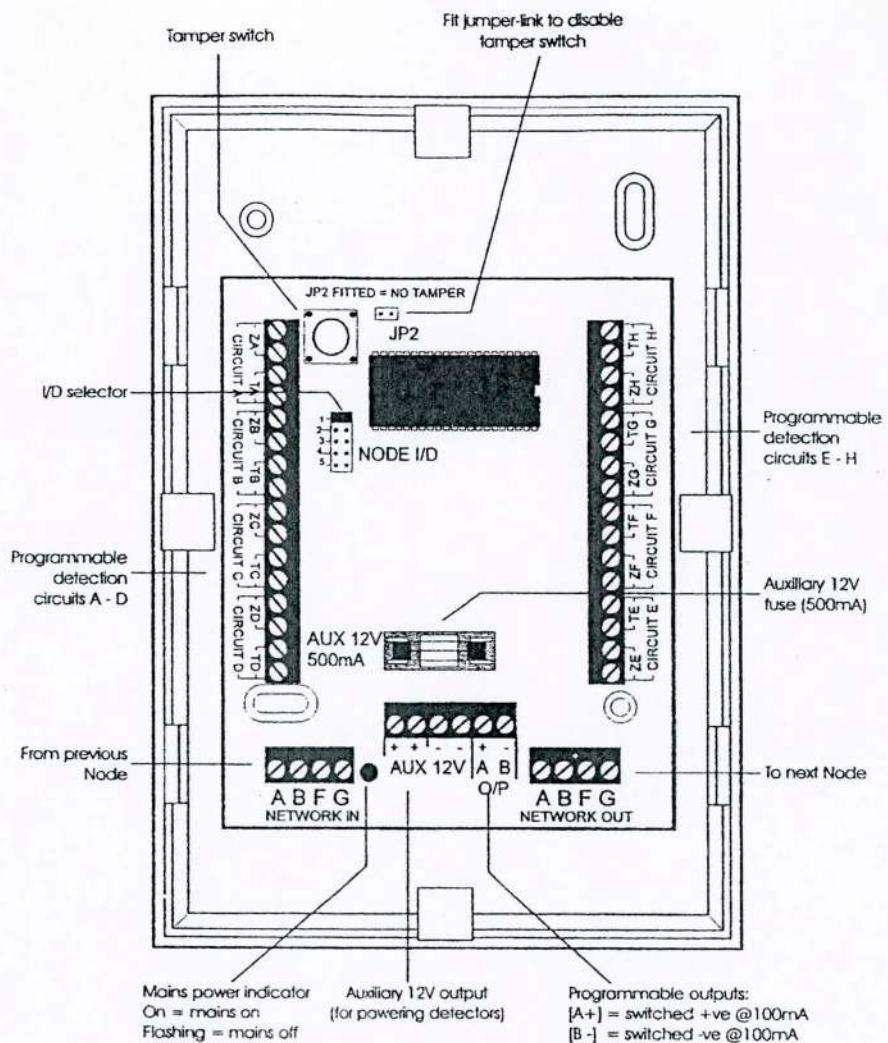


Figure 17. TS900 Node Layout

I/D	Detection Circuits								Node Outputs	
	A	B	C	D	E	F	G	H	A+	B-
1	N001	N002	N003	N004	N005	N006	N007	N008	N01A	N01B
2	N009	N010	N011	N012	N013	N014	N015	N016	N02A	N02B
3	N017	N018	N019	N020	N021	N022	N023	N024	N03A	N03B
4	N025	N026	N027	N028	N029	N030	N031	N032	N04A	N04B
5	N033	N034	N035	N036	N037	N038	N039	N040	N05A	N05B

N = Network number (1 - 8)

TS700 LEC

The TS700 LEC allows the facility to add an extra two programmable detection circuits and one programmable output. Up to five can be connected to a network. The TS700 LEC would normally be used when upgrading existing systems that have two zone expansion devices, such as the CPA6 MKII.

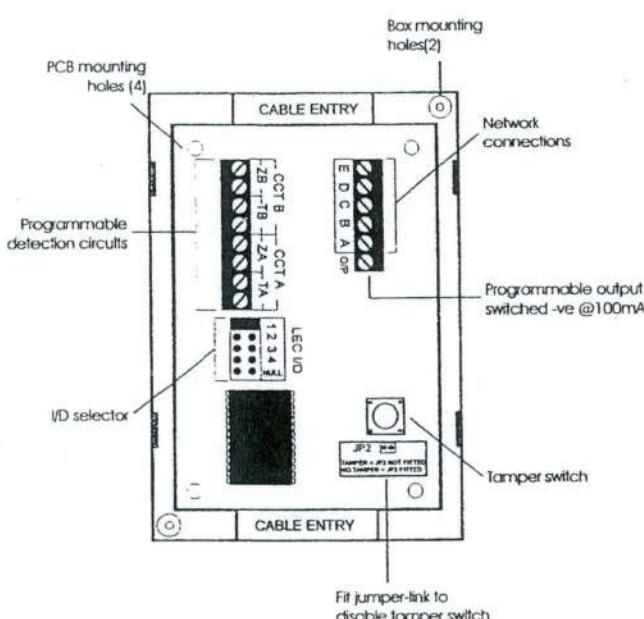


Figure 18. TS700 LEC Layout

Installing a TS700 LEC

1. Separate the cover and base of the LEC by using a screwdriver to push 2 of the clips (left or right) inward from the base indents, then lift the cover clear.
2. If the LEC is being fitted inside the control panel remove the LEC PCB from its base and secure it to the base of the control panel using self adhesive feet. If required, the tamper switch can be disabled by fitting the jumper link across JP2, see Figure 18.
3. If the LEC is being fitted outside the control panel, hold the base in position and mark the two securing holes. Drill and plug the wall, then pass all cables into the base via the cable entry points. Secure the base to the wall using the appropriate fixing screws.
4. Connect network data cables to the appropriate terminals.
5. Connect detection circuit cables to the appropriate terminals.
6. Set the I/D selector jumper link to the required position, see the table below, ensuring no two nodes, remote keypads or LEC's on the same network have the same I/D.
7. Fit the PCB into the base being careful not to trap cables or to obstruct the tamper switch.

TS700 LECs connected to the Network

I/D	Circuit A	Circuit B	Output
1	N001	N002	N01A
2	N009	N010	N02A
3	N017	N018	N03A
4	N025	N026	N04A
Null	N033	N034	N05A

N = Network Number (1 - 8)

TSLEC8

The TSLEC8s are designed to fit inside the control panel, each LEC allows the facility to add an extra eight programmable detection circuits to the system. Mounting space and holes have been provided inside the control panel to allow two TSLEC8s to be fitted. The TSLEC8s are assigned to "Network 0".

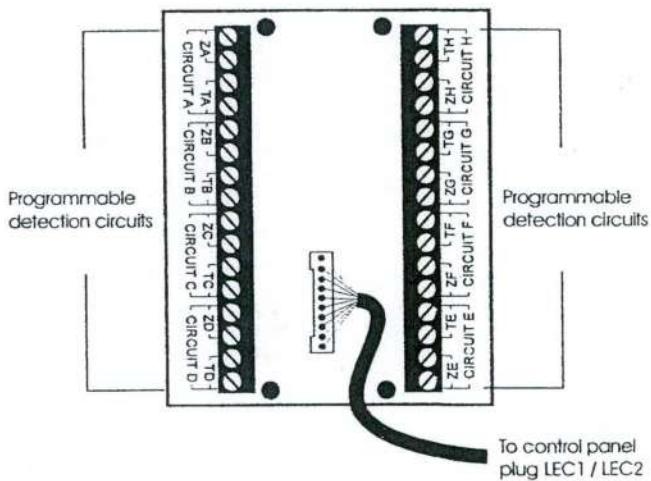


Figure 19. TSLEC8 Layout

Installing the TSLEC8

1. Insert the four mounting pillars provided into the four holes in the TSLEC8 and secure in the base of the control panel.
2. Connect one end of the interface lead into the TSLEC8 and the other into the control panel connector LEC 1 (detection circuits 0001 to 0008) or LEC 2 (detection circuits 0009 to 0016).
3. Connect detection circuit wiring to the appropriate terminals.

Detection Circuit Wiring

All detection circuits may be wired as "End Of Line" (EOL) or "Double Pole" (DP). Both methods can be used on the same equipment.

Double Pole

The DP method requires the following:

- The detector alarm and tamper contacts are connected to the zone and tamper terminals respectively.
- The combined alarm and tamper loop resistance must be less than 100 Ohms.
- The maximum number of detection devices allowed in a circuit is ten.
- Normally open devices such as exit terminator buttons are connected across the zone terminals and then must be programmed with the "Invert" attribute.
- If the detection circuit is not used links can be fitted across the zone and tamper loops or programmed as "Not Used".

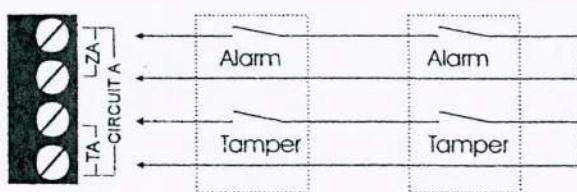
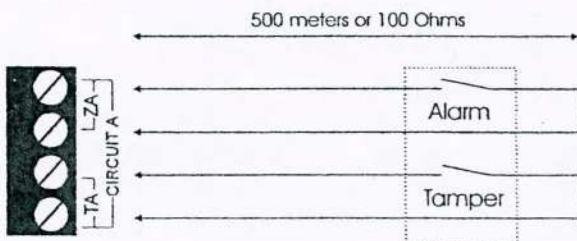


Figure 20. Double Pole Wiring

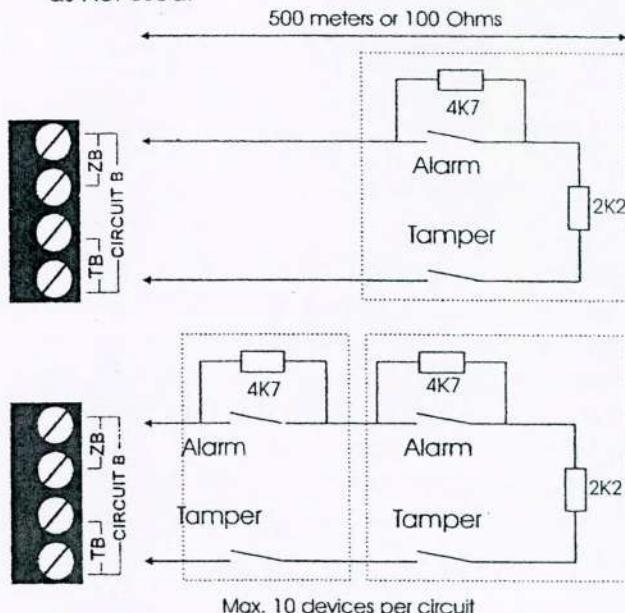
End Of Line

The EOL method requires the following:

- The detector alarm contacts must have a 4K7 shunt resistor fitted.
- A 2K2 End of Line (EOL) resistor must be fitted at the point in the circuit furthest from the control panel.
- Loop resistance with the EOL resistor shorted must be less than 100 Ohms.
- The maximum number of detection devices allowed in a circuit is ten.
- Normally open devices such as exit terminator buttons are connected in the same way as

normally closed devices and then must be programmed with the "Invert" attribute.

- If the detection circuit is not used links can be fitted across the zone and tamper loops or programmed as Not Used.



4K7 = Yellow, Violet, Red
2K2 = Red, Red, Red

Figure 21. End Of Line Wiring

External Sounders

Control Panel Sounder Connections

The following terminals have been provided to allow connections to an external sounder:

- | | |
|-------|---|
| H/O + | This is used to provide a permanent +ve hold off to external sounders, strobes etc. It is protected by a 1A fuse (Bell 12V). |
| H/O - | This is used to provide a permanent -ve hold off to external sounders, strobes etc. |
| TR - | This is the negative tamper return connection from the external sounder unit. |
| STB - | This is the strobe trigger output which switches to 0V on alarm and is rated at 500mA. Normally this output is connected to the strobe -ve, the strobe +ve is connected to [H/O+]. |
| TRG - | This is the bell trigger output which switches to 0V on alarm and is rated at 500mA. This output can be programmed for SAB or SCB operation, and operates as follows:
SAB - Switches to 0V on alarm and provides a maximum of 500mA.
SCB - Provides a negative hold off (500mA), which is removed on alarm. |

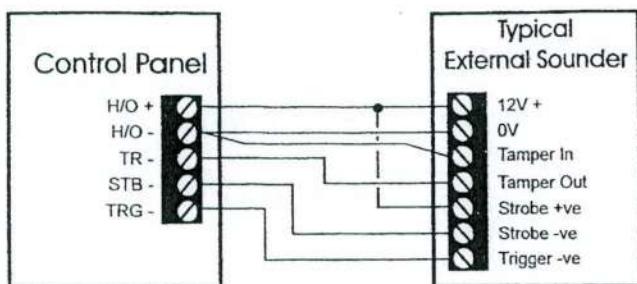


Figure 22. External Sounder Connections

Installing an External Sounder from a Node

Both the TS900 Node and XNode have two programmable outputs, these can be utilised to drive an external sounder. However, it is recommended that a remote power supply is fitted next to the Node in order to provide sufficient power for the external sounder. A relay module such as the Menvier RM3A is also required to drive the external sounder. The figure below shows the connection details.

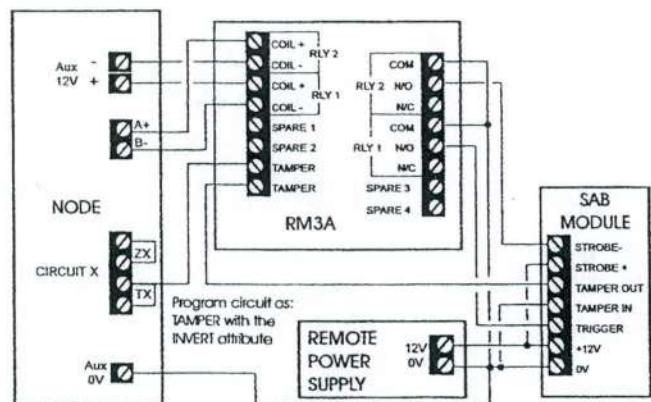


Figure 23. External Sounder Connections - Node

Extension Loudspeakers

Control Panel Connections

Up to two extension loudspeakers can be connected across the [+] and [-] SPEAKER terminals on the control panel PCB. The volume for the loudspeaker is controlled via a programming option, see "Set Volume Level" on page 81. The control panel loudspeaker can also be assigned to one or more wards so that it only operates under relevant conditions.

XNode Connections

Up to two extension loudspeakers can be connected across the [+] and [-] SPEAKER terminals on the XNode PCB. The volume for the loudspeaker is controlled via the "SPEAKER VOLUME." control. The XNode loudspeaker can also be assigned to one or more wards so that it only operates under relevant conditions.

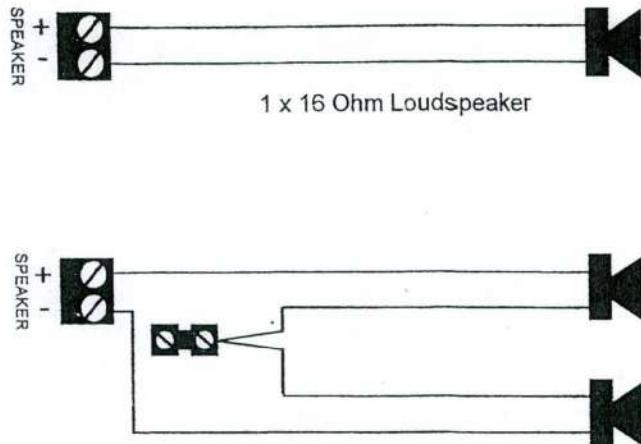


Figure 24. Loudspeaker Connections

RedCARE or Stand-alone Digicom

A stand-alone digital communicator, RedCARE STU or Paknet interface card can be connected to the system to transfer panel status information to a dedicated Alarm Receiving Centre.

The control panel has the following outputs for connection to a digicom/RedCARE:

Digicom Outputs 1 to 8

These are the programmable digicom/RedCARE output connections. They are normally at +12V and switch to 0V when active. The outputs can be inverted so that they switch from 0V to +12V when active, see "Configuration" on page 44. Each output will source 5mA in the +12V condition and sink 100mA in the 0V condition.

+DC POWER

This provides the +12V power to the digicom/RedCARE. This output is un-fused and therefore must only be used if the device is fitted inside the control panel. The 0V supply for the digicom/STU can be picked up from any of the auxiliary 0V terminals.

LINE FLT

When this input is switched to +12V, a "Line Fault" condition is generated. A "Line Fault" condition in the unset mode will cause a "Chime" type tone to be generated every minute, which can be silenced by entering any valid passcode. A "Line Fault" condition in the set mode will cancel the "Bell Delay".

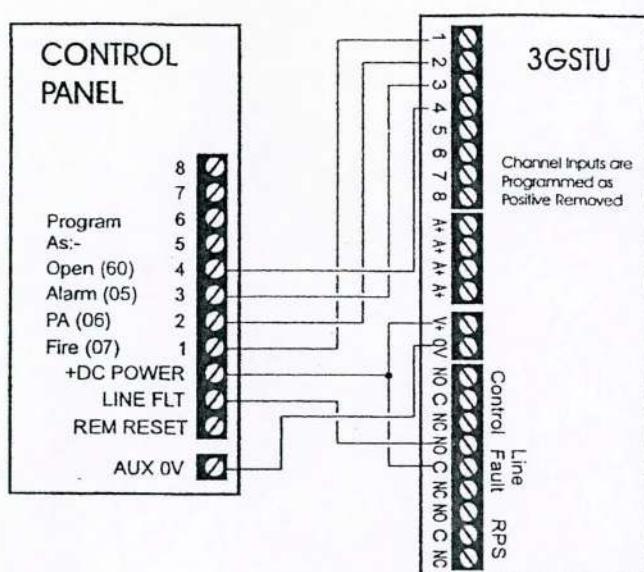


Figure 25. 3GSTU RedCARE Connections

DC54/DC58 Plug-on Digicoms

A plug-on digital communicator DC54 or DC58 can be fitted inside the control panel to allow alarm status information to be transferred to a dedicated Alarm Receiving Centre. The unit should be fitted in accordance with the installation instructions supplied with it and connected to the control panel plug DIGI-MODEM (JP7) using the lead provided with the unit. The NVM within the digicom can be programmed via the control panel, see "Digi/Modem options" on page 71.

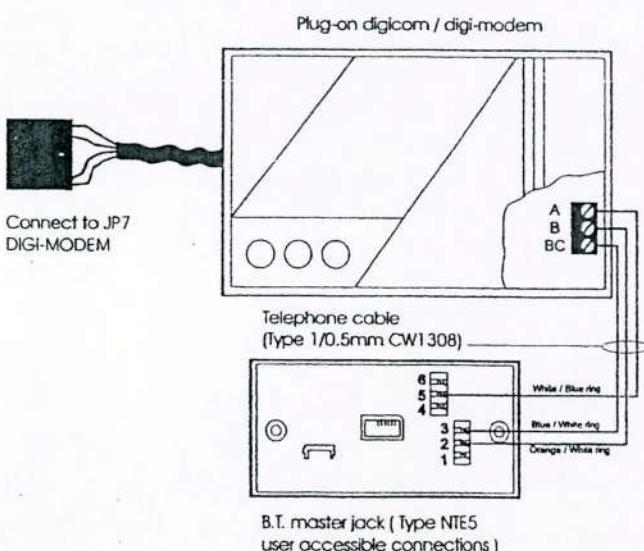


Figure 26. DC54/DC58 Connections

DC58M Plug-on Digi-modem

A plug-on digi-modem DC58M can be fitted inside the control panel to allow remote interrogation and programming via a personal computer (PC). It will also function as a standard digicom (if required). The unit should be fitted in accordance with the installation instructions supplied with it and connected to the control panel plug DIGI-MODEM using the lead provided with the DC58M. The NVM within the digi-modem can be programmed via the control panel, see "Digi/Modem options" on page 71. The modem data is also programmed via the control panel.

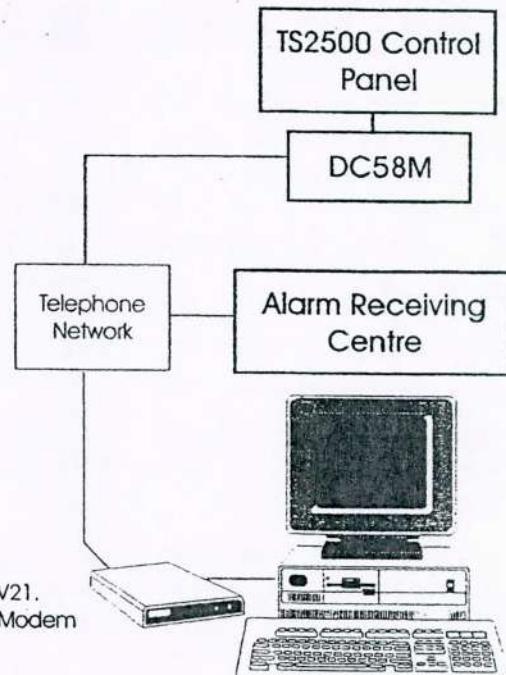


Figure 27. DC58M Digi-modem Schematic

Output Modules

The Output Module provides eight switched -ve outputs each rated at 100mA. They can be used to drive LED's or relays etc. Each module is supplied with an interface lead which allows it to be connected to the control panel or XNode. Output modules are normally fitted inside the equipment they are controlling and can be positioned up to 100 metres away.

Control Panel Connections

When connected to the control panel the output modules can be programmed to give ward status indications and/or circuit mimic/alarm indications.

XNode Connections

When connected to the XNode, the output module will provide circuit mimic indications for the eight detection circuits of the XNode.

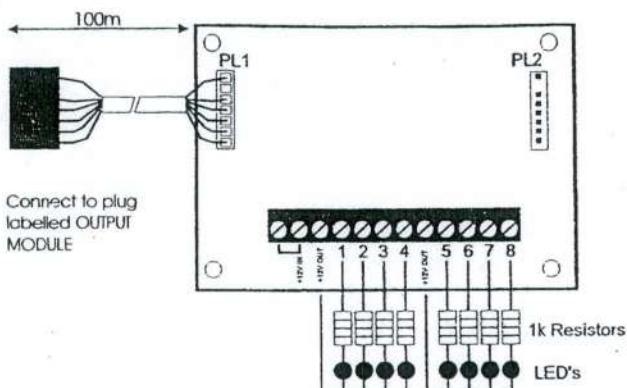


Figure 28. Output Module Connections

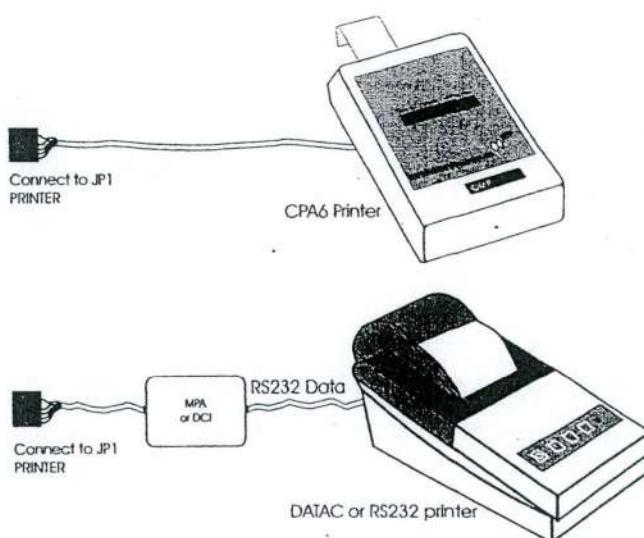


Figure 29. Printer Connections

Connecting a Printer

The TS2500 supports two type of printers, the CPA6 printer (no longer available) and any standard RS232 printer. When using an RS232 printer a DCI/MPA adaptor will be required. Menvier Security supply a DATAAC printer kit which consists of a portable RS232 printer, charger unit and DCI/MPA adaptor.

Using the CPA6 Printer

1. Plug the CPA6 printer directly on to the PRINTER plug (JP1) on the main control panel PCB.
2. The printer will printout a header, when finished the system program details and event log can be printed.
3. When finished unplug the printer. If the printer is left connected and the on-line printer option is enabled (see "Configuration" on page 44) events will be printed as and when they occur.

Using the DATAAC / RS232 Printer

1. Plug the DCI/MPA on to the PRINTER plug (JP1) on the main control panel PCB.
2. Plug the other end of the DCI/MPA into the DATAAC or RS232 printer.
3. In order for the printer to work correctly ensure the printer is set to the following:

Baud rate	= 4800
Parity	= None
Start bits	= 1
Stop bits	= 2
Data bits	= 8
DTR	= Normal

4. When set-up correctly the system program details and event log can be printed.
5. When finished unplug the MPA/DCI. If the printer is left connected and the on-line printer option is enabled (see "Configuration" on page 44) events will be printed as and when they occur.

Programmable Outputs

The TS2500 system has many programmable outputs which can be used to drive relays, LED's etc. Each output can be programmed for a different function, see "Programmable Output Types" on pages 33 - 37.

Control Panel Outputs

The control panel has four programmable outputs:

- [1] Set of voltage free change-over contacts rated at 1 Amp.
- [2-2] Switched -ve output rated at 500mA.
- [+3] Switched +ve output rated at 500mA.
- [+4] Switched +ve output rated at 500mA.

Node Outputs

Each XNode and TS900 Node has two programmable outputs:

- [+A] Switched +ve output rated at 100mA.
- [-B] Switched -ve output rated at 100mA.

Remote Keypads & TS700.LECs

Each remote keypad and TS700 LEC has one programmable output:

- [O/P] Switched -ve output rated at 100mA.

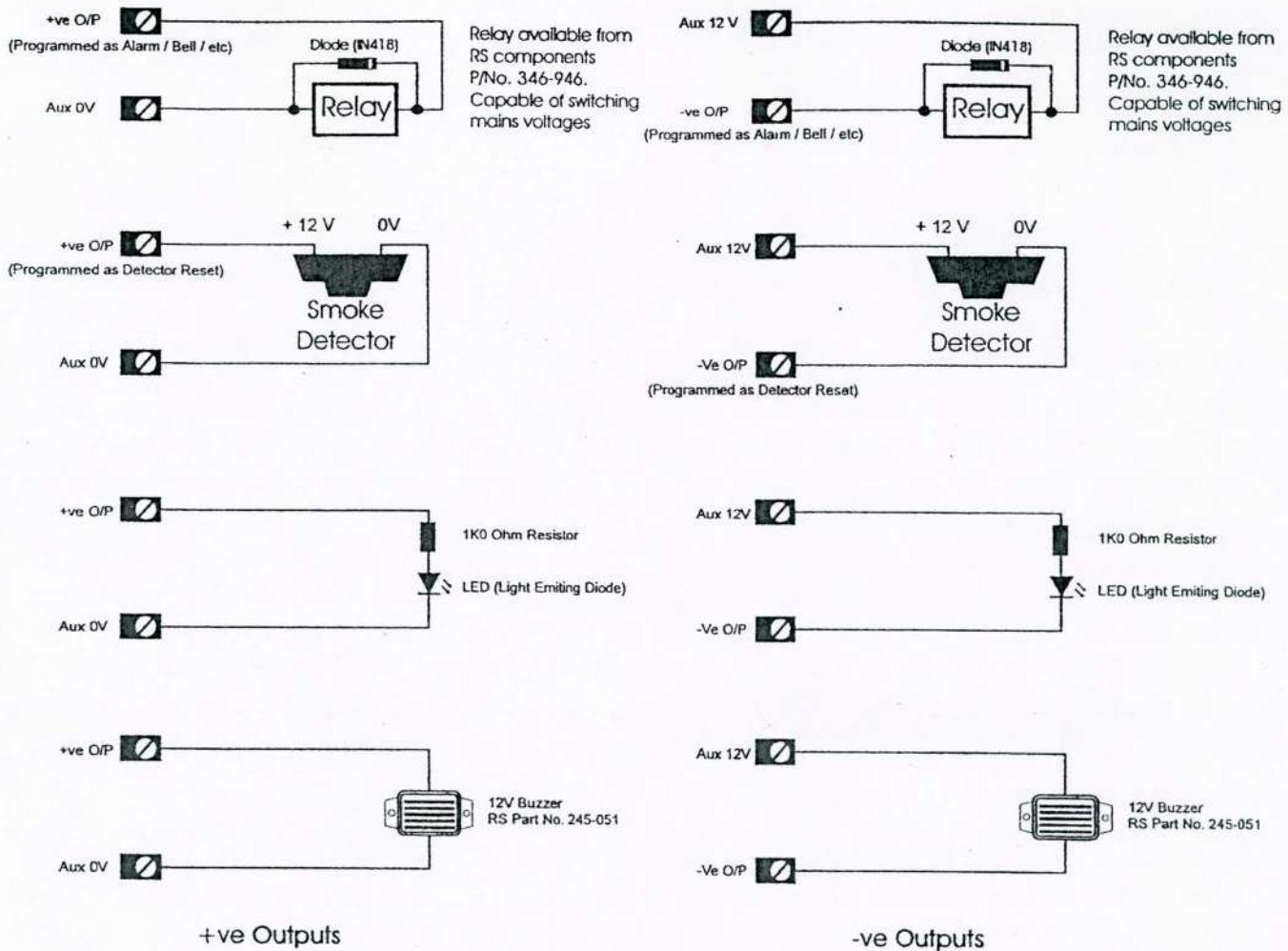


Figure 30. Output Examples

Monitoring a Remote Power Supply

The TS2500 can be configured to monitor a 519XB power supply unit using a 519FM fault monitor PCB. The 519FM plugs directly onto the 519XB PCB plug labelled JP1.

The 519FM PCB monitors any combination of:

- Supply Failure (mains)
- Low Battery Voltage
- 12V Failure (fuse failure)

In order to monitor all the above fault conditions, the outputs on the 519FM must be connected to three detection circuits. It is recommended that the circuits are programmed as custom circuits as shown in Figure 31. For details on configuring "Custom Circuits", see page 70.

If required, the PSU battery can be "load tested" periodically by connecting a switched +ve output to the 519FM BATT TEST terminal. The battery test occurs at pre-programmed intervals and every time the engineer logs off the system.

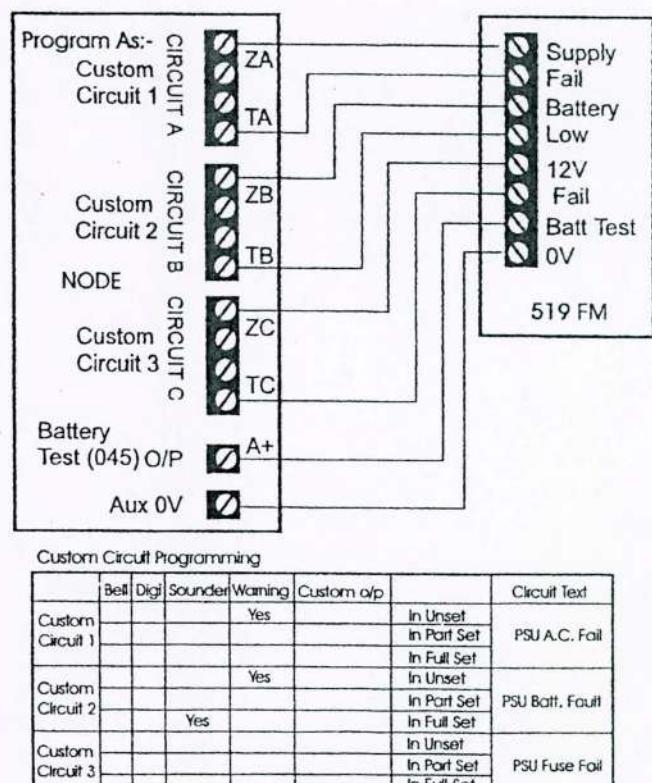


Figure 31. Monitored Power Supply Connections

Pre Power-Up Checks

Once the system is installed, but prior to powering-up give the system one final check to ensure that:

1. The wiring conforms to the requirements detailed in this manual and that all connections are correct (A to A, B to B etc.).
2. All system cables are kept clear of mains supply cables, telephone cables and R.F. cables. It is recommended that cable ties are used to keep cables separated.
3. Verify that maximum cable lengths and resistance's are not exceeded.
4. Mains power supply cables to the system are connected to an un-switched fused spur.
5. Grommets are used where cables enter metal housings to ensure that the cable insulation is not compromised.

Initial Power-Up

To power the system for the first time:

1. Place a small screwdriver blade between the pins on the control panel PCB, marked "FACTORY RESTART". This will ensure the factory default parameters are set, see page 47 for a list of defaults.
2. Switch on the 240V mains supply and remove the screwdriver blade after 5 seconds.
3. Check that the power LED on the control panel PCB is illuminated.
4. Check that the remote keypads display "Panel Lid tamper". The remote keypad sounders and extension loudspeakers will operate.
5. Enter the engineers passcode (default 1234) to silence the sounders.
6. Connect the standby battery.

Power-Up Checks

When the initial power-up checks have been completed, check the following:

1. Switch off the 240V mains supply and ensure that the DC voltage at each device on each network is greater than 11V whilst the system is powered from its standby battery.
2. Switch on the 240V mains supply and measure the DC voltage between the mains earth connection and AUX +12V. Then measure the DC voltage between the mains earth connection and AUX 0V. In both cases the measurement should be 1V or less. If the voltage is greater than 1V, the system has an "Earth Fault" and all cables should be checked for isolation to Earth.
3. Using a voltmeter measure the DC voltage across the control panel PCB test points (V) and calculate the system current consumption. Ensure that the reading is not greater than 1.5A.
4. Repeat test (3) with the system in an alarm condition and ensure that the reading is not greater than 1.5A.



The TS2500 has an overload protection circuit. If the power supply is overloaded, the display will show: "PSU OVERLOAD ! ! !" and sounder will sound.

Relearn Required Message

When the system is powered up after a factory restart, the remote keypads will display "RELEARN REQUIRED". On entering your engineer's passcode the system will automatically select the "Confirm Network Devices" option, see "Confirm Network Devices" on page 67. After confirming the correct number of devices the "RELEARN REQUIRED" message will be cleared. Once cleared, entering your engineer's passcode will select "Engineers menu 1".

Engineer's Menu 1

Introduction

Engineers menu 1 is the first of four engineers menus, which is selected when the engineer's passcode is entered. The Engineer may leave "Engineer menu 1" by pressing the [ESC] key. The system will return to the unset condition but the remote keypads will show "Engineer-on- site". This message will be cleared the next time a valid user passcode is entered or by selecting the log off engineer option in engineer's menu 1.

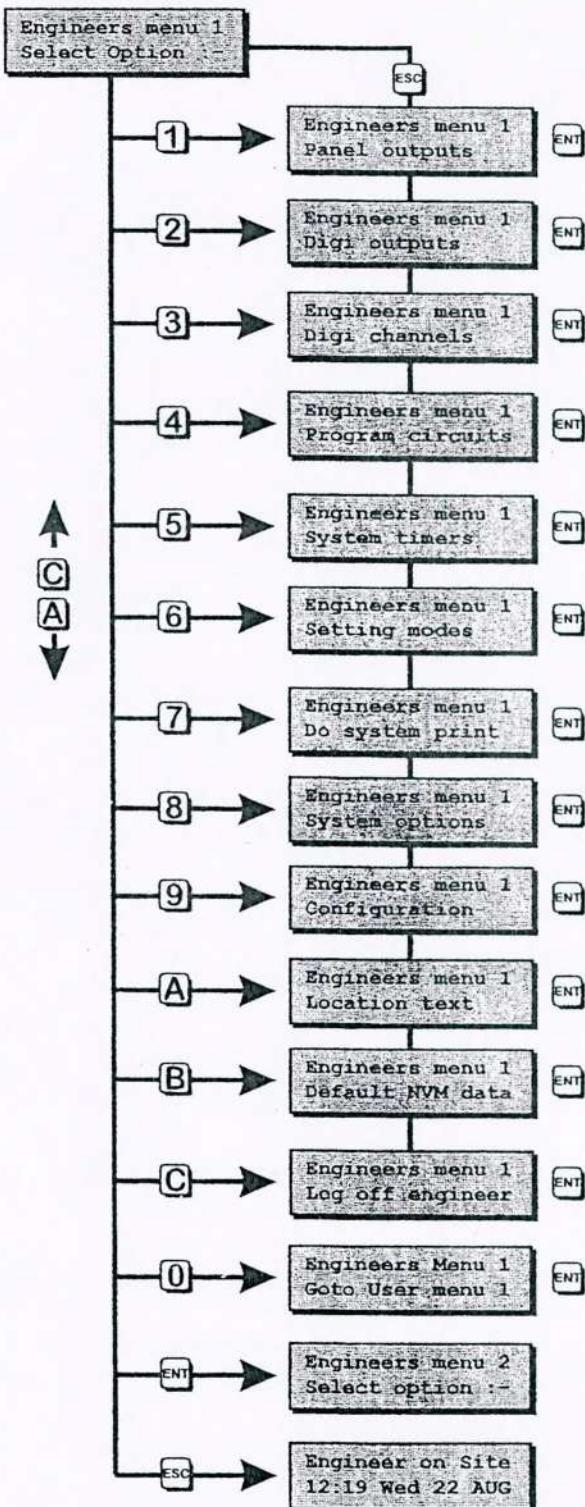
Menu contents

Hotkey	Option	Page
①	Program Panel Outputs	32
②	Program Dicom Outputs	32
③	Program Dicom Channels	32
④	Program Circuits, Attributes & Wards	38
⑤	Program System Timers	40
⑥	Program Setting Modes	42
⑦	System Print-out	42
⑧	Program System Options	43
⑨	Program Configuration	44
A	View Location Text	47
B	Default NVM data	47
C	Log Off Engineer	49
0	Goto User Menu 1	49

Enter Engineer's

Passcode

1 2 3 4



Engineers Menu 1

Panel Outputs**[1-1]**

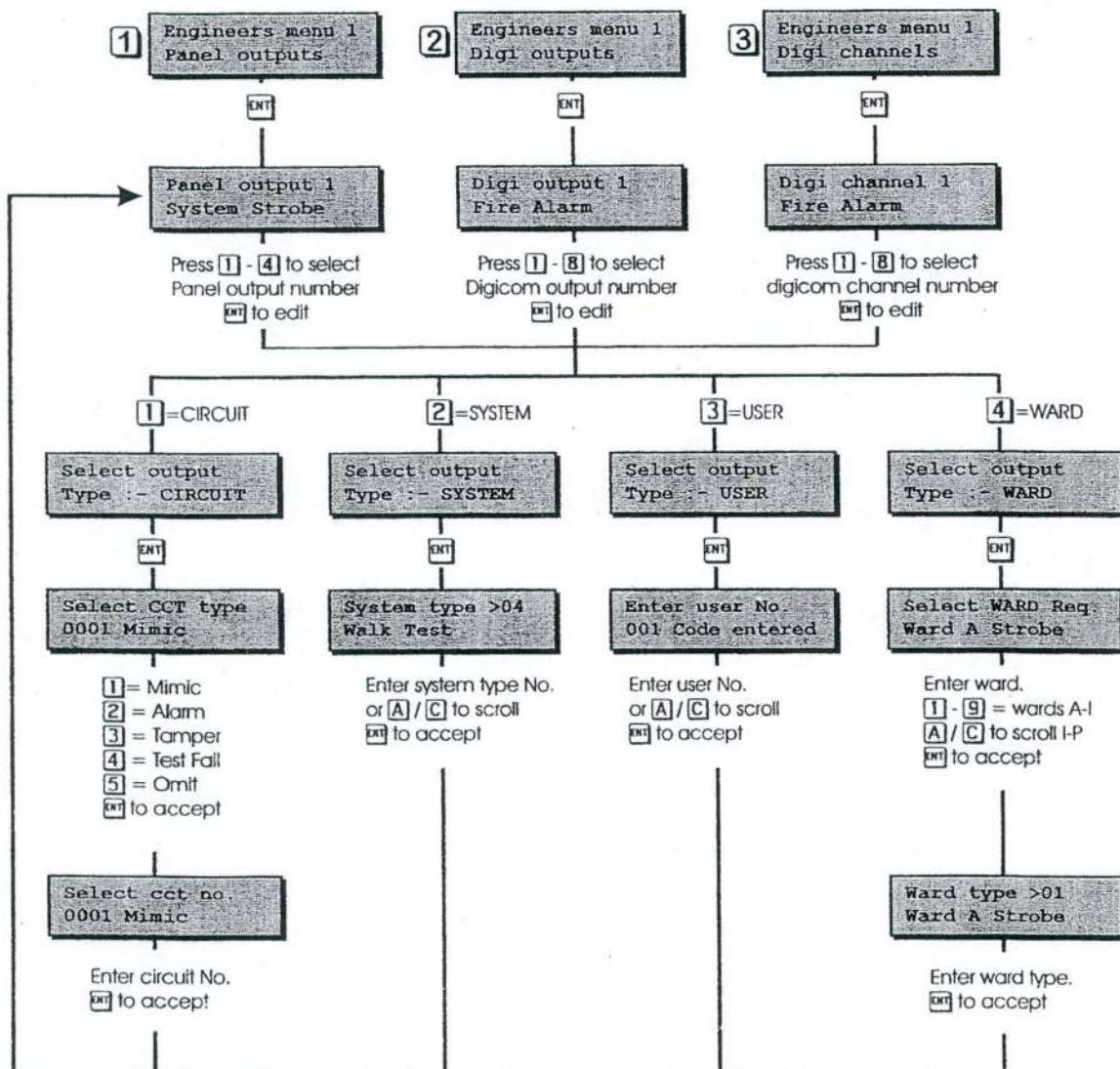
Outputs 1 - 4 on the control panel PCB can be programmed to any of the output types shown on pages 33 - 37. The relay output [Output 1] can also be Inverted, see "Configuration option 11" on page 44.

Digicom Outputs**[1-2]**

The 8 digicom outputs on the control panel PCB can be programmed to any of the output types shown on pages 33 - 37. In addition, all outputs can be inverted, see "Configuration option 12" on page 44.

Digicom Channels**[1-3]**

The 8 plug-on digicom channels can be programmed to any of the output types shown on pages 33 - 37.



Panel Outputs, Digicom Outputs and Digicom Channels Flowchart

Programmable Output Types

The TS2500 output types are broken down in to four specific groups:

- Circuit** Output types related to the status of detection circuits 0001 to 8128.
- System** Output types related to the status of the alarm system in general.
- User** Output types related to the user codes 001 to 199 being used.
- Ward** Output types related to the status of wards A to P.

Circuit Output Types

- 1 Mimic**
Activates when the selected circuit is active, deactivates when the selected circuit is healthy.
- 2 Alarm**
Activates when the selected circuit causes an alarm, deactivates when alarm is reset.
- 3 Tamper**
Activates when the selected circuit is in tamper, deactivates when tamper is reset.
- 4 Test Fail**
Activates when the selected circuit is triggered whilst on test, deactivates when the engineer clears the test failures.
- 5 Omit**
Activates when the selected circuit is omitted, deactivates when the selected circuit is reinstated.

System Output Types

- 00 Bell (SAB)**
Activates when the control panel bell output is on, deactivates when the control panel bell output is off.
- 01 System Strobe**
Activates when the control panel strobe output is on, deactivates when the control panel strobe output is off.
- 02 Switch 12 Volts**
Activates when any ward is set, deactivates when any ward goes into alarm or entry mode. This output is normally used for latching detectors
- 03 Detector Reset**
Activates all the time to power latching detectors (smoke detectors, shock sensors etc.), deactivates for 2 seconds when a code is entered to set the first ward.
- 04 Walk Test**
Activates when the walk test option is selected, deactivates when the walk test is exited.

- 05 Alarm**
Activates when any ward is in alarm, deactivates when all ward alarms have been reset.
- 06 Panic Alarm (PA)**
Activates when any PA alarm is detected, deactivates when all PA alarms have been reset.
- 07 Fire Alarm**
Activates when any fire alarm is detected, deactivates when all fire alarms have been reset.
- 08 System Set**
Activates when any ward is set, deactivates when all wards are unset.
- 09 Code Accepted**
Activates for the duration of the "Access Code Time" after any valid passcode has been entered.
- 10 24hr Alarm**
Activates when any 24Hr alarm is detected, deactivates when all 24Hr alarms have been reset.
- 11 2nd Alarm**
Activates for the duration of the "2nd Alarm Time" when any ward has a second detector causing an alarm (alarm confirmation).
- 12 Courtesy Light**
Activates for the duration of the "Courtesy Time" when any ward is in entry or if any keypad is operated.
- 13 Engineer on site**
Activates when the engineer's code is entered, deactivates when the engineer is logged off.
- 14 Circuits Omitted**
Activates when any circuit is omitted, deactivates when all circuits are reinstated.
- 15 Auxiliary Alarm**
Activates when any ward auxiliary alarm is activated, deactivates when all ward auxiliary alarms are reset.
- 16 Always on**
Active at all times.
- 17 Bell (SCB)**
This is output type 00 inverted.
- 18 Auxiliary Fuse**
Activates when the auxiliary fuse blows.
- 19 Auto-Setting**
Activates for 1 minute prior to any ward being set automatically.
- 20 Tamper Alarm**
Activates when a tamper alarm is triggered, deactivates when all tamper alarms have been reset.

- 21 Phone Line Fault**
Activates when a line fault is detected, deactivates when the telephone line is restored.
- 22 Mains Power Off**
Activates when the mains power is removed from the control panel, deactivates when the mains power is restored.
- 23 Exit / Entry**
Activates when any ward is in entry or exit mode.
- 24 Test CCTS Failed**
Activates when any circuit fails test, deactivates when reset by the engineer.
- 25 1st Knock**
Activates when any double knock circuit activates for the first time, deactivates when the circuit is activated for the second time or when the system is reset.
- 26 Digi Failed**
Activates for 5 seconds when the digicom fails to communicate (plug-on only).
- 27 Digi Successful**
Activates for 5 seconds when the digicom communicates successfully (plug-on only).
- 28 Digi Active**
Activates when the digicom is activated, deactivates when the digicom has finished communicating (plug-on only).
- 29 2nd entry only**
Activates when any ward starts the second entry timer, deactivates when the second entry time expires.
- 30 Entry Only**
Activates when any ward starts its entry mode, deactivates when the ward is set.
- 31 Exit Only**
Activates when any ward starts its exit mode, deactivates when the ward is unset.
- 32 Custom o/p 1 on**
Activates when a combination of output conditions occur, see "Custom Outputs" on page 69.
- 33 Custom o/p 2 on**
Activates when a combination of output conditions occur, see "Custom Outputs" on page 69.
- 34 Custom o/p 3 on**
Activates when a combination of output conditions occur, see "Custom Outputs" on page 69.
- 35 Custom o/p 4 on**
Activates when a combination of output conditions occur, see "Custom Outputs" on page 69.
- 36 Custom o/p 5 on**
Activates when a combination of output conditions occur, see "Custom Outputs" on page 69.
- 37 Custom o/p 6 on**
Activates when a combination of output conditions occur, see "Custom Outputs" on page 69.
- 38 Custom o/p 7 on**
Activates when a combination of output conditions occur, see "Custom Outputs" on page 69.
- 39 Custom o/p 8 on**
Activates when a combination of output conditions occur, see "Custom Outputs" on page 69.
- 40 Time Switch 1 On**
This output is controlled by the settings of "Time Switch 1", see "Time Switches" on page 60.
- 41 Time Switch 2 On**
This output is controlled by the settings of "Time Switch 2", see "Time Switches" on page 60.
- 42 Time Switch 3 On**
This output is controlled by the settings of "Time Switch 3", see "Time Switches" on page 60.
- 43 Access Code**
If configuration option 29 is set to "Access code only" this output will only activate when an "Access" type passcode is entered and will remain active for the duration of the "Access Code Time". If configuration option 29 is set to "Access all codes" this output will activate when any valid passcode is entered and will remain active for the duration of the "Access Code Time".
- 44 Payment Required**
Activates when the "Payment Time" has expired, deactivates when engineer resets the system.
- 45 Battery Test On**
Activates during the battery test and for the duration of the "Battery Test" duration.
- 46 Rem Service Call**
Activates when the system is on-line with a remote PC and the Lineload software.
- 47 System Full Set**
Activates when all defined wards are set, deactivates when any ward is unset.
- 48 24hr Omit Active**
Activates when the 24Hr omit group is omitted, deactivates when the 24Hr group is reinstated.
- 49 PC Output 1 On**
This output is controlled by a PC with Lineload software.

50	PC Output 2 On This output is controlled by a PC with Lineload software.	66	Bell box tamper Activates when the bell tamper is triggered, deactivates when the alarm is reset.
51	PC Output 3 On This output is controlled by a PC with Lineload software.	67	Panel lid tamper Activates when the panel lid tamper is activated, deactivates when the alarm is reset.
52	PC Output 4 On This output is controlled by a PC with Lineload software.	68	Chime Mimic Activates for 2 seconds when any chime circuit is activated..
53	Service Required Activates when the "Service Time" has expired, deactivates when the engineer passcode is entered.	69	24hr CCT Omitted Activates when any 24Hr circuit is manually omitted, deactivates when all omitted circuits are reinstated.
54	Reset Required Activates when the system requires an "Engineer Reset", deactivates when the system is reset either by the engineer or Remote Reset.	70	Monitored O/P On Activates when a monitored circuit is triggered and stays active for the duration of the "Monitor Cct Time".
55	Always Off This output never activates	71	Alarm Abort Activates for the duration of the "Abort duration" timer when the alarm has been aborted by the user .
56	Duress Alarm Activates when a duress code is entered, deactivates when the duress alarm is reset.	72	Code Lock 1 on Activates when "Code lock timer 1" is on, deactivates when the timer is off.
57	System Part Set Activates when any part of the system is set, deactivates when all wards are unset or the system is fully set.	73	Code Lock 2 on Activates when "Code lock timer 2" is on, deactivates when the timer is off.
58	Battery Fault Activates when a battery fault occurs, deactivates when the fault is cleared.	74	Code Lock 3 on Activates when "Code lock timer 3" is on, deactivates when the timer is off.
59	Set Failed Activates when any ward fails to set, deactivates when the set fail condition is reset.	75	Rem call enabled Activates when a user enables remote service call, deactivates when a user disables remote service call or after four hours.
60	System Open Activates when the system is unset, deactivates when any part of the system is set.	76	Auto-set timer 1 Activates when the "Auto-set timer 1" is on, deactivates when timer is off.
61	Shunt code Activates for 5 seconds when a shunt code is entered.	77	Auto-set timer 2 Activates when the "Auto-set timer 2" is on, deactivates when timer is off.
62	Random Output On Activates randomly (between 5 and 60 minutes).	78	Auto-set timer 3 Activates when the "Auto-set timer 3" is on, deactivates when timer is off.
63	Modem Lockout Activates when the modem is locked-out (four failed attempts), deactivates when a master code is entered or after 4 hours.	79	Relearn Required Activates when the system requires a relearn, deactivates when the relearn has been performed.
64	Auxiliary 1 tamp Activates when auxiliary tamper 1 is activated, deactivates when the alarm is reset.	80	Custom cct 1 Activates when the custom circuit 1 is triggered, deactivates when custom circuit 1 is reset.
65	Auxiliary 2 tamp Activates when auxiliary tamper 2 is activated, deactivates when the alarm is reset.	81	Custom cct 2 Activates when the custom circuit 2 is triggered, deactivates when custom circuit 2 is reset.

- 82 Custom cct 3
Activates when the custom circuit 3 is triggered, deactivates when custom circuit 3 is reset.
- 83 Custom cct 4
Activates when the custom circuit 4 is triggered, deactivates when custom circuit 4 is reset.
- 84 Custom cct 5
Activates when the custom circuit 5 is triggered, deactivates when custom circuit 5 is reset.
- 85 Custom cct 6
Activates when the custom circuit 6 is triggered, deactivates when custom circuit 6 is reset.
- 86 Custom cct 7
Activates when the custom circuit 7 is triggered, deactivates when custom circuit 7 is reset.
- 87 Custom cct 8
Activates when the custom circuit 8 is triggered, deactivates when custom circuit 8 is reset.
- 88 Exit Fault
Activates when a circuit is in a fault condition during exit, deactivates when the fault is reset.
- 05 Ward Alarm
Activates when the selected ward is in alarm, deactivates when the selected ward is reset.
- 06 Ward P.A. Alarm
Activates when the selected ward PA alarm is detected, deactivates when the selected ward PA alarm is reset.
- 07 Ward Fire Alarm.
Activates when the selected ward Fire alarm is detected, deactivates when the selected ward Fire alarm is reset.
- 08 Ward Set
Activates when the selected ward is set, deactivates when the selected ward is unset.
- 09 Ward 2nd Entry
Activates when the selected ward second entry timer is running.
- 10 Ward 24hr alm.
Activates when the selected ward 24Hr alarm is detected, deactivates when the selected ward 24Hr alarm is reset.
- 11 Ward 2nd Alarm
Activates for the duration of the "2nd Alarm Time" when the selected ward has a second detector causing an alarm.
- 12 Ward Entry
Activates when the selected ward is in entry mode, deactivates when the selected ward is unset.
- 13 Ward Exit
Activates when the selected ward is in exit mode, deactivates when the selected ward is set.
- 14 Ward CCTS Omit
Activates when the selected ward has any circuits omitted, deactivates when all circuits in the selected ward are reinstated.
- 15 Ward Access
If configuration option 29 is set to "Access code only" this output will only activate when an "Access" type passcode assigned to the selected ward is entered and will remain active for the duration of the "Access Code Time". If configuration option 29 is set to "Access all codes" this output will activate when any valid passcode assigned to the selected ward is entered and will remain active for the duration of the "Access Code Time".
- 16 Ward Set Fail
Activates when the selected ward fails to set, deactivate when the selected ward is reset.
- 17 Ward Bell-SCB
Activates when the selected ward is not in alarm, deactivates when the selected ward bell triggers. Re-activates when ward bell duration timer expires.

User Output Types

- 1 Code entered
If configuration option 26 is set as "Timed Code Output" the output will activate when the selected user passcode is entered and deactivate when the "Access Code Time" has expired.
If configuration option 26 is set as "Latched Code Output" the output will activate when the selected user passcode is entered and deactivate when the selected user passcode is re-entered.

Ward Output Types

- 00 Ward Bell-SAB
Activates when the selected ward is in alarm, deactivates when the selected ward bell duration timer expires.
- 01 Ward Strobe
Activate when the selected ward is in alarm, deactivates when the selected ward is reset.
- 02 Ward Switch 12
Activates when the selected ward is set, deactivates when the selected ward is in alarm or entry. This output is normally used for latching detectors.
- 03 Ward Det. Reset
Active all the time to power latching detectors (smoke detectors, shock sensors etc.), deactivates for 2 seconds when a code is entered to set the selected ward.
- 04 Ward Walk Test
Activates when the selected ward is walk tested, deactivates when the walk test is exited.

- 15 Ward Access
If configuration option 29 is set to "Access code only" this output will only activate when an "Access" type passcode assigned to the selected ward is entered and will remain active for the duration of the "Access Code Time". If configuration option 29 is set to "Access all codes" this output will activate when any valid passcode assigned to the selected ward is entered and will remain active for the duration of the "Access Code Time".
- 16 Ward Set Fail
Activates when the selected ward fails to set, deactivate when the selected ward is reset.
- 17 Ward Bell-SCB
Activates when the selected ward is not in alarm, deactivates when the selected ward bell triggers. Re-activates when ward bell duration timer expires.

- | | |
|---|--|
| 18 Ward Settling
Activates when the selected ward settling timer is running. | 32 Ward Auto set
Activates when the selected high security ward is unset, deactivates when the high security ward is set. |
| 19 Ward Clear
Activates when the selected ward is clear of faults when setting, deactivates when the selected ward has a fault during setting or when ward is unset. | |
| 20 Ward Tamper
Activates when the selected ward detects a tamper alarm, deactivates when the selected ward tamper alarm is reset. | |
| 21 Ward Reset Req
Activates when the selected ward requires a "Reset", deactivates when the ward has been reset. | |
| 22 Ward Lock-Out
Activates when a security key is active in the selected ward, deactivates when the security key is healthy. | |
| 23 Ward Chime On
Activates when any circuit in the selected ward causes a chime tone. | |
| 24 Ward 24hr Omit
Activates when the selected ward has one or more 24hr circuits omitted, deactivates when the selected ward has all its 24hr circuits reinstated. | |
| 25 Ward Monitor
Activates when a monitored circuit is triggered in the selected ward and stays active for the duration of the "Monitor Cct Time". | |
| 26 Ward Alm Abort
Activates for the "Abort Duration" when the alarm in the selected ward has been aborted by the user. | |
| 27 Ward Exit Flt
Activates when the selected ward has a fault during the setting procedure, deactivates when the fault is cleared. | |
| 28 Ward Exit/Ent.
Activates when the selected ward is in entry or exit. | |
| 29 Ward Sndr cll.
Activates when the selected ward is in exit, entry or alarm. | |
| 30 Ward Perimeter
Activates when the selected ward has a Night Perimeter circuit in alarm, deactivates when the alarm is reset. | |
| 31 Ward Shunted
Activates when the selected ward has one or more circuit shunted, deactivates when the circuits are reinstated. | |

Program Circuits

[1-4]

The TS2500 can monitor up to 1040 detection circuits, each circuit must be programmed in order for the system to respond correctly.

Circuit Numbering

The circuit number is always a 4 digit number, the first digit refers to the network number and can be 0 to 8 (0 is used for the TSLEC8s at the control panel). The next three digits refer to the circuits numbers and can be 001 to 128 (except when using network 0 which only has a range of 001 to 016). For example to select the first circuit on network 4 you would enter 4001.

Circuit Types

The circuit type defines how the circuit will respond when it is triggered. The circuit can also be programmed to respond differently when unset, see "Unset Circuit Types" on page 79. The following circuit types are available:

Not Used

A circuit that will never generate any alarm.

Night

A circuit that will generate a full alarm when the selected ward is set.

24hr

A circuit which is monitored at all times. When triggered in the unset condition a local alarm is generated and when triggered in the set condition a full alarm is generated.

PA Silent

A circuit which is monitored at all times. When triggered it will activate any outputs programmed as P.A.

PA Audible

A circuit which is monitored at all times. When triggered it will activate any outputs programmed as P.A. and generate a full alarm condition.

Fire

A circuit that is normally connected to a smoke detector. When triggered it will generate a fire tone on the internal sounders, the external sounders are pulsed for the bell duration and any outputs programmed as fire will be activated.

Auxiliary

A circuit which is monitored at all times. When triggered it will activate any outputs programmed as Auxiliary.

Final Exit

This must be the first detector or door contact that is triggered when entering the protected area. When the setting mode for the area is programmed for Final Exit setting, opening and closing of this circuit during the exit procedure will cause the ward to set. Once set, activation of this circuit will start the entry timer for that ward.

Exit Term

A circuit that is normally connected to a push button outside the protected area, which can be used to finally set the area.

Ward Key

A circuit normally connected to a shunt-lock or keyswitch, which is used to set and unset one or more wards.

Shunt Key

A circuit normally connected to a shunt-lock or keyswitch, which is used to shunt (isolate) one or more shuntable circuits for the selected wards. If the shunt key circuit is not assigned to any wards the shuntable circuits of the device its connected to are shunted when the shunt key operated.

Tamper

A circuit monitored at all times. When triggered in the unset condition a local alarm is generated and when triggered in the set condition a full alarm is generated. This circuit type can be used for a negative tamper return for monitoring SABs etc. When using the circuit for this type of monitoring the circuit MUST have the "Invert" attribute selected.

Security

A circuit used to lock-out keypad operation.

24hr Silent

As 24hr but remains silent in the unset and set condition.

Night Perimeter

A circuit that is used for perimeter protection. When triggered the internal and external sounders are activated but no digicom output. If any other circuit is triggered the digicom is activated.

Custom Circuits

There are eight customisable circuit types, see page 70 for details.

Circuit Attributes

Each circuit type can have one or more attributes assigned to it to alter its operation. The following circuit attributes can be programmed:

Access

Circuits programmed with this attribute are automatically isolated during the entry procedure to allow a "walk through" route for the user to access the remote keypad.

Double Knock

Circuits programmed with this attribute will only cause an alarm condition if:

- a) The circuit is activated twice within the Double Knock timer, see System Timers.
- b) The circuit remains active for the whole duration of the Double Knock timer.

On Test

Circuits with this attribute will be disabled from the system for the period set by the "Test Time", see System Timers. If the circuit is activated during this period the activation will be logged and the user is informed of the circuit failure when operating the system. The test fail message can only be cleared with the Engineers passcode. If at the end of the test period no activation's have occurred the test attribute is automatically removed. The test period is initiated by entering the Engineers passcode.

Omittable

Circuits with this attribute can be omitted by the users.

Reset

This attribute is normally assigned to a circuit that is connected to a vibration or smoke detector, so that during the "Detector Reset" period the circuit is not monitored.

Activity

Circuits with this attribute are monitored so that when they activate the circuit activation is stored. When the user attempts to set the system, any circuits not activated during the "Activity Delay" period are reported, indicating that the detector may be obstructed. An example of this feature would be to assign movement detectors within a warehouse area with this attribute. This would report to the user at the time of setting any detectors that have become obstructed by pallets etc.

Entry

Circuits with this attribute will initiate the entry procedure when the system is part-set and respond as normal when full set. This attribute must be assigned to all circuits that are required to initiate the entry procedure in the part set condition.

Chime Tone 1

Circuits with this attribute will cause the internal sounders and remote keypad sounders to generate a single two-tone "chime" sound if the circuit is activated.

Chime Tone 2

Circuits with this attribute will cause the internal sounders and remote keypad sounders to generate a double two-tone "chime" sound if the circuit is activated.

Chime Tone 3

Circuits with this attribute will cause the internal sounders and remote keypad sounders to generate a triple two-tone "chime" sound if the circuit is activated.

Inverted

Circuits with this attribute are inverted so that a healthy circuit is seen as active and an active circuit is seen as healthy. This attribute should be used when monitoring normally open devices such as exit terminator buttons and pressure pads etc.

Shutable

Circuits with this attribute are shunted (isolated) when a "Shunt Key" circuit is operated or when a "Shunt code" is entered.

Beam Pair

Circuits with this attribute will only cause an alarm if two or more circuits with the beam pair attribute are in alarm in the same ward within the "Beam Pair" timer.

Eng. Test

Circuits with this attribute are enabled during the engineer false setting routine.

Monitored

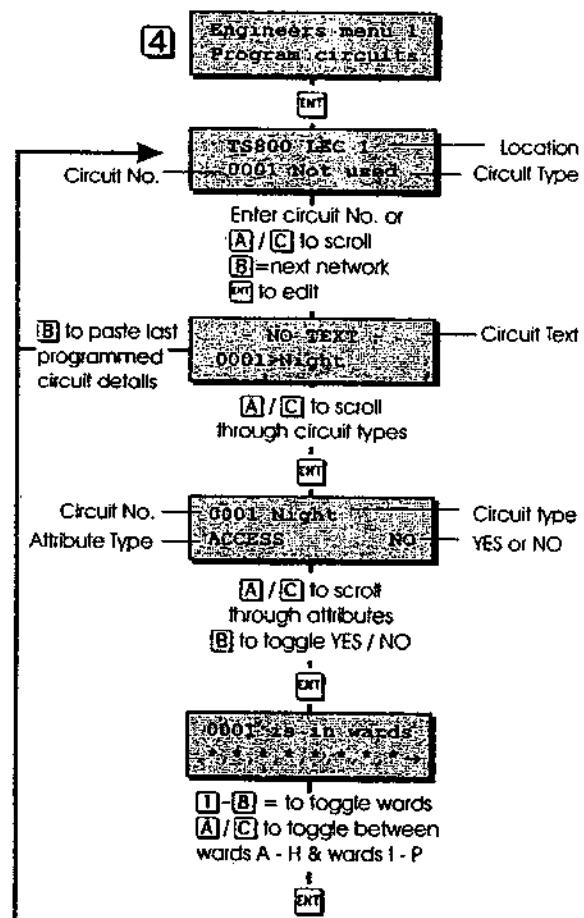
Circuits with this attribute activate the "Monitored" output type when triggered.

Non Latching

This attribute is used to make the "Ward Key", "Shunt Key" or "Security Key" non latching.

Circuit Wards

The TS2500 has sixteen wards which are labelled A to P, each circuit can be assigned into one or more wards. Circuits assigned to more than one ward will only be armed when all the wards they are in are set.



Program Circuits Flowchart

System Timers

[1-5]

There are 103 programmable system timers which are listed below.

Exit time wards A to P

When using timed exit this timer sets the delay between the user initiating the exit procedure and the ward actually setting. If during the exit time an "Exit Terminator" circuit is activated the any remaining exit time is cancelled and the ward sets immediately. (Default = 030 Seconds).

Entry dly wards A to P

When the ward is set and the entry procedure is initiated, the entry timer starts to count down. If a valid user passcode has not been entered when the timer reaches zero, the internal sounders are activated and the "2nd entry delay" timer is started. (Default = 015 Seconds).

Digi dly wards A to P

When an alarm is triggered the communication of an alarm signal to the central station for the selected ward can be delayed by the value of this timer. (Default = 000 Seconds).

Bell dly wards A to P

When an alarm is triggered the activation of the external sounder for the selected ward can be delayed by the value of this timer. (Default = 000 Minutes).

Bell dur wards A to P

When the "Bell Delay" for the selected ward has expired the duration of the external sounder can be controlled by the value of this timer. (Default = 020 Minutes).

Exit settle time

When a ward is set by "Final Exit" or "Exit Terminator", detectors that are on the exit route sometimes take several seconds to settle after activation. The delay programmed in this timer is used to ensure that these detectors are not active before the ward is set. (Default = 005 Seconds).

2nd Entry delay

When the ward "Entry Dly" has expired the "2nd entry delay" timer starts to count down. If at the end of this time the ward has not been unset then an alarm will be generated for the relevant ward. (Default = 015 Seconds).

Double knock dly

This is the "Double Knock" time window in which either two circuit activations must occur to generate an alarm condition, or the circuit must remain active for the whole duration of this time to generate an alarm condition. This will only apply to circuits with the "Double Knock" attribute. (Default = 010 Seconds).

Abort duration

This timer controls the duration of the "Abort" output. (Default = 010 Seconds).

Abort delay

This timer sets the period in which the alarm signal may be aborted following an alarm condition. When an alarm occurs, the "Abort Output" is only activated if the system is unset within this period. If the system is unset after this period the abort output is NOT activated. (Default = 180 Seconds).

2nd alarm time

This timer controls the duration of the "Second Alarm" (Confirmation) output. (Default = 060 Seconds).

Courtesy time

This timer is used to control the duration of the output type "Courtesy Light". (Default = 120 Seconds).

Access code time

This timer is used to control the duration of the output types "Code Accepted", "User code entered" and "Ward Access". (Default = 005 Seconds).

Menu time-out

This timer controls how long a user menu can be selected before timing out and returning the system to the unset condition. (Default = 180 Seconds).

Line fault delay

This timer delays the "audible" line fault indication when a telephone line fault occurs. The display and any outputs programmed as "Phone Line Fault" are not affected. (Default = 030 Seconds).

AC off delay

This timer delays the "audible" mains off indication when the mains power is removed. The display and any outputs programmed as "Mains Power Off" are not affected. (Default = 030 Seconds).

Monitor cct time

This timer affects the duration of the output types "System Monitored" and "Ward Monitor". (Default = 060 Seconds).

Beam Pair time

This is the time window in which two "Beam Pair" circuit activations must occur in order for the system to generate an alarm condition. (Default = 010 Seconds).

Battery test dur

This timer controls the duration of the battery test. (Default = 030 Seconds).

Answer ring time

This timer is used to allow modems and faxes/answer machines to be used on the same telephone line. For example if the timer is set to 30 seconds, the PC will dial into the alarm system and allow the line to ring for 3 or 4 seconds then hang up. The PC will then dial in again and providing this has occurred within 30 seconds of the first time it rang in, the panel modem will answer the call. (Default = 030 Seconds).

Global belt div.

If the system is fully set and the Global/Ward Bell configuration option (23) is set to "Global" the system will apply this timer to all alarms for all wards, otherwise it will use the relevant ward bell delay timer. (Default = 000 Minutes).

Global bell cur.

If the system is fully set and the Global Ward Bell configuration option (23) is set to "Global" the system will apply this timer to all alarms for all wards, otherwise it will use the relevant ward bell duration timer. (Default = 020 Minutes).

Activity delay

This timer sets the duration within which all "Activity Monitored" circuits must be activated to ensure that the system may be set without displaying inactive circuits. Once the timer expires it is restarted and all "Activity Monitored" circuits must once again be re-activated. (Default = 060 Minutes).

Defer setting by

When using the auto-set feature users may defer setting of the word(s) by the amount set in this timer. (Default = 010 Minutes).

Battery test

The timer controls the frequency of the system battery test. (Default = 060 Minutes).

Hi Security time

This timer sets the duration in which a "High Security" ward can remain unset before it automatically attempts to set itself. When a "High Security" ward is unset activation of any circuit with that ward will reset this timer. (Default = 000 Minutes).

Cct test time

This timer varies the number of days that the "Test" attribute may be applied to a circuit. If the timer is set to 000 then circuits will remain on test until the "Test" attribute is removed. (Default = 014 Days).

Service time

The installation company may use this timer to periodically generate "SERVICE REQUIRED" message so that the user is reminded that a service call is required. The users may continue to set and unset the system. When the engineer attends the site and enters their passcode the message is cleared. The service timer is re-started when the engineer re-selects this timer option. To disable this feature set the timer to 000. (Default = 000 Days).

Payment time

The installation company may use this timer to prevent the users from setting the system. When the timer expires the selected ward will lock into "Engineer Reset" and the users are unable to set the selected ward until the engineer has reset the system or the user has been provided with a "Remote Reset" code.

To disable this feature set the timer to 000. The payment timer can be selectively applied to wards A to P, see "Equipment Wards" on page 78. (Default = 000 Days).

Test call every

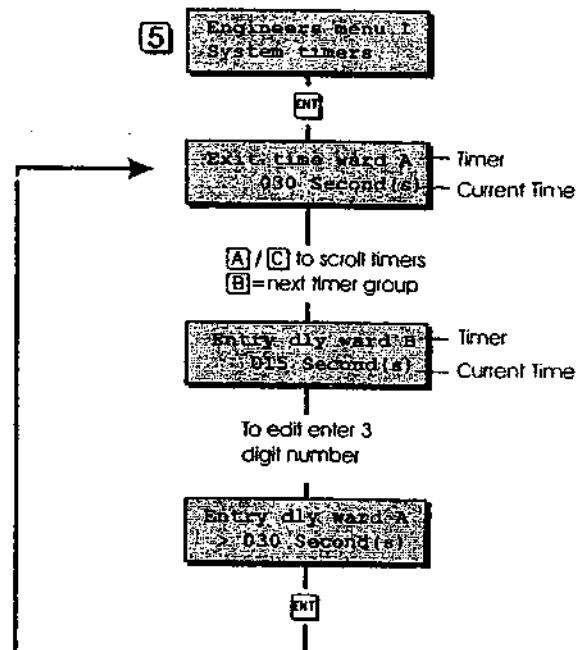
If the system is fitted with a plug-on digicom (DC54, DC58 or DC58M) it is possible for the control panel to make the digicom send a timed test call to the central station. The "Test Call" timer sets the frequency of activation in days. Once programmed the digicom will send the test call at 3.00AM. (*Default = 000 Days*).

Select menu item

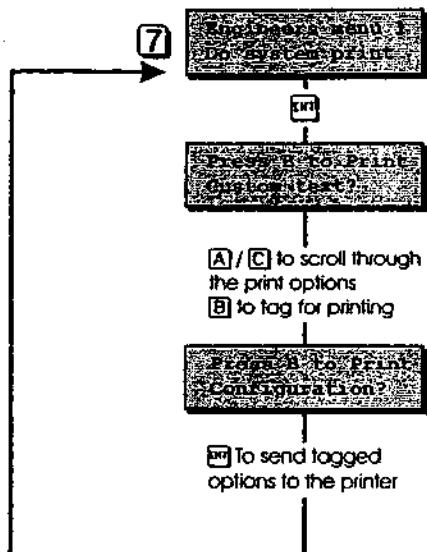
This timer determines how long the "Set/Unset" menu is displayed after a user passcode is entered. (Default = 010 Seconds).

Custom o/p 2 fmri

This timer determines how long "Custom Output 2" will remain active after it is triggered. (Default = 000 Seconds).



System Timers Flowchart



System Print Flowchart

System Options

[1-8]

The system options are as follows:

Number of rearms

At the end of the bell duration time the system re-arms all circuits that are healthy. Circuits that are still in an alarm are isolated until they change to a healthy condition. This counter controls the number of times that a "circuit" will re-arm before it is locked out of the system. The rearm feature can be selectively applied to wards A to P, see page 78. (Default = 003).

Modem rings

This counter is for use with the DC58M, it allows the engineer to specify how many rings are required before the DC58M answers the call. If the counter is set to 000 it will answer the call immediately. (Default = 000)

Keys until tame

The value of this counter determines how many illegal key presses can be entered before the a code tamper occurs. A code tamper locks out the remote keypad for 5 minutes. (Default = 017)

Remote resets

This counter determines how many "Remote Resets" can occur before the system locks into engineer reset only. When the engineer attends site and enters their passcode the counter is restored to its original value. The Remote Reset feature can be selectively applied to wards A to P, see page 78. (Default = 032)

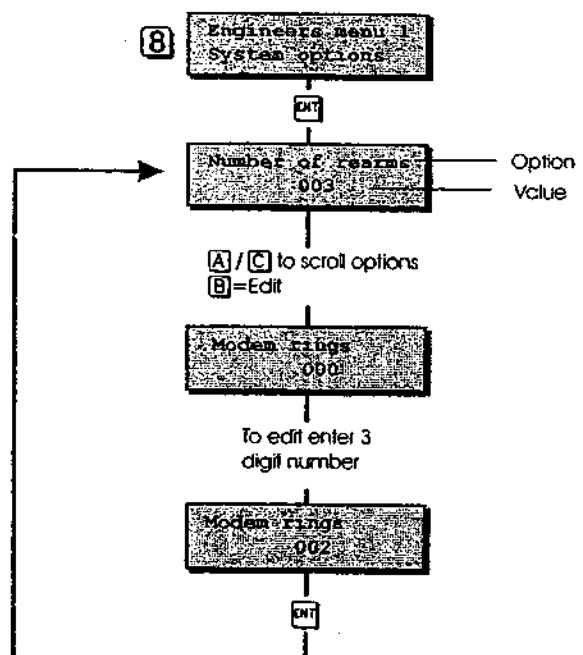
Reset algorithm

When a ward is programmed for "Engineer Reset" the requirement to send an engineer to site can be overridden by the user by using the "Remote Reset" facility. If an alarm is generated the system will respond with a four digit "seed" code which the user quotes to the Alarm Receiving Centre or alarm company. The "seed" code is then entered into a decoder and a unique "Remote Reset" code is generated. This is passed back to the user and on entering the "Remote Reset" code, the system is reset. The remote reset feature can be selectively applied to wards A to P, see page 78.

The "Remote Reset" code is generated using an algorithm identified by a 3 digit number. Alternative algorithms can be selected but these must correspond to that used by the ARC (or alarm company) otherwise the "Remote Reset" code will be incorrect. (Default = 004).

Double Knocks

This counter determines how many "Knocks" must occur on a double knock circuit before the control panel responds with an alarm condition. This counter can then be selectively applied to wards A to P, see page 78. If a ward is not selected to use this counter all double knock circuits within the ward will behave as normal double knock circuits, i.e they must activate twice within the double knock time delay or remain active for the duration of the double knock delay before causing an alarm. *(Default = 002).*



System Options Flowchart

Configuration

[1-9]

There are 35 configuration options as follows:

- | | |
|---|--|
| <p>00 Bell Is an SAB (Default)
The control panel bell output applies 0V when active.</p> <p>Bell is an SCB
The control panel bell output removes 0V when active.</p> | <p>07 Unset ward first (Default)
When the system is part set and a passcode is entered the "0=UNSETWARDS" option will be displayed first.</p> <p>Set ward first
When the system is part set and a passcode is entered the "0=SETWARDS" option will be displayed first.</p> |
| <p>01 View alms P.set (Default)
When the system is part set and alarm occurs in a set ward the alarm information is displayed on all remote keypads immediately.</p> <p>View alms unset
When the system is part set and alarm occurs in a set ward the alarm information is only displayed when the ward that the alarm occurred in is unset.</p> | <p>08 Can set with LF (Default)
The selected wards can be set with a telephone line fault, however the user will be asked to confirm this at the time of setting. Line fault can be assigned to any ward, see "Equipment Wards" on page 78.</p> <p>No set with LF
The selected wards cannot be set with a telephone line fault.</p> |
| <p>02 Duress Disabled (Default)
When entering a passcode with the first two digits reversed a duress alarm will NOT be generated.</p> <p>Duress Enabled
When entering a passcode with the first two digits reversed a duress alarm will be generated.</p> | <p>09 Can set - AC off (Default)
The selected wards can be set with no mains power. Mains power off can be assigned to any ward, see "Equipment Wards" on page 78.</p> <p>No set - AC off
The selected wards cannot be set when the mains power is off.</p> |
| <p>03 Engr Authorised (Default)
When using Menvier Lineload software data in the control panel can be overwritten without the users knowledge.</p> <p>User Authorised
When using Menvier Lineload software data in the control panel can only be overwritten with authorisation by the user.</p> | <p>10 Quiet chimes (Default)
The level of the chime tones is determined by the volume control of the device driving the loudspeaker. If the device is a XNode the volume level set by the volume control pot on the XNode PCB. If the device is the control panel the volume level is set via the "Set Volume Level" option, see "Set Volume Level" on page 81.</p> <p>Loud chimes
The level of the chime tones is always full volume.</p> |
| <p>04 On-Line Enabled (Default)
When using Menvier Lineload software the On-Line Keypad feature is enabled.</p> <p>On-Line Disabled
When using Menvier Lineload software the On-Line Keypad feature is disabled.</p> | <p>11 O/P 1 normal (Default)
Panel output 1 (Relay) is normally de-energised.</p> <p>O/P 1 inverted
Panel output 1 (Relay) is normally energised.</p> |
| <p>05 Lo-sec Engineer (Default)
The engineer can access the engineers programming menus by entering his engineer's passcode.</p> <p>Hi-sec Engineer
The engineer can only access the engineers programming menus after entering his engineer's passcode and obtaining a "Remote Reset" code.</p> | <p>12 Digi normal (Default)
The eight digicom outputs on the control panel switch from +12V to 0V when active (+ve removed).</p> <p>Digi inverted
The eight digicom outputs on the control panel switch from 0V to +12V when active (+ve applied).</p> |
| <p>06 Normal answer (Default)
When using a DC58M digi-modem the modem will answer the call after a pre-programmed number of rings, see "System Options" on page 43.</p> <p>Timed answer
When using the DC58M digi-modem the digi-modem will used the "answer ring timer", see "System Timer" on page 43.</p> | <p>13 4 digit codes (Default)
All system passcodes are 4 digits.</p> <p>6 digit codes
All system passcodes are 6 digits. When using 6 digit passcode the last 2 digits of the passcode are the user number, e.g. the engineer's passcode is 123400 and the master user's passcode is 567801.</p> |

- 14 Modem on Com1 (Default)**
The panel comms port (JP8) is used for the modem.
- Printer on Com1**
The panel comms port (JP8) is used for the printer.
- 15 Chime Audible (Default)**
Circuits that are programmed as chime will only generate a chime tone.
- Chime Visible**
Circuits that are programmed as chime will generate a chime tone and the remote keypads will display the circuit that was triggered.
- 16 Manual Omits (Default)**
Circuits with the omit attribute can only be omitted via the user omit routine.
- Automatic Omits**
Circuits with the omit attribute are automatically omitted if they are still active when the system is being set.
- 17 Omit Tamper No (Default)**
Tamper faults cannot be omitted by the user.
- Omit Tamper Yes**
Tamper faults can be omitted by the user.
- 18 O/M's mimic cct (Default)**
The output modules connected to the control panel indicate circuit mimic activations.
- O/M's mimic alms**
The output modules connected to the control panel indicate circuit alarm activations.
- 19 Log Time & Date (Default)**
The system log will show the time and date in the following format: "17:10.57 25/12" where 25/12 is the 25 December.
- Log Time & Day**
The system log will show the time and day in the following format: "17:10.57 Wed 25" where Wed is Wednesday and 25 is the date.
- 20 Global Setting (Default)**
The user can set their allocated wards from any remote keypad.
- Local Setting**
The user can only set their allocated wards from a remote keypad assigned to their wards.
- 21 Global Unsetting (Default)**
The user can unset their allocated wards from any remote keypad.
- Local Unsetting**
The user can only unset their allocated wards from a remote keypad assigned to their wards.
- 22 24hr Omit Global (Default)**
Any 24hr circuit or group can be omitted from any remote keypad.
- 24hr Omit Local**
Only 24hr circuits or group that are assigned to the same wards as the remote keypad can be omitted.
- 23 Ward bell time (Default)**
The system uses the respective "ward bell delay" and "ward bell duration" timers when the system is full or part set.
- Global bell time**
When the system is part-set the respective "ward bell delay" and "ward bell duration" timers are used. When the system is full set the system uses the "global bell delay" and "global bell duration" timers.
- 24 Latching Fire (Default)**
Fire detection circuits will cause an alarm when triggered and will only be re-armed after a full reset, i.e. Enter passcode to silence alarm, then enter passcode followed by [ESC] to reset the alarm.
- Nonlatching Fire**
Fire detection circuits will cause an alarm when triggered. On entering a passcode the alarm is silenced, if the same circuit is activated before carrying out a reset, the alarm re-triggered.
- 25 Online Printing (Default)**
Events recorded in the system log are also sent to the printer port.
- Offline Printing**
Events recorded in the system log are not sent to the printer port.
- 26 Timed code o/p (Default)**
The "User Code Accepted" output types are timed for the duration of the "Access code time".
- Latched code o/p**
The "User Code Accepted" output types are activated when user passcode is entered and de-activated when the passcode is re-entered.
- 27 Activity fit ok (Default)**
Users can set their wards with circuits flagged as inactive.
- Activity fit Bar**
Users cannot set the system whilst circuits are flagged as inactive (forced walk test).

28 Latching 24hr (Default)

24 hour detection circuits will cause an alarm when triggered and will only be re-armed after a full reset, i.e. Enter passcode to silence alarm, then enter passcode followed by [ESC] to reset the alarm.

Nonlatching 24hr

24 hour detection circuits will cause an alarm when triggered. On entering a passcode the alarm is silenced, if the same circuit is activated before carrying out a reset, the alarm re-triggered.

29 Access code only (Default)

The "System Access" and "Ward Access" output types are triggered only when a "Access" type passcode is entered.

Access all codes

The "System Access" and "Ward Access" output types are triggered when any passcode is entered.

30 Answer anytime (Default)

When using a DC58M digi-modem, the digi-modem will always attempt to answer incoming calls.

Answer o/p 1 on

The digi-modem will only attempt to answer incoming calls when "Custom Output 1" is on.

31 NVM is Unlocked (Default)

The NVM can be reset to the factory defaults by shorting the FACTORY RESTART pins during power-up.

NVM is Locked

The NVM cannot be reset by shorting the FACTORY RESTART.

 If the "NVM Is LOCKED" option is selected it is imperative that the engineer code is not lost or forgotten. If this is the case then the only way of returning the system to its factory default setting is by returning the control panel PCB to Menvier Security.

32 Unshunt, no exit (Default)

The use of a shunt code to reinstated a selected group of circuits will not initiate the exit procedure.

Unshunt & exit

The use of a shunt code to reinstated a selected group of circuits will initiate the exit procedure.

33 Ignore errors (Default)

When attempting to set with one or more circuits in fault the system will continue with the exit procedure but will display the circuits that are in fault. If the circuits are not cleared at the end of the exit procedure a set fail condition will occur.

View exit errors

When attempting to set with one or more circuits in a fault the system will prompt the user that a fault exists and the display will scroll through the circuits

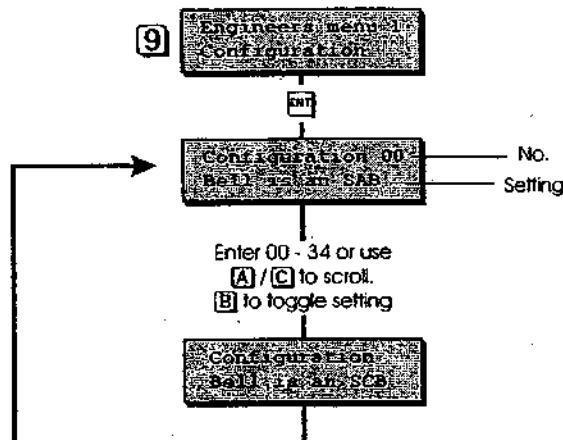
that are in fault. Once the faulty circuits are cleared the user will be prompted to press [ENT] to continue with the exit procedure.

34 Mimic. All times (Default)

When using output modules or outputs that are programmed as circuit mimic, the outputs will mimic the circuit at all times.

Mimic. Set only

When using output modules or outputs that are programmed as circuit mimic, the outputs will only mimic the circuit if the circuit is in a set ward.



Configuration Flowchart

Location Text [1-A]

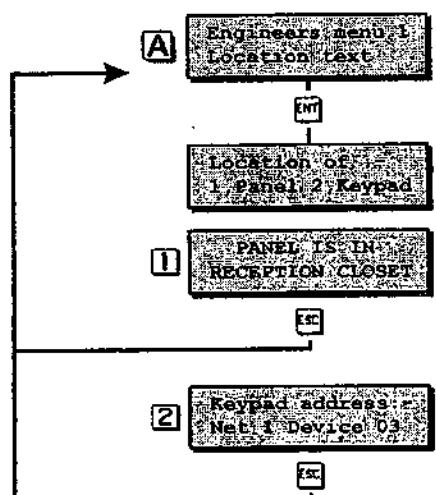
This option allows the engineer to view the following:-

Panel Location Text

This option displays the panel location text which is programmed in "Engineers menu 3", see "Custom Text Menu" on page 64.

Keypad Location

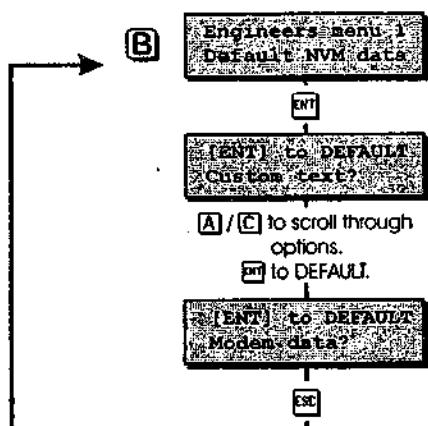
This option displays the network number and device number of the keypad that is currently being used.



View Location Text Flowchart

Default NVM Data**[1-B]**

The default NVM data option allow the engineer to reset the NVM data back to the factory defaults. The initialisation procedure has been broken down into specific sections so that the engineer can reset all data or specific areas.



Default NVM Data Flowchart

Section	Option	Default
Custom Text	Reset Message	CALL ENGINEER TO RESET SYSTEM
	Location Text	PANEL LOCATION TEXT NOT SETUP
	Printer Header	MENIER SECURITY TS2500 SYSTEM
	Printer Prefix	Blank
	Banner Message	Blank
	Part Set Banner	Blank
	Aux Tamper 1	Blank
	Aux Tamper 2	Blank
Modem Data	Remote Reset Msg	RING A.R.C FOR REM. RESET CODE
	Modem String	Blank
	Call Back No.1	Blank
	Call Back No.1	Blank
	Call Back No.1	Blank
User Codes	Modem Password	Blank
	Modem Site No.	Blank
	User 000 Engineer	1234
Configuration	User 001 Master	5678
	User 002 - 199	Not used
	00	Bell is an SAB
	01	View alarms P.Set
	02	Duress Disabled
	03	Engr Authorised
	04	On-Line Enabled
	05	Lo-sec Engineer
	06	Normal answer
	07	Unset ward first
	08	Can set with L.F
	09	Can set - AC off
	10	Quiet chimes
	11	O/P 1 normal
	12	Digi normal
	13	4 digit codes
	14	Modem on Com1
	15	Chime Audible
	16	Manual Omits
	17	Omit Tamper No
	18	O/M's mimic cct
	19	Log Time & Date
	20	Global Setting
	21	Global Unsetting
	22	24hr Omit Global
	23	Ward bell time
	24	Latching Fire
	25	Online Printing
	26	Timed code o/p

Section	Option	Default
Configuration	27	Activity fit ok
	28	Latching 24hr
	29	Access code only
	30	Answer anytime
	31	NVM is Unlocked
	32	Unshunt & No exit
	33	Ignore errors
	34	Mimic. All times
Outputs	Panel Output 1	Walk Test
	Panel Output 2	Courtesy Light
	Panel Output 3	Switch 12 Volts
	Panel Output 4	Detector Reset
	Digicom Output 1	Fire Alarm
	Digicom Output 2	Panic Alarm (PA)
	Digicom Output 3	Alarm
	Digicom Output 4	System Set
	Digicom Output 5	Engineer on site
	Digicom Output 6	Bell (SAB)
	Digicom Output 7	Tamper Alarm
	Digicom Output 8	2nd Alarm
	Digi Channel 1	Fire Alarm
	Digi Channel 2	Panic Alarm (PA)
	Digi Channel 3	Alarm
	Digi Channel 4	System Set
	Digi Channel 5	Engineer on site
	Digi Channel 6	Bell (SAB)
	Digi Channel 7	Tamper Alarm
	Digi Channel 8	2nd Alarm
	All Node Outputs	Circuit 0001 Alarm
	All Remote Outputs	Circuit 0001 Alarm
	Custom outputs 1-8	Circuit 0001 Alarm
Setting Modes	All Wards	Timed Exit
System Timers	Exit time wards A-P	030 Seconds
	Entry dly wards A-P	015 Seconds
	Digi dly wards A-P	000 Seconds
	Bell dly wards A-P	000 Minutes
	Bell dur wards A-P	020 Minutes
	Exit settle time	005 Seconds
	2nd Entry delay	015 Seconds
	Double Knock dly	010 Seconds
	Abort duration	010 Seconds
	Abort delay	180 Seconds
	2nd alarm time	060 Seconds
	Courtesy time	120 Seconds
	Access code time	005 Seconds
	Menu time-out	180 Seconds
	Line fault delay	030 Seconds
	AC off delay	030 Seconds

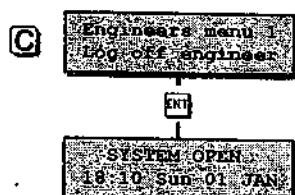
Section	Option	Default
System Timers	Monitor cct time	060 Seconds
	Beam pair time	010 Seconds
	Battery test dur	030 Seconds
	Answer ring time	030 Seconds
	Global bell dly	000 Minutes
	Global bell dur	020 Minutes
	Activity delay	060 Minutes
	Defer setting by	010 Minutes
	Battery test	060 Minutes
	Hi Security time	000 minutes
	Cct test time	014 Days
	Service time	000 Days
	Payment time	000 Days
	Test call every	000 Days
	Select menu time	010 Seconds
	Custom o/p 2 Tmr	000 Seconds
	Number of rearms	003
	Modem rings	000
	keys until tamp	017
	Remote resets	032
	Reset algorithm	004
	Double Knocks	002
Time Switches	On times 1, 2 & 3	00:00
	Off times 1, 2 & 3	00:00
	Timers operate on	No days
	Time switch output	Off
Code Locks	On times 1, 2 & 3	00:00
	Off times 1, 2 & 3	00:00
	Timers operate on	No days
	Time lock output	Off
	User assigned	None
Auto-set Times	Set times 1, 2 & 3	00:00
	Unset times 1, 2 & 3	00:00
	Timers operate on	No days
	Wards assigned	None
Custom Circuits	Circuits 1 - 8	Not defined
Circuits	Circuits 0001 - 8128	Not Used
Equipment Wards	Panel tamper	Ward A
	Bell box tamper	Ward A
	Aux 1 tamper	Ward A
	Aux 2 tamper	Ward A
	Phone line fault	Ward A
	Mains power off	Ward A
	Payment timer	Not assigned
	Alarms Eng Reset	Not assigned
	Tamper Eng Reset	Ward A
	Remote reset	Ward A
	Panel speaker	Ward A

Section	Option	Default
Equipment Wards	Relearn required	Not assigned
	Re-arms apply to	Ward A
	Hi Security ward	Not assigned
	Digi in Part Set	Wards A - P
	System Bell/STB	Wards A - P
	Ward A foyer Mode	Not assigned
	Unset fire sig.	Not assigned
Net Equipment	Dble Knock wards	Not assigned
	All new devices	Ward A
	Part set groups	Part set groups 0 - 9
Log	All 4000 Events	No Event

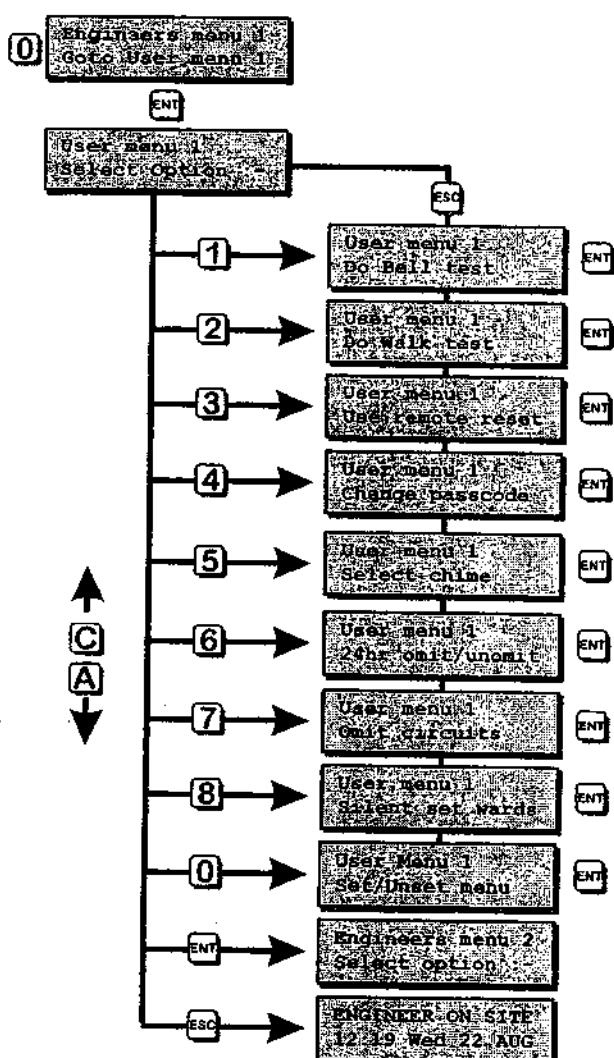
Log Off Engineer

[1-C]

Selecting this option will log off all engineers and return the system to the "SYSTEM OPEN" condition.

*Log Off Engineer Flowchart***Goto User Menu 1** [1-0]

This option allows the engineer to access "User menu 1", the flowchart below shows the options within "User menu 1", for full details refer to the "Operators Manual".

*User Menu 1 Flowchart*

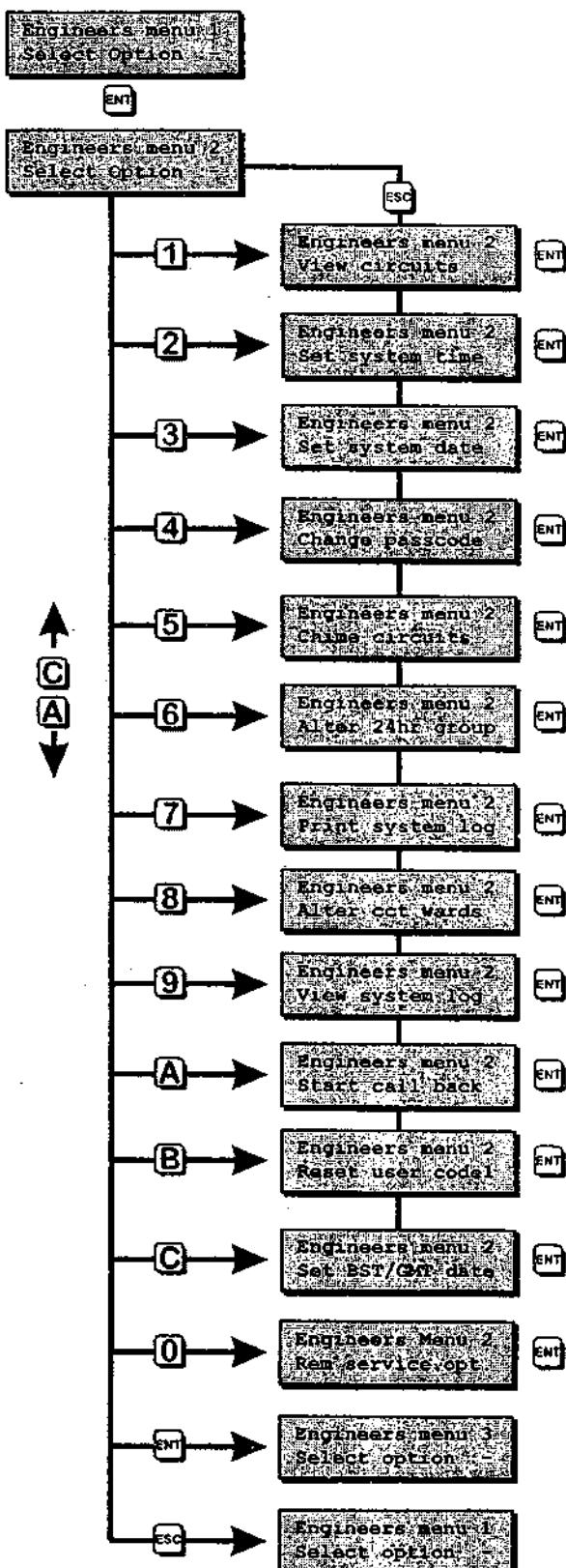
● Engineer's Menu 2

Introduction

Engineers menu 2 is selected by pressing the [ENT] whilst Engineers menu 1 is selected. Each menu option can be selected by pressing the relevant "hot-key" or you can scroll forwards and backwards through the options using the [A] and [C] keys.

Menu contents

Hotkey	Option	Page
1	View Circuits	52
2	Set System Time	52
3	Set System Date	52
4	Change Passcode {Engineers}	52
5	Alter Chime Circuits	53
6	Alter 24hr Group	53
7	Print System Log	53
8	Alter Circuit Wards	54
9	View System Log	54
A	Start Call Back Sequence	58
B	Reset User Code 1	58
C	Set BST/GMT Dates	58
0	Remote Service Options	58

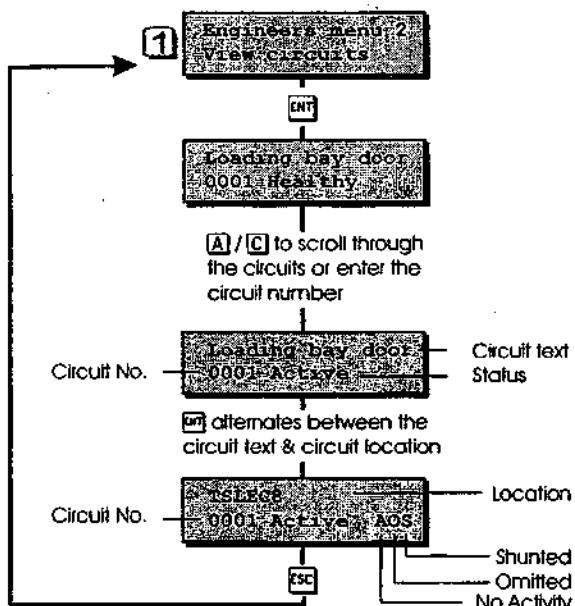


Engineer's Menu 2

View Circuits [2-1]

Each detection circuit may be viewed to ascertain its status. The circuit status conditions and resistance are shown below:

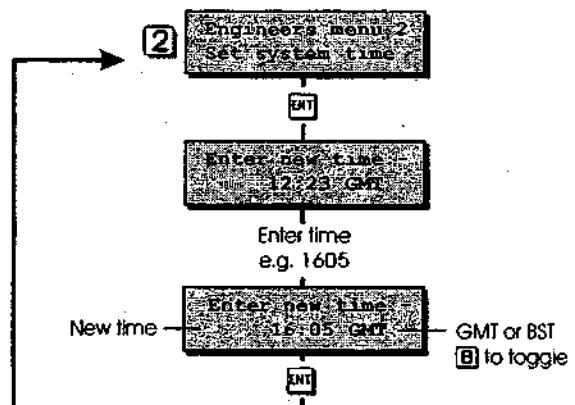
Status	Response	Normal	Min.	Max.
Healthy	None	2.2 kΩ	54 Ω	4.1 kΩ
Active	Alarm	6.9 kΩ	4.1 kΩ	54 kΩ
Tamper	Tamper	∞	54 kΩ	∞
Shorted	Alarm	0 Ω	0 Ω	53 Ω



View Circuits Flowchart

Set System Time [2-2]

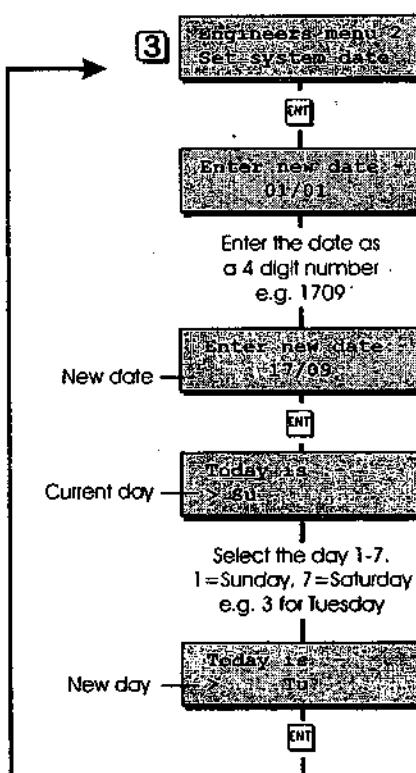
The system time is displayed in a 24hr format on all remote keypads and is also used to time stamp events in the system event log. The BST/GMT changeover can be programmed to automatically occur on specific dates, see page 58.



Set System Time Flowchart

Set System Date [2-3]

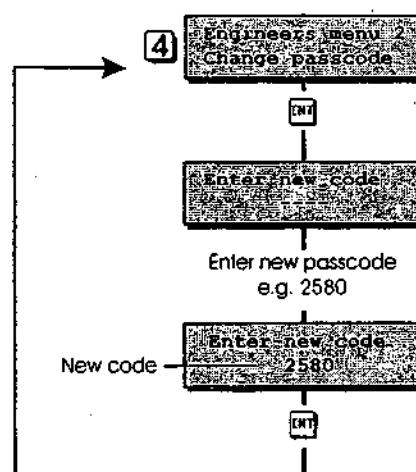
The system date is displayed in a day/date/month format on LCD remote keypads. It is also used to provide date stamps for events in the system log.



Set System Date Flowchart

Change Passcode [2-4]

This option allows the engineer to change their passcode. The default passcode is 1234 if 4-digit passcode are enabled and 123400 if 6-digit passcodes are enabled.



Change Passcode Flowchart

Alter Chime Circuits [2-5]

This option allows an alternative method of programming circuits as "chime". Three types of chime tones are available:

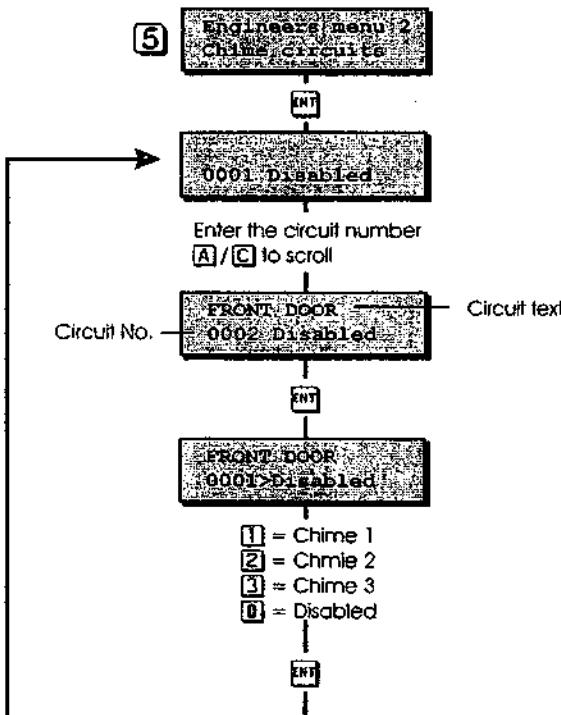
Chime 1
Generates a single two-tone chime sound.

Chime 2
Generates a double two-tone chime sound.

Chime 3
Generates a triple two-tone chime sound.

When a circuit is programmed as chime it will only generates the relevant chime tone from remote keypad sounders and extension loudspeakers assigned to the same ward(s) as the detection circuit.

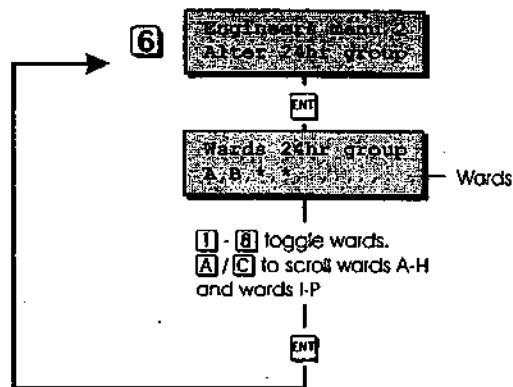
If configuration option 15 is programmed as "Chime Visible", the display will show the circuit that caused the chime.



Chime Circuits Flowchart

Alter 24Hr Group [2-6]

Any combination of wards can be assigned to the 24hr group. Circuit types "24hr" and "Auxiliary" with the "Omittable" attribute within the selected ward will be isolated when the selected ward is omitted using user menu 1 option 6 (24hr omit/unomit). Only the wards that are assigned to the 24hr group can be selected by the user.

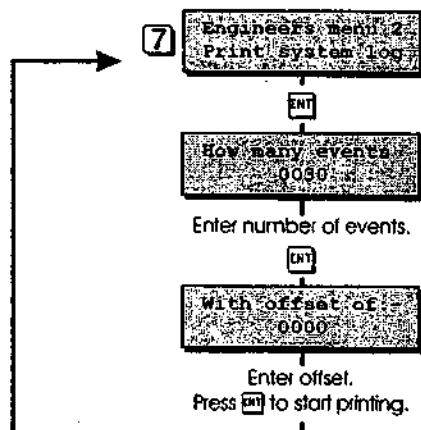


After 24hr Group Flowchart

Print System Log

[2-7]

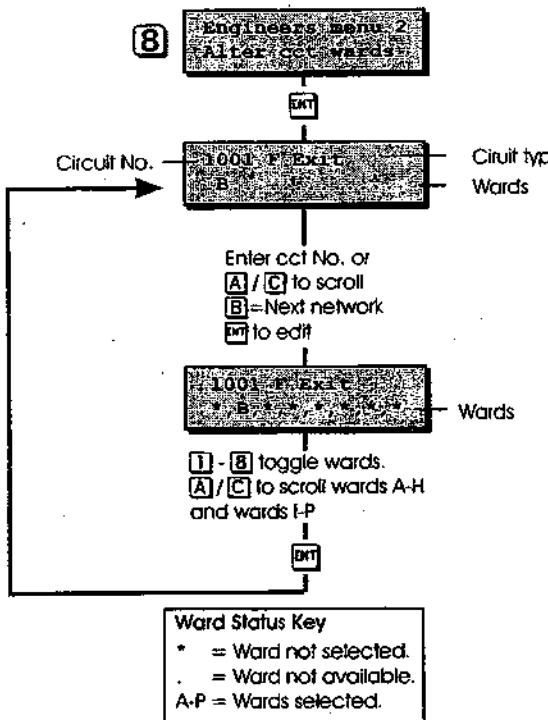
The system log stores 4000 events, if a printer is connected to the system it is possible to print a selected number of events. By specifying an offset you can print the selected number of events from the offset point rather than the last event, e.g. if you specify 100 events with an offset of 1000, you will get a printout of events 2900 - 3000. Once the print-out has been started it can only be stopped by selecting this option again and entering "0000" for the number of events.



Print System Log Flowchart

Alter Circuit Wards**[2-8]**

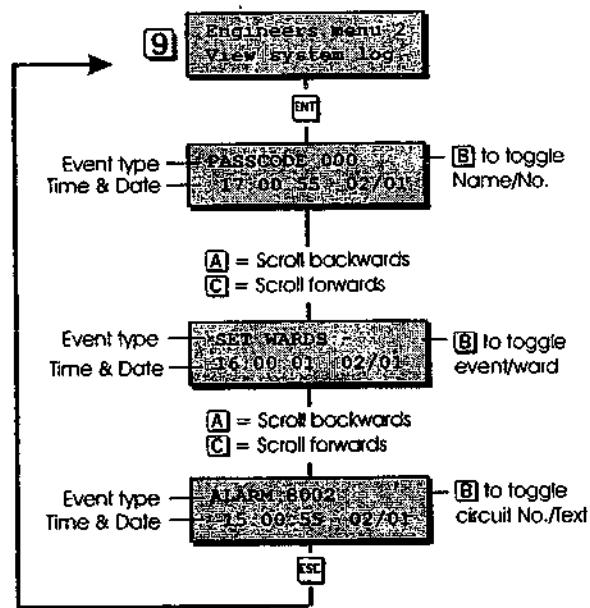
Normally the engineer will assign circuits to wards when using the "Program circuits" option in Engineers menu 1, this option allows an alternative method of configuring wards.



Alter Circuit Wards Flowchart

View System Log**[2-9]**

The engineer can use this option to view the system log. The [A] and [C] keys allow you to scroll backwards and forwards through the log events. Keys [1] to [9] can be set-up as search keys so that when pressed they take you to specific events within the log. To set-up the search keys see "Engineers menu 4".



View System Log Flowchart

Log Event Codes

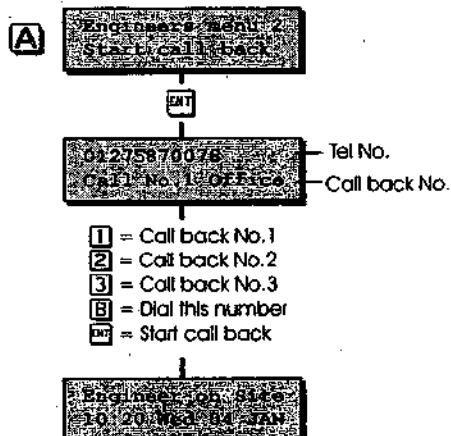
Event	Description
— NO EVENT —	No event
#### ACTIVATED	Monitored circuit activated
#,## LEC LOST	Network #, device No. ## is a LEC that has been removed
### LEC or REM'S	The number of LEC or REM's logged on to system after a re-learn
#,## NODE ADDED	Network #, device No. ## is a TS900 Node that has been added to the system
#,## NODE LOST	Network #, device No. ## is a TS900 Node that has been removed
### NODE'S	The number of TS900 Nodes logged on to the system after a re-learn
### XNODE'S	The number of XNodes logged on to the system after a re-learn
#### OFF TEST	Circuit number #### taken off test
#### OMITTED	Circuit number #### omitted
#### REINSTATED	Circuit number #### reinstated
#,## REM ADDED	Network #, device No. ## is a remote keypad that has been added to the system
#,## REM LOST	Network #, device No. ## is a remote keypad that has been removed
#### SHUNTED	Circuit number #### shunted
#,## XNODE ADDED	Network #, device No. ## is a XNode that has been added to the system
#,## XNODE LOST	Network #, device No. ## is a XNode that has been removed
24Hr ALARM #####	24hr alarm from circuit number #####
24Hr OMITTED:	24Hr group omitted in wards:- A - P
24Hr REINSTATED:	24Hr group reinstated in wards:- A - P
24Hr WARDS:-	24hr Alarm on wards:- A - P
ABORT ON WARDS:-	Alarm aborted on wards:- A - P
ABORTED ERRORS	Remote service errors
ACCESS ###	Access passcode ### entered.
ACCESS FAILED	Access failed due to code lock in operation
ALARM #####	Alarm from circuit number #####
ALARM WARDS:-	Alarm in wards:- A - P
AUTOSET # OFF	Autoset timer 1-3 off
AUTOSET # ON	Autoset timer 1-3 on
AUXILIARY #####	Auxiliary alarm from circuit number #####
AUXILIARY # TAMP	Auxiliary 1 or 2 tamper
AUXILIARY FUSE	Auxiliary Fuse failed
BATTERY FAULT	Battery disconnected or voltage level below 9.5V
BATTERY RESTORE	Battery restored to healthy condition
BEAM PAIR #####	First activation of a beam pair circuit number #####
BELL BOX TAMPER	External sounder/bell tamper
BELL TESTED:-	Bell tested for wards:- A - P
BELLS ACTIVE:-	Bell active for wards:- A - P
CALL ABORTED	Remote service call aborted
CALLED No. #	Remote service call initiated via panel to remote PC 1, 2 or 3
CALLING BACK No. #	Remote service call requested via PC to "Call back No" 1, 2 or 3
CCT ON TEST #####	Circuit number ##### put on test
CCT TESTED #####	Circuit number ##### tested during walk test routine
CCTS REINSTATED	Circuits reinstated with a shunt code
CIRCUITS SHUNTED	Circuits shunted with a shunt code
CODE LOCK # OFF	Code lock number # is off
CODE LOCK # ON	Code lock number # is on
CODE LOCKED ###	User number ### attempted to use their passcode whilst locked-out

Event	Description
CODE TAMPER	Keypad locked out for 5 minutes due to invalid entry of passcode
COMMS FAILED	Plug-on digicom failed to communicate with ARC
COMMS SUCCESSFUL	Plug-on digicom communicated successfully with the ARC
DATE CHANGED	System date changed
DEFAULT USER ####	User 001 defaulted to 5678
DEFERRED SET:-	Deferred set on wards:- A - P
DIGI-COM FITTED	Plug-on digicom fitted
DIGI/MODEM LOST	Plug-on digicom or modem removed
DIGI/MODEM RESET	Plug-on digi-modem reset
DURESS CODE ####	Duress alarm from user number ####
ENGINEER ARRIVES	Engineer is logged on the system
ENGINEER DEPARTS	Engineer is logged off the system
ENTRY #####	Entry mode started from circuit number #####
ENTRY TIME-OUT:-	Entry mode timed out for wards:- A - P
ENTRYWARDS:-	Entry on wards:- A - P
EXIT CANCELLED:-	Exit mode cancelled for wards:- A - P
EXIT STARTED:-	Exit mode started for wards:- A - P
FACTORY RESTART	Factory default loaded
FIRE ALARM #####	Fire alarm from circuit number #####
FIREWARDS:-	Fire alarm on wards:- A - P
FIRST KNOCK #####	First activation of circuit number ##### (circuit with Double-Knock attribute)
From Remote #,##	Quick set perform from remote keypad (# = Network, ## = device No)
Hi Security SET:	Wards A - P set using "High Security" feature
LEC #,## TAMPER	Network #, LEC number ## lid tamper alarm
LINE RESTORE	Telephone line restored to healthy
LINK ESTABLISHED	Remote link via PC established
MAINS POWER OFF	Mains power removed from control panel
MAINS POWER ON	Mains power applied to control panel
MENU TIMEOUT ####	User number #### entered their passcode and did not selected any functions
MODEM FITTED	Plug-on digi-modem fitted
MODEM LOCK-OUT	Modem locked-out (4 failed attempts made via Lineload)
NODE #### R# ADD	Remote keypad added to XNode
NODE #### R# LOST	Remote keypad removed from XNode
NODE #### R# TAMP	Remote keypad lid tamper from remote on XNode
NODE #,## FUSE	TS900 Node fuse failed
NODE #,## TAMPER	TS900 Node lid tamper
NODE SHUNT #####	Circuits shunted on a Node
ON-LINE ENDED	Remote service call ended (PC and Lineload)
ON-LINE TO No.#	On-line to remote PC
ON-SITE RESTART	On-site restart
PA ALARM #####	PA Alarm from circuit number #####
P.A CODE ####	PA code from user number ####
PA WARDS:-	PA alarm on wards:- A - P
PANEL LID TAMPER	Control panel lid tamper
PASSCODE ####	User number #### entered their passcode
PAYMENT EXPIRED	System payment timer has expired
PC CONNECTED	PC connected to control panel (PCI/DCI)
PC DISCONNECTED	PC disconnected from control panel (PCI/DCI)

Event	Description
PHONE LINE FAULT	Telephone line fault detected
QUICK SET KEY #	Quick set key A, B or C activated
Q.SET ABORTED	Quick set key aborted
REARM ONWARDS:-	Wards:- A - P re-armed
REINSTATED WARDS	Wards A - P reinstated
REM #,## TAMPER	Remote keypad lid tamper
REM RESET ACTIVE	Remote reset via the REM RESET input terminal (RedCARE)
REM RESET FAILED	Remote Reset failed
REM SERVICE CALL	Remote service call in progress
RESET WARDS:-	User or engineer has reset wards:- A - P
SEC. KEY #####	Security key operated on circuit number #####
SERVICE CALL END	Remote service finished
SERVICE REQUIRED	System requires a service visit (Service Timer expired)
SET FAIL WARDS:-	Set fail for wards:- A - P
SET FAIL #####	Set fail caused by circuit #####
SET NO ACTIVITY	System was set with inactive circuits (circuits with the activity attribute)
SET WARDS:-	Wards set:- A - P
SET WITH L.FLT:-	Wards A - P set with a line fault present
SETTING DEFERRED	Setting deferred
SHUNT CODE ####	Shunt code number #### enter their passcode
SHUNT KEY #####	Shunt key circuit ##### operated
SYSTEM RELEARN	A system relearn has been performed
T.SWITCH # OFF	Time switch number # off
T.SWITCH # ON	Time switch number # on
TAMPER #####	Tamper alarm from circuit number #####
TAMPER WARDS:-	Tamper alarm on wards:- A - P
TEST FAIL #####	Circuit number ##### failed whilst on test
TEST TOTAL #####	Total number of circuit tested during walk test
TIME CHANGED	System time changed
UNSET WARDS:-	Wards:- A - P unset
USER #### DELETED	User number #### deleted
WALK TESTED:-	Wards:- A - P walk tested
WARD KEY #####	Ward key circuit ##### operated
WARDS LOCKED:-	Wards:- A - P locked via security key circuit
WARDS UNLOCKED:-	Wards:- A - P unlocked via security key circuit
XNODE #,## FUSE	XNode fuse failed
XNODE #,## TAMP	XNode lid tamper

Start Call Back [2-A]

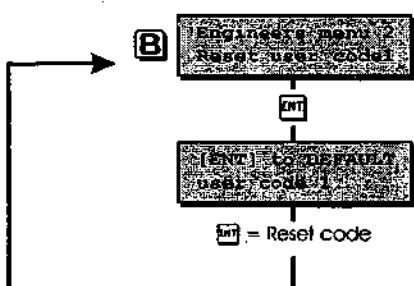
If the system is fitted with a DC58M digi-modem, it is possible for the installation engineer to initiate an upload sequence to a remote site (normally the alarm company). Once the communication link is established with the remote site, data can be sent and received from the control panel. This feature is only compatible with Menvier Lineload software version 2.2 or above.



Start Call Back Flowchart

Reset User Code 1 [2-B]

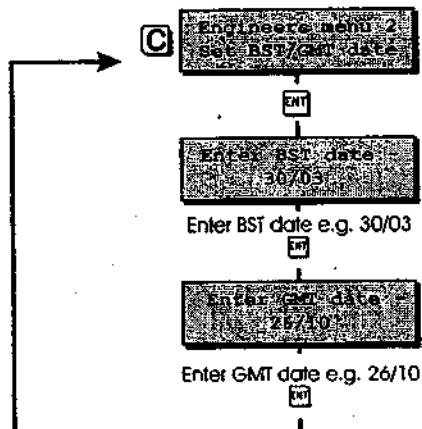
This option allows the installation engineer to reset the master user (User 001) back to the factory default code of "5678". This feature is useful when the master user has forgotten their passcode or has accidentally changed it without realising. This operation is logged.



Reset User Code Flowchart

Set BST/GMT Date [2-C]

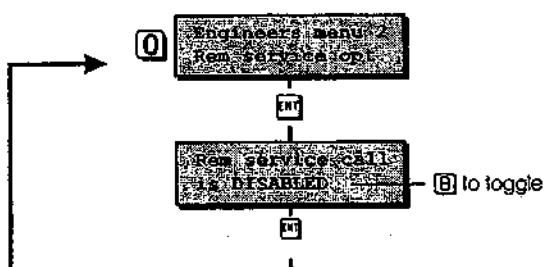
This option allows the engineer to specify the dates at which BST starts and ends. The system will then add an hour at 2:00 am on the BST date and subtract an hour at 2:00 am on the GMT date.



Set BST/GMT Dates Flowchart

Rem Service Option [2-0]

This option allows the engineer to enable or disable the remote service option.



Remote Service Options Flowchart

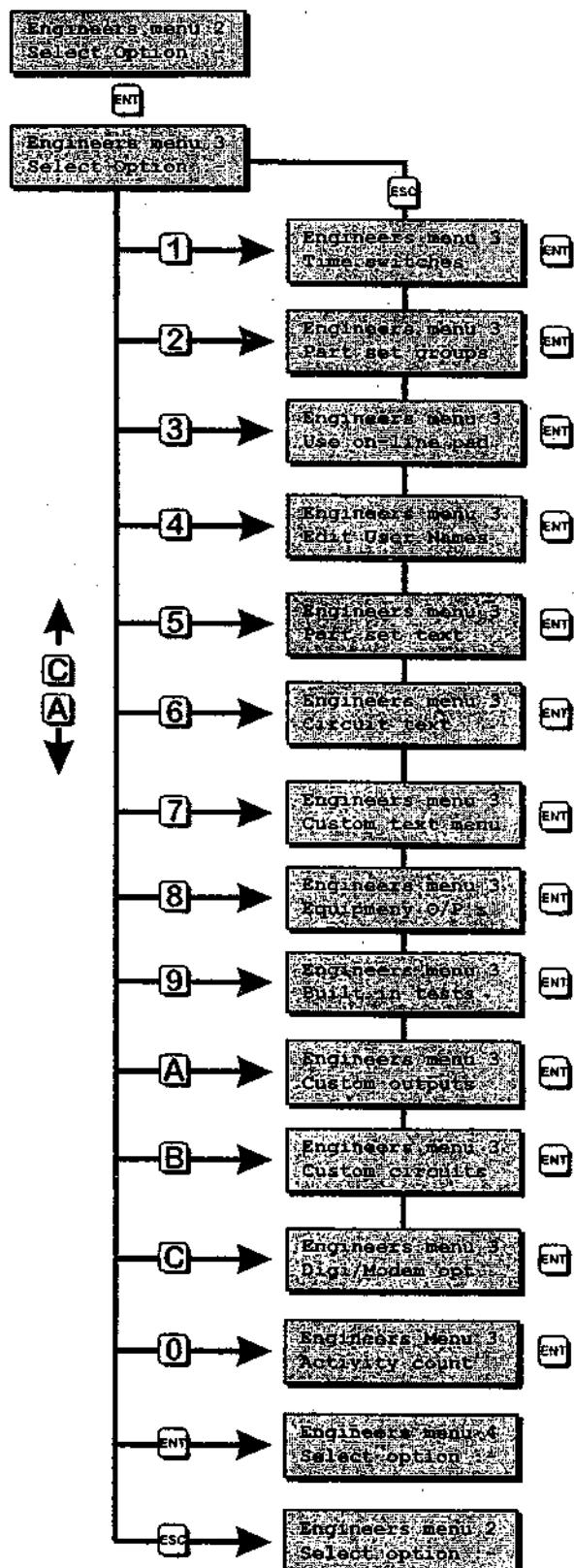
● Engineers Menu 3

Introduction

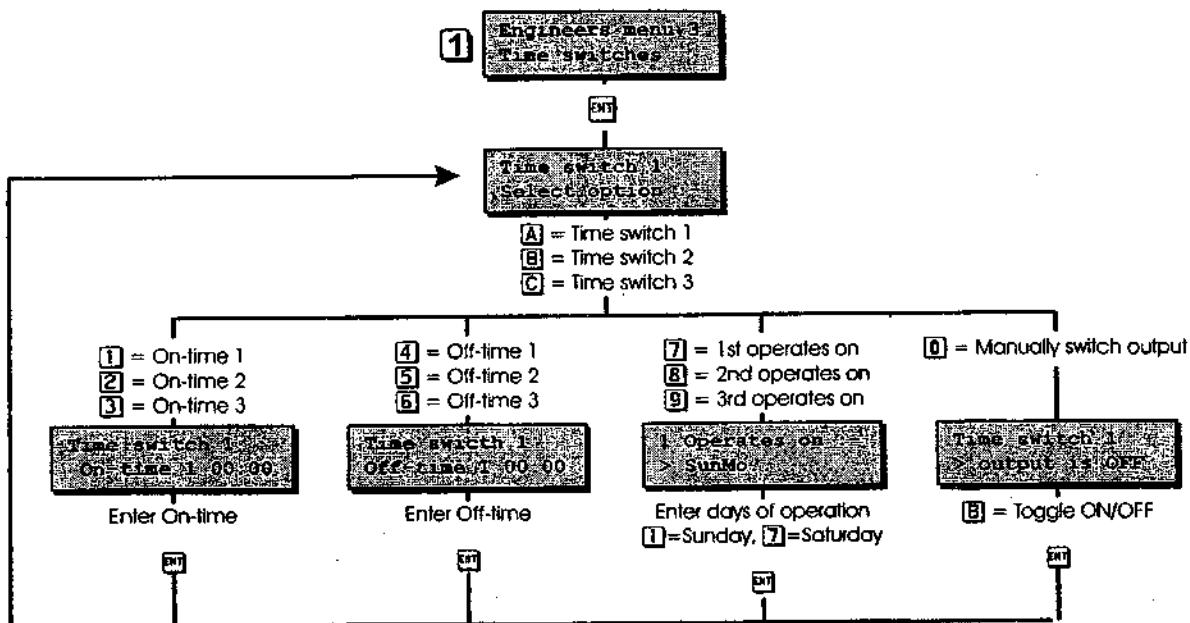
Engineers menu 3 is selected by pressing the [ENT] whilst Engineers menu 2 is selected. Each menu option can be selected by pressing the relevant "Hotkey" or you can scroll forwards and backwards through the options using the [A] and [C] keys.

Menu Contents

Hotkey	Option	Page
①	Program Time Switches	60
②	Part Set Groups	60
③	Use On-line Keypad	61
④	Edit User Names	61
⑤	Part Set Text	61
⑥	Circuit Text	62
⑦	Custom Text Menu	64
⑧	Equipment Outputs	65
⑨	Built In Tests	66
A	Custom Outputs	69
B	Custom Circuits	70
C	Digi-modem Options	71
D	Activity Count	74



Engineers Menu 3



Time Switches Flowchart

Time Switches

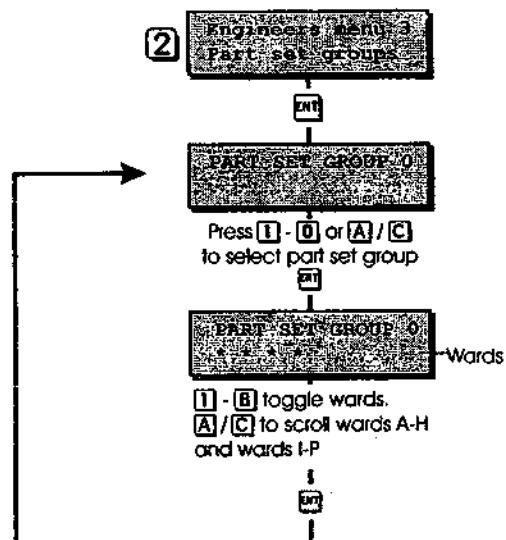
[3-1]

The TS2500 has three programmable time switches. Each time switch can be programmed with up to three separate on/off times and made to operate on any day of the week. The time switches can be assigned to outputs which in turn can be used to control internal or external lighting via a relay etc.

Part Set Groups

[3-2]

This option allows the engineer to define up to 10 part-set groups. Each group can be programmed so that it sets any combination of wards. For example "PART SET GROUP 1" could be allocated wards A and C, whereas "PART SET GROUP 2" could be allocated wards A and B.



Ward Status Key

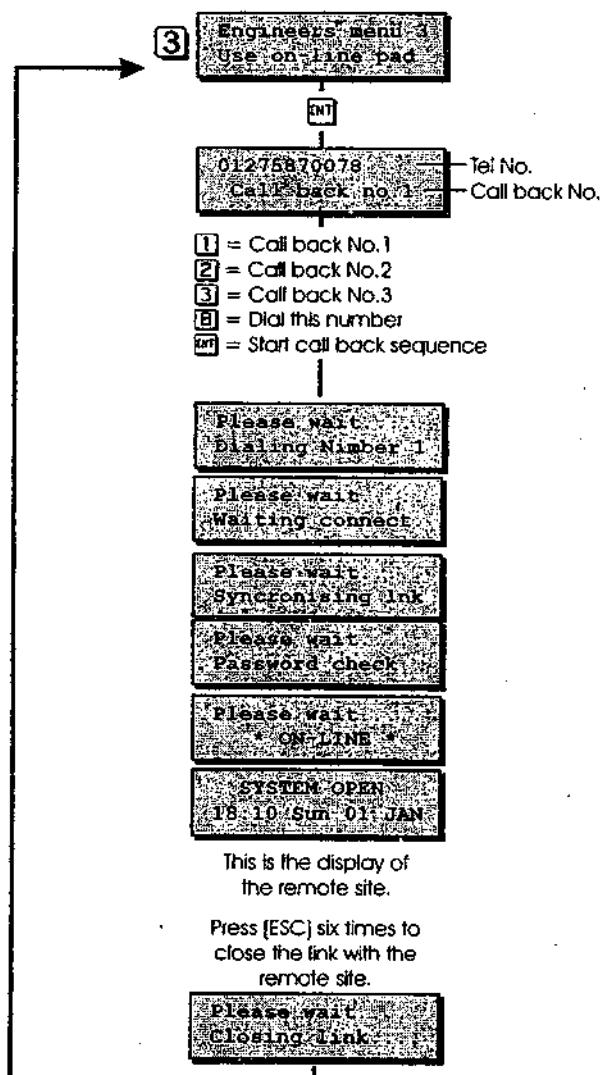
*	= Ward not selected.
.	= Ward not available.
A-P	= Wards selected.

Part Set Groups Flowchart

Use On-line Pad [3-3]

If the system is fitted with a DC58M digi-modem, you can use this option to connect to another TS2500 or TS790/900 (providing the remote system also has a modem fitted). Once a connection has been established the remote keypad will behave as if it were connected to the remote site. For example you could use this option to connect to another TS2500 alarm system and once on-line you can use your own keypad to set the remote site.

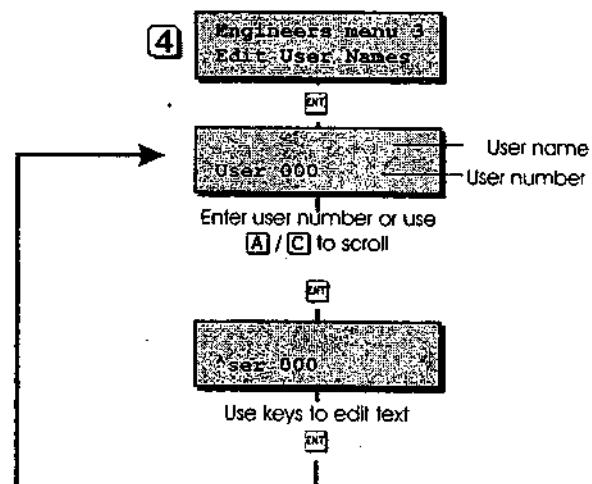
- Note:** The modem passcode on the TS2500 must match the modem passcode on the remote site in order for the feature to work.



Use On-line Keypad Flowchart

Edit User Names [3-4]

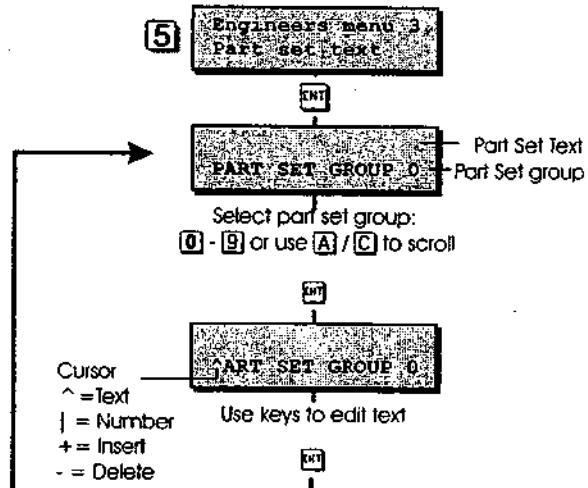
This option allows the engineer to assign a name (8 characters) to each user. When using the view log option you can press the [B] key to alternate between displaying the user number and user name.



Edit User Names Flowchart

Part Set Text [3-5]

This option allows the engineer to assign 16 characters of text to each of the part set groups. When the user selects the part set options during setting, the top line of the display will show the text and the bottom line will show the words assigned to the part set group.



Edit User Names Flowchart

Circuit Text [3-6]

Each detection circuit can have up to 16 characters of text assigned to it.

When you have selected the circuit that you require to program, the system will give you the following options:

1 Edit

The edit option allows you to edit text that has been previously programmed or to create new text using the text editing keys.

2 Library

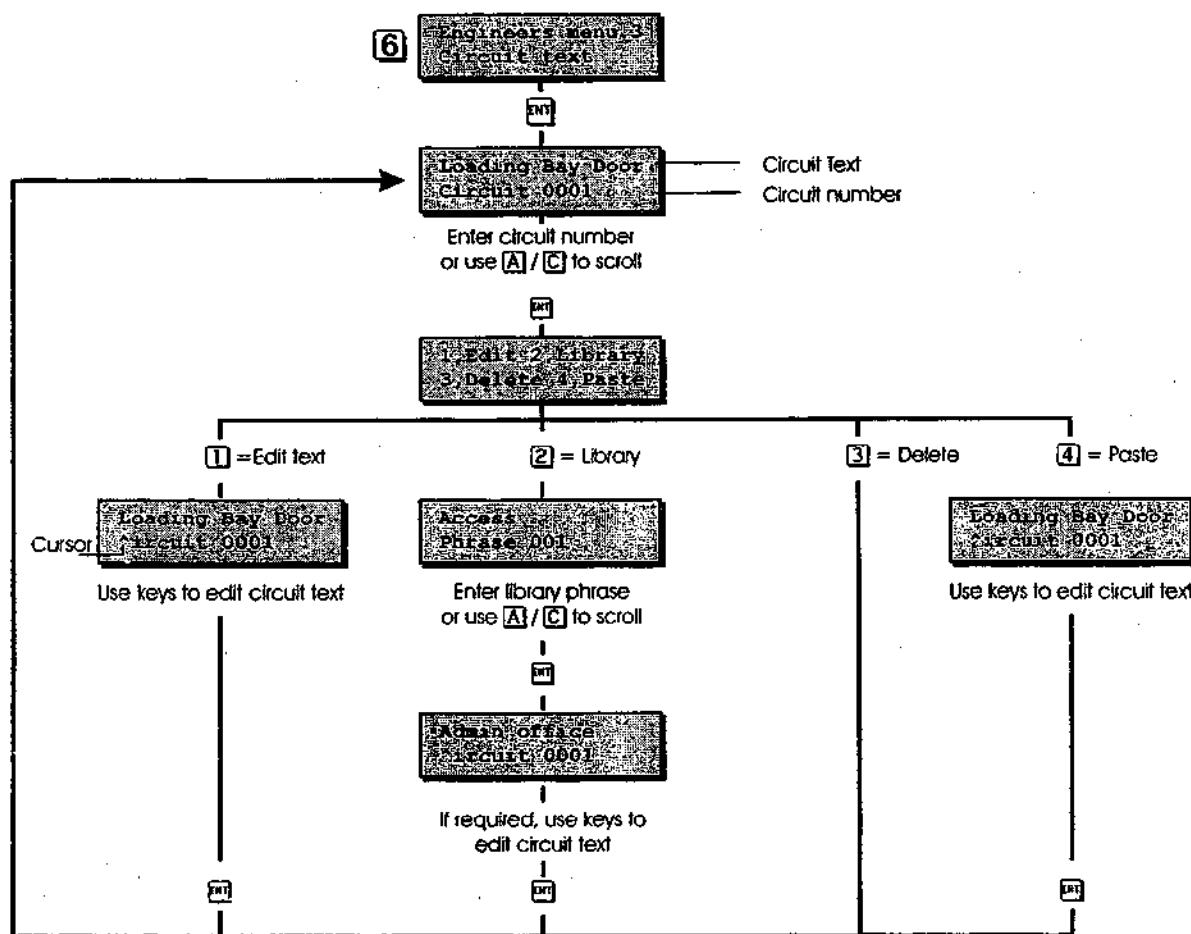
The library option allows you to choose a phrase from the circuit text library, once the phrase has been selected you can further edit it, if required.

3 Delete

The delete option erases the circuit text for the selected circuit.

4 Paste

The paste option will paste the last programmed circuit text into the selected circuit. For example if you program circuit 0001 to "Roller Door 1", then select circuit 0002 and choose the paste option, circuit 0002 will also be programmed as "Roller Door 1". After selecting the paste option you are giving the option to edit the pasted text, so in the above example it would be simple case of changing the "1" to a number "2" etc.



Circuit text Flowchart

Circuit Text Library

No.	Phrase	No.	Phrase	No.	Phrase	No.	Phrase
000	Above	044	Church	088	Loading bay PIR	132	Refectory
001	Access	045	Classroom	089	Lobby	133	Research
002	Accountant	046	Cleaners	090	Lounge	134	Restaurant
003	Accounts	047	Collection	091	Lounge PIR	135	Roller
004	Admin office	048	Communicator	092	Lounge window	136	Room
005	Animal	049	Computer	093	Magnetic	137	Safe
006	Annexe	050	Computer room	094	Managers	138	Sales door
007	Arch	051	Conservatory	095	Master	139	Sales office
008	Area	052	Contact	096	Medical	140	Sales PIR
009	Assembly	053	Dark-room	097	Mezzanine	141	Secretaries
010	Assistant	054	Detector	098	Microwave	142	Secretary
011	Attack	055	Dining room PIR	099	Middle	143	Security
012	Attic	056	Director	100	Monitor	144	Sensor
013	Automatic	057	Dispatch	101	Movement	145	Service door
014	Auxiliary	058	Door	102	Nursery	146	Service PIR
015	Back	059	Double doors	103	North	147	Showroom
016	Baggage	060	Entrance	104	Office	148	Shutter
017	Bakery	061	Factory floor	105	Outside	149	Side
018	Balcony	062	Fire door	106	P.A. Button	150	Sliding
019	Ballroom	063	Floor	107	Panel	151	Squash court
020	Bank	064	Front	108	Panic	152	Stairwell
021	Banking	065	Garage	109	Partition	153	Station
022	Bar	066	Geography	110	Passive	154	Store room
023	Barn	067	Grocery	111	Patio	155	Stores
024	Basement	068	Ground	112	Penthouse	156	Surgery
025	Bathroom	069	Guard	113	Perimeter	157	Swimming pool
026	Bay	070	Hall passive	114	Personal	158	Technical
027	Beam	071	Heater	115	Personnel	159	Technician
028	Bedroom	072	History	116	Physics lab	160	Theatre
029	Bedroom PIR	073	House	117	Passive in	161	Toilet
030	Bell	074	Industrial	118	PIR in	162	Transport
031	Biology Lab	075	Information	119	Plumbers	163	Ultrasonic
032	Board room	076	Infra-red	120	Porch	164	Upstairs PIR
033	Bottom	077	Interior	121	Power	165	Upstairs Window
034	Break glass	078	Isolation	122	Power supply	166	Ventilator
035	Cabinet	079	Junior	123	Pressure	167	Warehouse
036	Cafe	080	Kitchen PIR	124	Processing lab	168	Window
037	Canteen door	081	Kitchen window	125	Production	169	Woodwork Shop
038	Canteen PIR (1)	082	Landing PIR	126	PSU Battery Fail	170	Workshop door
039	Cashier	083	Landing window	127	PSU Fuse Blown	171	Workshop PIR
040	Ceiling	084	Laundry	128	PSU Mains Fail	172	Workshop Window
041	Cellar	085	Lavatory	129	Public	173	X-Ray department
042	Changing room	086	Library	130	Purchasing		
043	Chemistry lab	087	Loading bay door	131	Reception		

Custom Text Menu

[3-7]

This menu option allows the installation engineer to edit the following text messages:

Reset Message

The default reset message "CALL ENGINEER TO RESET SYSTEM" can be personalised by the engineer, e.g. the message may be programmed to read "CALL XYZ ALARMS ON 0181-1234567".

Location Text

This option allows the engineer to program a 32 character location message. When "Engineers menu 1" is selected the engineer can view this message. This can be used to provide the location details for the control panel, e.g., "CP located in reception area", thus assisting service engineers unfamiliar with the site.

Printer Header

This option allows the installation engineer to program a 32 character printer header message. This is printed whenever a system or log printout is taken from the system. This can be used as a site reference, e.g., "ABC Company Job No123456".

Remote Reset Message

The default remote reset message "CALL A.R.C FOR REM.RESET CODE" can be personalised by the engineer, e.g. the message can be programmed to read "CALL 0181 121212 FOR RESET CODE".

Printer Prefix

This option allows the engineer to specify a 16 character message which is prefixed to every event sent to the printer.

Banner Message

Normally when the system is unset the bottom line of the display shows the time and date, and the top line is left blank. This menu option allows the engineer to program or edit a 16 character "Banner" message which is displayed on the top line. This may be used to display the company's name, e.g., "Blogg Alarms", "ABC Security" etc.

Part Set Banner

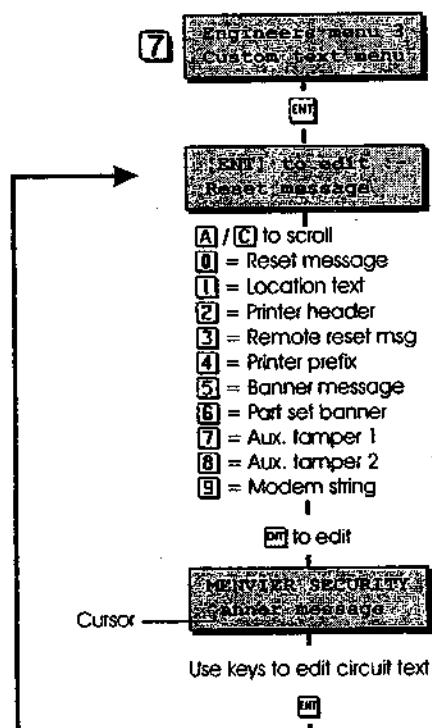
The part set banner is a 16 character message displayed on the top line of the display whenever the system is part set. If the message is left blank the top line of the display will show the words that are set. If the message is programmed the top line of the display will show the message, e.g., "System Part-Set".

Aux. Tamper 1/2

The control panel has two auxiliary tamper inputs, this option allows the engineer to program a 16 character text description for each input.

Modem String

For future use.

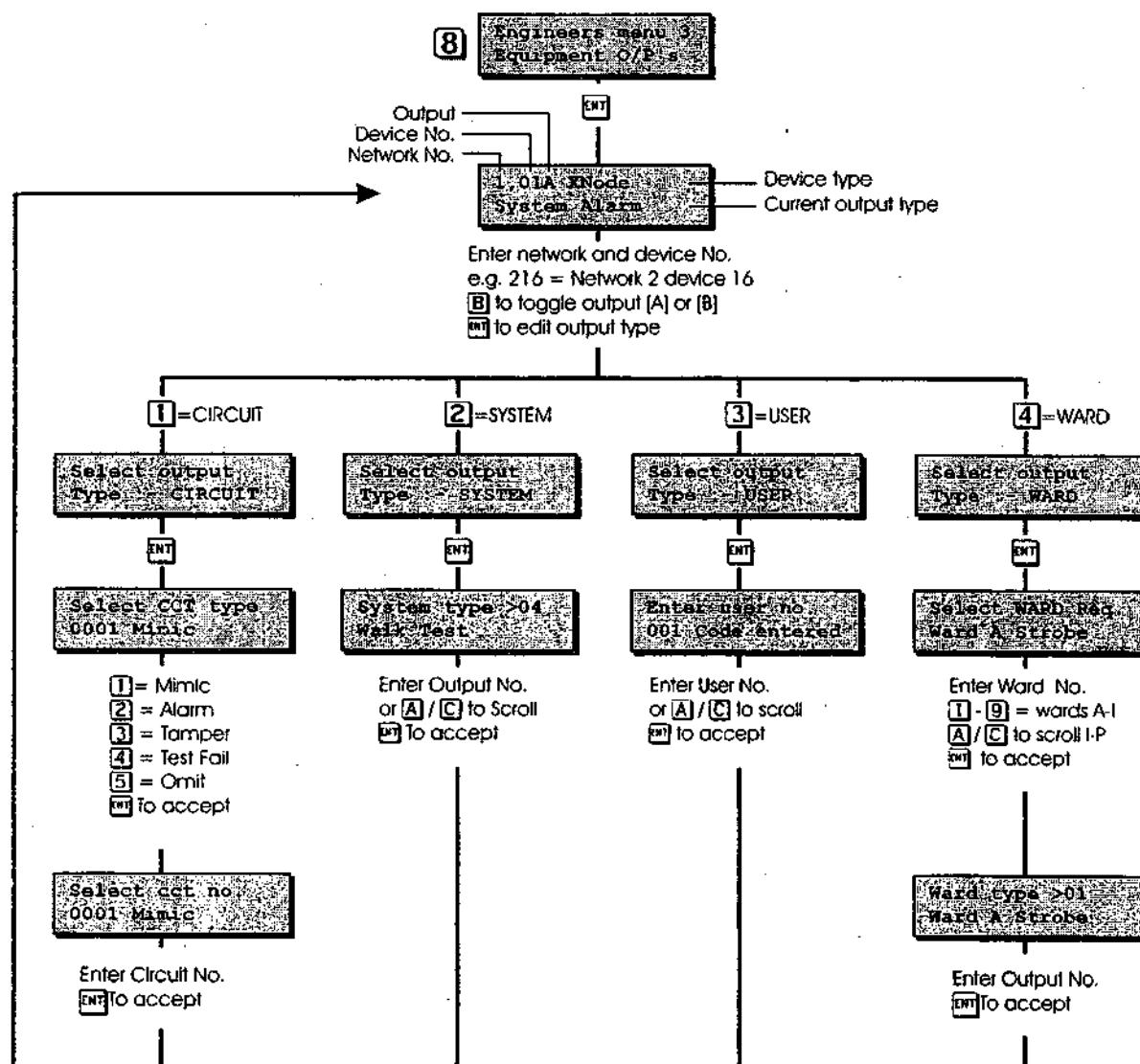


Custom Text Menu Flowchart

Equipment O/P's

[3-8]

This option allows the engineer to program the two outputs on each node and the single output on each remote keypad or LEC.

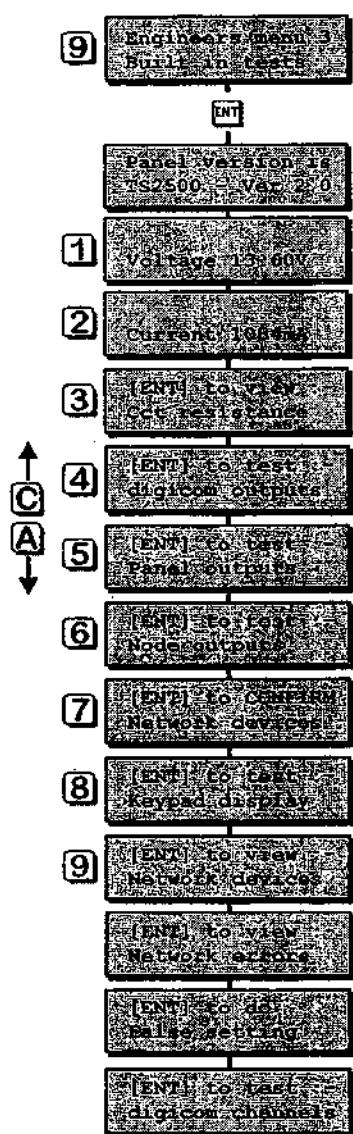


Equipment Outputs Flowchart

Built In Tests

[3-9]

The TS2500 system has the following diagnostic routines:



Built In test Menu Flowchart

Software Version

When selecting the built in tests routine the software version is displayed until you select one of the other diagnostic routines.

Voltage

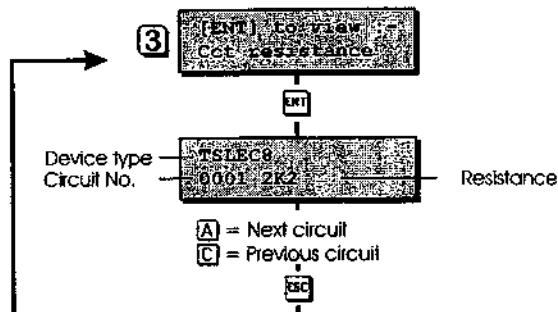
When this test option is selected the battery charging voltage at the control panel is displayed, the accuracy of this measurement is $\pm 0.2V$.

Current Consumption

When this test option is selected the total current consumption for the system is displayed, the accuracy of this measurement is $\pm 50mA$.

View Circuit Resistance

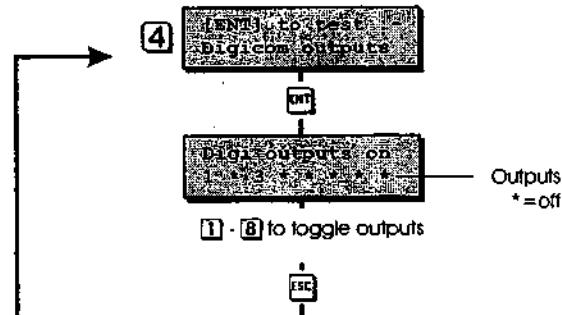
When this test routine is selected the resistance for each detection circuit may be measured, the accuracy of this measurement is $\pm 0.1\text{ KOhms}$.



View Circuit Resistance Flowchart

Test Digicom outputs

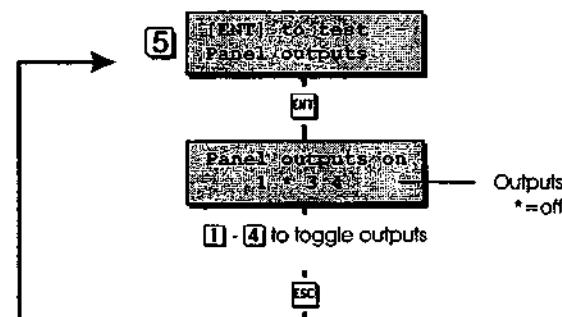
This test routine allows the engineer to test all eight digicom outputs on the main control panel PCB.



Test Digicom Outputs Flowchart

Test Panel outputs

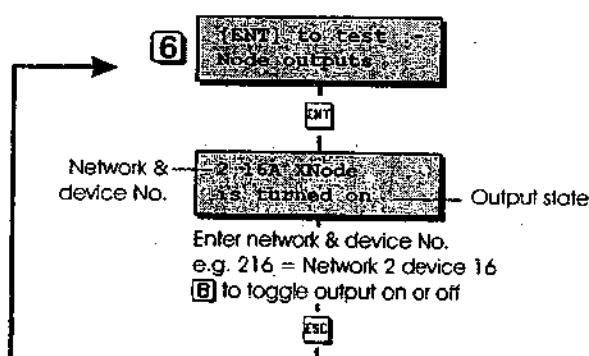
This test routine allows the engineer to test the four control panel outputs.



Test Panel Outputs Flowchart

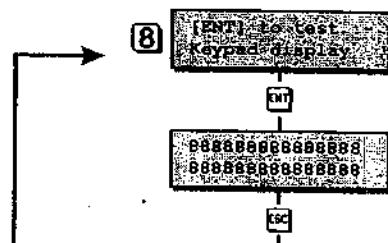
Test Node outputs

This test routine allows the engineer to test all Node outputs.



Test Keypad display

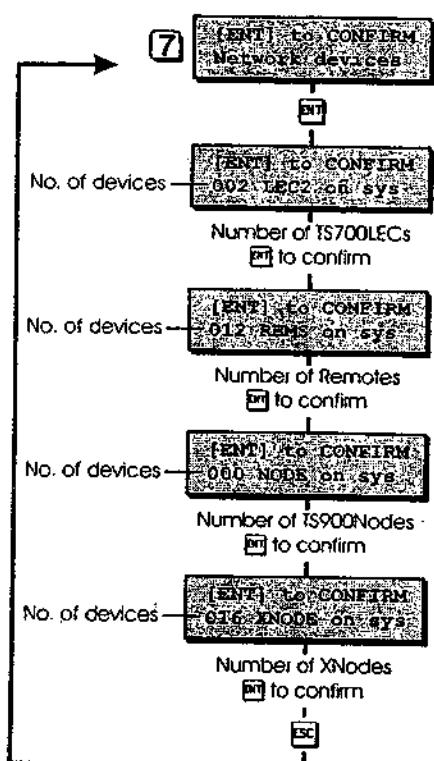
This test routine allows the engineer to test the LCD on all TS900 remote keypads.



Test Keypad Display Flowchart

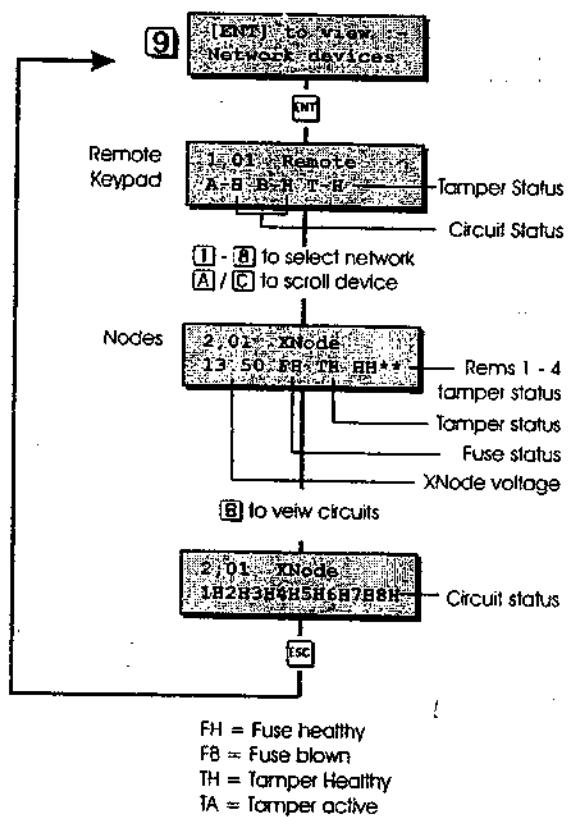
Confirm Network devices

This option allows the engineer to confirm the correct number of devices are connected to the system. After confirmation any changes in the system hardware will cause the "RELEARN REQUIRED" message to be displayed on all remote keypads.



View Network devices

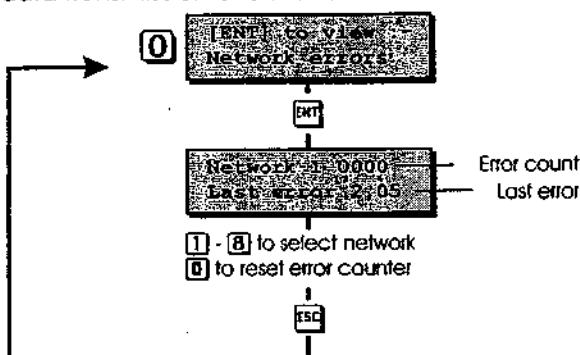
This test routine allows the engineer to view the status of each device connected to the network. The information displayed will depend on the device type.



When selecting this option the remote keypad that you are using is the first device to be displayed.

View Network errors

This test routine allows the engineer to view the number of data transmission errors for each network.

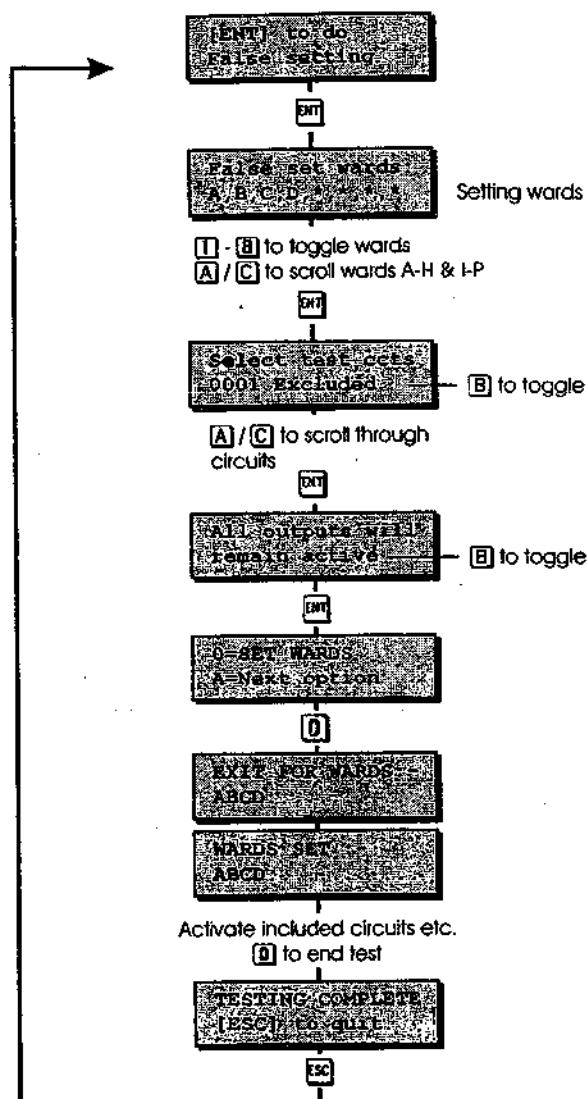


View Network Errors Flowchart

False Setting Routine

This option allows the engineer to set the system whilst the premises are occupied. When selecting this option the engineer can choose the following:

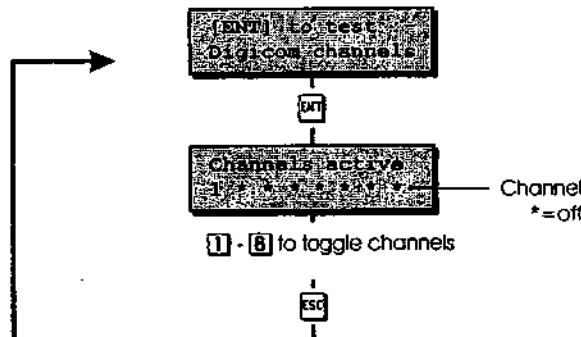
1. The wards that will false set.
2. The circuits that will remain active once the system has been false set. Included circuits will remain active during the false set and excluded circuits will remain isolated during a false set. Normally all circuit default to excluded.
3. All outputs (digicom, bell, strobe etc.) can be enable or disabled during the false set routine.



False Setting Flowchart

Test Digicom channels

This test routine allows the engineer to test all eight channels for the plug-on digicom.

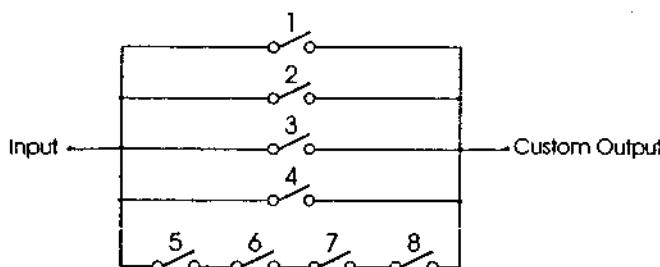


Test Digicom Channels Flowchart

Custom Outputs

[3-A]

This option allows the engineer to program the eight custom outputs type. The diagram below represent the logic circuit for the custom output.



Each switch in the diagram represents a programmable output type, therefore the custom output will only activate when the correct combination of output types are active.

Switches 1 - 4 perform a logical "OR" function and switches 5 - 8 perform a logical "AND" function.

Custom Output - Example 1

This example shows how the "OR" function can be used so that the "Custom Output" activates when circuit 0001 or 0005 or 0016 causes an alarm condition. The table below shows how each switch is programmed to achieve this.

OR		AND	
1	Circuit 0001 Alarm	5	System Always Off
2	Circuit 0005 Alarm	6	System Always Off
3	Circuit 0016 Alarm	7	System Always Off
4	System Always Off	8	System Always Off

When using the "Custom Output" for "OR" logic only, all unused switches must be programmed to the type "Always Off".

Custom Output - Example 2

This example shows how the "AND" function can be used so that the "Custom Output" only activates when the system is ward A is set and time switch 1 is active. The table below shows how each switch is programmed to achieve this.

OR		AND	
1	System Always Off	5	Ward A Set
2	System Always Off	6	Time Switch 1 On
3	System Always Off	7	System Always On
4	System Always Off	8	System Always On

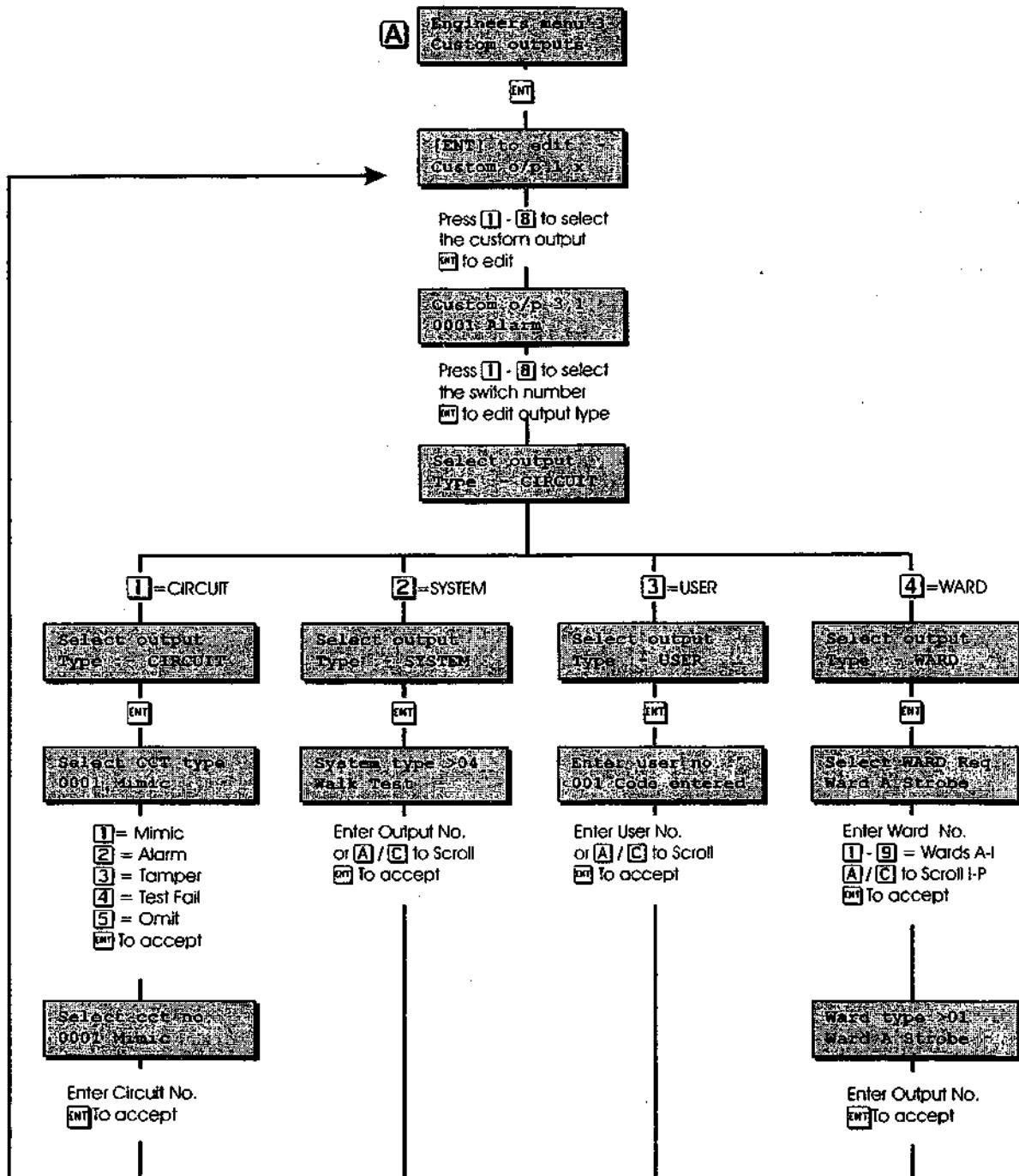
When using the "Custom Output" for "AND" logic only, switches 1-4 must be programmed to the type "Always Off" and any of the unused "AND" switches must be programmed to the type "Always On".

Custom Output - Example 3

This example shows how to use both the "AND" and "OR" functions so that the "Custom Output" activates when ward A is set and time switch 1 is active or when the courtesy light output is active. The table below shows how each switch is programmed to achieve this.

OR		AND	
1	System Courtesy Light	5	Ward A Set
2	System Always Off	6	Time Switch 1 On
3	System Always Off	7	System Always On
4	System Always Off	8	System Always On

When using the "Custom Output" for "AND" and "OR" logic, any of the unused "OR" switches must be programmed to the type "Always Off" and any of the unused "AND" switches (5-8) must be programmed to the type "Always On".



Custom Outputs Flowchart

Custom Circuits

[3-B]

This option allows the engineer to program the eight custom circuit types. Each custom circuit can be programmed to activate the following:

Bell required

A custom circuit with the "Bell required" attribute will activate the control panel bell and strobe output, and any outputs programmed as "System Bell-SAB", "System Strobe". The relevant "Ward Bell-SAB" and "Ward Strobe" are also activated.

Digi required

A custom circuit with the "Digi required" attribute will activate any outputs programmed as "System Alarm" and any relevant "Ward Alarm" outputs.

Sounder required

A custom circuit with the "Sounder required" attribute will activate internal sounders assigned to the same ward as the custom circuit.

Warning required

A custom circuit with the "Warning required" attribute will generate a warning tone every minute from the internal sounder assigned to the same ward as the custom circuit.

Trig Custom o/p

A custom circuit with the "Trig Custom o/p" attribute will activate the relevant "Custom Circuit" output type, e.g. If custom circuit 3 is programmed to trigger its custom output, it will activate "Custom cct 3" output (system output No 82).

Each attribute can be assigned to the custom circuit so that they are only activated for the following conditions:

Unset

Attributes assigned to the custom circuit for the unset mode will only operate when the ward that the circuit is assigned to is in an unset state.

Part

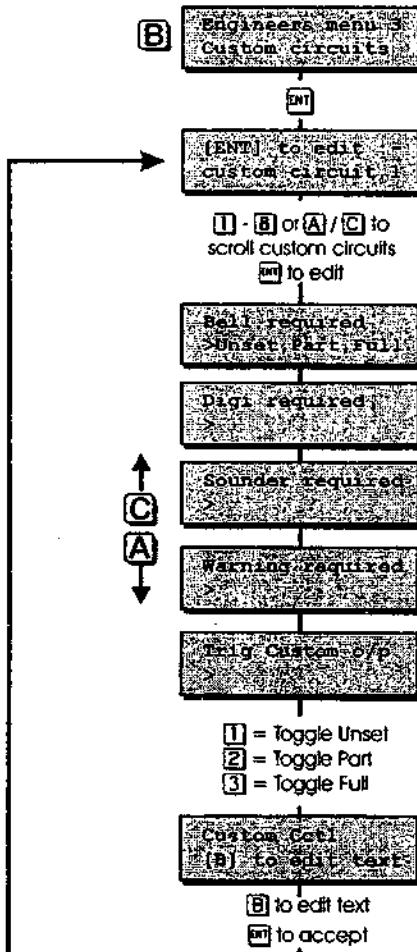
Attributes assigned to the custom circuit for the part set mode will only operate when the ward that the circuit is assigned to is set and one or more wards are unset, i.e. the system is in a part set state.

Full

Attributes assigned to the custom circuit for the full set mode will only operate when the system is fully set, i.e. all defined wards set.

Custom Circuit Text

Up to 11 characters can be assigned to each custom circuit. This text is displayed when programming circuits.

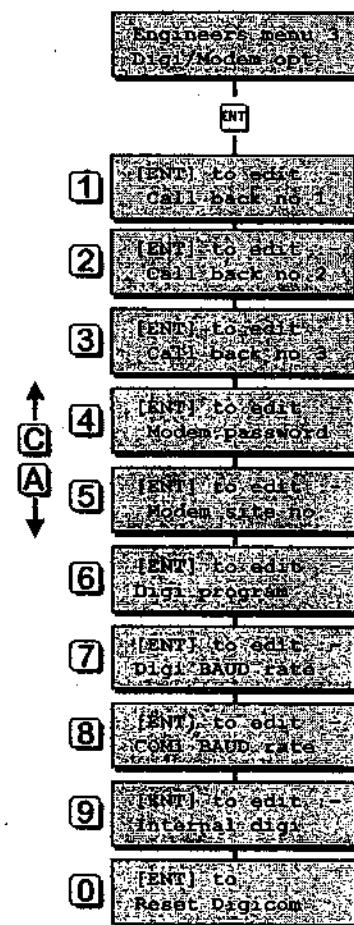


Custom Circuits Flowchart

Digi/Modem Options

[3-C]

This option allows the engineer to program the plug-on digicom or digi-modem.



Digi/Modem Options Flowchart

Call Back No.1

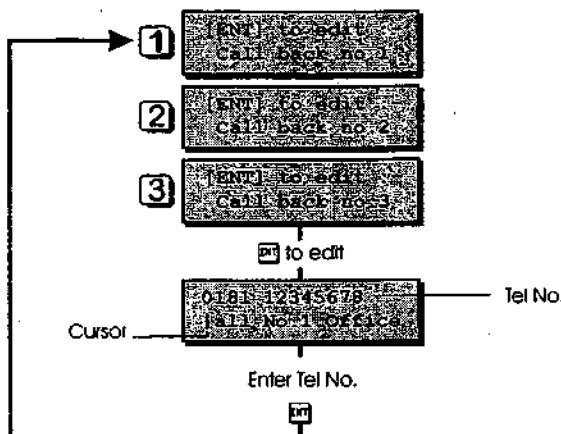
This option allows the first call back telephone number to be programmed.

Call Back No.2

This option allows the second call back telephone number to be programmed.

Call Back No.3

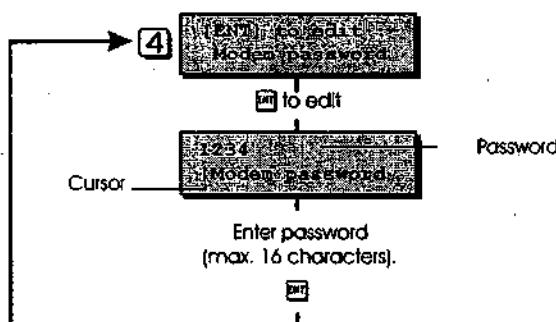
This option allows the third call back telephone number to be programmed.



Modem Call Back Numbers Flowchart

Modem Password

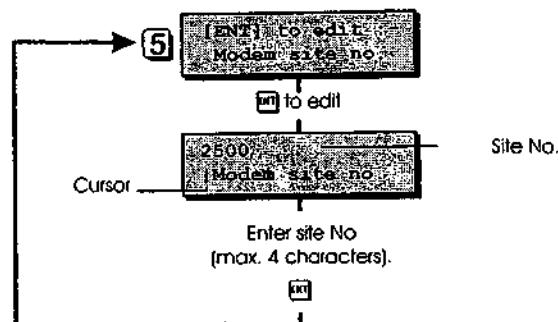
This option allows the modem password to be programmed. The "Modem Password" can be up to 16 character long and provides a means of security for remote communications. When using the "Lineload" software the "Modem Password" in the site profile must match the "Modem Password" that is stored in the control panel.



Modem Password Flowchart

Modem Site No.

This option allows the Modem site number to be programmed. The "Modem Site No." is a 4 digit number that is used as a site reference. When using the "Lineload" software the "Site Reference" number in the site profile must match the "Modem Site No." that is stored in the control panel.

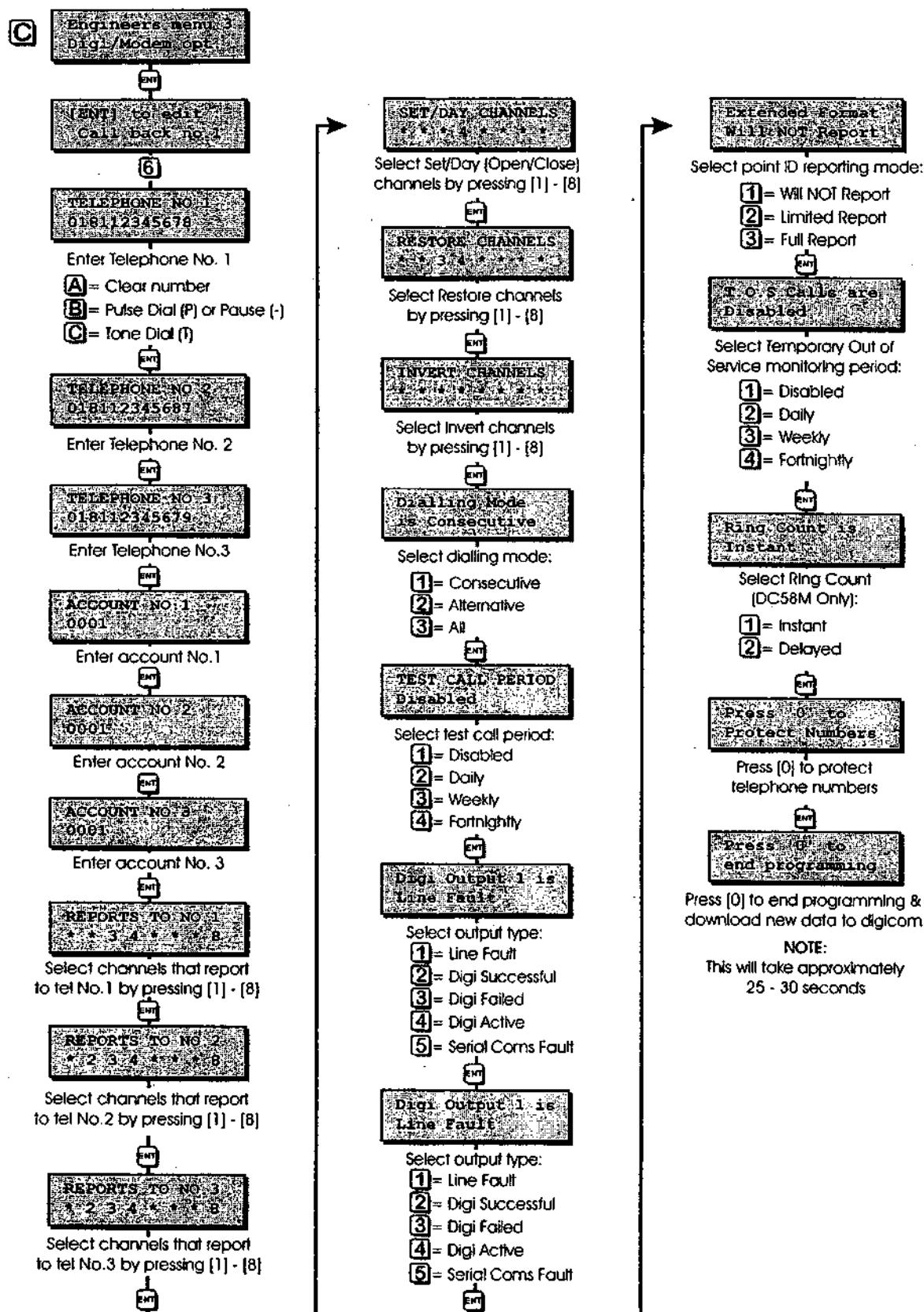


Modem Site No. Flowchart

Program Digicom

This option allows the plug-on digicoms DC54, DC58 and DC58M to be programmed via the control panel.

- ☞ When prompted to "press the [0] key to end programming", it will take approximately 25 - 30 seconds to download the new data to the digicom.
- ☞ When using the control panel to program a DC54, the program options that are not applicable can be ignored, e.g. telephone number 3 and channels 5 - 8 are not used by the DC54 and therefore do not require programming.



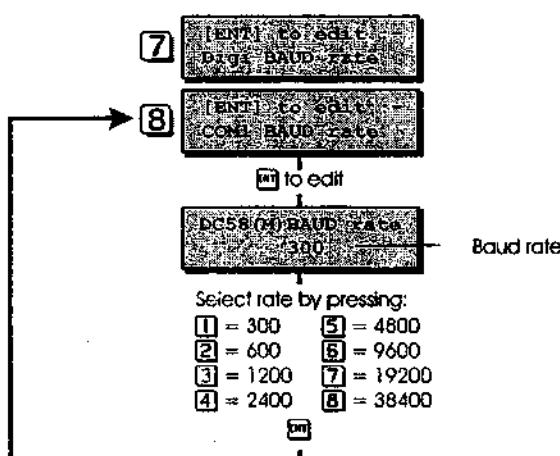
Program Digicom Flowchart

Digi Baud rate

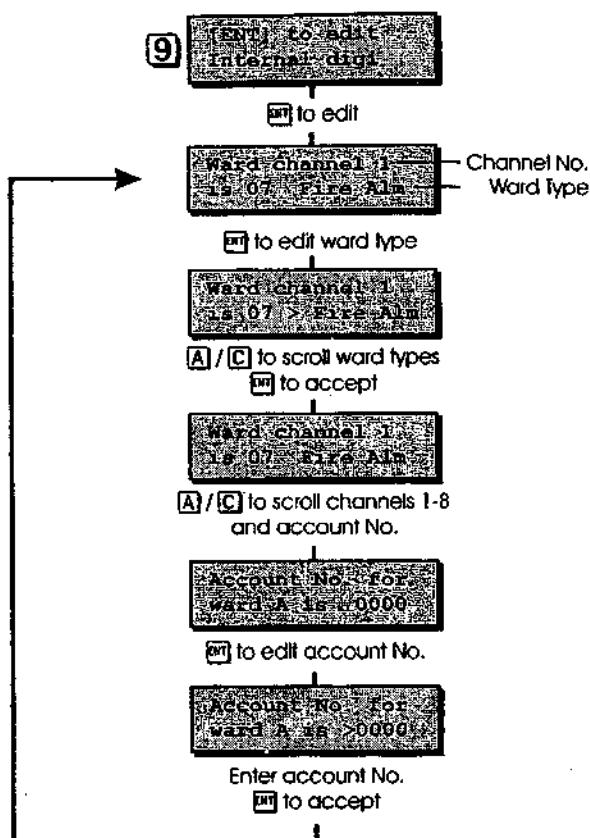
This option allows the engineer to set the baud rate for the plug-on digicom. For the DC54/58/58M this MUST be set at 300 baud.

COM1 Baud rate

This option allows the engineer to set the baud rate for the general communication port (For future use).



Digi & Com1 Baud Rate Flowchart



Internal Digicom Flowchart

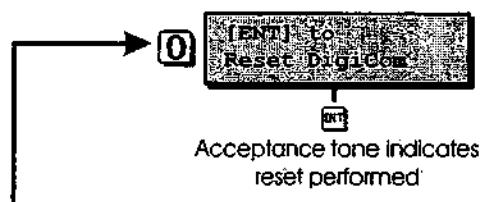
Internal digi

This option allows the engineer to use the DC58/58M as a multi account digicom. This in effect gives you 16 digicoms in one unit. The feature can only be used with DC58/DC58M's fitted with version 2.8 software.

Each channel can be assigned a ward output type, e.g. channel 3 ward alarm. Each ward can then be assigned a four digit account number (if the ward account is set to '0000' then all channels for that ward are disabled).

Reset Digicom

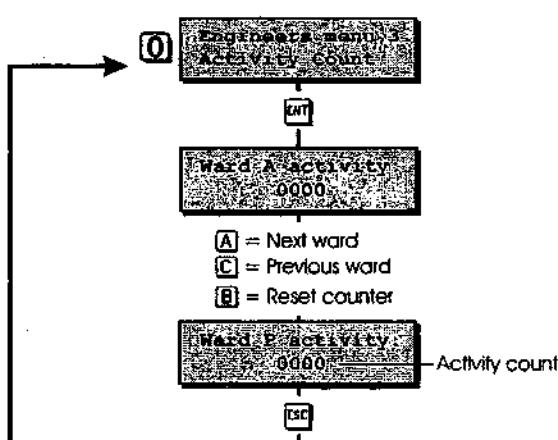
This option resets the plug-on digicom and uploads the digicom NVM data to the control panel. The upload will take approximately 25 - 30 seconds. Once uploaded the data can be edited using the "Program Digicom" option and then sent back to the digicom.



Reset Digicom Flowchart

Activity Count [3-0]

Circuits with the "Activity Monitor" attribute that have been activated whilst the system was unset cause the "Activity Counter" to be increased by one. This option allows the engineer to view the counter value.



Activity Count Flowchart

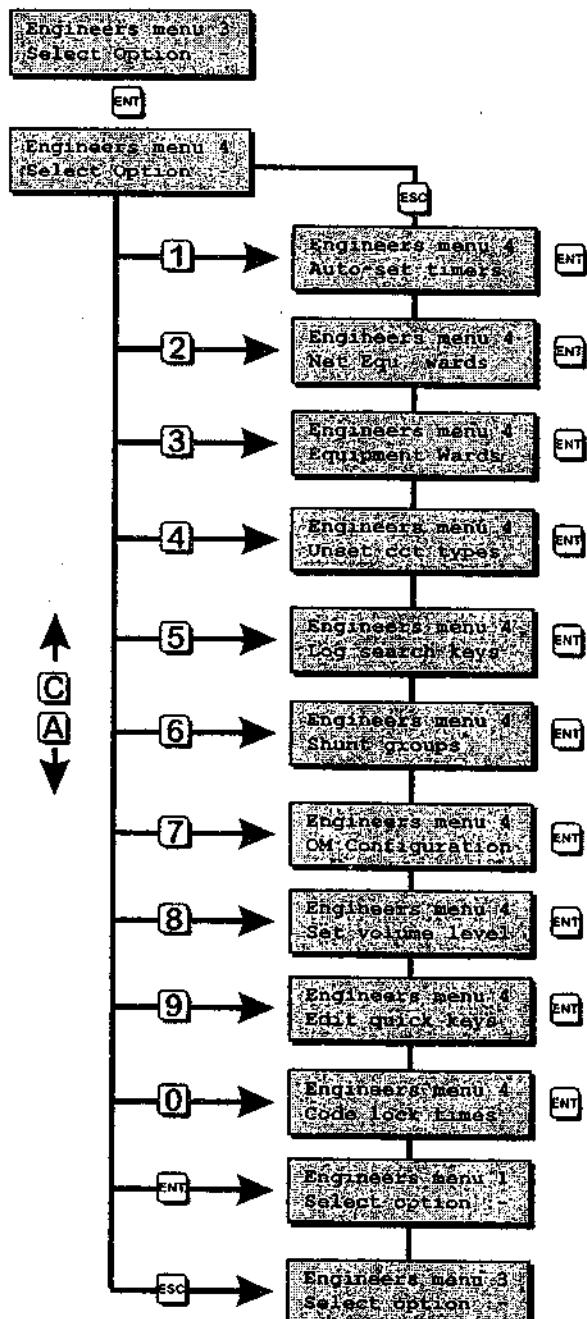
● Engineers Menu 4

Introduction

Engineers menu 4 is selected by pressing the [ENT] whilst Engineers menu 3 is selected. Each menu option can be selected by pressing the relevant "hotkey" or you can scroll forwards and backwards through the options using the [A] and [C] keys.

Menu Contents

Hotkey	Option	Page
[1]	Auto-set Timers	76
[2]	Network Equipment Wards	77
[3]	Equipment Wards	78
[4]	Unset Circuit Types	79
[5]	Log Search Keys	80
[6]	Shunt Groups	80
[7]	OM Configuration	81
[8]	Set Volume Level	81
[9]	Edit Quick Set Keys	81
[A]	Engineer wards	81
[0]	Code Lock Timers	82



Engineer's Menu 4

Auto-set Timers [4-1]

The TS2500 has three auto-set timers, each timer has the following options:

Set times 1, 2 & 3

Each timer has three independent setting times.

Unset time 1, 2 & 3

Each timer has three independent unsetting times.

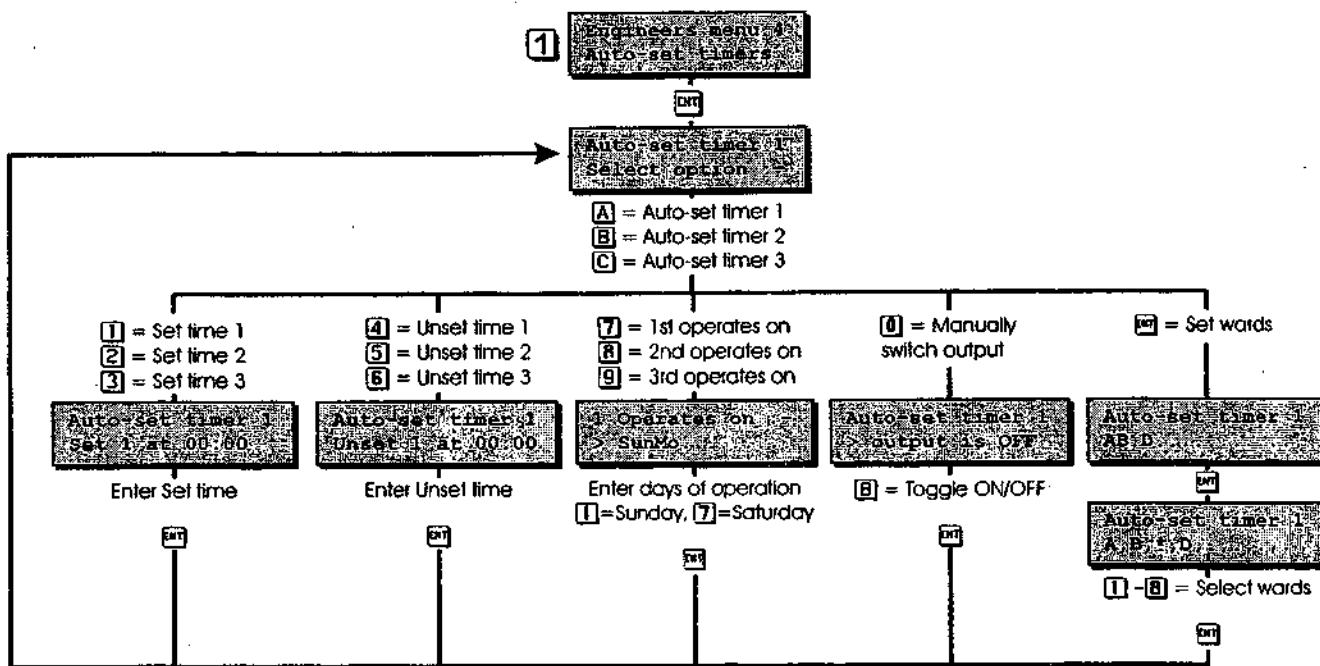
Days of operation 1, 2 & 3

Each of the individual set/unset timers can be programmed to operate on different days of the week.

Set/Unset Wards

Each timer can set and unset any combination of wards

A-P.



Auto-set Timers Flowchart

Network Equipment Wards [4-2]

This option allows the engineer to assign remote keypads, XNodes and Nodes to wards. This will ensure that lid tamper alarms from devices on the network have the correct response, e.g. if a Node is assigned to ward A and ward A is unset, an internal alarm is generated when the Node lid is removed. However if ward A is set then a full alarm is generated.

XNodes

The assignment of XNodes to wards will also ensure that the correct operation of remote keypads and extension loudspeaker connected to the XNode. If an XNode is assigned to ward A, the remote keypads and the extension loudspeakers connected to the XNode are also assigned to ward A.

Remote Keypads

The assignment of remote keypads to wards also ensures the correct operation of user passcodes, e.g. if a user is assigned as a "Standard Ward" user type to ward A, the user will only be able to set and unset ward A from a remote keypad that is assigned to ward A.

Keypad Sounder

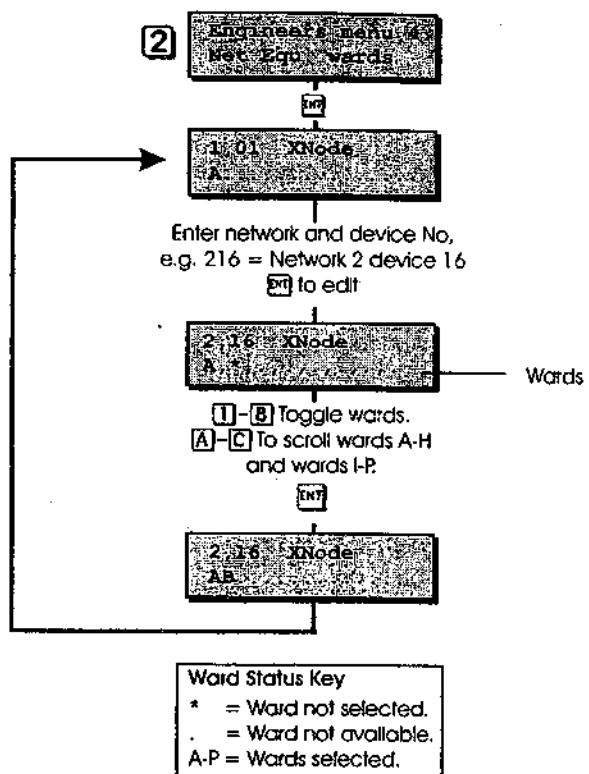
The internal sounder inside each remote keypad will operate as follows:

1. If the remote keypad is connected to an XNode the sounder will follow the assignment of the XNode. For example, if the XNode is assigned to ward B the remote keypad sounder will operate when ward B is in entry, exit or alarm.
2. If the remote keypad is connected directly to a network, the sounder will follow the assignment of the panel speaker (see "Equipment Wards" on page 78). For example, if the panel speaker is assigned to wards A & B the remote keypad sounder will operate when wards A or B are in entry, exit or alarm.

Extension loudspeakers

Extension loudspeakers will operate as follows:

1. If the extension loudspeaker is connected to an XNode the loudspeaker will follow the assignment of the XNode. For example, if the XNode is assigned to ward B the loudspeaker will operate when ward B is in entry, exit or alarm.
2. If the extension loudspeaker is connected to the control panel, the loudspeaker will follow the assignment of the panel speaker (see "Equipment Wards" on page 78). For example, if the panel speaker is assigned to wards A & B the loudspeaker will operate when wards A or B are in entry, exit or alarm.



Network Equipment Wards Flowchart

Equipment Wards [4-3]

This option allows the engineer to assign the following options to wards.

Panel tamper

The control panel lid tamper can be assigned to any combinations of wards, this will ensure the correct tamper response from a lid tamper alarm.

Bell Box Tamper

The bell box tamper can be assigned to any combination of wards, this will ensure that tamper alarms from external bell have the correct response.

Aux 1 Tamper

Auxiliary tamper 1 can be assigned to any combination of wards, this will ensure that tamper alarms from this input have the correct response.

Aux 2 Tamper

Auxiliary tamper 2 can be assigned to any combination of wards, this will ensure that tamper alarms from this input have the correct response.

Phone Line Fault

The phone line fault input can be assigned to any combination of wards. When a phone line fault occurs the system will respond as follows:

- All remote keypads will display "PHONE LINE FAULT".
- All internal sounders assigned to the same wards as the "Phone Line Fault" will generate a chime tone every minute on the minute and after the line fault delay timer has expired.
- If "Can Set With L.F" is enabled (see configuration) users assigned to the same wards as the "Phone Line Fault" can set their wards but will be asked to confirm that they are setting with a phone line fault present.
- If "No Set With L.F" is enabled (see configuration) users assigned to the same wards as the "Phone Line Fault" cannot set their wards until the phone line fault is cleared.

Mains Power Off

The mains power off condition can be assigned to any combinations of wards. When the loss of mains power occurs the system will respond as follows:

- All remote keypads display "AC OFF".
- All internal sounders assigned to the same wards as the "Mains Power Off" will generate a chime tone every minute on the minute and after the mains off delay timer has expired.
- If "Can Set-AC Off" is enabled (see configuration) users assigned to the same wards as the "Mains Power Off" can set their wards.

- If "No Set-AC Off" is enabled (see configuration) users assigned to the same wards as the "Mains Power Off" cannot set their wards until the mains power is restored.

Payment Timer

The payment timer can be assigned to any combination of wards, when the payment timer expires the selected wards will then be locked into engineer reset/remote reset.

Alarms Engineer Reset

Alarms can be assigned as engineer or user reset for each ward. If a ward is assigned as engineer reset, the ward can only be reset by the engineer or remote reset (if remote reset is enabled for that ward). If a ward is not assigned as engineer reset it becomes user reset and can be reset by any user that has access for that ward.

Tamper Engineer Reset

Daytime tamper alarms can be assigned as engineer or user reset for each ward. If a ward is assigned as engineer reset, a daytime tamper alarm can only be reset by the engineer or remote reset (if remote reset is enabled for that ward). If a ward is not assigned as engineer reset it becomes user reset and can reset by any user that has access for that ward.

Remote Reset

Remote reset can be enabled or disabled for each ward. If a ward has remote reset enabled users have access to the remote reset feature. If a ward does not have remote reset enabled, only the engineer can reset after alarm.

Panel Speaker

The control panel speaker can be assigned to any combination of wards, this will ensure that the sounders only operate when the relevant ward(s) are in alarm, entry & exit etc.

Relearn Required

When the system hardware configuration changes the system requires a relearn. This option allows you to select which wards require a relearn before the ward can be set.

Re-arms applies to

The rearm facility can be applied to any combination of wards. If rearm is applied to a ward the ward will rearm according to the "Number of rearms" specified in the "System Options", see page 43. If rearm is not applied to a ward, the ward will not auto rearm after an alarm, i.e., one activation of the bell.

Hi Security ward

If a ward is selected as "High Security" the ward will always attempt to stay in a set condition. If the ward is unset by a user the remote keypads display "HI SECURE UNSET" and the "Hi Security" timer is started. Every time a detector is triggered in the unset ward(s) the "Hi Security" timer is reset. When the timer expires the system will attempt to automatically set the "High Security" ward(s).

Digi in Part Set

When the system is full set (all defined wards set), an alarm in any ward will trigger the digicom. This option allows you to select which wards will trigger the digicom when the system is in a part set state.

System Bell/STB

This option allows you to select which wards will trigger the main bell and strobe outputs on the control panel.

Ward A Foyer Mode

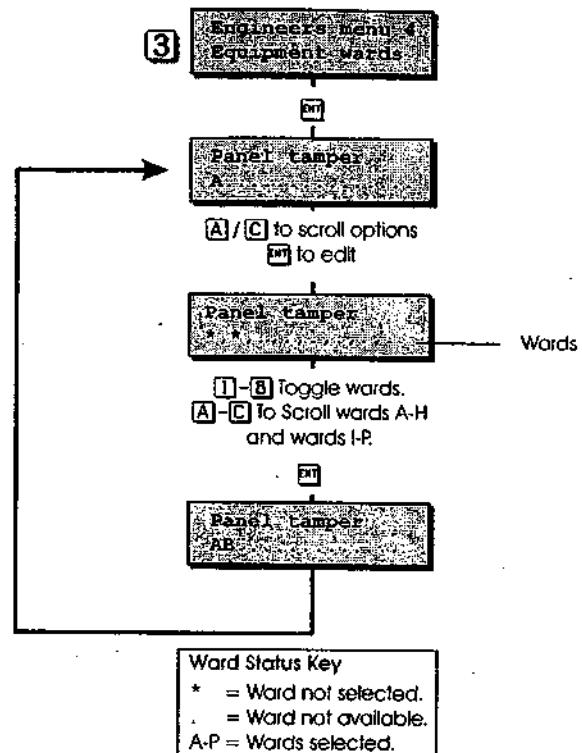
The "Ward A Foyer Mode" allows you to create a common area that is automatically set when all the wards that are assigned to it are set. Ward A will also automatically unset when any one of the assigned wards is unset. For example if wards B, C and D are assigned to the "Ward A Foyer Mode" the system will automatically set ward A when the last ward (B, C or D) is set. The system will automatically unset ward A when the first ward (B, C or D) is unset.

Unset fire Signals

This option allows you to designate which wards will trigger the "System Fire" output and "Ward Fire" output when a fire alarm circuit is trigger within an unset ward. If a ward is assigned to this option, a fire alarm from the selected ward will activate the "System Fire" output and the respective "Ward Fire" output when the ward is set or unset. If a ward is not assigned to this option, a fire alarm from the selected ward will only activate the "System Fire" output and the respective "Ward Fire" output when the ward is set.

Double Knock Wards

This option allows you to designate which wards will use the double knock counter (see "System Options" on page 43). If the double knock counter is assigned to a ward, all circuits with the double knock attribute within the selected ward will use the value defined by the double knock counter (1-999). If the double knock counter is not assigned to a ward, all circuits with the double knock attribute within the selected ward will use a default value of 002.



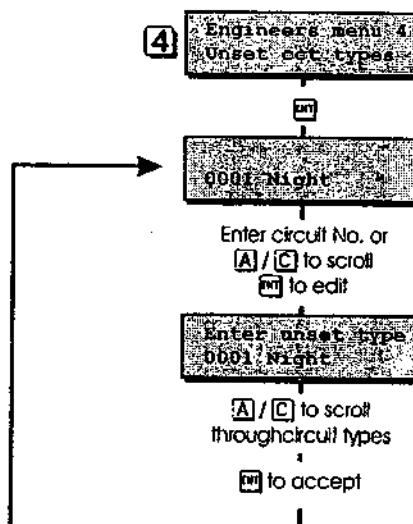
Equipment Words Flowchart

Unset Circuit Types

[4-4]

This option allows the engineer to change the circuit type when the circuit is unset, e.g. detection circuit 1001 can be programmed for night operation whilst the ward is set and then change to PA operation when the ward is unset.

NOTE: You must program detection circuits in "Engineers menu 1" before programming the unset circuit types. Initially the unset circuit type automatically follows the type programmed in "Engineers menu 1" and must be altered using this option.



Unset Circuit Types Flowchart

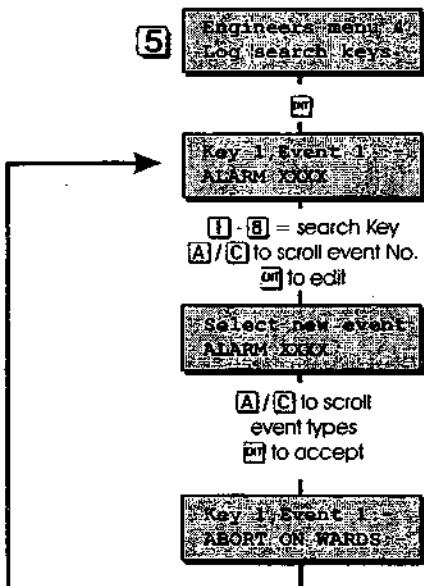
Log Search Keys [4-5]

This option allows the engineer to configure the nine log search keys. When viewing the event log you would normally use the [A] and [C] keys to scroll backwards and forwards through the event log. The log search keys allow you to scroll backwards through the log, but will only display events that meet the search key criteria. Each search key can have up to 5 search events assigned to it.

For example, log search key [1] could be set-up to search for alarms, set wards and unset wards. When viewing the log and pressing [1] the display would show the next event that met the search key criteria, i.e. it would display the next logged alarm, set or unset wards.

If you only want to search for a single event type, then assign all 5 events as the same type. The table below shows the default log search key settings:

Key	Event 1	Event 2	Event 3	Event 4	Event 5
1	ALARM	ALARM	ALARM	ALARM	ALARM
2	24hr ALARM				
3	FIRE ALARM				
4	PA ALARM				
5	TAMPER	TAMPER	TAMPER	TAMPER	TAMPER
6	ENTRY	ENTRY	ENTRY	ENTRY	ENTRY
7	PASS CODE				
8	SETWARDS	SETWARDS	SETWARDS	SETWARDS	SETWARDS
9	UNSETWARDS	UNSETWARDS	UNSETWARDS	UNSETWARDS	UNSETWARDS



Log Search Keys Flowchart

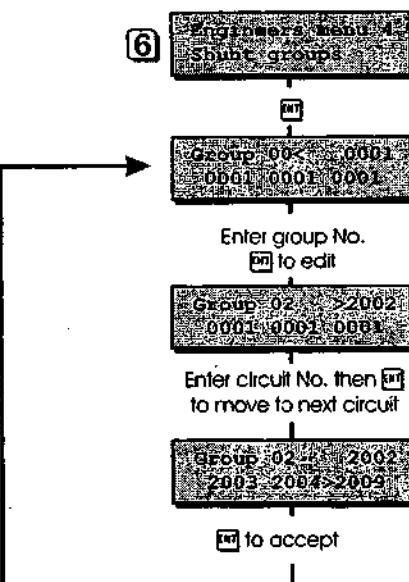
Shunt Groups [4-6]

The TS2500 alarm system has 50 shunt groups each group can have up to 4 circuits assigned to it. Each circuit must have the "Shutable" attribute assigned in order for it to be shunted. Each group can then be allocated to a user passcode (type "Shunt").

Operation

When a shunt passcode is entered the selected group of circuits are shunted (isolated), this is confirmed by the remote keypads showing "Your circuits are now shunted". When the shunt passcode is re-entered, the selected group of circuits are reinstated and the remote keypad shows "Your circuit are reinstated".

If the system configuration is programmed as "Unshunt, no exit", the shunted circuits are reinstated as soon as the passcode is entered. If the system configuration is programmed as "Unshunt & exit", the exit procedure is started when the passcode is entered and the shunted circuits are reinstated on completion of the exit procedure.



Shunt Groups Flowchart

OM Configuration [4-7]

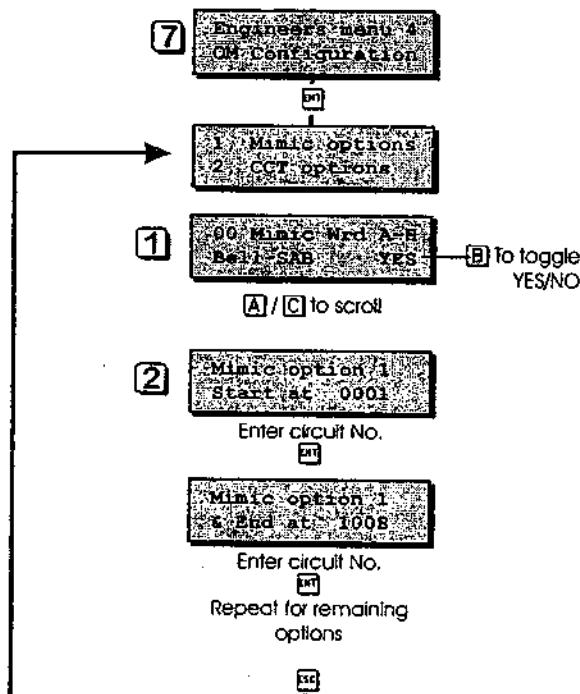
This option allows the engineer to define which ward and circuit status information is sent to the control panel output module port.

Mimic options

The mimic options allow you to define which ward related data is sent to the output module port.

CCT options

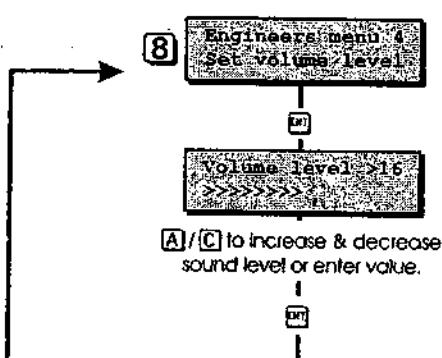
The circuit options allows you to define which circuit related data is sent to the output module port.



OM Configuration Flowchart

Set Volume Level [4-8]

This option allows the engineer to adjust the volume level of the control panel speaker output.

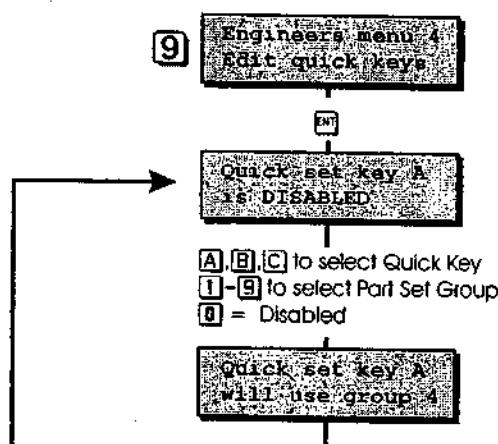


Set Volume Level Flowchart

Edit Quick Keys [4-9]

This options allows the engineer to configure the [A], [B] and [C] keys on the remote keypads to perform set functions. For example, key [A] could be programmed to follow part set group 1, whereas key [B] could be programmed to follow part set group 8.

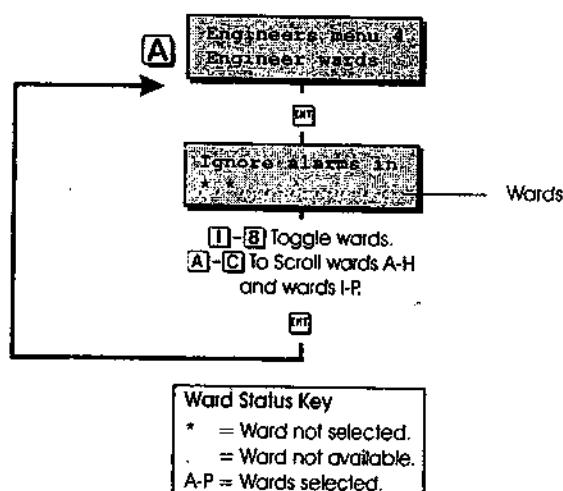
Once defined the quick keys do NOT require the user to enter their passcode, they simply press the relevant "Quick Set Key" and the system will perform the function assigned to that key.



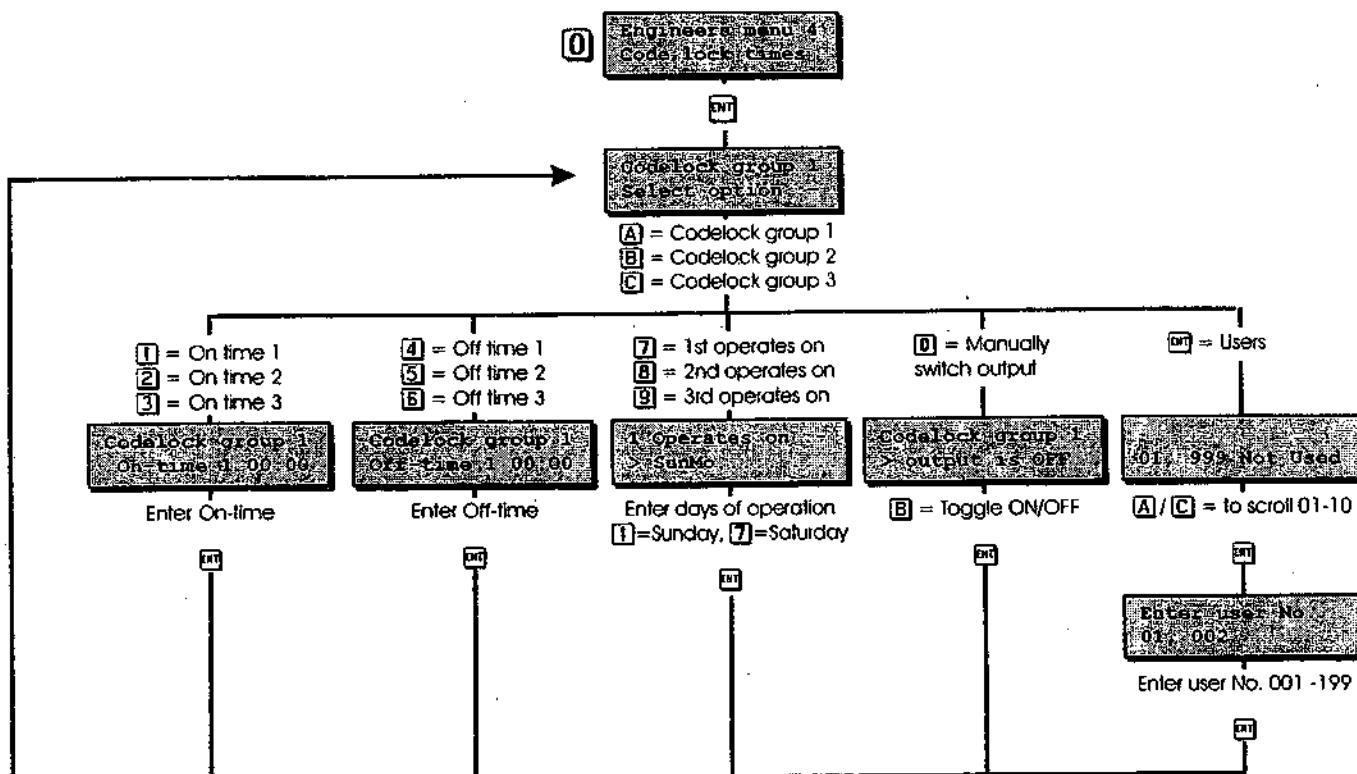
Edit Quick Keys Flowchart

Engineers Wards [4-A]

This option allows the engineer to select wards as "Engineer Wards". When a ward is selected as an "Engineer Ward" all circuits within that ward are NOT monitored whilst the engineer is logged on. If the ward is subsequently set whilst the engineer is still logged on the monitoring of circuits within that ward is resumed. The engineer cannot select a ward that is currently set. This feature allows parts of the system to be disabled and other parts to be kept live when an engineer is logged on.



Engineer wards Flowchart



Code Lock Times Flowchart

Code Lock Times [4-0]

This options allows the engineer to define up to three code lock time groups, each group has the following options:

On-times 1, 2 & 3
Each group has three independent on times.

Off-time 1, 2 & 3
Each group has three independent off times.

Days of operation 1, 2 & 3
Each group can be programmed to operate on different days of the week.

Users
Up to 10 users can be assigned to each code lock group.

Operation

Once a user is assigned to a code lock group their passcode is only valid when the code lock group timer is off. If the user attempts to use their passcode whilst the timer is on the display will show "Sorry. Your code is locked out".

● Appendices

Text Editing Keys

When programming any text the keys on the keypad function as shown below:

1	= A	2	= E	3	= I
3	= O	5	= U	4	= 0 (zero)
7	= Move cursor left	8	= Change case	9	= Move cursor right
ENT	= Accept text	0	= Space	ESC	= Abandon text editing
A	= Up the alphabet	B	= Change cursor	C	= Down the alphabet

Text Editing Keys

Cursor Types

- [^] This is the normal text editing cursor. Use the text editing keys as shown above.
- [|] This is the number cursor. Use the numbered keys 0 - 9 to enter numeric data.
- [+] This is the insert cursor. Use text editing keys as shown above to insert text at the cursor.
- [|-] This is the delete cursor. Use key [7] to delete from the left of the cursor and key [9] to delete from the right of the cursor.

Common Key Sequences

Character	Key Sequence	Character	Key Sequence
A	1	U	5
B	1A	V	5A
C	1AA	W	5AA
D	2C	X	5AAA
E	2	Y	5AAAA
F	2A	Z	5AAAAA
G	2AA	:	1CCCCCCC
H	3C	:	1CCCCCC
I	3	<	1CCCCC
J	3A	=	1CCCC
K	3AA	>	1CCC
L	3AAA	?	1CC
M	4CC	@	1C
N	4C	!	0A
O	4	"	0AA
P	4A	#	0AAA
Q	4AA	\$	0AAAA
R	4AAA	%	0AAAAA
S	5CC	&	0AAAAAA
T	5C		

Setup New Users

The TS2500 allows up to 199 users to operate the alarm system, each user is assigned a user type, passcode and ward access. User 001 is the master user which has a default setting of 5678.

User Types

The following user types are available:

Master

This user type has access to all fours our user menus and options. A master user is also a global user which allows the user to set and unset their assigned wards from any remote keypad.

Manager

This user type has access to "User menu 1" and "User menu 2". A manager user is also a global user which allows the user to set and unset their assigned wards from any remote keypad.

Standard Global

This user type has access to "User menu 1". A standard global user is also a global user which allows the user to set and unset their assigned wards from any remote keypad.

Standard Ward

This user type has access to "User menu 1". A standard ward user can only set and unset their assigned wards from a remote keypad that is assigned to the same ward(s) that they are trying to set/unset. For example if the user is assigned to wards A and B, then operates the system from a keypad assigned only to ward B, the user would only have the option to set/unset ward B.

Reset Only

This user type allows 24hr alarms to be reset and access to "User menu 1" options 1 to 9. A reset only user is also a global user type which allows the user to reset 24hr alarms from any remote keypad.

Panic Code

This user type does not have access to any user menus nor can it be used to set and unset the system. When this user code is entered a "Panic Alarm" is transmitted to the alarm receiving centre and the external sounder(s) and strobe light(s) are also activated.

Duress Code

This user type operates in the same way as a standard global user, but when the passcode is used a silent "Panic Alarm" is transmitted to the alarm receiving centre.

☞ If "Configuration option 02" is set to enabled, all users can generate a "Duress" alarm by entering their passcode with the first two digits reversed (e.g. for a passcode of 2580 enter 5280 to generate a "Duress" alarm).

Access

This user type does not have access to any user menus nor can it be used to set and unset the system. When this user code is entered it will operate specific outputs which in turn can be used to operate an electric door strike or similar.

Shunt

This user type does not have access to any user menus nor can it be used to set and unset the system. When this user code is entered it will isolate a pre-defined group of detection circuits. When the code is re-entered it will reinstate the group.

Set Only

This user type operates in the same way as a standard global user, except that it only allows setting of wards.

Not in use

This user type does not perform any operation. Select this user type to delete an existing user.

User Wards

Each user must be assigned to wards. Once assigned to wards the user can then set, unset and reset the wards they have been given access to.

Auto Sets wards

Wards that are assigned as auto set will automatically be selected for setting when choosing the "SET WARDS" option. If a ward is not assigned as auto set the user is given the choice to select the ward at the time of setting.

Auto Unset Wards

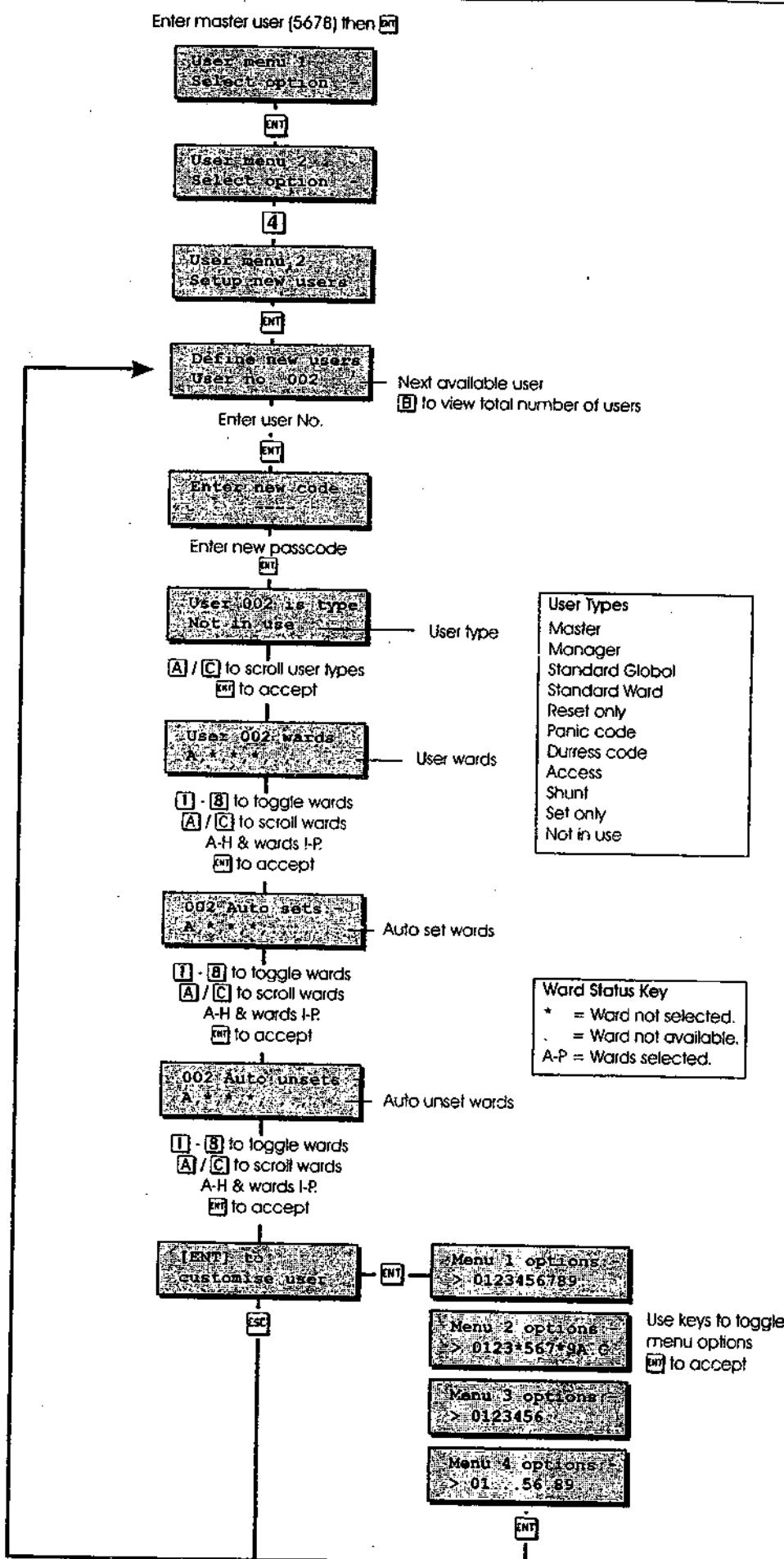
Wards that are assigned as auto unset will automatically be selected for unsetting when choosing the "UNSET WARDS" option. If a ward is not assigned as auto unset the user is given the choice to select the ward at the time of unsetting.

Customising Users

Access to user menus is initially defined by the user type, e.g. the manager user has access to user menus 1 and 2, and a standard global user has access to user menu 1 only. However, each user can be customised so that individual options within user menus are available or restricted, e.g. user 002 could be given the initial type of standard ward, then customised to allow the user to access all user menus and options.

The table below shows all four user menus and the options available:

Key	User Menu 1	User Menu 2	User Menu 3	User Menu 4
1	Bell Test	View circuits	Time Switches	Auto-set Timers
2	Walk Test	Set System Time	Part Set Groups	
3	Remote Reset	Set System date	Use On-line Pad	
4	Change passcode	Setup new users	Edit User Names	
5	Enable Chime	Chime Circuits	Part Set Text	Log Search Keys
6	24hr Ormit	24hr Group	Circuit Text	Shunt Groups
7	Ormit Zones	Print System Log		
8	Silent Set	Alter Wards		Set Volume Level
9		View System Log		Edit Quick Keys
0	Set/Unset	Rem. Serv. Options	Activity Count	Code Lock Times
A		Start Call Back		
B				
C		Set BST/GMT Dates		



Setup New Users Flowchart

Engineer's Quick Reference

Engineers Menu 1

Hotkey	Options	Page
[1]	Program Panel Outputs 1 = Panel Output 1 (relay) 2 = Panel Output 2 (-ve) 3 = Panel Output 3 (+ve) 4 = Panel Output 4 (+ve)	32
[2]	Program Digicom Outputs 1 = Channel 1 5 = Channel 5 2 = Channel 2 6 = Channel 6 3 = Channel 3 7 = Channel 7 4 = Channel 4 8 = Channel 8	32
[3]	Program Digicom Channels 1 = Channel 1 5 = Channel 5 2 = Channel 2 6 = Channel 6 3 = Channel 3 7 = Channel 7 4 = Channel 4 8 = Channel 8	32
[4]	Program Circuits, Attributes & Wards Circuit Types 0 = Not Used 8 = Exit Terminator 1 = Night 9 = Ward Key 2 = 24 Hour A/C = Shunt Key 3 = PA Silent A/C = Tamper 4 = PA Audible A/C = Security 5 = Fire A/C = 24hr Silent 6 = Auxiliary A/C = Night Perimeter 7 = Final Exit A/C = Custom circuits Circuit Attributes 1 = Access 9 = Chime 2 2 = Double Knock A/C = Chime 3 3 = On Test A/C = Inverted 4 = Omittable A/C = Shutable 5 = Reset A/C = Beam Pair 6 = Activity A/C = Eng. Test 7 = Entry A/C = Monitored 8 = Chime 1 A/C = Non Latching 9 = Toggle attribute between YES/NO Wards 1 - 8 = Select/deselect wards displayed A/C = Toggle wards A-H or I-P B = Select/deselect all wards	38
[5]	Program System Timers Exit time wards A-P Monitor cct time Entry dly wards A-P Beam pair time Digi dly wards A-P Battery test dur Bell dly wards A-P Answer ring time Bell dur wards A-P Global bell dly Exit settle dly Global bell dur 2nd Entry delay Activity delay Double Knock dly Defer setting by Abort duration Battery test Abort delay Hi Security time 2nd alarm time Cct test time Courtesy time Service time Access code time Payment time Menu time-out Test call every Line fault delay Select menu time AC off delay Custom o/p 2 Trm	40
[6]	Program Setting Modes A/C =Select ward 1 = Final Exit 2 = Exit Terminator 3 = Timed Exit 4 = Instant 5 = Deferred	42

Hotkey	Options	Page
[7]	System Print-out 0 = Custom text 8 = Code locks 1 = Modem data 9 = Auto-set times 2 = User codes A/C = Custom Circuits 3 = Configuration A/C = Circuits 4 = Outputs A/C = Equipment wards 5 = Setting modes A/C = Net equipment 6 = System timers A/C = Part set groups 7 = Time switches	42
[8]	Program System Options Number of alarms Remote resets Modem rings Reset algorithm Keys until tamper Double Knocks	43
[9]	Program Configuration 00 = Bell is on SAB / Bell is an SCB 01 = View alms P.Set / View alms unset 02 = Duress Disabled / Duress Enabled 03 = Engr Authorised / User Authorised 04 = On-Line Enabled / On-Line Disabled 05 = Lo-sec Engineer / Hi-sec Engineer 06 = Normal answer / Timed answer 07 = Unset ward first / Set ward first 08 = Can set with L.F / No set with L.F 09 = Can set - AC off / No set - AC off 10 = Quiet chimes / Loud chimes 11 = O/P 1 normal / O/P1 inverted 12 = Digi normal / digi inverted 13 = 4 digit codes / 6 digit codes 14 = Modem on Com1 / Printer on COM1 15 = Chime Audible / Chime Visible 16 = Manual Omits / Automatic Omits 17 = Omit Tamper No / Omit Tamper Yes 18 = O/M's mimic cct / O/M's mimic alms 19 = Log Time & Date / Log Time & Day 20 = Global Setting / Local Setting 21 = Global Unsetting / Local Unsetting 22 = 24hr Omit Global / 24hr Omit Local 23 = Ward bell time / Global bell time 24 = Latching Fire / Nonlatching Fire 25 = Online Printing / Offline Printing 26 = Timed code o/p / Latched code o/p 27 = Activity fit ok / Activity fit Bar 28 = Latching 24hr / Nonlatching 24hr 29 = Access code only / Access all codes 30 = Answer anytime / Answer o/p 1 on 31 = NVM is Unlocked / NVM is Locked 32 = Unshunt & No exit / Unshunt & exit 33 = Ignore errors / View exit errors 34 = Mimic, All times / Mimic, set only 8 = Toggle between two options	44
[A]	View Location Text 1 = Panel Location 2 = Remote Location	47
[B]	Default NVM data 0 = Custom text 8 = Code locks 1 = Modem data 9 = Auto-set times 2 = User codes A/C = Custom Circuits 3 = Configuration A/C = Circuits 4 = Outputs A/C = Equipment wards 5 = Setting modes A/C = Net equipment 6 = System timers A/C = Part set groups 7 = Time switches A/C = Log	47
[C]	Log Off Engineer	49
[D]	Goto User Menu 1 1 = Bell Test 6 = 24hr Omit 2 = Walk Test 7 = Omit Circuits 3 = Remote Reset 8 = Silent Set Wards 4 = Change code 0 = Set/Unset Menu 5 = Select Chime	49

Engineers Menu 2

Hotkey	Option	Page
[1]	View Circuits A/C = Scroll up and down ENT = Toggle text / location	52
[2]	Set System Time B = Toggle BST / GMT	52
[3]	Set System Date	52
[4]	Change Passcode (Engineers)	52
[5]	Alter Chime Circuits A/C = Scroll up and down ENT = To edit 1 = Chime tone 1 2 = Chime tone 2 3 = Chime tone 3 0 = Disabled	53
[6]	Alter 24hr Group 1 - 8 = Select/deselect words displayed A/C = Toggle words A-H or I-P B = Select/deselect all words	53
[7]	Print System Log	53
[8]	Alter Circuit Words A/C = Scroll up and down ENT = To edit 1 - 8 = Select/deselect words displayed A/C = Toggle words A-H or I-P B = Select/deselect all words	54
[9]	View System Log A/C = Scroll up and down B = Toggle user name / No B = Toggle event / word B = Toggle circuit No / circuit text	54
[A]	Start Call Back Sequence 1 = Call Back No 1 2 = Call Back No 2 3 = Call Back No 3 B = Enter number required ENT = Start call back sequence	58
[B]	Reset User Code 1 ENT = Reset user 1 to 5678	58
[C]	Set BST/GMT Dates	58
[D]	Remote Service Options B = Toggle Enabled / Disabled	58

Engineers Menu 3

Hotkey	Option	Page
[1]	Program Time Switches A = Time switch 1 1 = On time 1 B = Time switch 2 2 = On time 2 C = Time switch 3 3 = On time 3 4 = Off time 1 7 = 1st operates on 5 = Off time 2 8 = 2nd operates on 6 = Off time 3 9 = 3rd operates on 0 = Manually switch output	60
[2]	Part Set Groups 1 - 9/G = Select part set group ENT = Edit	60
[3]	Use On-Line Keypad	61
[4]	Edit User Names A/C = Scroll up and down ENT = Edit text	61
[5]	Part Set Text 1 - 9/0 = Select part set group ENT = Edit text	61
[6]	Circuit Text A/C = Scroll up and down ENT = Edit text	62
[7]	Custom Text Menu 0 = Reset message 5 = Banner message 1 = Location text 6 = Part set banner 2 = Printer header 7 = Aux. Tamper 1 3 = Rm/rst msg 8 = Aux. Tamper 2 4 = Printer prefix 9 = Modem string	64
[8]	Equipment Outputs A/C = Scroll up and down B = Toggle output A / B	65
[9]	Built In Tests Software Version 1 = Voltage 2 = Current 3 = Circuit Resistance 4 = DigiCom Outputs (Panel) 5 = Test panel outputs 6 = Test Node outputs 7 = Confirm Network devices 8 = Test Keypad display 9 = View Network devices A/C = Network errors A/C = False setting routine A/C = Test digicom channels (Plug-on)	66
[A]	Custom Outputs	69
[B]	Custom Circuits 1 - 8 = Select custom output 1 - 8 ENT = Edit 1 = Toggle unset A/C = Bell required 2 = Toggle part set A/C = Digi required 3 = Toggle set A/C = Sounder required A/C = Warning required A/C = Trig Custom o/p	70
[C]	Modem Options 1 = Call back No 1 6 = Program digicom 2 = Call back No 2 7 = Digi Baud rate 3 = Call back No 3 8 = COM1 Baud rate 4 = Modem password 9 = Internal digicom 5 = Modem site No 0 = Reset digicom	71
[D]	Activity Count A/C = Scroll wards B = Reset counter	74

Engineers Menu 4

Hotkey	Option	Page
①	Auto-set Timers A = Timer 1 1 = Set Time 1 B = Timer 2 2 = Set Time 2 C = Timer 3 3 = Set Time 3 4 = Unset Time 1 7 = 1st operates on 5 = Unset Time 2 8 = 2nd operates on 6 = Unset Time 3 9 = 3rd operates on ENT = Select words 0 = Manually switch output	76
②	Network Equipment Wards A/C = Scroll up and down ENT = Edit words 1 - 8 = Select/deselect words displayed A/C = Toggle words A-H or I-P B = Select/deselect all words	77
③	Equipment Wards 1 = Panel tamper 2 = Bell box tamper 3 = Aux 1 tamper 4 = Aux 2 tamper 5 = Phone line fault 6 = Mains power off 7 = Payment timer 8 = Alarms Eng Reset 9 = Tamper Eng Reset A/C = Remote reset A/C = Panel speaker A/C = Realarm required A/C = Re-arms apply to A/C = Hi Security word A/C = Digi In Part Set A/C = System Bell/SIB A/C = Ward A foyer Mode A/C = Unset fire sig. A/C = Dble Knock wards	78
④	Unset Circuit Types Circuit Types 0 = Not Used 8 = Exit Terminator 1 = Night 9 = Ward Key 2 = 24 Hour A/C = Shunt Key 3 = PA Silent A/C = Tamper 4 = PA Audible A/C = Security 5 = Fire A/C = 24hr Silent 6 = Auxiliary A/C = Night Perimeter 7 = Final Exit A/C = Custom circuits	79
⑤	Log Search Keys	80
⑥	Shunt Groups	80
⑦	OM Configuration 1 = Mimic options 2 = CCT options	81
⑧	Set Volume Level A/C = Increase / Decrease	81
⑨	Edit Quick Set Keys A/B/C = Quick set key A/B/C 1 - 9 = Select part set group 0 = Disabled	81
⑩	Code Lock Timers A = Codelock 1 1 = On Time 1 B = Codelock 2 2 = On Time 2 C = Codelock 3 3 = On Time 3 4 = Off Time 1 7 = 1st operates on 5 = Off Time 2 8 = 2nd operates on 6 = Off Time 3 9 = 3rd operates on ENT = Select users 0 = Manually switch output	82
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² CCTV

SAFETY WARNING AND INFORMATION

The VCL Microsphere is designed to operate in the following indoor environment:

Temperature: 14°F to 122°F (-10°C to +50°C)
Humidity: 85% (non-condensing)



To reduce the risk of electrical shock, do not remove the transparent cover - there are no user serviceable parts inside.

This equipment must only be installed indoors and by qualified personnel.

Refer all servicing and/or maintenance to qualified personnel.

These products contain static electricity sensitive devices so take appropriate precautions when handling them.

Handle the microsphere assembly with care as improper handling may damage precision or sensitive parts.

Never point the camera towards a bright light source such as the sun or expose the camera to strong light as this may damage the camera pick-up device.

Design and specifications are subject to change without notice



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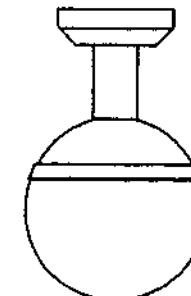
3" MICROSPHERE PRODUCT RANGE

FOR INDOOR USE WIRING INSTRUCTIONS AND PHYSICAL DIMENSIONS

Features: Telemetry Control, Variable Speed Pan and Tilt,
64 presets and 4 Patrols/Tours

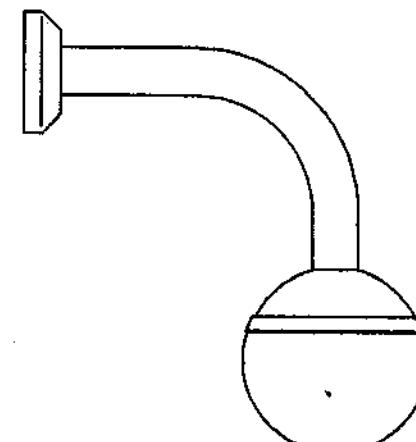
CEILING MOUNTED

VC3S-CPTC	COLOUR PAN & TILT
VC3S-MPTC	MONO PAN & TILT
VC3S-CSC	COLOUR STATIC
VC3S-MSC	MONO STATIC



WALL MOUNTED

VC3S-CPTW	COLOUR PAN & TILT
VC3S-MPTW	MONO PAN & TILT
VC3S-CSW	COLOUR STATIC
VC3S-MSW	MONO STATIC



SPECIFICATIONS FOR MONOCHROME AND COLOUR CAMERAS

Feature	Monochrome	Colour
Picture Element	1/3" CCD 500(H) x 582(V)	1/4" CCD 752(H) x 582(V)
Scanning System	CCIR	PAL
Video Output	1V p/p into 75Ω	
Resolution	380 TV lines	400 TV Lines
Min. Illumination	1 lux	5 lux
Current consumption		
Static Models	180mA	250mA
Pan & Tilt Models:	255mA	325mA
Power Source	12V DC	
Lens	3.6mm or 6mm	5.6mm
Zoom		
Static Models	n/a	n/a
Pan & Tilt Models:	n/a	2x Digital
Auto Iris Facilities	Built In	
Sync. System	Internal	
S/N Ratio	46db	
Operating Temperature	-10°C to +50°C	

PRESET AND TOUR SPECIFICATIONS

The 3" microsphere has 64 presets (PAN, TILT and ZOOM) and 4 tours containing up to 64 positions.

Details of how to program presets and tours can be found in the "Telemetry Operator Instructions", supplied with the transmitter hand set.

The 3" microsphere has the following features

- a) The programmed dwell time for each position in a tour has a minimum dwell time of 10 seconds;
 - b) The dwell time for the final position in the tour is 3 minutes before recommencing the tour;
 - c) The speed between positions can be varied from "1" to "100" where "1" is the minimum speed and "100" is the maximum speed. This parameter does not reflect the speed in degrees per second as with other microspheres but provides a very high degree of control not found in other comparable sized spheres.

CAMERA NUMBER SELECTION DIL SWITCH SETTINGS FOR TELEMETRY PRESETS RECEIVER

= OFF

ON

DIL Switch position 8 (RS485 Termination) must be set correctly - OFF for all cameras EXCEPT the last one in the chain which must have this switch set ON.

CAMERA ADDRESS DIL SWITCH SETTINGS

All data for all cameras is sent via the single RS485 twisted pair cable link.

The data contains the address of the destination camera, and the camera will only respond to data that contains the same camera address as set on the DIL switch settings on the receiver PCB within the camera.

All other data will be ignored.

A table of DIL switch settings is shown opposite.

EXAMPLE

In a 12-camera installation camera 12 will have the following DIL switch settings:

DIL Switch Setting:	1	OFF
	2	OFF
	3	ON
	4	OFF
	5	ON
	6	ON
	7	ON

Because camera 12 is the last in the chain, DIP switch setting 8 is set to ON:

8 ON

The table opposite shows this as:

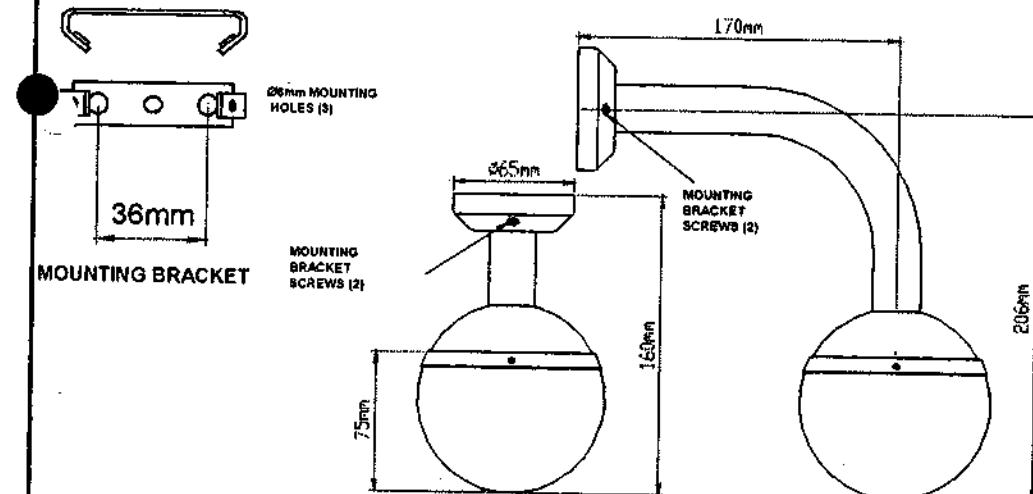


All other cameras (Cameras 1 to 11 inclusive) will have DIP switch 8 set to OFF.

GENERAL PRODUCT DIMENSIONS

CEILING AND WALL MOUNTED MODELS

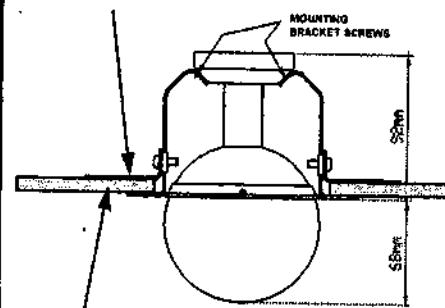
1. To install, remove bracket from microsphere and attach to wall/ceiling.
2. Cut cable access within the base area and attach cables to microsphere.
3. Refit microsphere to bracket pushing excess cable into ceiling/wall.



Ceiling Models Only: Label position on inner face of base indicates pan limit of travel orientation/position.

FALSE CEILING MOUNTING KIT

MICROSPHERE MOUNTING AND RETAINING PLATES (2)



Ceiling thicknesses from 3mm to 50mm (1/8" to 2") can be accepted by the kit.

1. Cut a Ø108mm (Ø4 1/4") hole in the ceiling.
2. Remove mounting plates from kit frame and fit frame to microsphere using mounting bracket and screws.
3. Attach wiring and then pass kit with microsphere through hole into ceiling.
4. Refit retaining plates on back face by pressing down firmly on ceiling and screw firmly in position.

IMPORTANT NOTES FOR RS485 INSTALLATIONS

TWISTED PAIR AND "DAISY CHAIN" CONNECTIONS

Twisted pair RS485 telemetry receivers may be "daisy chained" from one twisted pair RS485 output. It is essential that the 8-way termination switch (labelled "DILSW1" on the VC391 PCB) is set correctly.

In a chain of cameras, DIL switch position 8 must be turned OFF for all intermediate cameras and only turned ON for the last camera in the chain.

INDIVIDUAL TWISTED PAIR OUTPUTS

If a single twisted pair RS485 telemetry receiver is to be connected to an individual twisted pair output the termination switch should be turned ON in the receiver.

STAR CONNECTIONS

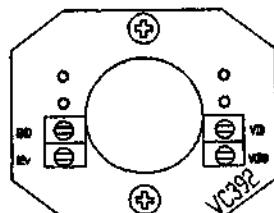
Do not connect several twisted pair RS485 telemetry receivers to one twisted pair output using long cables - use the "Daisy chain" method instead. If it is necessary to connect all the cameras to the transmitter the VCTM16ITP must be used to provide individual RS485 outputs to the cameras.



The above rules must be adhered to so that telemetry data will not be corrupted. Failure to do so will seriously reduce the performance of the camera installation or even prevent it operating at all.

CONNECTOR WIRING INFORMATION

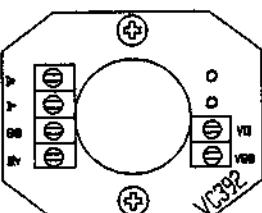
STATIC MODELS



GND
12V
VID
VGND

Power Ground
12V DC
Video Signal
Video Ground

PAN & TILT MODELS

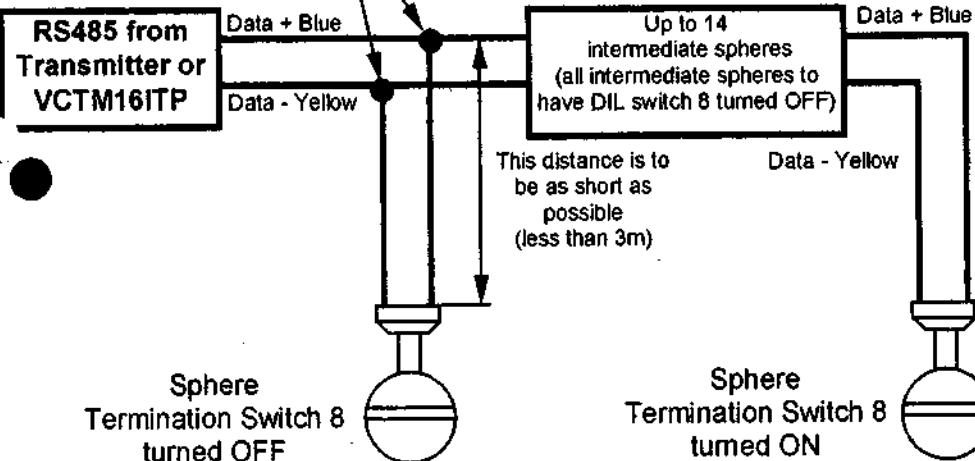


D+ }
D- }
GND
12V
VID
VGND

RS485 twisted pair
telemetry
Power Ground
12V DC
Video Signal
Video Ground

EXAMPLE OF A "DAISY CHAIN" INSTALLATION

Use insulated screw
terminals or crimps to join
cables close to sphere



EXAMPLE OF USE OF INDIVIDUAL RS485 TWISTED PAIR OUTPUTS

RS485 from
Transmitter or
VCTM16ITP

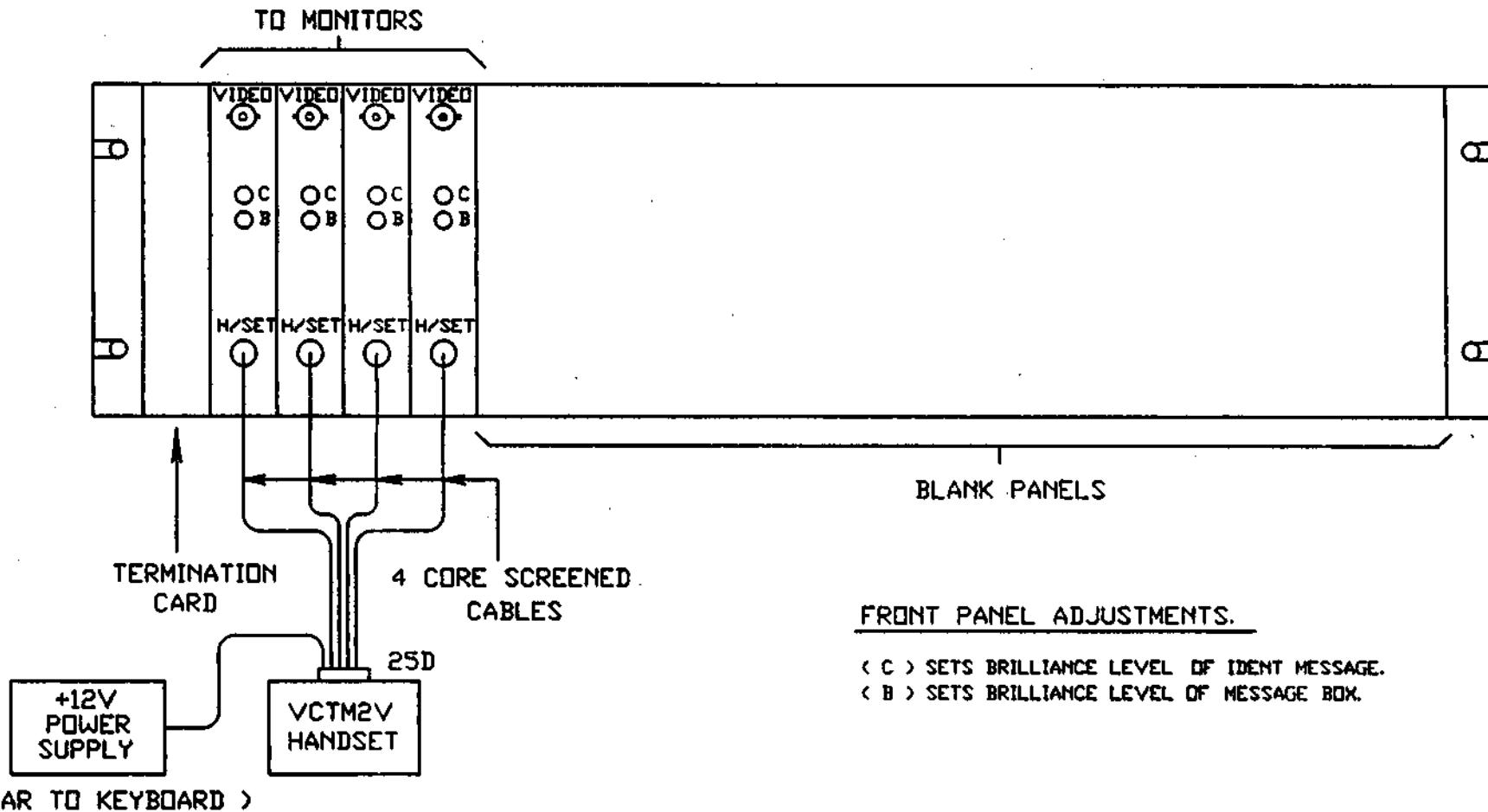
Data + Blue

Data - Yellow

Sphere
Termination Switch 8
turned ON

INSTALLATION INSTRUCTIONS FOR VCTM64/16 AND VCTM64/16L CARD FRAME

19" X 3U RACK (FRONT VIEW)



(NEAR TO KEYBOARD)

TERMINATION CARD

THERE ARE 64 SWITCHES (8 X 8 WAY SWITCHES) ON THE TERMINATION CARD TO ALLOW INDIVIDUAL CAMERAS TO BE TERMINATED WITH 75Ω RESISTORS OR HIGH IMPEDENCE FOR LOOPING APPLICATIONS .

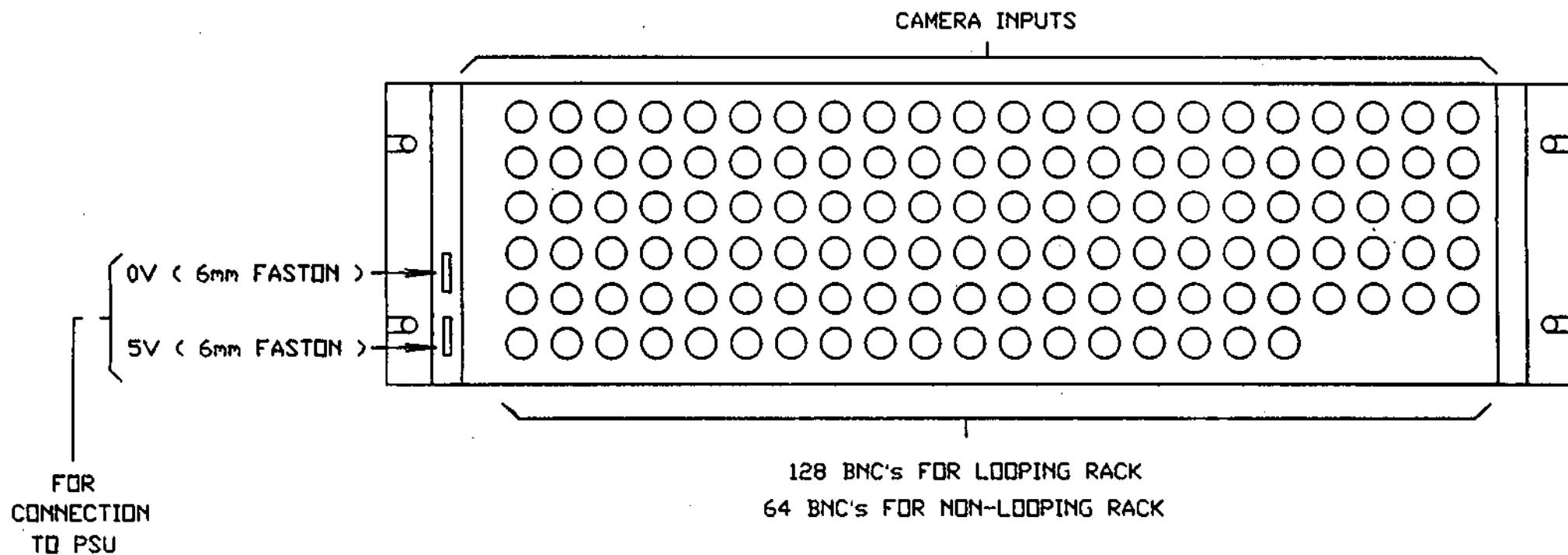
THE SWITCHES ARE NUMBERED WITH THE CORRESPONDING CAMERA NUMBER .

SWITCH ON = 75Ω TERMINATION (TERMINATION ON)

SWITCH OFF = HIGH IMPEDENCE (TERMINATION OFF) SUPPLIED WITH ALL SWITCHES ON .
THE VCTM64/16 AND VCTM64/16L ARE

INSTALLATION INSTRUCTIONS FOR VCTM64/16 AND VCTM64/16L CARD FRAME

19" X 3U RACK (REAR VIEW)



OPTICAL AND DIGITAL ZOOM SETTING

Switch 8 of the 8 way DIL switch is used to switch the camera between digital zoom and optical zoom, or optical zoom only, as shown below:-

SWITCH 8	ZOOM SETTING
ON	OPTICAL AND DIGITAL ZOOM
OFF	OPTICAL ZOOM ONLY

SPECIFICATIONS FOR MONOCHROME AND COLOUR MICROSPHERES

Feature	Monochrome	Colour
Scanning system	CCIR	PAL
CCD Size	1/4"	1/3"
Line Resolution	570	460
Zoom Lens Size (Optical)	4-48mm	5.4-64.8mm
Optical Zoom	12x	
Digital Zoom	24x	
Video Output	1V p/p into 75Ω	
Min. Illumination	0.3 lux	1.5 lux
Sync. System	Internal	
S/N Ratio	>46db	
Operating Temperature	-10°C to +50°C	
Variable Pan speed	0.1° to 400° per second	
Pan Coverage:	360° Continuous	
Variable Tilt Speed:	0.1° to 200° per second	
Tilt Coverage:	90°	
Programmable Presets	128 - Each includes pan, tilt, zoom, iris and focus	
Programmable Tours	4	
Number of Presets per Tour	128 - Any of the 128 preset positions can be included in any one tour. Each tour can be programmed with variable speed and variable dwell times for each position.	
Current consumption:	1.6A @ 12V DC	
Power Supply	12V DC	
Recommended Power supply:	VC3PSU	
Mounting Options:	Wall - Ceiling - False Ceiling	



SAFETY WARNING AND INFORMATION



Refer all servicing and/or maintenance to qualified personnel.

These products contain static sensitive devices so take appropriate precautions when handling them.

Handle the microsphere with care as improper handling may damage precision or sensitive parts.

Never point the camera towards a bright light source such as the sun or expose the camera to strong light as this may damage the camera pick-up device.

Design and specifications are subject to change without notice

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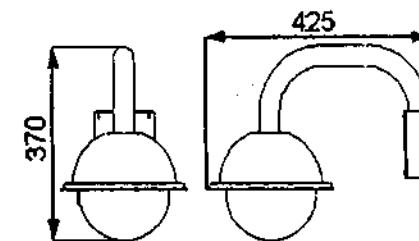
© VCL 1998



8" EXTERNAL MICROSPHERE

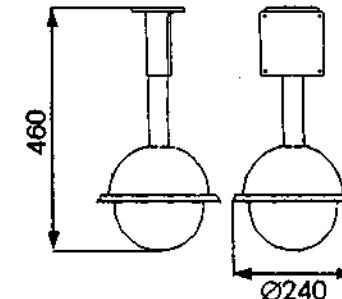
WALL MOUNT

VC8E-12AFP / W
COLOUR TWISTED PAIR
VC8E-12AFMP / W
MONO TWISTED PAIR
VC8E-12AFT / W
COLOUR 'IN COAX'
VC8E-12AFMT / W
MONO 'IN COAX'



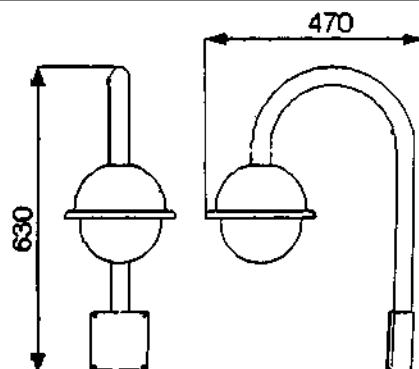
SOFFIT MOUNT

VC8E-12AFP / S
COLOUR TWISTED PAIR
VC8E-12AFMP / S
MONO TWISTED PAIR
VC8E-12AFT / S
COLOUR 'IN COAX'
VC8E-12AFMT / S
MONO 'IN COAX'



POLE MOUNT

VC8E-12AFP / P
COLOUR TWISTED PAIR
VC8E-12AFMP / P
MONO TWISTED PAIR
VC8E-12AFT / P
COLOUR 'IN COAX'
VC8E-12AFMT / P
MONO 'IN COAX'



MICROSPHERE ADJUSTMENTS AND DISPLAYS

DISPLAYS ON THE MAIN PC BOARD (VC415/4)

If LED D3 is OFF, check the sphere power supply output using a voltmeter.

LED D4 is ON when the receiver is powered up. It is controlled by the internal +5V supply and simply indicates that the receiver is ON. (It does not indicate that the +5V is satisfactory for the circuit to function correctly.)

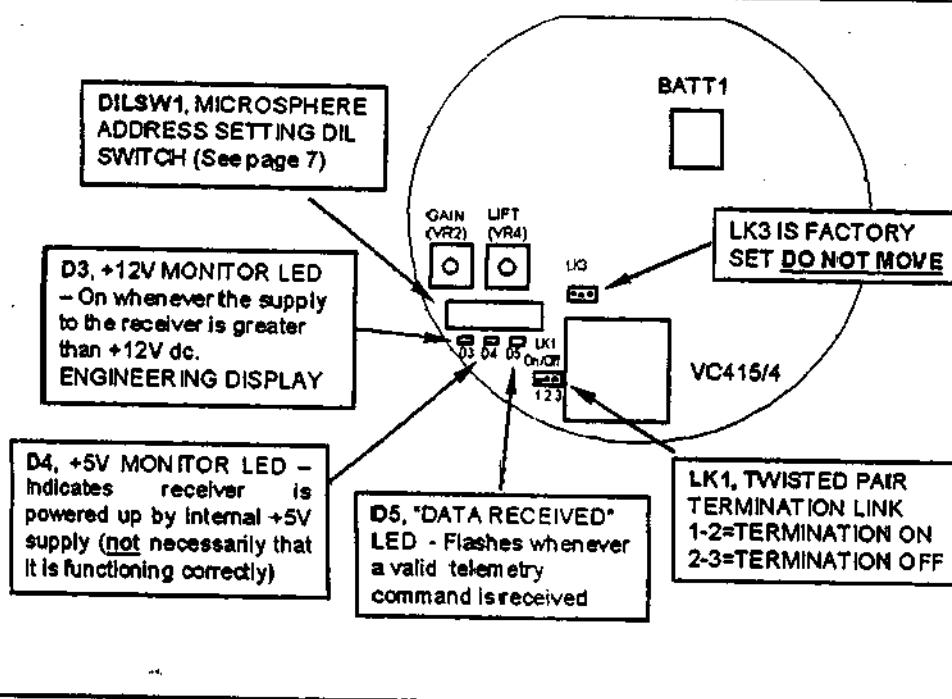
GAIN AND LIFT ADJUSTMENTS.

VR2 (GAIN) and VR4 (LIFT) are factory set. They are intended to improve the picture quality when degradation occurs due to long video cable runs. Ensure that the iris has been correctly adjusted before adjusting either the GAIN or LIFT.

If the contrast of the picture is low (caused by an attenuated video signal), this can be adjusted using the GAIN pot (VR2).

If the picture is 'smearing' due to a long coax cable (e.g. over 500 meters), the LIFT pot (VR4) can be adjusted to 'sharpen' the picture.

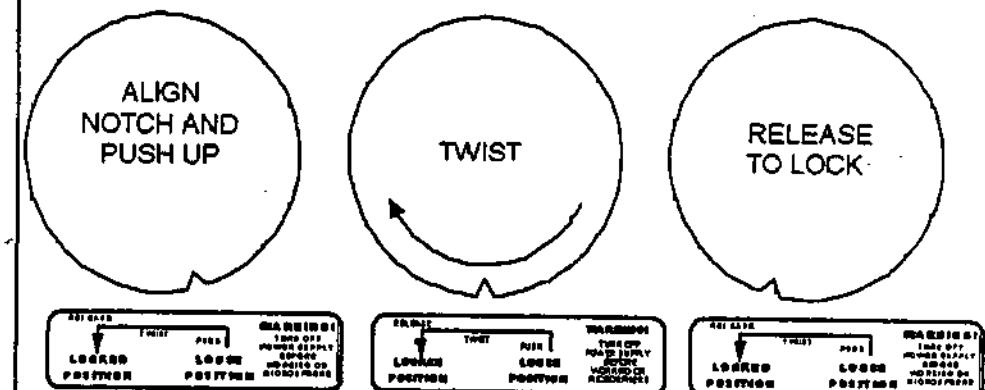
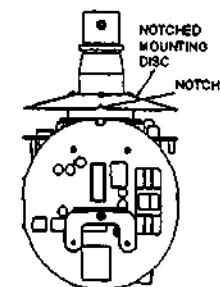
Note: Over adjustment of the GAIN and LIFT will degrade the picture.



GENERAL PRODUCT DETAILS

INSTALLING MICROSPHERE INTO EXTERNAL HOUSINGS

1. Attach the bracket (wall, soffit or pole type) using adequate fixings for the surface and overall weight of the unit (2.5kg) – see page 2.
2. Complete the electrical wiring and check the connections are sound and correct to the pin names (see page 2).
3. Remove the black opaque cover from the microsphere – DO NOT hold the microsphere by this, as this action will damage the unit. Set the unit to zero tilt angle (camera horizontal).
4. Holding the microsphere by the notched mounting disc, align the notch on the disc with the words "LOOSE POSITION" on the label, push the microsphere up and twist it clock-wise until the notch is aligned with the words "LOCKED POSITION", release the microsphere and allow it to engage into the bayonet fitting. Check the microsphere is securely retained.



5. Fit the inner black opaque plastic camera cover using the fixings provided.
6. Locate the main transparent cover over the three fixings and place it squarely on the sealing gasket. Using the M4x6mm long screws provided, fasten the cover in place. **DO NOT OVERTIGHTEN THESE SCREWS.** 
7. Fit the cover to the termination box using the M3x10mm long screws provided using star type lock washers.

IMPORTANT NOTES FOR RS485 TWISTED PAIR INSTALLATIONS

USE SCREENED CABLES FOR RS485 TWISTED PAIR CABLES

INDIVIDUAL TWISTED PAIR OUTPUTS

If a single twisted pair RS485 telemetry receiver is to be connected to an individual twisted pair output, the termination link should connect pins 1 and 2 on LK1 (termination on), on the receiver PCB.

TWISTED PAIR AND "DAISY CHAIN" CONNECTIONS

Twisted pair RS485 telemetry receivers may be "daisy chained" up to a maximum of 32 units from one twisted pair RS485 output. It is essential that the termination link (labelled "LK1" on the VC415/4 PCB) is set correctly. In a chain of microspheres, the link must connect pins 2 and 3 of LK1 (termination off), for all intermediate microspheres and connect pins 1 and 2 (termination on), for the last microsphere in the chain (see page 6).

STAR CONNECTIONS

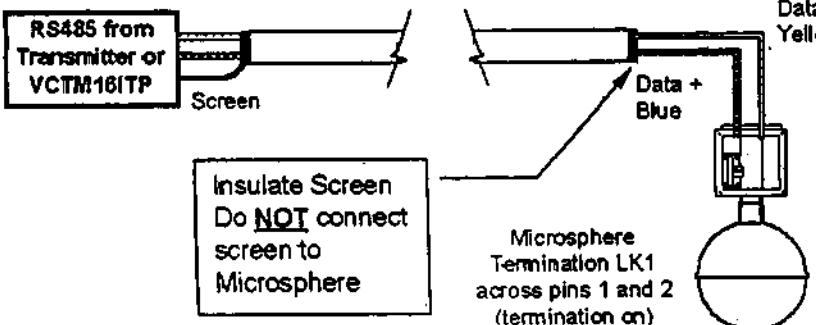
Do not connect several twisted pair RS485 telemetry receivers in a star connection to one twisted pair output using long cables - use the "Daisy chain" method instead. If separate cables are bought back from the microspheres to the transmitter the VCTM16ITP must be used to provide individual RS485 outputs to the cameras.

VCTM16ITP must be used in systems that have more than 32 microspheres. NOTE: Using individual twisted pairs from a VCTM16ITP will allow the rest of the system to operate if one twisted pair cable is damaged due to vandalism.



The above rules must be adhered to so that telemetry data will not be corrupted. Failure to do so will seriously reduce the performance of the microsphere installation.

EXAMPLE OF USE OF INDIVIDUAL RS485 TWISTED PAIR OUTPUTS



EXAMPLE OF A TWISTED PAIR "DAISY CHAIN" INSTALLATION

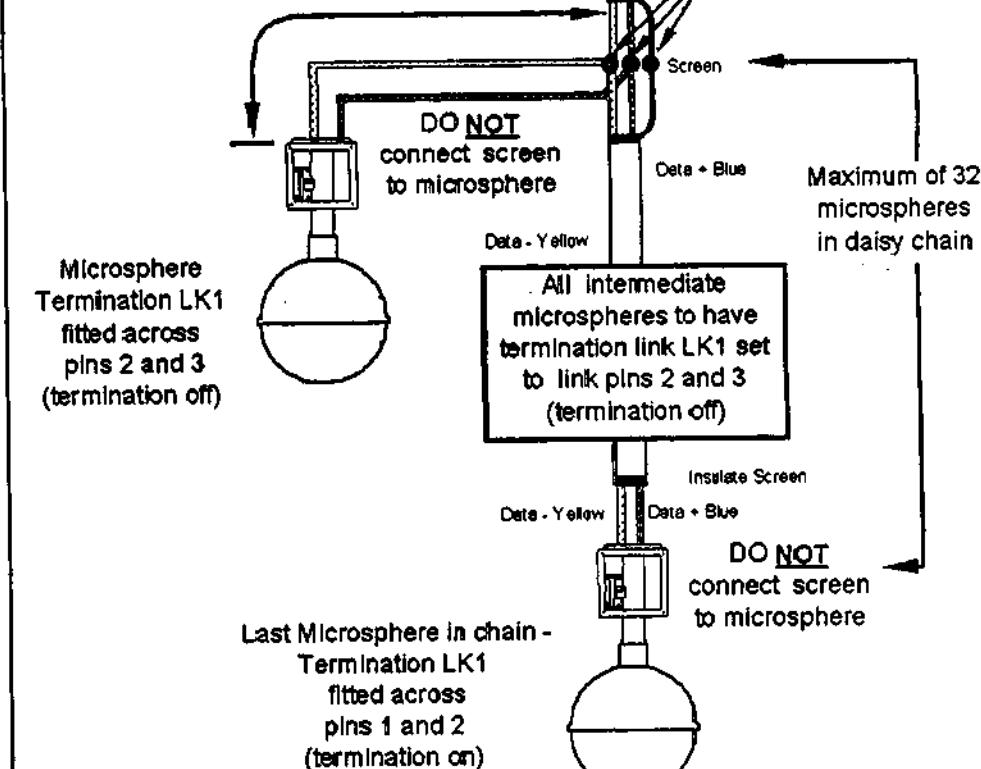
Connect screen of RS485 cable to transmitter ground.

Connect screen to all segments of Daisy Chain

Do not connect screen to microspheres.

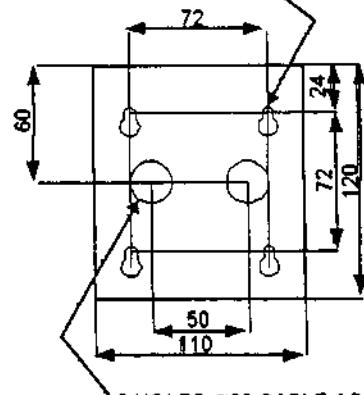
WARNING - A fault in the wiring can cause all the microspheres in the chain to fail or malfunction.

This distance is to be as short as possible (less than 3m)



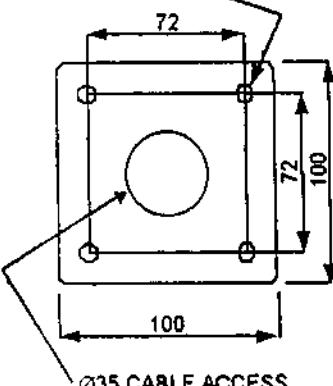
FITTING AND CONNECTOR WIRING INFORMATION

QTY 4 SCREW-HEAD SLOTS
SCREW Ø5 MAX, HEAD Ø10 MAX



WALL MOUNTING BOX
FIXING HOLES

4 HOLES Ø8 ON
4° PCD

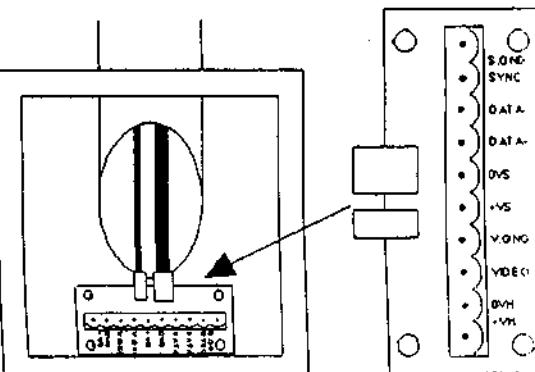


SOFFIT AND POLE MOUNTING PLATE
FIXING HOLES

These products are supplied with a base sealing gasket which provides adequate sealing of the unit to a smooth surface. If the unit is to be mounted on a surface which is not smooth, you must ensure that a different method is used and that sealing is adequate for the purpose intended.

You must attach these housings to a structure of adequate strength for the purpose and use fixings which are also adequate for the working load of housing and camera taking into consideration the type and state of the surface/ structure concerned.

CONNECTION BOX ON MOUNTING POLE



	CON1
S.GND	Sync GND
SYNC	Sync SIGNAL
DATA-	RS485 Data - } For twisted
DATA+	RS485 Data + } pair only

CON3

0VS	0V Sphere Supply
+VS	+V (12VDC) Sphere Supply
V.GND	Video Ground
VIDEO	Video Signal
0VH	0V Heater Supply
+VH	+V Heater supply

MICROSPHERE ADDRESS DIL SWITCH SETTINGS (TWISTED PAIR TELEMETRY ONLY)

All data for twisted pair microspheres is sent via the single RS485 output from the transmitter.

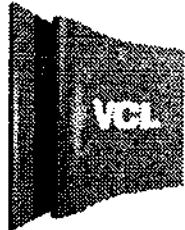
The data contains the address of the destination microsphere, and the microsphere will only respond to data that contains the same microsphere address as set on the DIL switch settings on the receiver PCB within the microsphere. All other data will be ignored.

Set the DIL switch (positions 1 to 7) on the main PCB (opposite) to one of the values in the table below (position 8 controls the zoom setting, see page 8)

- Denotes the switch position ■ = ON □ = OFF

CAMERA	1	2	3	4	5	6	7	8	CAMERA	1	2	3	4	5	6	7	8	CAMERA	1	2	3	4	5	6	7	8	CAMERA	1	2	3	4	5	6	7	8
1	■	■	■	■	■	■	■	■	33	■	■	■	■	■	■	■	■	65	■	■	■	■	■	■	■	■	97	■	■	■	■	■	■	■	■
2	■	■	■	■	■	■	■	■	34	■	■	■	■	■	■	■	■	66	■	■	■	■	■	■	■	■	98	■	■	■	■	■	■	■	■
3	■	■	■	■	■	■	■	■	35	■	■	■	■	■	■	■	■	67	■	■	■	■	■	■	■	■	99	■	■	■	■	■	■	■	■
4	■	■	■	■	■	■	■	■	36	■	■	■	■	■	■	■	■	68	■	■	■	■	■	■	■	■	100	■	■	■	■	■	■	■	■
5	■	■	■	■	■	■	■	■	37	■	■	■	■	■	■	■	■	69	■	■	■	■	■	■	■	■	101	■	■	■	■	■	■	■	■
6	■	■	■	■	■	■	■	■	38	■	■	■	■	■	■	■	■	70	■	■	■	■	■	■	■	■	102	■	■	■	■	■	■	■	■
7	■	■	■	■	■	■	■	■	39	■	■	■	■	■	■	■	■	71	■	■	■	■	■	■	■	■	103	■	■	■	■	■	■	■	■
8	■	■	■	■	■	■	■	■	40	■	■	■	■	■	■	■	■	72	■	■	■	■	■	■	■	■	104	■	■	■	■	■	■	■	■
9	■	■	■	■	■	■	■	■	41	■	■	■	■	■	■	■	■	73	■	■	■	■	■	■	■	■	105	■	■	■	■	■	■	■	■
10	■	■	■	■	■	■	■	■	42	■	■	■	■	■	■	■	■	74	■	■	■	■	■	■	■	■	106	■	■	■	■	■	■	■	■
11	■	■	■	■	■	■	■	■	43	■	■	■	■	■	■	■	■	75	■	■	■	■	■	■	■	■	107	■	■	■	■	■	■	■	■
12	■	■	■	■	■	■	■	■	44	■	■	■	■	■	■	■	■	76	■	■	■	■	■	■	■	■	108	■	■	■	■	■	■	■	■
13	■	■	■	■	■	■	■	■	45	■	■	■	■	■	■	■	■	77	■	■	■	■	■	■	■	■	109	■	■	■	■	■	■	■	■
14	■	■	■	■	■	■	■	■	46	■	■	■	■	■	■	■	■	78	■	■	■	■	■	■	■	■	110	■	■	■	■	■	■	■	■
15	■	■	■	■	■	■	■	■	47	■	■	■	■	■	■	■	■	79	■	■	■	■	■	■	■	■	111	■	■	■	■	■	■	■	■
16	■	■	■	■	■	■	■	■	48	■	■	■	■	■	■	■	■	80	■	■	■	■	■	■	■	■	112	■	■	■	■	■	■	■	■
17	■	■	■	■	■	■	■	■	49	■	■	■	■	■	■	■	■	81	■	■	■	■	■	■	■	■	113	■	■	■	■	■	■	■	■
18	■	■	■	■	■	■	■	■	50	■	■	■	■	■	■	■	■	82	■	■	■	■	■	■	■	■	114	■	■	■	■	■	■	■	■
19	■	■	■	■	■	■	■	■	51	■	■	■	■	■	■	■	■	83	■	■	■	■	■	■	■	■	115	■	■	■	■	■	■	■	■
20	■	■	■	■	■	■	■	■	52	■	■	■	■	■	■	■	■	84	■	■	■	■	■	■	■	■	116	■	■	■	■	■	■	■	■
21	■	■	■	■	■	■	■	■	53	■	■	■	■	■	■	■	■	85	■	■	■	■	■	■	■	■	117	■	■	■	■	■	■	■	■
22	■	■	■	■	■	■	■	■	54	■	■	■	■	■	■	■	■	86	■	■	■	■	■	■	■	■	118	■	■	■	■	■	■	■	■
23	■	■	■	■	■	■	■	■	55	■	■	■	■	■	■	■	■	87	■	■	■	■	■	■	■	■	119	■	■	■	■	■	■	■	■
24	■	■	■	■	■	■	■	■	56	■	■	■	■	■	■	■	■	88	■	■	■	■	■	■	■	■	120	■	■	■	■	■	■	■	■
25	■	■	■	■	■	■	■	■	57	■	■	■	■	■	■	■	■	89	■	■	■	■	■	■	■	■	121	■	■	■	■	■	■	■	■
26	■	■	■	■	■	■	■	■	58	■	■	■	■	■	■	■	■	90	■	■	■	■	■	■	■	■	122	■	■	■	■	■	■	■	■
27	■	■	■	■	■	■	■	■	59	■	■	■	■	■	■	■	■	91	■	■	■	■	■	■	■	■	123	■	■	■	■	■	■	■	■
28	■	■	■	■	■	■	■	■	60	■	■	■	■	■	■	■	■	92	■	■	■	■	■	■	■	■	124	■	■	■	■	■	■	■	■
29	■	■	■	■	■	■	■	■	61	■	■	■	■	■	■	■	■	93	■	■	■	■	■	■	■	■	125	■	■	■	■	■	■	■	■
30	■	■	■	■	■	■	■	■	62	■	■	■	■	■	■	■	■	94	■	■	■	■	■	■	■	■	126	■	■	■	■	■	■	■	■
31	■	■	■	■	■	■	■	■	63	■	■	■	■	■	■	■	■	95	■	■	■	■	■	■	■	■	127	■	■	■	■	■	■	■	■
32	■	■	■	■	■	■	■	■	64	■	■	■	■	■	■	■	■	96	■	■	■	■	■	■	■	■	128	■	■	■	■	■	■	■	■

Note: 'In coax' receivers are always set to address 128



INSTALLATION INSTRUCTIONS

VCTM4V

VARIABLE SPEED HANDSET TO CONTROL UP TO 4 MONITORS

Northern office:

3&4 Aston Fields Road, Whitehouse Industrial Estate,
Runcorn, Cheshire WA7 3DL, UK.

Tel: 01928 701991 Fax: 01928 701629.

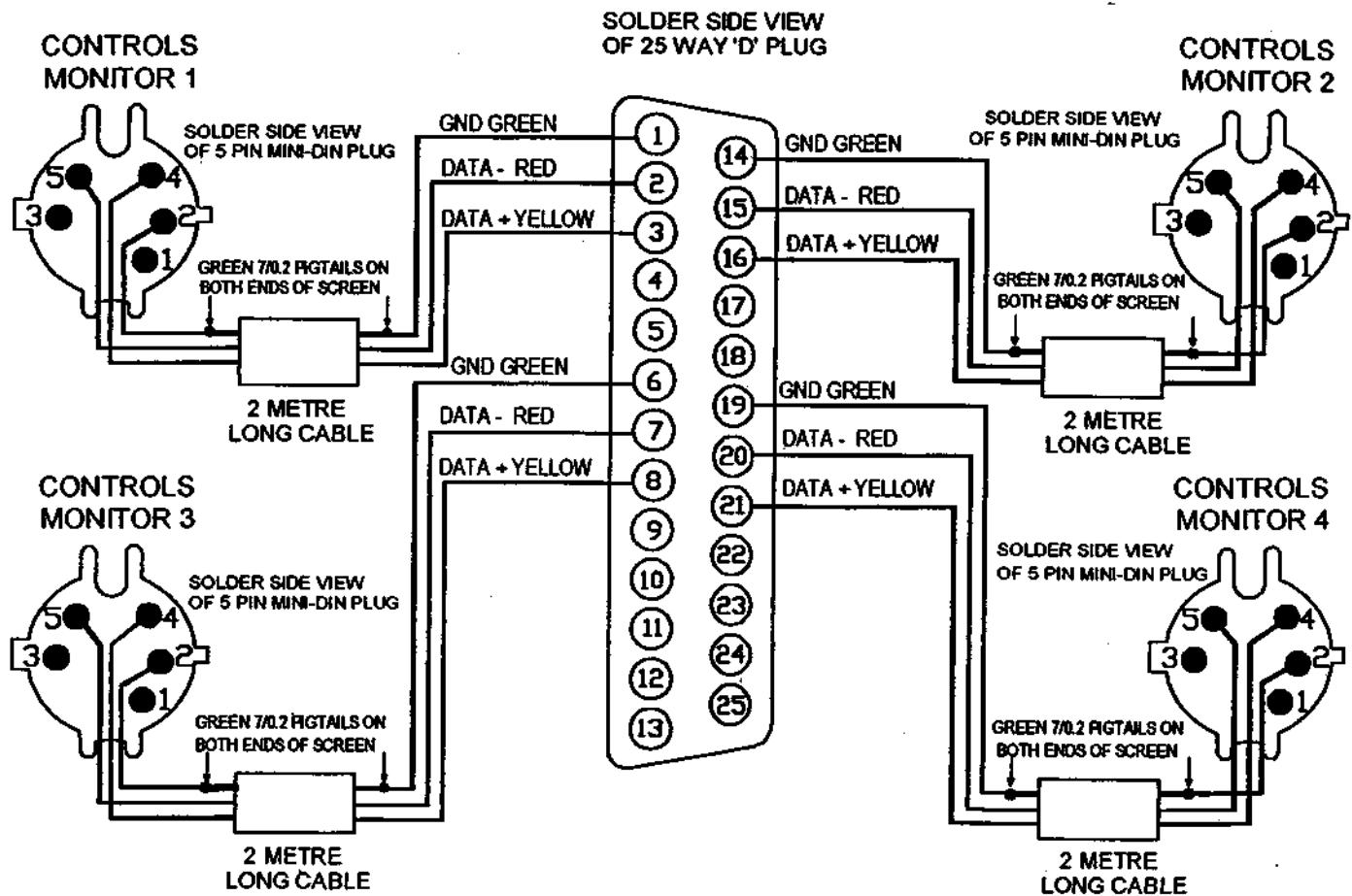
Southern office:

Unit 9, York Way, Lancaster Road, Cressex Business Park,
High Wycombe, Bucks HP12 3PY, UK.

Tel: 01494 448090 Fax: 01494 445474.

Handset connections

This handset is fitted with a 25 way 'D' socket. It is supplied with a 2 metre long pre-made cable fitted with 2 or 4, 5 pin mini-DIN plugs ready for plugging into a central box or matrix.

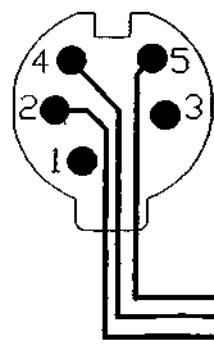


5 PIN MINI-DIN, PIN No	COLOUR	SIGNAL NAME
1	----	N/C
2	SCREEN/GREEN	GND
3	----	N/C
4	YELLOW	DATA +
5	RED	DATA -

Handset extension cable

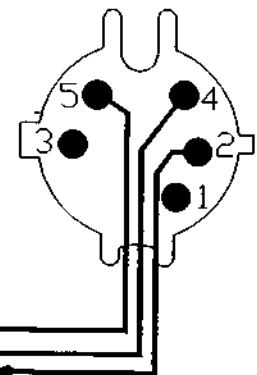
Cables can be extended upto 300 metres using 4 core 7/0.2 screened cable as shown below:

SOLDER SIDE VIEW
OF 5 PIN MINI-DIN SOCKET



PIN No	COLOUR	SIGNAL
1	—	N/C
2	SCREEN/GREEN	GND
3	—	N/C
4	YELLOW	DATA +
5	RED	DATA -

SOLDER SIDE VIEW
OF 5 PIN MINI-DIN PLUG

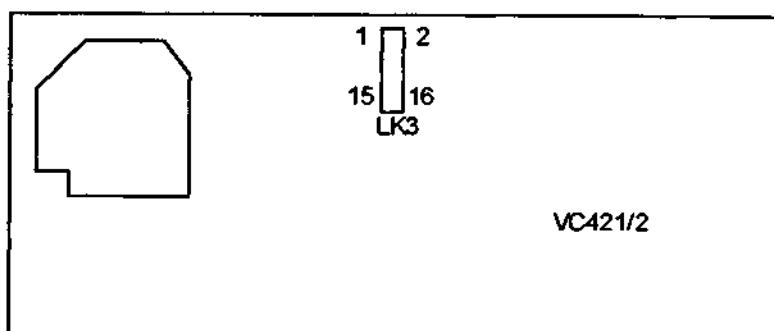


GREEN 7/0.2 PIGTAILS ON BOTH ENDS OF SCREEN

Jumper settings

The internal jumper link LK3, located on the VC421/2 printed circuit board inside the handset, must be set to correspond with the number of monitors that the handset will control.

Position of LK3 on the VC421/2 PCB



For controlling 1 monitor connect the jumper between pins 1 and 2.



For controlling 2 monitors connect the jumper between pins 3 and 4.



For controlling 3 monitors connect the jumper between pins 5 and 6.



For controlling 4 monitors connect the jumper between pins 7 and 8.



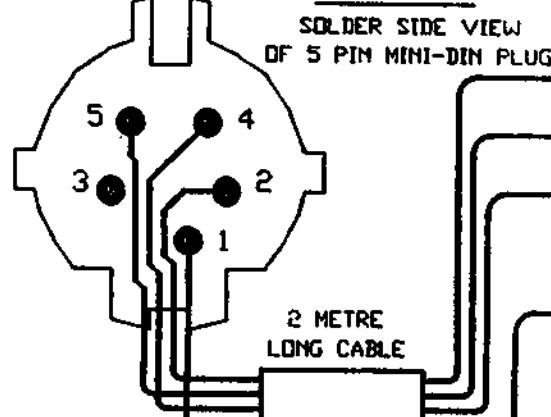
INSTALLATION INSTRUCTIONS FOR VARIABLE SPEED TELEMETRY HANDSET

< CONNECTED TO A LOCAL PSU > TYPE :- VCTM4V

THIS HANDSET IS FITTED WITH A 25 WAY 'D' SOCKET. IT IS SUPPLIED WITH 2 METRE LONG PRE-WIRED CABLE FITTED WITH 1, 2, 3 OR 4 5 PIN MINI-DIN PLUGS READY FOR PLUGGING INTO CENTRAL BOX AND A 2 METRE LONG CABLE FOR CONNECTION TO A LOCAL PSU.

CONTROLS

MONITOR 1

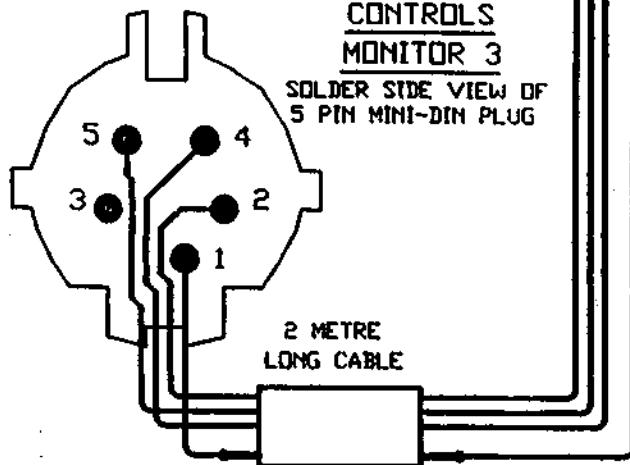


SOLDER SIDE VIEW
OF 5 PIN MINI-DIN PLUG

2 METRE
LONG CABLE

CONTROLS

MONITOR 3



SOLDER SIDE VIEW
OF 5 PIN MINI-DIN PLUG

2 METRE
LONG CABLE

GREEN 7/0.2 PIGTAILS ON BOTH ENDS OF SCREEN

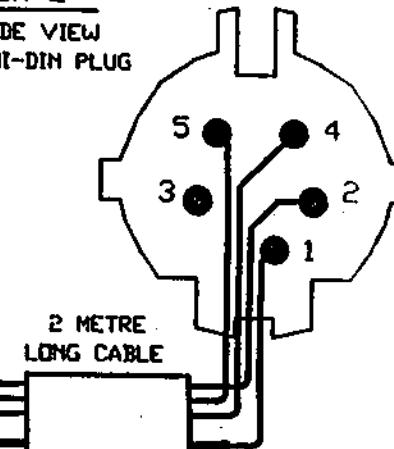
SOLDER SIDE VIEW OF 25 WAY 'D' PLUG

SOLDER SIDE VIEW OF 5 PIN MINI-DIN PLUG

CONTROLS

MONITOR 2

SOLDER SIDE VIEW
OF 5 PIN MINI-DIN PLUG



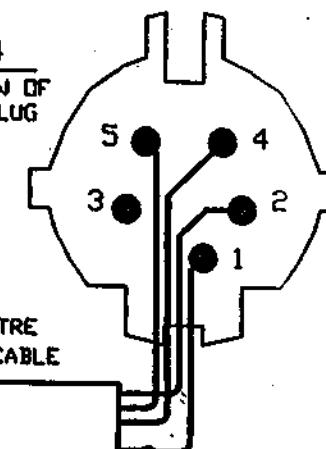
2 METRE
LONG CABLE

GREEN 7/0.2 PIGTAILS ON BOTH ENDS OF SCREEN

CONTROLS

MONITOR 4

SOLDER SIDE VIEW OF
5 PIN MINI-DIN PLUG



2 METRE
LONG CABLE

GREEN 7/0.2 PIGTAILS ON BOTH ENDS OF SCREEN

5 PIN MINI-DIN PIN NO	COLOUR	SIGNAL NAME
1	SCREEN	FGND
2	GREEN	GND
—	BLUE	—
4	YELLOW	DATA+
5	RED	DATA-
NOT USED		

NOTE THIS CONNECTOR CAN BE SUPPLIED WITH 1, 2, 3, OR 4 MINI-DIN PLUGS AND CABLES.

TIME-LAPSE SETTING FOR:

MICROPLEX and VIDEOPLEX

VCMICRO-4C 4 Camera Colour Multiplexer
VCMICRO-8C 8 Camera Colour Multiplexer
VCMICRO-4M 4 Camera Mono Multiplexer
VCMICRO-8M 8 Camera Mono Multiplexer
VCM1008C 8 Camera Colour Multiplexer
VCM1016C 16 Camera Colour Multiplexer
VCM1008M 8 Camera Mono Multiplexer
VCM1016M 16 Camera Mono Multiplexer

Timelapse settings.

The connection of the 'VCR SW' ('CAMERA SW OUT') will control automatic selection of 'time-lapse' setting on the Microplex and Videoplex multiplexers.

<u>Manufacturer</u>	<u>Model number</u>	<u>Type</u>	<u>VCR Connector Name</u>	<u>Terminal</u>
Computar	CTR3960B	B	'CLK' output	Screw
Domestic VCR	SP/LP (Live)	C	No 'VCR SW' required	n/a
Hitatchi	VTL2000E	B	'CAMERA SW OUT'	Pin 9 of 15D
Mitsubishi	HS5424	A	'CLK' output	Screw
Mitsubishi	HS-S5600E	A	'CLK' output	Screw
Panasonic	AG6124	A	'CAMERA SW OUT'	Phono
Sanyo	SRT500P	B	'SW OUT'	Screw
Sanyo	TLS900P	B	'SW OUT'	Screw
Sanyo	TLS2000P	B	'SW OUT'	Screw
Sony	SVT100P	B	'SW OUT'	Screw
Sony	SVT3000P	A	'SW OUT'	Screw

Note Type B VCR's

If recording in time-lapse and the VCR is switched manually to 3 hour mode, press 'REPLAY' then press 'RECORD' on the Microplex / Videoplex, or the multiplexing will be lost for seven seconds.

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INSTALLATION INSTRUCTIONS FOR
MICROPLEX 4 AND MICROPLEX 8

MICROPLEX

Types:

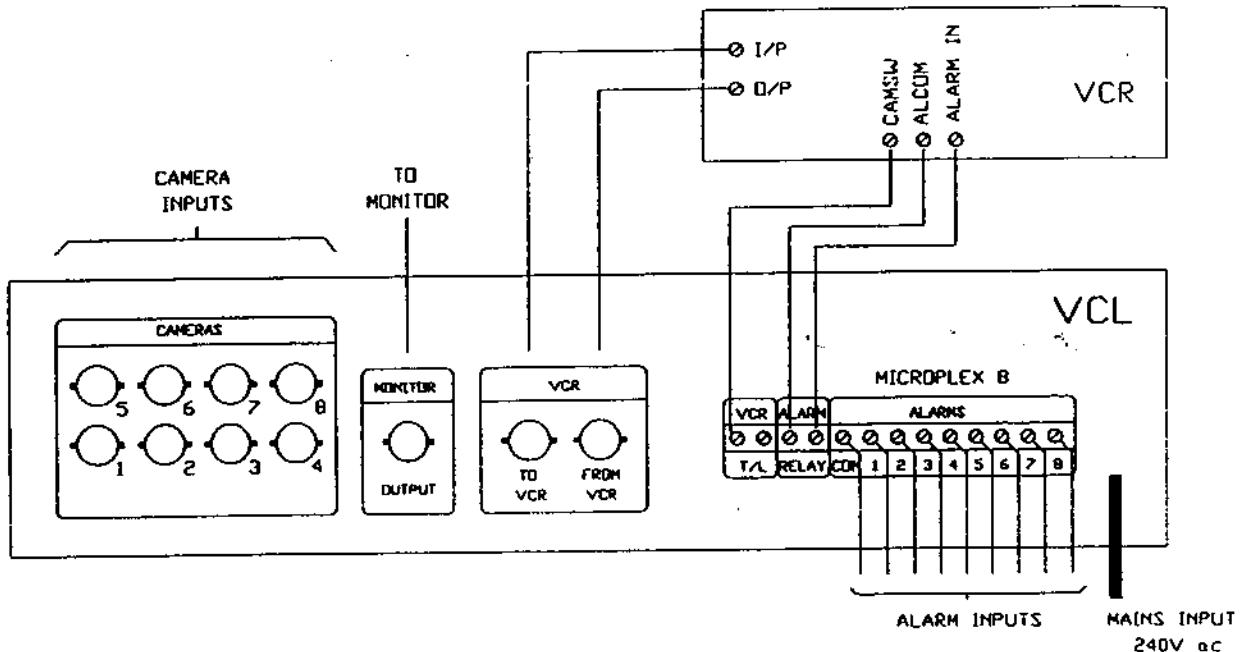
VCMICRO-4C 4 Camera Colour Multiplexer
VCMICRO-8C 8 Camera Colour Multiplexer
VCMICRO-4M 4 Camera Mono Multiplexer
VCMICRO-8M 8 Camera Mono Multiplexer

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Ref.: CI273VI.

1. Connections to Microplex:

A typical connection example is shown below:



i. Video coax connections.

Connect CAMERAS, MONITOR and VCR using coax cables as shown.

ii. VCR control connections.

If the VCR 'CAMERA SW' signal is compatible with the Microplex, connect the VCR's 'CAMERA SW' to the first 'VCR T/L' terminal. This allows automatic detection of the VCR's time-lapse setting.

Connect the 'ALARM RELAY' terminals to the 'ALARM INPUT' of the VCR. This will allow the VCR to change its time-lapse setting when alarms are received. (This connection is not required if alarms are not being used.)

iii. External alarm connections

IMPORTANT: ALL CONNECTIONS TO ALARM INPUTS MUST BE VOLT FREE

Connect external alarms to the 'ALARM INPUTS' of the Microplex. (These connections are not required if alarms are not being used.) Each alarm requires connections to the alarm common ('COM') and the appropriate alarm input terminal (labelled '1', '2' etc.).

2. Internal Adjustments.

WARNING ELECTRIC SHOCK RISK

TURN OFF MAINS SUPPLY BEFORE REMOVING COVER

REFIT COVER BEFORE USE

i. Camera termination switches

Camera terminations are set using internal DIL switches labelled 'TERMINATION'. 'ON' = 75R 'OFF' = Hi-Z. If the cameras are being 'looped' to other equipment, fit BNC 'T' adaptors at the rear of the Microplex. The equipment furthest from the camera must have it's termination set to 75R. All intermediate equipment must have it's termination set to 'OFF'.

The Microplex is normally supplied with the camera termination to 'ON'.

ii. Setting alarm type

IMPORTANT, ALL CONNECTIONS TO ALARM INPUTS MUST BE VOLT FREE

Alarm type is set using internal DIL switches. Labelled 'ALARM TYPE'. If an alarm is 'normally open' (N.O.) set the corresponding DIL switch to 'ON'. If the alarm is 'normally closed' (N.C.) set the DIL switch to 'OFF'. Set the DIL switches to 'ON' for unused 'ALARM INPUTS'. (If the DIL switches are set to 'OFF' the Microplex will activate it's alarm inputs if the alarm cable is disconnected.)

The Microplex is normally supplied with 'ALARM TYPE' DIL switches set to 'ON'.

The internal DIL switches labelled 'ALARM MODE' have no function.

iii. Character and Box

The brightness of the character and box of the 'camera ident' for the monitor picture are adjusted using VR1 and VR2 which are located on the bottom circuit board.

Do not attempt to make any other internal adjustments.

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OPERATOR INSTRUCTIONS FOR
MICROPLEX 4 AND MICROPLEX 8

MICROPLEX

Types:

VCMICRO-4C 4 Camera Colour Multiplexer
VCMICRO-8C 8 Camera Colour Multiplexer
VCMICRO-4M 4 Camera Mono Multiplexer
VCMICRO-8M 8 Camera Mono Multiplexer

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Ref.: CI272V2.

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NOTE

In the descriptions that follow: 'Press' means 'press and release' unless the instructions say 'press and hold'.

1. Selecting Cameras for Recording

The Microplex is in 'RECORD' mode when the 'RECORD' LED is 'ON'.

i. To select 'RECORD' mode

Press the 'RECORD' button.
'RECORD' LED will switch 'ON' = 'RECORD ON'

(To turn 'RECORD' off press the 'REPLAY' button. See section 8.)

When the Microplex is recording, 'CAMERAS RECORDING' LED's that are 'ON' indicate which cameras are being recorded.

ii. To change the cameras which will be recorded

Press and hold the 'RECORD' button.

Press the required 'number' buttons to cause the 'CAMERAS RECORDING' LED's to toggle 'ON' or 'OFF'.

Release the 'RECORD' button.

iii. Attempts to record cameras that are not connected

If an attempt is made to record a camera that is not connected. The 'CAMERAS RECORDING' LED will be automatically turned 'OFF' when the Microplex attempts to record it.

iv. Viewing pictures that are being sent to the VCR

The multiplexed pictures being sent to a VCR that is set to 'RECORD' can be viewed as follows :

Press and hold 'RECORD' button.

Press and hold 'REPLAY' button.

(The multiplexed pictures are displayed on the monitor.)

Release 'REPLAY' button.

(The monitor shows the live camera or auto-sequence, that was being displayed previously.)

Release 'RECORD' button.

2. To Replay Pictures from VCR

Rewind the VCR tape if necessary and switch the VCR to 'PLAY'.

Press 'REPLAY' button on the Microplex. (The 'REPLAY' LED will be 'ON'. The monitor shows the output from the VCR for use when programming the VCR on screen messages. See section 9.) Then select a 'number' button to view a recorded camera.

E.g. Replay camera 3

Press 'REPLAY' button then press button '3' to select camera 3 for replay. ('Camera 3' LED will be 'ON').

i. To change camera being replayed

E.g. Replay camera 2

Press button '2' ('Camera 2' LED will be 'ON').

If the selected camera was not recorded on the VCR tape, the monitor will be blank.

ii. To return the Microplex to 'VIEWING' and 'RECORD' mode

Press 'RECORD' on the Microplex. Set the VCR to 'RECORD' if required.

3. Camera Select

i. To select a camera

Press a 'number' button.

E.g. To select Camera 3.

Press button '3'.

ii. Absent Cameras

If a camera is absent, the Microplex will automatically skip to the next camera that is present ('Auto-skip').

4. Auto-sequence Control

i. To turn 'ON' auto-sequence

Press 'AUTO' button. (LED will switch on = AUTO-SEQUENCE 'ON'.)

ii. To turn off auto-sequence

Press 'AUTO' button again (LED will switch off = AUTO-SEQUENCE off.)

iii. To turn off the auto-sequence and select a particular camera

Press required 'NUMBER' button.

iv. Absent Cameras in 'Auto-sequence'.

If a camera in the auto-sequence is absent, the Microplex will automatically skip to the next camera that is present in the sequence. ('Auto-skip')

5. Set-up of Auto-sequence for Cameras.

i. E.g. To set an auto-sequence of cameras 1, 2, 4

Press and hold 'AUTO' button.

Press button '1'.

Press button '2'.

Press button '4'.

Release 'AUTO' button.

Any auto-sequence of cameras can be programmed : e.g. Auto-sequence could be cameras 1, 2, 1, 3, 1, 4.

The maximum length of any sequence is 64 entries long.

6. Setting Auto-sequence Timer

The dwell-time for auto-sequencing is adjustable in the range 1 second to 100 seconds (nominal).

Turn the rotary control on the front panel anti-clockwise to decrease the dwell time and clockwise to increase it.

7. Time And Date Select

i. To set the Time And Date

Press and hold 'AUTO' button then press 'RECORD' button.(The first position in the Time And Date will flash.)

Press the 'REPLAY' button to cycle round until correct digit is flashing.

Press the 'RECORD' button to set this digit.

Repeat until all digits are set as required.

Release 'AUTO' button.

ii. To turn Time And Date on or off

Press and hold 'AUTO' button then press 'ALARM' button.(Repeat process to turn on Time And Date.)

8. Alarms.

The Microplex has alarm inputs that are associated with the cameras. (i.e. Alarm 1 is associated with camera 1; alarm 2 with camera 2 etc.)

When the Microplex is in 'RECORD' mode, and an alarm becomes active, the update rate of pictures from that camera being sent to VCR is increased. The picture from the associated camera will be displayed on the monitor. If more than one alarm is active, the highest priority alarm (lowest number = highest priority) will be displayed on the monitor.

If the Microplex is in 'REPLAY' mode, it cannot respond to alarms because the operator is using the VCR and monitor. Any active alarms or timers will be responded to when the Microplex and VCR are returned to 'RECORD' mode.

The Microplex goes into alarm mode when the alarm contacts go active and remains in alarm mode for 5 seconds ('alarm timer') after the alarm contacts become inactive. If any alarms are active the 'alarm relay output' from the Microplex will be 'closed'. The 'alarm relay output' can be used to switch a time-lapse VCR to 'alarm mode recording' (E.g. it could switch from 'time-lapse' to 'real-time').

When an alarm becomes active, the monitor will switch to show the corresponding camera picture. The message 'ALARM n' (n is the alarm number) will be displayed. If an alarm becomes active but the camera is not connected, the Microplex will not switch but the 'ALARM n' message will be displayed.

To select another camera onto the monitor, while the alarm is still active, press the 'ALARM' button. The increased update rate of recorded pictures is not changed until the alarm becomes inactive.

The 'ALARM' button can be pressed to produce an 'operator alarm'. The 'alarm relay' will activate to put the VCR into 'alarm mode'. (E.g. 'real-time'.) The 'ALARM' LED will be 'ON' and 'ALARM' will be added to the 'on-screen' ident.

9. To Edit The VCR Menu

Ensure that the VCR is in 'STOP' mode.

Press the 'REPLAY' button (A live digital picture will be seen on the monitor display.) Edit the VCR menu options as required. Turn off the VCR 'MENU' button and press the 'RECORD' button on the Microplex.

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Ref.: CI272V2.

3 ACCESS CONTROL

System Administrator Manual

HB02/73-EN Iss 1E

Applicability

This manual applies to System Manager Version 3.00
and to Remote Site Manager Version 3.00

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NOVEMBER 1997

This manual is based on the best information available to Cotag International at the time of publication. Although every effort is made to keep our documentation up to date, small changes which arise from the Company's policy of continuing product improvement are not necessarily incorporated. Some products are not available in all countries. All orders are accepted only on the Company's standard Conditions of Sale, copies of which are available on request.

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Cotag International. 17304 Preston Road, Building E100, Dallas, Texas, 75252-9943.
Telephone: (972) 733 6000 Fax: (972) 733 6091

Other documents you may need

All the component programs of the access control system can be run from LaunchPad which is described in the LaunchPad manual.

The Operator Software manual describes how to enter records, how to monitor the system and acknowledge alarms, and how to generate reports.

The Alarm Graphics program which is used to monitor and clear alarms from the access control system and display them on the screen as flashing objects on plan pages is described in the Alarm Graphics manual.

The Transaction Monitoring program which is used to display alarms and messages on the screen and to send them to a printer in real time is described in the Transaction Monitoring manual.

The I/O Programming manual describes how to use and configure the programmable I/O features (sometimes known as CLIC).

The Video Badging Manual describes how to capture images from a camera and print them on cards.

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Chapter 1

Introduction

Who should read this manual

This manual should be read by the person installing and setting up the access control system, and the person who will be maintaining the system when it is in service. Installation of the access control software from the CD-ROM is described in chapter 2.

The system administrator

The person who looks after the day to day running of the access control system is referred to in this manual as the "system administrator".

The network manager

In a multi-user installation, people running Operator Software can log in to the access control database at computer terminals connected to a network such as Novell or Windows Network (LAN Manager, NT, Windows for Workgroups, Windows 95). The person who looks after the day to day running of the network is referred to in this manual as the "network manager". The system administrator and the network manager can be the same person, and this situation is probably beneficial.

System planning

The system administrator must plan the entire access control system on paper before entering any data into the computer. Chapter 8, "Planning your access control system", gives step by step instructions on how to do this. If the installation requires control and monitoring of external equipment, refer to the I/O Programming manual.

The access control software

The access control software consists of a number of Windows programs. When you install the software from the CD-ROM, you can choose which of the programs to install. The programs are as follows:

System Manager

This manual is mainly about the System Manager program. The function of System Manager is described in detail below, but its main purpose is to control communications between all the access controllers and the computer. There must be one copy of System Manager running on a single computer at all times, and this computer must be the one connected to the access control system hardware. The computer running System Manager is called the "host computer".

Operator Software

Operator Software is used to enter data into the access database, and to edit the access database. The access database consists of a number of files storing information about Access Points, Time Frames, Access Levels, etc. The contents of these files determine how the access control system functions. Operator Software is also used to monitor the system for alarms and other messages coming from the controllers. Any computer on the network can run a copy of the Operator Software, and as many copies as you want can be run at the same time.

Alarm Graphics

The Alarm Graphics program monitors the messages passing between the controllers and the host computer. You configure the program to respond to certain alarm messages by displaying a picture on the screen, part of which flashes to indicate where the alarm occurred. Usually the picture is of the rooms in a building. The operator who monitors the system can see the representation of the alarm on the screen and acknowledge the alarm using the Operator Software.

Remote Site Manager

Remote Site Manager controls a modem for the purposes of communicating with controllers at remote sites using normal dial-up telephone lines. Each modem in the system needs a copy of Remote Site Manager running on the computer to which the modem is connected. A modem can be connected to any computer on the network.

Transaction Monitoring Software

Transaction Monitoring Software sends alarm messages and other messages from the controllers to a printer, or to the screen, or both, in real time. It can be run on any computer on the network. If a printout is required, the computer must be connected to a printer via one of its parallel LPT printer ports.

What the System Manager does

The System Manager is a Windows program which runs under Windows 3.1 or later. Its main purpose is to control all communications between the host computer (the computer running the System Manager) and the access controllers in the security and access control system.

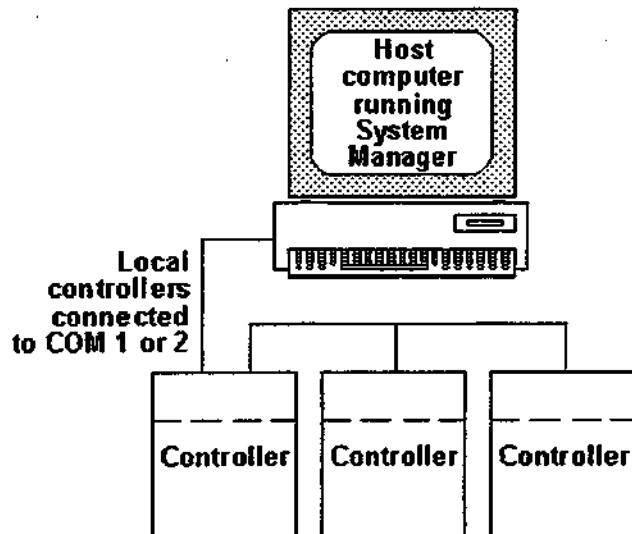
- It maintains the "system list", a database file which contains the addresses of all the access controllers in the system, both those attached directly to the host computer, and those at remote sites which are contacted via a modem and dial-up telephone line (see later). The system list is displayed graphically on the System Manager's **Configuration** page.
- It maintains the "network comms" file (also known as the "queue" file) which is updated in real time with the messages passing between the host computer and the access controllers. The file is of fixed length, and old messages are discarded as new ones arrive. This file is used by other programs in the Access Control Software package to monitor the communications between the host and the controllers. The System Manager controls communications between the host and the local controllers directly. Communications between the System Manager and controllers at remote sites pass through an intermediate program, the Remote Site Manager, which dials-up, and receives calls from, the remote sites. Each modem at the host end of the system has its own Remote Site Manager.
- It stores the configuration of the remote sites - the site names, and the modems available to communicate with them, and the times when the remote sites should be contacted. It also gets the Remote Site Manager to dial out to a chosen remote site immediately when you click on the **Send Messages Now** button, and provides a monitor screen displaying the dates and times when remote sites dialled in, or were dialled out to, or an attempt was made to dial out which failed. These messages are also stored in a log file if required.

- The database of access points, time frames, cardholders etc is maintained by the Operator Software, but can be downloaded manually using the System Manager to all the controllers, or to selected controllers. There are also options to flush the controllers' message buffers, download the I/O database only, or clear the I/O variables.
- If you are logged in to the System Manager using the master operator name and password, you have access to the **Administrators Setup** screen. This enables you to set site codes (see below), change the master operator name and password, set the software type to standard (up to 64 access points and 10,000 cardholders) or enhanced (up to 2048 access points and up to 30,000 cardholders), and set the dual-operator function on reports (two passwords required to generate a report using the Operator Software). The master operator name and password is the first operator record displayed in the **Operators Passwords** screen of the Operator Software. Other operator names and passwords are entered using the Operator Software and can give access to any or all of the features in the Operator Software and the System Manager, but not to the **Administrators Setup** screen.
- It stores the site code(s) used in the cards, along with site name(s) and reference numbers. Only the reference numbers for each site are displayed on any of the monitor screens. Only the master operator can set the site codes, see above.
- It runs the I/O Configuration program which is used to configure the programmable I/O features (CLIC). For debugging purposes it also provides manual control of I/O elements: outputs, flags, counters and trigger events.
- It can output alarms and/or transaction messages to a printer connected to one of the host computer's LPT ports, in real time. (Any other computer on the network running Transaction Monitoring Software can also provide this feature if required.) These alarms and/or transaction messages can also be displayed on a monitor screen in real time.
- All messages passing between host and controllers can be displayed on a debug screen in real time. This is especially useful when first installing a system to make sure it is working, and when configuring remote sites.

Note: there must be only one computer in the whole system running the System Manager program.

Local controllers

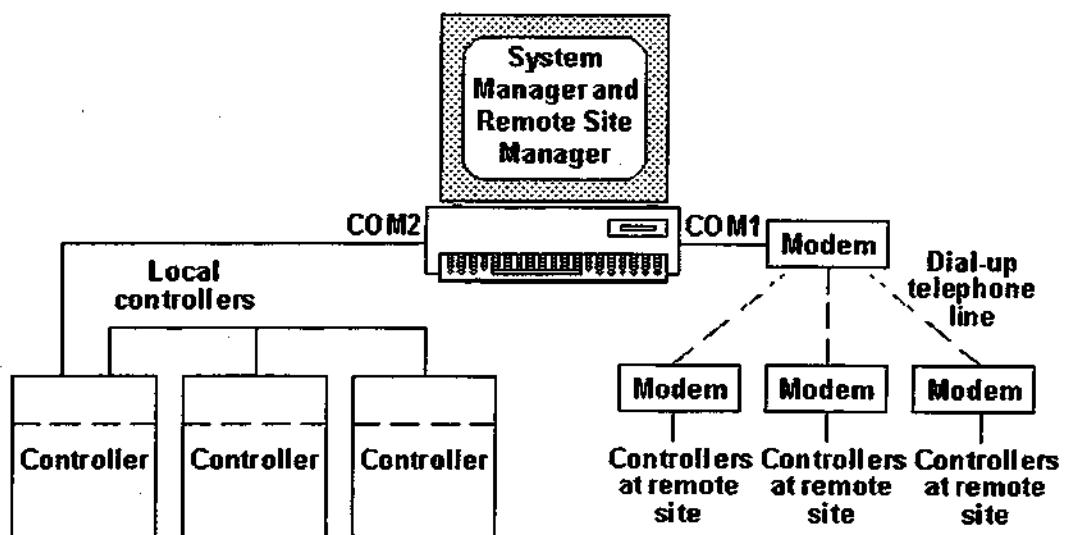
The host computer can communicate directly with access controllers attached locally to one of its RS232 COM ports as shown in the following diagram.



Note that the Controllers can be connected to any COM port from 1 to 8 if a digi-board is fitted to the computer.

Controllers at remote sites

It can also communicate with access controllers at remote sites anywhere in the world using modems and normal dial-up telephone lines. The host computer, or any other computer connected to the host on a local area network, can have a modem connected to one of its COM ports. Each computer with a modem runs a program called a "Remote Site Manager" which controls communications between the remote sites and the host via the modem. The following diagram shows a system with the System Manager and the Remote Site Manager both running on the host computer.



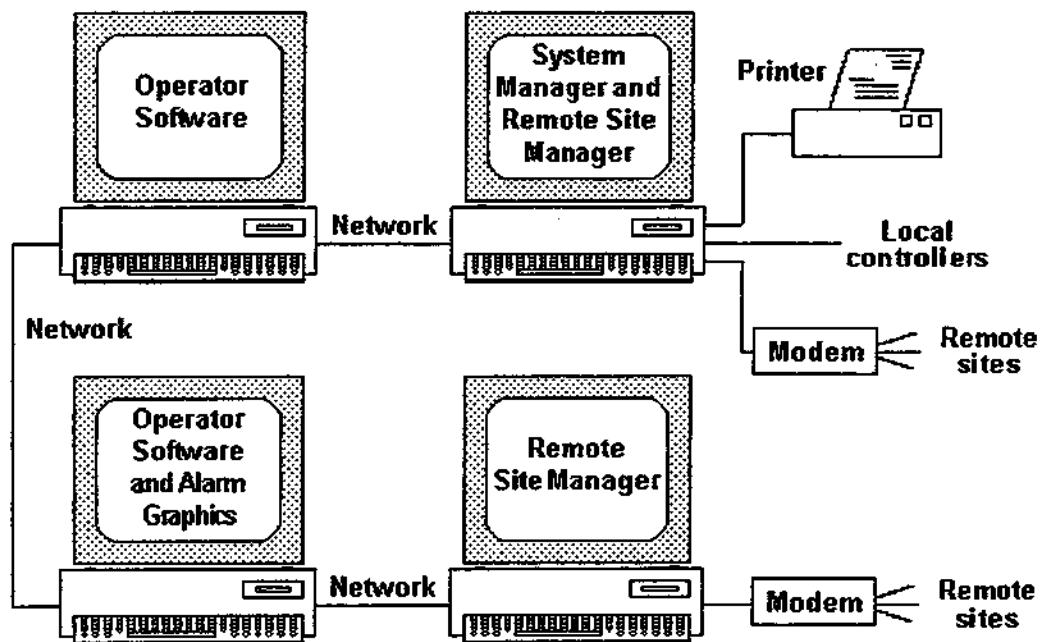
The controllers at the remote sites do not need to be connected to a computer at their own site. The controllers can be configured to dial-up the host computer at selected times of the day or week, or when a controller's transaction buffer is 75% full, or immediately when an alarm occurs. The host computer can also dial out to the remote sites at specified times or intervals, or manually when you click on the **Send Messages Now** button in the System Manager.

Operator Software

The database files which define how the security and access control system operates are entered and edited using the Operator Software which can run on any number of computers with access to the database files, either directly or via a local area network.

Local area network

If you are using a local area network, the Operator Software, Remote Site Manager (and Alarm Graphics Software and Transaction Monitoring Software as well, if required) can be run on any of the computers on the network as shown in the diagram below.



The system can control the local site connected directly to the host, and up to 99 remote sites using one or more modems connected to any computers on the network running Remote Site Manager, and a single modem at each remote site.

Printing transactions in real time

In any of the layouts described above, the host can be connected to a printer via one of its LPT ports to provide a printed copy of transactions as they occur. If a printout is required at any other computer on the network, it must run a copy of the Transaction Monitoring Software.

Chapter 2

Installing

What you need before you can install the access control software

- An access control system with all the controllers installed and connected. You need to make a list of the locations of all the controllers in the buildings, the names of the doors that they control, and their hardware addresses.

Refer to the Installation Notes supplied with each piece of equipment for details of installation and connection.

- A Pentium computer with 16Mbytes of RAM running Windows 3.1 or later.
- Make sure the **config.sys** file in the C:\ root directory contains the following line:

files = 180

- The computer should have a mouse, as Windows programs are almost impossible to use without one. If you are using the remote sites feature on the host computer then you must use a "bus mouse" so both the computer's COM ports are free for the access control system - COM1 for the remote sites modem and COM2 for the local controllers. If you are only using local controllers on the host computer then you can use COM1 for a "serial mouse" (you can still dial-up remote sites using a modem connected to another computer on the local area network).
- If you want to run Alarm Graphics, or Operator Software, or Remote Site Manager, or Transaction Monitoring Software on computers other than the host, you need a local area network such as Novell, or a Windows network (LAN Manager, NT, Windows for Workgroups, Windows 95).

On a Novell network your **net.cfg** file in your network directory must contain the following line:

file handles = 180

- If you already have an access control system running DOS Software version 2.30, when you install the System Manager

you tell it where the existing database files are stored. It will then use the existing database files, and the existing master operator name and password. You can find the paths to your existing directories by reading the **4850.ini** file (using any text editor).

Installing the access control software

1. Insert the CD-ROM in your computer's drive.
2. If you are not already running windows, from the C:\> DOS prompt, type **win** and press the **Enter** key.
3. Using My Computer or Explorer in Windows 95, or File Manager in Windows 3.1, find the file called **setup.exe** in the **install** directory on the CD-ROM drive and double-click on it.
4. Choose the language you want to use, click on the **Next** button, then click on the **Yes** button to verify.
5. Click on the access control button (not video badging).
6. Read the screens which follow: Welcome, Licence text and Copyright. Click on the **Next** or **Yes** button after each.
7. On the next screen, type your name and your company name. Click on the **Next** button, then click on the **Yes** button to verify.
8. Choose the programs you want to install.

You can choose from:

- **Minimum:** installs the following:
 - LaunchPad
 - System Manager (includes I/O Configuration)
 - Operator Software
- **Custom:** you can choose any of the following:
 - LaunchPad
 - System Manager (includes I/O Configuration)
 - Operator Software
 - Transaction Monitoring Software

- Alarm Graphics program
- Remote Site Manager
- **Full:** installs all of the following:
 - LaunchPad
 - System Manager (includes I/O Configuration)
 - Operator Software
 - Transaction Monitoring Software
 - Alarm Graphics program
 - Remote Site Manager
- 9. If you are installing a real system, choose **No** to demo database.
- 10. If you are not using passive cards (cards which do not have a battery), choose **No** to passive cards.
- 11. Choose System Manager's paths.

If you are upgrading an existing system, choose the directories used by the existing system so that the System Manager operates using the existing database.

If you are installing a new system, you need to choose directories for the System Manager to use. The directories you choose depend on whether you are installing everything on the host computer, or whether you are installing some things on a file server.

- For everything on the host computer, we recommend the following (which are the default settings displayed on the screen when you install from the CD-ROM):

Local directory: **c:\sysmgr**

Database directory: **c:\sysmgr\data**

Program directory: **c:\sysmgr\progs**

Network comms: **c:\sysmgr\comms**

Reports directory: **c:\sysmgr\reports**

Log file directory: **c:\sysmgr\log**

- For a network with a file server (where t: is a network drive on the file server), program on host computer and shared files on file server, we recommend the following:

Local directory: **c:\sysmgr**

Database directory: **t:\sysmgr\data**

Program directory: **c:\sysmgr\progs**

Network comms: **t:\sysmgr\comms**

Reports directory: **c:\sysmgr\reports**

Log file directory: **t:\sysmgr\log**

- For a network with a file server (where t: is a network drive on the file server), with everything on the file server, we recommend the following:

Local directory: **c:\sysmgr**

Database directory: **t:\sysmgr\data**

Program directory: **t:\sysmgr\progs**

Network comms: **t:\sysmgr\comms**

Reports directory: **t:\sysmgr\reports**

Log file directory: **t:\sysmgr\log**

Note that if you are installing Operator Software on an existing system you will be asked if you want to "Overwrite existing form file?" If you do this, you will lose your custom cardholder screen and the default will be used instead.

12. Choose the paths for the other programs you are installing.
13. Choose the Computer Name (for example, Fred's PC) - can be any name up to 20 characters - doesn't have to be the same as the Windows network name.

Choose the scroll type for the monitor screen in the Operator Software (**Cylinder** moves a bar down the screen with the latest message above the bar, **Vertical** prints the latest message at the bottom of the screen and scrolls the rest upwards.)

Choose whether you want the computer to beep on alarm (if you are installing Alarm Graphics and want to use the .wav sounds for alarms, you should disable beep on alarm).

Choose whether you want boxes printed around reports.

14. Choose a program folder (program group) for your icons from which you can run the programs (do not include parentheses or punctuation in the program folder name).
15. Check the details you have entered, click on the **Next** button then wait while the files are copied.
16. Choose whether you want to install the portable document file reader (**acread.exe**). If you want to read the manuals supplied on the CD-ROM you need to do this. When you install the reader, choose the default path settings. You can read the manuals from LaunchPad, see the LaunchPad manual or help file for details.

Chapter 3

Steps for setting up the System Manager

Steps for setting up the System Manager when installing a new system

1. Run the System Manager program

Run the System Manager from the Start menu in Windows 95 (click on the **Start** button, move the pointer to Programs, then move the pointer to your access control program folder, then double-click on the System Manager icon). In Windows 3.1, double-click on the System Manager icon in your access control group.



Note: you can also run System Manager by running LaunchPad. System Manager is configured to start automatically when you log in to LaunchPad.

When the Login box is displayed (either for System Manager or LaunchPad), the default name and password are MASTER and PASSWORD. You can change the name and password using the **Admin Setup** button on the System Manager's **Tools** page.

2. Enter the site name and site code number

Click on the **Tools** page and click on the **Admin Setup** button.

In the **Number** column, next to **0** (site code reference number 0), type in the site code number stored in your cards at your main site. Type the name of the site in the **Name** column. If you are only using one site code in all your cards then click on the **OK** button. If you are using cards with different site codes, type all the codes in the **Number** column and a site name for each in the **Name** column.

3. Choose the COM port you are using for the local controllers

When it is first installed, the System Manager is not configured to communicate with any local controllers connected directly to the host computer. If you are using local controllers, click on the **Configuration** page and click on the **Local Comms** button. Choose the COM port that your local controllers are connected to. (It is best to choose COM 2 if possible. This will leave COM1 free, either for a serial mouse, or for a modem to communicate with remote sites.) When you have selected your COM port, click on the **OK** button.

If the controllers are connected and are switched on, the System Manager should go on line (the message at the bottom of the screen will change from **Off Line** to **On Line**) and the system list will appear on the screen.

To check that the host is communicating with the local controllers, click on the **Monitor** page, then on the **Debug** page to display the monitor screen. Click on the **Enable Display** check box to see messages passing from the host to the controllers in the left (OUT) column, and from the controllers to the host in the right (IN) column.

4. Configure any remote sites

See "Setting up the remote sites"

5. Enter the database using Operator Software

See the Operator Software manual.

6. Configure any programmable I/O using the I/O Configuration program

See "Setting up the programmable I/O" and the I/O Programming manual.

7. Configure any printer(s) to print out alarms and transaction messages

See "Setting up the printing of alarms and transactions".

Steps for setting up the System Manager when upgrading existing DOS Software

Note that when you upgrade an existing system, you should enter the pathnames to the existing program files, database files, log files, network comms files and reports files when you install System Manager from the CD-ROM.

1. Run the System Manager program

Run the System Manager from the Start menu in Windows 95 (click on the **Start** button, move the pointer to **Programs**, then move the pointer to your access control program folder, then click on the System Manager icon). In Windows 3.1, double-click on the System Manager icon in your access control group.



Note: you can also run System Manager by running LaunchPad. System Manager is configured to start automatically when you log in to LaunchPad.

When the **Login** box is displayed (either for System Manager or LaunchPad), enter the master operator name and password used by your old DOS Software.

If you can log in using your existing master operator name and password, go to step 2.

If you can't log in with your existing master operator name and password, log in using the default name: **MASTER** and default password: **PASSWORD**. If you still can't log in, re-install System Manager.

When you have logged in, you need to change the **4850.ini** path to get System Manager to use your existing database files.

To do this, you need to find where your **4850.ini** file is stored. Using My Computer or Explorer in Windows 95, or File Manager in Windows 3.1, go to the **c:\windows** directory, open the file called **sysman.ini** using a text editor (just double-click on **sysman.ini** in Windows 95 and it opens automatically) and look for the line which says

[FilePaths]

The pathname in the line below [FilePaths] tells you where **4850.ini** is stored.

Return to System Manager and display the Administrators Setup screen by clicking on the **Admin Setup** button on System Manager's **Tools** page. Click on the **Browse** button at the top right of the screen, find your existing **4850.ini** file (now you know where it is from looking in **sysman.ini**), and select it in the **4850 INI File Path** field.

2. Choose the COM port you are using for the local controllers

When it is first installed, the System Manager is not configured to communicate with any local controllers connected directly to the host computer. If you are using local controllers, click on the **Configuration** page and click on the **Local Comms** button. Choose the COM port that your local controllers are connected to. (It is best to choose COM2 if possible. This will leave COM1 free, either for a serial mouse, or for a modem to communicate with remote sites.) When you have selected your COM port, click on the **OK** button.

If the controllers are connected and are switched on, the System Manager should go on line (the message at the bottom of the screen will change from **Off Line** to **On Line**) and the system list will appear on the screen.

To check that the host is communicating with the local controllers, click on the **Monitor** page, then on the **Debug** page to display the monitor screen. Click on the **Enable Display** check box to see messages passing from the host to the controllers in the left (OUT) column, and from the controllers to the host in the right (IN) column.

3. Configure any remote sites

See "Setting up the remote sites".

4. Configure any printer(s) to print out alarms and transaction messages

See "Setting up the printing of alarms and transactions".

Using the System List

The System List is displayed in the left hand column on the System Manager's **Configuration** page. The following diagram shows a system with just one controller.



The System List shows a picture of the controller, along with its address (03) and its name. You can enter the name, or change the name, of any controller in the system by clicking on its picture in the System List and then clicking on the **Controller Names** button. You type the name in the space to the right of where it says **System List**.

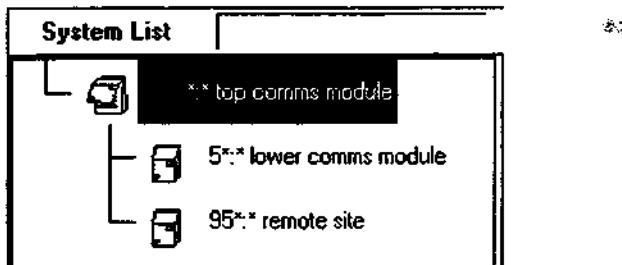
If you have a system with a comms module, the System List shows a picture of the controller containing the first (type F) comms module, along with the address *:*.



If you click on the picture of the controller, you get information about the comms module.

Address	Version	DIL	A	B	Status	On Line	Database
:	34/05A	F	1	1	OK	OK	OK

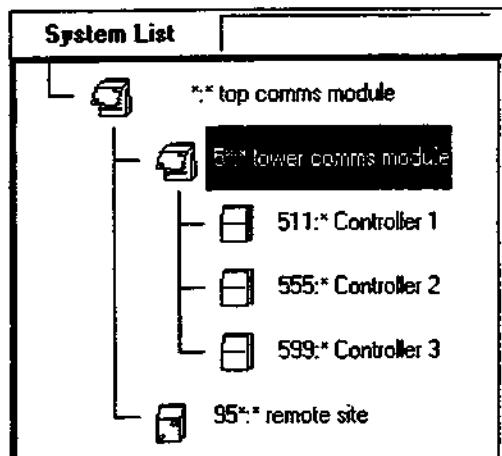
To display the controllers, comms modules and remote sites connected to the type F comms module, double-click on the picture of the controller containing the comms module.



The picture of the controller containing the comms module "opens" and the next branch is displayed.

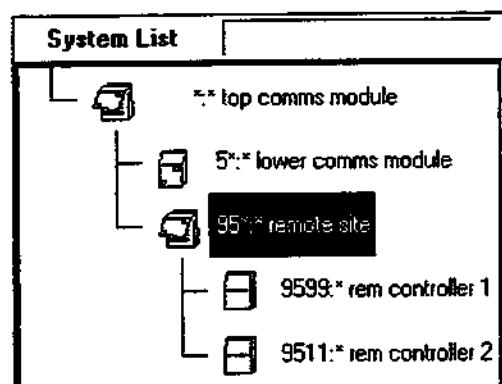
If there is another comms module beneath the type F comms module, it appears as a picture of a controller, but with a comms module

address, for example, **5*:*** for a comms module whose address is set to 5, as shown in the example above. The * before the : shows that this is a comms module and not a controller. For example, a controller whose address is set to 5 has an address **05:*** (no * before the :). To display the controllers connected to the comms module, double-click on the picture of the controller containing the comms module as shown below.********



Remote sites - addresses prefixed by 9

The above examples show a picture of a controller containing a comms module at a remote site. When a message is received from a controller at a remote site, the System Manager prefixes 9 to the address. When you get a System List, the comms module and all controllers in remote sites have 9 in front of the address, as shown below.



When you use the **Reconfigure System** button on System Manager's **Tools** page, the database is only downloaded to the local controllers. To send the database to the remote controllers, you switch the Remote Site Manager to **Manual Operation** and use the reconfigure button in the Remote Site Manager.

Controller/comms module information

If you click on the picture of a controller, the right hand column of the System List displays information about the controller:

Address	Version	DIL	A	B	Status	On Line	Database
511:*	33/07A	0			OK	OK	OK

or the comms module:

Address	Version	DIL	A	B	Status	On Line	Database
5*:*	34/05A	5	1	1	OK	OK	OK

The headings have the following meanings:

Address

This field shows the address of the comms module or the controller. For example: **F*:******* is a comms module of type F (the top comms module), **5*:******* is a comms module with address 5. ***:******* represents all the controllers and module slots addressed by that comms module. **00:******* is a controller with address 00, **511:******* is a controller with address 11 underneath a comms module with address 5. **:******* represents the module slot numbers in that controller.

Version

EPROM version number. The EPROM contains the code, called the firmware, which runs the controller or comms module.

DIL

DIL switch setting of controller (in hexadecimal), or rotary switch setting of comms module. The DIL switch is SW3 on the controller circuit board. It is a 4 way switch, but only numbers 3 and 4 are used. If switch 4 is up (for RS232 operation) the number in this field is 8, if switch 4 is down (for RS485 operation) the number in this field is 0. The comms module has a rotary switch on which you set its address.

AB

Upstream/downstream baud rate setting on the comms module. 1 represents 9600 baud. (0=19.2k, 1=9600, 2=4800, 3=2400, 4=1200, 5=300.) Upstream is in the direction of the computer, downstream is in the direction of the controllers.

Status

For a controller, if **Off** appears in this column then it is no longer talking to the system. **OK** indicates that the controller is in the polling list of the comms module at the head of the branch of controllers. For a comms module, if **Off** appears in this column then everything connected to that comms module is no longer talking to the system. **OK** indicates that the comms module is in the polling list of the next comms module upstream.

On Line

OK if the computer is talking to the device. **Off** if it is not. (The first comms module, address F, has its on/off line status displayed at the bottom of the System Manager window at all times.)

Database

If this column says **Update**, the controller needs to be reconfigured - use the **Reconfigure System** button on the **Tools** page. This occurs when a reconfigure has been performed when this controller was off line.

Module information

If you double-click on the picture of a controller, the right hand column of the System List displays information about the modules in the controller.

Address	Location	Hardware Type	Configured Type
03:0	Front Door	4320 (Dual)	4320 (Dual)
03:1	Sales	4320 (Dual)	4320 (Dual)
03:2	Production		4320 (Dual)
03:3			
03:4			
03:5	Stores		4420 (Dual)
03:6	Outhouse	4310 (Single)	4310 (Single)
03:7			
03:8			

The headings have the following meanings:

Address

This field shows the address of the module. In the diagram, **03** is the controller address, **:0** is module address 0, **:1** is module address 1, etc. There are five module slots in each controller, each with two

module addresses, numbered from 0 to 9 giving ten module addresses in all.

Location

This field displays the contents of the **Location** field from the access point record in the Operator Software.

Hardware Type

This column shows the module type installed at the address shown in the **Address** column.

Configured Type

This column shows what the System Manager expects the hardware to be at the address shown in the **Address** column. If the entries are different in the **Hardware Type** and **Configured Type** columns then the Software does not match the installed hardware. In the diagram, addresses 03:2 and 03:5 are configured as reader modules, but the hardware is not plugged in as the **Hardware Type** entry is missing.

Naming controllers and comms modules

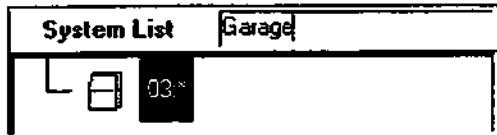
It is a good idea to name the controllers in the system, so you know where they are located in the building or site, or which remote site they are on. It is also a good idea to name each comms module with the address of the controller into which it is plugged, for example "Comms module in 03:". This will help you find the comms module easily when you need to.

To name a controller or comms module, take the following steps:

1. Display the System List by clicking on the System Manager's **Configuration** page.
2. If necessary, double-click on the picture of a controller to display all the controllers beneath the type F comms module.
3. Click on the picture of the controller you want to name, or the picture of the controller containing the comms module you want to name.
4. Click on the **Controller Names** button.

The field next to System List changes colour.

5. Click in the field next to **System List** to insert the cursor, and type the controller or comms module name.



6. Click on the picture of the controller again - its name appears next to its address.



Modifying the System List to reflect changes in your Controller layout

Note: deleting controllers from the System List and/or reassigning them can cause your system to stop working. You should only attempt this if you have sufficient knowledge to correct the consequences if it goes wrong.

When you use the **Update System List** button, System Manager locates all the Controllers connected to the host computer and adds them to the System List. It does not remove any controllers from the System List, even if they are no longer connected.

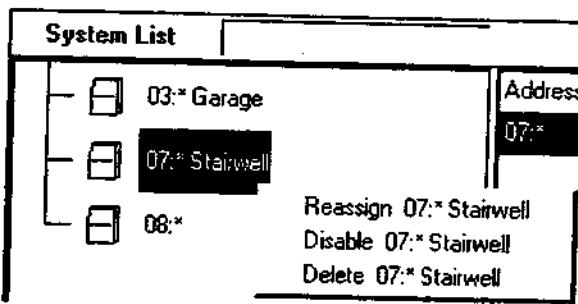
If you are logged in to System Manager as a master operator, you can modify the System List as follows:

- to reassign one controller's data records to another controller at a different address (the destination controller must contain the same application modules with the same module addresses as those in the source controller).
- to delete a controller from the System List and remove all its I/O data records from the software database.
- to delete a comms module from the System List. (Before you can do this, you must delete all the controllers which are downstream from the comms module.)
- to disable a controller by removing it from the System List but leaving its I/O data records intact. (You can disable a comms module if you first disable all the controllers downstream.)

Reassigning a controller to another comms address

As an example, if you disconnect a controller from one part of the comms layout and reconnect it somewhere else, you can use this function to "move" its data records to the new comms address. You could do this as follows:

1. After moving the controller, click on the **Update System List** button to get a new System List. The System List will now show the controller in its new position in the comms layout, and also in its old position.
2. Click on the "old" controller in the System List to highlight it, then right-click on it to display the list of commands.



3. Click on the **Reassign** option. (The address and name of the controller you are choosing to reassign is shown after the command.)
4. Click on the **OK** button to confirm that you want to proceed.
5. Click on the list box to show all the available controllers, and click on the one to which you are transferring the data, then click on the **OK** button.
6. Click on the **OK** button to confirm the source and destination controllers.

The data records are transferred from the source to the destination controller (which will take some time if there are a lot of cardholders) and then the source controller is deleted from the System List.

Note: the destination controller must contain the same application modules with the same module addresses as those in the source controller.

Removing a controller from the System List temporarily

To remove a controller from the system list and keep its access point and I/O records intact in the host computer's database, use the **Disable** option:

1. Click on the controller in the System List to highlight it, then right-click on it to display the list of commands.
2. Click on the **Disable** option. (The address and name of the controller you are disabling is shown after the command.)
3. Click on the **OK** button to confirm that you want to proceed.

When the controller is disabled, no data will be downloaded to this controller when you use the **Reconfigure System** or **Reconfigure I/O** commands.

To get the controller back on line, make sure it is connected and powered up, then click on the **Update System List** button to get it back in the System List, then click on the **Reconfigure System** button to download the data to the controller. Note that any disabled controller which is connected and powered up will also reappear in the System List if you re-start System Manager.

Removing a comms module from the System List temporarily

You can disable a comms module in the same way as a controller, provided you first disable all the controllers which are downstream from the comms module.

To get the comms module and all its downstream controllers back on line, make sure the comms module and the controllers are connected and powered up, then click on the **Update System List** button to get them back in the System List, then click on the **Reconfigure System** button to download the data to the controllers. Note that a comms module which is connected and powered up will also reappear in the System List if you re-start System Manager.

Removing a controller from the System List permanently

To remove a controller from the system list and delete its I/O records from the host computer's database, use the **Delete** option:

1. Click on the controller in the System List to highlight it, then right-click on it to display the list of commands.
2. Click on the **Delete** option. (The address and name of the controller you are deleting is shown after the command.)

3. Click on the **OK** button to confirm that you want to proceed.

When the controller is deleted, its I/O records are also deleted from the software database. Its access point records remain in the software database as configured and the access point addresses in these records are blanked so they can be reassigned to another controller if required.

Removing a comms module from the System List permanently

You can delete a comms module in the same way as a controller, provided you first delete all the controllers which are downstream from the comms module.

Setting the time and date

To set the time and date in the host computer and the controllers, take the following steps:

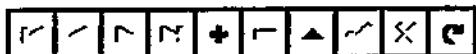
1. Click on the System Manager's **Configuration** page.
2. Click on the **Time & Date** button.
3. Change the time by clicking in the **Time** field and typing in the new time.
4. You can either set the date by clicking in the **Date** field and typing the new date, or you can click to the right of the **Date** field and use the pop-up calendar.
5. Click on the **OK** or the **Apply** button to set the new time and date in the host computer (**OK** closes the box, **Apply** leaves it open). If the system is on line, the time and date is also broadcast to the local controllers. To send the time and date to controllers at a remote site, use the **Send Messages Now** page on the **Dial-Up** page.

Add a new record for each modem by clicking on the  button, choosing the **Comm Port** number to which the modem is connected (using the guidelines given in the examples), and filling in the other fields.

Note: these settings apply to the modem at the host end only. The modem at the remote site is configured separately using a Remote Site Manager once communications have been opened.

2. Enter a record for each remote site in the system (name the remote sites and enter their telephone numbers)

Click on the **Dial-up** page, then click on the **Remote Sites** page and enter a record for each remote site in the system. To add a remote site record, click on the  button which is in the middle of the navigating buttons shown below.



Enter a name for the remote site in the **Site Name** field, then enter its telephone number in the **Site Tel. No.** field. You must enter a password for the remote site, but this will be updated later when you set the password using the Remote Site Manager - enter 00000000 to start with. You must click on the **Contact Point** tab and, in the **Primary Modem Number** field, enter the telephone number which the remote site should use to dial in to the host. Other fields on this page determine when the remote site should dial in to the host. For details of all the fields on this page see "Fields on the Remote Sites page of the System Manager".

Add a record for each remote site by clicking on the  button and entering data in the fields.

3. Run the Remote Site Manager program and manually open communications with each of the remote sites

Run the Remote Site Manager program by double-clicking on the **Remote Site Manager** icon.



Click on the **Sites** page. If you get a message that there are no free modems, go to the **Modems** page in the System Manager and check that there is at least one modem record configured.

You may need to click on the **Clear Modems Used Flags** button to free up the modems.

When you try to open communications with a remote site for the first time, you need to do the following:

- Choose a modem number from the list of free modems.
- Choose a site name from the **Site Name** list box.

The list will contain all the sites configured on the **Remote Sites** page of the **Dial-Up** page in the System Manager.

- Click on the **Manual Operation** check box. This enables you to dial in to the remote site manually as described in the next step.
- Click on the  button to dial in to the remote site and open communications - check the status message at the bottom right of the window. You can click on the **Data** page of the Remote Site Manager to view the messages passing between the host and the remote site for debugging purposes.
- When communications are opened, click on the  button. You can now set the password, an 8-digit number, which the remote site will use whenever it dials in to the host. The password is downloaded to the remote site, then sent back for verification by the host.
- Click on the  button to initialise the modem at the remote site. The system will use a basic protocol to communicate with the modem at the remote site until you have configured it to operate at its optimum.
- Click on the  button to request the hardware configuration from the remote site. This information is passed to the System Manager which then shows the remote controllers on its System List.
- Click on the  button and choose **Reconfigure Remote System** from the menu to download the database to the controllers at the remote site.

Note: you cannot reconfigure the controllers at a remote site from the System Manager - you must click on the  button in the Remote Site Manager.

- When you have carried out the above steps, disconnect the remote site by clicking on the  button.
- Choose another remote site from the list and repeat all the above steps.
- Minimize the Remote Site Manager.

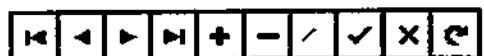
Adding a new modem record

Click on the **Dial-up** page, then click on the **Modems** page of the System Manager.

To add a new modem record, click on the  button. The label to the right of the navigating buttons changes to **Insert Mode**.

When you select a **Comm Port** number, the **Modem No.** to the left of the navigating buttons shows the next modem number, as shown in the diagram below.

Modem No. 2



Insert Mode

Fill in the other fields on the **Modems** page as required. For details of all the fields on this page see "Fields on the Modems page of the System Manager". (You do not need to fill in the fields displayed when you click on the **Dial In** tab - this is for information only.)

When you have configured this modem record, click on the  button to save the record.

Editing a modem record

Click on the **Dial-up** page, then click on the **Modems** page of the System Manager.

Find the modem record you want to edit using the  buttons (display first record, display previous record, display next record, display last record).

To edit the displayed modem record, click on the  button. The label to the right of the navigating buttons changes to **Edit Mode**.

Edit the fields on the screen and then click on the  button to save the changes.

If you want to leave edit mode without saving the changes, click on the  button.

Deleting a modem record

Click on the **Dial-up** page, then click on the **Modems** page of the System Manager.

Find the modem record you want to delete using the  buttons (display first record, display previous record, display next record, display last record).

To delete the displayed modem record, click on the  button. Click on the **OK** button to delete the record. (Note that you can't delete a modem record for a modem which is currently in use.)

Adding a new remote site record

Click on the **Dial-up** page, then click on the **Remote Sites** page of the System Manager.

To add a new remote site record, click on the  button. The label to the right of the navigating buttons changes to **Insert Mode**.

Enter the name of the site in the **Site Name** field.

Type in the **Site Telephone Number** for the modem at this remote site (this is the dial out telephone number).

You must enter a **Site Password**, but this will be updated later when you set the password using the Remote Site Manager - enter 00000000 to start with.

Fill in the other fields on the **Remote Sites** page as required. For details of all the fields on this page see "Fields on the Remote Sites page of the System Manager".

When you have configured this remote site record, click on the button to save the record.

Editing a remote site record

Click on the **Dial-up** page, then click on the **Remote Sites** page of the System Manager.

Find the remote site record you want to edit using the  buttons (display first record, display previous record, display next record, display last record), or click on the list box to the left of the buttons and choose from the list.

To edit the displayed remote site record, click on the button. The label to the right of the navigating buttons changes to **Edit Mode**.

Edit the fields on the screen and then click on the button to save the changes.

If you want to leave edit mode without saving the changes, click on the button.

Deleting a remote site record

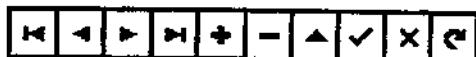
Click on the **Dial-up** page, then click on the **Remote Sites** page of the System Manager.

Find the remote site record you want to delete using the  buttons (display first record, display previous record, display next record, display last record), or click on the list box to the left of the buttons and choose from the list.

To delete the displayed remote site record, click on the button. Click on the **OK** button to delete the record.

Fields on the Modems page of the System Manager

Navigating buttons



These buttons enable you to add modem records, browse through records and edit them. If you hold the pointer over a button for a short time, a help tip is displayed telling you what the button does.

Comms settings

Comm Port:	<input type="text" value="1"/>	<input type="button" value="▼"/>
Baud Rate:	<input type="text" value="19200"/>	<input type="button" value="▼"/>
Data bits:	<input type="text" value="8"/>	<input type="button" value="▼"/>
Parity:	<input type="text" value="None"/>	<input type="button" value="▼"/>
Stop bits:	<input type="text" value="1"/>	<input type="button" value="▼"/>
Flow control:	<input type="text" value="RTS/CTS"/>	<input type="button" value="▼"/>

These settings control RS232 communications between the computer and the modem. Apart from the COM port number, the default settings are correct for this purpose.

Alarm Modem - Dial in only

If there is a tick in this field, the modem cannot be used by the host to dial out, so it is always available for remote sites to dial in with alarm messages.

Disconnect an outgoing call after xx secs

If there is a tick in this field, an outgoing call on this modem will automatically terminate after the number of seconds specified in the box after any data has been sent from host to remote site.

Record a log file

If there is a tick in this field, a log file is saved on the computer's disk which contains information about the modem's activity: time it connected, time it disconnected, time it failed to connect, etc. The log file messages can be viewed in real time on the **Connection Log** page. The log file is saved on the disk as **rlogfile.dbf**.

Tone dialling

If there is a tick in this field, the modem uses tone dialling. If there is no tick, the modem uses pulse dialling.

Redial Enabled xx secs

If there is a tick in this field, if the modem fails to connect it will redial after the number of seconds specified in the box. (We recommend there should be a tick here.)

Modem Enabled

There must be a tick in this field for the modem to work. It is used for temporarily disabling the modem for debugging purposes.

Init Strings, Resp. 0-4, Resp. 5-10, Resp. 11-12

The default initialisation strings and response strings will not normally need to be changed.

Dial In

For information only.

Direct Connection

If there is a tick in this field, the modem settings are ignored and the access controllers are connected directly to the specified COM port (local system).

Clear Modems Used Flags

Each modem has a flag which is set when the modem is claimed by a Remote Site Manager. When you run a Remote Site Manager, it claims the first available modem whose flag is clear. If a problem occurs which leaves all the modem flags set, running a Remote Site Manager will give the error message **No Free Modems**. You can click on this field to clear all the flags and so free all the modems for use by Remote Site Managers.

Fields on the Remote Sites page of the System Manager

Navigating buttons



These buttons enable you to add remote site records, browse through records and edit them. If you hold the pointer over a button for a short time, a help tip is displayed telling you what the button does.

Site Name

Can be any name up to 20 characters long, including spaces.

Contact Remote Site Daily at hh:mm hours

If there is a tick in this field, the host dials out to the remote site at the specified time each day.

Retrieve Site's Transaction Messages

If there is a tick in this field, when the host dials out to the remote site it will take all the transaction messages from the controllers. If this field is left blank, the transaction messages will not be passed to the host - they are discarded. You can do this if you only want alarm messages.

Contact Remote Site every xx minutes

If there is a tick in this field, the host dials out to the remote site every time the specified number of minutes elapses.

Only if data to send

If there is a tick in this field, the host will not dial out to the remote site, even if it is configured to do so in the previous field, unless it has data to send to the remote site.

Site Entry

Site Entry	Dial-In Time	Contact Point	Site Init Strings
Site Tel. No.	0171 333 4444		
Site Password	00000000	Time Zone Offset	+ 00:00 hours

You must enter the telephone number for the modem at the remote site into the **Site Tel. No.** field.

Enter 00000000 for the **Site Password** - it is updated when you set the password for the modem at the remote site using the Remote Site Manager.

If the remote site is in a different part of the world, enter the number of hours in front or behind in the **Time Zone Offset** field. (Click on the + button to turn it into a minus if necessary.)

Dial-In Time

Site Entry	Dial-In Time	Contact Point	Site Init Strings
<input type="checkbox"/> All site dial-in disabled			
<input type="checkbox"/> Timed site dial-in enabled <input checked="" type="checkbox"/> Send Transactions at 75% Full			
Dial In Time	02:00	Hours	Daily <input type="checkbox"/>

If you select **All site dial-in disabled**, the remote site will never dial in to the host, even if an alarm is generated, and the fields below are disabled. This is useful if a remote site develops a fault which causes it to dial the host all the time, for example: faulty door contacts.

If you select **Timed site dial-in enabled**, the remote site will dial in to the host at the specified time either daily, or on the specified day of the week.

If you select **Send Transactions at 75% Full**, the remote site will dial in to the host whenever any of the controllers has a transaction buffer which becomes 75% full. This option can be set in addition to the timed site dial-in above.

Contact Point

Site Entry	Dial-In Time	Contact Point	Site Init Strings
Primary Modem Number	0171 1234567		
Secondary Modem Number	0171 2345678		
Remote Time Out	30	Secs	

You must enter the telephone number for the modem at the host site into the **Primary Modem Number** field.

When the remote site dials in to the host, the line may be busy or faulty, or the host may not respond. This box enables you to choose a secondary modem telephone number at the host site which the remote site will try if there is no activity on the primary modem for the **Remote Time Out** period. If you have configured one of the modems as **Dial in only** on the **Modems** page, make this the primary modem for the remote sites and choose one of the other modems for the secondary modem.

Site Init Strings

The default initialisation strings will not normally need to be changed.

Chapter 4

Setting up the programmable I/O

Running the I/O configuration program

The I/O configuration program is used to configure inputs, outputs, flags, counters and trigger events. You must plan and test your I/O very carefully. Read the "I/O Programming Manual" for a full description of how to use programmable I/O and the I/O configuration program.

- To run the I/O configuration program, click on the System Manager's **Configuration** page, then click on the **I/O Configuration** button. (You can also run the I/O configuration program from LaunchPad if you wish.)

Note: when you have configured the programmable I/O you must return to System Manager and click on the **Reconfigure I/O** button on System Manager's **Tools** page to send the I/O database to the controllers.

Downloading the I/O configuration to the local controllers

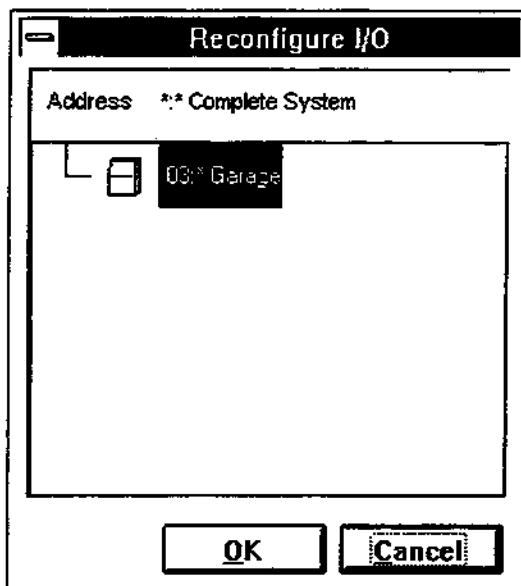
The System Manager provides a button to download the I/O configuration to the local controllers, without having to download the whole access database.

(Note: to download the I/O configuration to controllers at a remote site, you must click on the  button in the Remote Site Manager.)

To download the I/O configuration to the local controllers, take the following steps:

1. Click on the System Manager's **Tools** page.

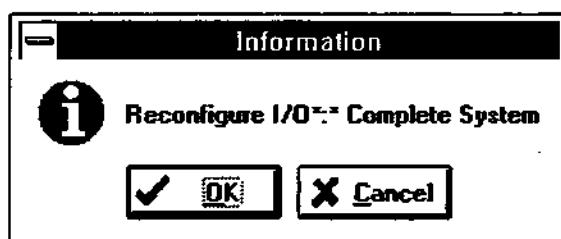
2. Click on the **Reconfigure I/O** button.



A box displays the system list.

3. If you want to download the I/O configuration to all the local controllers, check that the address says ***: Complete System** as in the above diagram and click on the **OK** button.

If you want to download the I/O configuration to a single controller, double-click on the first controller in the list to display the next layer of controllers, click on your chosen controller and then click on the **OK** button.



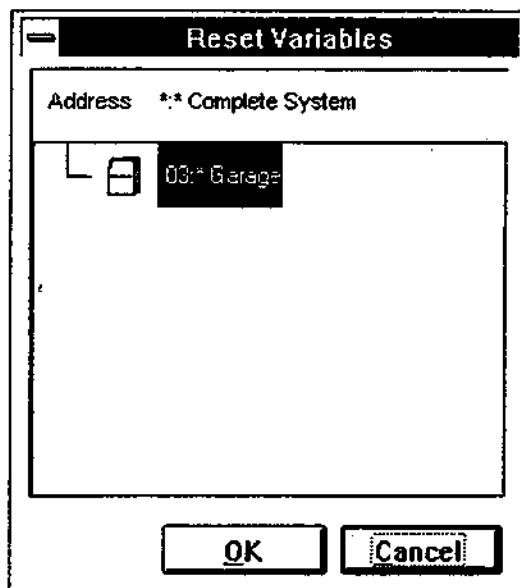
4. A box is displayed with the address of the controllers you are reconfiguring. Check the address and click on the **OK** button.

Resetting the I/O variables in the local controllers

The System Manager provides a button to reset the flags and counters in the local controllers to their default values (you specify the default values when you configure the flags and counters using the I/O configuration program).

To reset the flags and counters in the local controllers, take the following steps:

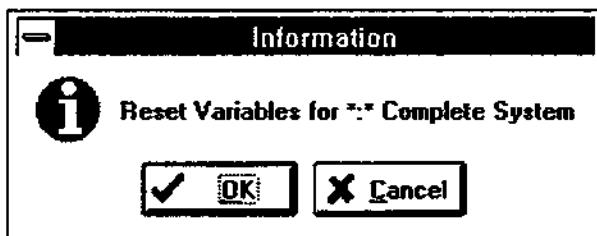
1. Click on the System Manager's **Tools** page.
2. Click on the **Reset Variables** button.



A box displays the system list.

3. If you want to reset the variables in all the local controllers, check that the address says *: **Complete System** as in the above diagram and click on the **OK** button.

If you want to reset the variables in a single controller, double-click on the first controller in the list to display the next layer of controllers, click on your chosen controller and then click on the **OK** button.



4. A box is displayed with the address of the controllers. Check the address and click on the **OK** button.

Using System Manager's I/O Debug tools

On its **Tools** page, System manager provides manual control of outputs, flags, counters and trigger events to help with debugging programmable I/O systems. Note that leaving the **Selected** field unchecked in the I/O Configuration Program's records does not stop I/O being manually controlled using I/O Debug.

I/O Debug enables you to switch outputs on and off or pulse them, set or clear flags, set counters to any value, or force a trigger event to perform its actions. I/O Debug also enables you to read the state of outputs and flags and the value of counters so you can see what is happening in the program.

Outputs

1. Click on the **Tools** page, then click on **Outputs Debug**.
2. Click on the **Name** field to display all the outputs in the system which are configured.
3. Choose one of the outputs from the list by clicking on it.
4. Click on the **Force State** field to display the list of possible actions for the output.

The options are:

No Action Do nothing.

Normal Set output to normal. This means that it will behave as configured in trigger events, etc.

On Force output on. Nothing can change the output until it is returned to Normal.

Off Force output off. Nothing can change the output until it is returned to Normal.

Pulse Activate the output for the time set in the **Pulse Period** field.

Note: if you set the output to **On** or **Off**, nothing else happening in the system can change its state until either you return the output to **Normal** using **Outputs Debug**, or you click on the **Reconfigure System** button.

5. Choose an option and click on the **Action** button to carry out the action.

Remember to set the output back to **Normal** if you want to return it to the control of the system when you leave **Outputs Debug**.

Flags

1. Click on the **Tools** page, then click on **Flags Debug**.
2. Click on the **Name** field to display all the flags in the system which are configured.
3. Choose one of the flags from the list by clicking on it.

The screen now shows the name of the chosen flag and its current state. These two fields are information fields and you cannot change them.

4. Click on the **Force State** field to display the list of possible actions for the flag.

The options are:

No Action Do nothing.

Set Force flag to be set. (Flag still acts as normal afterwards.)

Clear Force flag to be clear. (Flag still acts as normal afterwards.)

5. Choose an option and click on the **Action** button to carry out the action.

Counters

1. Click on the **Tools** page, then click on **Counters Debug**.
2. Click on the **Name** field to display all the counters in the system which are configured.
3. Choose one of the counters from the list by clicking on it.

The screen now shows the name of the chosen counter and its current value. These two fields are information fields and you cannot change them.

4. Type the value you want to put in the counter in the **Force Value** field.
5. Click on the **Action** button to put this value in the counter.

Trigger events

1. Click on the **Tools** page, then click on **Trigger Debug**.
2. Click on the **Name** field to display all the trigger events in the system which are configured.
3. Choose one of the trigger events from the list by clicking on it.

The screen now shows the name of the chosen trigger event, its current state and the name of the controller in which this trigger event is stored. These three fields are information fields and you cannot change them.

4. Click on the **Force State** field to display the list of possible actions for the trigger event.

The options are:

No Action Do nothing.

Enable Controller will process trigger event.

Disable Controller will not process trigger event.

Force Perform the trigger event's actions.

5. Choose an option and click on the **Action** button to carry out the action.

Password protection

Remember that operators logging on to the System Manager can play havoc with the I/O system, especially if they have access to the I/O Debug feature described above. It is important that you restrict access to I/O Debug to those people who are qualified to use it.

Chapter 5

Setting up the printing of alarms and transactions

What transaction monitoring does

The transaction monitoring feature monitors the messages received from access controllers and sends them immediately to a printer. The printer must be connected directly to an LPT: port on the host, or directly to an LPT port on another computer on the network - we recommend you use a dot matrix printer as this will print each message immediately when it arrives. It must be a 132 column printer.

If the printer is connected to the host, the System Manager program sends the alarms and transactions to the printer. If the printer is connected to a different computer, it must run the Transaction Monitoring Software.

The Transaction Monitoring Software monitors the messages from the access controllers by looking at the "network comms" file which is maintained by the System Manager.

Both System Manager and the Transaction Monitoring Software can filter messages so they only sends certain types of message to the printer. The options are:

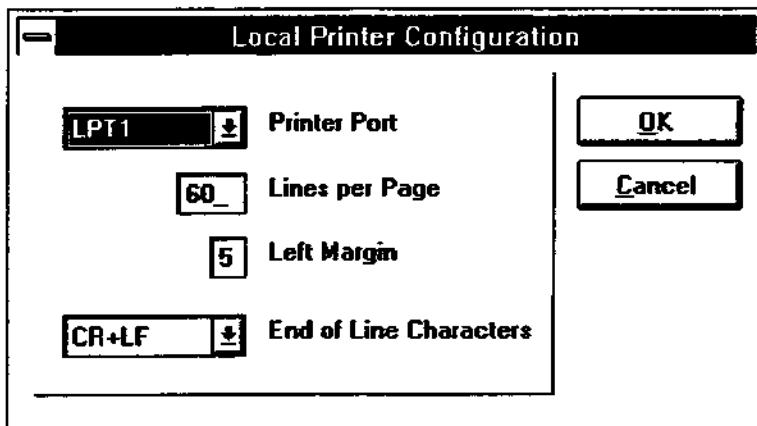
- All activities (all messages)
- Alarms (alarm messages only)
- Valid card transactions (access granted messages)

You can assign a time frame to any of the above options, so, for example, you could print only alarm messages during the day time, and all messages at other times. (The time frames available are those used by the Operator Software - you can view the time frames from the System Manager or the Transaction Monitoring Software but to define a new time frame you must use the Operator Software.)

Steps for setting up a printer connected to LPT port on host

1. Set the local printer configuration

Click on the System Manager's **Configuration** page, then click on the **Local Printer Setup** button.



Choose the LPT: port into which your printer is plugged, set the number of lines per page, the left margin indent and the characters you want sent to the printer at the end of each line (the options are to send both a carriage return and linefeed, or a carriage return only). Note that only parallel printers can be used - the Transaction Monitoring feature will not work with a printer connected to a serial COM: port.

2. Choose the printing options and time frames

Click on the **Monitor** page, then click on the **Filter** page.

A screenshot of a section titled "Activities Monitored" on a "Filter" page. It contains three checkboxes: "All Activities", "Alarms", and "Valid Card Transactions". Each checkbox has a corresponding dropdown menu labeled "during Time Frame" with the value "All" and a "View" button to its right.

You can select any combination of the three options by clicking on the check boxes at the left. The options are:

- **All Activities:** all messages are sent to the printer.
- **Alarms:** only alarm messages are sent to the printer.

Setting up the printing of alarms and transactions

- **Valid Card Transactions:** only messages from cards being granted access are sent to the printer.

You can choose a time frame for each option by clicking on the list box to open the list of time frames, then clicking on one of the time frames in the list.

Activities Monitored

<input checked="" type="checkbox"/> All Activities	during Time Frame	<input type="button" value="All"/>	<input type="button" value="View"/>
<input type="checkbox"/> Alarms	during Time Frame	<input type="button" value="All The Time"/>	<input type="button" value="View"/>
<input type="checkbox"/> Valid Card Transactions	during Time Frame	<input type="button" value="Night Time"/>	<input type="button" value="View"/>
		<input type="button" value="Office Hours"/>	<input type="button" value="View"/>
		<input type="button" value="Visitors Hours"/>	<input type="button" value="View"/>

(The time frames available are those used by the Operator Software - you can view the time frames from this screen but to define a new time frame you must use the Operator Software.)

To view the time frame you have chosen, click on the **View** button.

Time Frame

Times		Days										
Enabled	Start	End	Su	Mo	Tu	We	Th	Fr	Sa	HA	HB	HC
<input checked="" type="checkbox"/>	<input type="button" value="18:00"/>	<input type="button" value="08:00"/>	<input checked="" type="checkbox"/>									
<input type="checkbox"/>	<input type="button" value="00:00"/>	<input type="button" value="00:00"/>	<input type="checkbox"/>									
<input type="checkbox"/>	<input type="button" value="00:00"/>	<input type="button" value="00:00"/>	<input type="checkbox"/>									

(Note: you **cannot** edit a time frame from this screen - you have to use Operator Software.)

The following is an example of a completed **Options** page:

Activities Monitored

<input checked="" type="checkbox"/> All Activities	during Time Frame	<input type="button" value="Night Time"/>	<input type="button" value="View"/>
<input checked="" type="checkbox"/> Alarms	during Time Frame	<input type="button" value="All The Time"/>	<input type="button" value="View"/>
<input checked="" type="checkbox"/> Valid Card Transactions	during Time Frame	<input type="button" value="Office Hours"/>	<input type="button" value="View"/>

3. Enable printing

Click on the **Enable Real Time Printing** button to select it (it has a cross in the check box when selected).

Chapter 6

Using the System Manager

Starting the System Manager

1. Run the System Manager from the Start menu in Windows 95 (click on the **Start** button, move the pointer to **Programs**, move the pointer to your access control program folder, then click on the **System Manager** icon). In Windows 3.1, double-click on the **System Manager** icon in your access control group.



2. If the System Manager does not go on line to the local controllers, click on the **Configuration** page, then click on the **Local Comms** button and choose the correct COM port, then click on the **OK** button.
3. If there are modems connected to the host computer to communicate with remote sites, run a Remote Site Manager for each modem connected.

The System Manager now runs in the background, and you can use Operator Software as normal for monitoring alarms and transactions, and for editing the database. The host and remote sites will dial each other at the times configured.

Alarm log, transaction log and remote site log files

Each day, the System Manager saves two new log files in the directory chosen for that purpose when you installed System Manager (the default is **c:\sysmgr\log**). One of these log files is for alarms, and one for all other transactions. Whenever System Manager receives an alarm message from the controllers, it saves the message in an alarms pending file. When the alarm is cleared by someone using the Operator Software, System Manager saves the alarm message in the alarm log file.

Non-alarm messages are stored in the transaction log file immediately when they arrive.

Alarm log files (**lg*.***) and transaction log files (**al*.***) should be archived and deleted from time to time so they don't fill up the disk drive: copy them onto a floppy disk using Windows File Manager or Explorer. Note that transaction log files can be deleted automatically after a chosen number of days if you set the feature on the **Log Files** page of the **System Parameters** screen in the Operator Software.

If the System Manager is used with remote sites, it can be configured to save a connection log file containing details of times and dates when remote sites dialled in, or were contacted. This data is stored in a single file called **rlogfile.dbf** stored in the **data** directory.

When do you need to use System Manager?

When your access control system is in operation, System Manager runs in the background on the host computer, communicating with the controllers, saving the log files and sending transaction and alarm messages to a printer. After setting up the system in the first place, you only need to log in to the System Manager in the following circumstances:

- to set the time and date on the computer and in the controllers.

See "Setting the time and date".

- to update the System List if you change the controllers in your system, or the modules in your controllers.

See "Using the System List" and "Modifying the System List to reflect changes in your controller layout".

- to dial out to a chosen remote site manually by clicking on the **Send Messages Now** button.

See "Using the System Manager to download the database to the local controllers".

- to add new remote sites, or change existing ones.

See "Steps for setting up the remote sites".

- to examine the remote sites connection log file, giving details of times and dates when remote sites dialled in, or were contacted.

See "Using the System Manager to download the database to the local controllers".

- to configure programmable I/O.

You run the I/O configuration program by clicking on the **I/O Configuration** button on the System Manager's **Configuration** page.

See chapter 4 and the I/O Programming manual.

- to download the database to all controllers, or to selected controllers, in the local system.

See "Using the System Manager to download the database to the local controllers".

(To download the database to controllers at remote sites, you

need to use the  button in the Remote Site Manager.)

- to clear the messages stored in the controllers' comms buffers by clicking on the **Reset Buffers** button.
- to add more site codes to the system.

See "Administrators setup".

Using the System Manager to download the database to the local controllers

The System Manager provides a button to download the whole database to the local controllers.

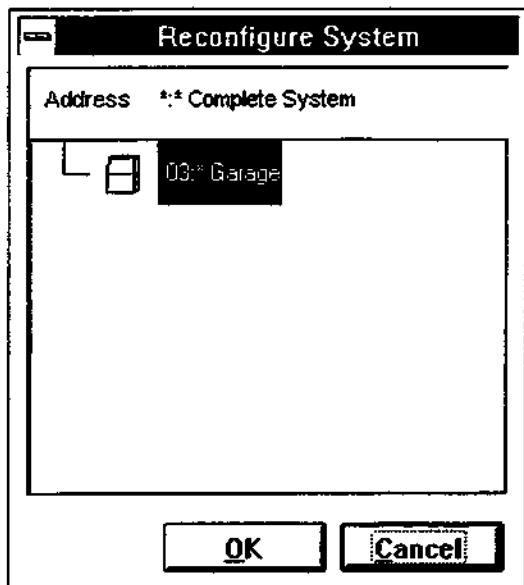
(Note: to download the database to controllers at a remote site, you

must click on the  button in the Remote Site Manager.)

To download the database to the local controllers, take the following steps:

1. Click on the System Manager's **Tools** page.

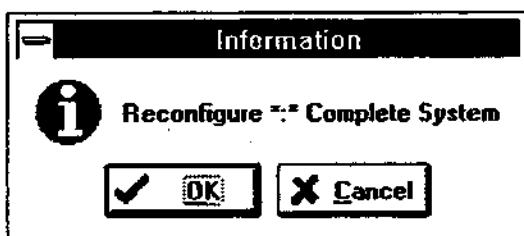
2. Click on the **Reconfigure System** button.



A box displays the system list.

3. If you want to download the database to all the local controllers, check that the address says ***: Complete System** as in the above diagram and click on the **OK** button.

If you want to download the database to a single controller, double-click on the first controller in the list to display the next layer of controllers, click on your chosen controller and then click on the **OK** button.



4. A box is displayed with the address of the controllers you are reconfiguring. Check the address and click on the **OK** button.

Using the System Manager to communicate with remote sites

Before System Manager can communicate with controllers at remote sites, you must:

- install a modem connected to the upstream RS232 side of the type F comms module at each of the remote sites.
- install at least one modem on the host computer or another computer on the network to communicate with all the remote sites; you may want to install a modem configured for dial-in only as the primary modem for each site to dial in to, so alarm messages from the remote sites can always get through.
- configure the modems and remote sites using the System Manager, as described in "Steps for setting up the remote sites".
- make contact with each of the remote sites using the Remote Site Manager in manual operation, configure the modems at the remote sites and download the database to the remote sites.

When the remote sites are configured and are communicating, System Manager can be used for the following:

1. To send messages to remote sites and receive transactions from them immediately, without waiting for the configured time. (**Send Messages Now** page in the **Dial-Up** page.)
2. To view the latest log file data (if the system is configured to record a log file on the **Modems** page of the System Manager's **Dial-Up** page). The data shows when each remote site last connected and disconnected from the host, and whether any errors occurred, for example if the host failed to connect to a remote site. (**Connection Log** page in the **Dial-Up** page.)
3. To view all messages passing between the System Manager and the controllers, both the local controllers and those at remote sites. This is very useful for debugging purposes when you first install the system. (**Debug** page in the **Monitor** page.)

Send Messages Now page

The **Send Messages Now** page on System Manager's **Dial-Up** page displays the names of all the remote sites in the **Site Name** column. The other columns show you when each remote site was last dialled, when it was last connected and when it last disconnected (**Closed**).

You can therefore find out how long it has been since each remote site was connected to the host and, if necessary, connect to one of them immediately using the **Send Messages Now** button.

To do this, take the following steps:

1. Click on the remote site in the **Site Name** column.
2. Click on the **Send Messages Now** button. (The **Last Button Press** field to the right of the button is updated to show the time you clicked on the button.)

The Remote Site Manager now dials the remote site selected. When it connects, any messages which the System Manager is waiting to send are sent to the remote site. If the remote site is configured on the **Remote Sites** page of the configuration program to send transaction data to the host then it does so.

Connection Log page

The **Connection Log** page displays the most recent data in the log file and is updated in real time. This data is only sent by the remote sites if they are configured to do so on the **Modems** page. The information recorded is when each site dialled, connected and disconnected from the host, and also any errors, for example if a remote site dialled and failed to connect. This data is stored in a file called **rlogfile.dbf** stored in the **data** directory on the computer's disk. This file is added-to all the time. If it gets too big then you can back it up and delete it (you will have to do this manually using your operating system).

Debug page

The **Debug** page displays all messages passing through the system.

- The **In** column displays all messages passing upstream from all access controllers, both local and remote, to the System Manager.
- The **Out** column displays all messages passing downstream from the System Manager to all access controllers, both local and remote.

Using the System Manager to monitor alarms and transactions

System Manager has a monitor screen which displays the same alarms and messages as those chosen for output to the printer. You can still use the monitor screen even if you do not have a printer connected.

To display the monitor screen, take the following steps:

1. Click on the System Manager's **Monitor** page, then click on the **Filter** page.
2. Set the filter to the type of message you want to monitor, the same as you would for transaction monitoring, see "Steps for setting up a printer connected to LPT port on host".
3. Click on the **Display** page.
4. Select the **Enable Monitoring** check box (it should have a cross in it).
5. The messages will be displayed on the screen as they arrive, from the local controllers and from the controllers at remote sites.

<input checked="" type="checkbox"/> Enable Monitoring						
Description	Time	Status	Card No	Surname	Forename	
Outhouse	12:34	Valid Entry	1,0	Baxter		
Sales	12:35	Valid Entry	2,0	Blenny	Betty	
Outhouse	12:35	Valid Entry	4,0	Eel	Elsie	
Outhouse	12:35	Valid Entry	16,0	Clark	Shane	
Outhouse	12:35	Valid Entry	3,0	Baker	Bert	
Outhouse	12:35	Valid Entry	89,0	Smith	Tina	
Outhouse	12:35	Valid Entry	5,0	Skate	Sharron	
Outhouse	12:36	Valid Entry	157,0	Olefin	Diego	
Sales	12:36	Valid Entry	66,0	Crab	Kirsten	

Normally new messages are printed at the bottom of the window. If you select the **Cylindrical Scrolling** check box, new messages are displayed above a line which moves down the window and then back to the top, so the display does not jerk when a new message arrives.

Chapter 7

Troubleshooting guide

Reindexing the databases

To keep the databases in good condition they should be reindexed regularly, especially after they have been edited. To do this you use the **Repair & Reindex Databases** utility which you can see as an icon in your access control system directory or folder.

Before you use this utility, you must close all copies of Operator Software and Remote Site Manager running on the system, and also exit System Manager. You then run the utility and wait for it to complete. Then run System Manager again and start all your other programs.

Getting the System Manager on line to the controllers

To get the controllers communicating (on line), take the following steps:

1. Make sure that the system is connected as shown in the diagrams in the section on "What the System Manager does" in chapter 1. The most common cause of a system not working is connecting it up wrongly.
2. If you have local controllers connected directly to the computer, get them working first. If the System Manager says **Off Line** at the bottom of the screen, click on the **Local Comms** button on the **Configuration** page, check that the COM port is correct, then click on the **OK** button (don't click on the **Cancel** button, even if the COM port was already correct). The System Manager should then say **On Line**. Look at the **Debug** screen on the **Monitor** page and check that the System Manager is polling the controllers (**!F#** in the **Out** column). If the system is not responding with **&F#** in the **In** column then check your COM port number and your RS232 connections both at the computer and at the controller or comms module.

Make sure that you have not set the System Manager to **Enhanced** in the **Administrators Setup** screen without a 4235 Comms module as the first in the system.

If you do **not** have any local controllers, set the COM port to **(none)**. The System Manager will say **No Local** instead of the **Off Line** or **On Line** messages.

3. To sort out problems with remote sites, try connecting to each remote site manually using the **Send Messages Now** option and check that the host dials and connects to the remote site. If it fails, check that the telephone number is correct and that the modems are wired and configured correctly.
4. When you have connected to a remote site, use the **Debug** page to look at the messages passing between the host and the remote site.

Getting System Manager or Transaction Monitoring Software to send messages to a printer

If a printer connected to the host computer will not print any messages, check the following:

1. Click on the System Manager's **Monitor** page, then click on the **Display** page.
2. Select the **Enable Monitoring** check box (it should have a cross in it).
3. If no messages are displayed on the screen, either the access control system is not generating messages (see the System Parameters screen in the Operator Software), or the filter is set so that messages are not being displayed.
4. Click on the **Filter** page.
5. Select the **All Activities** check box (it should have a cross in it) and choose a time frame which is definitely active at this time.

Enable Real Time Printing

Activities Monitored

All Activities

during Time Frame

All The Time



View

6. Select the **Enable Real Time Printing** check box (it should have a cross in it).

7. If there are still no messages printed on the printer, click on the **Configuration** page, click on the **Local Printer Setup** button and check that you have selected the correct LPT port. If the host computer is connected to a network, check that the LPT port you are using is not redirected to a network printer. Finally, check the connections to the printer.

If a printer connected to a computer which is not the host will not print any messages, check the following:

1. Make sure you are running Transaction Monitoring Software and that it is set up as described in the Transaction Monitoring manual.
2. Click on the **Monitor** page of the Transaction Monitoring Software.
3. Select the **Enable Monitoring** check box (it should have a cross in it).
4. If no messages are displayed on the screen, then the access control system is not generating messages (see the System Parameters screen in the Operator Software), or the Transaction Monitoring Software has not been started, or the network comms file is not set correctly, or the filter is set so that messages are not being displayed.
5. Make sure the Transaction Monitoring Software has been started.
6. If the Transaction Monitoring Software has been started then it may be set up with the wrong network comms file, or no network comms file.
7. If messages are displayed on the Monitor page, check that the **Enable Real Time Printing** check box at the top of the **Options** page is selected. If it is then check that the filter options beneath it make sense - you may have selected only alarms and there aren't any, or you may have selected a time frame which is not active at this time.
8. If the filter settings are logical, the problem must be with the printer connections or setup. Check that you have selected the correct LPT port. If the computer is connected to a network, check that the LPT port you are using is not redirected to a network printer. Finally, check the connections to the printer.

Miscellaneous problems and features

1. System Manager does not enable you to create a custom cardholder screen. If you want to do this then you need to use a copy of the old DOS software, or use a DBASE editor.
2. The uninstall procedure leaves the following files on the hard drive:
 - Sysmgr** and all subdirectories
 - All files associated with Alarm Graphics
 - All database files
 - All log files
 - Granta.reg** in the **Progs** subdirectory of **Sysmgr**
3. Do not uninstall a copy of Operator Software as doing so deletes some of the files used by System Manager and other copies of Operator Software running on the system.
4. If the install process does not create a program group or folder, make sure you have not used parentheses or punctuation in the name. If you haven't, perform the install procedure again.
5. Global anti-passback will not work while you are downloading the database to the controllers.
6. System Manager gives no warning if hard disk space on the computer is running very low.
7. If you are using sequence files to configure system features, the sequence files must be stored in System Manager's program directory.

Chapter 8

Planning your access control system

This chapter:

- Describes how to divide your cardholders into user-groups (Access Levels).
- Describes how to configure Access Points and allocate them to Access Levels.
- Describes how to configure the Time Frames.
- Shows you how to tabulate the plan.
- Describes how to enter the plan in the Operator Software.

(Planning your programmable I/O is described in the "I/O Programming Manual".)

Before you can configure your system, you must plan your access control database on a piece of paper. This chapter gives you detailed step by step instructions on how to do this. Only when you have all the details written down on paper should you start to enter data into the computer. Before you start you must have a list of the locations of all the controllers in the buildings, the names of the doors that they control, and their hardware addresses. You can get the hardware address from the System List, see "Using the System List". You can name the controllers and comms modules in the system using the **Controller Names** button on the System List page.

Access Levels (cardholder-groups)

Write down a name for each group of people who require access through the same set of doors at the same times (up to a maximum of 20 characters for each name, including spaces). For example, MANAGERS, GENERAL-STAFF, STORES, CLEANERS.

Write down the names of the people in each Access Level. For example,

Managers

A Person

B Person

General

C Person

D Person

E Person

F Person

Stores

G Person

H Person

Cleaners

I Person

J Person

Access Points (doors)

Write down a name for each Access Point in the system (up to a maximum of 20 characters for each name, including spaces). Note that if you are using anti-passback you may need two Access Points for one door (in and out).

Front-door

Admin

R&D

Stores

Production

Write down the configuration for each Access Point from the following list of options:

Unlocked Door unlocked during Time Frame

Monitoring Detection of door open and door forced

Egress Manual door exit control fitted

In Door is entrance for anti-passback

Out Door is exit for anti-passback

PIN Door has PINpad

PIN (dis) Door has PINpad

(PIN disabled during Time Frame)

Front-door

Unlocked

Monitoring

Egress

Admin

Monitoring

Egress

R&D

Monitoring

PIN

Stores

Monitoring

PIN (dis)

Production

Monitoring

Egress

Write down the names of the doors to which each Access Level is allowed access.

Managers

All doors

General

Front-door

Admin

R&D

Production

Stores

Front-door

Stores

Production

Cleaners

Front-door

Admin

Production

Time Frames (times of the day, days of the week and holidays)

For each user-group, write down the times of the day they are allowed access through each door, the days of the week on which they are allowed access, and whether they are allowed access on days which are designated holidays. (If you are defining different holiday types then specify the type.)

Managers

All doors 24 hours, seven days a week, including holidays

General

Front-door	8.00 am to 8.00 pm, Monday to Friday, not holidays
	8.30 am to 1.30 pm Saturday, not holidays
Admin	8.00 am to 8.00 pm, Monday to Friday, not holidays
R&D	8.00 am to 8.00 pm, Monday to Friday, not holidays
Production	8.00 am to 8.00 pm, Monday to Friday, not holidays
	8.30 am to 1.30 pm Saturday, not holidays

Stores

Front-door	8.00 am to 8.00 pm, Monday to Friday, not holidays
	8.30 am to 1.30 pm Saturday, not holidays
Stores	8.00 am to 8.00 pm, Monday to Friday, not holidays
	8.30 am to 1.30 pm Saturday, not holidays
Production	8.00 am to 8.00 pm, Monday to Friday, not holidays
	8.30 am to 1.30 pm Saturday, not holidays

Cleaners

Front-door	6.00 pm to 8.00 pm, Monday to Friday, not holidays
Admin	6.00 pm to 8.00 pm, Monday to Friday, not holidays
Production	6.00 pm to 8.00 pm, Monday to Friday, not holidays

Write down the same information for any Unlocked Time Frames and any PIN disabled Time Frames for each door.

Door Unlocked

Front-door 9.00 am to 5.30 pm, Monday to Friday, not holidays

PIN disabled

Stores 8.00 am to 8.00 pm, Monday to Friday, not holidays

 8.30 am to 1.30 pm Saturday, not holidays

Write down a name for each different Time Frame up to a maximum of 20 characters in total, including spaces.

24 Hours - Seven Days

24 hours, seven days a week, including holidays

Daytime - Mon/Sat

8.00 am to 8.00 pm, Monday to Friday, not holidays

8.30 am to 1.30 pm Saturday, not holidays

Daytime - Mon/Fri

8.00 am to 8.00 pm, Monday to Friday, not holidays

Evenings - Mon/Fri

6.00 pm to 8.00 pm, Monday to Friday, not holidays

Unlocked - Mon/Fri

9.00 am to 5.30 pm, Monday to Friday, not holidays

Each Time Frame can incorporate up to ten different time/day combinations (called timezones).

Tabulating the plan

You can now fill out tables to enable easy entry of the Access Level data into the Software database. Here are the tables for our example:

<u>Access Level</u>	<u>Access Point</u>	<u>Time Frame</u>
Managers	Front-door	24 Hours - Seven Days
	Admin	24 Hours - Seven Days
	R&D	24 Hours - Seven Days
	Stores	24 Hours - Seven Days
	Production	24 Hours - Seven Days

<u>Access Level</u>	<u>Access Point</u>	<u>Time Frame</u>
General	Front-door	Daytime - Mon/Sat
	Admin	Daytime - Mon/Fri
	R&D	Daytime - Mon/Fri
	Production	Daytime - Mon/Sat

<u>Access Level</u>	<u>Access Point</u>	<u>Time Frame</u>
Stores	Front-door	Daytime - Mon/Sat
	Stores	Daytime - Mon/Sat
	Production	Daytime - Mon/Sat

<u>Access Level</u>	<u>Access Point</u>	<u>Time Frame</u>
Cleaners	Front-door	Evenings - Mon/Fri
	Admin	Evenings - Mon/Fri
	Production	Evenings - Mon/Fri

Entering data

After you have planned the system you can enter the data on the computer using the **Operator Software**.

- You must enter an Access Point record for each Access Point before you can enter the Access Level records.
- You can define Time Frames either in the Time Frame screen, or from within the Access Point and Access Level screens by pressing Alt+T.
- After you have defined the Access Levels, you can enter the cardholder records.

Access Point records

Chapter 7 of the Operator Manual describes entering Access Point records. Read the following first.

1. An Access Point is usually a door. The Access Point record names the door and defines its features.
2. If you do not know the detailed information about each Access Point, you can still save the record as long as you type its name in the Location field. Click on the Save button to save a record. You can always return to the record and amend it to add more details later.
3. The Address field contains the system address of the Access Point, and this depends on the hardware installation. Click on the Address field to see a list of addresses in the system from which you can choose.

If there are no addresses or they are incomplete, generate a new system list using the Update System List option in the Options menu on the Master Software. If the system is off line, you can leave the Address field blank for the present and fill it in later.

4. The Type field must be set according to the reader module type:

<u>Reader module type</u>	<u>Type field</u>
Dual Cotag Reader 4320	Dual Cotag Reader
Dual Swipe Card 4420	Dual Reader
Cotag Reader & PINpad 4310	Single Cotag Reader
Swipe Card & PINpad 4410	Single Reader

If the module is one with a PINpad, you have an extra screen to fill in which you can see by clicking on the tab labelled Single Zone Options.

Time Frame records

Chapter 8 of the Operator Manual describes entering Time Frame records. Read the following first.

1. Each Time Frame record consists of at least one and at most ten Timezones. Each Timezone consists of a period of time linked to the days of the week and holidays.
2. Time Frame records can be defined within the Access Point and Access Level screens if required by pressing Alt+T.
3. Time Frame records are not only used for Access Levels. There are seven uses, these being: Access Levels, door unlock times, PINpad disable times, selection of Controller messages broadcast during certain times, input monitoring disable times, output activating times and trigger event source/condition times.

Access Level records

Chapter 9 of the Operator Manual describes entering Access Level records. Read the following first.

1. An Access Level record is a list of all the Access Points with a Time Frame allocated to each one.
2. You must enter all the Access Point records before defining Access Levels, otherwise the ones you have not yet entered will be missing from the list. You can save an Access Point record without knowing all the details about the Access Point as described earlier.

3. If you do not allocate a Time Frame to an Access Point, the default is the null Time Frame (represented by a horizontal line on the screen) which means there is no access through that door for cardholders in this Access Level.

Cardholder records

Chapter 6 of the Operator Manual describes entering cardholder records. Read the following first.

1. At its simplest, a cardholder record links a person's name and an Access Level to a Card Number. Whenever the Controller reads that Card Number, it checks the Access Level to see if the Card is allowed entry. The computer takes the Card Number from the Controller and displays the name of the person who holds that Card.
2. If your system uses PINs, you can either enter the PIN for each cardholder in the Pin No field, or you can type ???? in that field which enables the cardholder to enter his or her own PIN the first time they use the system. If, when you later view the cardholder record, the Pin No field still contains ????, the cardholder has not yet entered a PIN. If the field instead contains **** then the cardholder has entered a PIN. The asterisks ensure that no one can read the PIN so it remains confidential to the cardholder. If a cardholder forgets the PIN, simply amend the record and enter ???? in the field again. They can then key in a new PIN.

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System Administrator Manual

4 METHOD STATEMENT

METHOD STATEMENT

SITE

5 -7 CARLTON GARDENS

ELECTRICAL CONTRACTOR: T CLARKE PLC

SECURITY SUB-CONTRACTOR: BLENHEIM SECURITY SYSTEMS

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BLENHEIM DRAWINGS: ISSUE 1 July 1998.

Introduction

- 1.0 Blenheim Security Systems shall install and commission an integrated Security System. Comprising of CCTV, Intruder Alarm, Access Control in conjunction with the procedures and standards of NACOSS (National Approval Council for Security Systems), NACP's 1-20 and BS 4737 in conjunction with T Clarkes Plc. Electrical testing procedures as laid down by the IEE wiring regulations for Electrical Installations.

Prerequisites to Procedure

2.0

- 2.1 Blenheim operatives will require access on site from 0900 hrs- 1700hrs Monday - Friday and if required, outside of these hours by prior arrangement.
- 2.2 All containment be it 2 compartment trunking steel conduit, flexible conduit, etc from Alarm Detector, CCTV camera, Access Control Point to Slave Controller, then on to Main Controls, are the responsibility of the Electrical Contractor (Electrical Package).
- 2.3 All 240v power requirements to supply security 12v/24v PSU's are the responsibility of the Electrical Contractor (Electrical Package).
- 2.4 Interconnections from the 240v supply to the Security PSU's will be, the responsibility of the Security Contractor under the Supervision of the Electrical Contractor to meet the requirements of the IEE Regulations.
- 2.5 All necessary 240v power supplies will be required after 1st fixing of Security Cables but, before completion of 2nd fixing of component parts so the Security Contractor can carry out necessary commissioning tests.
- 2.6 All building works ie, holes through concrete brickwork, metal etc, are specialised fixing's for security component parts are the responsibility of the (main Building Contractor).
- 2.7 All building works ie holes through holes through concrete brickwork etc will be required before commencement of the First Fix (Building Contractor).

Design Parameters

- 3.1 Blenheim Security Security Systems shall adhere to the design parameters as per the Ove Arup and Partners Security specification volume 5 and the Blenheim Security drawings issue no: 1 July 1998.

Reference Documents

4.0

- 4.1 Installation First Fix

As per Blenheim drawing issue no: 1 July 1998.

- 4.2 Installation Second Fix

- a. As per BS 4737 and NACOSS NACP 1 1 - 12
 - b. As per NACOSS NACP 20 CCTV.
 - c. As per NACOSS NACP 30 Access Control.
 - d. As per BS 7671 NACP 1992 IEE Wiring sixteenth add.
- 4.3 Security components parts will also be installed as per Manufacturers current guidelines which form part of the OM manual.

Pre - Start Checks

5.0

- 5.1 Prior to commencement of 2nd fix and after completion of each part of 1st fix, Blenheim Security will record detailed measurements of cable perimeters onto document Record Measurements.
- 5.2 The above measurements shall be collated and filled after each phase. On completion of 2nd fix, the above measurements shall be tested again to prove cabling etc, against the introduction of malicious or accidental damage. Electrical Inductance etc.

Commission/test Procedures

6.0

- 6.1 After completion of above Blenheim Security shall start installation of component parts in line with BS4737 and NACOSS, NACP's and Manufacturers instructions.
- 6.2 Documentation for Intruder alarm as per enclosed.
- 6.3 Documentation for CCTV as per enclosed.
- 6.4 Documentation for ACCESS as per enclosed.

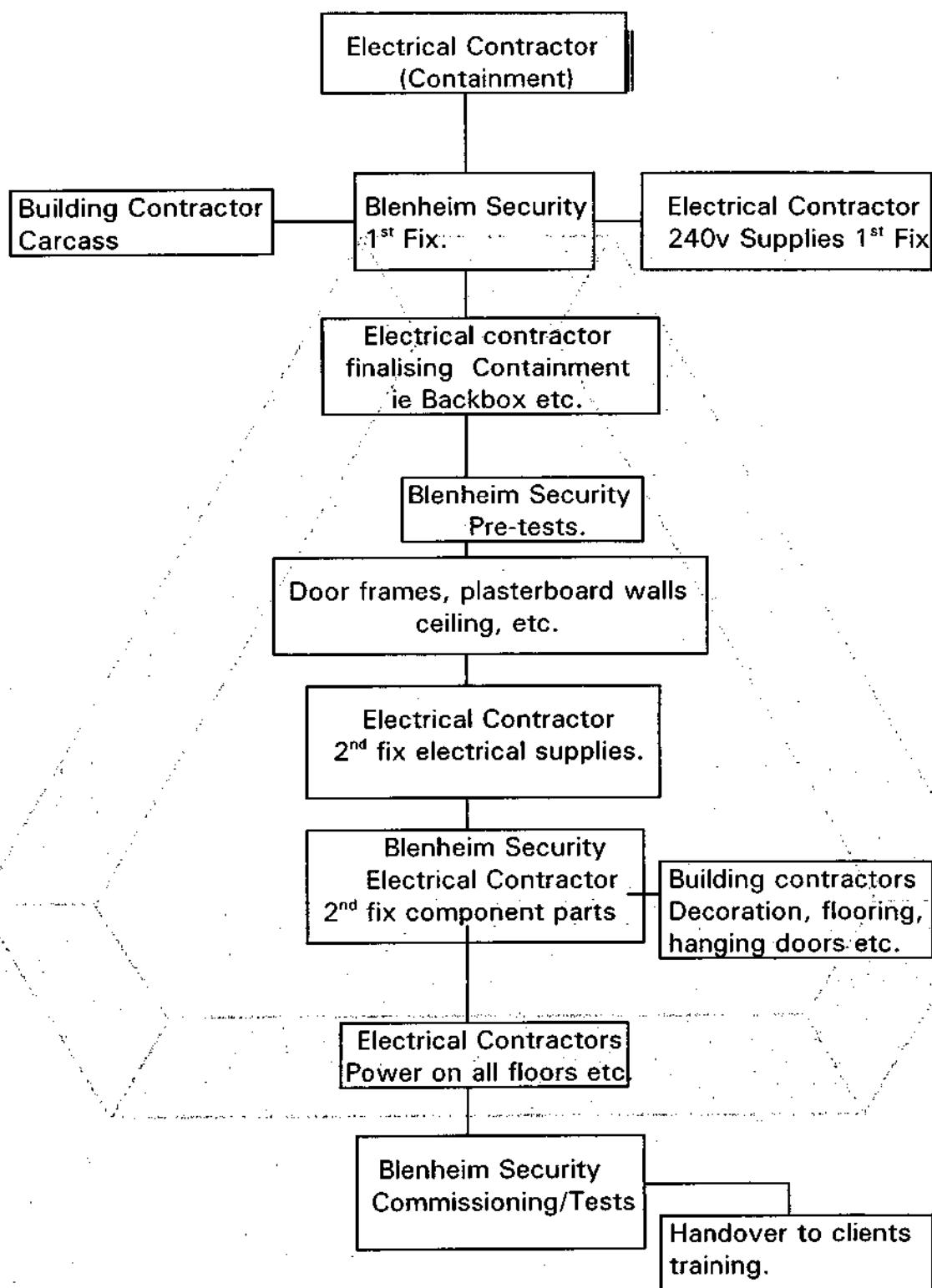
Interface Procedures

7.0

- 7.1 Before final commissioning/testing Blenheim Security will co-ordinate with T Clarke Plc. To finalise and test, 240v power requirements in conjunction with the electrical specification and security specification issue 5.
- 7.2 Blenheim Security Systems will require full co-operation from the following services, to enable final testing/commissioning to be practically complete.
 - a. Electrical Contractors: 240v power/containment
 - b. Building Contractor: holes, making good. Suspended ceiling, decoration, access to practically good area's requiring security 2nd fixing.

Security System Flowchart

7.4



Documentation

8.0

As per Attached.

Demonstration Procedures

9.0

- 9.1 Blenheim Security Systems shall demonstrate each aspect of the Security System as per the Manufacturers guidelines and through pre-handover discussions with clients. To record Clients specific operating requirements.
- 9.2 On completion of the demonstrations. Blenheim shall have recorded documentation signed for by the Client, accepting the above has been carried out in a thorough and precise manner.

Instrumentation

- 10.0 To be issued as per Blenheim Security System 1509002 part 1 quality manual.

Staffing

- 11.0 To be advised.

Safety Aspects

- 12.0 As per Blenheim Security Systems, Health and Safety Policy enclosed.

SYSTEM ATTRIBUTES

BELL DELAY

BELL DURATION

ENTRY TIME _____ S

EXIT TIME

PERSONAL ATTACK

RESET*

LINE FAULT MONITOR

BATTERY CAPACITY

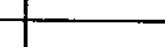
SILENT/AUDIBLE

CUSTOMER / ENGINEER

SILENT/AUDIBLE

Ab

* See BS4737, Part 1 : 1986.
clause 5.5

SIGNATURES	DATE
	
ENGINEER	
	

CUSTOMER			JOB NO		ENGINEER
<i>Bottom Ground Floor N.20 E. 4</i>					<i>DARREN RILEY</i>
Cct zone	Location		Resistance (Ohms)	Detector	BATTERY CHARGING VOLTAGE
			Detector	Tamper	voltage
	LEFT SIDE FRT Door (9)	9.1	9.0	/ VOLTS
	MIDDLE FRONT Door (8)	9.4	9.4	/	POWER SUPPLY CURRENT (NORMAL) mA
	RIGHT SIDE FRT Door (5)	9.9	9.8	/	POWER SUPPLY CURRENT (IN ALARM) mA
	REAR SINGLE LIFT Door (4)	13.4	13.3	/ mA
	REAR LOBBY OUTL Door (3)	15.5	15.3	/	BATTERY DISCONNECTED mA
	PA IN CONS Room	16.4	16.4	/	
WARNING DEVICES					
			INPUT VOLTAGE TO SAB	SAB CHARGING CURRENT CHECKING	
			1	volts	(Tick)
			2	volts	(Tick)

SYSTEM ATTRIBUTES

BELL DELAYm	PERSONAL ATTACK	SILENT / AUDIBLE
BELL DURATIONm	RESET*	CUSTOMER / ENGINEER
ENTRY TIMEs	LINE FAULT MONITOR	SILENT / AUDIBLE
EXIT TIMEs	BATTERY CAPACITYAh

* See BS4737, Part 1 : 1986.
clause 5.5

SIGNATURES	DATE
<i>D. Riley</i> ENGINEER	<i>28/7/99</i>
SUPERVISOR	

CUSTOMER		JOB NO			ENGINEER	
Cct zone	Location <i>Top Level Ground Node 3</i>	Resistance (Ohms)		Detector voltage	BATTERY CHARGING VOLTAGE	
		Detector	Tamper	 VOLTS mA
	PIR 1				POWER SUPPLY CURRENT (NORMAL)	
	PIR 2			 mA	
	PIR 3				POWER SUPPLY CURRENT (IN ALARM)	
	PIR 4			 mA	
	PIR 5				BATTERY DISCONNECTED	
	PIR 6			 mA	
	PIR 7				WARNING DEVICES	
	PIR 8				INPUT VOLTAGE TO SAB	SAB CHARGING CURRENT CHECKING
					1	volts
					2	volts
						(Tick)
						(Tick)

SYSTEM ATTRIBUTES

BELL DELAYm

PERSONAL ATTACK

SILENT / AUDIBLE

BELL DURATIONm

RESET*

CUSTOMER / ENGINEER

ENTRY TIMEs

LINE FAULT MONITOR

SILENT / AUDIBLE

EXIT TIMEs

BATTERY CAPACITY

.....Ah

* See BS4737. Part 1 : 1986.
clause 5.5

SIGNATURES	DATE
<i>DG Riley</i> ENGINEER	<i>28/7/99</i>
SUPERVISOR	

CUSTOMER			JOB NO		ENGINEER
<i>CARLTON GARDENS</i>					<i>DARREN RILEY</i>
Cct/ zone	Location <i>Bottom Lower Ground</i> <i>Node 1</i>	Resistance (Ohms)	Detector	BATTERY CHARGING VOLTAGE	
			Detector	Tamper	voltage VOLTS
1	DOOR 1	22.7	22.6	/	POWER SUPPLY CURRENT (NORMAL) mA
2	DOOR 2	20.3	20.1	/	
3	DOOR 3	10.1	10.1	/	POWER SUPPLY CURRENT (IN ALARM) mA
4	DOOR 4	8.3	8.2	/	
5	DOOR 7	7.9	7.8	/	BATTERY DISCONNECTED mA
6	DOOR 8	9.6	9.7	/	
7	DOOR 15/16	17.2	17.2	/	WARNING DEVICES
8	DOOR 17	18.6	18.6	/	INPUT VOLTAGE TO SAB SAB CHARGING CURRENT CHECKING
9					
10				1 volts	(Tick)
11					
12				2 volts	(Tick)
13					
14					

SYSTEM ATTRIBUTES

BELL DELAYm	PERSONAL ATTACK	SILENT / AUDIBLE
BELL DURATIONm	RESET*	CUSTOMER / ENGINEER
ENTRY TIMEs	LINE FAULT MONITOR	SILENT / AUDIBLE
EXIT TIMEs	BATTERY CAPACITYAh

* See BS4737, Part 1 : 1986,
clause 5.5

SIGNATURES	DATE
<i>JG Riley</i> ENGINEER	28/7/99
SUPERVISOR	

BLENHEIM SECURITY SYSTEMS LTD
Unit 4, Station Mews, Station Close, Potters Bar, Herts, EN6 1TL
Tel No: (01707) 646232 Fax No: (01707) 646234

COMPLETION CERTIFICATE

Contract Number:

Our Reference: **CARLTON GARDENS**

Customer:

I confirm that the CCTV system has been installed to my satisfaction and that I have received:

1. A demonstration and instructions on how to operate the alarm system.
2. The security code number for the alarm.
3. Comprehensive written operating instructions for the alarm system.
4. A system record log book for the alarm system.
5. Details of the emergency contact number.
6. Certificate of Compliance No:.....

ENGINEER ASSESSMENT

YES NO

Did they arrive on time?

Were they appropriately dressed?

Were they polite and courteous?

Were the premises left clean and tidy?

SYSTEM SPECIFICATION DEVIATIONS ON INSTALLATION

INSTALLED ~~4x Monitors 2x Video Recorders 2x Multiplexers~~
~~1x 16x16 MATRIX Controller, 1x 16x16~~
~~1x All Cables for Cameras and Monitors~~

CUSTOMER'S SIGNATURE: 

CUSTOMER'S NAME: 

ENGINEER'S SIGNATURE: 

ENGINEER'S NAME: 

DATE: 28-7-99

BLENHEIM SECURITY SYSTEMS LTD
Unit 4, Station Mews, Station Close, Potters Bar, Herts, EN6 1TL
Tel No: (01707) 646232 Fax No: (01707) 646234

COMPLETION CERTIFICATE

Contract Number:

Our Reference: **CARLTON GARDENS**

Customer:

I confirm that the ACCESS Control system has been installed to my satisfaction and that I have received:

1. A demonstration and instructions on how to operate the alarm system.
2. The security code number for the alarm.
3. Comprehensive written operating instructions for the alarm system.
4. A system record log book for the alarm system.
5. Details of the emergency contact number.
6. Certificate of Compliance No:.....

ENGINEER ASSESSMENT

YES NO

Did they arrive on time?

Were they appropriately dressed?

Were they polite and courteous?

Were the premises left clean and tidy?

SYSTEM SPECIFICATION DEVIATIONS ON INSTALLATION

~~INSTALLED FLOOR PLATE CONTRACTOR CONSULE~~
~~LARGE GRANITE KITCHEN & BATHROOM TILES~~
~~INSTALLED GLASS FOR KITCHEN~~

CUSTOMER'S SIGNATURE: 

CUSTOMER'S NAME: **PAUL RILEY**

ENGINEER'S SIGNATURE: 

ENGINEER'S NAME: **DAVID RILEY**

DATE: **28/7/99**

BLENHEIM SECURITY SYSTEMS LTD
Unit 4, Station Mews, Station Close, Potters Bar, Herts, EN6 1TL
Tel No: (01707) 646232 Fax No: (01707) 646234

COMPLETION CERTIFICATE

Contract Number:

Our Reference: **CARLTON GARDENS**

Customer:

I confirm that the VIDEO ENTRY system has been installed to my satisfaction and that I have received:

1. A demonstration and instructions on how to operate the alarm system.
2. The security code number for the alarm.
3. Comprehensive written operating instructions for the alarm system.
4. A system record log book for the alarm system.
5. Details of the emergency contact number.
6. Certificate of Compliance No:.....

ENGINEER ASSESSMENT

YES NO

Did they arrive on time?

Were they appropriately dressed?

Were they polite and courteous?

Were the premises left clean and tidy?

SYSTEM SPECIFICATION DEVIATIONS ON INSTALLATION

INSTALLED ALL CABLES FOR ENTRANCES
AND WIRE HARNESS

CUSTOMER'S SIGNATURE

CUSTOMER'S NAME

ENGINEER'S SIGNATURE

ENGINEER'S NAME: *DAVID KEE*

DATE: *28/7/99*

BLENHEIM SECURITY SYSTEMS LTD
Unit 4, Station Mews, Station Close, Potters Bar, Herts, EN6 1TL
Tel No: (01707) 646232 Fax No: (01707) 646234

COMPLETION CERTIFICATE

Contract Number:

Our Reference: **CARLTON GARDENS.**

Customer:

I confirm that the **INTRUDER ALARM** system has been installed to my satisfaction and that I have received:

1. A demonstration and instructions on how to operate the alarm system.
2. The security code number for the alarm.
3. Comprehensive written operating instructions for the alarm system.
4. A system record log book for the alarm system.
5. Details of the emergency contact number.
6. Certificate of Compliance No:.....

ENGINEER ASSESSMENT

YES NO

Did they arrive on time?

Were they appropriately dressed?

Were they polite and courteous?

Were the premises left clean and tidy?

SYSTEM SPECIFICATION DEVIATIONS ON INSTALLATION

Not all General Power keys and
Pins in console not fully fitted in back
Screws and Grounding contacts on wings
Bulls on back ground

CUSTOMER'S SIGNATURE

CUSTOMER'S NAME

ENGINEER'S SIGNATURE

ENGINEER'S NAME

DATE: 28/1/99

CUSTOMER			JOB NO		ENGINEER
CARLTON GARDENS.					DARREN RICEY
Cct/ zone	Location		Resistance (Ohms)	Detector	BATTERY CHARGING VOLTAGE
	MIDDLE Lower Ground Node 2.			Tamper VOLTS
15	PIR 9				POWER SUPPLY CURRENT (NORMAL) mA
16	PIR 10				
17	PIR 11				POWER SUPPLY CURRENT (IN ALARM) mA
18	PIR 12				
19	DOOR 1	24.2	24.0		BATTERY DISCONNECTED mA
20	DOOR 2	24.2	24.0		
21	DOOR 3	23.9	23.8		WARNING DEVICES
22					INPUT VOLTAGE TO SAB
23					SAB CHARGING CURRENT CHECKING
24				1 volts	(Tick)
25					
26					
27				2 volts	(Tick)
28					

SYSTEM ATTRIBUTES

BELL DELAYm	PERSONAL ATTACK	SILENT / AUDIBLE
BELL DURATIONm	RESET*	CUSTOMER / ENGINEER
ENTRY TIMEs	LINE FAULT MONITOR	SILENT / AUDIBLE
EXIT TIMEs	BATTERY CAPACITYAh

* See BS4737, Part I : 1986.
clause 5.5

SIGNATURES	DATE
29 May ENGINEER	28/7/99
SUPERVISOR	

CUSTOMER		JOB NO			ENGINEER	
Cct/ zone	Location	Resistance (Ohms)		Detector voltage	BATTERY CHARGING VOLTAGE VOLTS	
		Detector	Tamper			
				POWER SUPPLY CURRENT (NORMAL) mA		
				POWER SUPPLY CURRENT (IN ALARM) mA		
				BATTERY DISCONNECTED mA		
				WARNING DEVICES		
				INPUT VOLTAGE TO SAB	SAB CHARGING CURRENT CHECKING	
				1 volts	(Tick)	
				2 volts	(Tick)	

SYSTEM ATTRIBUTES

BELL DELAYm
 BELL DURATIONm
 ENTRY TIMEs
 EXIT TIMEs

PERSONAL ATTACK
 RESET*
 LINE FAULT MONITOR
 BATTERY CAPACITYAh

* See BS4737, Part 1 : 1986,
clause 5.5

SIGNATURES	DATE
ENGINEER	
SUPERVISOR	

5 HEALTH & SAFETY

HEALTH AND SAFETY POLICY

Blenheim Security Systems is committed, so far as is reasonably practicable, to ensuring that it's activities and the actions of it's employees and sub-contractors, whilst engaged upon business of the company, do not hazard the health, safety and welfare of the company personnel or any other persons who may be affected by those activities or actions.

IMPLEMENTATION

1. All employee's will understand and observe in full, their individual and collective responsibilities with regard to the preservation of the health, safety and welfare at work of themselves, of other employees and sub-contractors and of persons other than employees and sub-contractors who may be affected by their action and activities for the company.
2. Statutory limitations and regulations, codes of practice, company limitations and regulations and proper working practices will be adopted and observed.
3. Machinery, plant and equipment used by company personnel for the conduct of company activities will be installed, operated and maintained at least to the manufactures instructions and in a proper manner.
4. Safe and healthy standards for the use, storage of materials and substances used in activities and for the disposal of residual warranties be assessed, established and observed in full.

EQUAL OPPORTUNITIES

Blenheim Security Systems Limited has an equal opportunity policy, which our staff are made aware of, and which is strictly enforced. Please note the following on our equal opportunities policy:

Equal Opportunities Recruitment of staff: Our policy is made clear in all recruitment advertising. We try to meet the aim of equal opportunities by positively encouraging the recruitment of women and minority group staff. All BSS staff are made aware, of the importance Blenheim Security Limited attach to equal opportunities and that we expect them to practice fair employment policies.

Contractor Behaviour: All BSS Limited staff are carefully briefed on the standards of behaviour and language which we expect of them in their dealings with BSS Limited clients and their residents. The following section of our written staff briefing is relevant:

Behaviour towards clients: A friendly, but respectful and businesslike approach is expected. In addition, contractors and their employees are expected to treat with respect the sensitivities of all our clients, in particular on questions of race, gender and possible disability:

Women should not be addressed using terms of endearment, such as "Love" or "Darling" or spoken to in any way that they are likely to find belittling.

No form of sexual harassment will be tolerated.

Offensive racial and ethnic terms and remarks will not be tolerated.

All people are to be treated as individuals and with respect regardless of **race, gender, physical condition or appearance and age.**

Swearing and other language which might cause offence will not be tolerated.

Patience and tolerance may be required in contacts with residents who have special problems.

Situations involving **aggressive individuals** should always be treated with extreme caution, and you should avoid any action or comment which is likely to make things worse.

All personal information pertaining to clients or residents should be treated as strictly **confidential**.

COMPANY

SAFETY

POLICY

STATEMENT OF SAFETY POLICY

1. The company will take all reasonable measures to ensure the safety, health and welfare at work of all employees in fulfilment of its moral, legal and economic responsibilities. These measures will also be aimed at protecting others who may be affected by our day to day work activities.
2. It is a function of management to provide the right circumstances under which works may be carried out safely. However, all employee's must be aware that they have a legal duty, not only to works in a safe manner but also to co-operate in efforts made to create safe working conditions.
3. The attached document details the chain of safety responsibility from board to site. Those responsibilities applicable to the person concerned are issued with this statement. Files of safety instructions are held at head office and are to be available to all employee's for perusal.
4. Action to be taken to control specific hazards and instructions or compliance with applicable regulations and codes of practice will be issued from time to time for inclusion in files of safety instructions. Training will be given to employees on how to meet the responsibilities placed on them.
5. The company has a good health and safety record. The co-operation of every employee is necessary in order that standards may be maintained or improved wherever possible.

INDIVIDUAL RESPONSIBILITIES

OPERATIVES

Main responsibilities are to:-

- a) Use correct tools and equipment for the job, use safety equipment and protective clothing supplied e.g. roof ladders, belt, goggles, helmets etc.
- b) Keep tools in good condition and report to supervisor any defects in plant and equipment.
- c) Develop a personal concern for safety - for themselves and others: particularly for newcomers and young people.
- d) Avoid improvising which entails unnecessary risk.
- e) Warn new men of known hazards.
- f) Refrain from horseplay and the abuse of welfare facilities.
- g) Suggest ways of eliminating hazards.
- h) Ensure that all areas of work which are 6'6" (2 metres) high or more are protected by either guard rails or intermediate platforms to open edges, before work commence.

Supervisor

Main responsibilities are to:-

- a) Be familiar with construction regulations on work which gangs are engaged on and insist on them being observed, including the requirement to protect open edges which are 6'6" (2 metres) high or more with the protection identified in para. 1 (h) above.

- b) Incorporate safety instructions in routine orders and see that they are obeyed.
- c) Ensure new employees learn to take safety precautions.
- d) Discourage horseplay and reprimand those who fail to consider the well-being of others.
- e) Wear a safety helmet and set a personal example.

CONTRACTS DIRECTOR

Main responsibilities are to:-

- a) Understand the firms policy and appreciate the responsibility allocated to each grade.
- b) Determine at planning stage and ensure operational:
 - 1) The most appropriate order and method of working.
 - 2) Edge protection
 - 3) Allocations of responsibilities with main staff and others.
 - 4) Facilities for welfare and sanitation and basic fire precautions.
- c) Provide instructions to establish working method, to explain the sequence of operations, to outline potential hazards at each stage and indicate precautions to adopt.
- d) Check over working methods and precautions with site management before work starts.
- e) Ensure that work, once started, is carried out as far as possible as planned and that all construction regulations are observed on site.
- f) Set a personal example on site visits by wearing appropriate protective equipment, including wearing safety helmet.
- g) Organise so that works is carried out with minimum risk to persons, equipment and materials.
- h) Know the board requirements of the Construction Regulations and other relevant legislation.

- i) See that all regulations and requirements are observed on site and that registers, records and reports are in order and that the "Competent" person appointed has sufficient knowledge of plant and machinery to evaluate all aspects of its safe operation.
- j) Give all operative and foreman precise instructions on their responsibility for correct working procedures and see that they do not require persons to take risks.
- k) Arrange delivery and stacking of materials and plan a tidy site giving safe access to working area's.
- l) Have full discussions with main contractors on site to avoid confusion about area's of responsibility.
- m) Make sure protective clothing is available where appropriate.
- n) Ensure availability of first-aid as required by construction regulations.
- o) Release site personnel when required for on or off site safety training.
- p) Co-operate with safety officer, act on his recommendations.
- q) Ensure site accommodation and facilities comply with minimum standards laid down.
- r) Ensure that no scaffold shall be erected or be substantially added to or altered or be dismantled except under the immediate supervision of a competent person and so far as possible by competent workman possessing adequate experience of such work. All materials for any scaffold shall be inspected by a competent person on each occasion before taken into use.
- s) Ensure only competent operators use plant and power tools.

ACTIVITY CHECKLISTS

Is it safe?

One sure way to reduce accidents is to pinpoint unsafe situations or practices, so that steps can be taken to correct them before anyone gets hurt. An attempt has been made to identify some of the most elementary hazards found on site, which frequently lead to accidents. This checklist, as its title says, is basic and it should, therefore, be modified to suit local needs.

ARRIVAL ON SITE

- a) It is the responsibility of the senior employee present to report arrival on site to a responsible representative for the client and indicate the area of operations and to ensure clearance to proceed with the work - this will normally have been arranged previously but does not remove the responsibility to report arrival.
- b) All employees should make themselves aware of any fire warning system that exists on site, how it works and the action to be taken thereafter.
- c) All employees must know where the nearest telephone is and how to use it.
- d) Make sure that occupiers of the building affected by the work are aware of the nature of the activity taking place and the works

dangers involved (this will normally have been dealt with previously but cannot be over stressed) i.e. the use of hot bitumen on roof levels above occupied premises.

SAFE ACCESS

More than 50% of the accidents that keep men away from work involve falls or collisions of men, materials and vehicles. It is, therefore, vital that access from place to place be made safe.

Checkpoints:-

- 1) Is safe access provided for all on site to reach their places of work i.e. good roads, gangways, passageways, passenger hoists, staircases, ladders and scaffolds?
- 2) Are all walkways level and free from obstruction?
- 3) Is edge protection provided or have preventative measures taken where men are likely to fall from an open side?
- 4) Are holes or openings covered over with securely fixed covers, or alternatively fenced off?
- 5) Protection to area's below?
- 6) Is the site tidy and are materials stored in safe positions?
- 7) Are there proper arrangements for the gathering and disposal of scrap?
- 8) Are nails in timber hammered down or removed?

LADDERS

More accidents arise each year from the use and/or miss-use of ladders than from any others single piece of equipment.

Checkpoints:-

- 1) Is every ladder in good condition and free from obvious defects?
- 2) Are all ladders secured near the top (including those used for short periods)?
- 3) If the ladder cannot be secured near the top, is it secured near the bottom, weighted or footed?
- 4) Does the ladder rise at least 1.07M (3ft. 6ins) above the place of landing? if not, is there adequate handhold at the place of landing?
- 5) Are ladders properly positioned for access.

TUBULAR SCAFFOLDS

The law requires that scaffolding work be done with competent and experienced supervision. All scaffolders except trainees should be experienced and competent in their work. The loading for which a scaffold has been provided should be known. The loading should be evenly distributed. The scaffold should not be over loaded. Scaffolds are required to be inspected at least once a week and after bad weather.

Checkpoints:-

- 1) Has proper access been provided to the scaffold platform?
- 2) Are all uprights provided with base plates or prevented in some there way from slipping or sinking?

TRANSPORT

- a) The driver of any company vehicle is responsible for using that vehicles in a safe manner and complying at all times with the requirements of the road traffic acts as far as speed, loading, parking and general road use are concerned.
- b) All defects in relation to vehicles which may result in danger to employees or others must be reported to the safety officer.

- c) The driver of any company vehicle is responsible for ensuring at all times that:-
 - 1) His load is securely fixed to the vehicles.
 - 2) All hand tools, cans, ladders etc. are securely fixed.
- d) No ladder, pole or other material may project more than 1 metre in from or behind the vehicle. All projecting material at the rear of the vehicle must be clearly marked with a clear warning sign. No material may project over either side of the vehicle without specific authority arranged through the safety officer.

CHAIN OF SAFETY RESPONSIBILITY

- 1) The contracts Director is responsible for the safety function and will report to the board on company safety and health matters at regular intervals.
- 2) The site senior employee is generally responsible for safety on sites.
- 3) Each site senior employee is responsible for the implementation of company safety procedures and for complying with legal requirements on his own job(s). Foreman are also appointed as safety supervisors for the purposes of the construction (General Provisions) Regulations, 1961.
- 4) Employees are expected to involve themselves in safety matters and report any unsafe equipment or dangerous situations to their respective foreman.



National Approval Council for Security Systems

Certificate of Quality Assurance

This is to certify that the Quality Management System

of

BLENHEIM SECURITY SYSTEMS LTD

Unit 3, Station Mews, Station Close,
Potters Bar, Hertfordshire. EN6 1TL

Complies with the requirements of BS EN ISO 9002 1994 and
Quality Schedule SSQS101 for the following service(s)

The Installation and Maintenance of Intruder
Alarms

Signed

A handwritten signature in black ink, appearing to read 'David Holt'.

Date: 7th July 1996

Chief Executive NACOSS

Certificate Number 100241

The National Approval Council for Security Systems
Queensgate House, 14 Cookham Road, Maidenhead, Berkshire SL6 8AJ

The use of the NACB accreditation mark indicates accreditation in respect of those activities covered by the
accreditation certificate number 019

This certificate remains the property of the National Approval Council for Security Systems and must be returned to NACOSS on demand. Recognition is conditional upon the Recognised Firm continuing to satisfy all the NACOSS Rules and other requirements applicable to the NACOSS scheme for Recognition of Firms engaged in the security systems industry.



This is to certify that

BLENHEIM SECURITY SYSTEMS LIMITED

was admitted to

*The British Security
Industry Association Ltd*

as a Principal Member

on the twenty fourth day of October 1995

*Given under the common Seal of
The British Security Industry Association Limited*

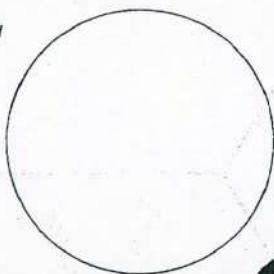
David Hilder

Chief Executive

C.A.

Secretary

Membership No. 396



*Note: This Certificate is the property of The British Security Industry Association Limited
(the "Association) and must be returned to the Association on termination of Membership.*

6 CABLE SPECIFICATIONS

ATTN:- Tom @ Blenheim.

01707 - 646234.

"making the connection"



COAXIALS AND MULTICORE CABLES

COMMTECH TRADING CO. LTD.
CLAYTON PARK IND. ESTATE
CLAYTON-LE-MOORS
HYNDBURN, LANCS. BB5 5JP
TEL: (01254) 232638
FAX: (01254) 301197

SPECIFICATION FOR
RG59 B/U MIL-C-17
Impedance Rating 75 ohm

Inner Conductor	1/16 CCS
Dielectric	PE (S)
Diameter of Dielectric	3.7mm
Outer Conductor	PCWB
Sheath	PVC
Nominal Outer Diameter	6.1mm
Minimum Bend Radius	OD x 5
Weight KG/KM	60
Nominal Capacitance (pF/mtr)	67

Nominal Attenuation (dB/100 mtrs)
Frequency MHz

5	2.2
10	3.2
30	5.8
50	7.5
100	13
200	19
300	24
600	36
1000	46
Maximum RF voltage (kv)	6.0

Maximum Power Rating (watts) at 20 Deg C
Ambient Temperature

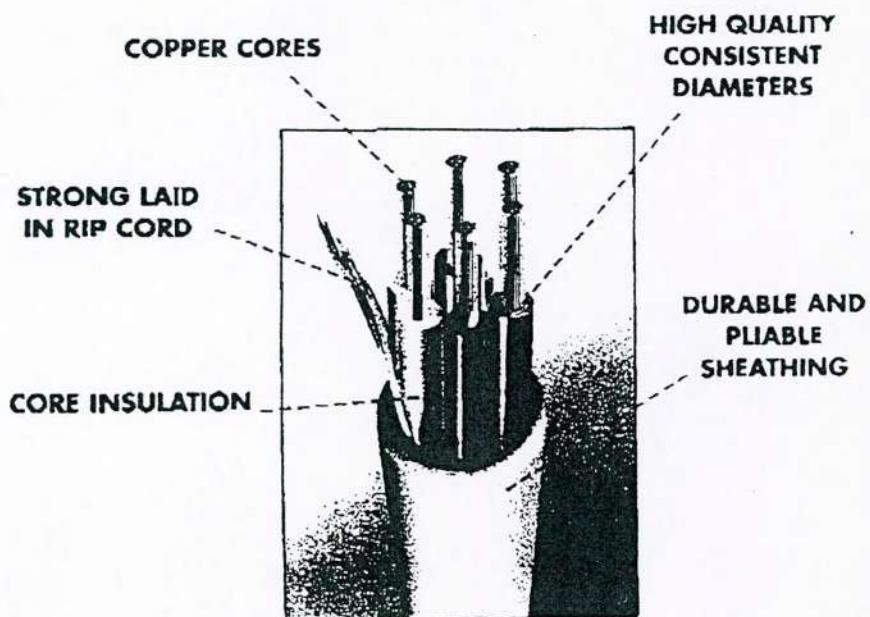
MHz	
100	230
200	160
300	120
600	83
1000	65

Multicore Cables

TECHNICAL SPECIFICATION

	STANDARD CABLE SCREENED CABLE	TWIN POWER & DATA	TWISTED PAIR
LOW SMOKE & FUME			
Core Type:	0.2mm	0.2mm	0.2mm
Strands per Core:	7	16 power 7 data	24
Strand Diameter:	0.2mm	0.2mm	0.2mm
Nom. Conductor Area:	0.22mm ²	0.55mm ² -power 0.22mm ² -data	0.75mm ²
Core Gauge:	24 AWG	22 AWG	20 AWG
Insulation Thickness:	0.3mm	0.4mm	0.3mm
Max. Operating Voltage:	50v RMS	50v RMS	50v RMS
Current Rating	1 AMP	3 AMP	4.5 AMP
per Core @ 70°C			
Max Operating Temp.:	70°C	70°C	70°C
Nom Core Resistance @ 20°C:	92 ohms/KM	40 ohms/KM	25 Ohms /KM

FEATURES



Building Services Operating and Maintenance Instructions
5-7 Carlton Gardens, London SW1

H.7

Delmatic Ltg. Management – Lighting Control

DELMATIC

Delmatic Limited, 117 Cleveland Street, LONDON, W1P 5PN, UK

tel: + 44 (0) 171 927 6500
fax: + 44 (0) 171 927 6525

e-mail: sales@delmatic.co.uk
URL: //www.delmatic.co.uk

from: Ms Sadhana Soborun
to: T Clarke
attn: Robin Aves
tel: 252 7676
fax: 893 8502
date: Wednesday 8th July 1998
pages: 5

Fax

5-7 CARLTON GARDENS - Delmatic lighting controls

We confirm that our equipment quoted for this project complies fully with the tender specification as indicated on pages 19-22 inclusive (attached).

Regards,

Ms Sadhana Soborun

11. EARTHING

A main earth bar shall be provided in the electrical switchroom of minimum dimension 50 x 6mm and of sufficient length to accept all equipotential bonding conductors with individual fixing bolts. 25% spare capacity shall be provided for future use. Each connection shall be made so that removal of any one can be made without affecting adjacent terminals. Every conductor shall be labelled according to its origin.

The main switchboard earth bar shall be connected to the main earth bar in the form of a ring connection.

It is understood from London Electricity that the supply earthing arrangement will be PME (TN-C) but within the building shall be TN-S.

Equipotential bonding conductors shall be provided to meet the requirements of the regulations and shall connect to the building structure and all the main services and all the main services runs.

A clean earth system shall be provided for the offices. A clean earth bar will be provided adjacent to each office tenant distribution board. These shall be individually connected back to one of two clean earth bars adjacent each Ryefield distribution boards. The clean earth bars shall then connect to the distribution earth bar.

12. LIGHTING

Artificial lighting shall be provided to all areas as indicated on the drawings and schedules.

The manufacturer's recommendations regarding the use of high temperature cables within luminaires and all other recommendations shall be adhered to strictly.

All fluorescent and discharge luminaires shall be provided complete with built-in control gear and shall operate with a minimum power factor of 0.95. All fluorescent luminaires shall be fitted with high frequency control gear.

Low voltage tungsten halogen luminaires shall be supplied from Multiload Technology VM300 & VM400 intelligent transformers. Each luminaire shall be wired individually from the unit and the voltage sensor connection shall be installed in accordance with the manufacturers recommendations.

All lamps shall be new at practical completion and the type, rating and colour shall be as detailed in the schedules.

12.1 Office Lighting

The office lighting installation will comply with CIBSE LG3, Category 2.

The flexible principle in the office is to incorporate the luminaires and air handling diffusers into single 750 square tiles. Every tile with a luminaire will also incorporate air handling slot diffusers. This will allow plenum boxes to be fitted to the back of the tile for supply air purposes at any luminaire location. Where plenum boxes are not fitted the luminaire/diffuser tiles serve as return air paths. It is envisaged that the plenum boxes will be by the tenants to any of the luminaire/diffuser tiles this requires all luminaire/diffuser tiles to be identical.

Because of the need for the plenum boxes for the air handling facility of the luminaire tiles to fit over the luminaire backs, the luminaire back box shall be sealed.

The square luminaires shall be incorporated in the centre of the tiles with slot diffusers on all four sides of the luminaire.

The luminaire louvre will have 16 cells.

COMPLY → The office luminaires shall be supplied from marshalling and control boxes mounted in the ceiling void. These will provide flexibility for office churn and shall be initially locally controlled from switches located at the core together with the emergency lighting key test switches.

COMPLY → The system shall be upgradeable for the later provision of a central control computer able to address each of the outputs of the marshalling and control boxes. The future upgrade path will be Echelon based.

COMPLY → The design of the system on the Tender drawings is based on Delmatic Delmate Z. The basic system provided shall allow for 8 controlled outputs with 4 control inputs. The outputs shall be able to be controlled in pairs. In the base build installation only 3 of the 4 pairs of controlled outputs shall be used. The fourth spare pair of controlled output will be for future use.

COMPLY → The Contractor shall allow in his tender for the provision of the RJ 45 buswires loop data highway for the future central control computer. This should be wired back to boxes located in the risers and to the switch positions. The initial switching of the lighting shall be in 2 zones, east and west. Two way and intermediate switches shall be provided at each of the three main entrance to the office space from the core area for LG1, 2, 3, 4 & 5 floors. At ground floor the only switching will be north and south. One way switching shall be provided at each of the main entrances to the office space from the core area. Future amendments and cellularisation of the offices shall be achieved by the tenant adding control inputs to the marshalling and control boxes within the fit out phase.

COMPLY → Luminaires shall be from the outputs of the marshalling and control boxes. Connection between the marshalling control boxes and the luminaires, and between luminaires shall be with flexible LSF insulated LSF sheathed cable, with Weiland type connectors, suitable for the number of conductors required including unswitched lives or emergency luminaires.

In order to protect the cable that is connected to the luminaire terminals from damage when the plenum box is fitted, all luminaires shall be provided with a 1 meter length of flexible conduit fitted with a through T Weiland 6 way connector for a linked luminaire arrangement.

In order to develop the design of the luminaire/diffuser/tile discussions have taken place with the following pairs of manufacturers:

Creedlight Engineering & Trox

Luxonic & Waterloo

The tenderer shall understand that he is not restricted to use the above manufacturers either as pairs, used individually or with another manufacturer not named above.

The overall requirements of the luminaire/diffuser tile are indicated on the detail drawing and in the schedules.

The luminaire manufacturer shall manufacture and supply the entire luminaire/diffuser tile as a single unit. The luminaire manufacturer shall incorporate the diffusers supplied by the diffuser manufacturer to the requirements of the diffuser manufacturer.

An indistinguishable paint match is required between the luminaire/diffuser tile and the normal tiles.

The luminaire manufacturer shall develop the luminaire/diffuser tile in accordance with the schedules and drawings in accordance with the requirements of the Construction Manager with regard to but not necessarily limited to the following:

- tile size/colour/perforations/hinging/edge detail/paint finish
- provision for attachment of plenum box to back of luminaire/diffuser tile
- provision for the attachment of future acoustic hood to back of luminaire/diffuser tile and any required strengthening
- provision of additional supports as necessary
- future partition restraint details

The tenderer shall note the Construction Manager reserves the right to procure the luminaires/diffusers tile in a different manner to that described above.

12.2 Common Area Luminaires

Luminaires in the common areas shall be controlled either by local PIR detectors or centrally controlled from timeclocks. Timeclocks shall have override switches in the security control room. Specific luminaire circuits shall remain on in order to provide a low level of security lighting. This will normally be half the stair lights and one circuit at each level on the office floors lobbies.

12.3 Plantrooms and Car Park

Luminaires in plantrooms and car park shall be mounted on chains fixed directly onto conduit. Contractor shall allow to suspend the luminaires at 2.5m above floor level. Wiring to the luminaire should be in the form of a LSF/LSF flex from a plug in rose, tie wrapped to one chain and glanded into the fitting. This shall allow for the luminaire to be removed for maintenance and the wiring left safe by fitting a cover over the plug in rose. Luminaires are controlled by local switches and PIR detectors as shown on the drawings.

12.4 External Area Luminaires

External lighting shall be provided for the building as shown on the drawings. External lighting shall be photocell and timeclock controlled via Contactors with a manual override switch at the main security desk.

All external luminaires shall be labelled to indicate the relevant circuit number and voltage warning.

12.5 Residential

Luminaires are controlled from local one way/two way/dimmer switches. Dimmer switched shall be rotary push on, push off suitable for use with a two way switch elsewhere.

13.**EMERGENCY LIGHTING**

The luminaires designated for emergency lighting purposes shall be provided as indicated on the drawings. They shall incorporate a battery pack, inverter, charger and changeover device which, upon local mains failure, shall provide 3 hours emergency lighting cover. Retrofit units shall be fitted by the luminaire manufacturer.

An addressable system for automatic monitoring and testing of the emergency lighting luminaires shall be provided. The central master panel shall be located in the BMS/security room. Each emergency luminaire shall be fitted with an addressable interface along with switching and monitoring devices to enable communication with the central panel via a 2-core data cable.

Emergency exit signage shall be of the pictogram type utilising the current European Standard.

Emergency luminaires shall be ICEL approved. Where possible all luminaires shall have integral battery packs. Where remote packs are necessary they shall be fixed to the soffit or on a support bracket within 300mm of the luminaire. Interconnecting cable shall be a fire rated cable. A separate charger indicator shall be provided in the luminaire in addition to the remote pack indicator.

Each emergency luminaire shall have a warning notice indicating that they are maintained live at the relevant voltage by the internal batteries even when isolated from the mains supply.

Each emergency lighting luminaire shall have an unswitched live feed direct from the local lighting circuit so that the luminaire shall operate on local circuit failure. A local key switch shall be provided for isolation purposes incorporated into the local circuit switchplate. The plate shall be engraved to indicate the charging and isolated positions.

COMPLY → In office areas the emergency key tests switch shall operate to test the luminaires via the SELV RJ45 buswire loop.

14.**LIGHTNING PROTECTION**

A lightning protection system shall be provided in accordance with the drawings, specifications and BS 6651.

The air terminal network shall comprise of PVC covered copper tapes where indicated on the drawings. All exposed roof plant and extraneous metalwork shall be bonded by copper tape to ensure inclusion within the protection zone.

The down conductors shall comprise of the structural steel columns. The connections between the air terminal network and the structure shall be provided at roof level as indicated on the drawings.

The structural steel in the foundation raft shall form the earth electrode. The downconducting columns shall be connected to the rafts as detailed.

The effectiveness of the raft as the earth electrode shall be established by the contractor by test in accordance with BS 6651.

The electrical system earth shall be bonded to the lightning protection system by means of a copper link between the earth bar in the LV switchroom and two structural steel connections at two separate locations.



UPGRADABLE SELV MARSHALLING BOX

Delmate Z is an innovative unit from Delmatic which combines the traditional cost-effectiveness of the Delmate concept with the unique ability to upgrade the unit to form part of a sophisticated computer addressable lighting management system.

The Delmate concept began with **Delmate K** - a stand-alone marshalling box to simplify and speed electrical installation while reducing labour and material costs - and expanded with the introduction of **Delmate 8** and **Delmate 8 Dimming**.

Delmate Z extends the boundaries of Delmate into the realms of addressable lighting management, taking cognisance of the fact that individual Clients within a speculative office development may have very different control requirements.

In its simplest form, **Delmate Z** provides zonal and local control of lighting. Yet this already flexible foundation system may be enhanced through a variety of upgrade paths to precisely suit the Tenant's desired method of control - paths which range from the introduction of infra-red control, of 0-10V dimming, and culminating in the transformation to full computer addressable control with dynamic PC graphics.

The provision within the basic **Delmate Z** unit of an "addressable" relay per luminaire socket enables the upgrade to a fully flexible ZMC system to be achieved simply by plugging-in a ZMC plug-in card.

delmate Z by **DELMATIC**

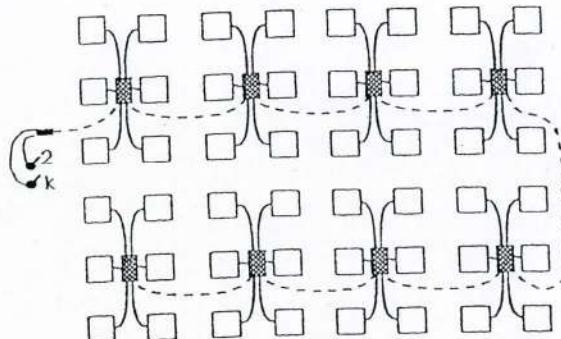
Delmate Z in its initial form provides stand-alone or zonal switching of lighting. The two-fix unit speeds electrical installation and accepts the plug-in connection of up to eight luminaires.

The module, which accepts a single 10A mains input is equipped with eight switching relays, each with an individual switching capacity of up to 4A. The relays provide the potential through the ZMC upgrade to individually address and switch each luminaire, although initially luminaires may be switched in pairs from up to four local switches or as part of two zones from zone switches.

A ninth normally-closed emergency test relay provides an unswitched (maintained) feed on the fourth pin of each socket for connection to luminaires with emergency packs: the relay switches off the feed to the fourth-pin of the socket (and hence to the emergency pack) upon operation of a keyswitch enabling central testing of emergency lighting on a floor.

Designed in accordance with SELV standards the unit ensures that zone and local switching devices operate at Safety Extra-Low Voltage enabling switchdrops to be safely wired through partitions without the need for conduit.

Base scheme infrastructure



An original zonal switching arrangement may be the subject of various levels of upgrade by incoming Tenants, from the simplest addition of

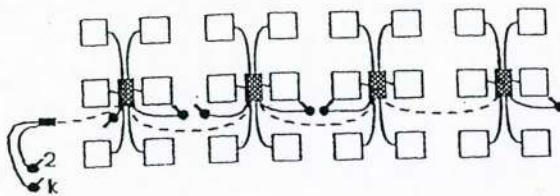
A Plug-in RJ45 buswire loop connects the Delmate Z units in a zone to an RG45 switch connector box from which SELV zone switches and emergency test keyswitch can be connected.

Each Delmate Z is equipped with eight sockets providing spare capacity for the connection of additional luminaires - six luminaires are detailed in the following examples.

local switching to the creation of a fully addressable lighting management system with telephone dimming.

Upgrade Path 1 - Local Switching

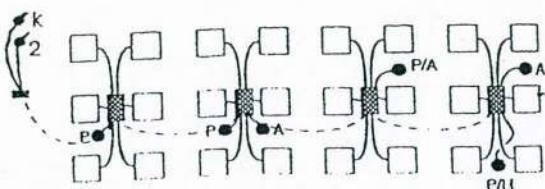
1



The simplest level of upgrade is the plug-in connection of local switches to the Delmate Z units. Up to four switches may be connected to provide individual local control of four pairs of luminaires, enabling occupants to match local switching arrangements to partitioning layouts without mains wiring alterations: the addition of local switches does not involve any changes to the base system infrastructure and the zone switching may be retained in open-plan areas.

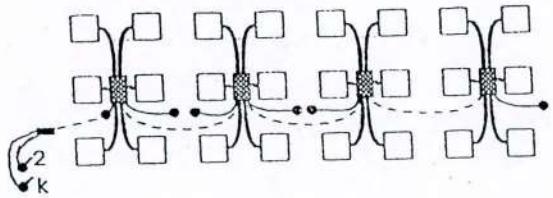
Upgrade Path 2 - Infra-Red & Presence Detectors

2



A simple "automatic" system can be created by connecting presence detectors (P) to the Delmate modules such that lighting is brought on when staff enter an area, and switched off after the space has been vacated. Infra-red receivers (A) operated from hand-held transmitters provide local switching without the need for switchdrops, while presence detectors with infra-red override (P/A) combine the energy-saving benefits of PDs with the advantages of local user control.

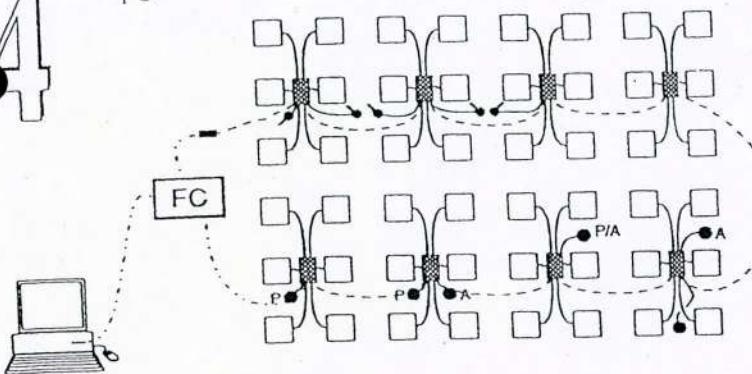
Upgrade Path 3 - Dimming



Delmate Dimming upgrade Cards inserted into the module provide a 0-10V analogue dimming feed onto the sixth pin of the lid-sockets. Cables to luminaires are uprated to include two additional cores for the dimming and common connections and the luminaires themselves fitted with high-frequency regulated ballasts.

Delmate rotary switches plugged into the Module to provide local dimming of lighting and the ability for users to set their preferred lighting level.

Upgrade Path 4 - Computer Addressable System



The basic Delmate Z contains all the elements of a fully-addressable system without the distributed intelligence. Plugging a ZMC card in place of the Delmate plug-in card upgrades the unit to a computer addressable module with eight individually addressed relays.

Floor Controllers connect to the upgraded modules via a plug-in RJ45 buswire loop and may provide stand-alone operation of a floor or may be connected to a central PC for central management and monitoring.

Upgrading to ZMC lighting management enables local switching patterns to be programmed either by Clients running their own software or by Delmatic engineers downloading changes to Clients' floor controllers. ZMC computer addressing opens the door to a plethora of features.

Loadshedding

Each luminaire may be programmed as essential or non-essential, the latter held off during back-up power generation. This feature obviates the need to install separate essential and non-essential lighting distributions and cabling.

Testing of Emergency Lighting
The upgrade to ZMC enables one and three-hour tests of emergency lighting to be initiated from the central PC with the date and time logged for record purposes.

ZMC Dimming

ZMC dimming enables lighting levels to be centrally configured and users to increase or decrease lighting to suit their individual preference. Local control is available from wall switches, infra-red devices or via telephones through an interface with the PABX.

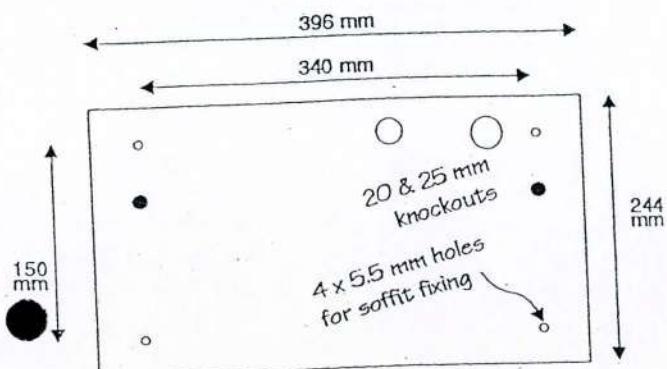
Dimming enables the incorporation of daylight-linked dimming and maintained illuminance.

Project-specific computer graphics

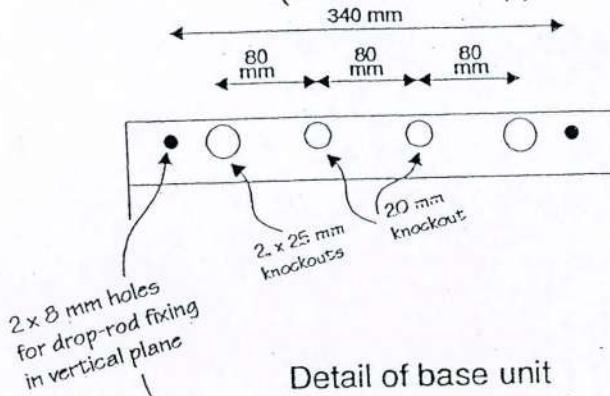
Full colour graphics detail the active status of every luminaire against background building and partition layouts. The ZMC software monitors the run-time of every luminaire and generates recommended relamping schedules by comparing this data with the manufacturer's recommended life.

The ZMC system may interface with other building systems such that lighting is brought on automatically for example in the event of security or fire alert.

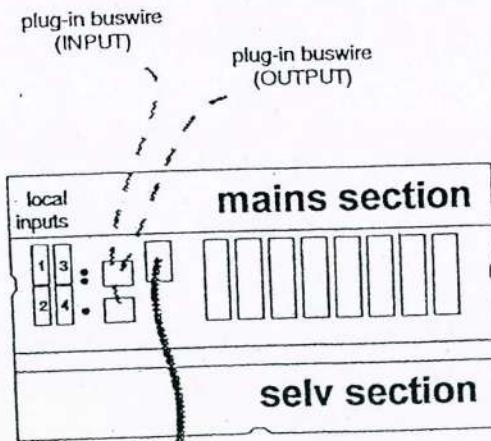
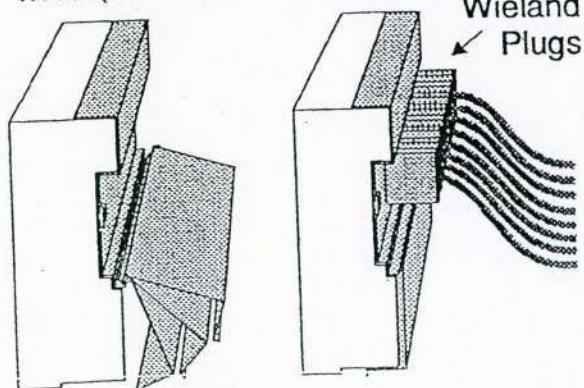
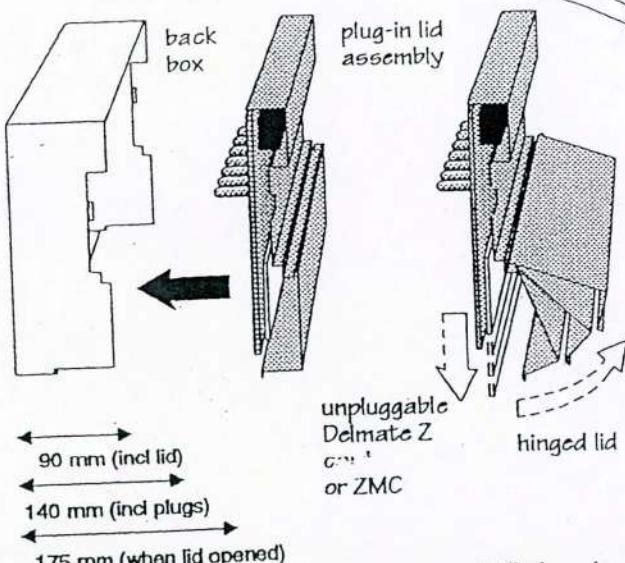
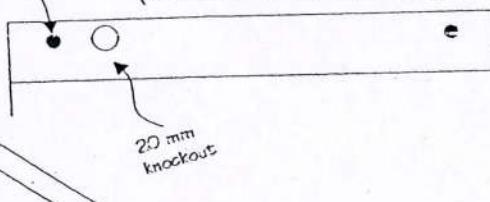
Detail of base unit
(viewed from inside)

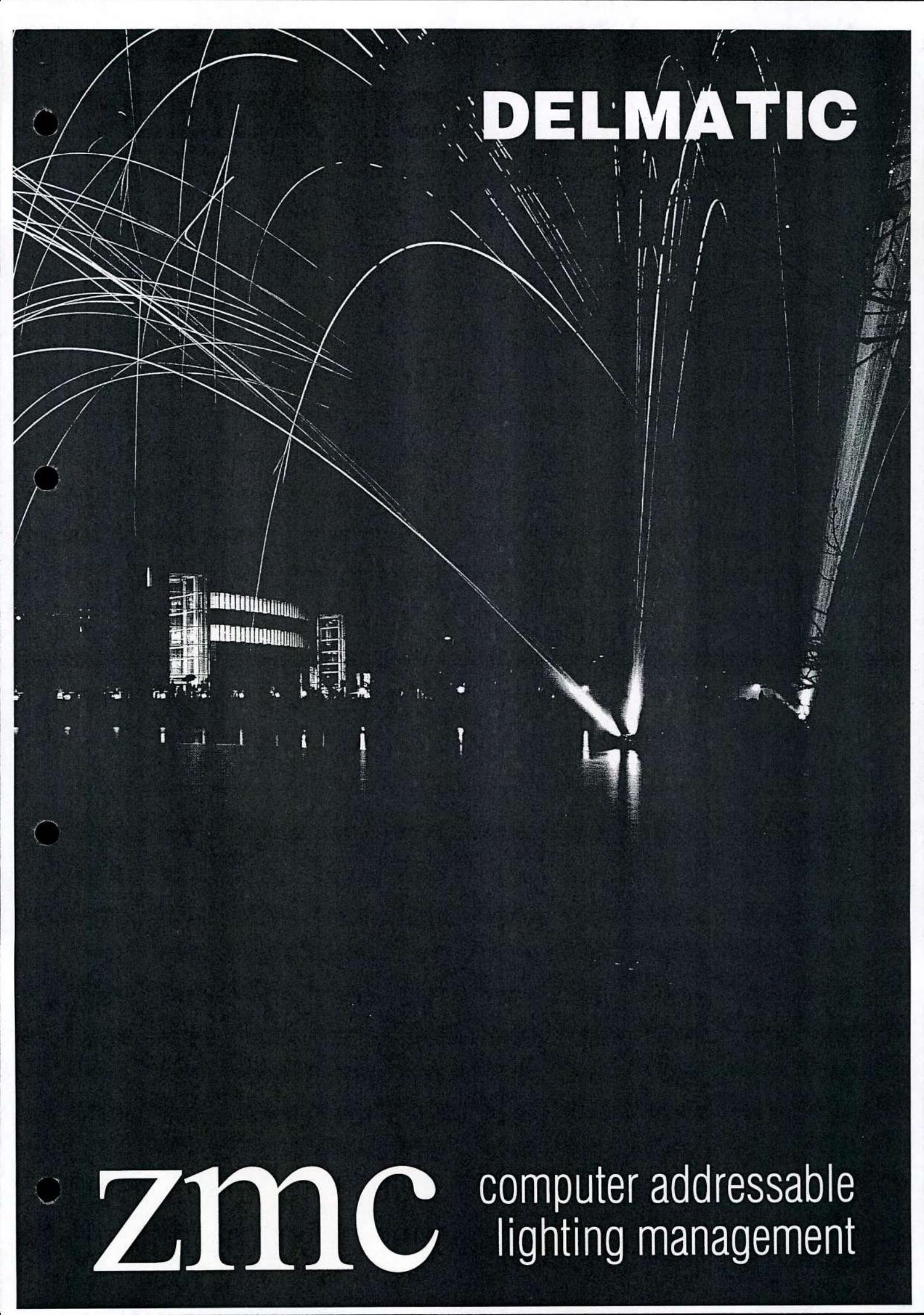


Detail of base unit
(viewed from top)



Detail of base unit
(viewed from bottom)





DELMATIC

zmc

computer addressable
lighting management

ZMC

Delmatic is a family-based firm, founded in the late 1950s, which has always remained staunchly independent and proud of its position at the forefront of the lighting management industry.

What to other companies is just a job providing income for some distant parent company, is to the team at Delmatic an integral part of our lives, and we receive many favourable comments not only on the operation and reliability of our systems, but on the performance and commitment of our staff.

We gain tremendous satisfaction from looking around London and major cities throughout the UK - not to mention other areas of the world - and knowing that within so many of the largest buildings, our hardware, our software, our designs, are quietly working to save energy and improve the efficiency and operation of the lighting installation. Having said that we are not ones to rest on our laurels and the excitement of developing new products and new software is tangible as you walk around our offices.

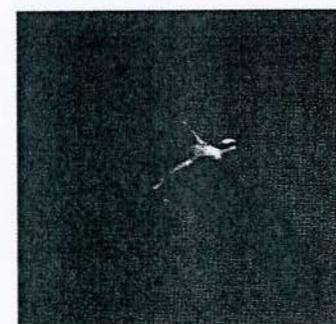
We all enjoy dealing with companies and individuals who are looking into the field of lighting management and with whom we can share our immense wealth of experience and expertise. We enjoy also the pride of a job well done, and the ongoing relationships with individual Consultants and Clients over many years.

I trust that you will find our latest ZMC systems of interest, and that you will recognise, maybe also have been associated with, some of the prestigious projects shown here. I hope also that for those with whom we have not yet worked, you too may come to know and become part of this most individual and personal of lighting management companies.

Stephen Woodnutt
Managing Director

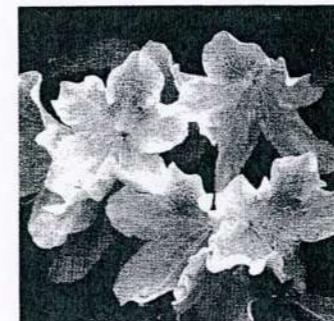
ZMC is a state-of-the-art computer addressable lighting management system providing absolute flexibility through independent control and monitoring of every luminaire in a building.

The powerful system combines leading-edge technology with advanced graphical software, and liberates Designers and Clients from the rigidities of traditional installation, enabling the entire lighting operation to be centrally programmed and adapted.



Virtual Wiring links luminaires to local control devices through software, and switching patterns may be instantly altered from a PC without the need to access equipment or carry-out disruptive wiring alterations. Essential and non-essential lighting may be centrally programmed and modified, emergency lighting centrally tested and monitored, and lighting levels varied at any time to suit differing needs and requirements.

Vibrant computer graphics bring the lighting installation to life.



The entire system operation is centrally monitored, and the active status of every luminaire displayed against a background of building and partition layouts.

To assist the Facilities Manager, a wealth of information is available on each luminaire including run-time data and relamping schedules, while Security personnel benefit from the system's ability to highlight unusual movements during out-of hours periods.

The potential for authorised users to centrally control and reconfigure lighting is matched by the power of local control given to individual users. Control not only to switch or dim local lighting from wall switches, infra-red devices, their telephone or PC, but interactive control too of exit lighting. Such attention to the needs of individuals enhances the working environment and provides a perfect match of corporate building management and the satisfaction of individual human needs.

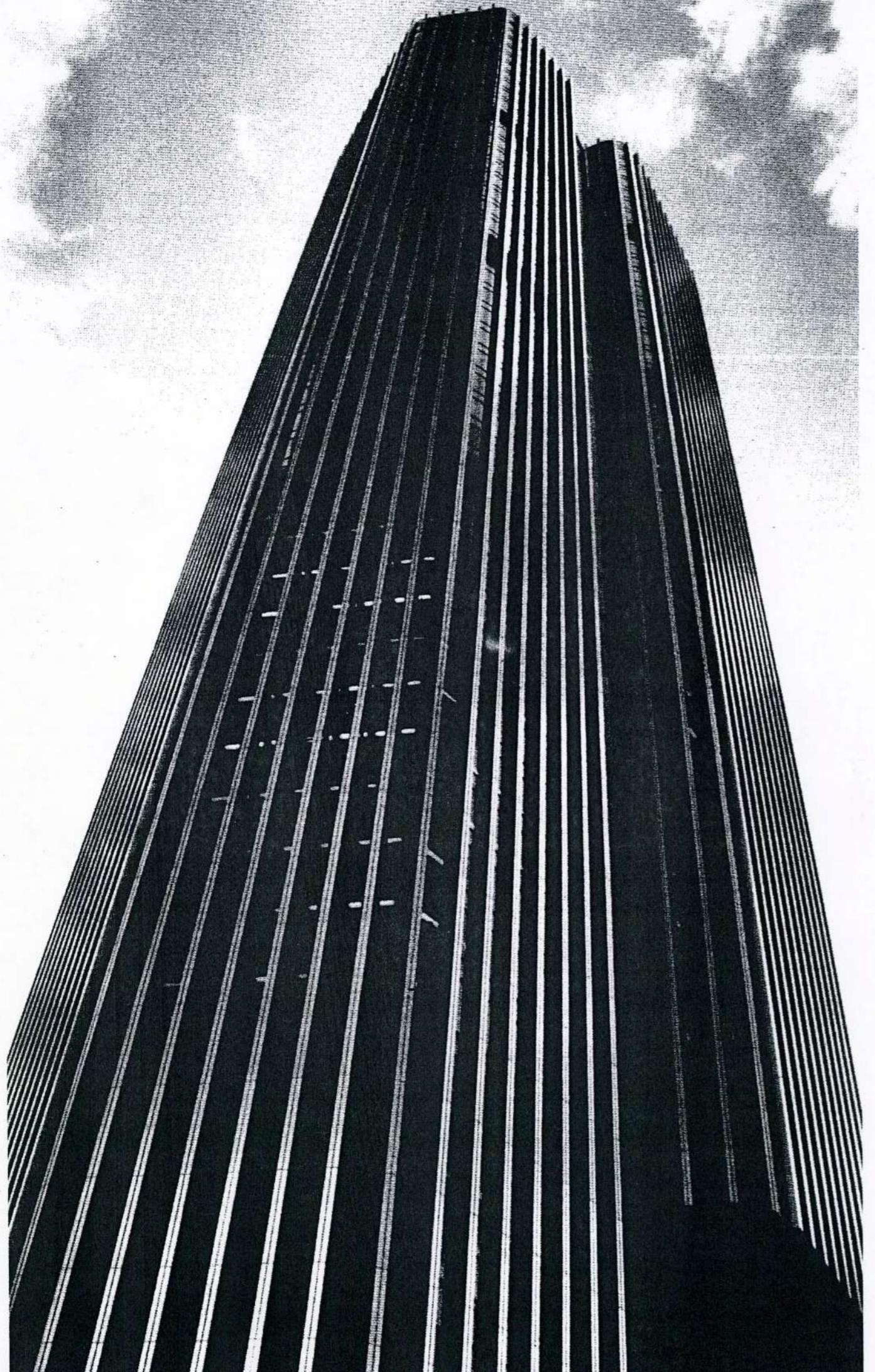
ZMC adds infinite value to a building, and the tremendous power coupled with the unmatched ease of software operation has resulted in ZMC systems being specified and supplied for premier projects within the UK and on the international scene. ZMC hardware and software has rapidly become the standard by which lighting management systems are judged.

Of course, once one has the ability to individually address and virtual-link unique points within a building, there is no limit to what may be achieved. Traditional distinctions between high and low-level services become irrelevant. Small-power circuits feeding non-essential services - photocopiers and printers - may be integrated with lighting usage; task and desk lights may be efficiently related to occupation of working areas; sun-blinds, fan-coils and HVAC plant may be integrated and linked to presence of staff.



With ZMC you are limited only by your Imagination.

So start imagining . . .



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a short background to Delmatic's long involvement in lighting management, culminating in the development of ZMC.	
back cover	

NATIONAL WESTMINSTER BANK TOWER (opposite)

A ZMC lighting management system within the 90,000 sq.m Natwest Tower provides individual addressable control of every luminaire.

The ZMC system continues Delmatic's involvement with this famous London landmark which was equipped with a Delmatic system when first constructed in the mid 1970s.

• Efficient facilities management

The Facilities Manager is responsible for the smooth running of all aspects of the building - a formidable task. ZMC systems support and assist the Facilities Manager in the effective management of the lighting installation, and lifelong operational efficiencies follow-on from initial capital and installation cost savings.

ZMC provides fingertip control of every luminaire in the building, and the ability to "rewire" the entire lighting installation from the FM desk. Traditional problems associated with churn are swept away by the power of a system which enables local switching arrangements to be modified instantly through software, while the headaches of trying to accommodate the many and changing needs of individuals are banished through the ability to programme lighting levels to suit individuals, and by providing users with local control of their own lighting.

ZMC monitors the complete lighting installation, providing the Facilities Manager with unrivalled information of lighting status, unprecedented central management and reporting, and unlimited scope for fine-tuning the operation and configuration of the system - all within a full graphical environment. Vibrant graphics detail every aspect of the system operation - which lights are on, where lighting is off, the dimming level of individual luminaires, even where lamps or ballasts have failed... the module to which each luminaire is connected, the switch controlling the luminaire; the manner in which the luminaire will respond in bright weather, under back-up generator conditions, and the time at which it will switch off. ZMC cumulates the number of hours each luminaire has been on, and generates accurate relamping schedules enabling optimum relamping.

The mouse-driven software is simplicity itself to operate, and context sensitive pop-up windows guide the User effortlessly through the powerful system facilities. Multi-level passwords offer access to a hierarchy of system controls ranging from low-level features including rescheduling of automatic functions, initiating tests of emergency lighting and generating emergency test logs and relamping schedules, to top-level options including the reconfiguration of switching arrangements to accord with changes in space-planning layouts.

To this may be added integrated control of small power and other services, the ability to generate inventories of luminaires, lamp types and suppliers - even extended facilities management through the logging of PCs and other items of capital equipment, with their location and logistical connections displayed on the ZMC system graphics.

Of course, should you so wish, the entire lighting system can be monitored and managed on your behalf from Delmatic's London Control Centre.



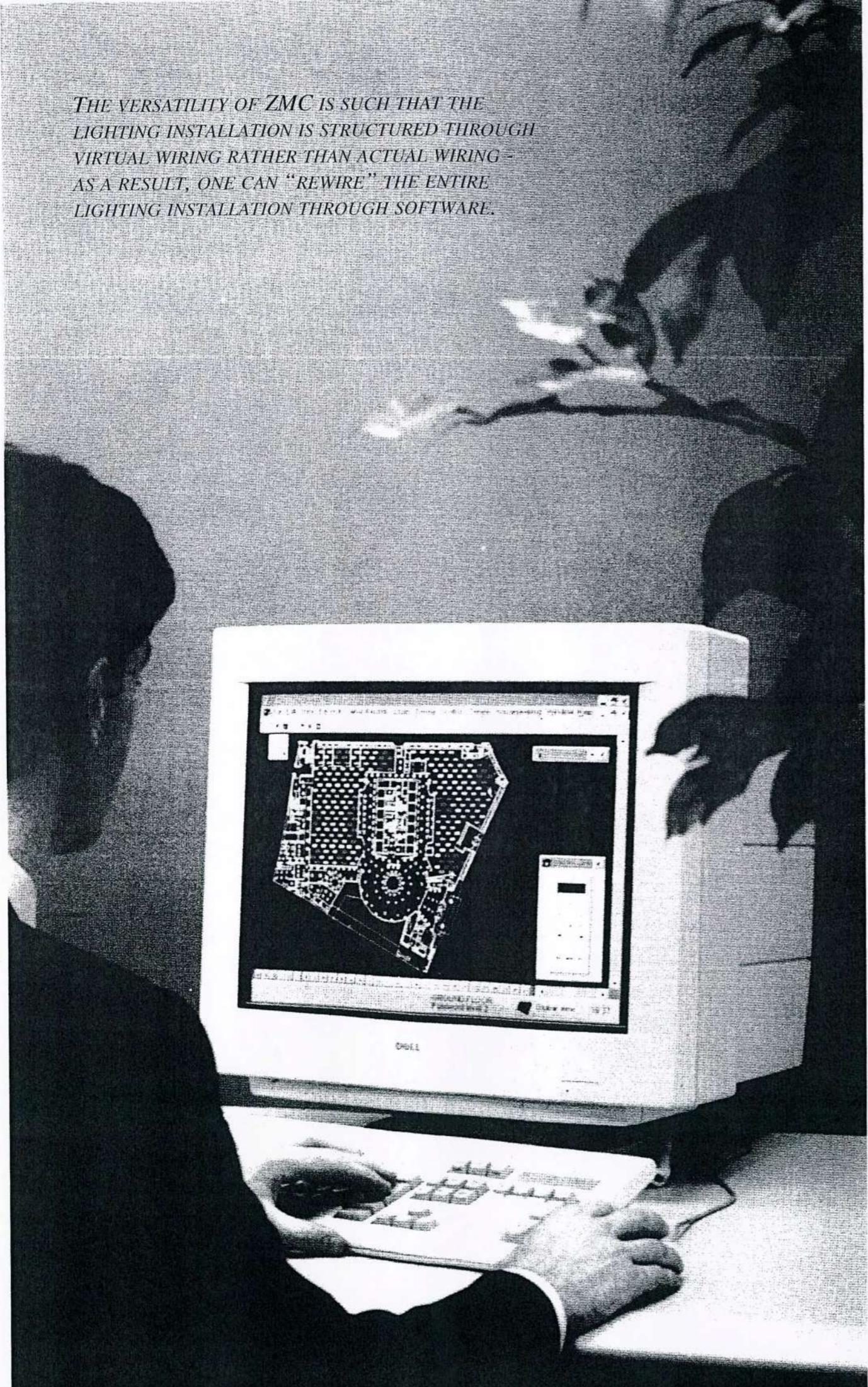
ZMC OFFERS THE FACILITIES MANAGER UNRIVALLED INFORMATION ABOUT THE LIGHTING INSTALLATION, UNPRECEDENTED CENTRAL MANAGEMENT AND REPORTING, AND UNLIMITED SCOPE FOR FINE-TUNING THE OPERATION AND CONFIGURATION OF THE SYSTEM - ALL WITHIN A FULL GRAPHICAL ENVIRONMENT.

NEVER HAS LIGHTING MANAGEMENT BEEN SO EFFICIENT.

CANARY WHARF (70,000 sq.m)

The most traditional-looking building on the Wharf is equipped with the most advanced lighting management system.

THE VERSATILITY OF ZMC IS SUCH THAT THE LIGHTING INSTALLATION IS STRUCTURED THROUGH VIRTUAL WIRING RATHER THAN ACTUAL WIRING - AS A RESULT, ONE CAN "REWIRE" THE ENTIRE LIGHTING INSTALLATION THROUGH SOFTWARE.



flexible lighting management

In today's working environment, office layouts rarely remain static for long, and the process of churn transforms open zones into cellular accommodation, relocates cellular offices, alters their size and shape, and requires corridors to be re-routed: associated with every space-planning change is the need to revise lighting switching arrangements to suit.

Traditionally such re-engineering of office space involved major mains wiring modifications and extensive re-routing of cables within ceiling voids - in short an extremely time-consuming, costly and disruptive upheaval. ZMC relegates such trauma to the past by providing Absolute Flexibility, and offers a future-proof installation where switching and dimming arrangements are adapted and modified from a computer terminal without mains or control wiring alterations.

Within a ZMC system, every luminaire is allocated a unique address, every luminaire is independently controlled, and each local control device assigned an individual identification. Local control devices are then linked through Virtual Wiring software to switch or dim the appropriate luminaires, and local switching arrangements are programmed to exactly match partitioning and open-plan workstation arrangements.

When layouts are revised, corresponding alterations to local switching arrangements are effortlessly made through the mouse-driven software without the need to access equipment or carry out rewiring.

If an open-plan workgroup is to be enlarged, the area is displayed on the graphics, and the mouse simply clicked on the luminaires to be added to the workgroup area. Done!

When a new cellular office is created, the area is called up on the graphics, the mouse clicked on the luminaires within the office and these assigned to a new local switching device plugged into a nearby module, or to a telephone or PC extension. Finished!

If circulation areas then need to be re-routed - traditionally one of the most disruptive changes faced by Facilities Managers - just clicking at the PC on the luminaires which form the new corridor route effects the change. So, no fuss, no disruption, just Click!

The versatility of ZMC is such that not only can you centrally programme local switching arrangements, you can in fact structure the entire lighting installation through Virtual Wiring rather than through physical wiring.

Consider the difficulty of changing non-essential luminaires loadshed under generator conditions to an essential designation: traditionally this could only be done by completely rewiring the circuits. With ZMC, essential and non-essential lighting is programmed, not installed. As areas change in usage, the designation of individual luminaires may be centrally altered from essential to non-essential and vice-versa simply by clicking on the luminaire on the graphics screen.

And of course, all changes may be carried out within minutes, during the working day.

• powerful user control

THE SCOPE FOR STAFF TO CREATE A PERSONALISED LOCAL LIGHTING ENVIRONMENT IS CENTRAL TO ZMC SYSTEMS, AND EACH INDIVIDUAL IS EMPOWERED WITH CONTROL OF THEIR OWN LIGHTING AS WELL AS OVERRIDING CONTROL OF EXIT LIGHTING.

Staff are an organisation's most important asset, and the provision of a pleasant working environment is crucial to their well-being and hence to the overall performance of the organisation. Lighting is, without doubt, the most visible aspect of this environment, and the growing body of guidelines and legislation testifies to the role played by lighting in the creation of a comfortable workplace.

Delmatic have long championed the importance of local user control, and recent research has confirmed that the ability of each individual to influence and control their immediate environment is of critical importance. Hence the scope for staff to create a personalised local lighting environment is central to ZMC systems.

Fears are sometimes expressed that central control systems will act as Big Brother, removing choice from the user and imposing the "wishes" of an all-powerful central computer. With ZMC, nothing could be further from the truth. Systems focus on the needs of the individual, and transfer Power to the People through the ability at all times (except under load-shedding conditions) to locally control lighting and override central commands.

ZMC ensures too that while staff are working in an area, corridor lighting on the floor as well as stairway and exit lighting is held on; in this way individuals control lighting not only in their own space, they also have interactive control over associated exit lighting.



ZMC offers an unmatched range of local control options, yet does not require global application of a single form of control, recognising that particular types of control device may better suit specific areas of a building.

Hence, local control devices may be mixed and matched - indeed highly effective solutions may be achieved by combining methods of local control.



MOMENTARY-ACTION SWITCHES enable staff to switch lighting on & off, override central commands and, with dimming systems, vary the lighting intensity up and down to suit their individual preference.



INFRA-RED TRANSMITTERS relay switching and dimming commands to ceiling-mounted receivers, providing local control of lighting without the need for switchdrops and associated wiring.



PRESENCE DETECTORS relate lighting to occupancy of individual areas and are an acknowledged source of energy savings. Dimming system PDs dim lighting in vacated areas to minimise distraction to staff at adjoining workstations and reduce the number of switching cycles on the lamps.



PHOTOCELL-PRESENCE DETECTORS vary the lighting level within occupied areas according to the extent of natural daylight.



ACTIVE PRESENCE DETECTORS combine the energy-saving benefits of presence detection with the advantages of local override from a hand-held transmitter. Staff may locally switch or dim lighting, while the presence detector switches lighting off after areas have been vacated.



TELEPHONE CONTROL enables lighting to be switched and dimmed from the telephone, and provides the benefits of local user control without the need to install switchdrops or fit devices within the ceiling.



PC CONTROL allows staff to switch lighting and set dimming levels via their desktop PC, by clicking their mouse on a lighting icon.

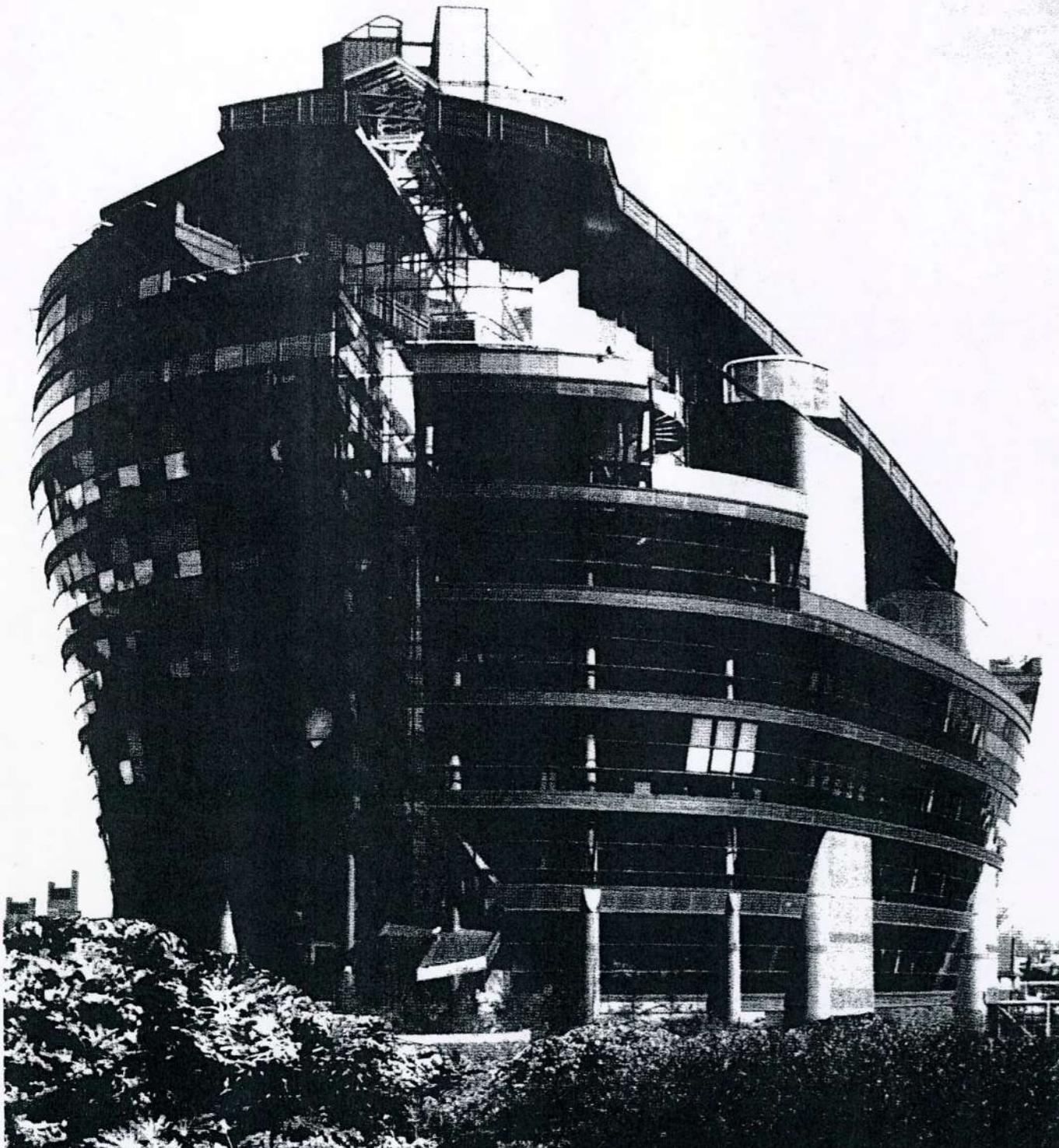


Both telephones and PCs provide "installation-free" local switching and dimming using devices already available within the office environment.

POWER TO THE PEOPLE

Each individual benefits from interactive control of building exit lighting.

TELEPHONE SWITCHING AND DIMMING PROVIDE THE CONVENIENCE OF LOCAL USER CONTROL WITHOUT THE NEED TO RUN SWITCHDROPS OR INSTALL DEVICES INTO THE CEILING.



telephone switching & dimming

Telephone switching and dimming provide the convenience of local user control without the need to run switchdrops or install devices into the ceiling. Using a control device associated with every workstation in a building, staff are able to locally switch or dim their lighting without leaving their workstations.

Staff anywhere in the building enter a standard code via the telephone keypad to switch lighting on and off or, with telephone dimming systems, to set lighting to their preferred level: via an interface with the building PABX, ZMC Telephone software identifies the location from which the command was initiated and, within a fraction of a second, switches or dims lighting within the area.



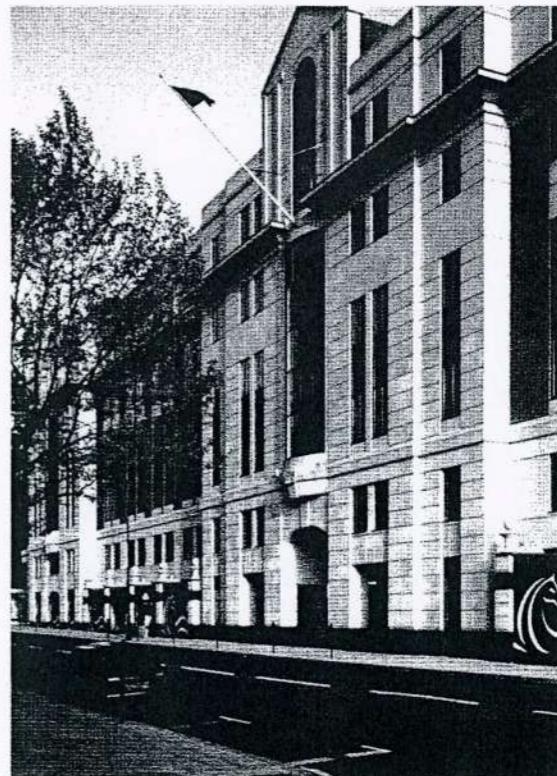
Telephone switching and dimming enable new locally-controlled areas to be created simply by allocating luminaires to telephone extensions - every conceivable layout change in the future can be carried out through software without the need to access ceiling voids or install switching devices.

The ability to locally control lighting without switchcables makes telephone control popular not only for new installations but also retrofit projects. Equipment mounted adjacent to distribution boards controls existing lighting circuits, and staff are provided with local control via the telephone - an energy-efficient, convenient control system introduced without disruptive wiring changes.

THE EMBODIMENT OF FLEXIBILITY (opposite)

What could be more flexible than the London Ark - 16,000 sq.m and not a straight line in sight.

A ZMC system ensures the landmark building is as flexible internally as it appears externally.



FAST-TRACK FIT-OUT AT THE DOT
(left)

Base-build lighting circuits within open-plan areas of the 28,000 sq.m Department of Transport HQ are controlled by addressable hardware mounted adjacent to the distribution boards during fitting-out works: ceiling-mounted modules provide control of individual luminaires within "partitionable" zones.

Telephone switching allows users in open-plan zones to control their lighting, while occupants of cellular offices benefit from telephone switching as well as control from architrave switches.

superb graphics

stunningly simple

Password Access
Multi-level password access allows different degrees of control to be implemented while password levels dictate the displayed menu options

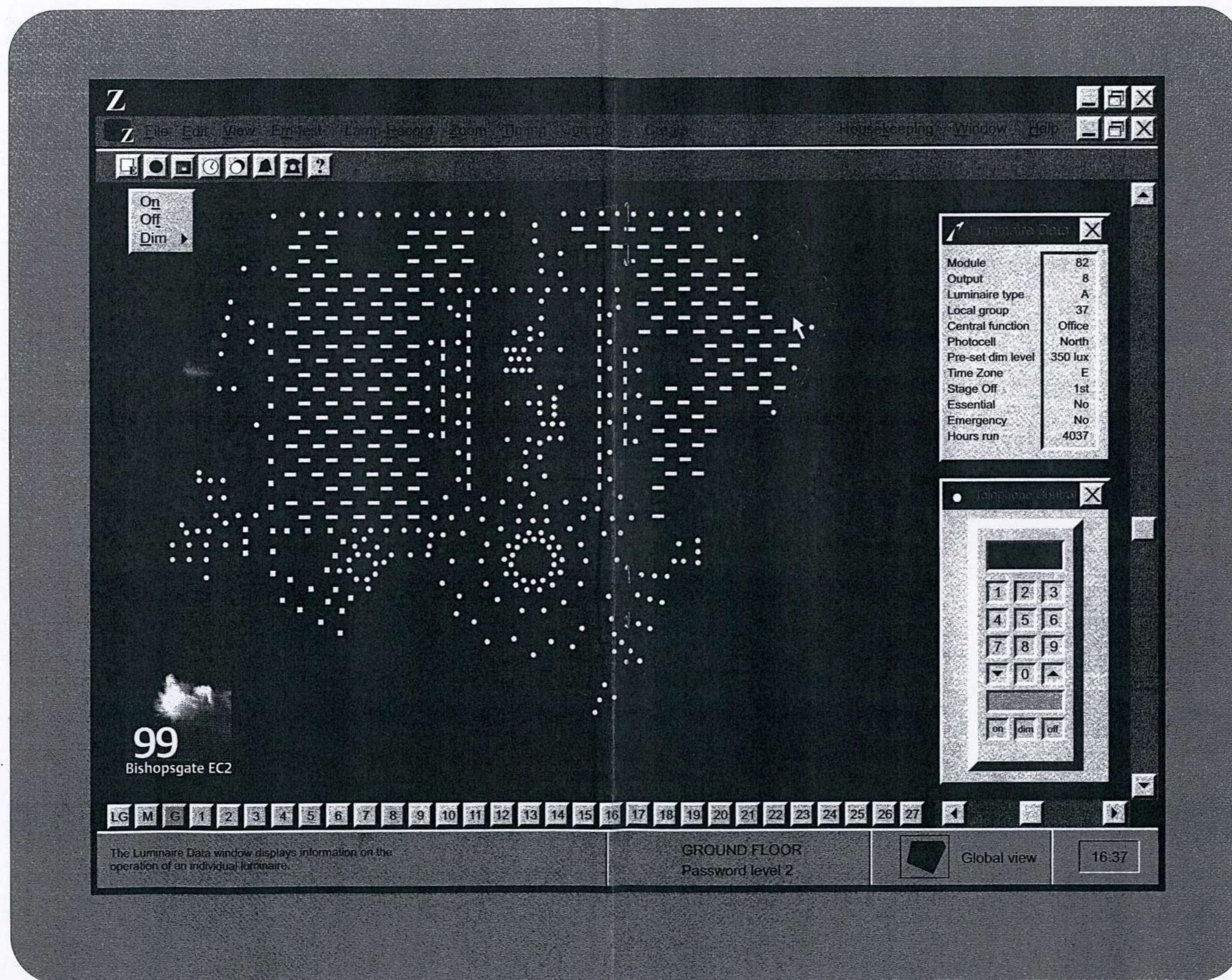
Luminaire Status
The actual status of every luminaire is displayed against background building and partitioning layouts.

Faults
The software can display when lamps or ballasts have failed, and print out work sheets enabling a rapid, proactive response.

Emergency
Tests of emergency lighting may be centrally programmed, initiated and monitored.

Loadshedding
The response of every luminaire under loss of mains power and during back-up generation of power is centrally programmed enabling selective loadshedding

Hours run log
The cumulative run-time of each luminaire is monitored and logged enabling relamping maps and relamping schedules to be displayed or printed.



VIRTUAL WIRING
Switching patterns are created through Virtual Wiring software - open plan zones, locally switched offices, and corridor routes are created and revised from the PC.

On-line help
Comprehensive on-line context-sensitive help guides the user effortlessly through the powerful system facilities.

Programmed data
A wealth of data is displayed on the programmed and operational characteristics of each luminaire

Perpetual calendar
Perpetual Calendar software enables switching times to be programmed up to twelve months ahead, with switching regimes matched to working patterns.

Interactive control
Interactive control of exit lighting ensures that corridor routes and stairs are lit while personnel are working in the building.

Local control
Local control is available from wall switches, presence detectors, infra-red transmitters as well as switching and dimming from telephones and PC terminals.

dimming

ZMC DIMMING ENABLES LIGHTING LEVELS TO BE
ADJUSTED TO SUIT OCCUPATIONAL REQUIREMENTS AS
WELL AS INDIVIDUAL NEEDS AND PREFERENCES

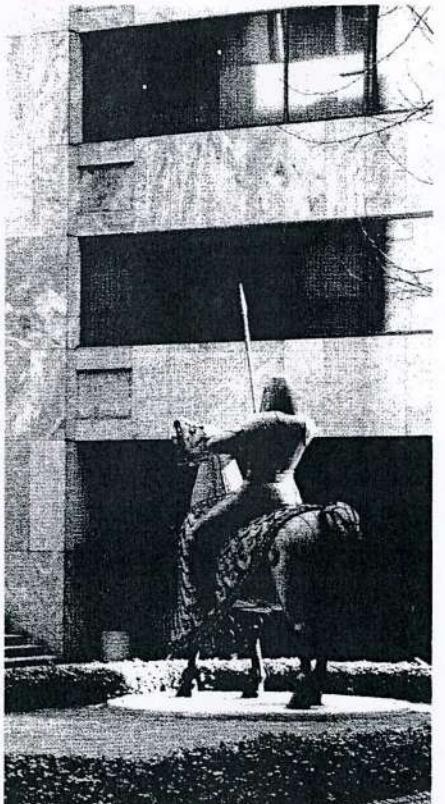
Recent legislation has highlighted the importance of providing appropriate lighting within the working environment, particularly within areas of high VDU usage. Unfortunately, the "appropriate" level of lighting depends very much on the eye of the beholder.

Studies reveal the level of light required to perform specific tasks typically increases with age - but also varies according to user preference. Neither age nor preference is known at the design stage.

It is a recognised fact that different tasks require different light levels. Computer-focused tasks on a vertical working plane typically require a lower light level than paper-based assignments with a horizontal working plane. When designing a lighting scheme, one is rarely in the position of knowing to which use particular areas will be put: nor will usage necessarily remain constant during the life of the building.

ZMC dimming provides the versatile and "fluid" lighting installation so essential to Clients needing to change the nature of working areas to suit advances in technology and working practices. Lighting levels may be programmed to suit operational requirements, and different levels set within distinct areas - office zones, dealer floors, notional corridor routes - levels which may be adjusted at any time from the PC to suit changes in use and space-planning. Dimming also offers enhanced user comfort through the ability for individuals to select their preferred lighting level.

Central operations too may be enhanced through the subtleties of dimming. Emergency test routines can dim general lighting to provide background illumination while testing emergency fittings, loadshedding strategies may dim all lighting rather than switching off selected luminaires, and daylight-linking and central off-commands can dim to off rather than switching off.

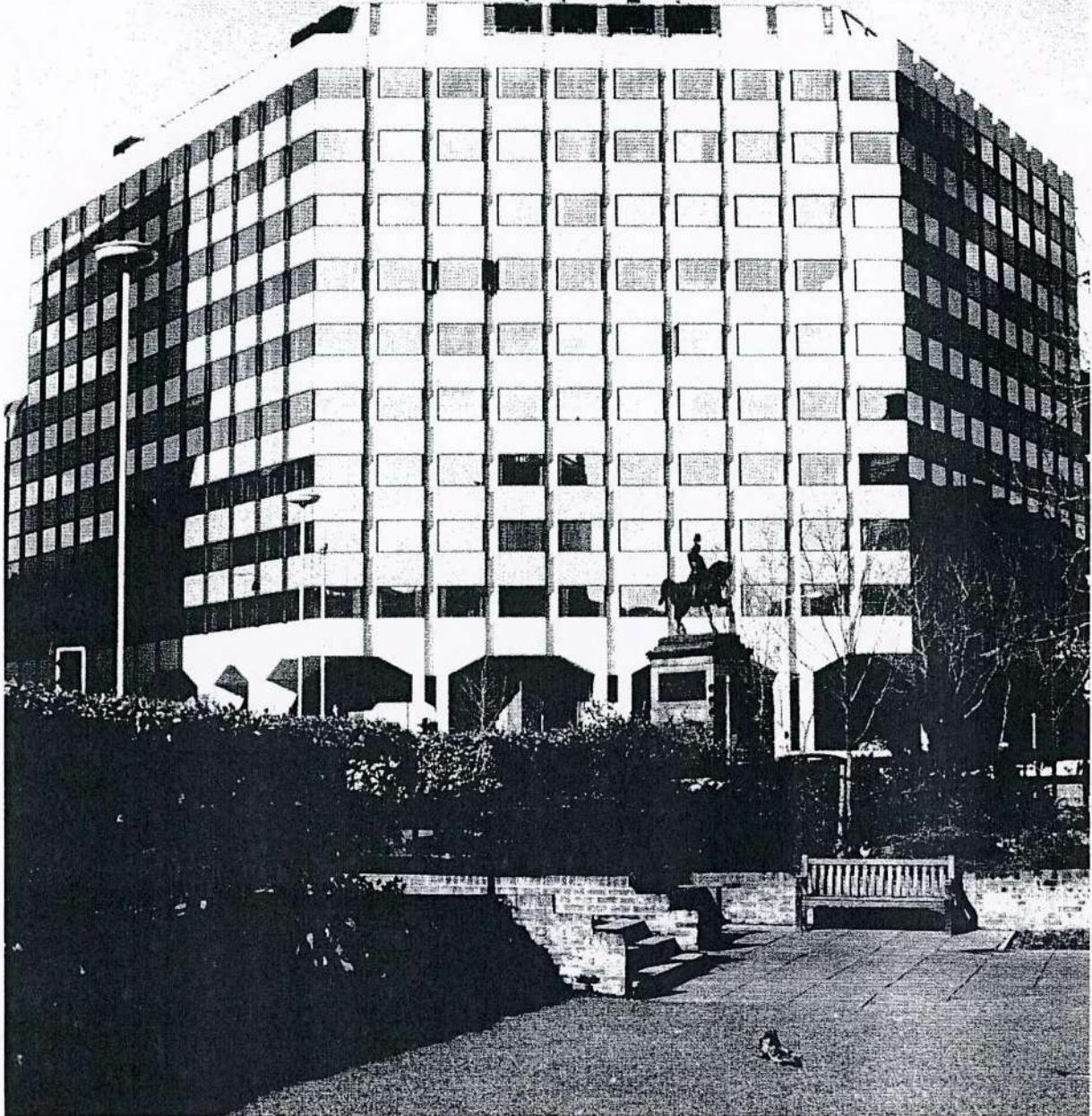


Dimming achieves valuable energy-savings. Power consumed by a lamp is proportional to its light output and so any reduction in lighting levels is immediately reflected in savings in energy usage. Furthermore where individuals are able to control their own lighting level, investigation has shown that lighting is typically set at a comfort level below that traditionally expected, thereby achieving further energy savings.

Determining correct lighting levels is even harder in buildings designed for multi-occupancy, where the identity and business sector of incoming Tenants is not known. Such projects are increasingly being equipped with ZMC Dimming: a notional lighting level set prior to a Tenant coming on-board may later be programmed to provide suitable lighting levels within distinct areas of the Tenancy commensurate with the tasks being performed.

Integrated scene-setting dimming controls are available for use in conference and specialist areas, providing sophisticated dimming operation with central programming of lighting scenes while ensuring that occupation of such areas holds on corridor and exit lighting.

ZMC Dimming software enables dimming levels to be centrally set from the computer terminal, while Differential Illuminance software maintains a differential between lighting levels in perimeter and inner zones of a working space. As daylight increases, luminaires in perimeter zones may efficiently be dimmed without loss of light on the working plane. Within inner zones however, the increased daylight provides no benefit yet increases the perceived brightness at the window in the vertical plane: staff not surprisingly expect their area to become brighter and hence the system increases the light output from luminaires within inner zones to maintain this balance.



CUTLERS GARDENS - opposite

Tenants within the prestigious Cutlers Gardens complex benefit from a fully-flexible system providing totally variable local dimming.

BRITISH TELECOM HOLBORN CENTRE - above

The dimming system provides user control through a combination of wall switches, presence detectors and local telephones. Modular hardware with full plug-in capability facilitated the fast-track refurbishment.

INSIDE INTEL - below

The high-frequency dimming system inside Intel UK Headquarters enables staff to match the lighting level in their area to individual needs and preferences.



cost efficiency

Design Savings

As organisations continually streamline operations to ensure efficiency, the pressure is on to keep costs to a minimum.

Lighting controls have always been associated with energy-savings, and yet with ZMC addressable lighting management systems, energy-efficiency is only one element in the Savings Equation.

FRONTIER TECHNOLOGY

The ZMC system at SmithKline Beecham's striking 45,000 sq.m Science Complex building at New Frontiers Science Park, Harlow, provides flexible switching and dimming with dual management and monitoring from two PC locations.

Installation Savings

The inherent flexibility of ZMC simplifies the design process. Switching arrangements need not be frozen at an early stage as these are configured through the graphical software, while Client revisions to layouts and partitioning have no impact on lighting circuiting, reducing the need to continually amend drawings.

Capital Cost Savings

ZMC's ability to Virtual-Wire the lighting installation eliminates the traditional expense and rigidities associated with structuring the lighting operation physically through hardwiring.

**ZMC SYSTEMS ACHIEVE SAVINGS FROM THE VERY FIRST STAGES OF DESIGN
AND THEREAFTER PROVIDE LIFETIME VALUE FOR MONEY**

Programming of essential lighting

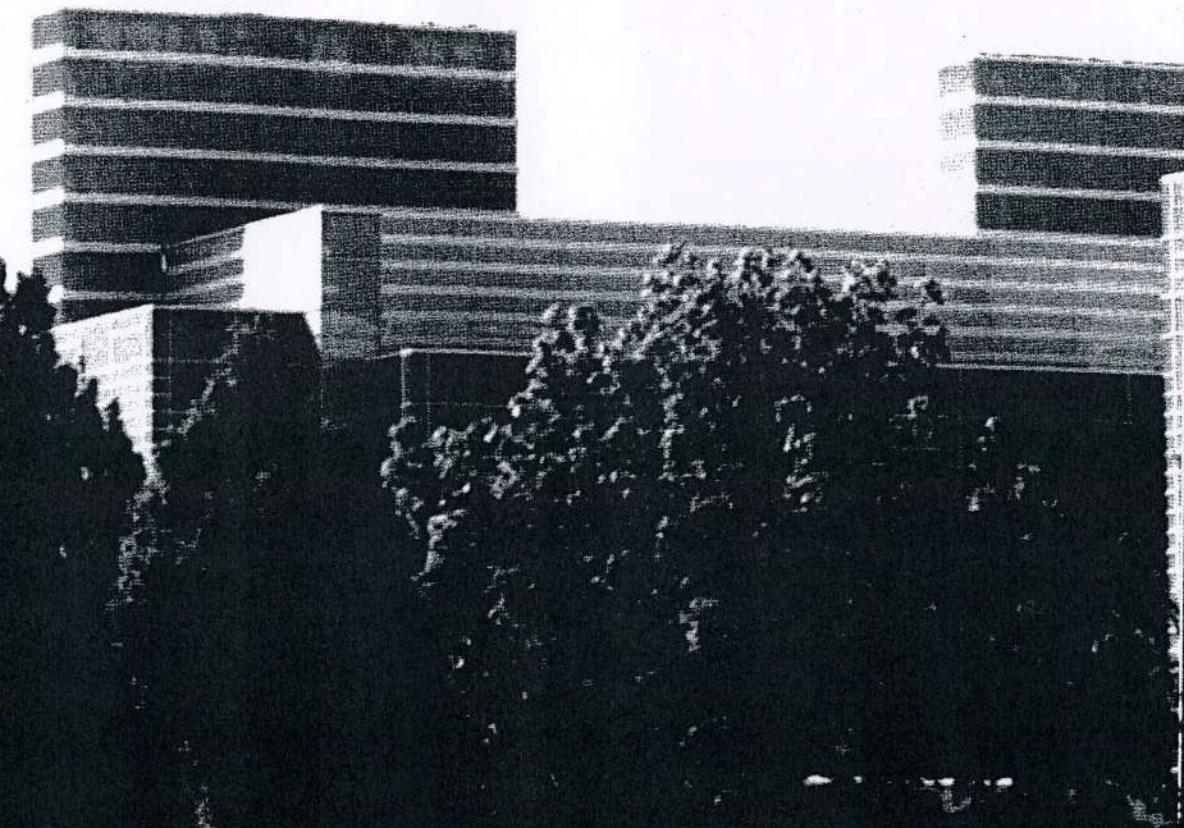
Traditional installation required the provision of dedicated essential and non-essential lighting distributions to shed load during generator operation. ZMC eliminates the need for separate distributions at a stroke, and avoids this unnecessary and costly duplication of distributions and associated wiring - a major reduction in capital cost which may be offset against the lighting management budget.

All lighting is fed from the essential, generator-backed distribution and loadshedding carried out locally through the system hardware. Individual luminaires are programmed from the PC to act as essential lighting (retained during back-up generation of power) or non-essential lighting (held off while the generator is in operation), and the designation of each luminaire may be altered at any time at the click of the mouse.

Testing of emergency lighting

Traditional installation necessitated fitting multiple test keyswitches (one per circuit) or dedicated wiring to enable emergency lighting to be tested. ZMC eliminates the need for such costly and convoluted installation, enabling emergency lighting to be centrally tested, monitored and logged.

Tests of emergency lighting, whether self-contained or central battery fed, may be initiated from a programmed keyswitch on the floor and from the computer, with the date and duration of tests logged at the PC. Optional monitoring of the performance of emergency fittings generates a schedule detailing the pass/fail record of each emergency luminaire with faulty lamps and/or batteries flagged on the PC graphics.



• multi-occupancy buildings

*ZMC SOLVES THE AGE-OLD DILEMMA
OF PROVIDING AN ENVIRONMENT
WITHIN MULTI-TENANCY BUILDINGS
SUITED TO THE NEEDS OF AS-YET
UNKNOWN OCCUPANTS.*

ZMC offers advantages to all, and every Client within a custom-built or single occupancy building will appreciate the benefits of a system which facilitates change and enables lighting to be adapted and managed.

But are such systems viable for buildings constructed for investment purposes where the tenant or tenants may not be known? Leading property investment & development groups believe so, and a growing number of prestigious speculative developments are equipped with ZMC.

Within such projects there is the same need for flexible management of lighting and space - possibly more so to accommodate the varying needs of tenants. Interactive holding-on of exit lighting while any tenanted area is occupied is a crucial advantage; the comprehensive calendar timing schedules offer ample scope to match the working patterns of individual tenants, while the monitoring of lighting run-time within Tenanted areas enables Landlord's lighting costs to be fairly apportioned should this form part of the billing structure.

99 BISHOPSGATE - left

The flagship 99 Bishopsgate tower development by Hammerson plc boasts a totally flexible ZMC system throughout the 30,000 sq.m office building.

Lighting in each of the 26 storey cores and stairwells is interactively controlled, the system interfaces with fire & security controls, while full lighting management and monitoring is available from the graphical head-end.

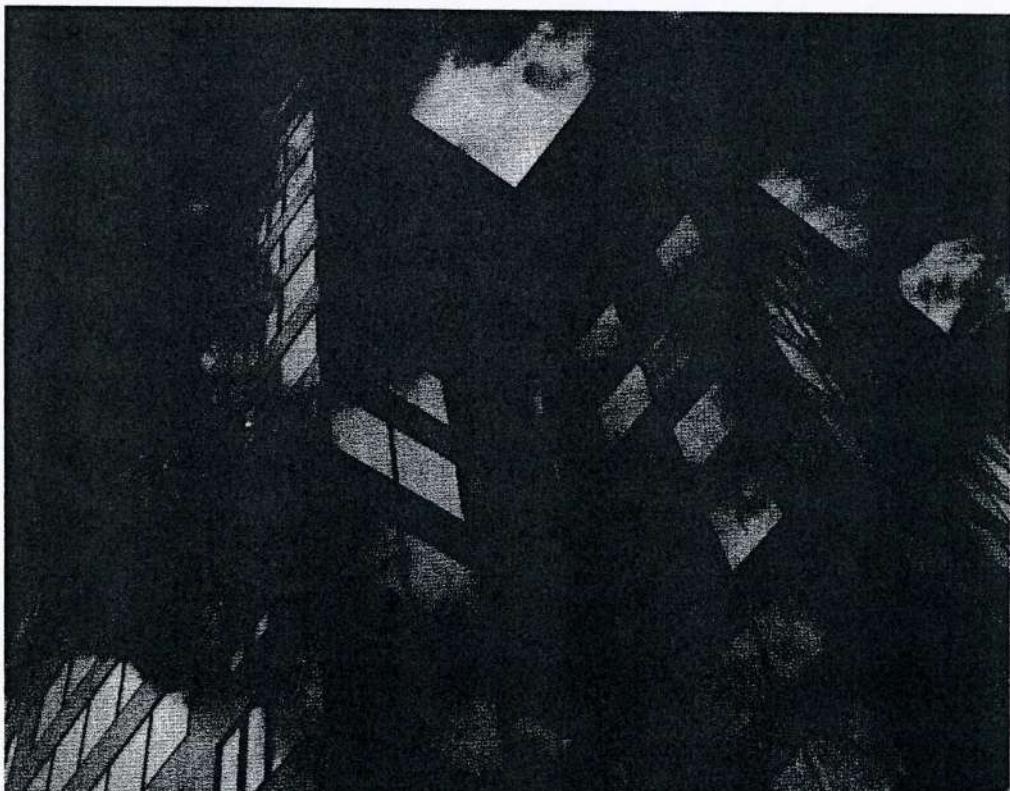
110 CANNON STREET - right

A stand-alone, fully flexible dimming system within each lettable area at the striking 12,000 sq.m Land Securities' Cannon Street development enables dimming levels to be set to suit the preferences and task requirements of individual Tenants.

Within fully-managed office complexes, the concept of Hotelling requires readily adaptable floorplates with the ability to remotely configure the space and rapidly incorporate layout modifications to accommodate changing requirements. With ZMC, switching layouts can be changed within minutes from the computer screen, or remotely by Delmatic as part of a complete lighting management package.

ZMC solves the age-old dilemma of how to provide an environment within multi-tenancy buildings suited to the needs of as-yet unknown occupants. Development companies can install a flexible foundation system enabling rapid low-cost fitting-out of space by incoming Tenants who may then select from a wish-list of upgrade options - daylight-linking, presence detection, telephone control, remote system management, etc

The choice is theirs.



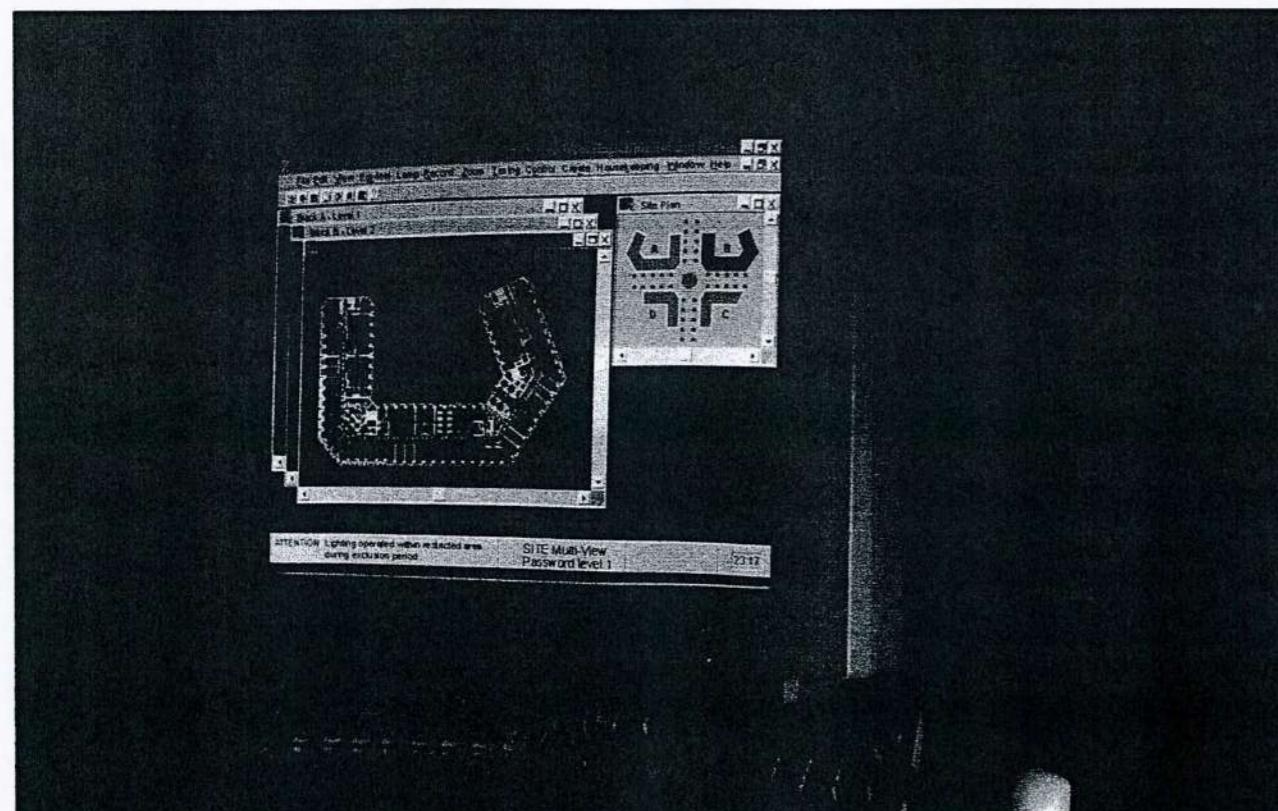
• Safe central control

Traditionally there has been a conflict between the provision of central control and the ensuring of staff safety. Safety is compromised by lighting being centrally switched off while staff are still working in the building, yet energy is wasted while lights remain lit in unoccupied areas. ZMC harmonises these previously opposing goals by switching lighting off promptly at the end of the day - but not at the expense of staff safety.

All automatic switching-off commands incorporate patented interrogatory sequences which warn staff that lighting is being shut down: staff may inhibit the sequence in their area from their local switching device which also instructs exit lighting to remain on. In the same way central manual control from the PC is managed by the ZMC software to prevent lighting being switched in an unsafe manner.

ZMC - ALWAYS VIGILANT

ZMC acts as a vigilant second pair of eyes and can immediately flag operation of lighting within restricted areas during programmed exclusion periods. A PC at a central security point can monitor and display feedback from multiple buildings on a site or even remote locations.



Security

Security plays an ever more important role in the modern working environment and ZMC systems, through their 24-hour monitoring of lighting, can make a valuable contribution to building security, acting as a vigilant second pair of eyes.

ZMC monitors the status of every luminaire, and security staff can view lighting status in all areas of the building and identify if lighting is on in restricted areas. Monitoring of adjoining buildings within a complex or remote locations via telephone links enable security staff at a central point to keep tabs on events elsewhere.

Presence detectors at strategic locations can be programmed to flag an audible or verbal alarm at the computer should out-of-hours movement be detected, with the path of intruders tracked on the graphics screen.

Dedicated keyswitches may be configured so that security staff may activate programmed patrol lighting prior to carrying out walk-abouts: alternatively security lighting may be initiated by use of interfaced swipe cards, proximity detectors or door contacts. A security PC "Panic Button" enables full lighting to be brought on immediately in an emergency condition.

System integration & interfacing

ZMC may interface or integrate with other building systems, enabling the User to benefit from coherent and synchronised operation of building services through the sharing and pooling of information. Interfacing avoids unnecessary duplication of software features, yet retains the advantages of specialist stand-alone systems.

Interfaces may range from volt-free contacts to Dynamic Data Exchange (DDE), while the open-protocol of ZMC software enables full integration of the lighting management system and other building services systems with two-way passage of commands and feedback data, as well as integration via gateways to building networks.

ZMC INTERFACING AND INTEGRATION WITH OTHER SERVICES ENABLES THE USER TO BENEFIT FROM COHERENT OPERATION OF SERVICES THROUGH THE SHARING AND POOLING OF INFORMATION.



HARMONIOUS INTEGRATION

INTEGRATION OF OTHER SERVICES

The comprehensive monitoring by the ZMC system of the lighting installation and the associated knowledge of building occupancy and usage patterns can prove beneficial in linking other power-consuming services to presence of personnel.



FAN-COILS may be connected to the luminaire control modules and their use, and hence power consumption, linked to lighting usage and occupation of office areas. Temperature set points may be varied by staff through the lighting management system telephone control facility and such data passed to the BMS.



BLINDS may be integrated into the ZMC system and be automatically raised, lowered or tilted in relation to sunlight, via commands from the BMS, or locally controlled by staff via the telephone or other switching devices.



SMALL POWER CIRCUITS feeding non-essential equipment such as photocopiers & printers may be related to occupation of working areas. Too often such devices remain on through the night consuming power and emitting heat which puts unnecessary load on cooling systems. Once lighting in an area has been shut down, small-power is switched off after a pre-set period: should staff re-enter an area and switch lighting on, power circuits are automatically reinstated.

Task lighting and lighting built into furniture is frequently left on when workstations are unoccupied. By linking this lighting to use of individual working areas, all lighting may be efficiently extinguished at the end of the day.

Integrated control of small power enables such circuits to be designated as essential or non-essential, eliminating the need for separate distributions, with selective loadshedding being carried out efficiently through the lighting management system.



INTERFACES WITH FIRE AND SECURITY CONTROLS
produce a comprehensive and integrated safety system where designated lighting is brought on upon an alarm being raised.



INTERFACES WITH ACCESS CONTROL SYSTEMS
may be used to enable or bring on designated lighting as individuals enter the building, and to shut down lighting prior to programmed automatic times upon confirmed vacaton of specified areas.



INTERFACES WITH BUILDING MANAGEMENT SYSTEMS
enable beneficial sharing of strategic data, and can range from utilisation of common switching regimes and monitoring of system status, to sophisticated integration with joint control and status display.

system structure

*CONSIDERING THE SOPHISTICATION OF
ZMC, THE SYSTEM STRUCTURE IS
SIMPLICITY ITSELF*

A typical ZMC system controls many thousands of addressed points, each uniquely identified, monitored and configurable through the software. Yet despite this sophistication, the system structure is simplicity itself comprising just four elements - a PC central computer, floor controllers, switching or dimming control modules, and local control devices.

The power and flexibility of ZMC software is an acknowledgment that Clients have individual and often widely differing requirements - requirements that will change over the coming weeks and years. In the same way, the comprehensive range of hardware acknowledges that each building is different, and specifiers may select and combine modular hardware to form an integrated system within the building.



A unique feature of ZMC is that all equipment is self-addressing, enabling a control module to be installed anywhere in the building without the need to set coding switches or request specific addressed nodes to be supplied.

Extensive use of plug and socket connectivity speeds the installation process, and modules are designed with plug-in capability for incoming mains, luminaires, buswires, and local control devices: all local controls operate at Safety Extra Low Voltage (SELV), enabling switchwires to be safely run through partitions and ceilings without protective conduit.

During the building lifetime, maintenance is facilitated through the ability to plug-in standard replacement cards anywhere in the system, while the system itself may be extended through the installation of additional modules which automatically determine their own individual and unique address.

Each ZMC system comprises a number of stand-alone sub-systems enabling projects to be configured, tested and handed over in phases without having the head-end PC connected.

TYPICAL SYSTEM SCHEMATIC

detailing central control equipment, and hardware for a typical floor including control modules within ceiling and floor voids, and local control devices.

