

--	--	--

WEIGHING CONTROLLER

AD-4335C

CONCRETE BATCHING MODEL

INSTRUCTION MANUAL

**A & D COMPANY, LTD.
A & D ENGINEERING, INC
A & D INSTRUMENTS GmbH**

specs-4335C-002a/b-v. 1



CONTENTS

1. INTRODUCTION
2. SPECIFICATIONS
 - 2-1 Analogue Input & A/D Conversion
 - 2-2 Digital Section
 - 2-3 General
 - 2-4 Accessories
 - 2-5 Installation
 - 2-6 Load Cell Connection
3. PANEL DESCRIPTIONS
 - 3-1 Explanation of the front panel
 - 3-2 Explanation of the keyboard
 - 3-3 Explanation of the rear panel
 - 3-4 Dimensions
 - 3-5 Calibration
4. PROGRAMMING EACH SETTING TABLE
 - 4-1 SCALE PROGRAM TABLE
 - 4-2 MATERIAL TABLE
 - 4-3 FORMULA TABLE
5. WEIGHING DISPLAY

1. INTRODUCTION

These Specifications concern the AD-4335C Concrete Batching Controller which can control up to three scales, 10 dispensing bins and 5 liquid reservoirs. Advanced data processing techniques allow this Controller to permit flexible system designs as well as offering other advantages only possible with computerised equipment. This Controller, for the Concrete Production Industry, makes the period when concrete formulations had to be painstakingly reset each time via a multitude of thumbwheels, very ancient history! Formulas can be speedily recalled, altered, monitored and controlled via a simple keyboard and visual display unit.

The incorporation of "Time Extrapolated Estimation" (TEE) and "Auto-matic Free Fall Compensation" (AFFC) means that bin control has never before been as fast, accurate or as simple as it is with AD-4335C. TEE means that the judgement frequency is increased from the A/D conversion speed to a resolution of about 200 judgements per second and thus dispensing from bins can be very accurately controlled. AFFC is a function which draws inferences from past experiences of the Free Fall weight value and applies what it has learnt to control the volume of freely falling material in future weighing events.

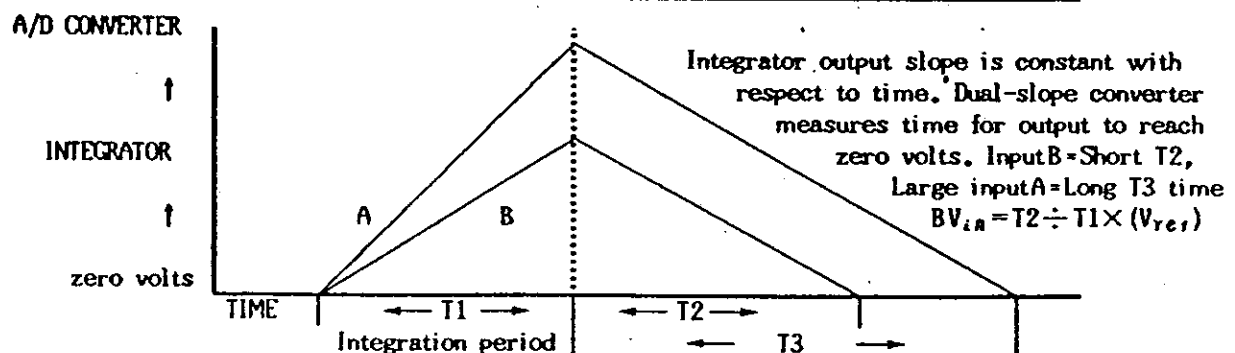
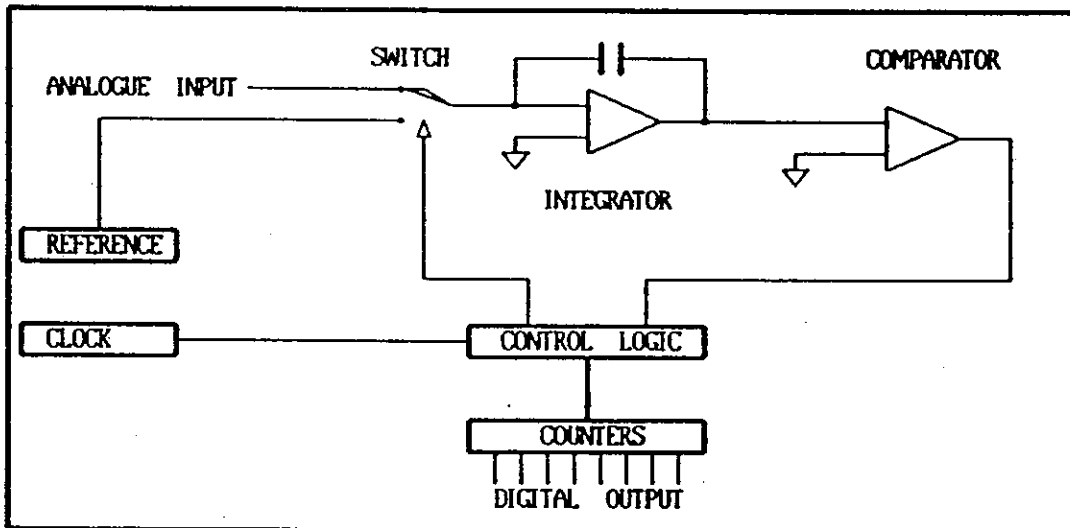
AD-4335C WEIGHING CONTROLLER FEATURES

1. Optically isolated analogue front end.
2. Accurate, stable and reliable dual-slope A/D converters.
3. Complete control from one compact computerized unit.
4. Ergonomically designed, colour coded dust-proof sheet keyboard.
5. Nickel Cadmium trickle charged battery back-up to protect all the volatile memory (including the internal clock) for up to ten days in the event of a power failure/interruption.
6. Incorporates "TEE" - Time Extrapolated Estimation - for very accurate control of filling and batching operations.
7. Clear 9 inch green CRT visual display unit and clear impact dot-matrix printing.
8. Can remember up to 100 different formulas using 15 ingredients out of 10 (dry) bins and 5 (wet) reservoirs.
9. High A/D resolution and high accuracy.
10. AD-4335C can drive up to 12 load cells (@ 350 ohms each).

2. SPECIFICATIONS


2-1 ANALOGUE INPUT AND A/D CONVERSION

MODEL N°	AD-4335C
Input Sensitivity	0.7 μ V/D to 3.6 μ V/D (D=Minimum Division)
Zero adjustment range	36mV (Max) [Span=7mV to 36mV]
Load cell excitation	12VDC, 280mA (voltage sensing) [4 LCs in parallel]
Input Impedance	10M Ω (min)
Load cells (max)	4 per board @ 350 Ω (8 for LC-B5103 @ 700 Ω)
Temp.coefficient	Zero \pm (0.3 μ V \pm 0.005% of initial zero offset voltage)/°C Span \pm 20ppm/°C of rdg.
Input noise	\pm 0.3 μ V _{p-p}
A/D conversion method	True Integrating Dual-slope
A/D resolution	40,000 counts (max)
A/D conversion rate	15-16 conversions per second
Display resolution	10,000



specs-4335C-002a/b-v.1

2-2 DIGITAL SECTION

MODEL N°	AD-4335C
Display Panel	9 inch green CRT visual display unit
Text Display	40 X 24 character display (960 character spaces)
Keyboard	32 keys and 6 LED (light-emitting diode) annunciators
Printer type	Impact 5 X 7 dot-matrix
Print lines	40 characters per line
Printing speed	1 to 2 lines per second
Paper	Normal roll paper, 69mm/2.72" wide
Internal Memory	64K bytes of DRAM working memory
Display Memory	16K bytes DRAM
Program Memory	128K bytes ROM
Data Memory	64K bytes CMOS RAM with NiCd battery back-up
Flow Meter	Open collector input 0-500Hz, 64,000 counts max
Flow Meter Pulse Width	 1ms (minimum)

2-3 GENERAL

MODEL N°	AD-4335C
Power (AC@ 50 or 60Hz)	100, 115, 200, 220, 240VAC ± 3%/200VA
Weight	30kg (66lb) approx.
Operating Temperature	0°C to 40°C (32°F to 104°F)
Max.Op.Humidity	95% Relative Humidity or less (non-condensing)
Physical Dimensions	350(W) x 450(H) x 420(D)mm / 13.8" x 17.7" x 16.5"

2-4 ACCESSORIES

2 Load cell connectors NJC-207-PF. 2 scale input A/D connectors.
 1 Liquid Flow Meter Connector for 5 flow meter input A/D board.
 2 Coax connectors BNC-P-58U (external CRT & Optional Scoreboard)
 Bin Selector connector=361J032-AG & Sequence Control=361J024-AG
 Printer Ink ribbon and 3 rolls of paper
 Fuse F1 100/115VAC = 2A & 200/220/240VAC = 1A (Printer F2 = 0.5A)

* WEIGHT CONVERSION TABLE *
One kg = 2.204 62 lb(avoir)approx.
One g = 0.035 27 oz(avoir)approx.
One t = tonne 1000 kg (Metric Ton) or 2204.62 lb approx.
= ton, long: (20 cwt)2240 lb or 1016.05 kg approx.
= ton, short: 2000 lb or 907.18 kg approx.
= tun 216imp.gal(ale), 252imp.gal(wine). "weight"=volumeXdensity*
One lb = 0.453 592 37 kg(UK) or 0.453 592 427 7 kg(USA)

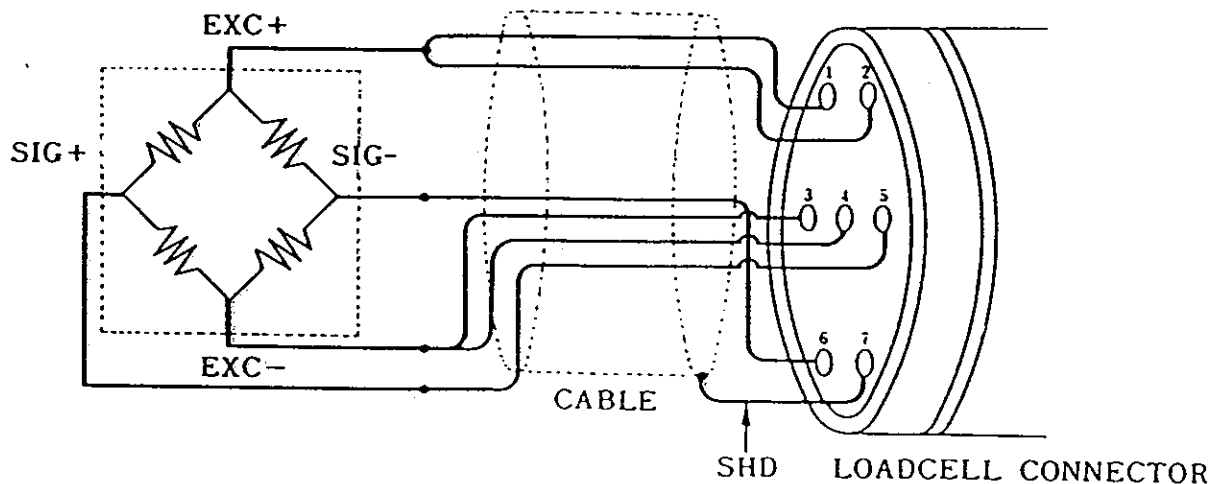
*One imp.gal.of distilled water @ 62°F=10lb=4.536kg but also=about 4.546litres/dm³/kg @ 4°C.
 One litre of water @ 4°C=1kg. One US gal.is about 5/6 of an imp.gal.or about 3.785litres(liters).

specs-4335C-002a/b-v. 1

2-5 INSTALLATION

- Do not allow AD-4335C to be exposed to direct sunshine, sudden temperature changes, vibration, wind, water or dirt.
- Earth via the power cable to the rear GND terminal. Ensure a good earth connection. Do not earth directly to other equipment.
- The analogue output from the load cell and the RS-232C input/output signals are sensitive to electrical noise. Do not bind these cables together as it could result in cross-talk interference. Please also keep them well away from AC power cables. Keep all cables/coax as short as possible.
- If the local AC electricity supply fluctuates by more than $\pm 10\%$, an AC regulator must be used to stabilise the power supply.

2-6 LOAD CELL CONNECTION



LOAD CELL PIN CONNECTIONS			CABLE COLOUR CODE	
PIN NUMBER	SIGNAL		LC-B5103, LC-T263,	LC-C861, LC-C881 etc
1	EXCITATION +	(EXC+)	RED	RED
2	SENSE +	(SEN+)		
3	SENSE -	(SEN-)		
4	EXCITATION -	(EXC-)	BLACK	WHITE
5	SIGNAL +	(SIG+)	GREEN	GREEN
6	SIGNAL -	(SIG-)	WHITE	YELLOW
7	SHIELD (SHD)	ORANGE	WIRE

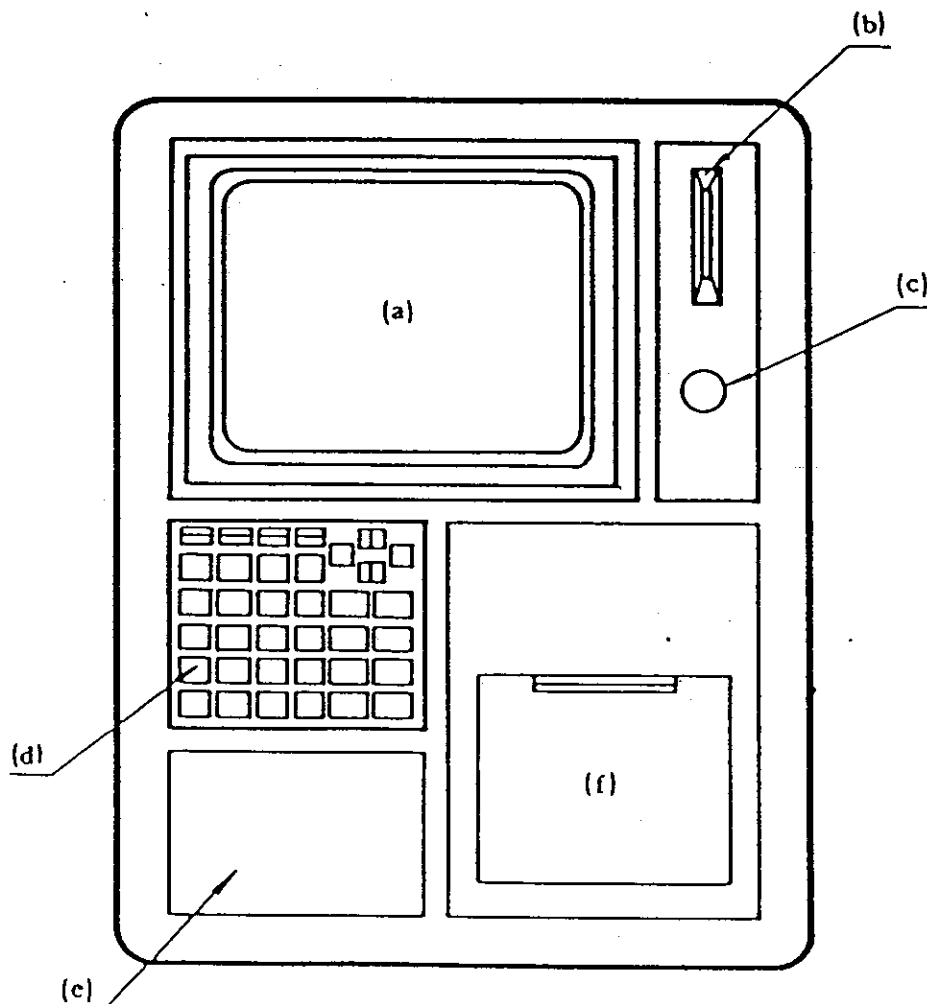
USE A SIX WIRE CABLE WITH SHIELD.

If AD-4335 is located near the load cells (within a few metres) you may use a 4 wire cable with shield, but first connect pins 1 + 2 and 3 + 4 with independent jumper leads.

3. PANEL DESCRIPTIONS

3-1 EXPLANATION OF THE FRONT PANEL

The AD-4335C display panel has a 9 inch green CRT at location (a) on the diagram below. This visual display unit allows an operator to monitor and program weighing operations with ease. Programming can be carried out either via the keyboard at location (d) or, even more easily, via the optional Optical Punch-Card Reader at location (b). A key switch has been provided in order to protect the memory from being tampered with (REG), this is located at position (c). The analogue boards used in calibration of the (1-3) scales are located behind the metal panel cover at (e); this cover may be secured with a wire and crimped lead seal. The printer and the emergency RESET button (press to reset CPU) are located behind the cover labelled (f) on the diagram below. A toggle switch below the RESET button should be used in conjunction with dip-switch N^o 7 on the A/D boards to disable command with the main unit. Toggle switch is normally ON (i.e. up)..



specs-4335C-002a/b-v. 1



3-2 EXPLANATION OF THE KEYBOARD

Starting with the LED annunciators, when ON:- READY = ready to weigh; START = starting to weigh; FINISH = weighing finished; ERROR = weighing error or system error; ERROR + READY = run time error; ERROR + START = power down; ERROR + FINISH = Watchdog; PRINTER = printer will print (press the key and the LED and printer will switch off); CHAR INPUT = letters may be entered via number codes (LED will stay off unless the key is pressed).

As for the keyboard, if an invalid key is pressed the error will be signalled by an alarm buzzer. The four "arrow" keys are for moving the cursor.

CHECK allows you to check if the span calibration has drifted.

ZERO NULL cancels a SCALE ZERO command.

SCALE ZERO may be used to zero the display.

SCALE SELECT may be used to select the scale (marked by a *).

CLEAR may be used to delete programming errors.

The YES/NO keys may be used to answer questions asked by the Controller.

ENTER terminates commands to the Controller.

The F1, F2 & F3 function keys are used in programming the Controller. NEXT PAGE is used in a display mode when all the data can not be presented on one page.

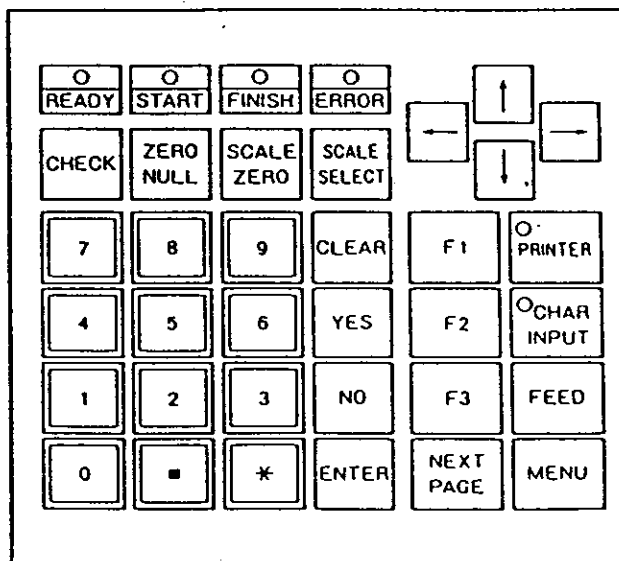
PRINTER key may be used to disable the printer (LED goes off).

CHAR INPUT key may be used to enter letters rather than numbers via input codes (LED comes on).

FEED (paper feed) and PRINTER are the only two keys which are always active and never disabled.

MENU offers a list of display mode options and is the starting point for programming.

"." is the decimal point and the 8 to 9 number keys may be used to enter alphanumeric information.

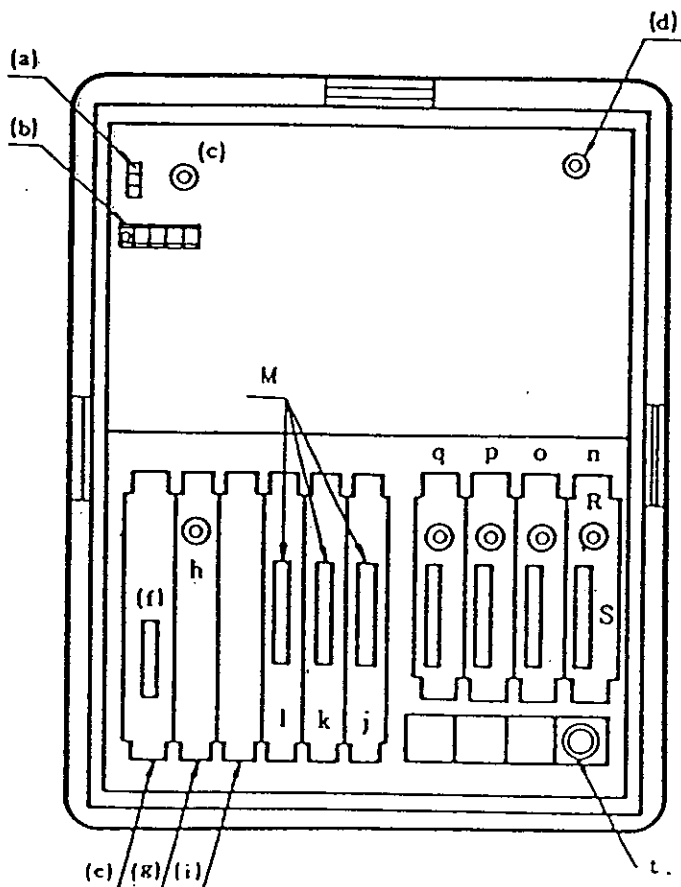


3-3 EXPLANATION OF THE REAR PANEL

(a) is the location of the power switch and (b) the location of the 3 input terminals for the AC power supply; live, neutral & earth/GND. **N. B. THIS EQUIPMENT MUST BE EARTHED.** An anti-surge/time-lag fuse is located at (c) and the brightness control for the CRT visual display is at (d).

The I/O interface board is at (e) with an RS-232C output connector at (f); printers or computers may be connected via (f). The CPU board is at (g) with a coaxial output socket for an external CRT at (h). (i) is the location of the Memory Board and (l), (k) & (j) are the slots for the CH.3, 2 & 1 bin selection output boards. (j) is standard and will control 1-10 bins and 5 reservoirs but (k) & (l) are optional and not generally required for Concrete Batching.

(q) is the Flow Meter Input board, (p), (o) & (n) are the locations of the A to D conversion boards 3, 2 & 1. (n) & (o), or boards 1 & 2, are standard but the other board, (p)/3, is optional (OP-01). These boards come with a coaxial output socket (R) for the OP-05 Net Weight Scoreboard and a sequence signal connector at (S). The load cell connector for each A/D board is located at the position (t) occupies.



specs-4335C-002a/b-v. 1

DIP-SWITCH PROGRAMMING

Dip-switch programming is carried out via dip-switches located on the A to D conversion board[s] and the CPU board inserted into slots in the rear panel. One 8 segment dip-switch assembly is located on each A/D board and on the CPU board. In both cases the boards should be carefully removed from their slots for setting the switches and then, just as carefully, returned. After setting the switches the rear panel can be sealed with wire and crimped lead seals. The setting of the zero and span dip-switches located on the analogue board[s] in the front panel will be covered under CALIBRATION.

A/D BOARD (PC:621A) 8 SEGMENT DIP-SWITCH

SEG #	FUNCTION	ON/OFF				NOTE
1	MINIMUM DIVISION	X1-ON	X2-OFF	X5-ON		MIN.DIV.="D"
2	MINIMUM DIVISION	X1-ON	X2-ON	X5-OFF		NEVER OFF, OFF!
3	AC FREQUENCY 50/60Hz	50Hz=ON, 60Hz=OFF				RE:A/D ACCURACY
4	DIGITAL HYSTERESIS FUNC'N	USED=ON, UNUSED=OFF				
5	CHECK	DISABLED=ON				THUS KEEP IT OFF
6	ZERO TRACK ON/OFF	ZT ON=ON, ZT OFF=OFF				
7	COMMAND COMMUNICATION	ENABLED=ON				NORMALLY ON
*	WITH MAIN UNIT	DISABLED=OFF				
8	INTERNAL COUNT	NORMAL DISPLAY=ON				NORMALLY ON
*	INTERNAL COUNT	INTERNAL DISPLAY=OFF				

* Segments 1 & 2. control the Minimum Division setting, the steps by which the least significant digit of the display will be incremented. A maximum display (of 10000 divided by 1) may be increased at the cost of decreased display resolution as the LSD moves from X1 to X2 to X5 ($50000 \div$ steps of $5^{\circ}D^{\circ}$).

* Segment 3 should be correctly set as the power frequency waveform could otherwise interfere with A/D conversion.

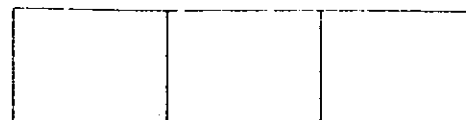
* Segment 4 should be switched ON if small vibrations (1 or 2 counts) in the weighing system cannot be eliminated from the display by other methods (such as eliminating the cause).

* Segment 5 should always be kept OFF.

* Segment 6 When on tracks small drifts from centre of zero.

* Segment 7 should be kept ON unless the A/D board is being used alone to drive an external display (eg: if/when something disastrous has happened to the CPU or CRT) in which case command communication with the main unit must be disabled. This switch must be used in conjunction with another switch inside the printer box. This second toggle switch must be pulled out and pushed up for ON or down for OFF.

* Segment 8 should be kept ON under virtually all circumstances.



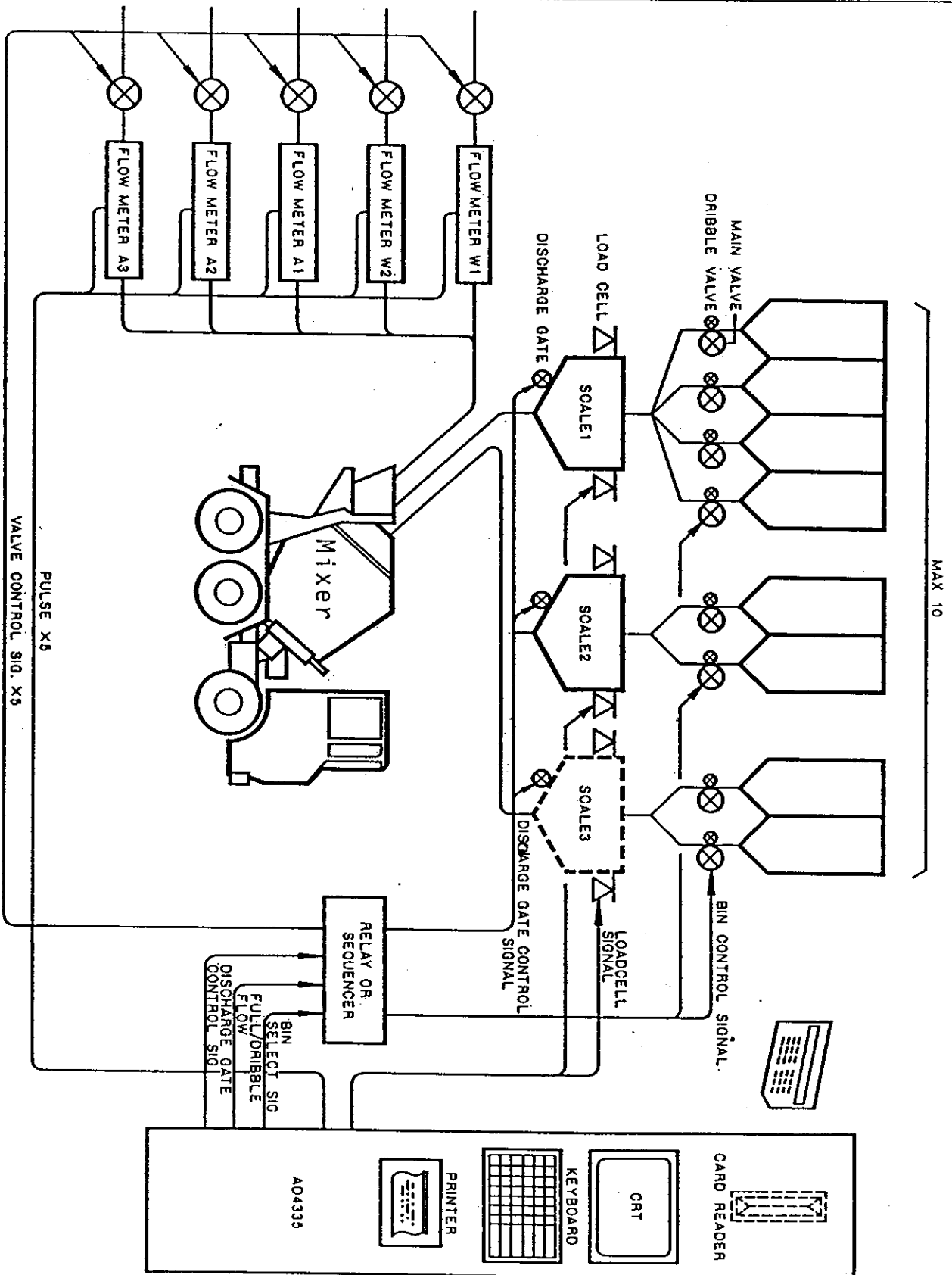
CPU BOARD 8 SEGMENT DIP-SWITCH SW1

SEG #	FUNCTION	ON/OFF	NOTE
1	NUMBER OF SCALES 2-3	2=ON 3=OFF	# of A/D boards
2	CARD READER OP-03?	YES=ON NO=OFF	Automatic entry
3	BATCH SIZE UNIT	Yd ³ =ON m ³ =OFF	Formula must = 1
4	WEIGHT/VOLUME UNIT	lb/gal=ON kg/l=OFF	Metric/non-metric
5	TYPE OF GALLON	US gal=ON Imp gal=OFF	USA/UK & elsewhere
6	OVER/UNDER BUZZER	Disable=ON Enable=OFF	Warning buzzer
7	WHEN OVER STOP?	Continue=ON Stop=OFF	Stop to correct?
8	WHEN UNDER STOP?	Continue=ON Stop=OFF	Stop to correct?

PLEASE NOTE: ALL SW-2 DIP-SWITCHES SHOULD BE KEPT OFF BUT IF SW-2 SEGMENT 1 IS SWITCHED ON YOU CAN OBTAIN A DISPLAY WITH ONE WATER INGREDIENT AND FOUR ADDITIVES INSTEAD OF TWO WATER INGREDIENTS AND THREE ADDITIVES.

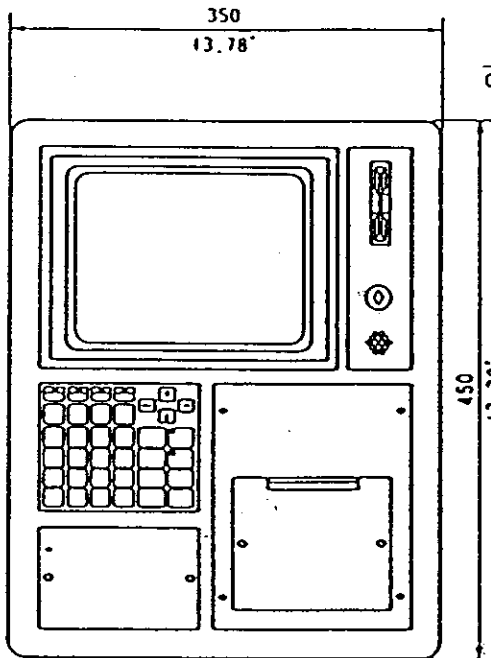
NOMENCLATURE:

Dry "INGREDIENTS" are stored in dispensing "BINS". AD-4335C controls the "GATES" which open to allow ingredients to flow down "DISCHARGE CHUTES" to be weighed via "LOAD CELL" transducers in "WEIGHING HOPPERS" by the "WEIGHING CONTROLLER". A number of wet and dry ingredients make up a "FORMULA", which when discharged is called a "BATCH". Batches are typically discharged after weighing into a mixer and wet "INGREDIENTS" are added at this stage. A number of batches make up a "JOB". The dry ingredients still in the chutes when the gates close are referred to as "FREE FALL" and when these ingredients are added to the "PRELIMINARY WEIGHT" of dry formulas already in the weighing hoppers, the "FINAL WEIGHT" or target weight of the dry product has been reached. In order to be able to close the gates completely at exactly the right moment in time, "FULL FLOW" is reduced to "DRIBBLE FLOW" at a point in time called "PRELIM". Dribble flow reduces oscillations in the scale and permits "TEE", which switches on at the "PRELIM"inary point, to make very accurate calculations. When the dry formula is discharged for mixing with wet ingredients the total mixture is measured by its volume in terms of cubic metres or cubic yards. All the ingredients in a formula must total one cubic metre or one cubic yard so that the controller can calculate the increase or decrease of each ingredient depending on the size of the batch. If the batch size is 2.5m³ then the volume (wet) or weight (dry) of each ingredient must be multiplied by 2.5.

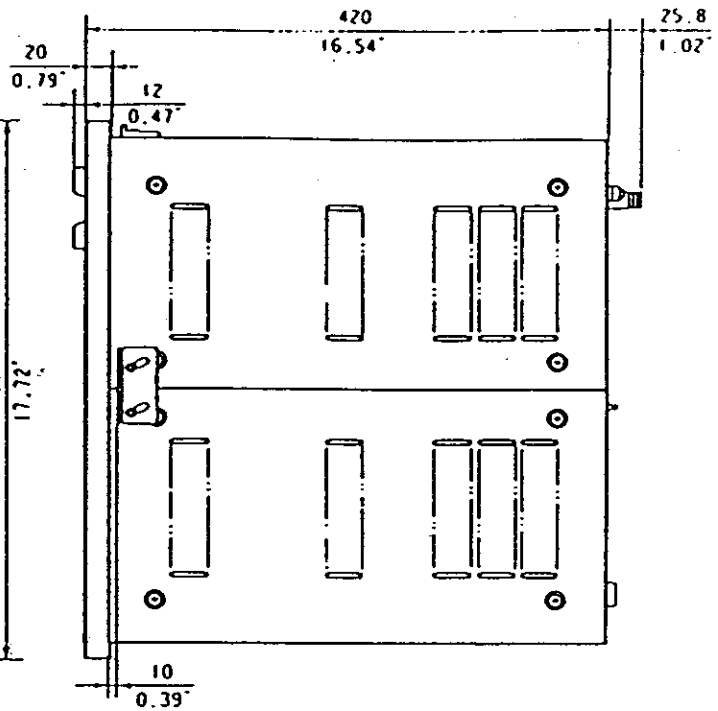


3-4 DIMENSIONS

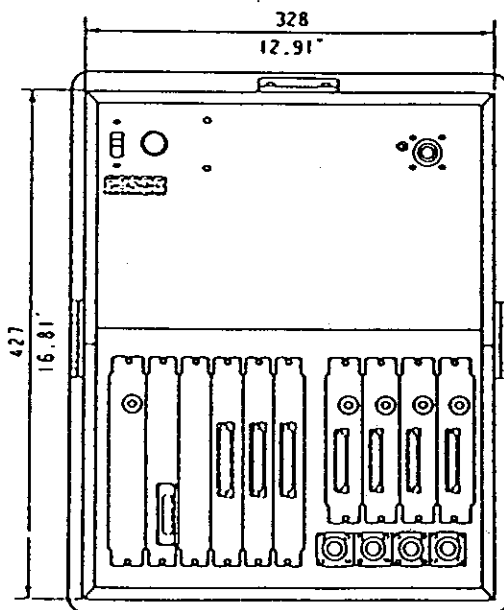
FRONT, SIDE & REAR ELEVATIONS



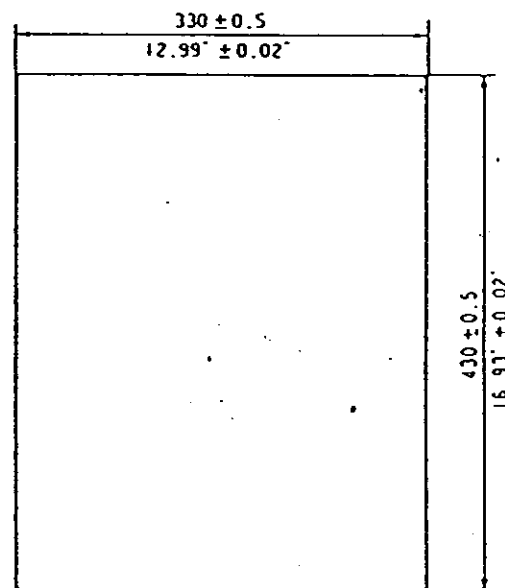
FRONT VIEW



SIDE VIEW



REAR VIEW



PANEL CUT

UNIT : $\frac{\text{mm}}{\text{inch}}$

specs-4335C-002a/b-v.1

--	--	--

3-5 CALIBRATION (ZERO AND SPAN ADJUSTMENT)

Calibration of the Controller is required when it is initially installed, when changing the installation site (or any part of the weighing system) and additionally every three months or so. "Weight" = Mass \times acceleration due to Earth gravity (about 9.8 metres per second per second in a vacuum) however gravity, air pressure and other factors vary from location to location and from time to time.

1. PREPARATION

- a) Install the Controller and program the dip-switches with reference to section 3-3. Connect the load cells installed on the scales to the Controller via the load cell input connectors. Make sure that all the solder joints are good and that the insulation/waterproofing of the connections and junction boxes located outside is thorough and complete. Take into account factors such as lever ratio and number of load cells when designing a weighing system to match this Controller's load cell input sensitivity parameters (0.7-3.6 $\sqrt{V/D}$).
- b) Turn on the power and allow a warm-up period of at least 30 minutes to achieve thermal stability in the load cells and Controller.
- c) Obtain a standard load equal or close to the maximum capacity of the scale. Make sure that the scales are empty, clean with nothing liable to foul or induce friction in the weighing platform assembly. Zero track Off.
- d) The Zero and Span dip-switches/adjustment trimmers are located on the 1-3 analogue board[s] found behind the panel cover below the keyboard. Board 1 is on the left and refers to Scale 1 on the VDU.

2. PROCEDURE

- a) ZERO ADJUSTMENT. Zero dip-switch segment N° 1 has the least effect on zero offset adjustment and segment N° 8 has the greatest effect.
- b) After bringing the display to a figure which is as close to zero as possible with the Zero dip-switch, final adjustment is carried out via the zero adjustment trimmer above it.
- c) After achieving an exact zero display proceed to span adjustment and place the standard known weight (e. g. 1 tonne) on the scale.
- d) SPAN ADJUSTMENT. Span dip-switch segment N° 1 has the least effect on the span display and segment N° 8 has the most effect.
- e) Bring the display to indicate a figure which is as close to the value of the standard weight as is possible with the Span dip-switch segments and then produce an exact weight display with the span adjustment trimmer.
- f) Remove the weight and recheck/trim zero (zero track should be off) and then replace the weight to recheck the span reading. If necessary repeat these steps until you obtain a clean return to zero and an exact standard weight display.
- g) When zero and span calibration have been completed for all the scales you may replace the panel cover, switch on zero track and commence weighing operations. Until the internal battery has had time to charge you should be careful to ensure that the power switch is never switched off or all the volatile memory, including the span and zero values, may be lost.

--	--	--

MEMORY BOARD INITIALIZATION

This Weighing Controller contains volatile 64K CMOS RAM as data memory but this is protected by an internal rechargeable NiCd battery. When the Controller is first installed, this battery will probably have discharged and will require charging for about one day before the Controller can safely be switched off again.

After programming via the dip-switches and calibrating the scales, you may proceed to memory initialization.

When the display is in "WEIGHING" mode, "KEY IN FORMULA # & ENTER" is displayed at the bottom of the screen with the flashing cursor at the top. During installation and if "Exec err_____" (execution/program run error) is displayed, simultaneously press both the "*" and RESET buttons on the keyboard and inside the printer box respectively (release RESET first). "CHECK PROGRAM" will then be displayed with a list of 0-9 options. Ignore 0-8 options which are for use during manufacture and press "9". The screen will clear and then, if "00" is written in the data memory, "CHECK PROGRAM" will be displayed again --- this time only press the RESET button and the display will return to "WEIGHING" mode.

Press "MENU" and, when the menu is displayed, select item 4, which is "INITIALIZE (CLEAR ALL TABLES)", and ENTER. The Controller will then ask a series of nine questions with the ninth being "INITIALIZE (CLEAR ALL TABLES)" again. If you press nine the Controller will ask "ALL TABLES DELETE OK? Y/N". If you press Yes there will be a short pause as the tables are cleared and the memory will be initialized.

When an error occurs within a single table in one of the "DATA SETTING MODES" in future, this single table should be cleared via the "DELETE (2)" command with the security key switch set to "REG".

2. A/D BOARD INITIALIZATION

This board uses the battery on the memory board to back-up Zero/Tare values held on this board. Thus if either board is disconnected these values will be lost and the problem will be indicated by "+-" or "- " being displayed without any weight value. After reconnection re-establish Zero values via the ZERO NULL key. Clear the Tare memory by shorting pin B-10 to B-12 and connect a push button switch to these terminals to make resetting the Tare memory simple. See the A/D board I/O pin designation table [TARE RESET (INPUT)].

Alternatively just "+-" or "- " displayed could mean that the weight value set via the SCALE PROGRAM TABLE is too small or that the displayed weight value has exceeded the maximum capacity by +10 counts (when the display will blank).



I/O TERMINALS OF A/D BOARD

*1. No.1 A/D board (Scale 1)

PIN No.	SIGNAL	PIN No.	SIGNAL
A-1	OUTPUT COM.	B-1	OUTPUT COM.
2	LO LIMIT	2	ERROR
3	HI LIMIT	3	TIME OVER
4	A/D ERROR	4	
5	DISCHARGE GATE CONTROL	5	SCALE ZERO OVER
6	DRIBBLE FLOW	6	FULL FLOW
7	ZERO BAND	7	START-SIG (IN)
8		8	DISCHARGE-SIG (IN)
9	SCALE ZERO (IN)	9	ZERO NULL (IN)
10	TARE (IN)	10	TARE RESET (IN)
11	ERROR RESET (IN)	11	SCALE 1 FINISH (IN)
12	WI FINISH (IN)	12	INPUT COM.

*2. No.2 A/D board (Scale 2)

PIN No.	SIGNAL	PIN No.	SIGNAL
A-1	OUTPUT COM.	B-1	OUTPUT COM.
2	LO LIMIT	2	ERROR
3	HI LIMIT	3	TIME OVER
4	A/D ERROR	4	
5	DISCHARGE GATE CONTROL	5	SCALE ZERO OVER
6	DRIBBLE FLOW	6	FULL FLOW
7	ZERO BAND	7	W2-FINISH (IN)
8	A2-FINISH (IN)	8	A1-FINISH (IN)
9	SCALE ZERO (IN)	9	ZERO NULL (IN)
10	TARE (IN)	10	TARE RESET (IN)
11		11	SCALE2-FINISH (IN)
12	A3-FINISH (IN)	12	INPUT COM.

***3. No.3 A/D board (Scale 3)**

PIN No.	SIGNAL	PIN No.	SIGNAL
A-1	OUTPUT COM.	B-1	OUTPUT COM.
2	LO LIMIT	2	ERROR
3	HI LIMIT	3	TIME OVER
4	A/D ERROR	4	
5	DISCHARGE GATE CONTROL	5	SCALE ZERO OVER
6	DRIBBLE FLOW	6	FULL FLOW
7	ZERO BAND	7	
8		8	
9	SCALE ZERO (IN)	9	ZERO NULL (IN)
10	TARE (IN)	10	TARE RESET (IN)
11		11	SCALE3-FINISH (IN)
12		12	INPUT COM.

*** OUTPUT SIGNAL**

1. Hi/Lo Limit signal will come on when the weighed value is outside the limits set in the Material Table.
2. A/D Error signal will be output when the CPU cannot read the A/D data. It will also be output when SW-1 segment 7 of the A/D board is set off (command communication with the main unit disabled).
3. Time over will be output when weighing time exceeds "T1" set in the scale program table.
4. Scale zero error will be output if you press SCALE ZERO for a value greater than 500 counts × 1, 1000 counts × 2 or 2500 counts × 5.

*** INPUT SIGNAL**

1. Scale 1~3, W₁ ~ A₃ - FINISH
COMPULSORY FINISH



4. FLOW METER INPUT BOARD I/O TERMINALS

PIN No.	SIGNAL	PIN No.	SIGNAL
A-1	INPUT COM	B-1	INPUT COM
2	W1 PULSE INPUT	2	W2 PULSE INPUT
3	A1 PULSE INPUT	3	A2 PULSE INPUT
4	A3 PULSE INPUT	4	
5		5	
6		6	
7		7	
8		8	
9		9	
10	W1 GATE CONTROL OUTPUT	10	W2 GATE CONTROL OUTPUT
11	A1 GATE CONTROL OUTPUT	11	A2 GATE CONTROL OUTPUT
12	A3 GATE CONTROL OUTPUT	12	OUTPUT COM

5. CH/Bin Selection Output Board

PIN No.	SIGNAL	PIN No.	SIGNAL
A-1	MODE SIG	B-1	BIN 1
2	READY SIG	2	2
3	ALL WEIGHING FINISHED	3	3
4	JOB END	4	4
5	BUSY SIG	5	5
6	START OK	6	6
7		7	7
8		8	8
9		9	9
10		10	10
11		11	
12		12	
13		13	
14		14	
15	COMMON	15	COMMON
16	COMMON	16	COMMON

MODE SIG. : ON= Weighing, OFF = setting mode

READY SIG. : Means " Ready to weigh after entering FORMULA#
and batch size."

ALL WEIGHING FINISHED : Weighing of all scales are finished
and ready to discharge.


BUSY SIG. : This signal is ON from weighing start till JOB END.



4. PROGRAMMING EACH SETTING TABLE

After switching on the display will be in normal "WEIGHING" mode, press "MENU" and program the tables in the order of:- firstly "SCALE PROGRAM (3)", then "MATERIAL (2)" and lastly "FORMULA (1)".

-MENU-

*TABLE REGISTRATION	
:FORMULA TABLE	(1)
:MATERIAL TABLE	(2)
:SCALE PROGRAM TABLE	(3)
:INITIALIZE (CLEAR ALL TABLES)	(4)
*WEIGHING	(5)
*TOTAL TABLE	
:GRAND TOTAL PRODUCT	(6)
:SUB TOTAL PRODUCT	(7)
:GRAND TOTAL MATERIAL	(8)
:SUB TOTAL MATERIAL	(9)
*FORMULA - PRODUCT TABLE	(10)
*DATE/TIME SETTING	(11)
KEY IN DESIRED NUMBER & "ENTER"	()

Press (3) and then press the ENTER key to call the Scale Program Table.

Press (2) and then press the ENTER key to call the Material Table.

Press (1) and then press the ENTER key to call the Formula Table.

Press (4) and then press the ENTER key to Clear all the Tables.

Press (5) and then press the ENTER key to enter normal Weighing Mode.

Grand Total accumulated memory is designed to act as a monthly report.

Sub Total accumulated memory is designed to act as a daily report.

Product Total lists the total volume of concrete formulas made in m^3/yd^3 .

Material Total lists the weights of dry ingredients and liquid volumes used.

Formula Product Table lists the names of the 0 ~ 99 Formulas in memory.

--	--	--

-SCALE PROGRAM TABLE-

	SCALE-1	SCALE-2	SCALE-3
D.P. LOCATION	*.....*	*.....*	*.....*
CAPACITY	*.....*	*.....*	*.....*
ZERO BAND	*.....*	*.....*	*.....*
T1 (S)	*.....*	*.....*	*.....*
T2 (S)	*.....*	*.....*	*.....*
T3 (S)	*.....*	*.....*	*.....*
W1	W2	A1	A2
***	***	***	***
BATCH SIZE LIMIT			
PRINT EACH BATCH WEIGHT DATA			
Y/N?			
T1: MAX WEIGHING TIME (S)			
T2: MAX VALID TIME (S)			
T3: DISCHARGE START TIME (S)			
EDIT (1) DELETE (2) PRINT (3)			
KEY IN DESIRED NUMBER			

--	--	--

4-1 SCALE PROGRAM TABLE

- a) Decimal Point Location. This can be set to one, two or three decimal places and should not be changed at a later date as to do so will interfere with the Grand Total/Sub Total accumulated memory and render it inaccurate.
- b) Maximum Capacity. Set the maximum capacity up to which each scale may weigh (5 digits, 0 ~ 50,000). If this weight value is exceeded by +10 counts (minimum divisions) the weight display in weighing mode will blank for that scale and + will be displayed and Hi Limit signal will be output.
- c) Zero Band. When the weight in the weighing hopper falls to within this band the hopper will be assumed to be empty and a scale zero signal will be transmitted (4 digits, 0 ~ 9999).
- d) T1 (S) Maximum Weighing Time (before time over). If the time from the start of each weighing event to the end exceeds this time then a time over signal will be output. Faults of this nature may occur when a discharge chute becomes blocked (or if a bin is empty) and the target weight cannot be reached within time. T1 (S) can be set from 0 to 999 seconds but if 0 is set, no time over signal will ever be output.
- e) T2 (S) Maximum Valid Time. This time represents the time taken for the weighing system to become stable after the gates have closed completely. If the weight was calculated from an analogue input at the point in time when the gates closed, the weight value would be clearly invalid. Thus several seconds should pass before the analogue output from the load cell could be considered to be a valid representation of the Final Weight value. Free Fall must be given time to arrive and mechanical oscillations time to decay. This time can be set from 0 to 9.9 seconds.
- f) T3 (S) Discharge Start Time (0 ~ 99 seconds). Time delay between the arrival of the discharge signal and discharge start. Separate settings for wet and dry ingredients.

--	--	--

g) BATCH SIZE LIMIT $(\ast. \ast Yd^3) / m^3$. Set the Batch Size Limit with reference to the capacities of the mixer, and/or scales, in use.

h) Each data setting table has three display modes:-

"EDIT (1), DELETE (2) & PRINT (3)".

EDIT (1) mode permits the operator to change data entered in the table. After pressing 1 the display will be in Edit mode and the cursor can be moved around the screen by means of the 4 arrow keys. Place the cursor on top of the character space to be edited, type in the new data and then press ENTER.

Press F1 to exit Edit mode and then proceed to REGISTER the fresh data with the security key switch turned to "REG", answer the question REGISTER OK? Y/N with YES unless you have made a mistake. If you do not register the correction, the old data will remain in the memory backed up by the battery and the new data will be lost when you exit this table, YOU HAVE BEEN WARNED!!

DELETE (2) mode will clear all entered data if the question DELETE OK? Y/N is answered with YES when the security switch is turned to "REG". In the case of the Scale Program Table, Capacity will revert to 10,000 and D. P. Location, Zero Band, T1, T2 and T3 will all be reset to 0. MAX CAPACITY OF MIXER will be reset to $1Yd^3 / 1.00m^3$, PRINT EACH BATCH & JOB WEIGHT DATA Y/N? will be set to YES and PRINT JOB WEIGHT DATA Y/N? will also be set to YES.

PRINT (3) may be used to obtain a hard copy print-out of the data set in each table but this command will only work if the keyboard Printer key LED is ON.

Press MENU in order to be able to return to the Menu display so that you may select the next setting table to be edited.

- MATERIAL TABLE -

PAGE A

INGRED" T	BIN	#	E. F.	A. F.	F. O.	LIMIT	LITER
NAME							/P LBS
# 0 *.....*	* *		*.....*		*.....*		* * *

```

4 * ..... * * * * *
N * ..... * * * * *
G * ..... * * * * *
R * ..... * * * * *
E * ..... * * * * *
D * ..... * * * * *
" * ..... * * * * *
T * ..... * * * * *
B * ..... * * * * *
- * ..... * * * * *
N * ..... * * * * *
# * ..... * * * * *
S * ..... * * * * *
O * ..... * * * * *
J * ..... * * * * *
F * ..... * * * * *
. * ..... * * * * *
F * ..... * * * * *
Y * ..... * * * * *
D * ..... * * * * *
A * ..... * * * * *
\ * ..... * * * * *
S * ..... * * * * *
E * ..... * * * * *
F * ..... * * * * *
. * ..... * * * * *
F * ..... * * * * *
- * ..... * * * * *
O * ..... * * * * *
T * ..... * * * * *
. * ..... * * * * *
P * ..... * * * * *
R * ..... * * * * *
E * ..... * * * * *
M * ..... * * * * *

```

```

0-----*-----*
1-----*-----*
2-----*-----*
3-----*-----*
4-----*-----*
DELETE(1) IN DELETED(2) PRINT(3) USE
KEY-----*-----*

```


--	--	--

-MATERIAL TABLE-

PAGE B

Y/N = USE OR NOT USE

INGRED" T
NAME

M.O.

LIMIT (%)
HI LO

G.TIMER(S)
OPEN CLOSE

.....

.....

.....

.....

.....



CHARACTER INPUT CODE

A 00	B 01	C 02	D 03	E 04	F 05	G 06	H 07	I 08	J 09	K 10	L 11	M 12
N 13	O 14	P 15	Q 16	R 17	S 18	T 19	U 20	V 21	W 22	X 23	Y 24	Z 25

26	[
27	¥
28]
29	^
30	_
31	\

a 32	b 33	c 34	d 35	e 36	f 37	g 38	h 39	i 40	j 41	k 42	l 43	m 44
n 45	o 46	p 47	q 48	r 49	s 50	t 51	u 52	v 53	w 54	x 55	y 56	z 57

59	//
60	#
61	\$
62	%
63	&
64	'
65	(
66)
67	*
68	+
69	.
70	-
71	.
72	/

73 ↓ 99	SP
---------------	----

4-2 MATERIAL TABLE

Access the Material Table by pressing "2" and then "ENTER". When in Material Table display mode you will be required to provide information on two screens (screen A and screen B) concerning the materials which are to be weighed. These materials will be referred to as "Ingredients" as they are the elements of "Formulas" which will be set-up in the Formula Table. In the Material Table you will be required to tell the Controller which ingredients you have put in which bins and which scales these bins are connected to via discharge chutes. The Controller will start at the top of the Formula Table and work down. Dry ingredients listed in the Material Table in bins 1 to 10 (ingredients 5~14) should also be grouped logically for ease of operation. Liquids like water will be measured by volume, via flow meters, during dry ingredient discharge and can only occupy W1~A3 (ingredients 0~4). As weight rather than volume, one litre of water weighs one kilogram (at 4°C) and one imperial gallon of water weighs ten pounds avoirdupois (at 62°F).

The letters of ingredient names may be input via two number codes when the CHAR INPUT key LED is ON (see the code table).

MATERIAL TABLE SCREEN A

Press NEXT PAGE to switch to Material Table Screen B

a) Ingredient Name. Up to 15 ingredient names of 8 character spaces may be stored in memory (10 "dry" and 5 "wet"). Names entered on screen A are copied on to screen B automatically. The CLEAR key may be used to delete mistakes made during entry.

After registering your Material Table obtain a print out of the table (screen A and screen B) as this will help you to make up formulas in the Formula Table.

b) Bin Number. Where will the dry ingredient be stored, which bin is connected by a discharge chute to the scale specified above?

c) Scale Number. Having entered a dry ingredient name you should next inform the Controller where the ingredient will go or which scale it will be weighed in.

d) Free Fall. (F.F.) How much Free Fall is there likely to be when considering this wet/dry material and the length of the discharge chute? Answer this question with a weight value between 0 and 9999 (any unit) and ENTER. The cursor will next stop under A.F.F.C. (automatic free fall compensation) if you wish to take advantage of this function press YES and "USE" will be placed next to the F.F. weight value (if you press NO the space will remain blank). The first weighing event will be based on your estimation of F.F. but for subsequent events the F.F. setting will be based on the Controller's experience of what actually happened last time. With the key turned fully counterclockwise, a delete command will delete only the Free Fall settings leaving all other settings intact.



e) Limit (to AFFC). Obviously the Controller should be given parameters within which to work when it is drawing inferences from the implications of past F. F. weighing events or it could derive outrageous suppositions from a system fault!! The weight value limits within which AFFC may function can be set from 0 to 9999 and if these limits are exceeded the Controller will assume that there has been some kind of fault (eg. gate failure) and will revert to the previous F. F. setting.

f) Flow Meter pulse. LITER/PLS or GALLON/PLS for specifications of the flow meter used. i.e. How many pulse signals will be sent for each gallon (US or Imperial) or each liter? Do not set 0.000!

g) Preliminary. At this point in time the Controller will send a signal to the gates controlling the rate of discharge from the bins in order to cut full (dry material) flow to dribble flow. TEE (Time Extrapolated Estimation) will switch on so that the Controller may accurately assess when the gates should be closed completely (at pre-act). This, preliminary weight value point in time before the target/final weight has been reached, can be set from the target/final weight value less 0 to 9999 units. Thus, if the target weight is 10,000lb and you wish the flow to be cut to dribble at 9,000lb, set PRELIM at 1000 (lb).

MATERIAL TABLE SCREEN B

a) Ingredient name will automatically be copied from screen A. On screen B you will be required to enter data concerning Hi & Lo limit final weight parameters, moisture content of "dry" materials and an accurate estimation of the period of time (in seconds) it will take the bin gates to open and to close.

b) Hi/Lo Limit. If the final weight must be very accurate you may wish to set Hi and Lo limit parameters. Hi/Lo limits may be set from 0 to 99.9%. If the target weight is 100.00kg (capacity is 20000 divided by 2 "D") and the final weight must be at least 99.80kg and not more than 100.20kg, set both Hi and Lo Limits to .20 (0.20kg); if 0 is set the function will switch OFF. If the Hi limit is exceeded an overweight signal will be transmitted and AD-4335C will stop and wait for a compulsory finish signal or Error Reset but if the Lo limit is not met the Controller will automatically attempt (up to 10 times) to add a bit more of the ingredient to make up the difference and bring the final weight to within limits. If it still remains Lo, AD-4335C will stop to wait for a Compulsory Finish or Error Reset signal.

c) Gate opening time. The amount of time it takes for the gate to open may be set from 0 to 9.9s in steps of 0.1s (rounded down if not correct).

d) Gate closing time. The amount of time it takes for the gate to close may be set from 0 to 9.9s in steps of 0.1s (rounded down if not correct).

e) M. C. (Moisture Content) is a special setting for "dry" materials like sand which may nevertheless be "holding" considerable quantities of water. Moisture content should be entered as a percentage of the material weight (for 4 ingredients max.) so that adjustments can be made to compensate for this water. A & D manufactures an Infra-red Moisture Balance (EY-220M) which can be used to find the moisture content of materials like sand. M. C. percentage can be set only in Weighing Display Mode and not during Material Table Screen B display mode.

PRINTOUT SAMPLES

-MATERIAL TABLE-

PAGE A

24/ 4/86 16:47

INGRED'T	BIN	A.F.F.C.	LITER
#	NAME	#	F.F. Y/N LIMIT /1PLS
0	WATER 1 W1	0.0 USE 1.0	0.100
1	WATER 2 W2	0.00 USE 0.10	0.002
2	ADDIT 1 A1	0.00 USE 0.10	0.002
3	ADDIT 2 A2	0.00 USE 0.10	0.001
4	ADDIT 3 A3	0.00 USE 0.10	0.001

INGRED'T	BIN	SCL	A.F.F.C.	PRE
#	NAME	#	#	F.F. Y/N LIMIT LIM.
5	CEMENT 1	1	1	2.6 USE 20.0 10.0
6	CEMENT 2	2	1	2.5 USE 20.0 10.0
7		1	1	0.0 0.0 0.0
8		1	1	0.0 0.0 0.0
9	AGG 1	4	2	21.0 USE 40.0 60.0
10	AGG 2	5	2	17.3 USE 40.0 65.0
11	SAND 1	6	2	14.2 USE 40.0 70.0
12	SAND 2	7	2	27.5 USE 40.0 50.0
13		1	1	0.0 0.0 0.0
14		1	1	0.0 0.0 0.0

-MATERIAL TABLE-

PAGE B

24/ 4/86 16:48

Y/N= USE or NOT USED

INGRED'T	M.C.	LIMIT (%)	G.TIMER(S)
NAME	HI	LO	OPEN CLOSE
CEMENT 1	10.0	2.0	1.0 1.0
CEMENT 2	10.0	2.0	2.0 2.0
	10.0	2.0	3.0 3.0
	0.0	0.0	0.0 0.0
AGG 1	0.4 10.0	3.0	0.3 0.5
AGG 2	10.0	3.0	1.0 0.5
SAND 1	0.2 10.0	4.0	1.0 0.5
SAND 2	0.3 10.0	2.0	2.0 1.0
	0.0	0.0	0.0 0.0
	0.0	0.0	0.0 0.0

--	--	--

PRINTOUT SAMPLES

-SCALE PROGRAM TABLE- 24/ 4/86 16:46

	SCALE-1	SCALE-2
D.P.LOCATION	1	1
CAPACITY	600.0	3000.0
ZERO BAND	2.0	5.0
T1 (S)	20	50
T2 (S)	2.0	2.0
T3 (S)	2	2

	W1	W2	A1	A2	A3
T3 (S)	0	0	3	3	3

MAX VOLUME OF BATCH (1.00 m3)

PRINT EACH BATCH WEIGHT DATA Y/N?(YES)

PRINT JOB WEIGHT DATA Y/N? (YES)

T1: MAX WEIGHING TIME (S)

T2: MAX VALID TIME (S)

T3: DISCHARGE START TIME (S)

-FORMULA TABLE- 24/ 4/86 16:49

		FORMULA #	50
		PRODUCT	CONCRETE
INGREDIENT	BIN SCL	FINAL VOL/WT	
NAME	# #		
WATER 1	W1	180.0	l
WATER 2	W2	0.00	l
ADDIT 1	A1	2.00	l
ADDIT 2	A2	1.50	l
ADDIT 3	A3	0.00	l
CEMENT 1	1 1	200.0	kg
CEMENT 2	2 1	150.0	kg
	1 1	0.0	kg
	1 1	0.0	kg
AGG 1	4 2	450.0	kg
AGG 2	5 2	530.0	kg
SAND 1	6 2	500.0	kg
SAND 2	7 2	290.0	kg
	1 1	0.0	kg
	1 1	0.0	kg

--	--	--

4-3 FORMULA TABLE

Access the Formula Table by pressing "1" and then "ENTER". When in Formula Table Mode you will be required to provide information concerning the Formula Code #, the Product name and the Final or target weight/volume for each ingredient. The total volume of one formula must equal one cubic metre or one cubic yard (m^3 or yd^3). 1000 litres of water weighs one tonne and has a volume of $1m^3$. One Imperial gallon weighs exactly 10lb with a volume of 277.42 cubic inches. One US gallon weighs about 8.344lb with a volume of 231 cubic inches. One cubic yard contains 46,656 cubic inches (168.18 imp. gal. or 201.97 US gal). The volume of dry materials will vary according to their density (kg/m^3 or lb/yd^3).

Entering an Ingredient code number in the column next to a Formula table line number will automatically recall the ingredient name associated with that number. All the other data concerning each ingredient (set up in the Material Table) is implicitly understood by the Controller and, apart from the Scale and Bin number, not displayed in this table. You may wish to separate displayed data concerning one scale from another by "ENTERING" a blank line between the data blocks but such spaces will not be printed.

Up to 15 ingredients (10 dry/5 wet) may be entered for each Formula and up to 100 Formulas may be registered in the basic Controller's memory.

The display modes EDIT (1), DELETE (2) & PRINT (3) were all explained in the SCALE PROGRAM section of this manual; RECALL (4) permits you to jump to another Formula after the display:-

"KEY IN FORMULA # & "ENTER"."

Remember to REGISTER your Formulas and Ingredients in the Formula & Material Tables!! If a new formula is similar to another previously registered, recall the old formula, change the name, number and one or two ingredients and then re-register this new formula.

FORMULA TABLE

- a) Formula Code #. 0 ~ 99.
- b) Product Name (or number). Enter letters via the CHAR [acter] INPUT key as for the ingredient names (8 character spaces available).
- c) Final Value. This value for l/gal and kg/lb represents the ideal target value for each ingredient (0 to 50000).

①

ING.	B.C.	F.O.B.
ING.	B.S.	F.O.B.
ING.	B.S.	F.O.B.

②

ING.	B.S.	F.O.B.
ING.	B.S.	F.O.B.
ING.	B.S.	F.O.B.

③

ING.	B.S.	F.O.B.
ING.	B.S.	F.O.B.
ING.	B.S.	F.O.B.

7

--	--	--

5. WEIGHING DISPLAY

- ① DATE/TIME (DATE/MONTH/YEAR HOUR/SECOND)
- ② PRODUCT NAME
- ③ FORMULA #
- ④ JOB SIZE (TOTAL OF BATCHES EQUALS JOB SIZE)
- ⑤ W1 TARGET FLOW COUNT
- ⑥ W2 PRESENT FLOW COUNT
- ⑦ INGREDIENTS FOR MOISTURE COMPENSATION (ENTER MATERIAL #)
- ⑧ SETTING OF PERCENTAGE OF MOISTURE CONTENT
- ⑨ ING */* (INGREDIENT NUMBER IN BATCH BEING WEIGHED)
- ⑩ NAME OF INGREDIENT BEING WEIGHED
- ⑪ FINAL WEIGHT SETTING OF DRY INGREDIENT
- ⑫ FREE FALL ESTIMATION FOR INGREDIENT
- ⑬ B. C. BATCH COUNT */* AND B. S. BATCH SIZE *. ** m³ OR Yd³
- ⑭ NET WEIGHT
- ⑮ GROSS WEIGHT
- ⑯ ERROR COMMENTS - 1 "ZERO ERROR" OR "A/D ERROR"
- ⑰ ERROR COMMENTS - 2 "UNDER", "OVER" OR "STOP"
- ⑱ "WEIGHING", "COMPLETE", "FINISH", "G. OPEN" OR "G. CLOSE"
- ⑲ OTHER MESSAGES
- ⑳ OTHER MESSAGES

WEIGHING DISPLAY MODE OPERATION

- BASIC OPERATION

a) In weighing mode "KEY IN FORMULA # & ENTER" will be displayed at position 19 and the cursor will flash at position 3. Enter the FORMULA# that you desire to weigh and the corresponding FORMULA NAME (PRODUCT) will be displayed.

b) 4335C will display "KEY IN JOB VOLUME & ENTER" at 19. Enter desired volume.

c) 4335C will display "MOISTURE TABLE MODIFIED? Y/N" at position 19. If you enter "No", 4335C will proceed to step (d). If you enter "YES", the cursor will start flashing at position 7 "Moisture Table", enter the MATERIAL CODE (5-14) for the material on which you wish to perform water compensation. If you enter a CODE other than 5-14, this area will blank and the cursor will proceed to the next material. Enter the CODE and AD-4335C will display the material name. Cursor proceeds to the area 5, enter water content (2/2). Using above procedure, you can compensate moisture from 0~99.9% against 4 materials. When editing is finished, press "F3" and you can exit MOISTURE TABLE. AD-4335 will display "REGISTER OK Y/N?" If you press "Yes" the data you edited now will be memorized. If you press "NO" the data before editing will be displayed.

d) Next, 4335C will automatically compensate the volume and weight of each data according to JOB Volume.

- VOLUME AND WEIGHT COMPENSATION

* In case JOB VOLUME (4) does not equal 1m^3 (1yd^3) and is less than the "BATCH SIZE LIMIT" set in the Scale Program table, AD-4335C will compensate for volume and weight by multiplying ($\text{JOB VOLUME}/1.00\text{m}^3$) with the FINAL WEIGHT of each ingredient in the FORMULA TABLE.

Example:-

· JOB VOLUME = 2.5m^3

· $W_1 = 51$

· BATCH SIZE LIMIT = 3m^3

· Dry material (SAND) = 60kg

$$W_1 : 51 \times 2.5\text{m}^3 \div 1\text{m}^3 = 12.51$$

$$\text{SAND} : 60\text{kg} \times 2.5\text{m}^3 \div 1\text{m}^3 = 150\text{kg}$$

* If the JOB VOLUME is more than the "BATCH SIZE LIMIT", AD-4335 will weigh in some batches automatically. You will get the information on each batch at B.C. and B.S. First of all, JOB VOLUME will be divided by "BATCH SIZE LIMIT" and you will know how many times AD-4335 will weigh. If there are no fractions remaining (a round number), the value of "BATCH SIZE LIMIT" will be set in "B.S." and the round number will be set is "B.C.". If there is a fraction remaining, "JOB VOLUME" will be divided by "round number + 1" until two decimal points and the answer will be set in "B.S." and "answer + 1" will be set is "B.C." Fractions remaining will be added to the last batch.

--	--	--

Example:-

JOB VOLUME = 8.10m^3 , BATCH SIZE LIMIT = 2.5m^3

$W_1 = 5\text{ l}$, SAND = 60 kg

8.10m^3 (JOB VOLUME) \div 2.5m^3 (BATCH SIZE LIMIT) = 3 (round)
+ fraction remaining

Since you have a fraction, AD-4335C calculate as below :

$8.10\text{m}^3 \div (3 + 1) = 2.02 + 0.02$

Thus "B. C." is 4 & "B. S." is 2.02 ($2.02 \times 4 = 8.08$) but the final batch will be $2.02 + 0.02 = 2.04$ ($2.02 \times 3 = 6.06 + 2.04 = 8.10$).

-MOISTURE COMPENSATION

After compensating for volume & weight and if there is a Dry Material which requires moisture compensation among the Dry Materials, the following procedure for MOISTURE COMPENSATION should be done to the Dry Material and W_1 .

Example:-

$W_1 = 50\text{ l}$, SAND = 100 kg, Moisture content = 10.0 % of the weight

$100\text{kg} \times 10.0 \div 100 = 10\text{ kg}$

Thus, FINAL VALUE will be changed as below :

SAND..... 100 kg + 10 kg = 110 kg

W_1 50 l - 10 l = 40 l

In this calculation, 1 liter of Water equals 1 kg,

1lb of Water equals 0.1 imp. gal. (16 imp. fluid ounces) or 0.1198 US gal.

After water compensation, the following will checked and error comments may be displayed.

* The total of the FINAL WEIGHTS in each scale exceeds the "CAPACITY" in Scale Program table.

"ERROR SCALE * CAPACITY OVER"

* When θ is set for "Liter/PLS" in Material Table,

"ERROR ** / PLS = θ "

* Input PULSE counts for the FINAL VALUE exceed 64,000.

"ERROR ** COUNTER OVER"

* FINAL VALUE for W_1 after water compensation is less than θ .

"ERROR ** < θ "

After displaying the ERROR Comments above, AD-4335C will return to weighing procedure (1).

--	--	--

After finishing all compensations and if no error was found, AD-4335 will display data at 9, 10, 11, 12 and 5, 6, at $W_1 \sim A3$.

READY signal & START OK signal of CH/ Bin Selection Output Board will be ON and now AD-4335 is ready to receive START signal. (NO. 1 A/D board Start Sig.)

If you wish to quit weighing here, press key "F". AD-4335 will return to Weighing Mode Operation - (1).

WEIGHING

1) If START signal is input, each scale will start weighing. First of all, BIN selection signal is output, AZ (Zero Null) functions and FULL flow and Dribble below signal will be generated. (After second material, AD-4335 will tare the former materials. Thus, only NET display 14 will be 0). When the weight reaches preliminary and final weight, Full flow and Dribble flow signal will be OFF. After the interval set in Scale program table T2, AD-4335 will judge Hi & Lo limits and calculate the data for A. F. F. C.

If the result was LO and open/close for gate timer are set in Material Table, AD-4335 will start filling again.

If the weight data still exceeds Hi or Lo limit, AD-4335 will stop weighing until "ERROR reset sig. " has been input.

2) If the weight was within Hi & Lo limit or "ERROR RESET SIG" was input, AD-4335 will start next weighing after a 2 second interval. Former weight data will be taken into memory and will be used for TOTAL print out and so on.

When all the weighing of every scale has finished, "All weighing finished" signal will be output and AD-4335C will wait for a "DISCHARGE" signal.

DISCHARGE

1) If "DISCHARGE sig. " is input, the weighing data of the last material will be taken into the memory and AD-4335 will prepare to measure the liquid materials. After the interval set in T3 of Scale program table, AD-4335 will start discharging and measuring liquid flow meter pulses.

Dry materials will be discharged with "DISCHARGE GATE CONTROL sig. " after the interval set in T3. (Simultaneously "G. open" comment will be displayed)

As discharge proceeds, the weight will come within the ZERO BAND. After an interval of 3 min., DISCHARGE GATE CONTROL sig. will go off. (Simultaneously "G. CLOSE" will be displayed.)

--	--	--

2) When all scales finish discharging, AD-4335 will check if a "START" signal is input or, if it's off, AD-4335 will wait for the "START" sig. If printing, AD-4335C will wait until printing finishes.

If it's ON, AD-4335 will start a new calculation of moisture compensation. Moisture compensation data that were changed during the last weighing will be applied at this stage.

If the final value of W_1 is less than zero after calculation using the new data of moisture content, an ERROR message will be displayed. In this case, change the moisture content data and input "ERROR RESET" sig. AD-4335 will perform MOISTURE COMPENSATION again.

3) AD-4335 checks start signal again and if it's ON, each scale will start weighing. When weighing finishes and if the printing of last batch finishes, AD-4335 will wait for a DISCHARGE signal. But if printing has not finished yet, AD-4335 will wait until it finishes and then wait for a start signal.

4) After an interval of T_3 , you should input each control signal for the liquid material ($W_1 \sim A_3$) and they will start being measured. If they reach the final value, the control signal will go OFF and, after 2 or 3 seconds, the measured data will be memorized. If all discharge and measurement (pulse count) of all scales and flow meters finish, AD-4335 will print out the data of one batch. If it is the final batch, AD-4335 will print out JOB TOTAL after printing the batch.

NOTE

You can change the moisture compensation data during weighing or discharging. However the data is effective only from the first weighing event of the next batch. Meantime, while changing the moisture compensation data, you cannot proceed to the next job. Please finish data change as soon as possible.

F2 key - START changing the moisture compensation data

F3 key - FINISH

GENERAL NOTES FOR INSTALLATION

1. When you take out or replace an A/D logic board or memory board from the main unit. -
Power on right after put the board in and also input signal of AZ/Zero Null reset and Tare reset.

(Zero Null reset A/D logic board I/O Terminal B9 - B12)

(TARE reset B10 - B12)

If you don't do that,

* Weight display may blank.

* Internal clock may be inaccurate.

* The data in Formula table and Total function may become inaccurate.

--	--	--

2. Do not power off or input result signal while weighing! -

If you do the weight display may show a big number with (-) in case TARE data is entered. When you have a problem like this, input a TARE reset signal. Meantime, if you power off while in DELETE mode, the data in the table may be lost and you may get an ERROR message. In that case, please INITIALIZE the table and input all the data again.

3. DO NOT POWER-ON WHILE DISCONNECTING THE LOAD CELL CONNECTORS !

If you do you may get A/D ERROR message, turn off the power, connect the load cell connectors, wait for a minute and power on again.

4. BE SURE TO SECURE THE BOARDS ON THE MAIN FRAME.

If you don't they may not be connected to the main frame properly and you may develop a problem.

I/O TERMINALS OF A/D BOARD

*** OUTPUT SIGNAL**

1. Hi/Lo Limit signal will come on when the weighed value is outside the limits set in the Material Table.

2. A/D Error signal will be output when the CPU cannot read the A/D data. It will also be output when SW-1 segment 7 of the A/D board is set off (command communication with the main unit disabled).

3. Time over will be output when weighing time exceeds "T1" set in the scale program table.

4. Scale zero error will be output if you press SCALE ZERO for a value greater than 500 counts \times 1, 1000 counts \times 2 or 2500 counts \times 5.

*** INPUT SIGNAL**

1. Scale 1~3, W₁ ~ A₃ - FINISH
COMPULSORY FINISH

--	--	--

(37)

PRINTOUT SAMPLES

-SUB TOTAL MATERIAL-

24/ 4/86 17: 0

INGRED'T BIN SCL

NAME	#	#	TOTAL
WATER 1	W1		891.5 l
WATER 2	W2		0.00 l
ADDIT 1	A1		10.00 l
ADDIT 2	A2		7.50 l
ADDIT 3	A3		0.00 l
CEMENT 1	1	1	999.4 kg
CEMENT 2	2	1	749.5 kg
	1	1	0.0 kg
	1	1	0.0 kg
AGG 1	4	2	2258.0 kg
AGG 2	5	2	2648.5 kg
SAND 1	6	2	2503.0 kg
SAND 2	7	2	1449.0 kg
	1	1	0.0 kg
	1	1	0.0 kg

-GRAND TOTAL MATERIAL-

24/ 4/86 17:10

INGRED'T BIN SCL

NAME	#	#	TOTAL
WATER 1	W1		1939.3 l
WATER 2	W2		0.00 l
ADDIT 1	A1		22.00 l
ADDIT 2	A2		16.50 l
ADDIT 3	A3		0.00 l
CEMENT 1	1	1	2198.8 kg
CEMENT 2	2	1	1648.9 kg
	1	1	0.0 kg
	1	1	0.0 kg
AGG 1	4	2	4968.5 kg
AGG 2	5	2	5827.5 kg
SAND 1	6	2	5508.0 kg
SAND 2	7	2	3188.0 kg
	1	1	0.0 kg
	1	1	0.0 kg

-GRAND TOTAL PRODUCT-

24/ 4/86 16:55

PRODUCT

#	NAME	TOTAL
0	FFF 0	0.00 m3
1	FFF 1	0.00 m3
2	FFF 2	0.00 m3
3	FFF 3	0.00 m3
50	CONCRETE	3.00 m3

specs-4335C-002a/b-v. 1

--	--	--

(38)

24/ 4/86 16:58 B.C. 1/ 2
 F.NAME CONCRETE(50) B.SIZE 1.00 m3
 M.C. SAND 1(0.2%) SAND 2(0.3%)
 AGG 1(0.4%)

NAME	BIN	SCL	FINAL	
WATER 1	W1		176.3	176.3 l
ADDIT 1	A1		2.00	2.00 l
ADDIT 2	A2		1.50	1.50 l
CEMENT 1	1 1		200.0	199.9 kg
CEMENT 2	2 1		150.0	149.9 kg
AGG 1	4 2		451.8	451.5 kg
AGG 2	5 2		530.0	530.0 kg
SAND 1	6 2		501.0	500.5 kg
SAND 2	7 2		290.9	290.0 kg

24/ 4/86 16:59 B.C. 2/ 2
 F.NAME CONCRETE(50) B.SIZE 1.00 m3
 M.C. SAND 1(0.2%) SAND 2(0.3%)
 AGG 1(0.4%)

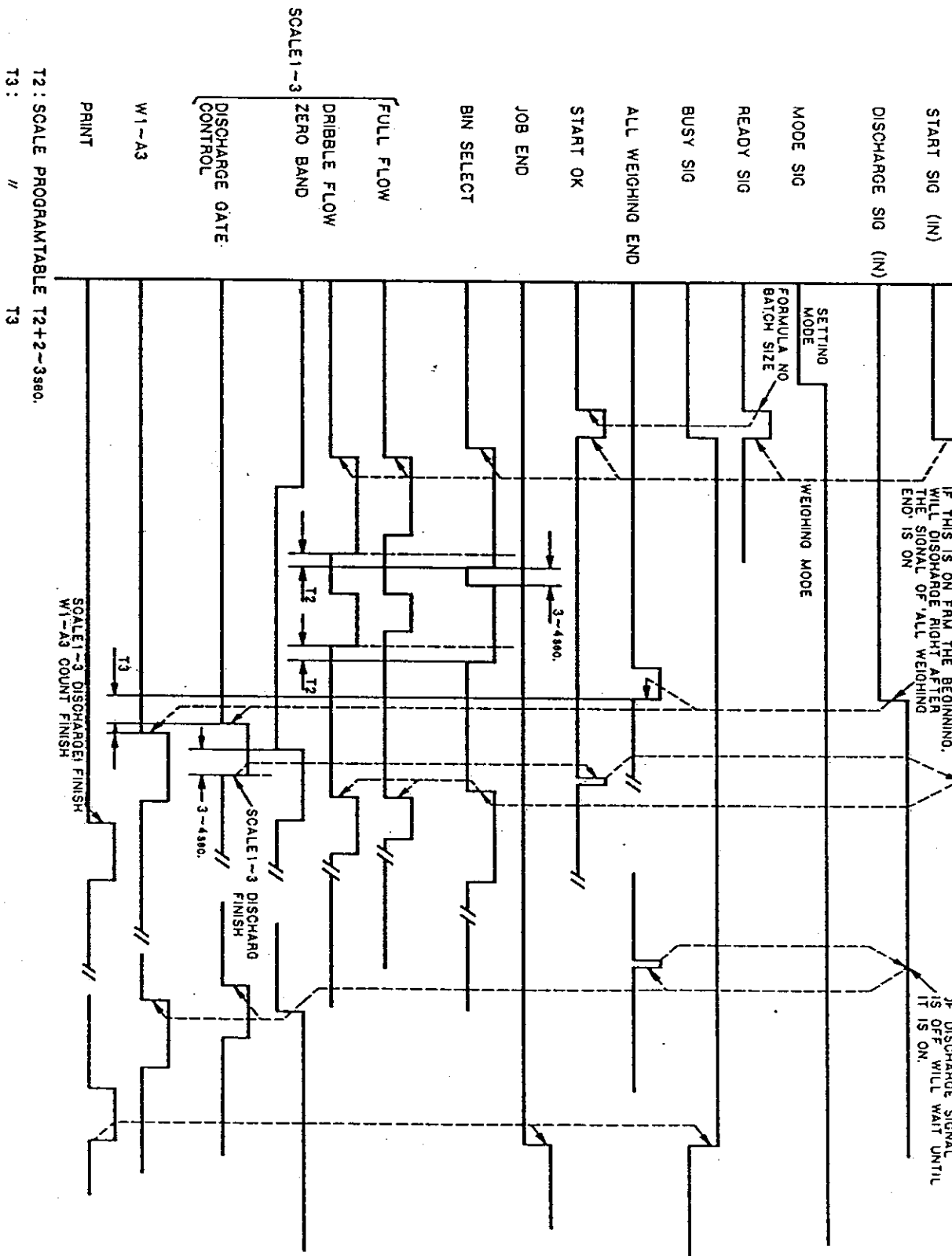
NAME	BIN	SCL	FINAL	
WATER 1	W1		176.3	176.3 l
ADDIT 1	A1		2.00	2.00 l
ADDIT 2	A2		1.50	1.50 l
CEMENT 1	1 1		200.0	199.9 kg
CEMENT 2	2 1		150.0	149.9 kg
AGG 1	4 2		451.8	452.0 kg
AGG 2	5 2		530.0	529.5 kg
SAND 1	6 2		501.0	500.5 kg
SAND 2	7 2		290.9	290.0 kg

JOB WEIGHT DATA

24/ 4/86 16:59
 F.NAME CONCRETE(50) JOB VOLUME 2.00 m3
 M.C. SAND 1(0.2%) SAND 2(0.3%)
 AGG 1(0.4%)

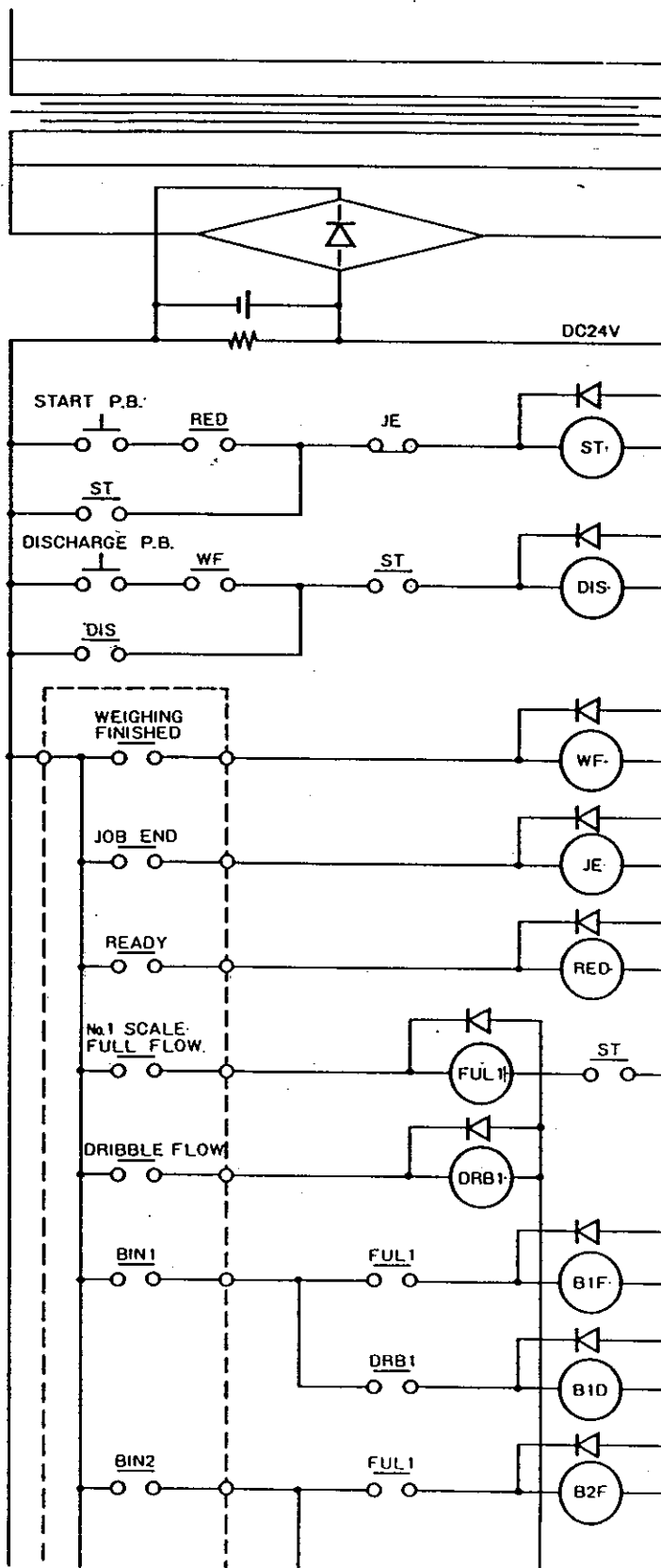
NAME	BIN	SCL	FINAL	
WATER 1	W1		352.6	352.6 l
ADDIT 1	A1		4.00	4.00 l
ADDIT 2	A2		3.00	3.00 l
CEMENT 1	1 1		400.0	399.8 kg
CEMENT 2	2 1		300.0	299.8 kg
AGG 1	4 2		903.6	903.5 kg
AGG 2	5 2		1060.0	1059.5 kg
SAND 1	6 2		1002.0	1001.0 kg
SAND 2	7 2		581.8	580.0 kg

TIMING CHART

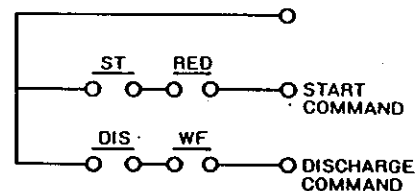


specs-4335C-002a/b-v. 1

EXTERNAL CIRCUIT EXAMPLE



TO AD4335



START CONTROL

DISCHARGE CONTROL

WEIGHING FINISHED

JOB END

READY

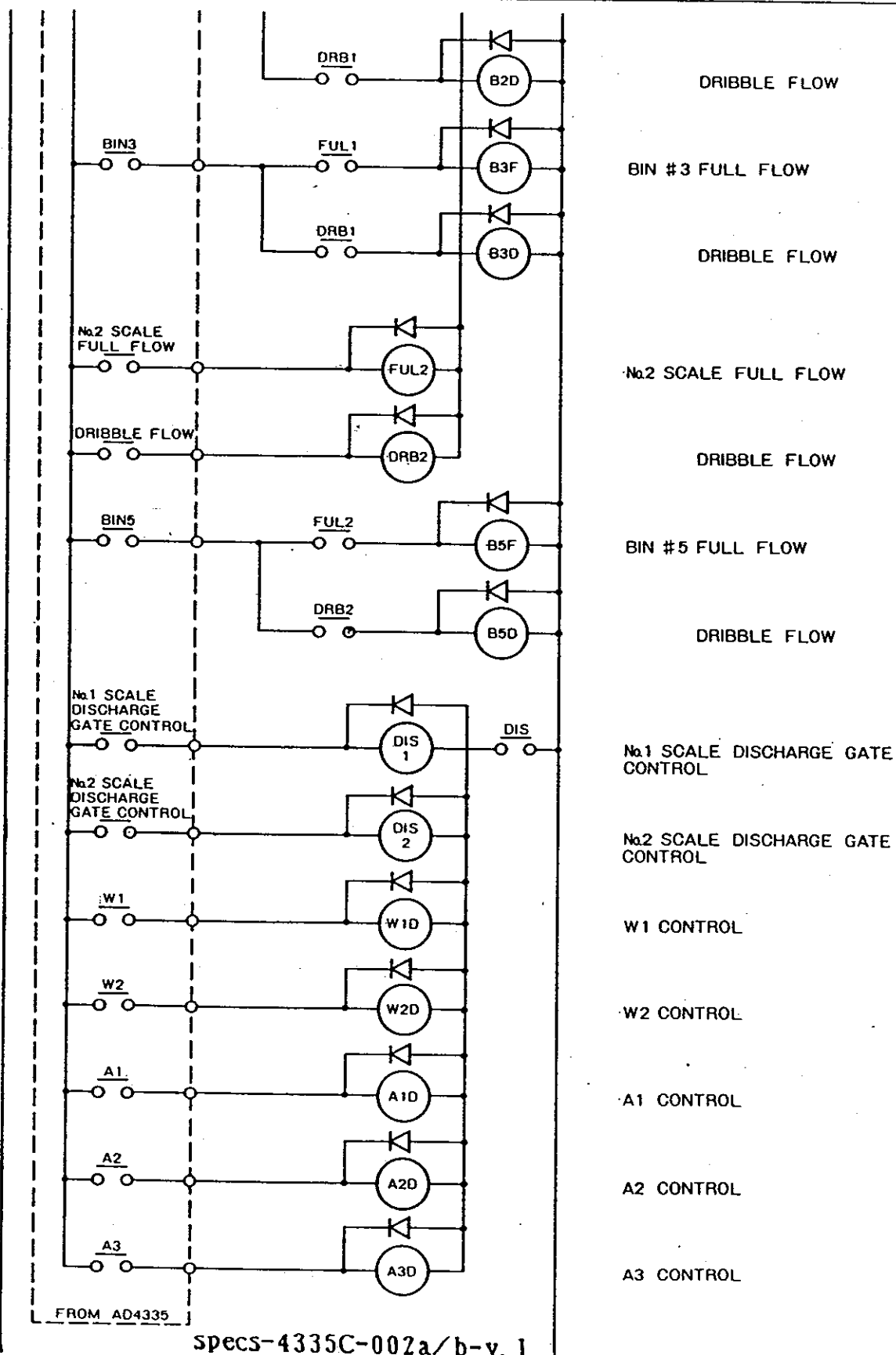
No.1 SCALE FULL FLOW

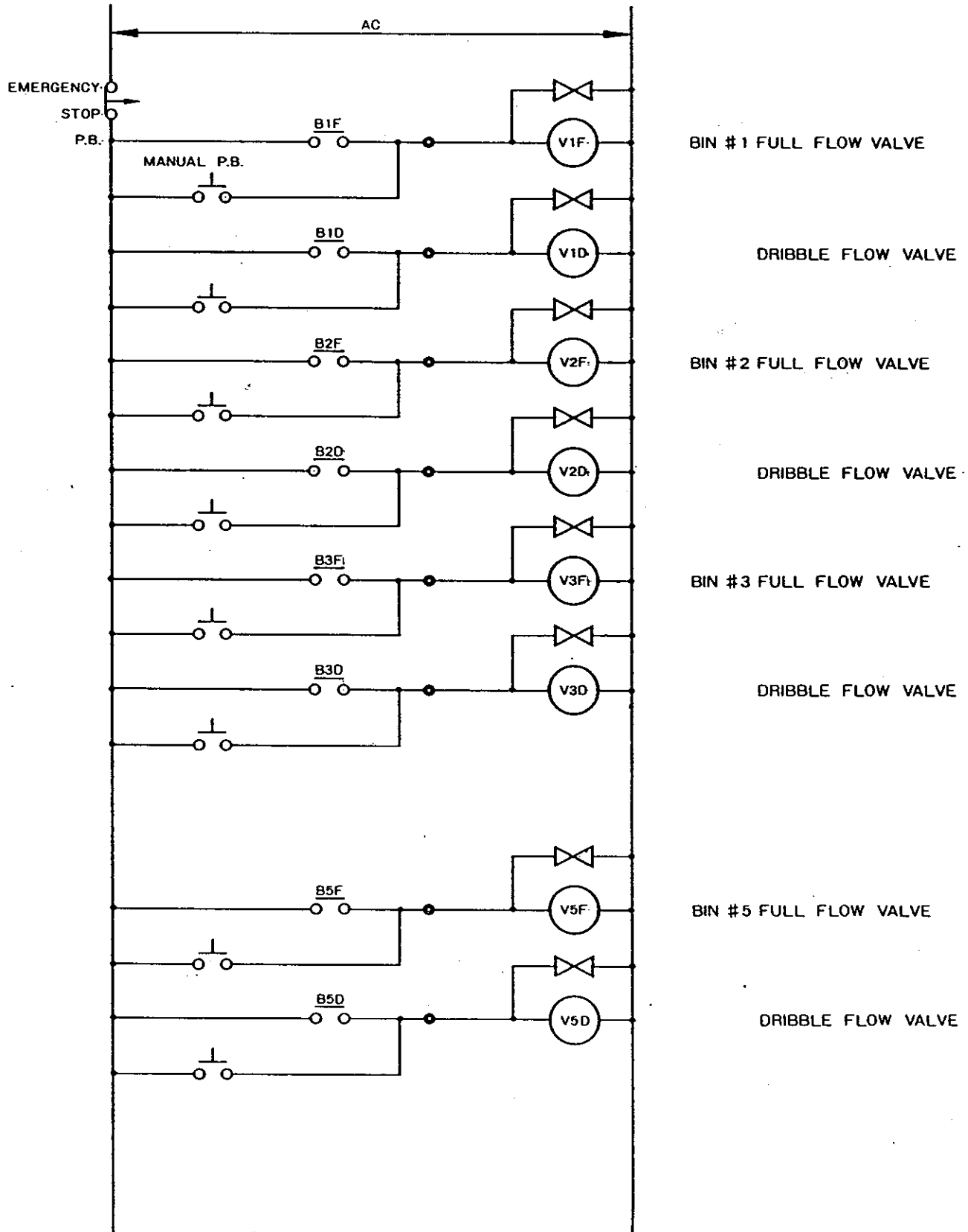
DRIBBLE FLOW

BIN #1 FULL FLOW

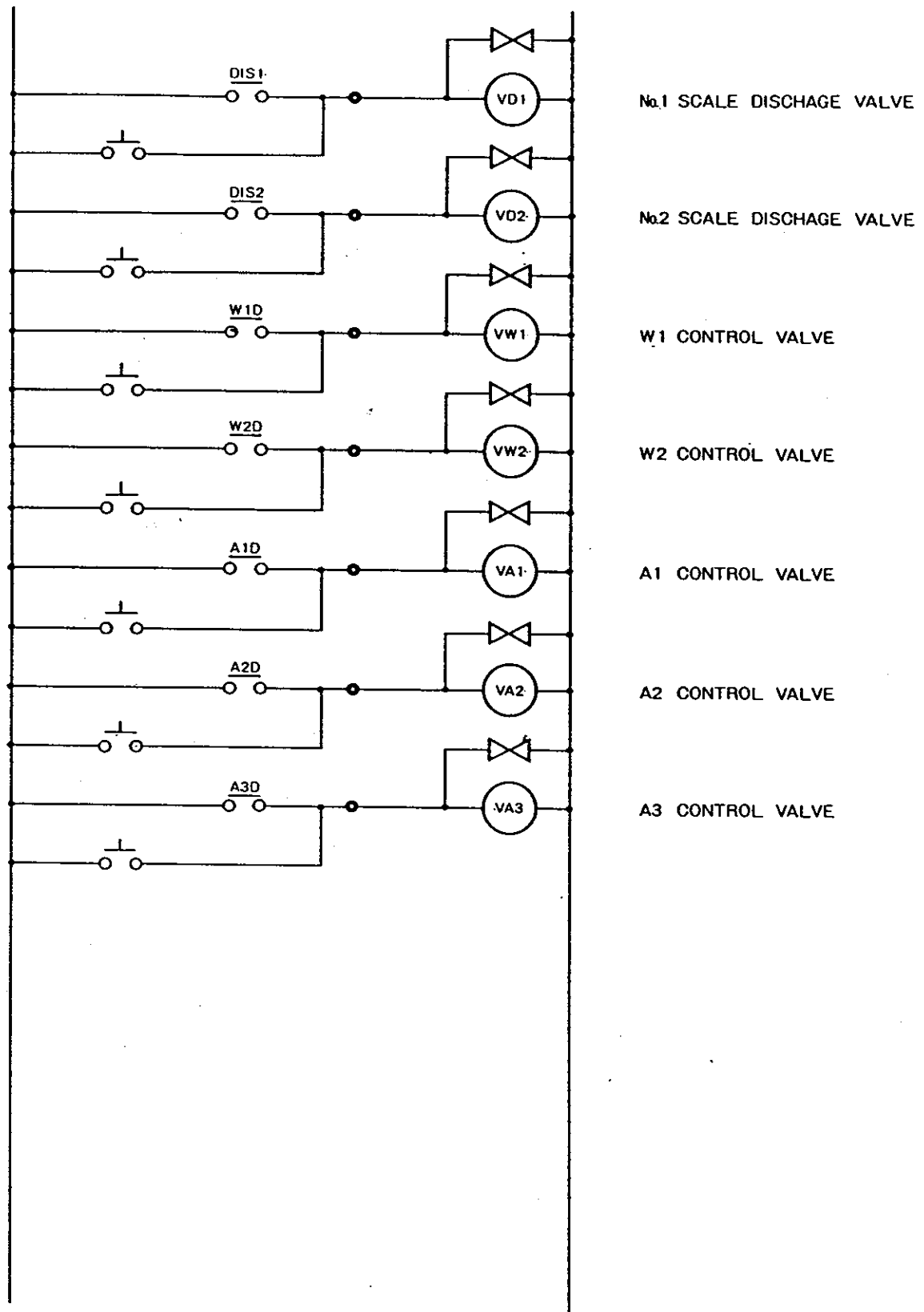
DRIBBLE FLOW

BIN #2 FULL FLOW





Specs-4335C-002a/b-v. 1



specs-4335C-002a/b-v. 1

APPENDIX

OPTION-03 OPTICAL PUNCH-CARD READER

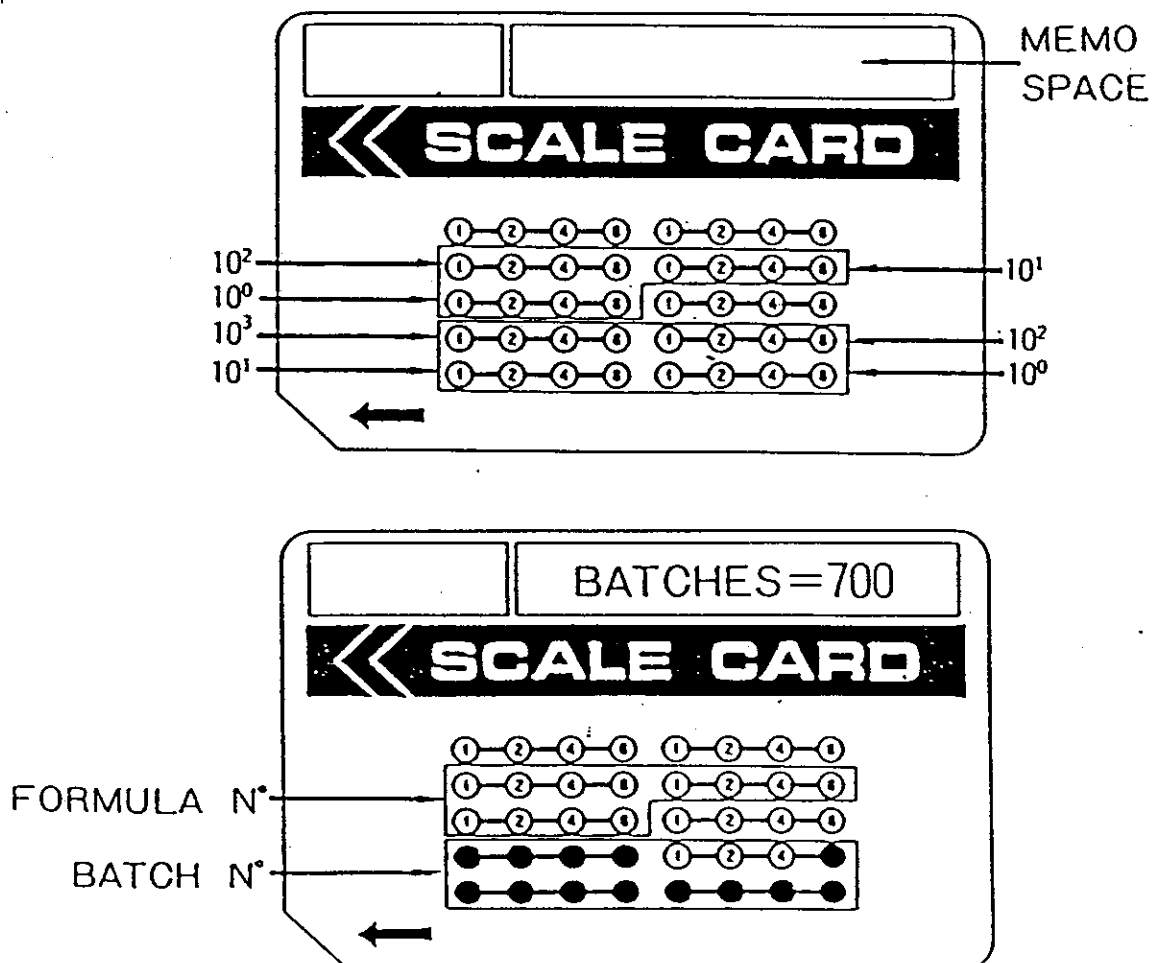
Formula number and number of batches may be entered very simply by inserting a card. The upper section of the card is for Formula numbers and the lower section for number of batches. Alternatively Formula number may be set by punch card and batch number via the keyboard, or vice versa. The security key-switch should be turned hard left or right (REG), it should not be set to "CPU".

A HOLE in the card is read as "8" and NO-HOLE as "1".

EXAMPLE: When the number of batches = 700

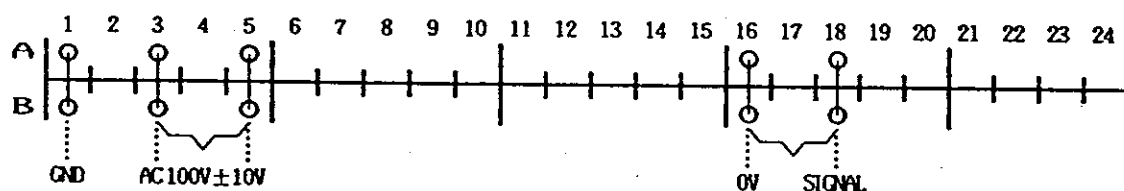
Spaces 1, 2, 4 & 8 of 10^3 , 10^1 & 10^0 should be punched out (0 00).

$1+2+4(-7)$ of 10^2 should be left in with space 8 punched out (0700).



OPTION-05 NET WEIGHT SCORE BOARD[s]

CONNECTION



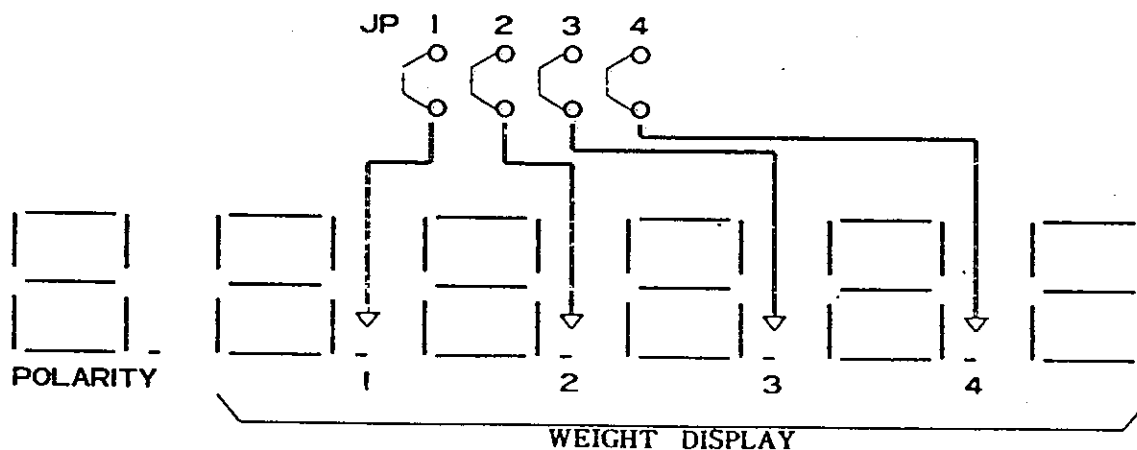
Pins 1, 3, 5, 16 & 18 are used with sides A & B shorted.

Take a coax cable to the external display connector on the A/D board located in the rear panel of AD-4335C.

SIGNAL=CORE and OV=SHIELD.

SETTING THE DECIMAL POINT

Remove the front panel of the Option-05 seven segment, six character display unit. Each score board unit can display an LED decimal point in order to give one, two, three or four decimal places. Setting the location of the decimal point is achieved by cutting the power links to the three decimal point positions not required. Behind the front panel you will find JP links 1, 2, 3 & 4 which correspond to the decimal point positions on the display panel; e.g. If you wish the display to read to two decimal places you should cut links 1, 2 & 4.





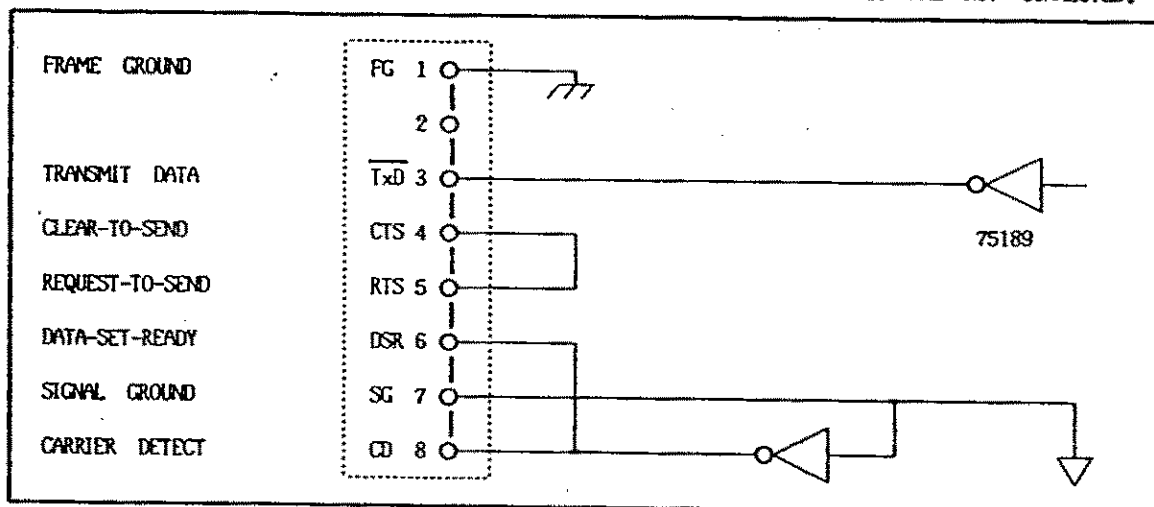
EIA-RS232C SERIAL OUTPUT PORT

The Controller is designated as Data Communication Equipment.

Method:- Half-duplex, asynchronous transmission

Format:- 600 baud = short J2
 2400 baud = short J1.
 Data bits = 7
 Parity bit = 1 (EVEN)
 Stop bit = 1
 Code = ASCII

CONTROLLER OUTPUT CIRCUIT AND RS-232C PIN CONNECTIONS. PINS 2 & 9-25 ARE NOT CONNECTED.



DATA SENT FOR EACH WEIGHING EVENT

? DAY/MONTH/YEAR ; HOUR/MIN ; BC ; BC ; PRODUCT ;
 FORMULA # ; BS CR LF . (TIME, BATCH COUNT/SIZE ETC)
 = MC ING ; ***- ; MC ING ; ***** ; MC ING ; ***** ;
 MC ING ; ***** ; CR LF (MOISTURE COMPENSATION)
 \$ INGREDIENT ; BIN# ; SCALE# ; FINAL ; WEIGHT DT ;
 HI/LO CR LF (REPEATED WITH ! CR LF FINALLY)

1. FOR JOB WT DATA BC=00 & BS CHANGES TO JOB VOLUME
2. ?[3FH] (START) . \$[24H] , ;[3BH] , -[3DH] , ! [21H] (END)
3. FOR WATER/ADDITIVES SCALE# WILL BLANK
4. WHEN IN CONDITION "GO" HI/LO WILL BE BLANK
5. ACTUAL LENGTH OF DATA STRINGS NOT SHOWN ABOVE