Instruction book for

AIR PARTNER
MA(S)3 Gd - MAS6 Gd - MA(S)7 Gd
with Detroit diesel engine

Registration code
Collection: APC M/P
Tab: 38
Sequence: 0996

Replaces Nos.
2920 5805 00 (1984-10)
2920 1101 00 (1992-10)
2920 1151 00 (1992-11)

1993-11

Atlas Copco Portable Air Division

No. 2920 1178 00

This instruction book describes how to handle and operate the subject machine(s) to ensure safe operation, optimum working economy and long service life.

Read this book before putting the machine into operation to ensure correct handling, operation and proper maintenance from the beginning. The maintenance schedule contains a summary of the measures for keeping the compressor in good repair. The maintenance procedures are simple but must be carried out regularly.

Keep the book available for the operator(s) and make sure that the compressor is operated and that the maintenance actions are carried out according to the instructions. Record all operating data, maintenance work effected, etc. in an operator's logbook available at Atlas Copco. Follow all applicable safety precautions, amongst others those mentioned in Printed Matter No. 2927 1168 00, enclosed with the technical literature set delivered with each machine, or on the cover or on the first few pages of this book. If your copy should be missing, do not hesitate to claim one from your Atlas Copco agency.

Repair operations should be performed by trained personnel, available at Atlas Copco Service Outlets, which should also be contacted if any further information is desired.

In all correspondence always mention the compressor type and the complete serial number, shown on the data plate.

For all specific data not mentioned in the text, consult sections "Preventive maintenance schedule" and "Principal data".

The company reserves the right to make changes without prior notice.

Contents

	Page
1 Leading particulars	3
1.1 General description	3
1.2 Cooling, lubricating and regulation system	3
1.3 Control panel	3
1.3.1 Control panel of MA(S)3 Gd and MAS6 Gd	3
1.3.2 Control panel of MA(S)7 Gd	4
1.4 Electrical diagrams	5
2 Operating instructions	8
2.1 Before starting	8
2.2 Starting	8
2.2.1 MA(S)3 Gd and MAS6 Gd	8
2.2.2 MA(S)7 Gd	11
2.2.3 Cold weather starting	12
2.3 Stopping	14
2.3.1 MA(S)3 Gd and MAS6 Gd	14
2.3.2 MA(S)7 Gd	14
3 Maintenance	14
3.1 Preventive maintenance schedule for the compressor	14
3.2 Oil specifications	15
3.3 Compressor oil change	15
3.4 Storage	15

	Page
4 Adjustments and servicing procedures	16
4.1 Air filter elements	16
4.1.1 Recommendations	16
4.1.2 Servicing	16
4.2 Cooler block	16
4.3 Safety valves	16
4.4 Testing of the shut-down switches	16
4.4.1 Temperature switches	16
4.4.2 Oil pressure switches	16
4.5 Cold starting aid equipment	17
4.5.1 Applicable safety precautions	17
4.5.2 Installation or replacement of a fuel cylinder	18
4.5.3 Checking of the system	18
4.6 Air delivery hoses	18
4.7 Parking brake adjustment	19
5 Problem solving	19
6 Principal data	19
6.1 Readings on gauges	19
6.1.1 MA(S)3 Gd and MAS6 Gd	19
6.1.2 MA(S)7 Gd	19
6.2 Settings of shut-down switches and safety valves	20
6.2.1 MA(S)3 Gd and MAS6 Gd	20
6.2.2 MA(S)7 Gd	20
6.3 General specifications	21
6.4 Conversion list of SI units into British units	22

1 Leading particulars

1.1 General description

The MA(S)3 Gd, MAS6 Gd and MA(S)7 Gd are portable, single-stage screw compressors. The MA(S)3 Gd and MAS6 Gd compressors deliver oil-free air at an effective working pressure of 1.7 bar (25 psi) or 3 bar (43.5 psi), as required, whereas the MA(S)7 Gd delivers oil-free air at an effective working pressure of 2.9 bar (42 psi). They have been specially designed to start aircraft engines equipped with turbine starters.

1.2 Cooling, lubrication and regulating system

A detailed description dealing with the cooling, lubrication and regulating system is available on request.

1.3 Control panel

1.3.1 Control panel of MA(S)3 Gd and MAS6 Gd (Fig. 1)

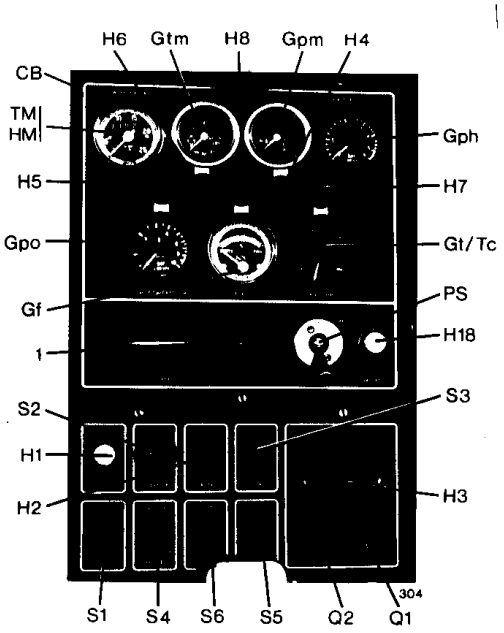


Fig. 1. Control panel of MA(S)3 and MAS6 Gd

Push buttons, control devices and toggle switches

PS. Air pressure selector valve.

S1. Toggle switch to switch voltage on or off.

S2. Momentary action push button to temporarily override compressor and engine oil pressure shut-down switches during starting.

S3. Knob to energize starting motor to crank and start engine.

S4.
- In AIRCRAFT position, engine will not be stopped if an abnormal condition arises during operation. However, the lamp connected in the circuit of the operative shut-down switch will light up.
- In EQUIPMENT position, engine will be stopped through action of the operative shut-down switch if an abnormal operating condition arises. The lamp connected in the circuit of the operative shut-down switch will then also light up.

S5. Toggle switch to switch position lights on or off.

S6. Toggle switch to switch instrument panel and interior lights on or off.

1. Engine speed control lever.

Lamps

H1. Indicator lamp which goes out after starting, indicating that alternator is charging.

H2. Indicator lamp, lights up during starting, indicating that oil pressure shut-down switches have closed and that the compressor is running.

H3. Lights up together with a fault indicator lamp to attract immediate attention if an abnormal condition arises. Does, however, not light up if engine coolant level is too low.

H4. Lights up if engine oil pressure shut-down switch reacts to too low a pressure.

H5. Lights up if compressor oil pressure shut-down switch reacts to too low a pressure.

H6. Lights up if engine coolant temperature shut-down switch reacts to too high a temperature. Also lights up if coolant in engine radiator drops to too low a level.

H7. Lights up if air temperature shut-down switch reacts due to temperature of air leaving compressor element(s) being to high.

H8. Indicator lamp which lights up if there is less than 135 litres for MA(S)3 (36 US gal) or 180 litres (47 US gal) for MAS6 of fuel in the tanks.

H18. Indicator lamp which must be out before starting, indicating that air shut-off valves are closed, as otherwise engine cannot be started. Lights up as soon as a valve is opened.

Thermic release switches

Q1. Thermic release switch; cuts out if an overload occurs in the light circuits. Can be reset after cooling off by pressing its push button.

Q2. Thermic release switch; cuts out if an overload occurs in any of the shut-down circuits. Can be reset after cooling off by pressing its push button.

Gauges

Gf. Fuel gauge.
Gph. Air pressure gauge.
Gpm. Engine oil pressure gauge.
Gpo. Compressor oil pressure gauge.
Gtm. Engine coolant temperature gauge.
Gt/Tc. Compressor air temperature gauge and shut-down switch.
TM/HM. Tachometer and hourmeter.

CB. Electrical control board.

1.3.2 Control panel of MA(S)7 Gd (Fig. 2)

Push buttons and toggle switches

S1. Toggle switch to switch on the voltage or to stop the compressor after an idling time of 5 minutes.
S2. Momentary-action push button to temporarily override the compressor and engine oil pressure shut-down switches during starting.
S3. Push button to energize starting motor to start the engine.
S4. - In AIRCRAFT mode, the engine will not stop if an abnormal condition arises during operation. However, the lamp connected in the circuit of the operative shut-down switch will light up.
- In EQUIPMENT mode, the engine will be stopped through the action of the operative shut-down switch if an abnormal condition arises. The lamp connected in the circuit of the operative shut-down switch will then also light up.

S20. (above control panel) Maintained-action push button to stop the compressor immediately; **to be used only in case of emergency.**

Lamps

H1. Indicator lamp which goes out after starting, indicating that the alternator is charging.
H2. Indicator lamp, lights up during starting, indicating that the oil pressure shut-down switches have closed and that the engine is running.
H3. Lights up together with a fault indicator lamp to attract immediate attention if an abnormal condition arises. Does, however, not light up if engine coolant level is too low.
H4. Lights up if the engine oil pressure alarm or shut-down switch reacts to too low a pressure.
H5. Lights up if the compressor oil pressure alarm or shut-down switch reacts to too low a pressure.
H6. Lights up if the engine coolant temperature shut-down switch reacts to too high a temperature.
H7. Lights up if the air temperature shut-down switch reacts due to temperature of air leaving the compressor elements being too high.
H8. Indicator lamp which lights up if there is less than 180 litres (47 US gal) of fuel in the tanks.
H13/14. Control panel light.
H18. Indicator lamp which must be out before starting, indicating that the air outlet valves are closed, as otherwise the engine cannot be started. Lights up as soon as a valve is opened.

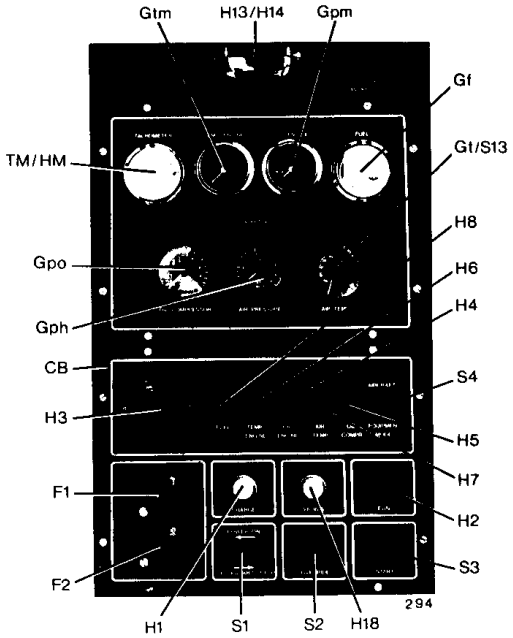


Fig. 2. Control panel of MAS7 Gd

Thermic release switches

F1. Thermic release switch; cuts out if an overload occurs in the light circuits. Can be reset after cooling off by pressing its push button.
F2. Thermic release switch; cuts out if an overload occurs in any of the shut-down circuits. Can be reset after cooling off by pressing its push button.

Gauges

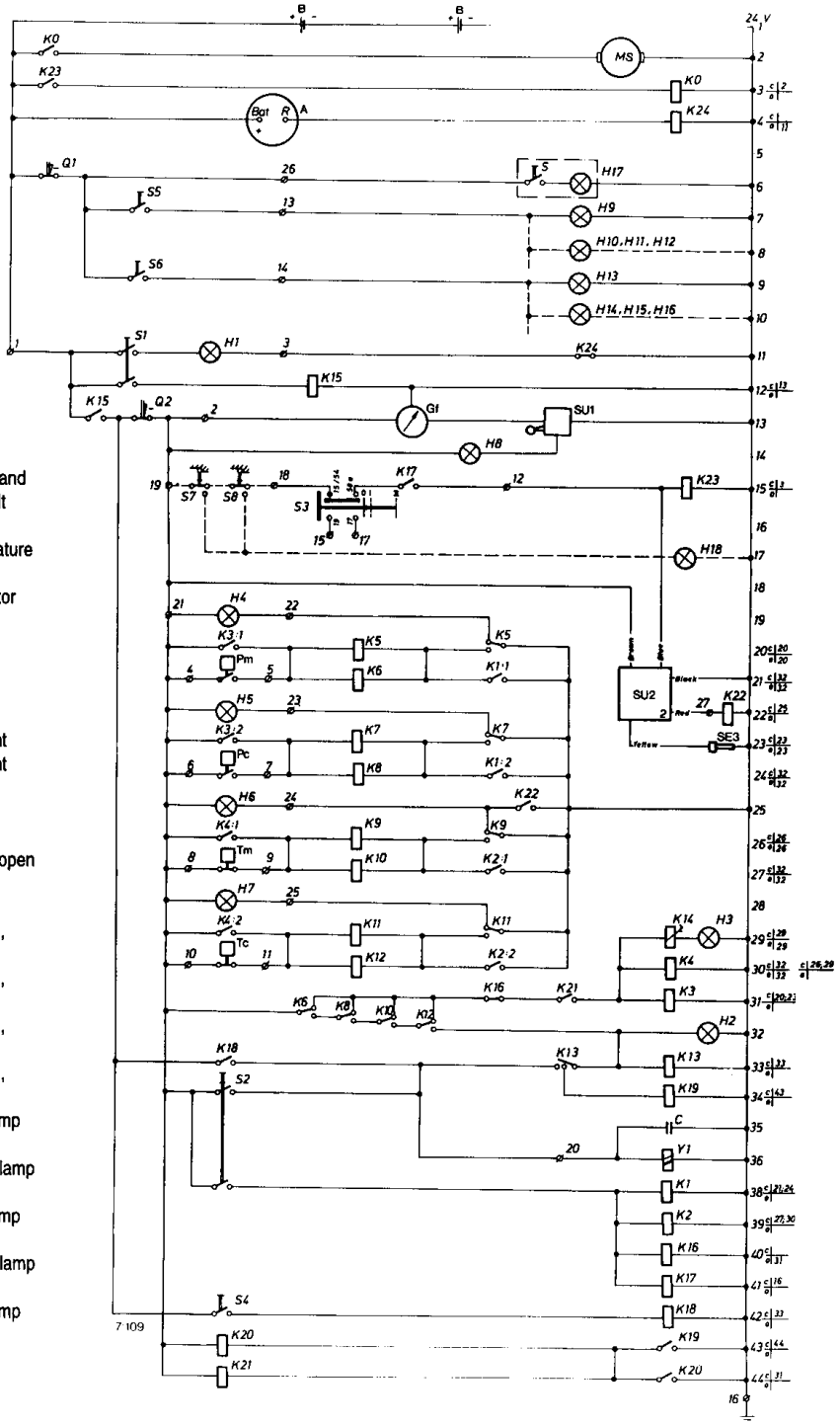
Gf. Fuel gauge.
Gph. Air pressure gauge.
Gpm. Engine oil pressure gauge.
Gpo. Compressor oil pressure gauge.
Gtm. Engine coolant temperature gauge.
Gt/S13. Compressor air temperature gauge and shut-down switch.
TM/HM. Tachometer and hourmeter.

CB. Electrical control board.

1.4 Electrical diagrams (Figs. 3 and 4)

A. Alternator
B. Batteries
C. Capacitor
Gf. Fuel gauge
H1. Alternator charging pilot lamp
H2. Run indicator lamp
H3. General faults flasher lamp
H4. Engine oil pressure fault indicator lamp
H5. Compressor oil pressure fault indicator lamp
H6. Engine temperature and coolant low level fault indicator lamp
H7. Compressor temperature fault indicator lamp
H8. Fuel low level indicator lamp
H9. Position light
H10. Position light
H11. Position light
H12. Position light
H13. Instrument panel light
H14. Instrument panel light
H15. Interior light
H16. Interior light
H17. Spotlamp
H18. Air shut-off VALVES open indicator lamp
K0. Starter solenoid
K1. Auxiliary relay (N.O.), shut-down circuits
K2. Auxiliary relay (N.O.), shut-down circuits
K3. Auxiliary relay (N.O.), shut-down circuits
K4. Auxiliary relay (N.O.), shut-down circuits
K5. Blocking relay, H4 lamp circuit
K6. Blocking relay, RUN lamp circuit
K7. Blocking relay, H5 lamp circuit
K8. Blocking relay, RUN lamp circuit
K9. Blocking relay, H6 lamp circuit

(cont. on next page)

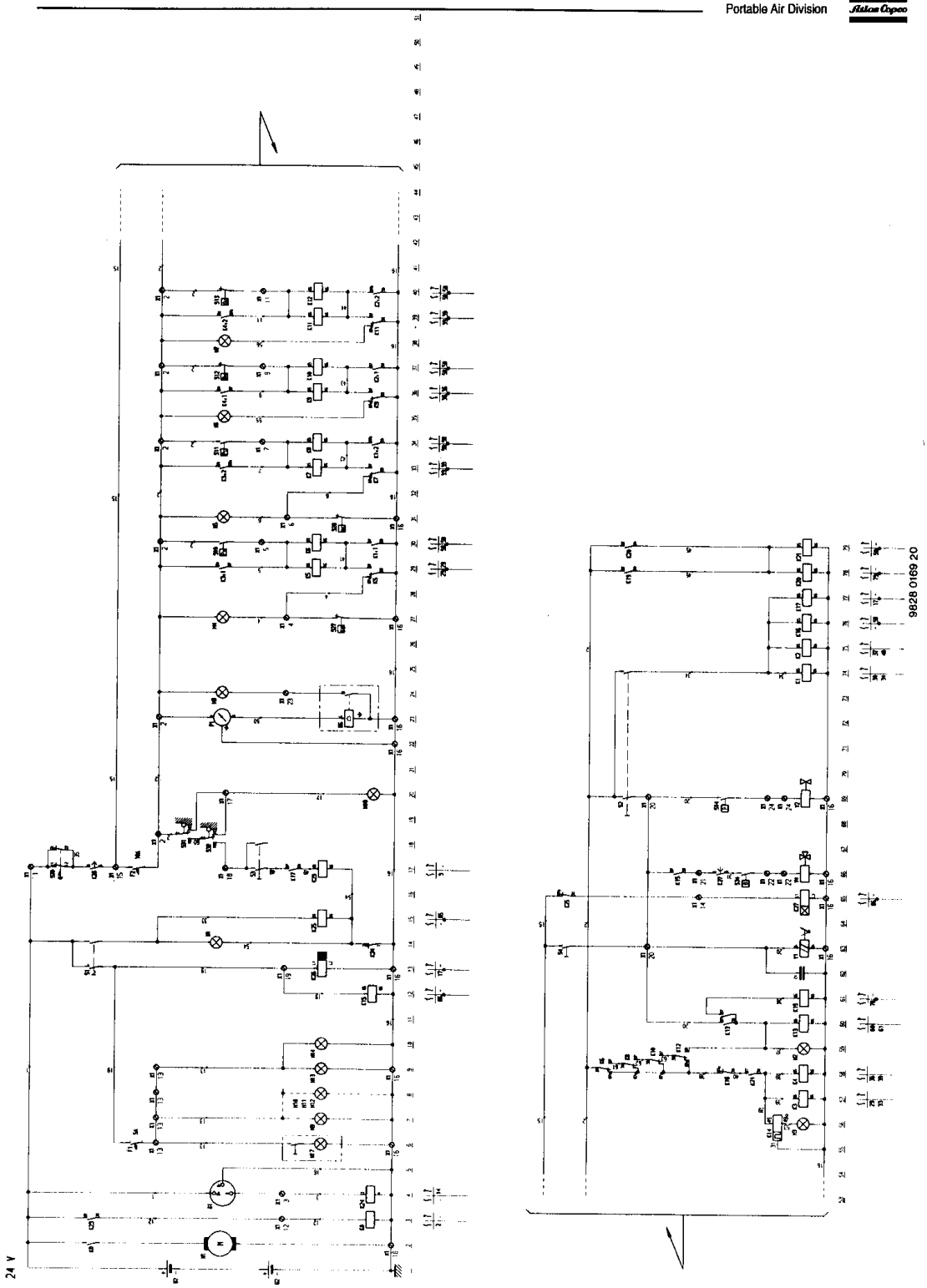


K10. Blocking relay, RUN lamp circuit
K11. Blocking relay, H7 lamp circuit
K12. Blocking relay, RUN lamp circuit
K13. Blocking relay, engine stop solenoid
K14. Flasher relay
K15. Auxiliary relay, run circuit
K16. Auxiliary relay, flasher lamp circuit
K17. Auxiliary relay, start circuit
K18. Auxiliary relay, safety system overriding circuit
K19. Auxiliary relay, flasher lamp circuit
K20. Blocking relay, flasher lamp circuit
K21. Auxiliary relay, flasher lamp circuit
K22. Auxiliary relay, engine coolant level sending unit
K23. Start relay
K24. Charge indication relay
MS. Starting motor
Pc. Compressor oil pressure shut-down switch
Pm. Engine oil pressure shut-down switch
Q1. Thermic release switch, light circuits
Q2. Thermic release switch, general circuit
SE3. Sensor, engine coolant low level
SU1. Sending unit, fuel gauge
SU2. Sending unit, engine coolant level sensor
S1. Contact switch
S2. Safety system overriding push button
S3. Starter switch
S4. Equipment/Aircraft starting selector switch
S5. Switch, position lights
S6. Switch, instrument panel and interior lights
S7. Limit switch, air outlet valve
S8. Limit switch, air outlet valve
Tc. Compressor air outlet temperature shut-down switch
Tm. Engine coolant temperature shut-down switch
Y1. Engine stop solenoid

Fig. 3. Electrical circuit diagram of MA(S)3 and MAS6 Gd

C1. Capacitor
F1. Thermic release switch, light circuits
F2. Thermic release switch, general circuit
G1. Alternator
G2. Batteries
H1. Alternator charge indicator lamp
H2. Run indicator lamp
H3. General fault indicator lamp
H4. Engine oil pressure alarm and fault indicator lamp
H5. Compressor oil pressure alarm and fault indicator lamp
H6. Engine coolant temperature fault indicator lamp
H7. Compressor air outlet temperature fault indicator lamp
H8. Low fuel level indicator lamp
H9. Position light
H10. Position light
H11. Position light
H12. Position light
H13. Instrument panel light
H14. Instrument panel light
H17. Spotlamp
H18. Air shut-off VALVES open indicator lamp
K0. Starter solenoid
K1. Auxiliary relay, safety system overriding circuit
K2. Auxiliary relay, safety system overriding circuit
K3. Auxiliary relay, shut-down memory
K4. Auxiliary relay, shut-down memory
K5. Shut-down relay, engine oil pressure
K6. Shut-down relay, engine oil pressure
K7. Shut-down relay, compressor oil pressure
K8. Shut-down relay, compressor oil pressure
K9. Shut-down relay, engine temperature
K10. Shut-down relay, engine temperature
K11. Shut-down relay, compressor temperature
K12. Shut-down relay, compressor temperature
K13. Blocking relay
K14. Flasher relay
K15. Auxiliary relay, loading
K16. Auxiliary relay, general fault indicator lamp circuit
K17. Auxiliary relay, start circuit
K19. Auxiliary relay, general fault indicator lamp circuit
K20. Auxiliary relay, general fault indicator lamp circuit
K21. Auxiliary relay, general fault indicator lamp circuit
K23. Auxiliary relay, start
K24. Auxiliary relay, starter motor protection
K25. Auxiliary relay, load control
K26. Time relay, delayed stop (5 min)
K27. Time relay, delayed loading (30 s)
M1. Starting motor
P1. Fuel gauge
S1. Selector switch, POWER ON/ PROGRAMMED STOP
S2. Safety system overriding push button
S3. Starter push button
S4. AIRCRAFT/ EQUIPMENT mode selector switch
S10. Engine oil pressure shut-down switch
S11. Compressor oil pressure shut-down switch
S12. Engine coolant temperature shut-down switch
S13. Compressor air outlet temperature shut-down switch
S14. Speed control pressure switch
S20. Push button, emergency stop
S27. Alarm switch, engine oil pressure
S28. Alarm switch, compressor oil pressure
S31. Limit switch, air outlet valve
S32. Limit switch, air outlet valve
S34. Temperature switch, loading
Y1. Engine fuel stop solenoid
Y2. Speed control solenoid valve
Y4. Loading solenoid valve

Fig. 4. Electrical diagram of MAS7 Gd


24 V
9828 0169 20

2 Operating instructions

Safety precautions

1. The operator is expected to apply all relevant safety precautions, among others those mentioned in Printed Matter No. 2927 1168 00, enclosed with the technical literature set delivered with each machine.
2. The drawbar is equipped with a lockable weight compensator, which facilitates attaching of the compressor to the towing vehicle. The lock (5-Fig. 9) of the compensator must be released after the compressor has been attached to the towing vehicle and before driving off.
3. Before driving off, always ascertain that the air hoses are properly stowed and that the parking brake has been released. The operating mechanism of the parking brake is of the crank-type and located at the R.H. rear side of the compressor. Always secure the crank of the brake in its bracket.
4. When parking the compressor, place it as level as possible. Immobilize the compressor by applying the parking brake or by placing chocks in front of or behind the wheels.
5. **Truck-mounted compressors** are provided with a green "Air hoses stowed" indicator lamp fitted on the instrument panel of the truck. The lamp is connected to limit switch(es) (2-Fig. 10) located on the supports for the aircraft hose couplings (1-Fig. 10). The switches are actuated when the couplings are installed on the supports.
   After the truck has been started and before driving off, always check that the lamp is alight. This indicates that the hose couplings are plugged in their supports and that the hoses have been properly stowed for transport.

2.1 Before starting

1. **On MA(S)3 and MAS6,** check the coolant level in the overflow tank (RT-Fig. 6) of the engine radiator, which should be at or slightly below the MAX. mark. Add coolant, if necessary. Consult the Engine Operators Manual for the coolant specifications and frost protection.
   On MA(S)7, check the coolant level in the engine radiator. The coolant level must be flush with the lower end of the filler neck. The remaining space allows the coolant to expand at working temperature. Add coolant, if necessary. Consult the Engine Operators Manual for the coolant specifications and frost protection.
2. Check the level of the engine oil. Top up, if necessary, to the upper mark on the dipstick. Consult the Engine Operators Manual for the oil to be used.
3. Check the oil level in the compressor sump. Top up through pipe (FC1-Figs. 5 and 11), if necessary, to the upper mark on the dipstick (DSc-Figs. 5 and 11). Consult section 3.2 for the oil to be used.
4. Move contact switch (S1-Figs. 1 and 2) to RUN (MA(S)3 and MAS6) or to POWER ON (MA(S)7) and read the fuel gauge (Gf-Figs. 1 and 2). Top up the tanks, if necessary. Consult the Engine Operators Manual for the type of fuel to be used. Move the contact switch to (PROGRAMMED) STOP after checking or filling.
5. Check the air intake filter service indicator of the compressor; **on MAS6 and MA(S)7,** check also the service indicator of the engine air filters. If the red part shows completely in the window of an indicator, service or renew the filter elements of the compressor and engine simultaneously.
6. If the compressor has been standing idle for several days, or if it operates in a warm climate, check the electrolyte level in the batteries. Top up, if necessary, **with distilled water** to just above the top of the lead plates.

2.2 Starting

2.2.1 MA(S)3 Gd and MAS6 Gd (Fig. 1)

1. Check that engine speed control lever (1) is in the low speed or idle position, i.e. the pawl of the speed control lever engaged in the first tooth of its rack.
2. Check that the lever of air pressure selector valve (PS) is in the LOw pressure position.
3. Check that toggle switch (S4) is in the EQUIPMENT position. The engine shut-down system is thus operational.
4. Check that the levers of the air shut-off valves (AV-Fig. 12) are pushed against their stops. Thus the valves are closed.
5. Move contact switch (S1) to RUN, and check that the alternator CHARGE lamp (H1) and the four fault indicator lamps (H4, H5, H6 and H7) are alight. The air VALVES open indicator lamp (H18) must be out.
   If there is less than approx. 135 litres (36 US gal) for MA(S)3 or 180 litres (47 US gal) for MAS6 of fuel in the tanks, the fuel low level indicator lamp (H8) also lights up.
6. Press OVERRIDE button (S2) and keep it depressed. This will:
   - Cause the engine and compressor fault indicator lamps (H6 and H7) to go out.
   - Energize the engine stop solenoid (Y1-Fig. 5).
7. Fully pull out START knob (S3) to engage the starting motor. Release the knob as soon as the engine fires.

   Notes
   - Never hold the starting motor engaged for more than 10 seconds. Wait a few minutes between each starting attempt.
   - If the engine fails to start three times, consult the Engine Operators Manual for the remedy.
   - Starting at ambient temperatures below 5°C (40°F) requires the use of a cold weather starting aid (consult Engine Operators Manual). If cold weather starting aid equipment has been installed ex-factory as an option, consult sections 2.2.3 and 4.5.
8. Release OVERRIDE button (S2) as soon as the engine and compressor oil pressure fault indicator lamps (H4 and H5) have gone out, and RUN indicator lamp (H2) lights up.
   Never keep the OVERRIDE button depressed for longer than 20 seconds, as otherwise the engine or compressor may be damaged.
9. Check that CHARGE indicator lamp (H1) is out.

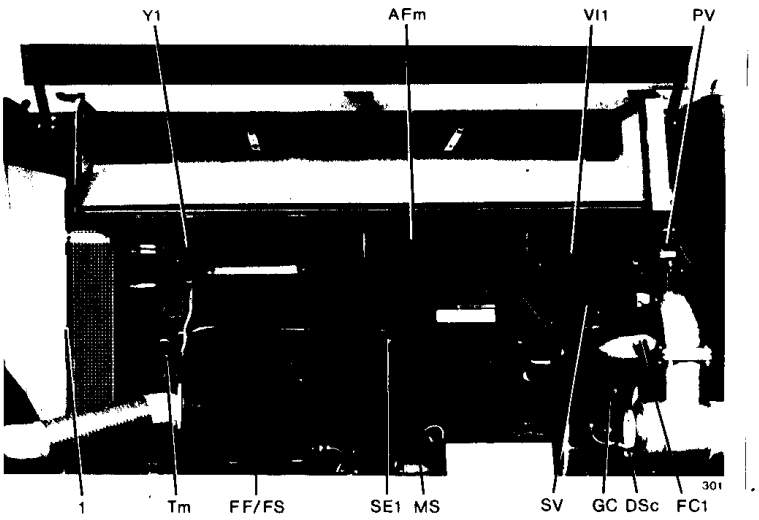


Fig 5. L.H. side view of MAS6 Gd

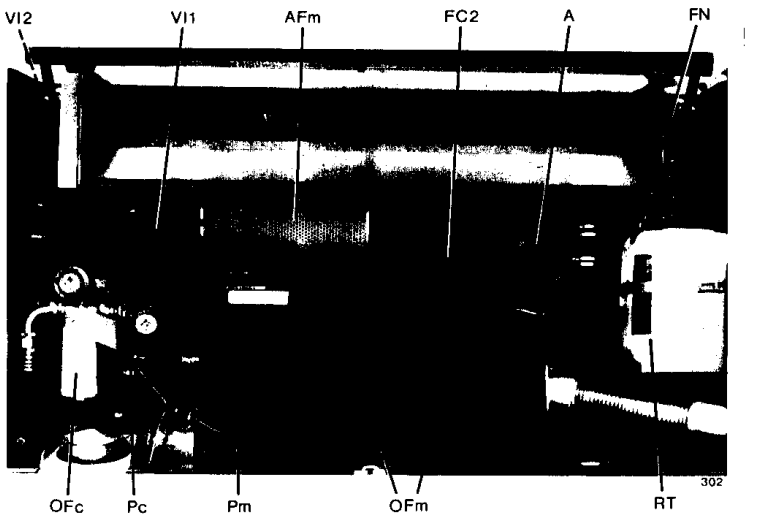
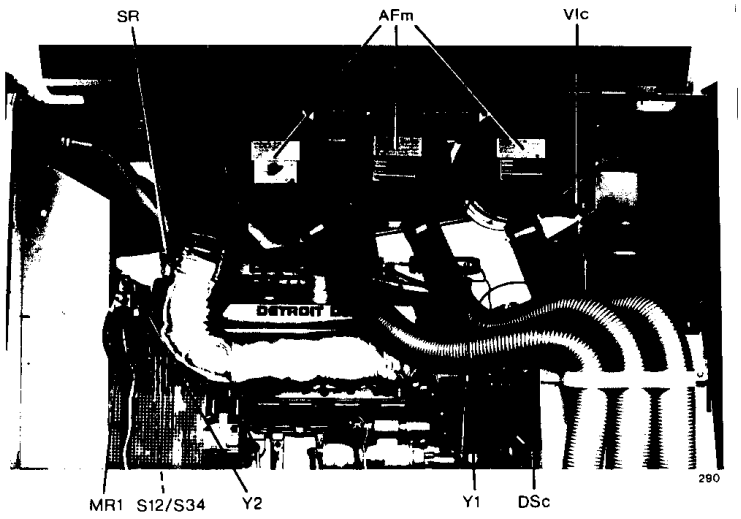


Fig. 6. R.H. side view of MAS6 Gd

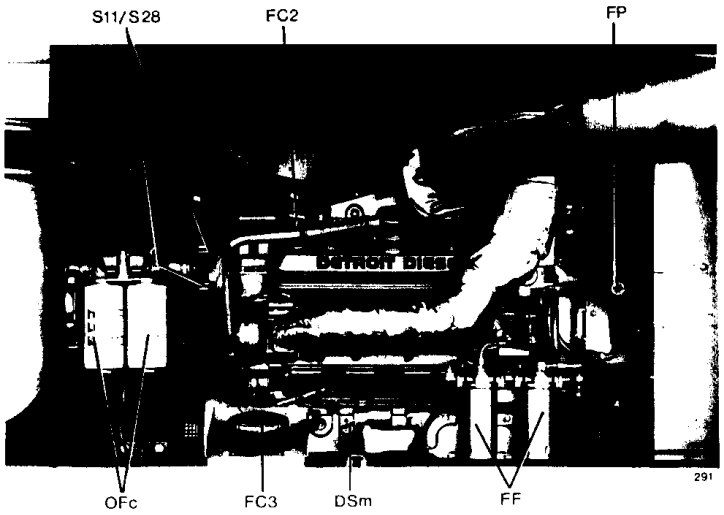
A.	Alternator	FS.	Fuel strainer	PV.	Pressure operating valve	VI1.	Service indicator, engine air filters
AFm.	Engine air filter (2 off)	GC.	Step-up gear casing	RT.	Overflow tank, engine cooling system	VI2.	Service indicator, compressor and engine air filters
DSc.	Compressor oil level dipstick	MS.	Starting motor assembly	SE1.	Sensing element, engine coolant temperature gauge	Y1.	Engine stop solenoid
FC1.	Compressor oil filler plug	OFc.	Compressor oil filter	SV.	Safety valves	1.	Engine radiator, compressor oil cooler and fan
FC2.	Engine oil filler cap	OFm.	Engine oil filter	Tm.	Engine temperature shut-down switch		
FF.	Fuel filter	Pc.	Compressor oil pressure shut-down switch				
FN.	Cooling fan	Pm.	Engine oil pressure shut-down switch				

Figs. 5 and 6. General views of MAS6 Gd



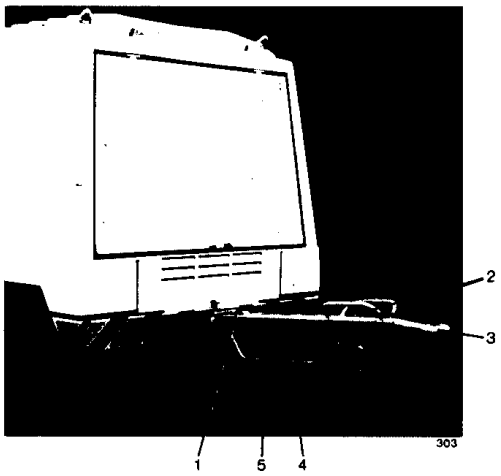
AFm. Engine air filter (3 off)
DSc. Oil level dipstick, compressor
MR1. Pressure-reducing valve, engine speed control
SR. Speed regulator
S12. Engine coolant temperature shut-down switch
S34. Temperature switch, loading
VIc. Air filter service indicator, compressor
Y1. Engine stop solenoid
Y2. Speed control solenoid valve

Fig. 7. L.H. side view of MAS7 Gd



DSm. Oil level dipstick, engine
FC2. Engine oil filler cap
FC3. Filler cap, fuel tanks
FF. Fuel filters
FP. Fuel priming pump
OFc. Compressor oil filter
S11. Compressor oil pressure shut-down switch
S28. Compressor oil pressure alarm switch

Fig. 8. R.H. side view of MAS7 Gd



1. Lock for securing drawbar in raised position
2. Grease nipples
3. Towing eye
4. Weight compensator
5. Lock, weight compensator

Fig. 9. Drawbar

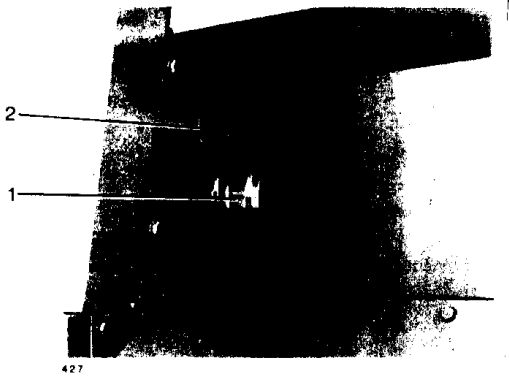
10. When the engine has been running for 30 seconds at low idle speed (approx. 950 r/min), move speed control lever (1) to the left and set its pawl in the second tooth of the rack. The engine speed should then be approx. 1100 r/min. Allow the engine to run at this speed for approx. 5 minutes in order to warm up. During this period, check:
    - for fuel, oil or coolant leaks
    - the engine oil pressure (Gpm)
    - the compressor oil pressure (Gpo)
    - the engine coolant temperature (Gtm)
11. When the engine has warmed up sufficiently, move the engine speed control lever gradually further to the left. With the lever in the utmost HIgh position the engine speed should be approx. 2100 r/min and the air pressure(e) registered on gauge (Gph) equal to the pre-set low working pressure.
    When the lever of the pressure selector valve (PS) is moved from LOw to HIgh, the pre-set high working pressure registers on gauge (Gph).
    If a malfunction occurs, the compressor will shut down, unless the lever of selector switch (S4) is placed in the AIRCRAFT position.
12. Connect the air delivery hoses to the air intake points of the aircraft. Lay out the hoses without straining: eliminate sharp bends and taut conditions.
13. Check that all temperatures and pressures are normal.
14. Fully open the air outlet valves (AV-Fig. 12). The yellow VALVES indicator lamp (H18) lights up and remains alight as long as the valves are open.
15. Adjust the engine speed between 2100-1200 r/min to maintain the working pressure at 1.7 bar(e) (25 psig) and warn the pilot that the aircraft air-conditioning packs can be operated.
16. Upon signal from the pilot, move operating mode selector switch (S4) to position AIRCRAFT. Subsequently, move the lever of air pressure selector valve (PS) to the HIgh position and adjust the position of the speed control lever to maintain the working pressure at 3 bar(e) (43.5 psig).

General recommendations

a. Keep a constant check on the air pressure gauge (Gph) during operation. Adjust the engine speed to maintain the specified working pressure, but do not exceed the maximum permissible speed of 2100 r/min.
b. Advise the pilot to avoid starting the next jet engine before the cut-off speed is attained on the engine being started, as otherwise there will be a drop in the working pressure, which will affect the acceleration of the engine to be started.
c. If any of the fault indicator lamps and the flasher lamp on the instrument panel light up during the aircraft engine starting operation, **the starting routine must not be interrupted in order to avoid a so called "hot start" of the jet engine being started.**

2.2.2 MA(S)7 Gd (Fig. 2)

1. Check that the air outlet valves (AV-Fig. 13) are closed.
2. Move switch (S1) to POWER ON and check that the alternator CHARGE indicator lamp (H1) and the four fault indicator lamps (H4, H5, H6 and H7) are alight. The air VALVES open indicator lamp (H18) must be out.
   If there is less than approx. 180 litres (47 US gal) of fuel in the tanks, the fuel low level indicator lamp (H8) also lights up.
3. Press and keep OVERRIDE button (S2) pressed. The engine and compressor temperature fault indicator lamps (H6 and H7) go out and the engine stop solenoid (Y1-Fig. 7) is energized.
4. Press the START button (S3) to engage the starting motor. Release the button as soon as the engine fires.
   Notes:
    - Wait a few minutes between each starting attempt.
    - If the engine fails to start after a storage period, it may be necessary to pressurize the fuel system by operating fuel priming pump (FP-Fig. 8) two or three times.
    - If the engine fails to start three times, consult the Engine Operators Manual to locate the fault and remedy.
    - Starting at ambient temperatures below 4°C (40°F) requires the use of a cold-weather starting aid (consult Engine Operators Manual).
5. Release OVERRIDE button (S2) as soon as the engine and compressor oil pressure fault indicator lamps (H4 and H5) have gone out and RUN indicator lamp (H2) lights up.
   Never keep the OVERRIDE button pressed for longer than 20 seconds, as otherwise the engine or compressor may be damaged.
6. Check that charge indicator lamp (H1) is out.



1. Support for aircraft hose coupling
2. Limit switch

Fig. 10. View of support for aircraft hose coupling of MAS3 Gd truck-mounted version

10. Warn the pilot that the aircraft can be started.
11. Upon signal from the pilot, switch mode selector switch (S4) to AIRCRAFT and fully open the air outlet valve(s) (AV-Fig. 13). The yellow VALVES indicator lamp (H18) lights up and remains alight as long as a valve is open.
    Important: If any of the fault indicator lamps and the general fault indicator lamp on the instrument panel light up during the aircraft engine starting operation, **the starting routine must not be interrupted in order to avoid a so-called "hot start" of the jet engine being started.**

2.2.3 Cold weather starting

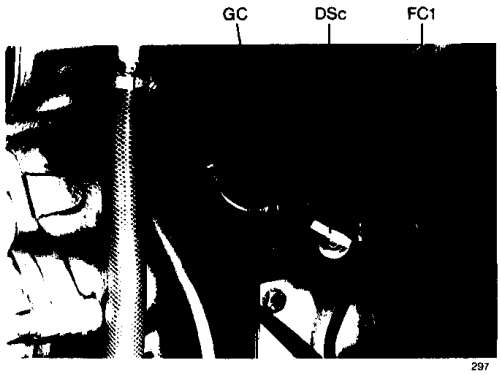
If the engine is provided with manually operated Fleetguard ether cold weather starting aid equipment, read the instructions given in section 4.5 as well as the ether cylinder label before using the equipment.

Attention: Inject ether only while cranking the engine.

The operation described below should preferably be done by two persons.

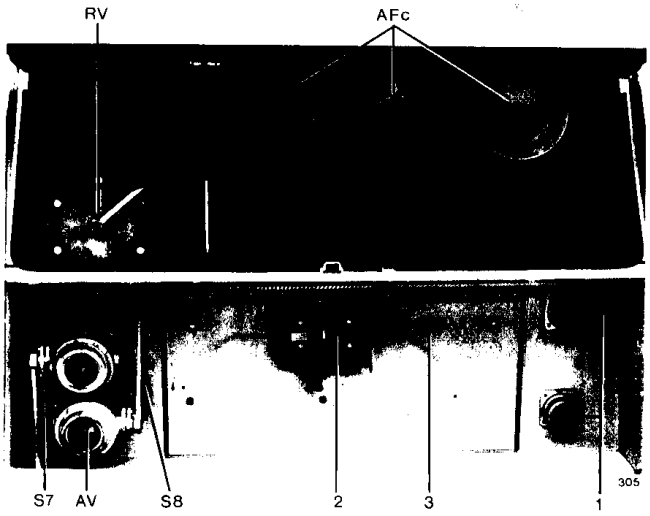
To start the engine, proceed as follows:
1. Securely install the ether cylinder.
2. Move the contact switch to the RUN (MA(S)3 and MAS6) or POWER ON (MA(S)7) position.
3. Press the OVERRIDE button and keep it depressed.

7. The compressor runs at no-load to warm up.
   During this period, check:
   - for fuel, oil or coolant leaks
   - the engine oil pressure (Gpm)
   - the compressor oil pressure (Gpo)
   - the engine coolant temperature (Gtm)
   - the engine speed (TM), which must be approx. 1400 r/min
8. When the engine has warmed up sufficiently, the loading solenoid valve (Y4-Fig. 4) loads the compressor and the engine speed increases to full-load speed (approx. 2300 r/min). The air pressure(e) registered on gauge (Gph) increases to the pre-set unloading pressure (3.2 bar(e)/46.4 psig). On reaching the pre-set unloading pressure, speed control solenoid valve (Y2-Fig. 4) is energized and the engine speed decreases to the pre-set stand-by speed (1700 r/min).
   Caution: Always lay out the hose(s) straight before opening the valve(s). Never open an air outlet valve when the compressor is operating and while the air delivery hose, connected to the valve, is folded up in the stowing compartment.
9. Connect the air delivery hose(s) to the air intake point(s) of the aircraft. Lay out the hose(s) without straining: eliminate sharp bends and taut conditions.



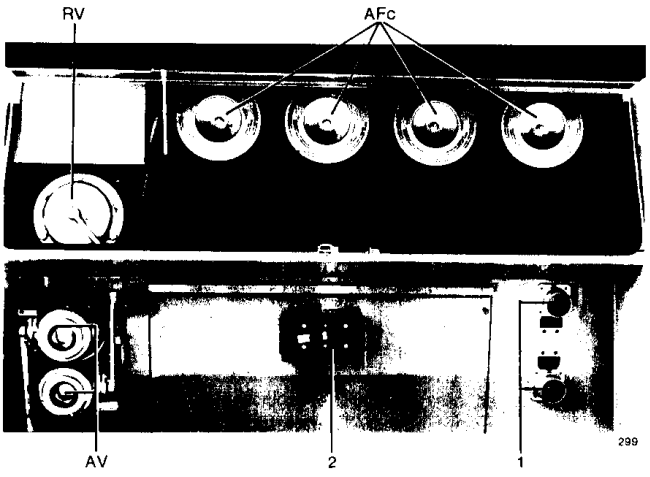
DSc. Oil level dipstick
FC1. Oil filler plug
GC. Gear casing

Fig. 11. Compressor gear casing of MAS7 Gd



AFc. Compressor air filters
AV. Air shut-off valves
RV. Regulating valve
S7/8. Valve limit switches
1. Supports, aircraft side quick connect hose coupling
2. Clamp, fire extinguisher
3. Rear door

Fig. 12. Rear view of MAS6 Gd (fire extinguisher and optional air delivery hoses not shown)



AFc. Compressor air filters
AV. Air shut-off valves
RV. Regulating valve
1. Supports, hose coupling for aircraft side
2. Support, fire extinguisher

Fig. 13. Rear view of MAS7 Gd

4. Pull the valve actuating knob of the starting aid equipment for 2 seconds to fill the valve chamber with ether, pull (MA(S)3 and MAS6) or press (MA(S)7) the START knob to crank the engine. Release the valve actuating knob to give a measured ether shot while the engine is cranking. If the engine does not start at once, continue cranking and pull the ether valve actuating knob again. Release the knob after 2 seconds to give another ether shot.
5. Release the START knob as soon as the engine fires.
6. Release the OVERRIDE button when the RUN lamp lights up.

Caution: Never use ether while the engine is running as it can cause severe damage to the engine.

The starting aid is **not** intended to correct for a low battery, heavy oil or other conditions which cause hard starting. It is only to be used when other conditions are normal, but the air temperature is too low for the heat of compression to ignite the fuel-air mixture.

2.3 Stopping

2.3.1 MA(S)3 Gd and MAS6 Gd (Fig. 1)

1. With the lever of pressure selector valve (PS) in the LOw position, slowly move the speed control lever (1) to the right to bring the engine speed to approx. 1100 r/min. Allow the engine to run at this speed for four to five minutes to permit the temperatures to equalize; do not stop the engine directly from full load.
2. Move the speed control lever to the low idle position. Wait for about 30 seconds before stopping the engine.
3. To stop the engine, move contact switch (S1) to STOP.

2.3.2 MA(S)7 Gd (Fig. 2)

1. When the aircraft starting routine is completed, close the air outlet valve(s) (AV-Fig. 13) and switch mode selector switch (S4) to EQUIPMENT.
2. Move toggle switch (S1) to PROGRAMMED STOP. The compressor unloads and the engine speed is reduced to minimum. The compressor runs at no-load speed for 5 minutes, allowing the temperatures to cool down, and stops.

3 Maintenance

3.1 Preventive maintenance schedule for the compressor

The schedule contains a summary of the maintenance instructions. Read the related section before taking maintenance measures.

In servicing, replace all removed gaskets, O-rings and washers.

Refer to the Engine Operators Manual for particulars on the engine maintenance.

The "longer interval" checks must also include the "shorter interval" checks.

Weekly
- Check coolant level in engine radiator (see note 1 and section 2.1).
- Check electrolyte level and terminals of batteries (see note 2).
- Check pressure of tyres (see section 6.3).
- Check for fuel, oil or coolant leaks.
- Check setting of pressure operating valve (see section 6.3).

Monthly
- Lubricate ball joints of stop solenoid, door hinges, locks, etc.
- Grease towing eye shaft, drawbar to steering gear shaft, brake cables and spindle of brake handle (see note 4).
- Check wheel nuts for tightness (see note 5).
- Check brake system (see section 4.7).
- Check condition and tension of engine fan belts.
- Check condition of air delivery hoses (see section 4.6).
- Check fire extinguisher (see note 6).
- Check specific gravity of electrolyte in battery cells. Charge batteries, if necessary (see note 7).

Monthly/50-60 running hours 1)
- Service air filter elements (see note 3 and section 4.1).

3-monthly
- Clean compressor externally.

6-monthly
- Clean radiator and oil cooler, if necessary (see section 4.2).

6-monthly/150-180 running hours 1)
- Drain water and sediment from fuel tanks (see note 8).

Yearly
- Replace compressor oil filter (see note 9).
- Clean breather of gear casing (see note 10).
- Renew air filter elements (see section 4.1.2).
- Have the diaphragms of balancing pistons and regulating valve inspected (see notes 11 and 12).

- Dismantle pressure operating valve, clean and inspect parts (see note 12).
- Check greasing of wheel hub bearings (see note 4).
- Have safety valves tested (see note 12 and section 4.3).
- Have shut-down switches tested (see note 12 and section 4.4).

Yearly/500 running hours 1)

- Change compressor oil (see note 9 and section 3.3).

Recommendation: Keep the bolts of the bodywork, axles, canopy, etc. securely tight.

1) **Whichever interval comes first.** The local Atlas Copco Sales Company may overrule the maintenance schedule, **especially the service intervals,** depending on the environmental and working conditions of the compressor.

Notes

1. If, **on MA(S)3 or MAS6**, the system traps air in the radiator top, the cooling system may continue to lose water without affecting the level in the overflow tank.
2. More frequently in high ambient temperatures.
3. More frequently when operating in a dusty atmosphere.
4. See parts list for position of the grease nipples. Use graphite grease for the parking brake spindle, blank extremities of brake cables, etc.; ball bearing grease for the wheel bearings.
5. Check and tighten the wheel nuts to torque after the first 50 km (30 miles) travel and subsequently as scheduled.
6. See that the seal is intact. Follow the instructions given on the data plate attached to the extinguisher.
7. Use a hydrometer to check specific gravity of electrolyte in all cells and refer to the instruction label attached to the batteries. To charge batteries, consult maker's specifications.
8. Drain until clean fuel flows from the drain cocks.
9. Renew the oil and oil filter(s) after the first 50 hours of operation, subsequently as scheduled.
10. Remove the breather, dismantle and wash the steel mesh pads in fuel oil or some similar cleaning solvent. Wash the sinter-bronze filter disk in trichloroethane. Dry the parts with compressed air, reassemble and reinstall the breather.
11. Especially check the balancing piston pipes. Repair even the slightest leak; replace damaged pipes. Overloading of the male rotor thrust bearings occurs if the balancing pistons are inoperative, which may cause serious damage.
12. To be carried out by an Atlas Copco Service representative.

Replace the fuel filter elements regularly. Gummed or clogged elements reduce the engine performance. The quality of the fuel determines the frequency of filter element renewal.

3.2 Oil specifications

Engine
Consult the Engine Operators Manual for the oil specifications, viscosity recommendations and oil change intervals.

Compressor
The same type of oil selected for the engine should also be used for the compressor.

However, the **viscosity grade** should be selected according to the ambient temperature and as shown in the table below.

Ambient temperature consistently	Viscosity grade
Above -10°C (14°F)	SAE 20W/20 or 15W/40
Below -5°C (23°F)	SAE 10W

Never mix oils of different brands or types.

3.3 Compressor oil change

1. Drain the oil from the compressor sump while the compressor is warm. Securely tighten the drain plug after draining.
2. Remove the oil filter, e.g. by means of the handle of a spanner applied in the slot at the bottom. Catch the oil in a drain pan.
3. Clean the filter seat on the adapter head. Fill the new oil filter for about two thirds with the correct oil. Oil the gasket and screw the filter into place until the gasket contacts its seat. Then tighten one half turn only.
4. Refill the sump to the upper mark on the dipstick with the correct oil.
5. Run the compressor unloaded for a few minutes; check the oil level. Top up, if necessary.

3.4 Storage

The oil film on the moving parts should be renewed once a week by running the compressor until warm. Load and unload the compressor a few times to operate the regulating components. Keep the air shut-off valves closed.

If the compressor is going to be stored without running from time to time, protective measures must be taken as described in a separate Service Bulletin (ASB), which may be obtained on request.

4 Adjustments and servicing procedures

4.1 Air filter elements

The MA(S)3 Gd has three filter elements for the compressor and engine. A service indicator is fitted on the air intake system downstream of the filter set.

The MAS6 Gd has three filter elements for the compressor and two separate elements for the engine. A service indicator is fitted on the air intake system downstream of each filter set.

The MA(S)7 Gd has four filter elements for the compressor and three separate elements for the engine. A service indicator is fitted on the air intake system downstream of each filter set.

The filter elements are of the dry paper-type. The service indicators show red when the elements are due for servicing. After servicing, the indicators can be reset by pushing the small knob located in the extremity of the indicator body.

4.1.1 Recommendations

1. For minimum compressor down-time, replace the dirty elements by new or cleaned ones.
2. **On MAS6 and MA(S)7**, also service the elements of the compressor, if the service indicator of the engine elements shows red and vice versa.
3. Never remove the elements while the compressor is running.
4. The elements may be washed not more than three times.
5. Discard the elements when damaged.
6. New elements must also be inspected for tears or punctures before installation.

4.1.2 Servicing

1. Open the rear door of the compressor, unscrew the nuts that secure the elements and withdraw them from their retaining brackets. Open the side doors and also remove the elements of the engine.
2. Using a damp cloth, clean the front panel of the air inlet box, taking care that no dirt drops inside the box.
3. Clean and inspect the element sealing surfaces on the inlet box. Inspect the sealing surfaces on the adapter plates.
4. Install the new or cleaned elements and securely clamp them into place. Close the doors.

4.2 Cooler block

Keep the coolers clean to maintain the cooler efficiency. The interval between cleaning operations depends on the working conditions.

On MA(S)3 and MAS6, the fan side surface of the oil cooler is accessible after the upper and lower front plates of the fan cowl have been removed.

Clean the coolers by air jet in reversed direction of normal flow.

If the dirt is oily, wash the cooler with fuel oil or a cleansing agent. A spray gun should preferably be used to apply the solvent to the fins. Rinse by means of a powerful water jet after a soaking-in period. Protect the electrical and regulating equipment, air filters, etc. against penetration by moisture.

Steam-cleaning may also be applied.

Reinstall the front plates of the fan cowl after cleaning. Do not leave liquids behind.

4.3 Safety valves

The safety valves, which are fitted on the air delivery manifold must be tested statically on a separate compressed air line.

The valves should open at a pressure(e) as specified in section 6.2. Fit a new spring, if necessary.

4.4 Testing of the shut-down switches

4.4.1 Temperature switches

The mechanical condition of the engine and compressor temperature switches can be tested by immersing their sensing elements in hot oil.

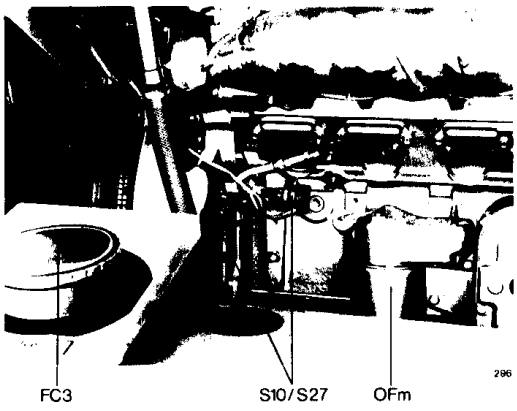
The contacts of the switches (Tm-Fig. 5, Tc- Fig. 1, S12 and S34-Fig. 7 and S13-Fig. 2) must open at the temperatures indicated in section 6.2. Test by means of an ohmmeter or a test lamp with battery, and a thermometer. Stir the oil during testing.

The setting of the compressor temperature switch can be adjusted by means of a slotted screw protruding through the protecting glass of the switch temperature indicator scale (Gt/Tc-Fig. 1 and Gt/S13-Fig. 2).

To prevent tampering, the screw bears a protecting cap with two holes. A special key, supplied with the machine, can be applied through the holes in the slot to turn the screw as required, until the switch trips at the specified temperature.

4.4.2 Oil pressure switches

The compressor and engine oil pressure switches (Pc and Pm-Fig. 6, S10 and S27-Fig. 14 and S11 and S28-Figs. 8 and 15) can be tested on a compressed air line by means of a pressure-reducing valve, small air receiver, pressure gauge and an ohmmeter or test lamp with battery. The contacts of the switches should open and close at the pressures indicated in section 6.2.



FC3. Filler cap, fuel tanks
OFm. Engine oil filter
S10. Engine oil pressure shut-down switch
S27. Alarm switch, engine oil pressure

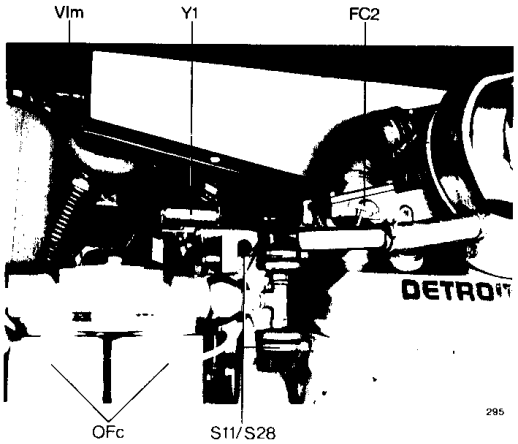
Fig. 14. Oil pressure switches, engine of MAS7 Gd

Notes
- The engine temperature switch, as well as the oil pressure switches have no setting device; replace them in case of malfunctioning.
- Test current not to exceed 1 A at 24 V.

4.5 Cold starting aid equipment (Fig. 16)

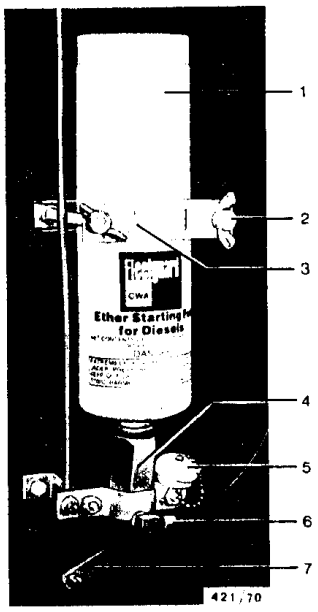
4.5.1 Applicable safety precautions

1. The ethyl ether used in this fuel system is extremely flammable, toxic, harmful or fatal if swallowed. Avoid contact with the skin or eyes and breathing the fumes. **If swallowed, call a physician immediately.**
2. If fuel enters or irritates the eyes, flush them with large quantities of clean water for 15 minutes. Contact an eye specialist.
3. Do not store cylinders in temperatures above 70°C (160°F). Contents are under pressure. Do not incinerate, puncture or attempt to remove centre core valve or side safety valve from cylinder.
4. When maintaining or trouble-shooting the system, make sure that you are in a well-ventilated area, away from heat, open flames or sparks. Wear safety glasses when testing to avoid eye injury. Make sure that openings of the valve, tube or atomizer are pointed away from yourself while testing.



FC2. Engine oil filler cap
OFc. Compressor oil filter
S11. Compressor oil pressure shut-down switch
S28. Alarm switch, compressor oil pressure
VIm. Air filter service indicator, engine
Y1. Engine fuel stop solenoid

Fig. 15. Oil pressure switches, compressor of MAS7 Gd



1. Fuel cylinder
2. Wing nut
3. Clamp
4. Valve body assembly
5. Valve cap
6. Nylon tube to atomizer
7. Pull control

Fig. 16. Fleetguard starting aid equipment

4.5.2 Installation or replacement of a fuel cylinder

With the compressor stopped, proceed as follows:
1. Clean the top and exterior of the valve.
2. Loosen the cylinder clamps.
3. Unscrew the dust cap or the cylinder, as the case may be.
4. Check the gasket in the valve top; replace if damaged. Never install two gaskets. Use only a genuine Fleetguard gasket.
5. Position the new cylinder on the valve and screw it all the way down handtight.
6. Securely clamp the cylinder into position.

If the cylinder is not going to be replaced, e.g. for summer operation, clean and fit the dust cap on the valve.

If the machine operates in an environment where the temperature does not drop below 7°C (45°F), the fuel cylinder should preferably be removed. When removed, install the dust trap on the valve.

4.5.3 Checking of the system

Check the following points if the equipment does not operate correctly:

Fuel cylinder
Check that the cylinder is screwed all the way down handtight. Also check if the cylinder is empty; an empty cylinder weighs 482 g (17 oz).

Atomizers
Important: Atomizer orifice clogging is the most common cause for failure because dirt has been allowed to enter the valve when changing fuel cylinders.

To check the atomizer, remove it from the engine and activate the system. If no ether sprays from the atomizer, disconnect it from the tubing. Activate the system; if ether flows from the tubing, the atomizer must be replaced.

Tubing
If ether did not flow from the end of the tubing after removing the atomizer, disconnect the tubing from the valve and reactivate the system. If ether flows from the valve, the tubing is obstructed and should be replaced.

Valve
Activate the valve by moving the lever or knob up and then down. If no ether is dispensed, the valve is clogged or damaged; replace it. If the valve operates, check the control cable for damage and the wire stop screw for tightness.

4.6 Air delivery hoses (Fig. 17)

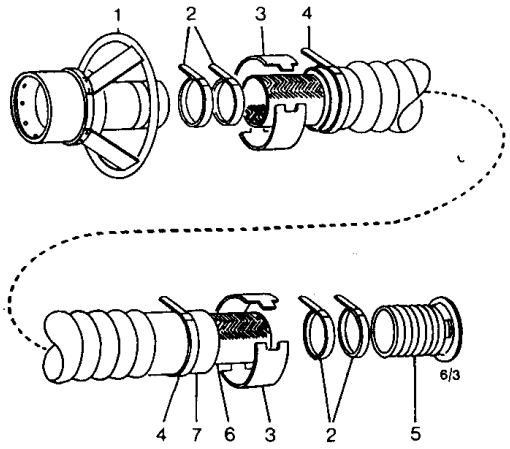
The compressor may be equipped with (an) air delivery hose(s) as an option.

Each hose consists of a duct (6), two couplings (1 and 5) and a jacket (7). Coupling (1) fits a corresponding connection on the aircraft and coupling (5) is clamped to the valve by means of a collar.

The jacket envelops the duct and protects it against damage from rough handling and dragging over rough surfaces. Proper maintenance is necessary, including replacement of the damaged jacket as required for adequate protection of the duct.

The service life of the hoses can be extended as follows:
1. Lay out the hoses on the ground between the aircraft and the compressor away from traffic.
2. Eliminate sharp bends and taut conditions.
3. Do not twist the hoses when attaching the couplings to the aircraft and compressor.

Inspect the hoses after every 50 hours of operation or approx. 600 aircraft starts. Proceed as follows:
1. Remove clamps (4) securing the jacket to couplings (1 and 5). This can be done after the stub ends have been bent back from the clamp buckles.



1 Coupling, aircraft side
2. Clamps, securing duct liner
3. Cuff
4. Clamp, securing scuffer jacket
5. Coupling, compressor side
6. Duct liner
7. Scuffer jacket

Fig. 17. Exploded view of air delivery hose

2. Draw off the jacket ends from the couplings. Remove the clamps (2) and cuffs (3) from the duct, and withdraw the duct from the jacket.
   Inspect the ducts carefully. Replace them if they are damaged or after 4,500 aircraft starts. If only the area of the duct connected to the coupling is damaged, the duct can be reused after removing the damaged part. **Consult Atlas Copco for the correct clamping method and tool.**

4.7 Parking brake adjustment

Adjustment of the crank-type parking brake can be made by shortening the length of the three brake cables equally by means of their clevises. Grease the spindle of the brake handle with graphite grease at least every three months. Do this with a brush.

5 Problem solving

A detailed description dealing with mechanical faults and their suggested remedies is available on request.

6 Principal data

6.1 Readings on gauges

6.1.1 MA(S)3 Gd and MAS6 Gd (Fig. 1)

Marking: TEMP. ENGINE
Reading: Between 70-85°C
Ref.: Gtm

Marking: OIL ENGINE
Reading: Between 2-5 bar(e)
Remarks: Should not be allowed to drop below 1.2 bar(e)
Ref.: Gpm

Marking: AIR PRESSURE
Reading: Pre-set low 1.7 bar(e)
Remarks: May range between 1.2-3 bar(e)
Ref.: Gph
Reading: Pre-set high 3 bar(e)
Remarks: May range between 2.2-3 bar(e)

Marking: OIL COMPRESSOR
Reading: Approx. 1.2 bar(e)
Remarks: Should not be allowed to drop below 0.7 bar(e)
Ref.: Gpo

Marking: AIR TEMP.
Reading: Approx. 140°C
Remarks: At working pressure of 1.7 bar(e)
Reading: Approx. 200°C
Remarks: At working pressure of 3 bar(e)
At 15.6°C ambient temperature and 1.013 bar(a) barometric pressure
Ref.: Gt

6.1.2 MA(S)7 Gd (Fig. 2)

Marking: TEMP. ENGINE
Reading: Between 70-85°C
Ref.: Gtm

Marking: OIL ENGINE
Reading: Between 2-5 bar(e)
Remark: Should not drop below 1.7 bar(e)
Ref.: Gpm

Marking: AIR PRESSURE
Reading: Approx. 2.9 bar(e)
Remark: Modulates, depending on the air consumption
Ref.: Gph

Marking: OIL COMPRESSOR
Reading: Approx. 2.9 bar(e) at full-load speed
Remark: Should not drop below 0.7 bar(e)
Ref.: Gpo

Marking: AIR TEMP.
Reading: Approx. 210°C
Remark: At working pressure of 2.9 bar(e)
At 20°C ambient temperature and 1.013 bar(a) barometric pressure
Ref.: Gt

6.2 Settings of shut-down switches and safety valves

6.2.1 MA(S)3 Gd and MAS6 Gd (Figs. 1, 5 and 6)

Shut-down switches	Makes at	Breaks at	Unit	Ref.
Engine oil pressure	0.8-1.2	1.2-0.8	bar(e)	Pm
	12-17	17-12	psig	
Engine coolant temperature	—	96	°C	Tm
	—	205	°F	
Compressor oil pressure	0.52-0.72	0.72-0.52	bar(e)	Pc
	7.5-10.5	10.5-7.5	psig	
Compressor air outlet temperature	—	240	°C	Tc
	—	464	°F	

Safety valves	Opening pressure(e)	Unit	Ref.
	3.7-4.2	bar(e)	SV
	53.5-61	psig	

6.2.2 MA(S)7 Gd (Figs. 2, 7, 14 and 15)

Alarm switches	Breaks at	Makes at	Unit	Ref.
Engine oil pressure	1.7-2.2	2.2-1.7	bar(e)	S27
Compressor oil pressure	0.7-0.9	0.9-0.7	bar(e)	S28

Shut-down switches	Makes at	Breaks at	Unit	Ref.
Engine oil pressure	0.8-1.2	1.2-0.8	bar(e)	S10
Compressor oil pressure	0.52-0.72	0.72-0.52	bar(e)	S11
Engine coolant temperature	—	96	°C	S12
Compressor air outlet temperature	—	250	°C	S13

Safety valves	Opening pressure	Unit	Ref.
	3.7-4.2	bar(e)	SV

6.3 General specifications

		MA3/MAS3	MAS6	MA7/MAS7
1. Compressor				
Maximum effective working pressure	bar(e)	3	3	3/2.9
Maximum ambient temperature	°C	45	45	40/45 **3)**
Air flow:				
- NACA conditions **1)**	lb/min	130	180	268/263 **3)**
- Reference conditions **2)**	l/s	804	1114	1660/1630 **3)**
Low working pressure setting (100 % air flow)	bar(e)	1.7	1.7	--
High working pressure setting (100 % air flow)	bar(e)	3	3	3/2.9 **3)**
Minimum starting temperature	°C	0	0	0
Sound pressure level, according to IATA/AHM/910 under field conditions at 4.5 m distance	dB(A)	97/88	88	102/83
2. Engine				
Detroit diesel engine, liquid-cooled		8V71 N70	12V71 N70	12V92TA/8V 92TA
Idle or no-load speed	r/min	950	950	1400
Speed during blow-off	r/min	-	-	1700
Maximum load speed	r/min	2100	2100	2100/2300
Minimum load speed	r/min	1200	1200	-
Electrical system, negative earthed	V	24	24	24
Batteries:				
- Number		2	2	2
- V/Ah		12/205	12/205	12/205
- Cold cranking current (SAE JS37 h)	A	900	900	900
3. Filling capacities				
Compressor oil system	l	66	70	65/100
Engine oil system				
Initial filling	l	26	32	34/30
Refill	l	21	24	26/25
Engine cooling system	l	86	120	120
Fuel tanks, approx.	l	445	560	560/400
4. Trailer				
Maximum towing speed	km/h	30	30	30
Tyre pressure, front wheels **4)**	bar(e)	6.5	6.5	6.5
Tyre pressure, rear wheels	bar(e)	6.5	6.5	6.5

		MA3/MAS3	MAS6	MA7/MAS7
Tightening torque, wheel nuts 4)	Nm	270	270	270
Length, drawbar raised, approx.	mm	4290	4400	4350/5320
Width, approx.	mm	1840	1850	2120/2140
Height, approx.	mm	1970	2250	1950/2400
Net mass (dry), approx.	kg	3600	5020	5600/5800

5. Fire extinguisher

Make	Walter Kidde
Model	5KS
Charge	CO2

1) NACA inlet conditions:
   - Absolute inlet pressure ..... bar 1.013
   - Air inlet temperature ..... °C 15.6
2) Reference conditions:
   - Absolute inlet pressure ..... bar 1
   - Relative humidity ..... % 0
   - Air inlet temperature ..... °C 20
   - Normal effective working pressure:
     MA(S)3 and MAS6 ..... bar 3
     MA(S)7 ..... bar 2.9
3) Maximum full-load time: 2 minutes.
4) On trailers with a short turning radius, i.e. equipped with a turntable, the tyre pressure of the four front wheels is 8 bar(e) (116 psig). The tightening torque of the front wheel nuts is 120 Nm (87 lbf ft).

6.4 Conversion list of SI units into British units

1 bar = 14.504 psi	1 kW = 1.341 hp (UK and US)	1 m = 3.281 ft	1 N = 0.225 lbf
1 g = 0.035 oz	1 l = 0.264 US gal	1 mm = 0.039 in	1 Nm = 0.738 lbf.ft
1 kg = 2.205 lb	1 l = 0.220 Imp gal (UK)	1 m³/min = 35.315 cfm	x°C = (32 + 1.8x) °F
1 km/h = 0.621 mile/h	1 l = 0.035 cu.ft	1 mbar = 0.401 in wc	Δt 1°C = Δt 1.8 °F

Notes:

Notes: