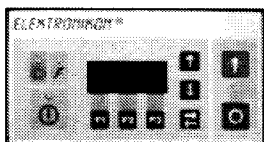


Instruction book for compressors

GA5 - GA7 - GA10



F1042



F1040

Registration code

Collection: APC G5-10

Tab: 38

Sequence: 978

No. 2920 1350 00

1997-02

Important

This book applies exclusively to GA5 - GA7 - GA10 from serial number AII-112 227 onwards equipped with:

- an electronic regulator as shown on the left above. For these compressors, this book must be used together with the "User manual for electronic regulator for GA5 up to GA75 compressors"
- an electro-pneumatic regulator as shown on the left below.

This instruction book meets the requirements for instructions specified by the machinery directive 89/392/EEC and is valid for CE as well as non-CE labelled machines

Atlas Copco

Industrial Air Division - B-2610 Wilrijk - Belgium



This instruction book describes how to handle the machines to ensure safe operation, optimum efficiency 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 comprises measures for keeping the machine in good condition.

Keep the book available for the operator and make sure that the machine is operated and that maintenance is carried out according to the instructions. Record all operating data, maintenance performed, etc. in an operator's logbook available from Atlas Copco. Follow all relevant safety precautions, including those mentioned on the cover of this book.

Repairs must be carried out by trained personnel from Atlas Copco who can be contacted for any further information.

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

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

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

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1 LEADING PARTICULARS

1.1 General description

GA are stationary, single-stage, oil-injected screw compressors driven by an electric motor. GA5, GA7 and GA10 are air-cooled.

GA Standard Pack (Figs. 2a and 9)

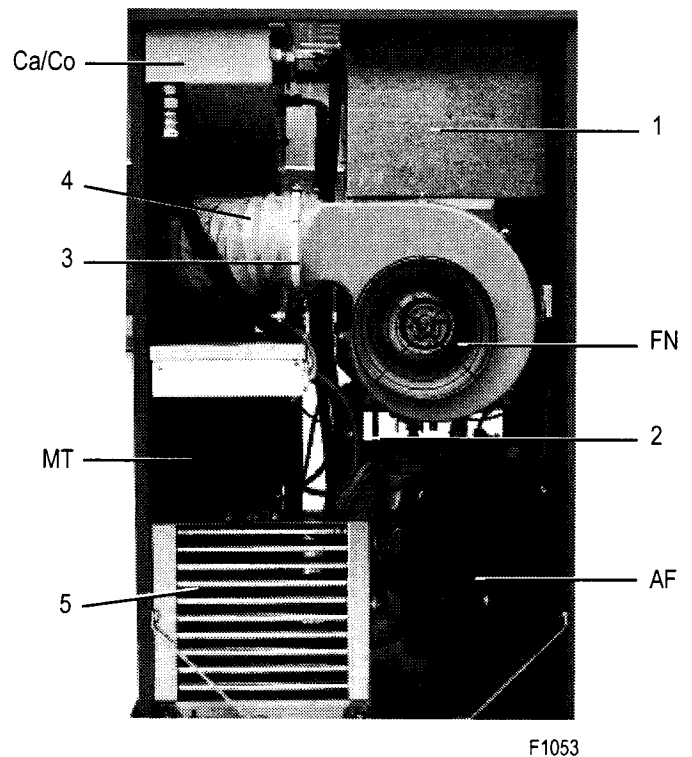
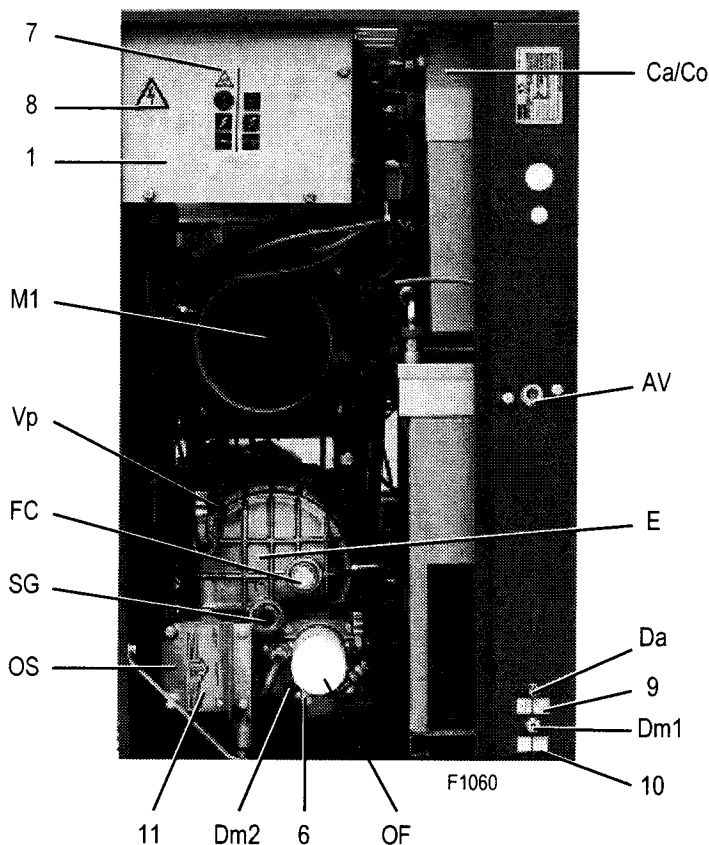
The compressors are enclosed in a sound-insulated bodywork. A control panel including the start/stop switch is provided. An electric cabinet comprising the relay-controlled regulator and motor starter is located behind this panel.

GA Pack (Figs. 2b and 6a)

The compressors are enclosed in a sound-insulated bodywork. The front panel comprises an electronic control module including the start and stop buttons. An emergency stop button is also provided. An electric cabinet comprising the motor starter is located behind this panel. An automatic condensate drain system is provided.

GA Full-feature (Figs. 1 and 6a)

GA Full-feature compressors are additionally provided with an air dryer integrated in the bodywork. The dryer removes moisture from the compressed air by cooling the air to near freezing point and automatically draining the condensate. See section 1.6.



AF. Air filter	FC. Oil filler plug	3. Hose clip	8. Warning: voltage
AV. Air outlet valve	FN. Fan	4. Hose	9. Automatic condensate drain
Ca. Air cooler	MT. Moisture trap	5. Condenser (only Full-feature)	10. Manual condensate drain
Co. Oil cooler	M1. Compressor motor	6. Plug	11. Label, type of compressor oil
Da. Automatic condensate drain outlet	OF. Oil filter		
Dm1. Manual condensate drain valve	OS. Oil separator element		
Dm2. Oil drain valve	SG. Oil level sight-glass		
E. Compressor element	Vp. Minimum pressure valve		
	1. Electric cabinet		
	2. Belts		

Pictographs

7. Switch off voltage and depressurize compressor before repairing

Fig. 1. Side views, GA Full-feature

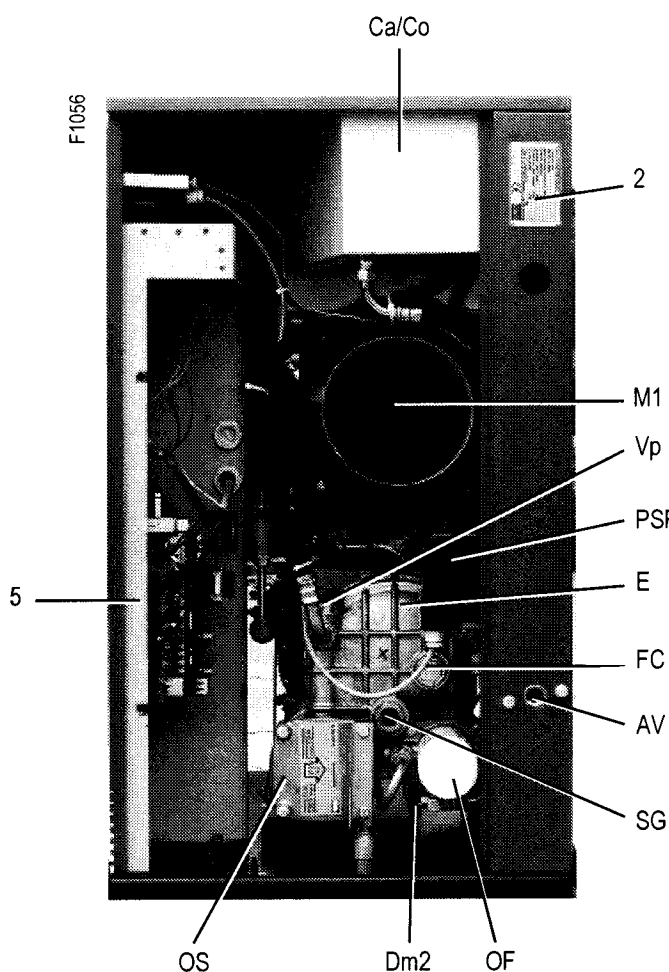


Fig. 2a. Side view, GA Standard Pack

- AF. Air filter
- AV. Air outlet valve
- Ca. Air cooler
- Co. Oil cooler
- Dm2. Oil drain valve
- E. Compressor element
- FC. Oil filler plug
- FN. Fan
- M1. Motor
- MT. Moisture trap
- OF. Oil filter
- OS. Oil separator
- PSR19. Load/unload pressure switch
- SG. Oil level sight-glass
- SV. Safety valve
- Vp. Minimum pressure valve
- 1. Electric cabinet
- 2. Data plate
- 3. Hose clip
- 4. Hose
- 5. Regulator
- 6. Belts

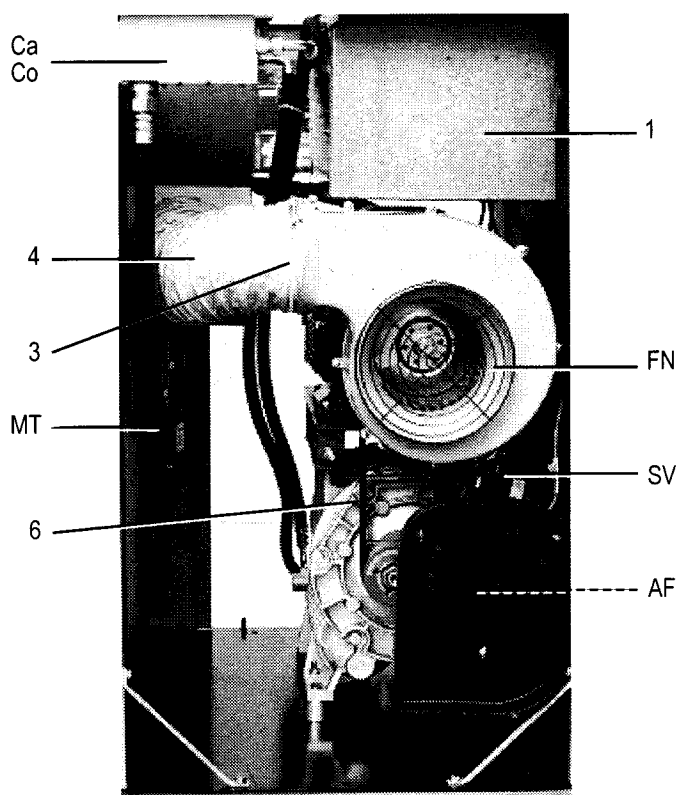
Figs. 2. Side views

Options and special versions

	Full- feature	Pack	Standard Pack
Integrated oil/water separator (OSD) . 1)	0	0	1)
High ambient version (up to 50°C) . . . NA	0	0	0
Lifting device	0	0	0
Bodywork heating	0	0	0
Rain protection	0	0	0
Heavy-duty filter	0	0	0
Modulating control regulator 2)	0	0	0
Integrated condensate separator (WSD)	S	S	0
Integrated dryer	S	0	NA
Main power isolating switch	0	0	0
Electronic drain	0	0	0
Dryer by-pass	0	0	NA
Transformer kit for dryer voltage supply	0	0	NA
Relay expansion box	0	0	NA

0 = optional S = standard NA = not available

- 1) If an oil/water separator is desired, a freestanding OSD22 must be applied.
- 2) Not for GA5.



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Fig. 2b. Side view, GA Pack

1.1.1 Air flow (Fig. 3)

Air drawn through filter (AF) and open inlet valve (IV) into compressor element (E) is compressed. The compressed air flows through oil separator (OS), minimum pressure valve (Vp) and air cooler (Ca) to outlet valve (AV).

1.1.2 Oil system (Fig. 3)

Air pressure forces the oil from oil tank (OT) through oil cooler (Co) and filter (OF) to compressor element (E) and the lubrication points.

The system comprises a by-pass valve (BV). When the oil temperature is below 75°C (167°F), there is no oil flow to the oil cooler. At approx. 90°C (194°F), the valve is closed so that all the oil passes through the cooler.

1.1.3 Cooling and condensate drain systems (Fig. 1)

The cooling system comprises air cooler (Ca) and oil cooler (Co). The cooling air is generated by fan (FN).

A moisture trap (MT) is provided in the air outlet system of GA Pack and Full-feature compressors 1). The trap is equipped with a valve for automatic condensate draining during operation (Da) and a manually operated valve for draining after stopping the compressor (Dm1).

net pressure increases. When the net pressure reaches the unloading pressure, solenoid valve (Y1) is de-energized. The plunger of the valve returns by spring force:

1. The control pressure present in the chambers of loading plunger (LP) and unloading valve (UV) is vented to atmosphere via solenoid valve (Y1).
2. Loading plunger (LP) moves by spring force and causes inlet valve (IV) to close the air inlet opening.
3. Unloading valve (UV) is opened by receiver pressure. The pressure from oil separator (OS) is released towards unloader (UA).

Air output is stopped (0%), the compressor runs unloaded.

1.2.2 Loading

When the net pressure decreases to the loading pressure, solenoid valve (Y1) is energized. The plunger of the valve moves against spring force:

1. Control pressure is fed from oil separator (OS) via solenoid valve (Y1) to loading plunger (LP) and unloading valve (UV).
2. Unloading valve (UV) closes the air blow-off opening. Loading plunger (LP) moves against spring force and causes inlet valve (IV) to open fully.

Air output is resumed (100%), the compressor runs loaded.

1.2 Unloading/loading system (Fig. 3)

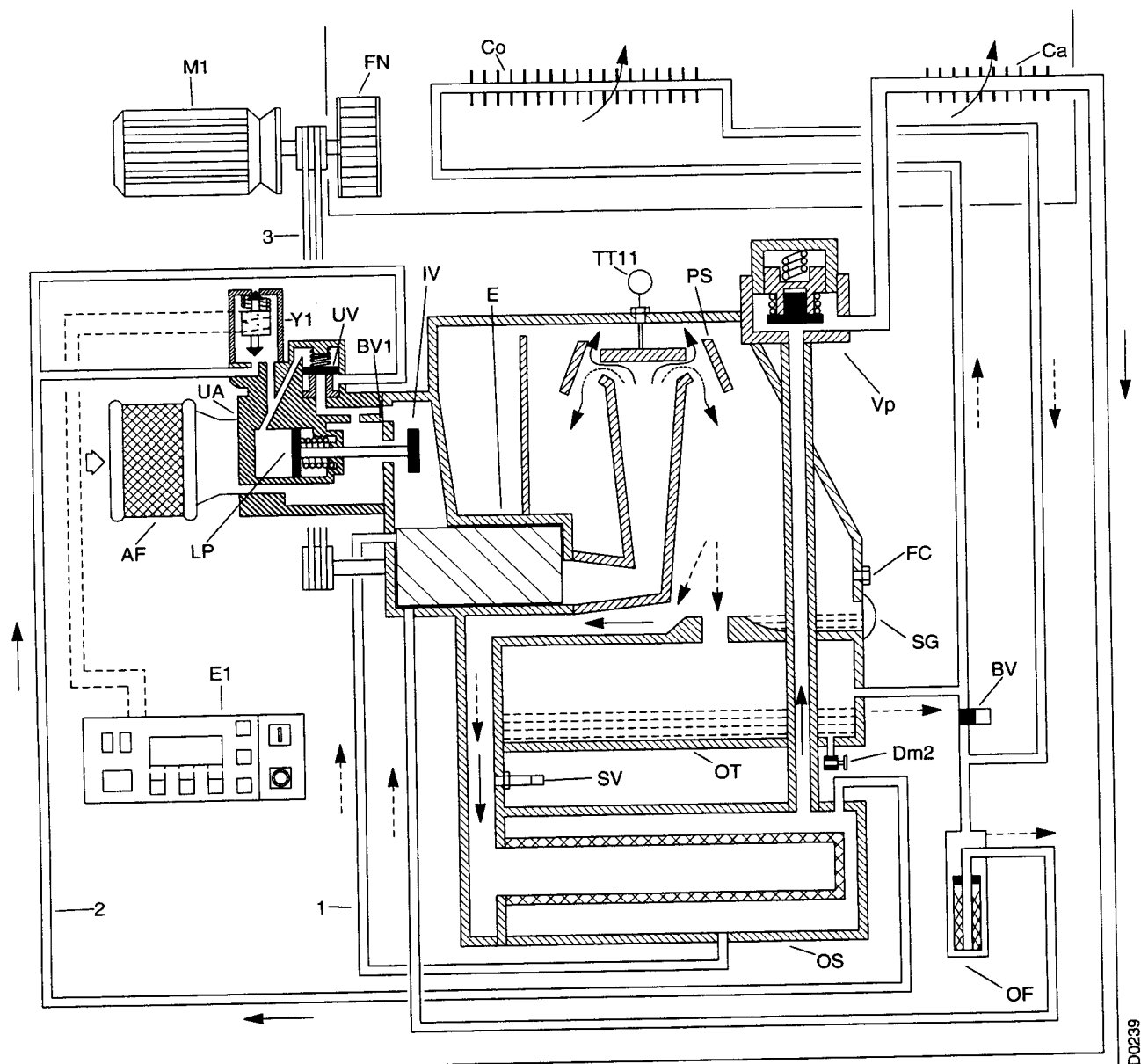
1.2.1 Unloading

If the air consumption is less than the air output of the compressor, the

1) Available as option on GA Standard Pack.

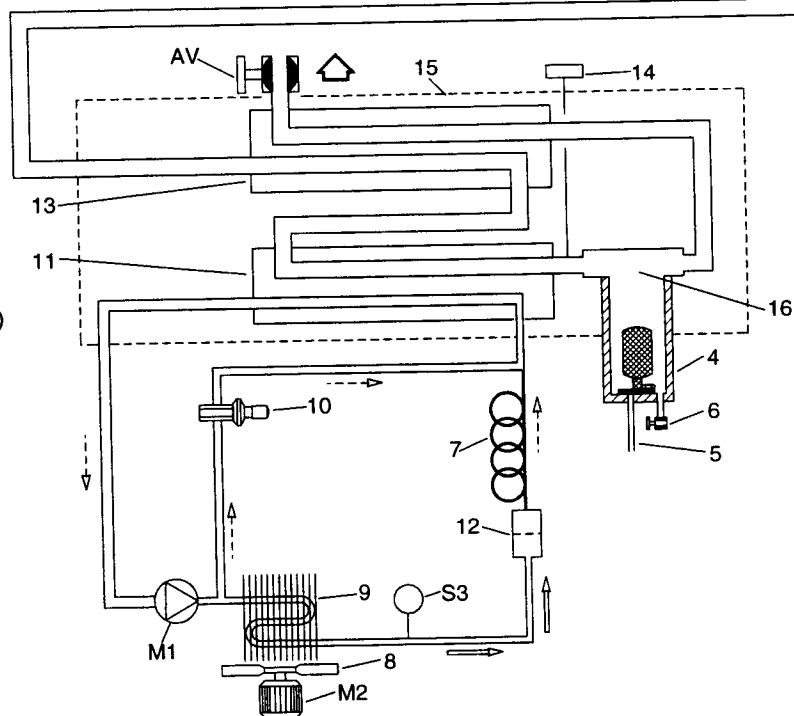
AF.	Air filter	LP.	Loading plunger	UV.	Unloading valve	6.	Manual condensate drain valve
AV.	Air outlet valve	M1.	Compressor motor	Vp.	Minimum pressure valve	7.	Capillary tube
BV.	Oil cooler by-pass valve	MT.	Moisture trap	Y1.	Loading solenoid valve	8.	Condenser cooling fan
BV1.	By-pass valve	OF.	Oil filter	1.	Oil scavenging line	9.	Refrigerant condenser
Ca.	Air cooler	OS.	Oil separator element	2.	Flexible, control air	10.	Hot gas by-pass valve
Co.	Oil cooler	OT.	Oil tank	3.	Belts	11.	Air/refrigerant heat exchanger/evaporator
Da.	Automatic condensate drain outlet	PS.	Oil pre-separator	On Full-feature also:		12.	Liquid refrigerant dryer/filter
Dm1.	Manual condensate drain valve	PT20.	Pressure sensor, air outlet			13.	Air/air heat exchanger
Dm2.	Oil drain valve	SG.	Oil level sight-glass	M1.	Refrigerant compressor	14.	Pressure dewpoint sensor
E.	Compressor element	SV.	Safety valve	M2.	Motor, condenser fan	15.	Insulation block
E1.	Control module	TT11.	Temperature sensor, compressor element outlet	S3.	Control switch, condenser fan	16.	Condensate separator
FC.	Oil filler plug			4.	Condensate trap		
FN.	Fan	UA.	Unloader	5.	Automatic condensate drain hose		
IV.	Inlet valve						

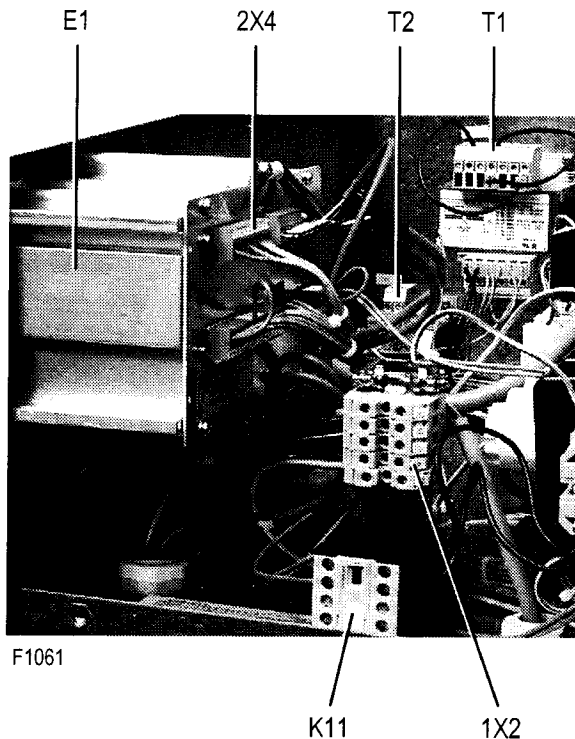
Fig. 3. GA Pack / Full-feature during loading (see next page)



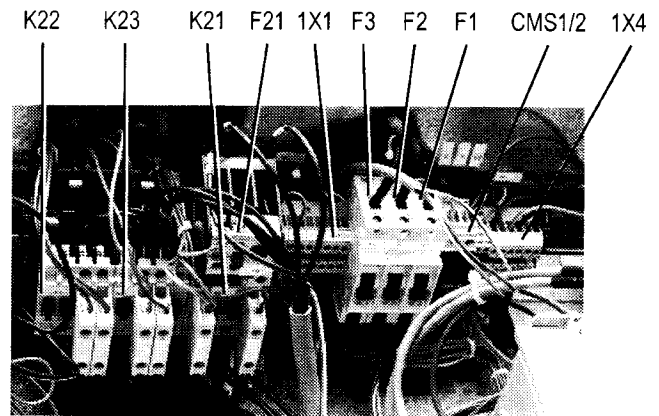
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- ◇ AIR INLET (1)
- ◇ COMPRESSED AIR OUT (2)
- COMPRESSED AIR (3)
- OIL (4)
- REFRIGERANT LIQUID (5)
- REFRIGERANT GAS (6)





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See legend of Figs. 5 for denomination of components

Fig. 4. Electric cabinet of GA Pack / Full-feature (typical example)

1.3 Electrical system for GA Pack / Full-feature

The system comprises:

1. Compressor motor (M1-Fig. 1)
2. Electronic control module (Fig. 6a)
3. Compressor start button (I) and stop button (O) (Fig. 6a)
4. Emergency stop button (S3-Fig. 6a)
5. Electric cabinet (Fig. 4)
6. Sensors for the compressor element outlet temperature (TT11) and for the air outlet pressure (PT20)
7. Dewpoint temperature sensor (TT90) for Full-feature compressors

1.4 Electronic control module for GA Pack / Full-feature

The control module consists of an electronic regulator and a control panel.

1.4.1 Electronic regulator (E1-Fig. 4)

The regulator has following functions:

Controlling the compressor

The regulator maintains the net pressure between programmable limits by automatically loading and unloading the compressor. A number of programmable settings, e.g. the unloading and loading pressures, the minimum stop time and the maximum number of motor starts are taken into account.

The regulator stops the compressor whenever possible to reduce the

power consumption and restarts it automatically when the net pressure decreases. In case the expected unloading period is too short, the compressor is kept running to prevent too-short standstill periods.

Protecting the compressor

If the compressor element outlet temperature exceeds the programmed shut-down level, the compressor will be stopped. This will be indicated on the control panel (Fig. 6a). The compressor will also be stopped in case of overload of compressor motor (M1).

If the compressor element outlet temperature exceeds a programmed value below the shut-down level, this will also be indicated to warn the operator before the shut-down level is reached.

Monitoring components subject to service

The regulator continuously monitors the oil, oil filter, oil separator and air filter. Each input is compared to programmed limits. If these limits are exceeded, a message will appear on the display (Fig. 6a) to warn the operator to replace the indicated component.

Automatic restart after voltage failure

For compressors leaving the factory, this function is made inactive. If desired, the function can be activated. Consult Atlas Copco.

Warning

If activated and provided the module was in the automatic operation mode, the compressor will automatically restart if the supply voltage to the module is restored within a programmed time period (this time period is called the **power recovery time**).

If the power recovery time is set to 00!, the compressor will always restart after a voltage failure, no matter how long it takes to restore the voltage.

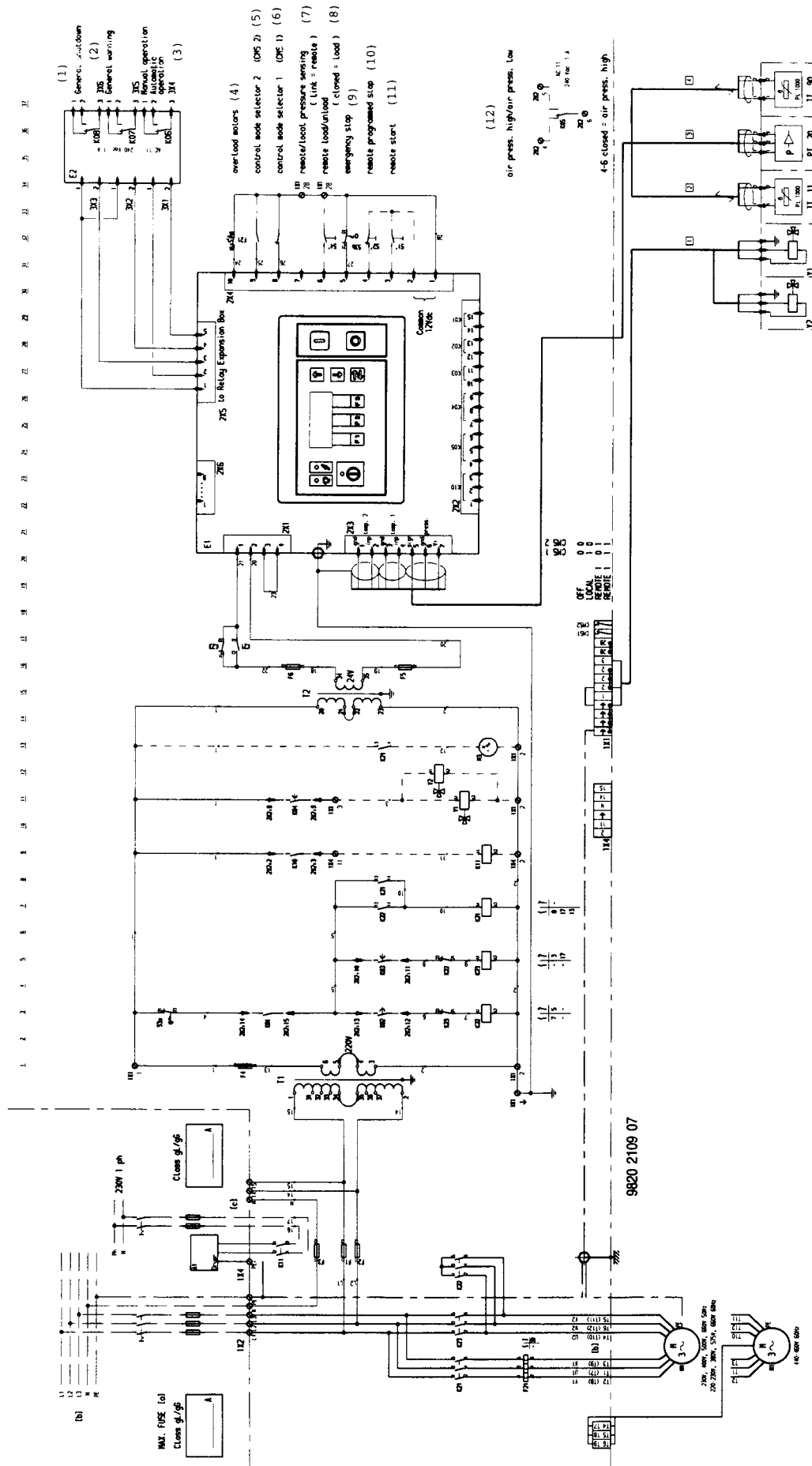


Fig. 5a. Electrical diagram, GA Pack / Full-feature (50 Hz / star-delta)

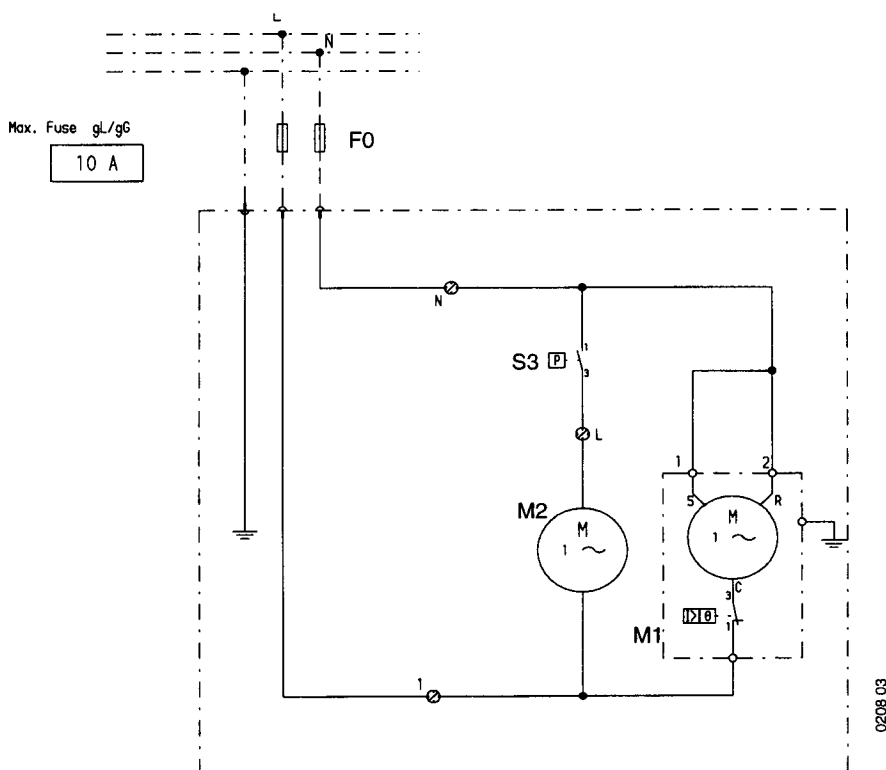


Fig. 5b. Electrical diagram, dryer on GA Full-feature

SENSORS/LOADING SOLENOID VALVE

- PT20. Pressure sensor, air outlet
TT11. Temperature sensor, compressor element outlet
TT90. Temperature sensor, dewpoint **1)**
Y1. Loading solenoid valve
Y2. Solenoid valve, modulating control

MOTORS

- M1. Compressor motor
M3. Fan motor 2)

ELECTRIC CABINET

- F1/F6. Fuses
F21. Overload relay, compressor motor

- | | |
|--------|----------------------------------|
| K11. | Auxiliary contactor for dryer 1) |
| K21. | Line contactor |
| K22. | Star contactor |
| K23. | Delta contactor |
| T1/T2. | Transformers |
| 1X1. | Terminal strip |
| 1X2. | Terminal strip |
| 1X4. | Terminal strip |

CONTROL MODULE (E1)

- CMS1/2. Switches, selection of compressor control mode
- I. Start button
- K01. Blocking relay
- K02. Auxiliary relay, star contactor

- K03. Auxiliary relay, delta contactor
- K04. Auxiliary relay, loading/unloading
- K05. Auxiliary relay, high/low air pressure
- K10. Auxiliary relay, dryer
- O. Stop button
- S3. Emergency stop button
- 2X1/6. Connectors

On GA Full-feature also:

- F0. Fuses**3)**
M1. Refrigerant compressor/motor
M2. Motor, condenser cooling fan
S3. Control switch, condenser cooling fan

- 1) Only for Full-feature compressors.
- 2) Installed in electric cabinet of compressors designed for high-temperature conditions.
- 3) Customer's installation.

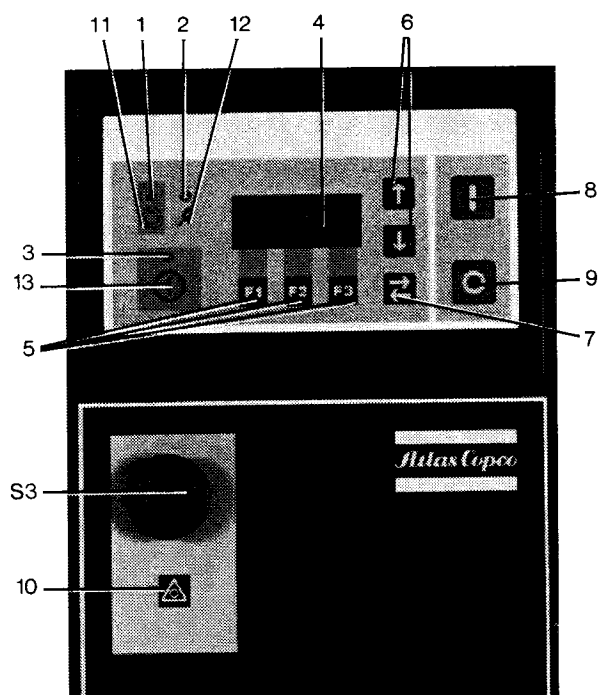
Figs. 5. Electrical diagrams for GA Pack / Full-feature

1.4.2 Control panel (Fig. 6a)

To control the compressor and to read and modify programmable parameters, the regulator is provided with a panel including:

Indicators, keys and buttons

- 1 Automatic operation LED
Indicates that the regulator is automatically controlling the compressor: the compressor is loaded, unloaded, stopped and restarted depending on the air consumption and the limitations programmed in the regulator.
- 2 Voltage on LED
Indicates that the voltage is switched on.
- 3 General alarm LED
Is normally out. Is alight or blinks in case of an abnormal condition. See below.
- 4 Display
Indicates:
 - the name of the sensor of which the actual reading is displayed
 - the unit and actual reading
 - messages regarding the operating status, a sensor error, a service need or a fault
- 5 Function keys
Keys to control and program the compressor. The actual function of each key is abbreviated and indicated on the bottom line. The most common ones are listed below.
- 6 Scroll keys
As long as an arrow is shown on the right side of the display, the key with the same symbol can be used to scroll through the display.
- 7 Tabulator key
Key to go to the next field of the display.
- 8 Start button
Push button to start the compressor. LED (1) lights up indicating that the regulator is operative (in automatic operation). The LED goes out after unloading the compressor manually.
- 9 Stop button
Push button to stop the compressor. LED (1) goes out. The compressor will stop after running in unloaded condition for 30 seconds.
- S3 Emergency stop button
Push button to stop the compressor immediately in case of emergency. Must be unlocked before restarting.



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- | | |
|-----------------------------|-------------------------------------|
| S3. Emergency stop button | 8. Start button |
| 1. LED, automatic operation | 9. Stop button |
| 2. LED, voltage on | 10. Pictograph, emergency stop |
| 3. LED, general alarm | 11. Pictograph, automatic operation |
| 4. Display | 12. Pictograph, voltage on |
| 5. Function keys | 13. Pictograph, alarm |
| 6. Scroll keys | |
| 7. Tabulator key | |

Fig. 6a. Control panel of GA Pack / Full-feature

Delivery air bar	7.0	
Auto loaded		
Menu	More	Unld
F1	F2	F3

Fig. 6b. Example of the main display

Status data		
		↓
Main	Slct	
F1	F2	F3

Fig. 6c. Example of a main menu

General alarm LED (3-Fig. 6a) 1)

- The LED blinks in case of a shut-down (due to either too high a compressor element outlet temperature or overload of the compressor motor); at the same time the shut-down screen appears. See section 6. After eliminating the cause of the trouble and when the abnormal condition has disappeared, press key <<Rset>> (5).
- The LED blinks and the compressor is shut down if the sensor of the compressor element (TT11-Fig. 15) is out of order; at the same time the display will show a fault message. Switch off the voltage, depressurize and check the sensor and its wiring.
- The LED is alight in case of a shut-down warning; at the same time a warning message appears. Remedy; see section 6.
- The LED is alight if the dewpoint sensor (TT90) is out of order (on Full-feature compressors); at the same time a fault message is shown. Stop the compressor, switch off the voltage, depressurize and check the sensor and its wiring.

Selecting a menu

To facilitate controlling the compressor, menu-driven programs are implemented in the electronic module. Use the function keys (5) to select the menus in order to program and monitor the compressor. The "User manual for electronic regulator for GA5 up to GA75 compressors" deals elaborately with all regulator functions.

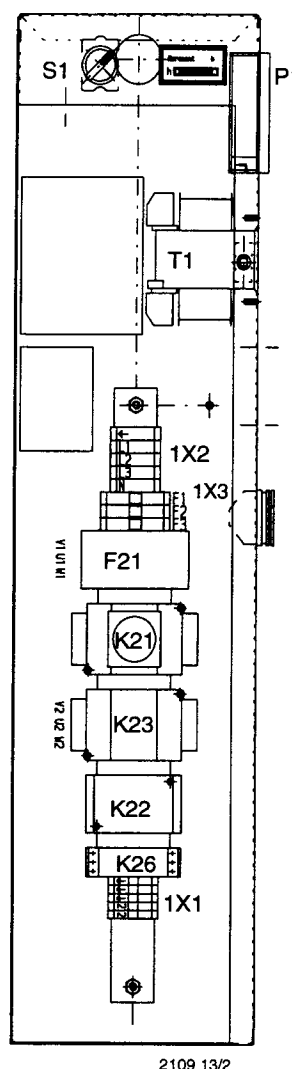
Function keys

Abbreviation	Designation	Function
Add	Add	To add compressor start/stop commands (day/hour)
Canc	Cancel	To cancel a programmed setting when programming parameters
Del	Delete	To delete compressor start/stop commands
Lim	Limits	To show limits for a programmable setting
List	List	To list programmed start/stop commands (day/hour)
Load	Load	To load the compressor manually
Main	Main	To return from a menu to the main display (Fig. 6b)
Menu	Menu	Starting from the main display (Fig. 6b), to initiate the main menu (Fig. 6c) which gives access to submenus Starting from a submenu, to return to the main menu (Fig. 6c)
Mod	Modify	To modify programmable settings
More	More	To have a quick look at the compressor status
Prog	Program	To program modified settings
Rset	Reset	To reset a timer or message
Rtrn	Return	To return to a previously shown option or menu
Slct	Select	To select a submenu or to read more details of a selection shown on display
Unld	Unload	To unload the compressor manually

1.5 Electrical system for GA Standard Pack

The system comprises:

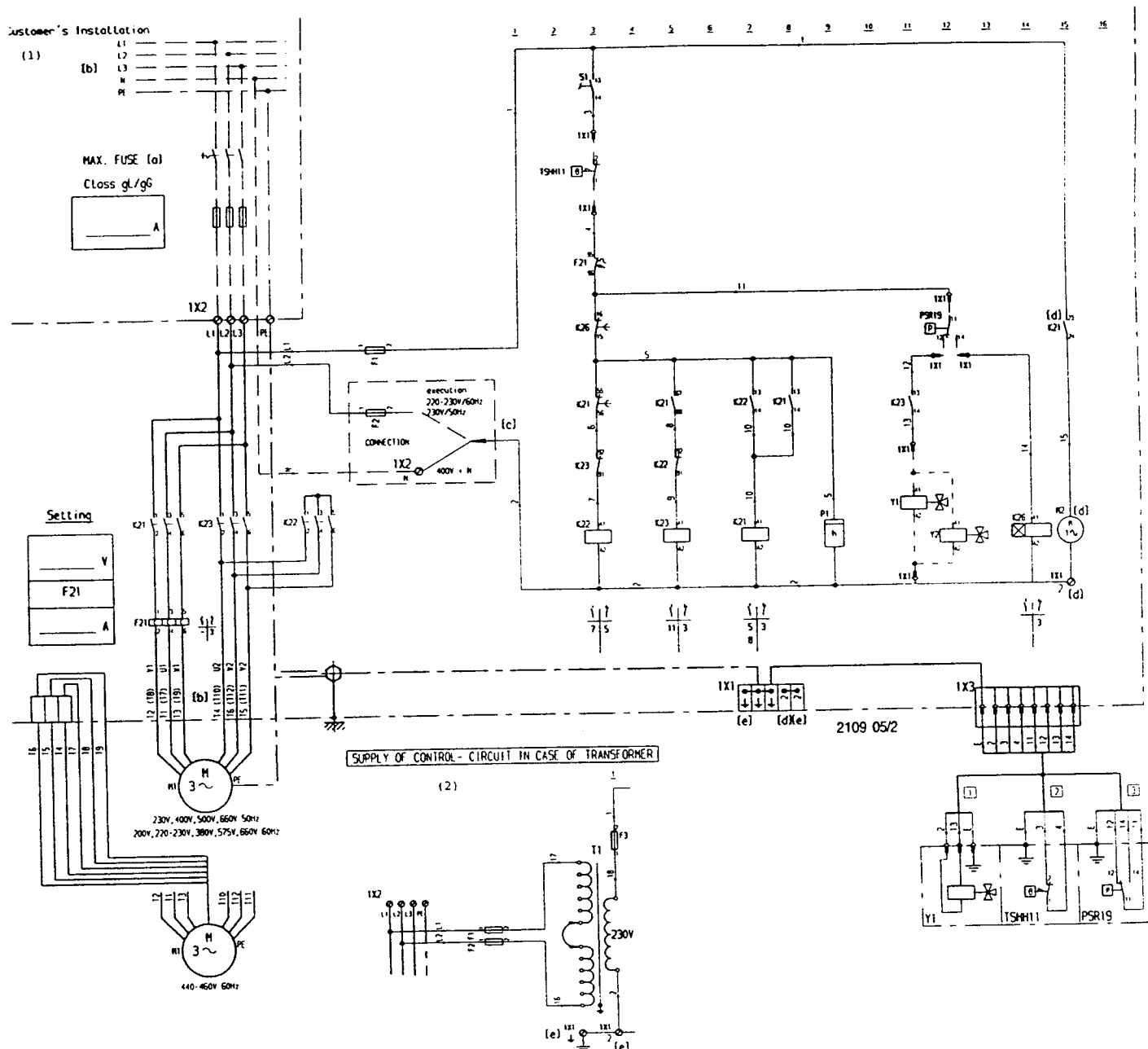
1. Compressor motor (M1-Fig. 1)
2. Regulator enclosed in a cabinet (Fig. 7)
3. Control panel with start/stop switch (S1-Fig. 9)
4. Temperature shut-down switch (TSHH11-Fig. 9)
5. Load/unload pressure switch (PSR19-Fig. 2a)



See legend of Fig. 8 for denomination of components

Fig. 7. Electric cabinet of GA Standard Pack (typical example)

- 1) Consult the User manual for the electronic regulator, section "Status data submenu".



SWITCHES / LOADING SOLENOID VALVE

- PSR19. Load/unload pressure switch
- TSHH11. Temperature shut-down switch
- Y1. Loading solenoid valve
- Y2. Solenoid valve, modulating control

MOTORS

- M1. Compressor motor
- M2. Fan motor (provided on compressors designed for high-temperature conditions)

ELECTRIC CABINET

- F1/F3. Fuses

- F21. Overload relay, compressor motor
- K21. Line contactor
- K22. Star contactor
- K23. Delta contactor
- K26. Timer, delayed motor stopping (5 minutes)
- T1. Transformer (if provided)
- 1X1/3. Terminal strips

CONTROL PANEL

- P1. Hourmeter, motor running time
- S1. Start/stop switch

Fig. 8. Electrical diagram for GA Standard Pack with star-delta starter

1.5.1 Regulator (Fig. 8)

The regulator loads, unloads, stops and restarts the compressor according to the air consumption, and protects the compressor and motor from overloads. The unloading and loading pressures are the opening and closing pressures respectively of switch (PSR19). See section 5.6.

Delayed motor stopping

The time relay for delayed motor stopping (K26) limits the frequency of automatic motor starts by stopping the motor only after a set time of 5 minutes of uninterrupted unloaded operation. If the net pressure drops to the loading pressure within the set unloading time, the compressor will be loaded without stopping.

Compressor temperature shut-down switch (TSHH11)

The switch prevents damage resulting from too high a temperature at the outlet of the compressor element.

Motor overload relay (F21)

The relay prevents damage resulting from too high a motor current.

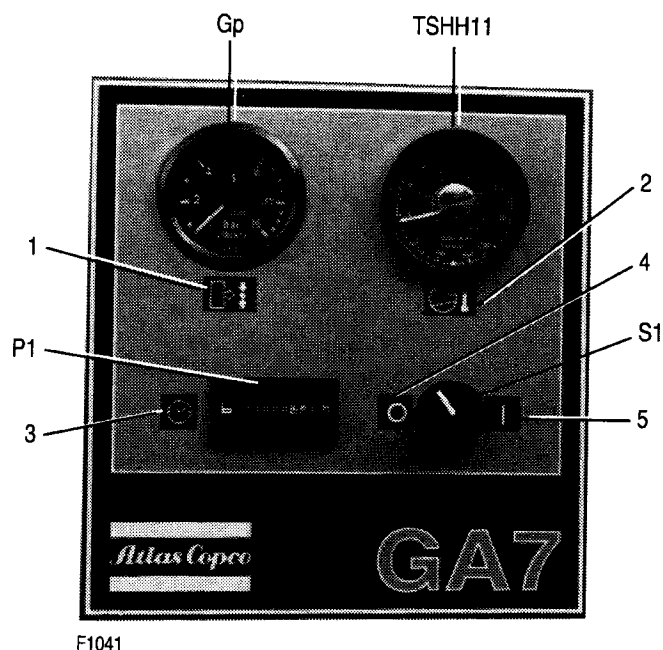


Fig. 9. Control panel of GA Standard Pack

1.5.2 Control panel (Fig. 9)

- Gp. Gauge indicating the working pressure
- P1. Hourmeter indicating the total motor running time
- S1. Switch to start or stop the compressor
- TSHH11. Gauge/switch, indicating the temperature at the outlet of the compressor element as well as the shut-down temperature; the regulator then stops the compressor
- 1. Pictograph, working pressure
- 2. Pictograph, outlet temperature of compressor element
- 3. Pictograph, running hours
- 4. Pictograph, compressor stop
- 5. Pictograph, compressor start

1.6 Air dryer on GA Full-feature (Fig. 3)

GA Full-feature are provided with a dryer which removes moisture from the compressed air. See Fig. 5b for the electrical diagram.

1.6.1 Air circuit

Compressed air enters heat exchanger (13) and is cooled by the outgoing, cold, dried air. Water in the incoming air starts to condense. The air then flows through heat exchanger/evaporator (11) where the

refrigerant evaporates causing the air to be further cooled to close to the evaporating temperature of the refrigerant. More water in the air condenses. The cold air then flows through separator (16) where condensate is separated from the air. The condensate collects in condensate trap (4) and is automatically drained. The cold, dried air flows through heat exchanger (13) where it is warmed up by the incoming air.

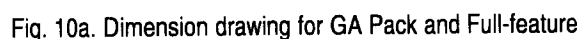
1.6.2 Refrigerant circuit

Compressor (M1) delivers hot, high-pressure refrigerant gas which flows through condenser (9) where most of the refrigerant condenses.

The liquid flows through dryer/filter (12) to capillary tube (7). The refrigerant leaves the capillary tube at evaporating pressure.

The refrigerant enters evaporator (11) where it withdraws heat from the compressed air by further evaporation at constant pressure. The heated refrigerant leaves the evaporator and is sucked in by the compressor.

2.1 Dimension drawings (Figs. 10)



2.2 Electric cable size, settings of overload relay (F21) and main fuses

Attention

- Local regulations remain applicable if they are stricter than the values proposed below.
- The voltage drop must not exceed 5% of the nominal voltage. It may be necessary to use cables with a larger section than those stated to comply with this requirement.
- Max. cable length = 25 m, max. ambient temperature = 40°C, cables in free air or in raceway, copper conductors.
- **On GA Full-feature**, the current to the air dryer is 2.4 A (50 Hz) or 2.7 A (60 Hz).

Compressor type	Supply voltage (V)	Line current (A)	Cable section (mm²/AWG size)	Overload relay (A)	Fuses (A)	
50 Hz compressors with star-delta starter						
GA5	230	21	4	12	35	
GA5	400	12	2.5	7	20	
GA5	500	10	2.5	6	20	
GA7	230	29	6	17	35	
GA7	400	17	4	10	25	
GA7	500	13	2.5	8	20	
GA10	230	39	10	22	50	
GA10	400	22	6	13	35	
GA10	500	18	4	10	25	
60 Hz compressors with star-delta starter						
GA5	220/230	23	4	13	35	
GA5	380	13	2.5	8	25	
GA5	440/460	11	2.5	7	20	
GA7	220/230	30	6	17	35	
GA7	380	18	4	10	25	
GA7	440/460	15	2.5	9	20	
GA10	220/230	40	10	23	50	
GA10	380	23	6	13	35	
GA10	440/460	20	4	12	25	
60 Hz compressors with direct-on-line starter						
					CSA HRC	UL Class K5
GA5	200	-	AWG8	26	60	60
GA5	220/230	-	AWG8	23	60	60
GA5	440/460	-	AWG12	11	30	30
GA5	575	-	AWG12	9	30	30
GA7	200	-	AWG6	34	80	70
GA7	220/230	-	AWG8	30	60	60
GA7	440/460	-	AWG10	18	60	60
GA7	575	-	AWG12	15	30	30
GA10	200	-	AWG6	44	100	100
GA10	220/230	-	AWG6	40	80	70
GA10	440/460	-	AWG8	20	60	60
GA10	575	-	AWG10	15	60	60

2.3 Installation proposal (Fig. 11)

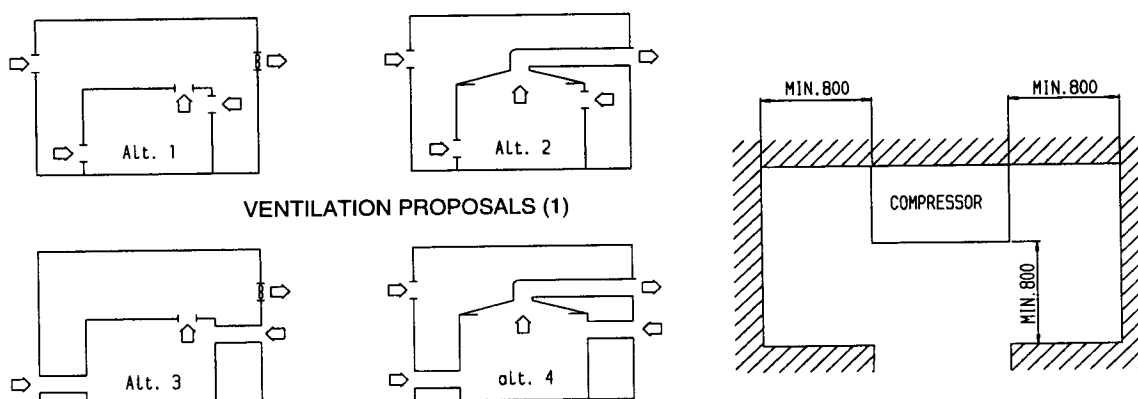
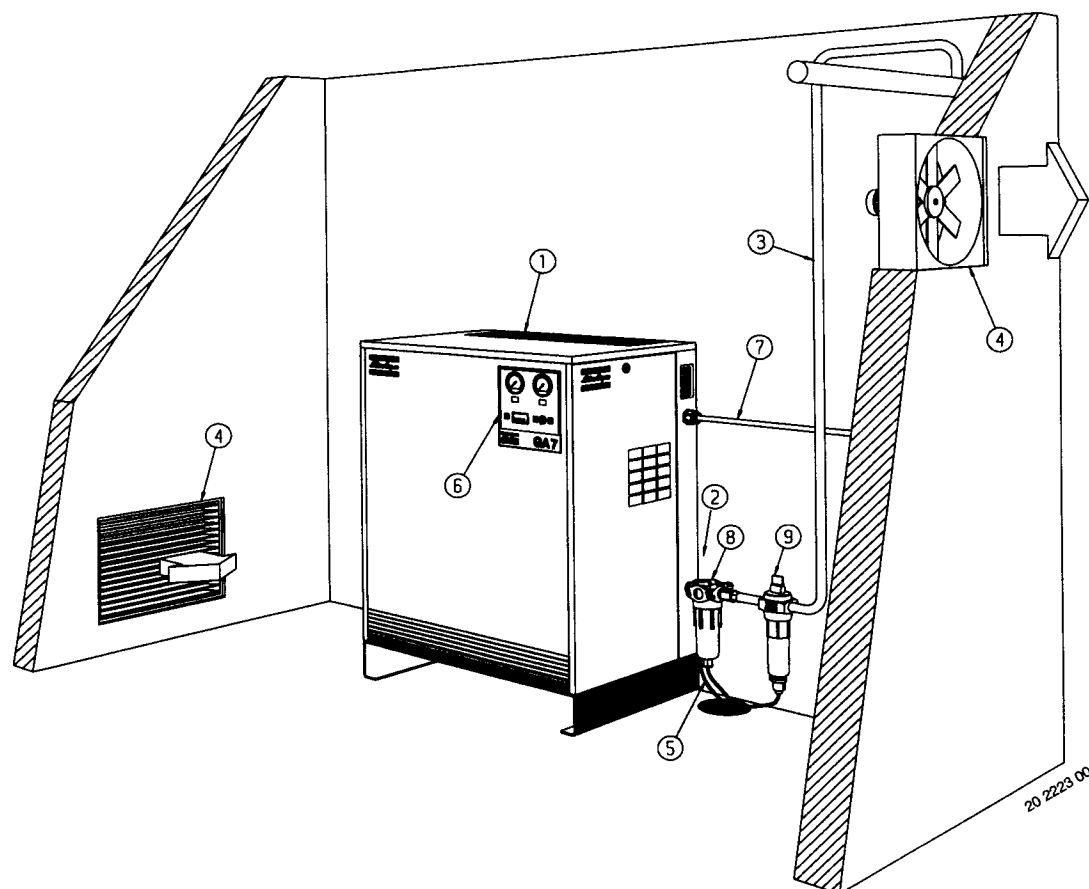


Fig. 11. Installation proposal, typical example for GA Standard Pack (installation of GA Pack / Full-feature is similar)

Ref. Description/recommendation

- 1 Install the compressor on a level floor suitable for taking the weight of the compressor and with a minimum clearance of 1.2 m above the unit (except for ventilation proposals 2 and 4).
- 2 Position of compressed air outlet valve.
- 3 The maximum total pipe length (including interconnecting piping between compressor and receiver) can be calculated as follows:

$$L = \frac{\Delta P \times d^5 \times P}{450 \times Q_c^{1.85}}$$

- L = pipe length in m
 ΔP = maximum allowable pressure drop (recommended 0.1 bar)
d = inner diameter of pipe in mm
P = compressor outlet pressure in bar absolute
Q_c = free air delivery of compressor in l/s

Ref. Description/recommendation

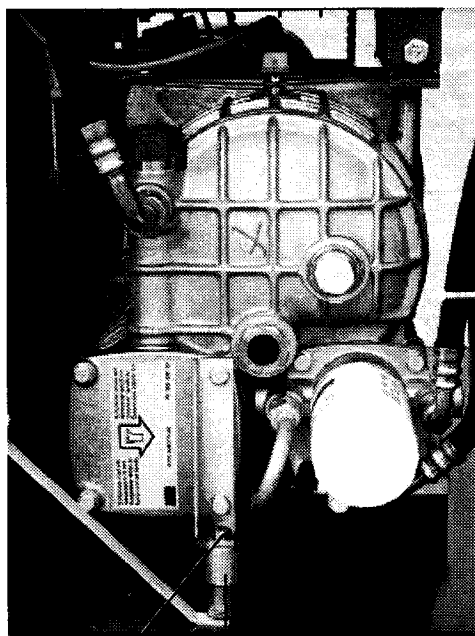
- 4 Ventilation: the inlet grids and ventilation fan should be installed in such a way that any recirculation of cooling air to the compressor or dryer is avoided. The air velocity to the grids must be limited to 5 m/s. The maximum allowable pressure drop over the cooling air ducts is 30 Pa. If this pressure drop is exceeded, a fan is needed at the outlet of the cooling air ducts. The maximum air temperature at the compressor intake opening is 40°C (minimum 0°C).

The required ventilation to limit the compressor room temperature can be calculated as follows:

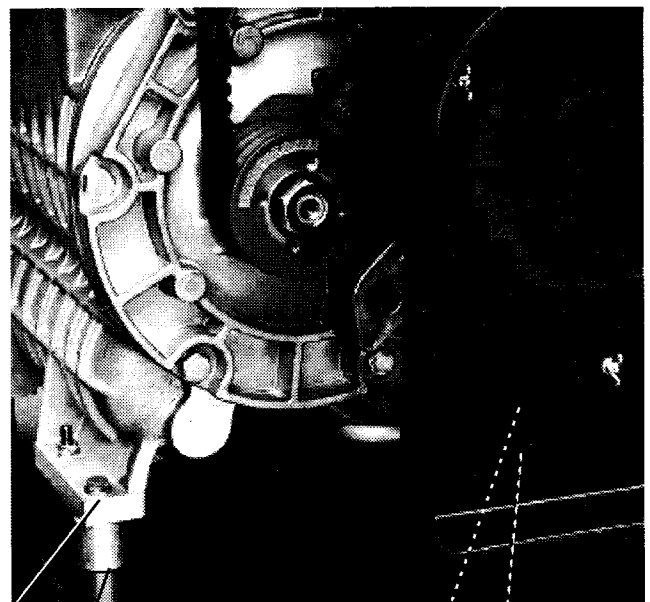
For alternatives 1 and 3: $Q_v = 0.92 N / \Delta T$

- Q_v = required ventilation capacity in m³/s
N = shaft input of compressor in kW
 ΔT = temperature increase in compressor room

For alternatives 2 and 4, the fan capacity should match the compressor fan capacity at a pressure head equal to the pressure drop caused by the cooling air outlet ducts.



1 2



1 2

1. Transport bolt
2. Transport spacer

Fig. 12. Transport fixations

Ref. Description/recommendation

- 5 Position of condensate drain flexibles. The flexibles towards the drain collector must not dip into the water of the drain collector. Atlas Copco has oil separators (OSD) to separate the major part of oil from condensate to ensure that the condensate meets the requirements of the environmental codes.
- 6 Position of control panel.
- 7 Position of mains cables entry. See section 2.2 for the recommended electric cables. See section 2.4 for connecting the power supply.
- 8 A condensate trap is integrated in the bodywork of GA Pack / Full-feature. It is available as option for GA Standard Pack.
- 9 Optional filters can be installed in the pressure line downstream of the outlet valve:
 - A DD filter for general-purpose filtration (filter traps solid particles down to 1 micron with max. oil carry-over of 0.5 mg/m³).
 - A high-efficiency PD filter (traps solid particles down to 0.01 micron with max. oil carry-over of 0.01 mg/m³). A PD filter must be installed downstream of a DD filter.
 - If oil vapour and odours are undesirable, a filter of the QD type should be installed downstream of the PD filter.
- The air receiver (optional) should be installed in a frost-free room and on a level concrete foundation.

For normal air consumption, the volume of the air net (receiver and piping) can be calculated as follows:

$$V = \frac{7.5 \times Q \times P}{\Delta P}$$

- V = volume of air net in l
 Q = free air delivery of compressor in l/s
 P = compressor air inlet pressure in bar absolute
 Δ P = Punload - Pload in bar

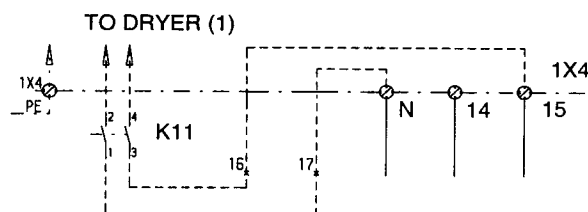


Fig. 13a. Supply from phase conductor/neutral conductor

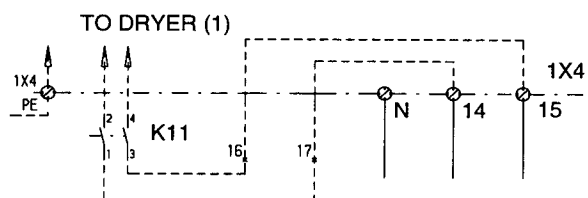


Fig. 13b. Supply from two phase conductors

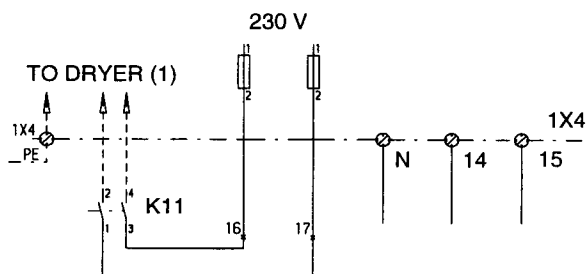


Fig. 13c. Separate voltage supply

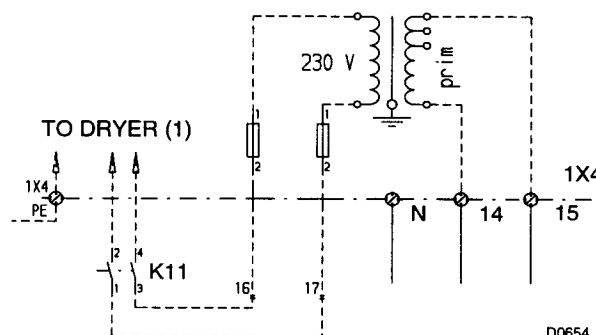


Fig. 13d. Supply from optional voltage transformer

Figs. 13. Dryer connections on GA Full-feature

2.4 Electrical connections

General

- The installation must include an isolating switch near to and visible from the compressor. **Make sure that this switch is open to isolate the compressor from the mains before carrying out any connection.**
- See section 2.2 for the size of the electric cables.
- The installation must be earthed and protected against short circuits by fuses of the inert type in each phase. See section 2.2.
- The electrical connections must correspond to the local codes.
- The indications on the data plate of the drive motor must correspond to the mains supply voltage and frequency.
- Check the fuses and the setting of the overload relay. See section 2.2.

On GA Standard Pack

Connect the power supply to terminals (L1, L2 and L3) of terminal strip (1X2-Fig. 7) and the earth conductor to terminal (PE).

For compressors with voltage transformer, check that the connections at the primary side of the transformer correspond to the mains voltage. For compressors without voltage transformer, check the connection of wire (2-Fig. 8):

- either towards the neutral terminal (N) in case of a 3 x 400 V plus neutral mains; connect the neutral conductor to terminal (N)
- or towards terminal (2) of fuse F2 in case of a 3 x 230 V mains

On GA Pack

Connect the power supply to terminals (L1, L2 and L3) of terminal strip (1X2-Fig. 4). Connect the earth conductor to terminal (PE) of terminal strip (1X2) and the neutral conductor to terminal (N). Consult section 2.2.

On GA Full-feature

- Connect the power supply to terminals (L1, L2 and L3) of terminal strip (1X2-Fig. 4). Connect the earth conductor to terminal (PE) of terminal strip (1X2) and the neutral conductor to terminal (N). Consult section 2.2.
- The electrical diagram of the dryer is stuck on the dryer module. The voltage to the dryer is supplied over the contacts of relay (K11-Fig. 4), which close when the compressor is started.
- **The voltage supply to the dryer must be single-phase 230 V.** The voltage may be branched off directly from the mains supply or via an optional voltage transformer.

1. The dryer voltage supply is branched off from the mains supply

- **For a compressor supply voltage of 3 x 400 V plus neutral conductor (Fig. 13a):**

The dryer supply voltage is branched off between a phase conductor and the neutral conductor.

- **For a compressor supply voltage of 3 x 230 V (Fig. 13b):**

The dryer supply voltage is branched off between two phase conductors.

- **For all other supply voltages (Fig. 13c):**

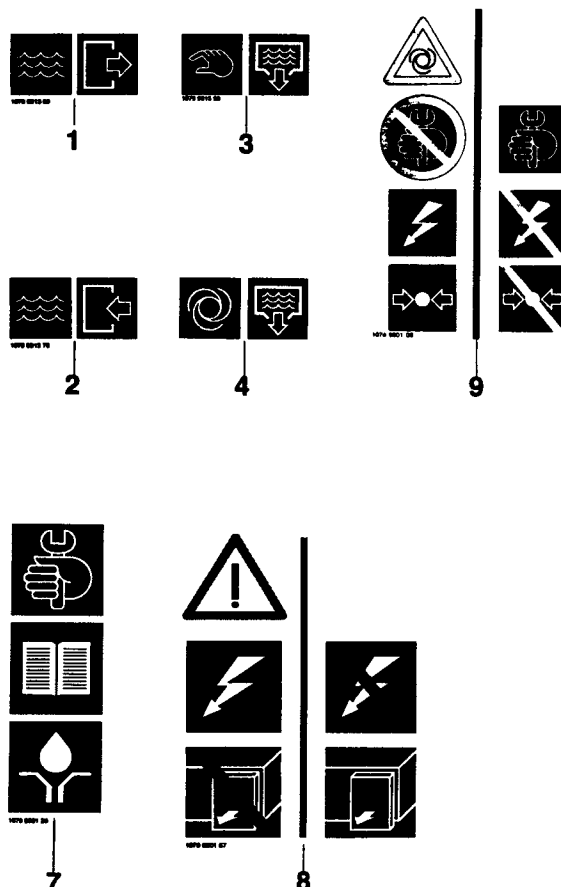
A separate single-phase 230 V voltage supply must be provided. Use wiring of minimum 1.5 mm². The dryer must be protected by fuses. Consult section 2.2.

2. The dryer voltage is branched off from the optional voltage transformer

The correct connections are shown on Fig. 13d.

2.5 Pictographs

Fig. 14 shows typical examples of pictographs used for GA compressors. See also Figs. 6a and 9.



5

	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20	0.21	0.22	0.23	0.24	0.25
0.67	1.5	5	8	20	40	70	170	330	560				
1	2.5	3.05	6.25	12.5	20.5	31.5	62.5	102	155				

6

P007

1. Water outlet
2. Water inlet
3. Manual condensate drain
4. Automatic condensate drain
5. Before connecting compressor electrically, consult instruction book for motor rotation direction
6. Torques for steel (Fe) or brass (CuZn) bolts
7. Consult Instruction book before greasing
8. Switch off voltage before removing protecting cover inside electric cubicle
9. Switch off voltage and depressurize compressor before repairing

Fig. 14. Pictographs

3 OPERATING INSTRUCTIONS

3.1 Before initial start-up

3.1.1 Safety precautions

The operator must apply all relevant safety precautions, including those mentioned in this book.

3.1.2 User manual (GA Pack / Full-feature only)

Read the "User manual for electronic regulator for GA5 up to GA75 compressors" to familiarize yourself with all regulator functions.

3.1.3 Outdoor/altitude operation

If the compressor is installed outdoors or if the air inlet temperature can be below 0°C (32°F), precautions must be taken. In this case, and also if operating at high altitude, consult Atlas Copco.

3.1.4 Handling

The bottom frame of the compressor is designed for easy handling with a pallet truck.

3.1.5 External compressor status indication (GA Pack / Full-feature only)

A relay box for external compressor status indication (E2-Fig. 5a) is available as option. It can be connected to the electronic control module (E1). The relay box has relays for indication of:

- manual load/unload or automatic operation (K06)
- warning condition (K07)
- shut-down condition (K08)

Maximum load for these contacts: 1 A / 240 V AC. Stop the compressor and switch off the voltage before connecting external equipment.

3.1.6 Compressor control modes (GA Pack / Full-feature only)

The electronic regulator has two switches (CMS1/2-Fig. 4) to select following compressor control modes (0 = open / 1 = closed):

CMS1	CMS2	Compressor mode
0	0	Compressor off

For remote starting and stopping: Connect one side of a remote start button (normally open contact) to terminal 3 of connector (2X4) 1). Connect one side of a remote stop button (normally closed contact) to terminal 4 of connector (2X4) 1). Bridge the other sides of these buttons. Connect this common joint to terminal 2 of connector (2X4).

Bridge terminal 28 of strip (1X1-Fig. 4) and terminal 6 of connector (2X4) 1). In this mode, the outlet pressure is still sensed by pressure transducer (PT20), resulting in loading and unloading of the compressor at the pressures programmed in the electronic regulator. If terminals 28 and 6 are not bridged, the compressor is switched out of automatic load/unload operation and remains running unloaded.

For remote loading/unloading (via external pressure switch): Bridge terminal 28 of strip (1X1-Fig. 4) and terminal 7 of connector (2X4) 1) and connect a load/unload switch between terminal 28 of strip (1X1-Fig. 4) and terminal 6 of connector (2X4) 1). This results in loading and unloading of the compressor at the closing and opening pressures of the external pressure switch respectively.

Have the modifications checked by Atlas Copco. Stop the compressor and switch off the voltage before connecting external equipment. Only voltage-free contacts are allowed.

3.2 Initial start-up

1. Remove the transport bolts and spacers. See Fig. 12.
2. Check that the electrical connections correspond to the local codes and that all wires are clamped tight to their terminals. See section 2.4.
3. Check the voltage selecting wires at the primary side of transformer (T1-Fig. 4) 2), the setting of compressor motor overload relay (F21), and that overload relay (F21) is set for automatic resetting.

1) At the back of the electronic module (see Fig. 4).

2) For GA Standard Pack: if a transformer is provided.

4. Fit air outlet valve (AV-Figs. 1 and 2). Close the valve. Connect the air net to the valve.
5. Fit valve (Dm1-Fig. 1). Close the valve. Connect the valve to a drain collector. 1)
6. Connect the automatic drain outlet (Da-Fig. 1) to a drain collector. 1)
7. The drain pipes to the drain collector must not dip into the water. For draining of pure condensate water, install an oil/water separator (OSD) which is available from Atlas Copco as option. If the pipes have been led down outside the room where freezing is possible, they must be insulated.
8. Check the oil level. The level in sight-glass (SG-Fig. 15) should be clearly visible.
9. A sticker dealing in short with the operating instructions and explaining the pictographs is delivered with the literature set. Affix the sticker next to the control panel. Make yourself familiar with the instructions and pictographs explained, as well as with those mentioned in section 2.5.
10. Check the motor (M1-Figs. 1 and 2) for correct direction of rotation. An arrow is provided on the motor cooling air duct. To facilitate this check, follow the instructions on the sheet attached to the ventilation outlet grating on the roof of the compressor: Switch on the voltage. With the doors of the bodywork closed, look at the sheet after pressing button (8-Fig. 6a) or moving switch (S1-Fig. 9) to "I": **if the sheet is not blown away, stop the compressor immediately** by pressing button (9-Fig. 6a) or moving switch (S1-Fig. 9) to "O", switch off the voltage and reverse two of the voltage supply lines. Repeat the procedure: if the sheet is blown away, the direction of rotation is correct. Remove the sheet.
11. On GA Pack / Full-feature, check the programmed settings. 2)
12. Start and run the compressor for a few minutes. Check that the compressor operates normally.

3.3 Starting

For GA Pack / Full-feature (Fig. 6a)

1. Check the oil level: the level should be clearly visible in sight-glass (SG-Fig. 15).
2. Switch on the voltage. Check that voltage on LED (2) lights up. The message <<compressor off>> appears.
3. Close condensate drain valve (Dm1-Fig. 1).
4. Open air outlet valve (AV-Fig. 1).
5. Press start button I (8). The compressor starts running and automatic operation LED (1) lights up. Ten seconds 3) after starting, the compressor motor switches over from star to delta. At the same time 3) the compressor starts running loaded. The message on display (4) changes from <<Auto unloaded>> to <<Auto loaded>>.

For GA Standard Pack

1. Check the oil level: the level should be clearly visible in sight-glass (SG-Fig. 15).
2. Switch on the voltage.
3. If installed, close the condensate drain valve. 4)
4. Open air outlet valve (AV-Fig. 2a).
5. Move switch (S1-Fig. 9) to "I".

3.4 During operation

1. Check the oil level **during loaded operation**: the sight-glass (SG-Fig. 15) must be between 1/4 and 3/4 full.

For GA Pack / Full-feature (Fig. 6a)

2. If automatic operation LED (1) is alight, the regulator is automatically controlling the compressor, i.e. loading, unloading, stopping of the motors and restarting.

3.4.1 Checking the display (GA Pack / Full-feature only) 5)

1. Regularly check the display for readings and messages. Normally the main display (Fig. 6b) is shown, indicating the compressor outlet pressure, the status of the compressor and the abbreviations of the functions of the keys below the display. See section 1.4.
2. Always check the display (4) and remedy the trouble if alarm LED (3) is alight or blinks. See section 1.4.
3. The display (4) will show a service message if one of the monitored components is to be serviced; replace the component and reset the relevant timer.

Notes:

- Whenever a shut-down, shut-down warning, service request, sensor error or motor overload message is displayed, the free spaces on the display between the function keys (5) are filled with blinking indicators (**).
- When more than one message needs to be displayed (e.g. both warning and service), the messages will be displayed one after the other for 3 seconds.

4. Regularly press the key <<More>> (5) 6) to call up information about the actual compressor condition:
 - the status of controlling the compressor (automatic or manual, local or remote)
 - the status of the compressor start/stop timer (on or off) 7)
 - the maximum allowable unloading pressure
 - the outlet pressure
 - the compressor element outlet temperature
 - the dewpoint temperature (on Full-feature compressors)
 - the status of the motor overload protection (normal or not)
 - the total running and loading hours

- 1) An automatic drain system for GA Standard Pack is available as option.
- 2) Consult the User manual for the electronic regulator, sections regarding the submenus "Measured data", "Service", "Modify settings", "Timer" and "Programmable settings".
- 3) Programmable. See the User manual for the electronic regulator, section "Programmable settings".
- 4) An automatic condensate drain system is available as option.
- 5) Consult the User manual for the electronic regulator, sections "Status data submenu" and "Service submenu".
- 6) If the <<More>> function is not indicated on the bottom line of display (4-Fig. 6a), press key <<Menu>> (5) until function <<Main>> appears above key (F1), then press the key <<Main>>.
- 7) The compressor is automatically started and stopped if these start/stop commands are programmed and activated; consult the User manual for the electronic regulator, section "Timer submenu".

3.5 Manual control for GA Pack / Full-feature (Fig. 6a) 1)

Normally, the compressor runs in automatic operation, i.e. the electronic regulator loads, unloads, stops and restarts the compressor automatically. LED (1) is then alight.

If required, the compressor can be unloaded manually. In this case, the compressor is switched out of automatic operation, i.e. the compressor remains running unloaded unless it is loaded again manually.

Manually unloading

Press the key <<Unld>> (unload) (5). LED (1) goes out. The message <<Manual Unloaded>> appears on the display.

Manually loading

Press the key <<Load>> (5). LED (1) lights up. The command <<Load>> does not force the compressor in loaded condition, but it will switch the compressor to automatic operation again, i.e. the compressor will be loaded if required by the air net pressure.

Manually starting/number of motor starts

In automatic operation, the regulator limits the number of motor starts. If the compressor is stopped manually, it must not be restarted within 6 minutes after the last stop.

3.6 Stopping

For GA Pack / Full-feature (Fig. 6a)

1. Press stop button O (9). LED (1) goes out. The message <<Programmed stop>> appears. The compressor runs unloaded for 30 seconds and then stops.
2. **To stop the compressor in case of emergency**, press button (S3). Alarm LED (3) blinks. After remedying the fault, unlock the button by turning it anticlockwise and press key <<Rset>> (5) before restarting. The message <<All conditions are OK>> appears. Press keys <<Menu>> and <<Main>>.
3. Close air outlet valve (AV-Fig. 1) and switch off the voltage.
4. Open condensate drain valve (Dm1-Fig. 1).

For GA Standard Pack

1. Move switch (S1-Fig. 9) to position "O".
2. Close air outlet valve (AV-Fig. 2a) and switch off the voltage.
3. If installed, open the condensate drain valve. 2)

3.7 Taking out of operation at end of compressor service life

1. Stop the compressor and close the air outlet valve.
2. Switch off the voltage and disconnect the compressor from the mains.
3. Depressurize the compressor by opening plug (FC-Fig. 15) one turn and opening valve (Dm1-Fig. 1). 2)
4. Shut off and depressurize the part of the air net which is connected to the outlet valve. Disconnect the compressor air outlet pipe

from the air net.

5. Drain the oil (Dm2-Fig. 15) and condensate circuits (Dm1-Fig. 1). 2)
6. Disconnect the compressor condensate piping (Da/Dm1-Fig. 1) from the local condensate drain system. 2)

4 MAINTENANCE

Attention

Before starting any maintenance:

1. Stop the compressor:
 - On GA Standard Pack, move switch (S1-Fig. 9) to "O"
 - On GA Pack / Full-feature, press button O (9-Fig. 6a), wait until the compressor has stopped (approx. 30 seconds) and press button (S3-Fig. 6a).
2. Switch off the voltage. If a separate voltage supply is provided for the dryer of GA Full-feature (see section 2.4), make sure that the voltage to the dryer is also switched off.
3. Close air outlet valve (AV-Figs. 1 and 2) and depressurize the air system.
4. Apply all relevant safety precautions, including those mentioned in this book.

The air outlet valve can be locked during maintenance or repair as follows:

- Close the valve.
- Remove the bolt fixing the handle.
- Lift the handle and turn it until the slot of the handle fits over the blocking edge on the valve body.
- Lock the handle using the special bolt and wrench delivered loose with the compressor.

4.1 Compressor motor (M1-Figs. 1 and 2)

The motor bearings are greased for life.

- 1) If the <<Load>> or <<Unld>> (unload) function is not indicated on the bottom line of display (4), press key <<Menu>> (5) until the function <<Main>> appears above key (F1), then press the key <<Main>>.
- 2) A condensate drain system is available as option for GA Standard Pack.

4.2 Preventive maintenance schedule for the compressor 1)

Attention

For overhauling or carrying out preventive maintenance, service kits are available. See section 4.8. Atlas Copco offers several types of Service contracts, relieving you of all preventive maintenance work. For more details, consult your nearest Atlas Copco representative.

The schedule comprises a summary of the maintenance instructions. **Read the respective section before taking maintenance measures.** The "longer interval" checks must also include the "shorter interval" checks. When servicing, replace all disengaged packings, e.g. gaskets, O-rings, washers.

Period 2)	Running hours 2)	See section	See note	Operation
Daily				Before starting
"	--	3.3	--	Check oil level
				During operation
"	8	3.4/7.1	--	Check readings on display or gauges
"	8	--	11/13	Check that condensate is discharged during loading (Da)
"	8	3.4	--	Check oil level (SG)
				After stopping
"	--	3.6	13	Drain condensate (Dm1)
Monthly	--	--	--	Check condition of belts
3-monthly	--	5.3	--	Operate safety valve (SV)
"	--	--	9	Carry out a LED/display test (not on GA Standard Pack)
"	--	--	8	Check for possible leaks
"	500	5.2	1/8	Inspect coolers (Ca/Co); clean if necessary
"	500	--	1/7	Remove air filter element (AF), inspect
"	--	--	1	Clean compressor
6-monthly	--	--	1	On GA Full-feature, brush or blow off the finned surface of condenser
Yearly	--	5.3	--	Have safety valve tested
"	--	--	--	Have operation of electrical components tested
"	--	--	10	Test temperature shut-down protection
"	2000	4.4/4.6	2/3/6	If Atlas Copco Roto-injectfluid is used, replace oil filter (OF)
"	4000	--	13	Remove, dismantle and clean float valve of moisture trap (MT)
"	4000	4.4/4.5	3/5/6	If Atlas Copco Roto-injectfluid is used, change oil
-----	4000	--	6/12	Have oil separator (OS) replaced
Yearly	4000	5.1	6	Replace air filter element (AF)
"	6000	--	--	Replace belts
				For 13 bar and 175 psi compressors
"	500	4.4/4.5/4.6	2/6	If oil as specified in section 4.4.2 is used, change oil and oil filter (OF)
				For 7 bar, 10 bar, 100 psi, 125 psi and 150 psi compressors
"	1000	4.4/4.5/4.6	2/6	If oil as specified in section 4.4.2 is used, change oil and oil filter (OF)
"	--	--	4	Have all flexibles inspected
"	--	2.5	--	Switch off voltage. Check terminals in electric cabinet for tightness

- 1) Use only authorized parts. Any damage or malfunction caused by the use of unauthorized parts is not covered by Warranty or Product Liability.
- 2) Whichever interval comes first. The local Sales Company may overrule the maintenance schedule, especially the service intervals, depending on the environmental and working conditions of the compressor.

Notes

1. More frequently when operating in a dusty atmosphere.
2. Use an oil filter as specified in the Parts list. The part number is marked on the filter.
3. Special Atlas Copco oil for screw compressors keeping the compressor in excellent condition.
4. Damaged flexibles must be replaced immediately.
5. It is strongly recommended to use Atlas Copco Roto-injectfluid. For the change interval in extreme conditions of temperature, humidity or cooling air, consult Atlas Copco.
6. Consult the User manual for the electronic regulator for resetting the service timer (not for GA Standard Pack).
7. Replace the filter if damaged.
8. Any leak should be attended to immediately.
9. Consult the User Manual for the electronic regulator, section "Display test" (not for GA Standard Pack).
10. For GA Pack / Full-feature: Consult the User Manual for the electronic regulator, section "Modify settings submenu", before modifying the temperature protection settings.
Decrease the shut-down warning level and shut-down level for the compressor element outlet temperature to the minimum settings. Run the compressor: when reaching the setting, the unit must shut down. Afterwards, reset the warning and shut-down levels to their original values.
For GA Standard Pack, consult Atlas Copco for testing.
11. Atlas Copco has oil separators (OSD) to separate the major part of oil from condensate to ensure that the condensate meets the requirements of the environmental codes.
12. Install the new separator element with the mark TOP upwards.
13. An automatic condensate drain system is available as option on GA Standard Pack.

4.3 Oil and oil filter change interval

Consult section 4.2 for the change intervals and section 4.4 for the oil specifications.

4.4 Oil specifications

Never mix oils of different brands or types. Consult Atlas Copco for the recommended oils. Use only non-toxic oils.

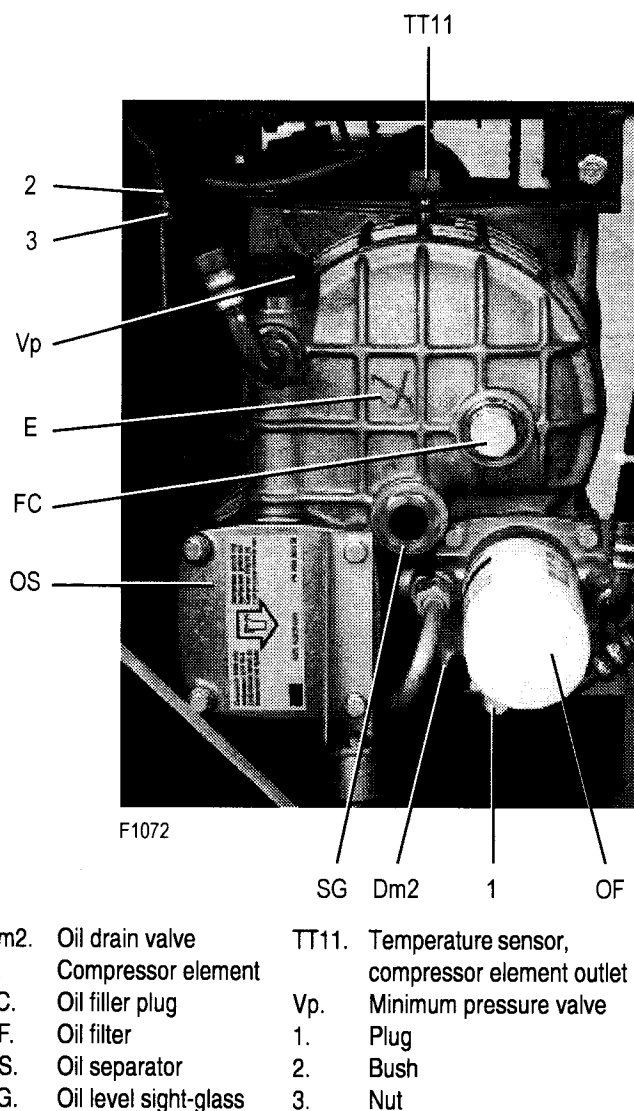
4.4.1 Atlas Copco Roto-injectfluid

It is strongly recommended to use Atlas Copco Roto-injectfluid. This is special oil for screw compressors which keeps the compressor in excellent condition. See also section 4.8.

4.4.2 Mineral oil

Although Roto-injectfluid is recommended, a high-quality mineral oil with oxidation inhibitors and anti-foam and anti-wear properties can also be used after taking some precautions. The previously used oil should first be drained and the system flushed. The oil filter should be replaced. The viscosity grade must correspond to the ambient temperature and ISO 3448, as follows:

Ambient temperature	Viscosity grade	Viscosity index
Consistently above 25°C (77°F)	ISO VG 68	Minimum 95
Between 25°C (77°F) and 0°C (32°F) . .	ISO VG 46	Minimum 95



Dm2.	Oil drain valve	TT11.	Temperature sensor, compressor element outlet
E.	Compressor element	Vp.	Minimum pressure valve
FC.	Oil filler plug	1.	Plug
OF.	Oil filter	2.	Bush
OS.	Oil separator	3.	Nut
SG.	Oil level sight-glass		

Fig. 15. Oil system components

4.5 Oil change (Fig. 15)

1. Run the compressor until warm. Stop it and close valve (AV-Figs. 1 and 2). Wait a few minutes. Depressurize the oil system by opening oil filler plug (FC) one turn to permit any pressure to escape.
2. Remove plug (1). Drain the oil by opening valve (Dm2). Close the valve and reinstall the plug. Collect the oil in a collector and deliver it to the local oil collection service.
3. Remove filler plug (FC) and pour 5 l of oil into the compressor element. Reinstall and tighten plug (FC). Open valve (AV-Figs. 2). 2)
4. Reset the oil service warning. 1)

4.6 Oil filter change (Fig. 15)

1. Stop the compressor and close valve (AV-Figs. 1 and 2). Depressurize by unscrewing oil filler plug (FC) one turn to permit any pressure in the system to escape.
2. Remove oil filter (OF).
3. Clean the filter seat on the manifold. Oil the gasket of the new element. Screw the element into place and tighten firmly by hand.
4. Check that the oil level is clearly visible.
5. Tighten plug (FC) and open valve (AV-Figs. 1 and 2).
6. Reset the oil filter service warning. 1)

4.7 Storage after installation

Run the compressor twice a week until warm. Load and unload the compressor a few times.

If the compressor is stored without running from time to time, protective measures must be taken. Consult Atlas Copco.

4.8 Service kits

Service kits are available offering the benefits of genuine Atlas Copco parts while keeping the maintenance budget low. The kits comprise all parts needed for servicing. Consult the Parts list for all service kits.

Service kit for oil filter, oil separator and air filter	Ordering number
---	-----------------

GA5-GA7-GA10	2901 0099 02
--------------------	--------------

Roto-injectfluid

Atlas Copco Roto-injectfluid (see section 4.4.1) can be ordered in following quantities:

Quantity	Ordering number
15-litre can	2901 0086 01
25-litre can	2901 0001 01

5 ADJUSTMENTS AND SERVICING PROCEDURES

5.1 Air filter (AF-Fig. 1)

1. Stop the compressor. Remove the air filter element. Discard damaged elements.
2. Fit the new element.
3. Reset the air filter service warning. 1)

5.2 Coolers (Co/Ca-Fig. 1)

Keep the coolers clean to maintain the cooling efficiency.

Remove any dirt from the coolers with a fibre brush. Never use a wire brush or metal objects. Then clean by air jet in reverse direction of normal flow. If it should be necessary to wash the coolers with a cleansing agent, consult Atlas Copco.

5.3 Safety valve (SV-Fig. 2b)

Operate the safety valve by unscrewing the cap one or two turns and retightening it or by pulling the valve lifting lever.

Testing

The valve can be tested on a separate compressed air line. If the valve does not open at the pressure marked on the valve, consult Atlas Copco.

Warning

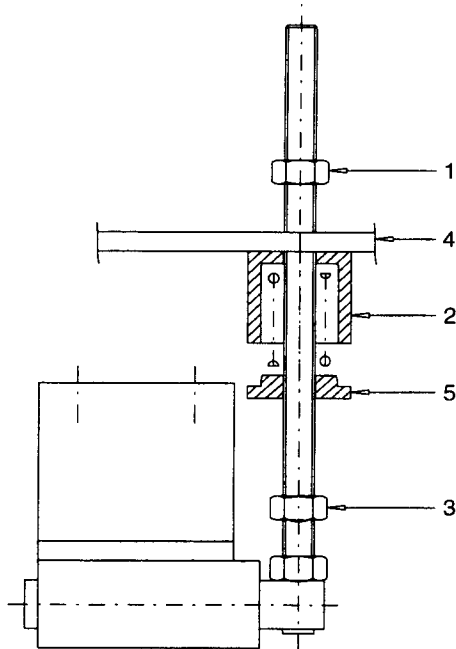
No adjustments are allowed. Never run the compressor without safety valve.

5.4 Belt set exchange

The belts must be replaced as a set, even if only one of them seems worn. Use Atlas Copco belts only.

1. Loosen clip (3-Fig. 1) and retract hose (4-Fig. 1) from the fan housing.
2. Unscrew nut (3-Figs. 15/16) to fully loosen the spring force on the belts.
3. Take the belts out of the pulley grooves. The belts can be pulled over the fan housing without disconnecting the latter.
4. Install new belts.

- 1) Consult the User manual for the electronic regulator, section "Service submenu" (not for GA Standard Pack).
- 2) If the filler plug (FC) is fitted on a Tee between the compressor element and sight-glass:
 - Remove plug (FC) and fill with oil until the level reaches the plug. Tighten plug (FC). Open valve (AV).
 - Run the compressor for a few minutes. Stop it and close valve (AV). Open plug (FC) one turn to permit any pressure to escape. Fill with oil until the level is in the middle of sight-glass (SG). Tighten plug (FC). Open valve (AV).



D0655

1. Nut
2. Bush
3. Nut
4. Motor plate
5. Spacer

Fig. 16. Belt tensioning equipment

5. Screw on nut (3-Figs. 15/16) until the spacer (5-Fig. 16) above the nut touches bush (2-Figs. 15/16). Make sure that the threaded rod remains perpendicular to the motor bottom plate. The belt tension is now correct.
6. Tighten nut (1-Fig. 16) to block the motor bottom plate (4-Fig. 16).
7. Refit hose (4-Fig. 1).

5.5 Regulating devices on GA Full-feature (Fig. 3)

The fan control switch (S3) stops and starts the condenser fan to keep the condenser pressure as constant as possible. The hot gas bypass valve (10) opens and hot, high-pressure gas is fed to the evaporator in case the evaporator pressure should drop below a given value during partial or no load. Both the switch and the valve are factory-adjusted to obtain optimum performance of the dryer. Do not alter the factory adjustments.

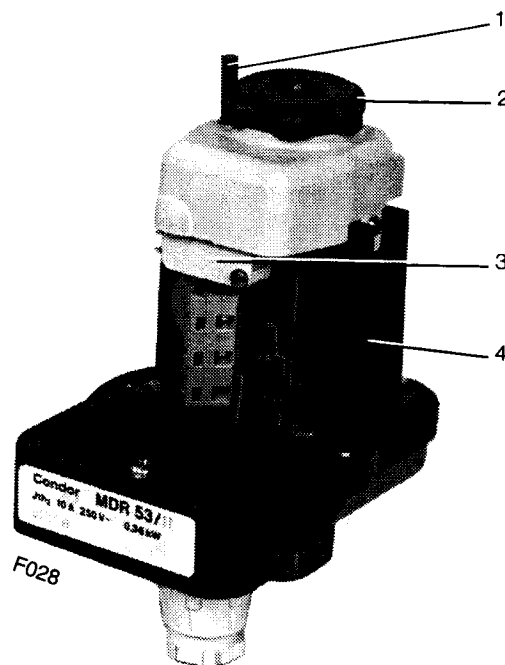
5.6 Load/unload pressure switch on GA Standard Pack

The switch allows the operator to select the unloading pressure and the pressure difference between the unloading and loading pressures. The unloading and loading pressures are the opening and closing pressures of the air pressure switch.

Adjustment can only be carried out when the air pressure switch is pressurized. Remove blocking device (1-Fig. 17) before adjusting knob (2).

The unloading pressure is controlled by adjusting knob (2). Turn the knob clockwise to raise the unloading pressure, anti-clockwise to lower it.

The pressure difference between unloading and loading is adjusted by means of the same knob. The adjustment range is given in Figs. 18. Push down the knob and turn it clockwise to reduce the pressure difference, anti-clockwise to increase it.



1. Blocking device (to be removed before turning knob 2)
2. Adjusting knob
3. Switch
4. Spring housing

Fig. 17. Air pressure switch (PSR19)

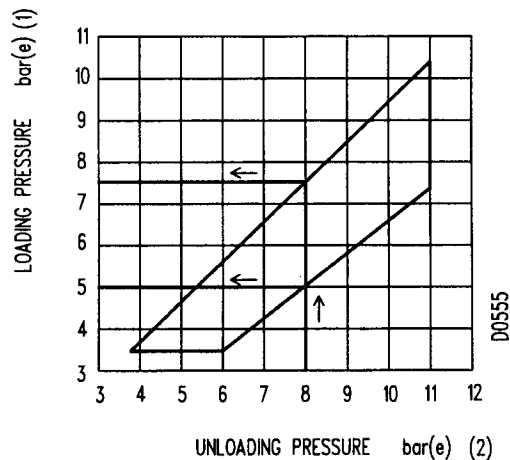


Fig. 18a. Switch MDR 53/11

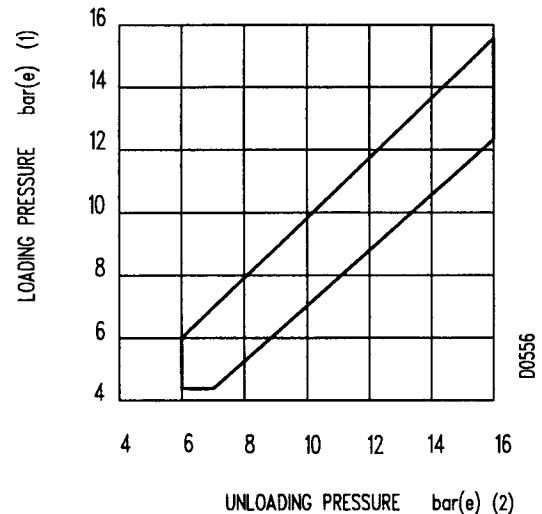


Fig. 18b. Switch MDR 53/16

Example (see Fig. 18a):

- unloading pressure(e): 8 bar
- loading pressure(e): adjustable between 5 bar and 7.6 bar

Figs. 18. Pressure difference adjustment ranges

5.7 Temperature shut-down switch on GA Standard Pack

Switch (TSHH11-Fig. 9) has an adjusting screw in the centre at the back of the housing of the switch.

The reset screw is located in the centre of the indicator scale and is protected by a cap. To reset the switch after tripping, unscrew the cap and turn the reset screw with a screw driver anti-clockwise.

6 PROBLEM SOLVING

Attention

- Before starting any maintenance:
 - Stop the compressor:
 - On GA Standard Pack, move switch (S1-Fig. 9) to "O".
 - On GA Pack / Full-feature, press button O (9-Fig. 6a), wait until the compressor has stopped (approx. 30 seconds) and press button (S3-Fig. 6a).
 - Switch off the voltage. If a separate voltage supply is provided for the dryer of GA Full-feature (see section 2.4), make sure that the voltage to the dryer is also switched off.
 - Close the air outlet valve and depressurize the air system. The outlet valve can be locked in closed position. See section 4.
 - Apply all relevant safety precautions, including those mentioned in this book.
- The chart helps to solve mechanical problems. An electrical fault must be traced by an electrician. Check that the wires are not damaged and that they are clamped tight to their terminals.

For GA Pack / Full-feature also:

- To facilitate solving some problems, a number of messages may appear on the control panel. Examples:

Message	Action
System failure 10 or 106	Switch off the voltage. Check the terminals on connector (2X1) and emergency stop button (S3) for correct connection.
System failure 11	Switch off the voltage. Check for possible connection with the ground of one of the digital inputs at connector (2X4).
System failure 104	Switch off the voltage. Check that the contacts to the digital inputs at the connectors of the module are voltage-free.

Connector (2X5) must only be used for connecting the Atlas Copco Relay expansion box (optional) which allows indication of manual/automatic operation, warning condition or shut-down condition.

- Consult the User manual for the electronic regulator if a service message or fault message appears on the display (4-Fig. 6a) or when alarm LED (3-Fig. 6a) is alight or blinks.

Mechanical faults and suggested remedies (Fig. 3)**1. Compressor starts running, but does not load after a delay time**

- Solenoid valve (Y1) out of order
- Have valve inspected
- Inlet valve (IV) stuck in closed position
- Consult Atlas Copco
- Leak in control air flexibles
- Have leak repaired
- Minimum pressure valve (Vp) leaking (when net is depressurized)
- Consult Atlas Copco

2. Compressor does not unload, safety valve blows

- Solenoid valve (Y1) out of order
- See 1a
- Inlet valve (IV) does not close
- See 1b

3. Condensate is not discharged from moisture trap 1) during loading

- Discharge flexible clogged
- Check and correct as necessary
- Float valve malfunctioning
- Consult Atlas Copco

4. Compressor air output or pressure below normal

- Air consumption exceeds air output of compressor
- Check equipment connected
- Choked air inlet filter element (AF)

- Replace filter element
- Solenoid valve (Y1) malfunctioning
- See 1a
- Leak in control air flexibles
- See 1c
- Inlet valve (IV) does not fully open
- See 1b
- Oil separator element (OS) clogged
- Have element replaced. Consult Atlas Copco
- Air leakage
- Check and correct as necessary
- Safety valve (SV) leaking
- Have valve replaced. Consult Atlas Copco
- Compressor element (E) out of order
- Consult Atlas Copco

5. Excessive oil consumption; oil carry-over through discharge line

- Oil level (SG) too high
- Check for overfilling. Release pressure and drain oil to correct level
- Incorrect oil causing foam
- Change to correct oil
- Oil separator element (OS) defective
- Have element checked. Replace, if necessary. Install the element with the mark TOP at the top and the seam at the bottom

6. Safety valve (SV) blows after loading

- Inlet valve (IV) malfunctioning
- See 1b
- Minimum pressure valve (Vp) malfunctioning
- See 1d
- Oil separator element (OS) clogged
- See 4f
- Safety valve (SV) out of order
- See 4h
- For Full-feature: dryer pipes clogged by formation of ice
- Have refrigerant system checked. Consult Atlas Copco

7. Element outlet 2) or air outlet temperature above normal

- Insufficient cooling air or cooling air temperature too high
- Check for cooling air restriction or improve ventilation of compressor room. Avoid recirculation of cooling air. If installed, check capacity of compressor room fan
- Oil level too low (SG)
- Check and correct as necessary
- Oil cooler (Co) clogged
- Clean cooler
- By-pass valve (BV) malfunctioning
- Have valve replaced
- Air cooler (Ca) clogged
- Clean cooler
- Compressor element (E) out of order
- See 4i

1) Available as an option on GA Standard Pack.

2) A warning message will appear on display (4-Fig. 6a) (not for GA Standard Pack).

7 PRINCIPAL DATA

7.1 Readings

7.1.1 Readings on display on GA Pack / Full-feature (4-Fig. 6a) 1)

Ref.: Air outlet pressure

Reading: Modulates between programmed unloading and loading pressures.

Shown: On main display (Fig. 6b), when:

- switching on voltage
- selecting main display with keys <<Menu>> and <<Main>> (5-Fig. 6a)
- keys of module are not used for four minutes

Sensor: PT20

Ref.: Compressor element outlet temperature

Reading: Approx. 60°C above cooling air temperature

Shown: When using the key <<More>> (5-Fig. 6a) on the main display (Fig. 6b)

Sensor: TT11

On Full-feature also:

Ref.: Dewpoint temperature

Reading: Approx. 3°C

Shown: When using the key <<More>> (5-Fig. 6a) on the main display (Fig. 6b)

Sensor: TT90

7.1.2 Readings on gauges on GA Standard Pack (Fig. 9)

Ref.: Air outlet pressure (Gp)

Reading: Modulates between preset unloading and loading pressures

Ref.: Compressor element outlet temperature (TSHH11)

Reading: For GA5/7 approx. 60°C above cooling air temperature
For GA10 approx. 65°C above cooling air temperature

Setting: 110°C

7.2 Setting of safety valve

The part number and set pressure are stamped on the valve. Also consult the Parts list. If the valve is malfunctioning, replace it by one with the same number. **No adjustments are allowed.**

7.3 Fan control switch on GA Full-feature

	Cut-out pressure	Switch-on pressure	Unit
Fan control switch (50 Hz) . .	7.9	9	bar(e)
Fan control switch (60 Hz) . .	9.9	11	bar(e)

7.4 Compressor specifications

7.4.1 Reference conditions

Nominal working pressure as stated below

Air inlet pressure (absolute)	bar	1
Air inlet temperature	°C	20
Relative humidity	%	0

7.4.2 Limitations

Maximum working pressure as stated below

Minimum working pressure	bar(e)	4
Maximum inlet temperature 2)	°C	40
Minimum ambient temperature	°C	0

- 1) See User manual for electronic regulator, sections "Modify settings submenu" and "More function".
- 2) Pack and Standard Pack compressors are also available as High ambient version (HAV) designed for operation in ambient temperatures up to 50 °C.

7.4.3 Specifications of GA5 1)

Compressor type		GA5-7.5	GA5-8	GA5-10	GA5-13	GA5-100	GA5-125	GA5-150	GA5-175
Frequency	Hz	50	50	50	50	60	60	60	60
Motor shaft speed	r/min	2855	2855	2855	2855	3475	3475	3475	3475
Oil capacity	l	5	5	5	5	5	5	5	5
GA Pack and GA Standard Pack									
Maximum (unloading) pressure	bar(e)	7.5	8	10	13	7.4	9.1	10.8	12.5
Nominal working pressure	bar(e)	7	8	9.5	12.5	6.9	8.6	10.3	12
Temperature of air at outlet valve	°C	32	32	32	32	33	33	33	33
Power input	kW	7.2	7.2	7.2	7.2	7.0	7.2	7.2	7.2
Sound pressure level (Pack 2)	dB(A)	68	68	68	68	69	69	69	69
Sound pressure level (Standard Pack 2)	dB(A)	70	70	70	70	71	71	71	71
GA Full-feature									
Maximum (unloading) pressure	bar(e)	7.25	7.75	9.75	12.75	7.15	8.85	10.55	12.25
Nominal working pressure	bar(e)	7	7.75	9.5	12.5	6.9	8.6	10.3	12
Temperature of air at outlet valve	°C	25	25	25	25	28	28	28	28
Power input	kW	7.7	7.5	7.7	7.7	7.6	7.8	7.8	7.8
Sound pressure level 2)	dB(A)	68	68	68	68	69	69	69	69
Dryer type		ID18	ID18	ID18	ID18	ID18	ID18	ID18	ID18
Refrigerant type		R134a	R134a	R134a	R134a	R134a	R134a	R134a	R134a
Refrigerant charge	kg	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25

7.4.4 Specifications of GA7 1)

Compressor type		GA7-7.5	GA7-8	GA7-10	GA7-13	GA7-100	GA7-125	GA7-150	GA7-175
Frequency	Hz	50	50	50	50	60	60	60	60
Motor shaft speed	r/min	2885	2885	2885	2885	3505	3505	3505	3505
Oil capacity	l	5	5	5	5	5	5	5	5
GA Pack and GA Standard Pack									
Maximum (unloading) pressure	bar(e)	7.5	8	10	13	7.4	9.1	10.8	12.5
Nominal working pressure	bar(e)	7	8	9.5	12.5	6.9	8.6	10.3	12
Temperature of air at outlet valve	°C	32	32	32	32	35	35	35	35
Power input	kW	9.8	9.6	9.8	9.8	9.7	9.8	9.8	9.8
Sound pressure level (Pack 2)	dB(A)	70	70	70	70	71	71	71	71
Sound pressure level (Standard Pack 2)	dB(A)	71	71	71	71	72	72	72	72
GA Full-feature									
Maximum (unloading) pressure	bar(e)	7.25	7.75	9.75	12.75	7.15	8.85	10.55	12.25
Nominal working pressure	bar(e)	7	7.75	9.5	12.5	6.9	8.6	10.3	12
Temperature of air at outlet valve	°C	25	25	25	25	28	28	28	28
Power input	kW	10.3	9.9	10.3	10.3	10.3	10.4	10.4	10.4
Sound pressure level 2)	dB(A)	70	70	70	70	71	71	71	71
Dryer type		ID18	ID18	ID18	ID18	ID18	ID18	ID18	ID18
Refrigerant type		R134a	R134a	R134a	R134a	R134a	R134a	R134a	R134a
Refrigerant charge	kg	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25

1) At reference conditions.

2) According to CAGI PNEUROP PN8NTC2.2.

7.4.5 Specifications of GA10 1)

Compressor type		GA10-7.5	GA10-8	GA10-10	GA10-13	GA10-100	GA10-125	GA10-150	GA10-175
Frequency	Hz	50	50	50	50	60	60	60	60
Motor shaft speed	r/min	2885	2885	2885	2885	3490	3490	3490	3490
Oil capacity	l	5	5	5	5	5	5	5	5
GA Pack and GA Standard Pack									
Maximum (unloading) pressure	bar(e)	7.5	8	10	13	7.4	9.1	10.8	12.5
Nominal working pressure	bar(e)	7	8	9.5	12.5	6.9	8.6	10.3	12
Temperature of air at outlet valve	°C	32	32	32	32	35	35	35	35
Power input (Pack)	kW	11.6	11.4	11.5	11.6	12.3	12.2	12.6	11.4
Power input (Standard Pack)	kW	13.1	12.6	12.3	12.0	12.9	13.2	13.0	11.4
Sound pressure level (Pack) 2)	dB(A)	72	72	72	72	72	72	72	72
Sound pressure level (Standard Pack) 2)	dB(A)	72	72	72	72	73	73	73	73
GA Full-feature									
Maximum (unloading) pressure	bar(e)	7.25	7.75	9.75	12.75	7.15	8.85	10.55	12.25
Nominal working pressure	bar(e)	7	7.75	9.5	12.5	6.9	8.6	10.3	12
Temperature of air at outlet valve	°C	25	25	25	25	28	28	28	28
Power input	kW	12.0	11.8	11.9	12.0	12.9	12.7	13.1	11.8
Sound pressure level 2)	dB(A)	72	72	72	72	72	72	72	72
Dryer type		ID18	ID18	ID18	ID18	ID18	ID18	ID18	ID18
Refrigerant type		R134a	R134a	R134a	R134a	R134a	R134a	R134a	R134a
Refrigerant charge	kg	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25

7.5 Conversion list of SI units into US/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

1) At reference conditions.

2) According to CAGI PNEUROP PN8NTC2.2.

Notes:

[illegible]