

Instruction book for compressors

GA30 - GA37 - GA45 **GA30 W - GA37 W - GA45 W**

Important

- 1 This book applies exclusively to GA30-GA37-GA45 equipped with an electronic regulator with a liquid crystal display. This regulator is used from following serial number onwards

All-310 000

2. This book must be used together with the "User manual for electronic regulator for GA30-GA37-GA45 compressors"

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

Registration code

Collection: APC G30-45

Tab: 38

Sequence: 0981

Replaces

No. 2920 1163 03



Industrial Air Division
B-2610 Wilrijk - Belgium

No. 2920 1163 04

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.

Contents

	Page		Page
1 Leading particulars	3	3.3 Oil and oil filter change interval	19
1.1 General description	3	3.4 Oil specifications	19
1.1.1 Air flow	3	3.4.1 Atlas Copco Roto-injectfluid	19
1.1.2 Oil system	3	3.4.2 Mineral oil for hydraulics	19
1.1.3 Cooling and condensate drain systems	5	3.4.3 Synthetic hydrocarbon lubricant	19
1.2 Unloading/loading system	5	3.5 Oil change	21
1.2.1 Unloading	5	3.6 Oil filter change	22
1.2.2 Loading	5	3.7 Storage after installation	22
1.3 Electrical system	8	3.8 Service kits	22
1.4 Electronic control module	8	4 Adjustments and servicing procedures	22
1.4.1 Electronic regulator	11	4.1 Air filter	22
1.4.2 Control panel	12	4.1.1 Recommendations	22
1.5 Electric cabinet	13	4.1.2 Servicing	22
1.6 Air dryer on GA Full-feature	13	4.2 Coolers	22
1.6.1 Compressed air circuit	13	4.3 Safety valve	23
1.6.2 Refrigerant circuit	14	4.4 Fan control switch on GA Full-feature	24
1.6.3 Automatic regulation system	14	4.5 High pressure shut-down switch on GA Full-feature	24
1.6.4 Dryer control and safety devices	14	4.6 Expansion valve on GA Full-feature	24
2 Operating instructions	15	5 Problem solving	24
2.1 Initial start-up	15	6 Principal data	26
2.1.1 Remarks	15	6.1 Readings on display	26
2.1.2 Outdoor/altitude operation	15	6.2 Settings of switches and safety valve	26
2.1.3 Moving/lifting	15	6.3 Settings of motor overload relay and fuses	27
2.1.4 Cooling water requirements	15	6.4 Settings of fan motor circuit breaker	27
2.1.5 Initial start-up	15	6.5 Compressor specifications	27
2.2 Before starting	16	6.5.1 Reference conditions	27
2.3 Starting	16	6.5.2 Specific data of GA30 / GA30 W	28
2.4 During operation	17	6.5.3 Specific data of GA37 / GA37 W	28
2.4.1 Checking the display	17	6.5.4 Specific data of GA45 / GA45 W	29
2.5 Manual control	18	6.6 Conversion list of SI units into British units	29
2.6 Stopping	18	7 Installation	30
2.7 Taking out of operation at end of compressor life cycle	18	7.1 Dimension drawings	30
3 Maintenance	19	7.2 Electric cable section	32
3.1 Compressor motor	19	7.3 Installation proposal	32
3.2 Preventive maintenance schedule for the compressor	19	7.4 Electrical connections	35
		7.5 Pictographs	36

1 Leading particulars

1.1 General description

GA are stationary, single-stage, oil-injected screw compressors driven by an electric motor. GA30, -37 and -45 are air-cooled, whereas GA30 W, -37 W and -45 W are water-cooled.

GA Pack

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 starters is located behind this panel.

GA Full-feature

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.

1.1.1 Air flow (Fig. 4b)

Air drawn through filter (AF) and open inlet valve (IV) into compressor element (E) is compressed. Compressed air and oil flow into air receiver/oil separator (AR) via check valve (CV). The air is discharged through outlet valve (AV) via minimum pressure valve (Vp), air cooler (Ca) and moisture trap (MT).

Check valve (CV) prevents blow-back of compressed air when the compressor is stopped. Minimum pressure valve (Vp) prevents the receiver pressure from dropping below a minimum pressure.

1.1.2 Oil system (Fig. 4b)

In air receiver/oil separator (AR), most of the oil is removed from the air/oil mixture centrifugally. The balance is removed by oil separator element (OS). The oil collects in the lower part of air receiver/oil separator (AR), which serves as oil tank.



- E1. Electronic control module
- 1. Air outlet pipe
- 2. Electric cable inlet
- 3. Condensate drains
- 4. Side door

Fig. 1. General view of GA45

- AF. Air filter
- AR. Air receiver/oil separator
- BV. Oil cooler by-pass valve
- Ca. Air cooler
- Co. Oil cooler
- CV. Check valve
- DP2. Oil drain plug, oil stop valve
- DP3. Oil drain plug, check valve
- DP4. Oil drain plug, gear casing
- E. Compressor element
- E1. Electronic control module
- FN2. Fan
- I. Start button
- MT. Air cooler moisture trap
- M1. Compressor motor
- M2. Fan motor
- O. Stop button
- OF. Oil filter

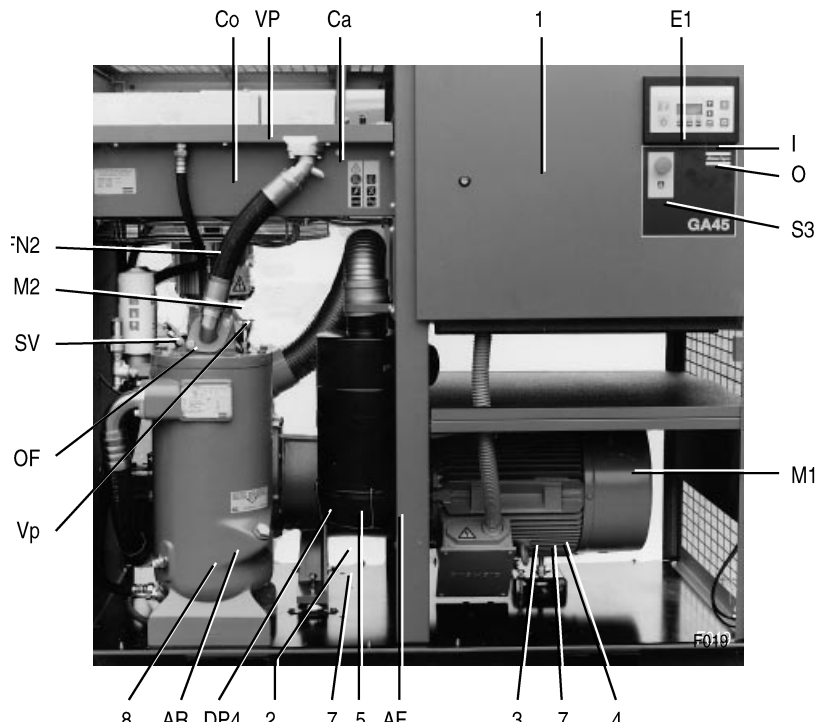


Fig. 2a. Front view of air-cooled GA45 Pack/Full-feature

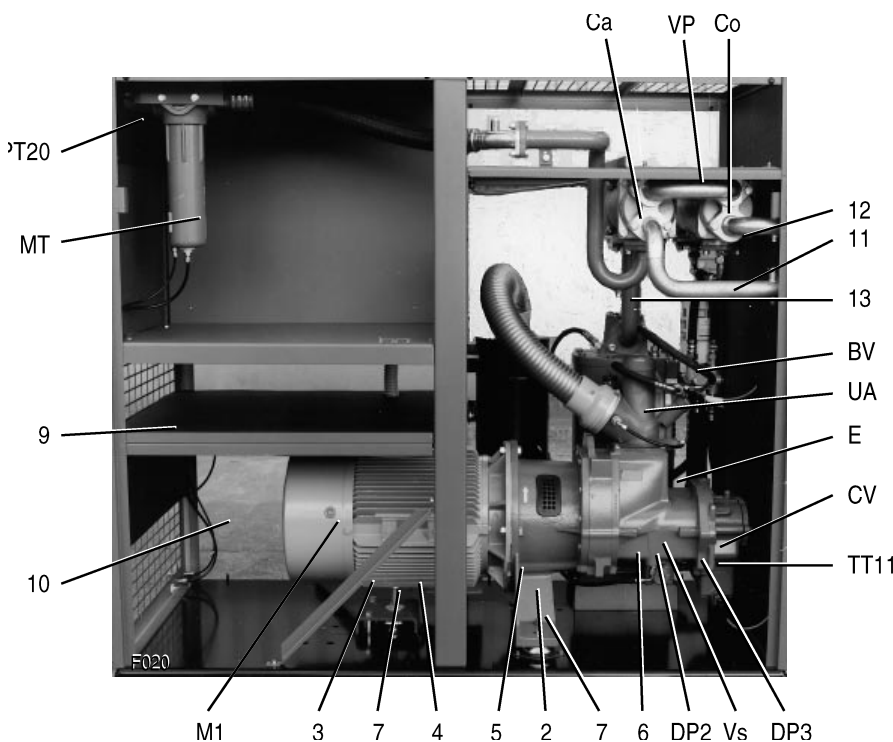


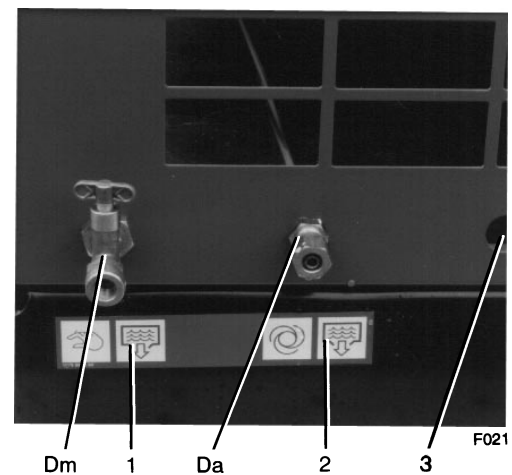
Fig. 2b. Rear view of water-cooled GA45 Pack

- PT20. Pressure sensor, compressed air outlet
- SV. Safety valve
- S3. Emergency stop button
- TT11. Temperature sensor, outlet of compressor element
- UA. Unloader
- Vp. Minimum pressure valve
- VP. Oil cooler vent plug
- Vs. Oil stop valve
- 1. Electric cabinet
- 2. Stud and nut (to be removed)
- 3. Bolt (to be removed)
- 4. Compressor motor support
- 5. Compressor element support
- 6. Oil scavenging flexible
- 7. Vibration damper
- 8. Oil drain flexible
- 9. Plate
- 10. Condensate drain flexibles
- 11. Cooling water inlet pipe
- 12. Cooling water outlet pipe
- 13. Compressed air pipe

Figs. 2. GA45 Pack and Full-feature

- Da.* Automatic condensate drain, air cooler moisture trap
- Dm.* Condensate drain valve, air cooler moisture trap
- 1. Pictograph, manual condensate drain
- 2. Pictograph, automatic condensate drain
- 3. Inlet for separate air dryer voltage supply

Fig. 3. Condensate outlets



The oil system is provided with a by-pass valve (BV). When the oil temperature is below 40°C (104°F) **1**, by-pass valve (BV) shuts off the oil supply from oil cooler (Co). Air pressure forces the oil from air receiver/oil separator (AR) through oil filter (OF) and oil stop valve (Vs) to compressor element (E) and its lubrication points. Oil cooler (Co) is by-passed.

By-pass valve (BV) starts opening the oil supply from cooler (Co) when the oil temperature has increased to the above-mentioned value. At approx. 55°C (131°F) **1** all the oil flows through the oil cooler.

Oil stop valve (Vs) prevents the compressor element from flooding with oil when the compressor is stopped. The valve is opened by element outlet pressure when the compressor is started.

1.1.3 Cooling and condensate drain systems (Figs. 2)

The cooling system comprises air cooler (Ca) and oil cooler (Co). On air-cooled compressors, the cooling air is generated by fan (FN2). Water-cooled compressors have a cooling water system. The water flows through inlet pipe (11), the tubestacks of the air cooler and oil cooler, and outlet pipe (12).

A moisture trap (MT) is provided in the air outlet system. The trap is equipped with a valve for automatic condensate draining during operation (Da-Fig. 3) and a manually operated valve for draining after stopping the compressor (Dm-Fig. 3).

- 1) The valve starts opening at 65°C (149°F) and is fully open at 80°C (176°F) for 13 bar and 175 psi compressors.

1.2 Unloading/loading system (Figs. 4)

1.2.1 Unloading (Fig. 4a)

If the air consumption is less than the air output of the compressor, the 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 upwards and causes inlet valve (IV) to close the air inlet opening.
3. Unloading valve (UV) is opened by receiver pressure. The pressure from air receiver (AR) is released towards unloader (UA).
4. The pressure is stabilized at a low value. A small amount of air is kept drawn in through flexible (3) and is also blown to the unloader.

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

1.2.2 Loading (Fig. 4b)

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

1. Control pressure is fed from air receiver (AR) 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 downwards and causes inlet valve (IV) to open fully.

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

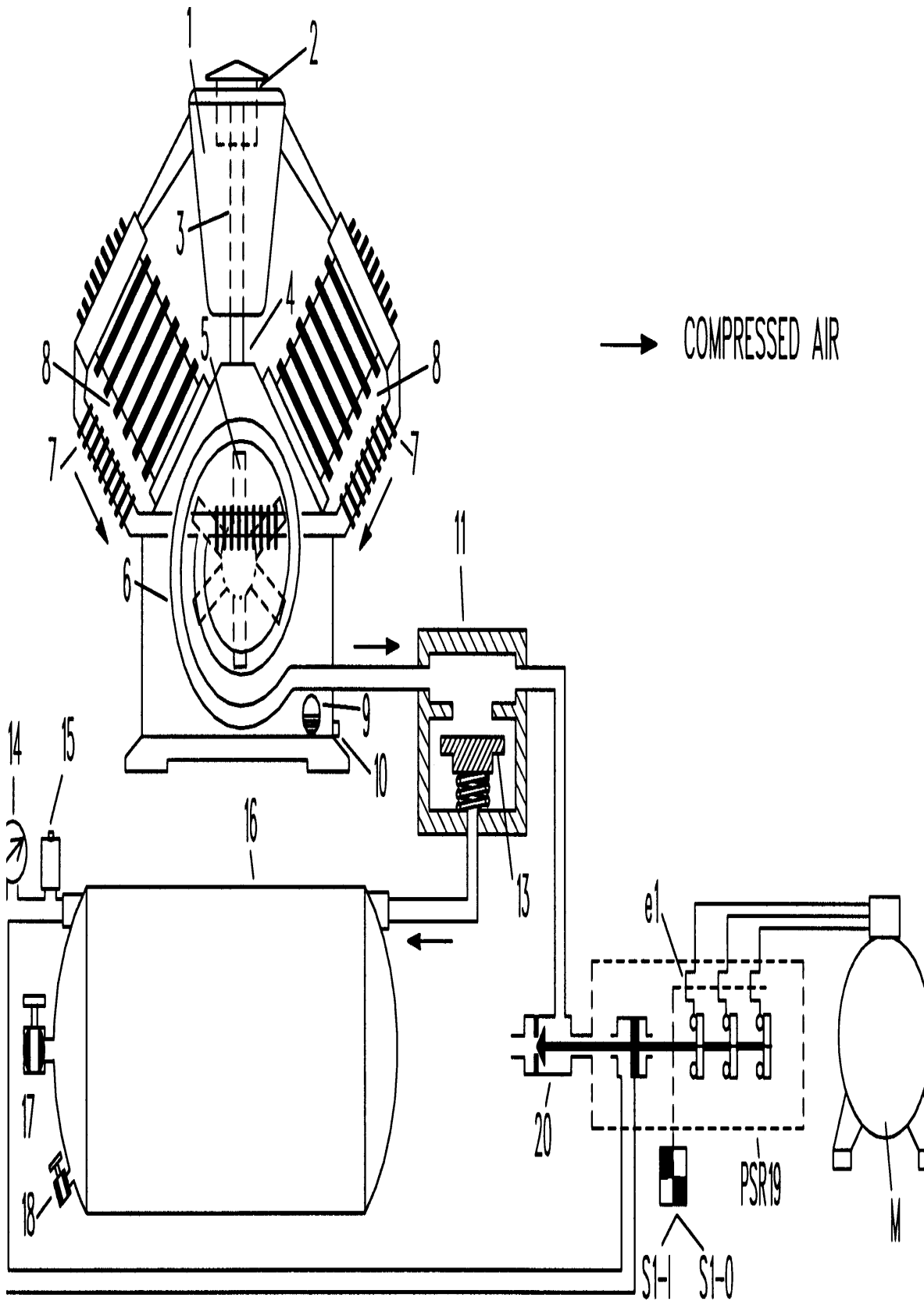


Fig. 4a. GA30/37/45 Full-feature during unloading

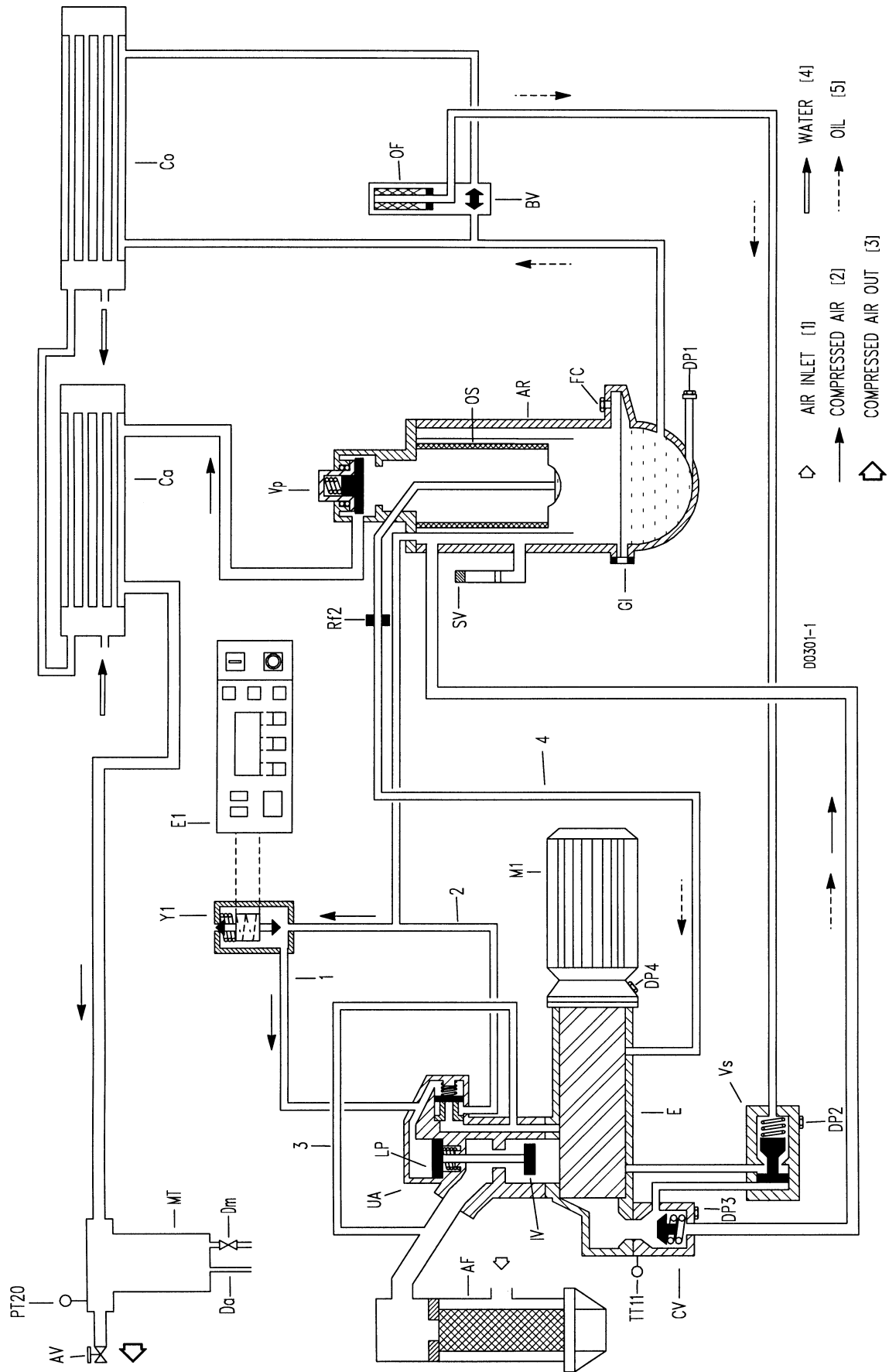


Fig. 4b. GA30 W/37 W/45 W Pack during loading

- | | | |
|--|---|--|
| AF. Air filter | IV. Inlet valve | 2. Blow-off air flexible |
| AR. Air receiver/oil separator | LP. Loading plunger | 3. Flexible, blow-off air or inlet air |
| AV. Air outlet valve | MT. Air cooler moisture trap | 4. Oil scavenging line |
| BV. Oil cooler by-pass valve | M1. Compressor motor | |
| Ca. Air cooler | M2. Motor, compressor fan | On Full-feature also: |
| Co. Oil cooler | OF. Oil filter | FN1. Fan, dryer condensor |
| CV. Check valve | OS. Oil separator element | M1. Refrigerant compressor |
| Da. Automatic drain outlet, air cooler moisture trap | PT20. Pressure sensor, air outlet | M2. Motor, condensor fan |
| Dm. Manual drain valve, air cooler moisture trap | Rf2. Restrictor | S3. Condensor fan control switch |
| DP1. Oil drain plug, air receiver | SV. Safety valve | S7. High pressure shut-down switch 1) |
| DP2. Oil drain plug, oil stop valve | TT11. Temperature sensor, compressor element outlet | 5. Air/air heat exchanger |
| DP3. Oil drain plug, check valve | TT90. Temperature sensor, dewpoint | 6. Air/refrigerant heat exchanger (evaporator) |
| DP4. Oil drain plug, gear casing | UA. Unloader | 7. Liquid separator |
| E. Compressor element | UV. Unloading valve | 8. Refrigerant/refrigerant heat exchanger 2) |
| E1. Control module | VI. Air filter service indicator | 9. Condensor |
| FC. Oil filler plug | Vp. Minimum pressure valve | 10. Liquid receiver |
| FN2. Fan, compressor coolers | Vs. Oil stop valve | 11. Expansion valve |
| Gl. Oil level gauge | Y1. Loading solenoid valve | 12. Filter |
| | 1. Control air flexible | |

- 1) TÜV-approved compressors only
- 2) Not on dryers of type ID120

Figs. 4. Air-oil and unloading-loading systems

1.3 Electrical system

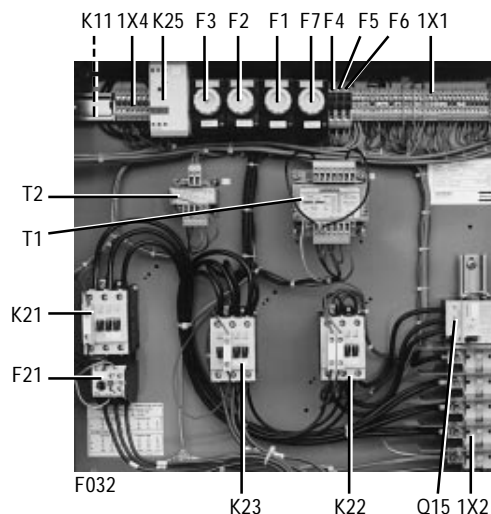
The system comprises (Figs. 2):

- 1. Compressor motor (M1) and fan motor (M2) 1)
- 2. Electronic control module (Fig. 7a)
- 3. Compressor start button (I) and stop button (O)
- 4. Emergency stop button (S3)
- 5. Electric cabinet (Fig. 5)
- 6. Sensors for the compressor element outlet temperature (TT11) and for the air outlet pressure (PT20)
- 7. Dewpoint temperature sensor (TT90-Figs. 6) for Full-feature compressors
- 8. Phase control relay (K25-Fig. 5)

1.4 Electronic control module

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

- 1) Air-cooled compressors only



See Figs. 6 for denomination of components

Fig. 5. Electric cabinet (typical example)

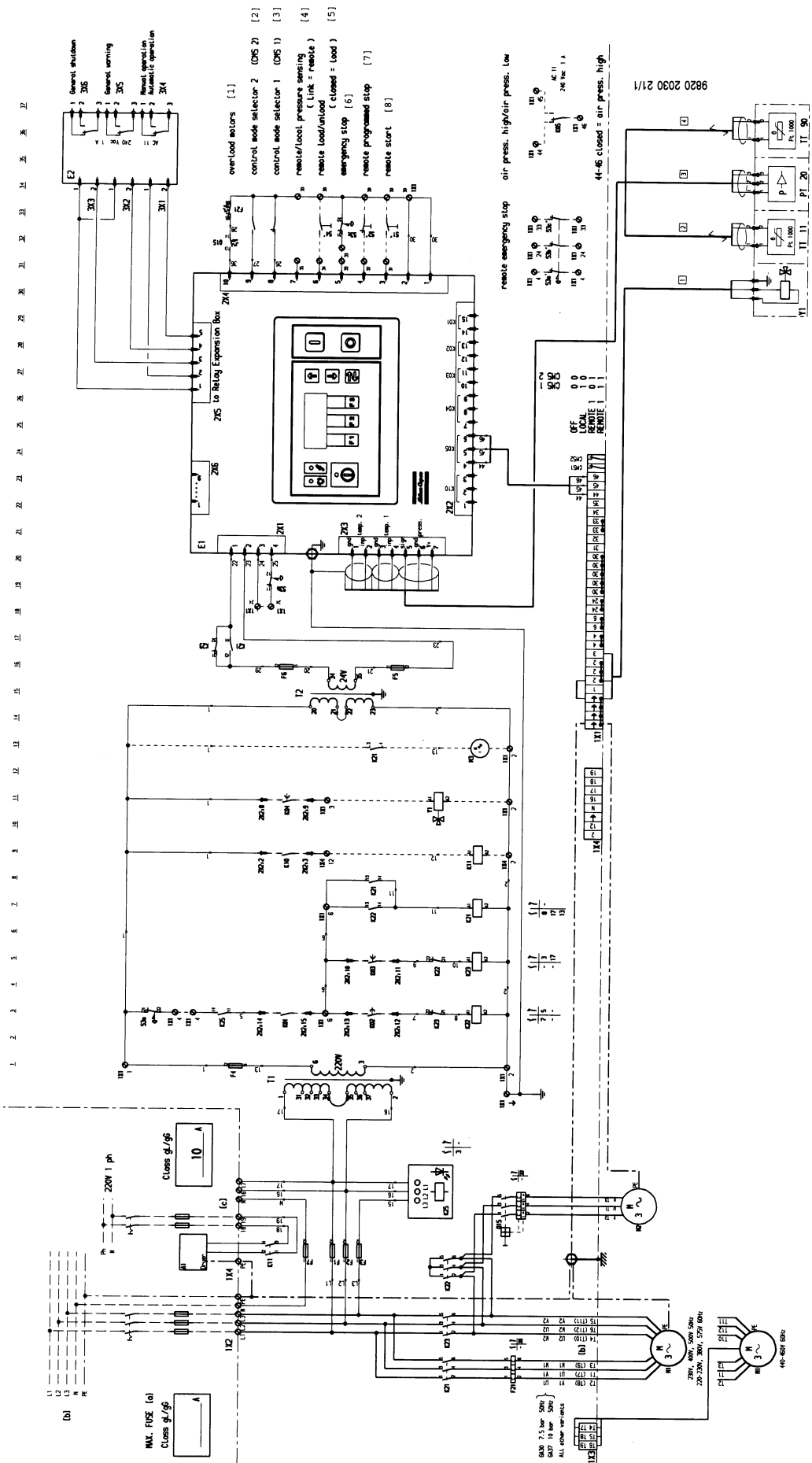


Fig. 6a. GA Pack / Full-feature (typical example)

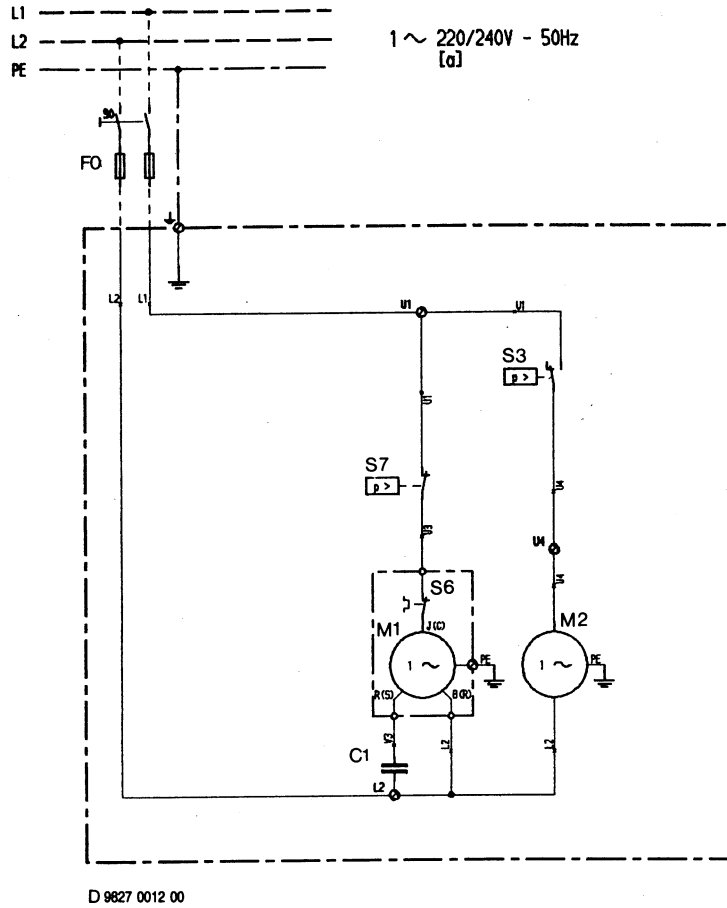


Fig. 6b. Dryer ID80/100 on GA Full-feature

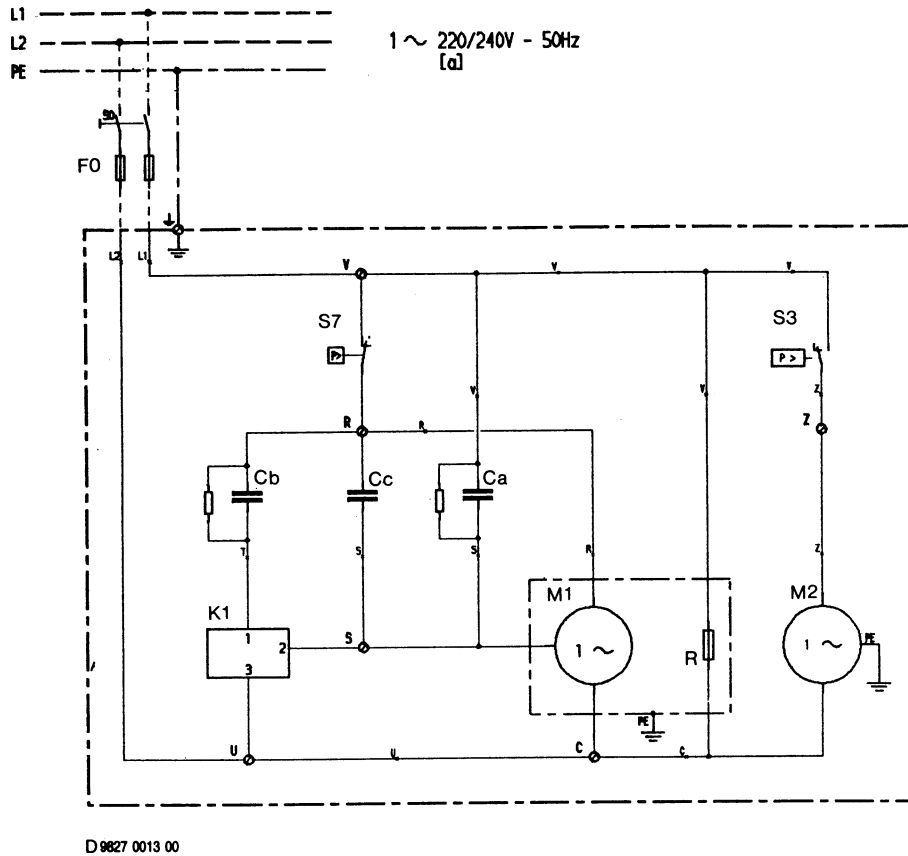


Fig. 6c. Dryer ID120 on GA Full-feature

SENSORS/LOADING SOLENOID VALVE

PT20. Pressure sensor, air outlet
 TT11. Temperature sensor, compressor element outlet
 TT90. Temperature sensor, dewpoint 1)
 Y1. Loading solenoid valve

MOTORS

M1. Compressor motor
 M2. Fan motor, compressor coolers
 M3. Fan motor, electric cabinet 2)

ELECTRIC CABINET

F1/F6. Fuses
 F7/8. Fuses 3)
 F21. Overload relay, compressor motor

K11. Auxiliary contactor for dryer 1)4)

K21. Line contactor
 K22. Star contactor
 K23. Delta contactor
 K25. Phase control relay
 Q15. Circuit breaker, fan motor
 T1/T2. Transformers
 1X1. Terminal strip
 1X2. Terminal strip, connection to mains
 1X3. Terminal strip
 1X4. Terminal strip

CONTROL MODULE (E1)

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

ON FULL-FEATURE ALSO

C. Capacitors
 FO. Fuses
 K1. Start relay
 M1. Motor, refrigerant compressor
 M2. Fan motor
 R. Heater
 S3. Condensor fan control switch
 S6. Thermal overload switch
 S7. High pressure shut-down switch 5)

- 1) Only for Full-feature compressors
- 2) Only for compressors designed for high temperature conditions
- 3) Only on 220/230 V compressors, CSA/UL approved
- 4) Relay not yet mounted
- 5) TÜV-approved compressors only

Figs. 6. Electrical diagrams

1.4.1 Electronic regulator (E1-Fig. 2a)

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. 7a). The compressor will also be stopped in case of overload of compressor motor (M1) or fan motor (M2). 1)

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 time intervals. If these limits are exceeded, a message will appear on the display (Fig. 7a) 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.

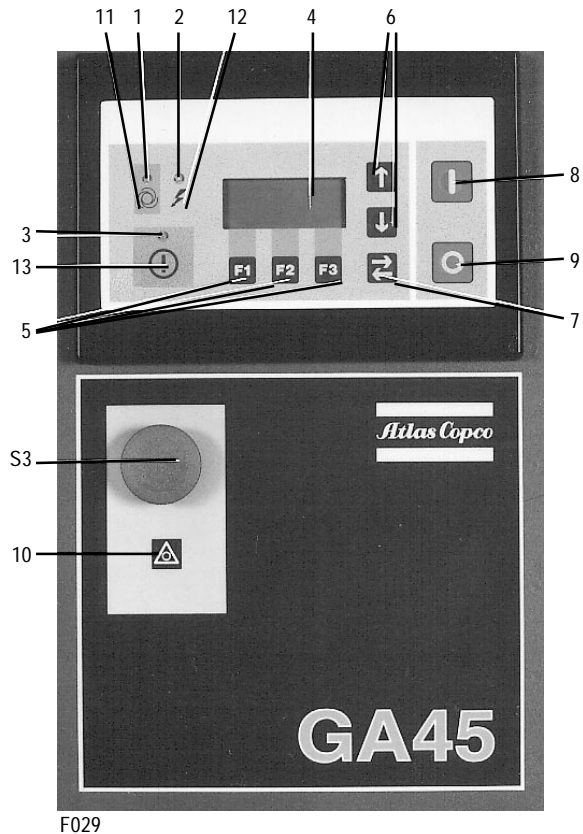
If activated and provided the module was in the automatic operation mode, the compressor will automatically restart if the supply voltage to the module is restored within a programmed time period.

- 1) Air-cooled compressors only

1.4.2 Control panel (Fig. 7a)

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

Ref.	Designation	Function
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: <ul style="list-style-type: none"> - 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	Maintained-action push button to stop the compressor immediately in case of emergency.



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

Fig. 7a. Control panel

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

Fig. 7b. Example of the main display

Status data		
↓		
Main	Slct	
F1	F2	F3

Fig. 7c. Example of a main menu

1.4.2.1 General alarm LED (3-Fig. 7a) 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 or fan motor) 2); at the same time the shut-down screen appears. 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. 2b) 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 5.
- 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.

1.4.2.2 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 GA30-GA37-GA45 compressors" deals elaborately with all regulator functions.

1.4.2.3 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. 7b)
Menu	Menu	Starting from the main display (Fig. 7b), to initiate the main menu (Fig. 7c) which gives access to submenus Starting from a submenu, to return to the main menu (Fig. 7c)
Mod	Modify	To modify programmable settings
More	More	To have a quick look at the compressor status

- 1) Consult the User manual for the electronic regulator, section "Status data submenu".
- 2) Air-cooled compressors only.

Abbreviation	Designation	Function
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 Electric cabinet (Fig. 5)

The cabinet comprises electric components such as relays, transformers and fuses as well as the start contactors for the compressor motor and fan motor 1). An overload relay for the compressor motor (F21) and a fan motor circuit breaker (Q15) are provided.

A phase control relay (K25) 2) is installed to monitor the connection to the mains. The relay has two LEDs. The green LED is alight if the voltage is switched on. If the connection of the incoming electric lines is correct, the yellow LED of the relay will be alight and the compressor will start after pressing button (8-Fig. 7a). In the other case, the yellow LED will be out and the compressor will not start: switch off the voltage and reverse two of the incoming lines of terminal strip (1X2).

On air-cooled compressors: if it should be necessary to change the rotation direction of the fan motor (M2-Figs. 2) only, switch off the voltage and reverse two connections at the terminals of circuit breaker (Q15).

On GA Full-feature, the voltage supply to the dryer must be 220-240 V single-phase. The voltage to the dryer is supplied over the contacts of relay (K11), which close when the compressor is started. Consult section 7.4.

1.6 Air dryer on GA Full-feature (Figs. 4a and 9)

GA Full-feature are provided with a dryer which removes moisture from the compressed air. Depending on the compressor type, following types of air dryers may be provided: ID80, ID100 or ID120. The type is stamped on the data plate (13-Fig. 9).

1.6.1 Compressed air circuit

Compressed air enters heat exchanger (5) and is cooled by the outgoing, cold, dried air. Water and oil in the incoming air start to condense. The air then flows through heat exchanger (6) where the refrigerant evaporates and withdraws heat from the air. This

- 1) Air-cooled compressors only.
- 2) Not installed on later production compressors. In this case, the phase control is carried out by the electronic regulator

cools the air to close to the evaporating temperature of the refrigerant. More water and oil in the air condense. The cold air then flows through moisture trap (MT) where all the condensate is separated from the air. The condensate is automatically drained through outlet (Da). The cold dried air then flows through heat exchanger (5), where it is warmed up by the incoming air. Condensation in the air net cannot occur unless the air is cooled to below the pressure dewpoint. The pressure dewpoint can be called up. See section 2.4.1.

1.6.2 Refrigerant circuit

Compressor (M1) delivers hot, high-pressure refrigerant gas which flows via liquid separator (7) through air-cooled condenser (9) where most of the refrigerant condenses. The cooled refrigerant then collects in receiver (10).

The liquid flows through heat exchanger (8) **1** and filter (12) to expansion valve (11) where it expands to evaporating pressure. The refrigerant enters evaporator (6) where it withdraws heat from the compressed air by further evaporation. Dependent on the compressed air load, all, or almost all, refrigerant evaporates at constant pressure and temperature. The vapour refrigerant leaving evaporator (6) flows through heat exchanger (8) **1** into liquid separator (7). The liquid separator prevents any droplets from entering compressor (M1) because warm refrigerant, leaving the compressor, flows through the liquid separator evaporating the surrounding liquid. The refrigerant gas is sucked in by compressor (M1).

1.6.3 Automatic regulation system

Expansion valve (11) maintains the evaporating temperature between 1 and -1°C (34 and 30°F); these are the approximate temperatures at zero and maximum air load respectively.

1.6.4 Dryer control and safety devices

Fan control switch (S3)

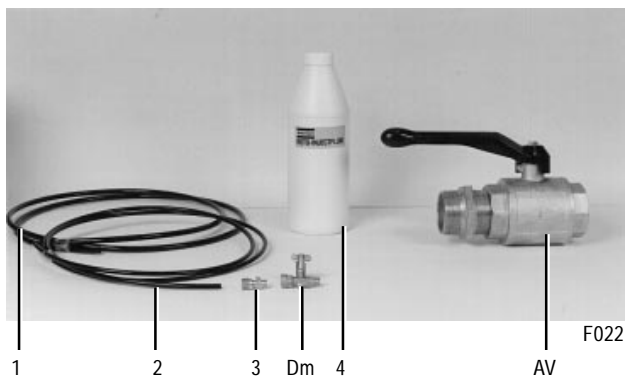
The condensor pressure must be kept as constant as possible to obtain stable operation of expansion valve (11). Therefore, fan control switch (S3) starts motor (M2) of the condensor fan as soon as the condensor pressure reaches the upper set point and will stop the motor when the condensor pressure reaches the lower set point.

Overload switch (S6-Fig. 6b) 1)

The motor of the refrigerant compressor (M1) is protected by a thermal overload switch (S6), built into the motor. The motor will automatically be restarted when it has cooled down.

Pressure shut-down switch (S7) 2)

The switch breaks the circuit to motor (M1) of the refrigerant compressor if the refrigerant pressure becomes too high. If this occurs, the switch must be reset by pressing its reset button.



- AV. Air outlet valve
 Dm. Manual condensate drain valve
 1. Condensate drain flexible for automatic drain
 2. Condensate drain flexible for manual drain
 3. Connection between flexible (2) and valve (Dm)
 4. Bottle containing Atlas Copco Roto-injectfluid

Fig. 8. Components delivered with the compressor (typical examples)

- 1) Not on dryers of type ID120
 2) Only TÜV-approved compressors

2 Operating instructions

Safety precautions

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

2.1 Initial start-up

2.1.1 Remarks

1. Read the "User manual for electronic regulator for GA30-GA37-GA45 compressors" to familiarize yourself with all regulator functions.
2. Consult section 7 for the dimension drawings, electrical connections and installation proposal.

2.1.2 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.

2.1.3 Moving/lifting

The compressor can be moved by a lift truck using the slots in the frame. Make sure that the forks protrude from the other side of the frame. The compressor can also be lifted after inserting beams in the slots. Make sure that the beams cannot slide and that they protrude from the frame equally. The chains must be held parallel to the bodywork by chain spreaders in order not to damage the compressor. The lifting equipment must be placed in such a way that the compressor will be lifted perpendicularly. Lift smoothly and avoid twisting.

2.1.4 Cooling water requirements

Following requirements are given as a general rule to prevent cooling water problems. If in any doubt, consult Atlas Copco.

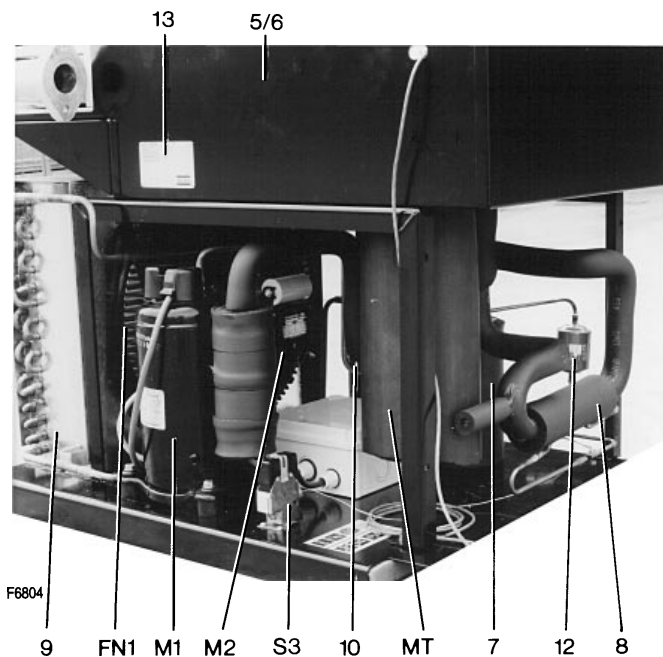
Recommended maxima - mg/l	Recirculating system	Open system
Chloride (Cl)	< 600	< 150
Sulphate (SO ₄ ⁻)	< 400	< 250
Total solids	< 3000	< 750
Suspended solids (as SiO ₂)	< 10	< 10
Free chlorine (Cl ₂)	< 4	< 2
Ammonia (NH ₄ ⁺)	< 0.5	< 0.5
Copper	< 0.5	< 0.5
Iron	< 0.2	< 0.2
Manganese	< 0.1	< 0.1
Oxygen	< 3	< 3
Carbonate hardness (as CaCO ₃)	50-1000	50-500
Organics (KMnO ₄ Consumption)	< 25	< 10

Remarks

- No algae nor oil.
- Chloride and sulphate are interactive. In open systems the sum of the squares of these values must not exceed 85,000. For recirculating systems with proper controls and treatment, the sum of the squares may be up to 520,000. Note that the sulphate value must include any sulphite present.
- The content of calcium compounds must be as low as possible and not exceed 120 mg of calcium oxide (CaO) per litre.

2.1.5 Initial start-up

1. The compressor element and motor are secured to the frame, immobilizing the vibration dampers (7-Figs. 2) during transport. Remove the stud and nuts (2) of both compressor element supports. Remove the bolts (3) of the motor support. Loosen the nut of the central stud and remove support (4). Turn the nut until it contacts the vibration damper (7). Tighten the nut.
2. Check that the electrical connections correspond to the local codes and that all wires are clamped tight to their terminals. The installation must be earthed and protected against short circuits by fuses of the inert type in all phases. An isolating switch must be installed near the compressor.
3. Check the voltage selecting wires at the primary side of transformer (T1-Fig. 5), the settings of compressor motor overload relay (F21) and fan motor circuit breaker (Q15), and that overload relay (F21) is set for automatic resetting. On water-cooled units, circuit breaker (Q15) is installed but not used. Check that the switch on the circuit breaker is in position "I".
4. Fit air outlet valve (AV-Fig. 8) to pipe (1-Fig. 1). Close the valve. Connect the air net to the valve.
5. Connect valve (Dm-Fig. 8) to the manual condensate drain outlet (Fig. 3). Close the valve. Connect the valve to a drain collector by means of flexible (2-Fig. 8) and connection (3-Fig. 8).
6. Connect the automatic drain outlet (Da-Fig. 3) to a drain collector by means of flexible (1-Fig. 8).
7. On water-cooled compressors, a drain valve, regulating valve and shut-off valve should be fitted by the customer in the cooling water piping.
8. Check the oil level. The pointer of the level gauge (GI-Fig. 12) should register in the green or orange range. Bottle (4-Fig. 8) can be used for topping up.
9. Noise-dampening plates are delivered loose. Close off the forklift grooves by means of these plates to reduce the sound pressure level.
10. 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 7.5.



- FN1. Condensator fan
 M1. Refrigerant compressor
 M2. Motor, condensator fan
 MT. Moisture trap
 S3. Condensator fan control switch
 5. Air/air heat exchanger
 6. Air/refrigerant heat exchanger
 7. Liquid separator
 8. Refrigerant/refrigerant heat exchanger
 9. Condensor
 10. Liquid receiver
 12. Filter
 13. Data plate

Fig. 9. Air dryer on Full-feature compressors

11. Switch on the voltage. If the yellow LED of relay (K25-Fig. 5) **1)** is alight, start the compressor. Check the rotation direction of the motors. When facing the drive end shaft of the motors, the correct rotation direction is:
- counter-clockwise for the fan motor (M2-Figs. 2) **2)**
 - counter-clockwise for the compressor motor (M1-Figs. 2) **(except for GA30 7 bar (50 Hz) and GA37 10 bar (50 Hz): clockwise)**

If the rotation direction is wrong, consult section 1.5.

12. Check the programmed settings. **3)**
 13. Start and run the compressor for a few minutes. Check that the compressor operates normally.

- 1)** Not installed on later production compressors, consult section 1.5.
2) Air-cooled compressors only.
3) Consult the User manual for the electronic regulator, sections regarding the submenus "Measured data", "Service", "Modify settings", "Timer" and "Programmable settings".

2.2 Before starting

If the compressor has not run for the past 6 months, it is strongly recommended to improve the lubrication of the compressor element at starting: remove bolts (7-Fig. 14b), lift unloader (UA) and pour 3/4 l of oil into the compressor element. Reinstall the unloader.

1. Check the oil level (GI-Fig. 12). The pointer should be in the upper field of the green range or in the HIGH range. If the pointer registers in the LOW range, depressurize the oil system (by unscrewing oil filler plug (FC) one turn) and add oil until the level reaches the filler plug. Tighten the plug.
2. If necessary, empty the dust trap of air filter (AF-Fig. 2a).
3. If the red part of the air filter service indicator (VI-Fig. 14b) shows full out, replace the air filter element (see section 4.1).

On water-cooled compressors also:

4. Check that the cooling water drain valve (customer's installation) is closed.
5. Open the cooling water inlet valve (customer's installation).
6. Open the water flow regulating valve (customer's installation). This step can be overlooked if, after previous operation, the setting of this valve has not been disturbed.

Remark

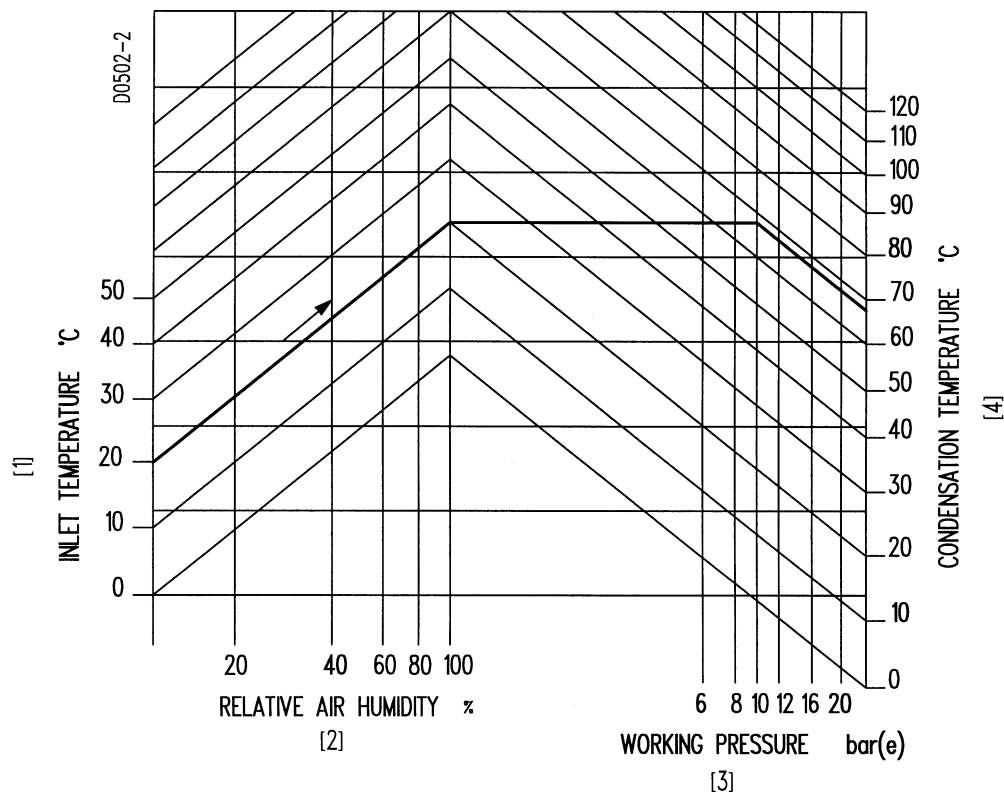
It is possible to remotely control following functions:

Function	Action (see strip 1X1-Fig. 5)
Remote start/ programmed stop	Connect a remote start button between terminals 30 and 31. Connect a remote stop button between terminals 30 and 32. Bridge terminals 30 and 34. Close switch CMS2.
Remote load/ unload	Bridge terminals 30 and 35. Connect a load/unload switch between terminals 30 and 34. Close switch CMS2

2.3 Starting (Fig. 7a)

1. Switch on the voltage. Check that voltage on LED (2) lights up. The message **compressor off** appears.
2. Open air outlet valve (AV).
3. Close condensate drain valve (Dm-Fig. 3).
4. Press start button I (8). The compressor starts running and automatic operation LED (1) lights up. Ten seconds **1)** after starting, the compressor motor switches over from star to delta. At the same time **1)** the compressor starts running loaded. The message on display (4) changes from **Auto unloaded** to **Auto loaded**.

- 1)** Programmable. See the User manual for the electronic regulator, section "Programmable settings".

**Example:**

If operating at a pressure of 10 bar(e) in an ambient temperature of 20°C and at a relative air humidity of 100 %, the minimum temperature to prevent condensate from forming is 68°C. Regulate the cooling water flow during loaded operation to obtain a temperature between 70°C and approx. 75°C at the outlet of the compressor element.

Fig. 10. Minimum compressor element outlet temperature for water-cooled compressors

On water-cooled compressors also:

5. If necessary, regulate the cooling water flow **during loaded running** to obtain the most suitable temperature at the outlet of the compressor element, i.e. between 2°C above the relevant temperature in Fig. 10 and approx. 5°C above that value. For optimum operation, the cooling water outlet temperature must never exceed the value specified in section 6.5. Consult Atlas Copco if condensate should be formed during frequent unloading periods.

2.4 During operation (Fig. 7a)

1. Check the oil level **during loaded operation**: the pointer of the level indicator (GI-Fig. 12) must register in the green range; if not, press button O (9), wait until the compressor has stopped, depressurize the oil system (by unscrewing oil filler plug (FC) one turn), wait a few minutes and add oil until the level reaches the filler plug. Tighten the plug.

2. If the red part of the air filter service indicator (VI-Fig. 14b) shows full out, stop the compressor and replace the air filter element (see section 4.1).
3. If automatic operation LED (1) is alight, the regulator is automatically controlling the compressor, i.e. loading, unloading, stopping of the motors and restarting.

2.4.1 Checking the display 1)

1. Regularly check the display for readings and messages. Normally the main display (Fig. 7b) 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 1.4.2.1.
- 1) Consult the User manual for the electronic regulator, sections "Status data submenu" and "Service submenu".

- 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.
- Regularly press the key **More** (5) **1** 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) **2**
 - 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

2.5 Manual control (Fig. 7a) 3)

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

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.

- 1) If the **More** function is not indicated on the bottom line of display (4-Fig. 7a), press key **Menu** (5) until function **Main** appears above key (F1), then press the key **Main**.
- 2) 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) 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**.

2.6 Stopping (Fig. 7a)

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-Figs. 4) and switch off the voltage.
4. Open condensate drain valve (Dm-Fig. 3).

On water-cooled compressors only:

5. Close the cooling water inlet valve.
6. **If freezing temperatures can be expected, drain the cooling system completely.**

2.7 Taking out of operation at end of compressor life cycle

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. 12) and valve (Dm-Fig. 3).
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. Shut off the compressor water piping and isolate it from the cooling water net.
6. Drain the oil, water and condensate circuits.
7. Disconnect the compressor condensate piping from the condensate drain system.

3 Maintenance

Attention

Before starting any maintenance, press stop button O (9-Fig. 7a), wait until the compressor has stopped (approx. 30 seconds), press stop button (S3-Fig. 7a) and switch off the voltage. Apply all relevant safety precautions, including those mentioned in this book.

A yellow-painted blocking device is delivered loose. The device can be fitted around the closed outlet valve (AV-Fig. 8) to lock the valve during maintenance or repair works.

3.1 Compressor motor (M1-Figs. 2)

The bearings must be regreased with a lithium-soap-based grease according to DIN 51 825 K3k. Quantity: 10 g (0.35 oz) per bearing each 2000 operating hours if working in ambient temperatures above 25°C, 20 g (0.7 oz) each 4000 hours if working below 25°C. The lubrication points are marked.

3.2 Preventive maintenance schedule for the compressor (see next page)

The schedule comprises a summary of the maintenance instructions. **Read the respective section before taking maintenance measures.**

When servicing, replace all disengaged packings, e.g. gaskets, O-rings, washers.

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

3.3 Oil and oil filter change interval

Consult section 3.2 for the change intervals and section 3.4 for the oil specifications.

The oil change interval depends on the working temperature. See note 5 below the maintenance schedule.

3.4 Oil specifications

Never mix oils of different brands or types. Consult Atlas Copco for the recommended oils. Use only non-toxic oils where there is a risk of inhaling delivered air.

3.4.1 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. If Atlas Copco Roto-injectfluid is not available, oil as specified in section 3.4.2 can be used.

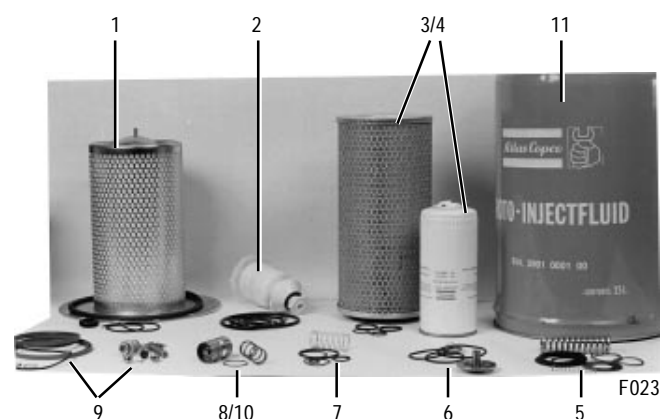
3.4.2 Mineral oil for hydraulics

High-quality, mineral oil for hydraulics with oxidation inhibitors and anti-foam and anti-wear properties. 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 32 or 46	Minimum 95

3.4.3 Synthetic hydrocarbon lubricant

A polyalphaolefine-based synthetic hydrocarbon lubricant with anti-oxidation, anti-foam and anti-wear properties can also be used. The viscosity grade must be ISO VG 32 or ISO VG 46 and the viscosity index minimum 130. Consult Atlas Copco.



- | | |
|-------------------------------|--|
| 1. Oil separator kit | 6. Check valve kit |
| 2. Moisture trap kit | 7. Oil stop valve kit |
| 3. Filter kit | 8. Thermostat kit |
| 4. Filter kit | 9. Unloader kit |
| 5. Minimum pressure valve kit | 10. Thermostat kit |
| | 11. Oil kit (Atlas Copco Roto-injectfluid) |

Fig. 11. Preventive maintenance kits (typical examples)

DE	DB	DS	ES	EP
JE				JE
"	--	22	--	JE
"	--	14	--	JE
"	8	12	--	JE
"	8	--	11	JE
"	8	42	--	JE
"	8	42	--	JE
"	--	32	--	JE
"	--	62	--	JE
JE	--	--	--	JE
JE	--	34	--	JE
"	--	--	9	JE
"	--	--	21	JE
"	05	24	81	JE
"	05	--	71	JE
"	05	--	4	JE
JE	--	34	--	JE
"	--	--	--	JE
"	--	--	01	JE
"	02	14	6	JE
"	02	--	--	JE
"	02	--	--	JE
"	02	--	--	JE
"	02	43	62	JE
"	03	43	63	JE
"	05	73	6	JE
"	--	13	--	JE
"	05	43	62	JE
"	05	--	--	JE
"	05	43	62	JE
"	05	--	--	JE
"	--	--	31	JE

- 1) **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.

Remark

For overhauling valves or carrying out preventive maintenance, service kits are available (Fig. 11). Consult the Parts list for the contents of the kits.

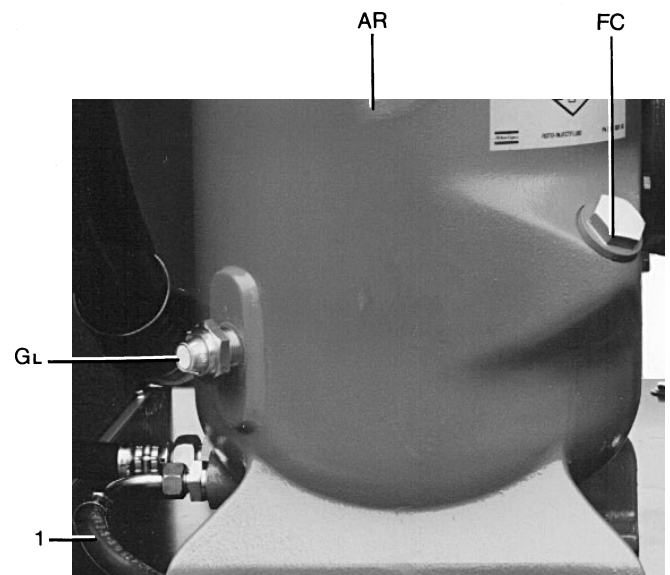
Notes

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. If the pressure drop reaches 0.5 bar, it is strongly recommended to change the filter element as its efficiency is decreasing. The filter element must be changed when the pressure drop reaches 0.7 bar.
5. It is strongly recommended to use Atlas Copco Roto-injectfluid. The change interval for this oil is 4000 running hours or yearly if operating continuously at a compressor element outlet temperature below 100°C and 2000 running hours or yearly if operating continuously close to or above 100°C.
6. Consult the User manual for the electronic regulator for resetting the service timer.
7. Replace the filter if damaged.
8. On Full-feature compressors, brush or blow off the surface of the condenser.
9. Consult the User Manual for the electronic regulator, section "Display test".
10. Consult the User Manual for the electronic regulator before modifying the temperature protection settings, section "Modify settings submenu".
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.
11. Atlas Copco has oil separators to separate the major part of oil from condensate to ensure that the condensate meets the requirements of the environmental codes.
12. Any leak should be attended to immediately.
13. Damaged flexibles must be replaced immediately.

3.5 Oil change (Fig. 12)

1. Run the compressor until warm. Stop the compressor, wait a few minutes and depressurize it by unscrewing oil filler plug (FC) only one turn to permit any pressure in the system to escape.
2. Remove vent plug (VP-Fig. 2a or 2b). Drain the oil by removing drain plugs (DP2, DP3-Fig. 2b), the drain plug of flexible (8-Fig. 2a) and plug (DP4-Fig. 2a). Fit and tighten all plugs after draining. Collect the oil in a collector and deliver it to the local oil collection service.
3. Fill air receiver (AR) with oil until the level reaches the filler neck. Take care that no dirt drops into the system. Reinstall and tighten filler plug (FC).
4. Run the compressor for a few minutes. Stop the compressor and wait a few minutes to allow the oil to settle. Depressurize the system. Fill the air receiver with oil until the level reaches the filler neck. Tighten filler plug (FC).
5. Reset the oil service warning. 1)

- 1) Consult the User manual for the electronic regulator, section "Service submenu"



- AR. Air receiver/oil separator
 FC. Oil filler plug
 GL. Oil level indicator
 1. Oil drain flexible

Fig. 12. Oil system components

3.6 Oil filter change (Fig. 12)

To change the filter without spilling oil:

1. Run the compressor unloaded for 3 minutes.
2. Stop the compressor and depressurize by unscrewing oil filler plug (FC) one turn to permit any pressure in the system to escape.
3. Remove vent plug (VP-Fig. 2a or 2b), wait 5 minutes, remove drain plug (DP2-Fig. 2b) and catch the oil in a receptacle.
4. Remove oil filter (OF-Fig. 14a).
5. Clean the filter seat on the manifold. Oil the gasket of the new element. Screw the element into place and tighten firmly by hand.
6. Fill the receiver (AR) with oil until the level reaches the filler plug.
7. Tighten plugs (FC, VP and DP2).
8. Reset the oil filter service warning. **1)**

3.7 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.

3.8 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.

Service kit for oil filters and air filters	Ordering number
GA30 all versions, GA37 10-13 bar, GA37 125-150-175 psi, GA45 13 bar, GA45 175 psi	2901 0325 00
GA37 7.5 bar, GA37 100 psi, GA45 7.5-10 bar, GA45 100-125-150 psi	2901 0326 00

Note: Atlas Copco Roto-injectfluid (see section 3.4.1) can be ordered in following quantities:

Quantity	Ordering number
15-litre can	2901 0086 01
25-litre can	2901 0001 01
209-litre drum	2901 0045 01

Service kit for the oil separator	Ordering number
GA30/45	2901 0213 00

4 Adjustments and servicing procedures

4.1 Air filter (AF-Fig. 2a)

4.1.1 Recommendations

1. Never remove the element while the compressor is running.
2. For minimum compressor down-time, replace the dirty element by a new one.
3. Discard the element when damaged.

4.1.2 Servicing

1. Release the snap clips and remove the dust trap and air filter element. Clean the trap.
2. Refit the new element and the trap. Check that the clips are properly engaged.
3. Reset the service indicator (VI-Fig. 14b) by pushing the knob in the extremity of the body.
4. Reset the air filter service warning. **1)**

- 1)** Consult the User manual for the electronic regulator, section "Service submenu".

4.2 Coolers

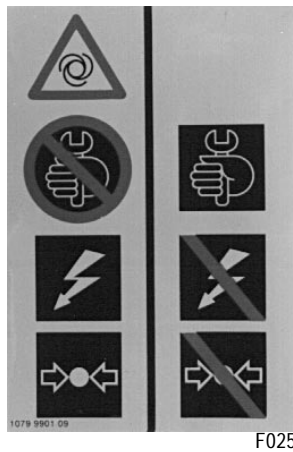
Keep the coolers clean to maintain the cooling efficiency.

On air-cooled compressors:

To facilitate cleaning of the coolers, side panel (4-Fig. 1) can be removed, giving access to an inspection hole in the fan cowl through which the inlet side of the coolers can be inspected and cleaned.

First loosen bolts (4-Fig. 14a), lower bracket (3-Fig. 14a) until it touches air receiver (AR-Fig. 14a) and then tighten bolts (4). In this way, the coolers are supported before the side panel is removed.

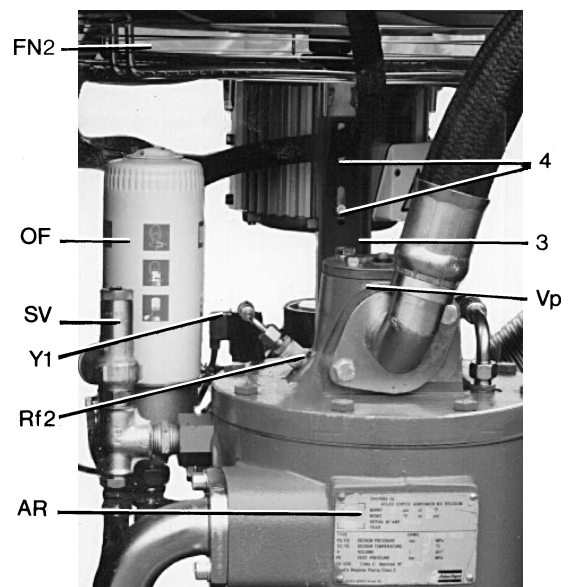
Remove any dirt from the coolers with a fibre brush. Never use a wire brush or metal objects. Then clean by air jet in reverse direction of normal flow. If it should be necessary to wash the coolers with a cleansing agent, consult Atlas Copco.



F025

Label indicating that it is not allowed to carry out any maintenance or repair as long as the compressor is in operation, pressurized or if the voltage is switched on.

Fig. 13. Safety label



F026

Fig. 14a. View of minimum pressure valve

Refit the side panel and fit the bracket (3) in its original lifted position.

On water-cooled compressors:
Consult Atlas Copco for cleaning.

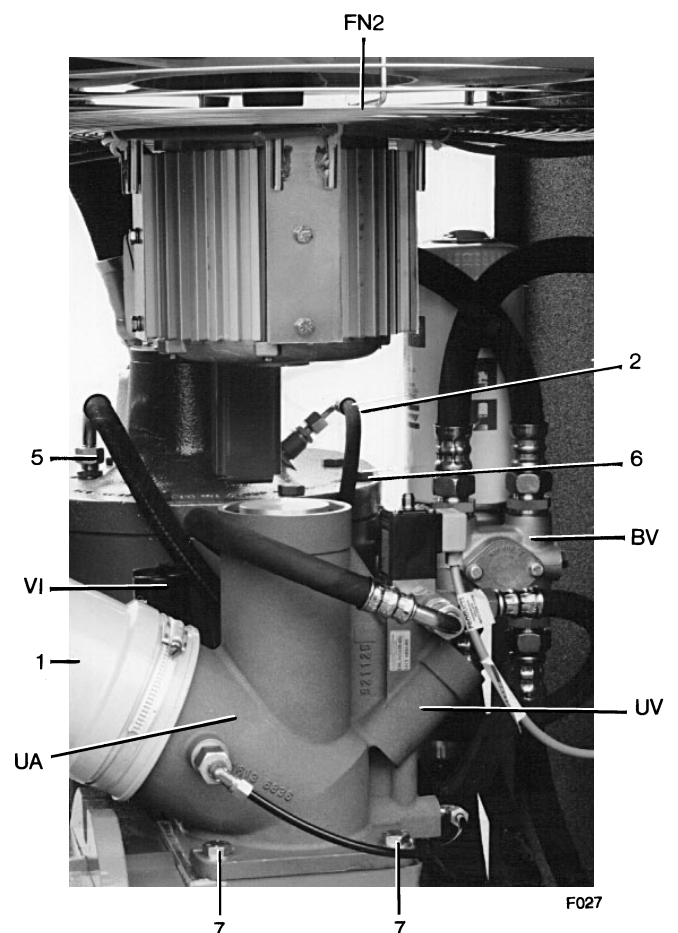
4.3 Safety valve (SV-Fig. 14a)

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 specified in section 6.2, consult Atlas Copco. **No adjustments are allowed.**

- AR. Air receiver/oil separator
- BV. Oil cooler by-pass valve
- FN2. Fan, compressor coolers
- OF. Oil filter
- Rf2. Restrictor
- SV. Safety valve
- UA. Unloader
- UV. Unloading valve
- VI. Air filter service indicator
- Vp. Minimum pressure valve
- Y1. Loading solenoid valve
- 1. Air inlet pipe
- 2. Oil scavenging line
- 3. Bracket (used if removing side panel)
- 4. Bolts
- 5. Blow-off flexible
- 6. Bolt
- 7. Bolt



F027

Fig. 14b. View of unloader

Figs. 14. View of minimum pressure valve and unloader

4.4 Fan control switch on GA Full-feature

The switch (S3-Fig. 9) is factory-adjusted and must be replaced if the switch-on or cut-out pressure deviates from the values given in section 6.2.

4.5 High pressure shut-down switch on GA Full-feature (TÜV-approved units only)

The switch (S7-Fig. 4a) is factory-adjusted and must be replaced if the shut-down value deviates from the value given in section 6.2.

4.6 Expansion valve on GA Full-feature

The valve (11-Fig. 4a) is a regulator which keeps the evaporator pressure, and consequently also the temperature, stable. The valve is controlled by its own outlet pressure. The valve is factory-set to keep the effective evaporator pressure at no-load at a minimum of 4.1 bar (59 psi), which corresponds to 1°C (34°F). If necessary, have the valve adjusted.

5 Problem solving

Attention:

- 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, emergency stop button (S3) and the bridge on terminals 24 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.

- Before starting repairs, press stop button O (9-Fig. 7a), wait until the compressor has stopped (approx. 30 seconds), press stop button (S3-Fig. 7a) and switch off the voltage. Furthermore, 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.
- Consult the User manual for the electronic regulator if a service message or fault message appears on the display (4-Fig. 7a) or when alarm LED (3-Fig. 7a) is alight or blinks.
- A yellow-painted blocking device is delivered loose. The device can be fitted around the closed outlet valve (AV-Fig. 8) to lock the valve during maintenance or repair works.
- To facilitate some maintenance or repair works, it may be efficient to remove side panel (4-Fig. 1). For air-cooled compressors, consult section 4.2. On water-cooled compressors, removal is possible as long as air cooler (Ca) and pipe (13-Fig. 2b) remain installed.

Mechanical faults and suggested remedies (Figs. 4)

Explanation of the table below:

- Conditions of the compressor, always preceded by a number, are printed in bold.
- Each possible fault is followed by its relevant suggested remedy and both are preceded by the same letter

1. **Push button (I) is pressed, compressor starts running, but does not load after a delay time**
 - a. Solenoid valve (Y1) out of order
 - a. Replace valve
 - b. Inlet valve (IV) stuck in closed position
 - b. Consult Atlas Copco
 - c. Leak in control air flexibles
 - c. Replace leaking flexible
 - d. Minimum pressure valve (Vp) leaking (when net is depressurized)
 - d. Consult Atlas Copco

2. **Compressor does not unload, safety valve blows**
 - a. Solenoid valve (Y1) out of order
 - a. See 1a
 - b. Inlet valve (IV) does not close
 - b. See 1b

3. **Condensate is not discharged from moisture trap during loading**
 - a. Discharge flexible clogged
 - a. Check and correct as necessary
 - b. Float valve malfunctioning
 - b. Consult Atlas Copco

4. **Compressor air output or pressure below normal**
 - a. Air consumption exceeds air output of compressor
 - a. Check equipment connected
 - b. Choked air inlet filter element (AF)
 - b. Replace filter element
 - c. Solenoid valve (Y1) malfunctioning
 - c. See 1a
 - d. Leak in control air flexibles
 - d. See 1c
 - e. Inlet valve (IV) does not fully open
 - e. See 1b
 - f. Oil separator element (OS) clogged
 - f. Have element replaced. Consult Atlas Copco
 - g. Air leakage
 - g. Check and correct as necessary
 - h. Safety valve (SV) leaking
 - h. Have valve replaced. Consult Atlas Copco
 - i. Compressor element (E) out of order
 - i. Consult Atlas Copco

5. **Excessive oil flow through air inlet filter after stopping**
 - a. Check valve (CV) leaking or oil stop valve (Vs) jammed
 - a. Consult Atlas Copco

6. **Safety valve (SV) blows after loading**
 - a. Inlet valve (IV) malfunctioning
 - a. See 1b
 - b. Minimum pressure valve (Vp) malfunctioning
 - b. See 1d
 - c. Oil separator element (OS) clogged
 - c. See 4f

- d. Safety valve (SV) out of order
- d. See 4h
- e. For Full-feature: dryer pipes clogged by formation of ice
- e. Have refrigerant system checked. Consult Atlas Copco

7. **Element outlet 1) or air outlet temperature above normal**
 - a. Insufficient cooling air or cooling air temperature too high
 - a. Check for cooling air restriction or improve ventilation of compressor room. Avoid recirculation of cooling air. If installed, check capacity of compressor room fan. On water-cooled compressors, check cooling water conditions
 - b. Oil level too low
 - b. Check and correct as necessary
 - c. Oil cooler (Co) clogged
 - c. Clean cooler
 - d. By-pass valve (BV) malfunctioning
 - d. Have valve replaced
 - e. Air cooler (Ca) clogged
 - e. Clean cooler
 - f. Compressor element (E) out of order
 - f. See 4i

1) A warning message will appear on display (4-Fig. 7a).

6 Principal data

6.1 Readings on display (4-Fig. 7a) 1)

- Ref.: Air outlet pressure**
Reading: Modulates between programmed unloading and loading pressures.
Shown: On main display (Fig. 7b), when:
 - switching on voltage
 - selecting main display with keys **Menu** and **Main** (5-Fig. 7a)
 - keys of module are not used for four minutes
Sensor: PT20-Fig. 2b
- Ref.: Compressor element outlet temperature**
Reading: Approx. 60°C/108°F above cooling air temperature or above cooling water temperature
Shown: When using the key **More** (5-Fig. 7a) on the main display (Fig. 7b)
Sensor: TT11-Fig. 2b

On Full-feature also:

- Ref.: Dewpoint temperature**
Reading: 3°C (37°F)
Shown: When using the key **More** (5-Fig. 7a) on the main display (Fig. 7b)
Sensor: TT90

1) See User manual for electronic regulator, sections "Modify settings submenu" and "More function"

6.2 Settings of switches and safety valve

Compressor type	Safety valve Set pressure(e)
- GA30/37/45 7.5 bar	8.5 bar(e)
- GA30/37/45 10 bar	11.5 bar(e)
- GA30/37/45 13 bar	14.5 bar(e)
- GA30/37/45 100 psi	145 psig
- GA30/37/45 125 psi	145 psig
- GA30/37/45 150 psi	175 psig
- GA30/37/45 175 psi	200 psig
- GA30/37/45 7.5 bar/ISPESL approved	9.3 bar(e)
- GA30/37/45 10 bar/ISPESL approved	11 bar(e)
- GA30/37/45 13 bar/ISPESL approved	14 bar(e)

Dryer control switch (only on GA Full-feature)	Cut-out pressure	Switch-on pressure	Unit	Ref.
Fan control switch	13	16	bar(e)	S3
Dryer shut-down switch (only on TÜV-approved GA Full-feature)	Breaks at		Unit	Ref.
Dryer shut-down switch		25	bar(e)	S7

6.3 Settings of motor overload relay and fuses

Compressor type	Supply voltage (V)	Frequency (Hz)	Max. setting of relay F21 (A)	Fuses gL/gG (A)	Fuses CSA HRC (A)	Fuses UL K5 (A)
GA30/W	230	50	62	125	/	/
GA30/W	400	50	36	80	/	/
GA30/W	500	50	29	63	/	/
GA37/W	230	50	72	160	/	/
GA37/W	400	50	42	100	/	/
GA37/W	500	50	33	80	/	/
GA45/W	230	50	87	200	/	/
GA45/W	400	50	50	100	/	/
GA45/W	500	50	40	100	/	/
GA30/W	220/230	60	69	160	150	150
GA30/W	380	60	40	125	/	/
GA30/W	440/460	60	35	100	80	70
GA30/W	575	60	27	/	80	70
GA37/W	220/230	60	86	160	200	175
GA37/W	380	60	50	100	/	/
GA37/W	440/460	60	43	100	80	100
GA37/W	575	60	33	/	80	70
GA45/W	220/230	60	100	200	200	200
GA45/W	380	60	58	100	/	/
GA45/W	440/460	60	50	100	80	100
GA45/W	575	60	39	/	80	100

6.4 Settings of fan motor circuit breaker (on air-cooled compressors)

Compressor type	Supply voltage (V)	Frequency (Hz)	Max. setting of breaker Q15 (A)
GA30/37/45	230	50	3
GA30/37/45	400	50	1.8
GA30/37/45	500	50	1.3
GA30/37/45	220/230	60	3
GA30/37/45	380	60	1.7
GA30/37/45	440/460	60	1.8
GA30/37/45	575	60	1.5

6.5 Compressor specifications

6.5.1 Reference conditions

Air inlet pressure (absolute)	bar	1
Air inlet temperature	°C	20
Relative humidity	%	0
Nominal working pressure as mentioned below		

On water-cooled compressors also:

Cooling water inlet temperature	°C	20
---------------------------------------	----	----

6.5.2 Specific data of GA30/GA30 W 1)

Compressor type	7.5	10	13	100	125	150	175
Frequency Hz	50	50	50	60	60	60	60
Number of compression stages	1	1	1	1	1	1	1
Maximum (unloading) pressure (for Pack compressors) bar(e)	7.5	10	13	7.4	9.1	10.8	12.5
Maximum (unloading) pressure (for Full-feature compressors) bar(e)	7.25	9.75	12.75	7.15	8.85	10.55	12.25
Nominal working pressure bar(e)	7	9.5	12.5	6.9	8.6	10.3	12
Minimum working pressure bar(e)	4	4	4	4	4	4	4
Maximum air inlet temperature 2) °C	40	40	40	40	40	40	40
Minimum air inlet temperature °C	0	0	0	0	0	0	0
Temperature of air leaving air outlet valve at nominal working pressure, approx. (for Pack compressors) °C	30	27	27	30	30	27	27
Temperature of air leaving air outlet valve at nominal working pressure, approx. (for Full-feature compressors) °C	25	22	22	23	23	20	20
Oil capacity, approx. 3) l	14(17.5)	14(17.5)	14(17.5)	14(17.5)	14(17.5)	14(17.5)	14(17.5)
Sound pressure level, according to CAGI PNEUROP dB(A)	74	73	72	77	77	76	76
Compressor electrical power input 4) kW	33.3(35.0)	33.9(35.4)	33.3(34.9)	36.1	36.5	36.7	36.8
Compressor electrical power input 5) kW	34.2(35.8)	34.7(36.2)	34.2(35.7)	37.3	37.7	38.0	38.1
Compressor motor, SIEMENS type 1LA5	188-2	188-2	188-2	188-2	188-2	188-2	188-2
Fan motor, SIEMENS type 1PP5	090-4	090-4	090-4	090-4	090-4	090-4	090-4
For water-cooled compressors also:							
Maximum cooling water outlet temperature °C	50	50	50	50	50	50	50
Maximum cooling water inlet pressure bar(e)	5	5	5	5	5	5	5

6.5.3 Specific data of GA37/GA37 W 1)

Compressor type	7.5	10	13	100	125	150	175
Frequency Hz	50	50	50	60	60	60	60
Number of compression stages	1	1	1	1	1	1	1
Maximum (unloading) pressure (for Pack compressors) bar(e)	7.5	10	13	7.4	9.1	10.8	12.5
Maximum (unloading) pressure (for Full-feature compressors) bar(e)	7.25	9.75	12.75	7.15	8.85	10.55	12.25
Nominal working pressure bar(e)	7	9.5	12.5	6.9	8.6	10.3	12
Minimum working pressure bar(e)	4	4	4	4	4	4	4
Maximum air inlet temperature 2) °C	40	40	40	40	40	40	40
Minimum air inlet temperature °C	0	0	0	0	0	0	0
Temperature of air leaving air outlet valve at nominal working pressure, approx. (for Pack compressors) °C	30	27	27	30	30	27	27
Temperature of air leaving air outlet valve at nominal working pressure, approx. (for Full-feature compressors) °C	25	22	22	23	23	20	20
Oil capacity, approx. l	17.5	17.5	17.5	17.5	17.5	17.5	17.5
Sound pressure level, according to CAGI PNEUROP dB(A)	74	73	72	77	77	77	77
Compressor electrical power input 4) kW	40.8(43.2)	39.7(41.8)	40.9(43.0)	44.7	45.2	46.1	45.8
Compressor electrical power input 5) kW	41.7(44.0)	40.5(42.6)	41.8(43.8)	45.9	46.5	47.3	47.0
Compressor motor, SIEMENS type 1LA5	207-2	207-2	207-2	207-2	207-2	207-2	207-2
Fan motor, SIEMENS type 1PP5	090-4	090-4	090-4	090-4	090-4	090-4	090-4
For water-cooled compressors also:							
Maximum cooling water outlet temperature °C	50	50	50	50	50	50	50
Maximum cooling water inlet pressure bar(e)	5	5	5	5	5	5	5

6.5.4 Specific data of GA45/GA45 W 1)

Compressor type	7.5	10	13	100	125	150	175
Frequency	50	50	50	60	60	60	60
Number of compression stages	1	1	1	1	1	1	1
Maximum (unloading) pressure (for Pack compressors)	7.5	10	13	7.4	9.1	10.8	12.5
Maximum (unloading) pressure (for Full-feature compressors)	7.25	9.75	12.75	7.15	8.85	10.55	12.25
Nominal working pressure	7	9.5	12.5	6.9	8.6	10.3	12
Minimum working pressure	4	4	4	4	4	4	4
Maximum air inlet temperature 2)	40	40	40	40	40	40	40
Minimum air inlet temperature	0	0	0	0	0	0	0
Temperature of air leaving air outlet valve at nominal working pressure, approx. (for Pack compressors) 3)	33(30)	30	30	33(30)	33(30)	30	30
Temperature of air leaving air outlet valve at nominal working pressure, approx. (for Full-feature compressors) 3)	28(25)	25	25	26	26	23	23
Oil capacity, approx.	17.5	17.5	17.5	17.5	17.5	17.5	17.5
Sound pressure level, according to CAGI PNEUROP	75	74	73	78	77	77	77
Compressor electrical power input 4)	49.9(53.0)	49.1(51.7)	49.8(52.2)	54.5	54.9	55.4	55.2
Compressor electrical power input 5)	50.8(53.8)	49.9(52.6)	50.7(53.0)	55.8	56.2	56.6	56.4
Compressor motor, SIEMENS type 1LA5	208-2	208-2	208-2	208-2	208-2	208-2	208-2
Fan motor, SIEMENS type 1PP5	090-4	090-4	090-4	090-4	090-4	090-4	090-4
For water-cooled compressors also:							
Maximum cooling water outlet temperature	50	50	50	50	50	50	50
Maximum cooling water inlet pressure	5	5	5	5	5	5	5

6.6 Conversion list of SI units into British units

1 bar = 14.504 psi	1 l = 0.220 Imp gal (UK)	1 mbar = 0.401 in wc
1 g = 0.035 oz	1 l = 0.035 cu.ft	1 N = 0.225 lbf
1 kg = 2.205 lb	1 m = 3.281 ft	1 Nm = 0.738 lbf.ft
1 km/h = 0.621 mile/h	1 mm = 0.039 in	$x^{\circ}\text{C} = (32 + 1.8x)^{\circ}\text{F}$
1 kW = 1.341 hp (UK and US)	1 m ³ /min = 35.315 cfm	$\Delta t 1^{\circ}\text{C} = \Delta t 1.8^{\circ}\text{F}$
1 l = 0.264 US gal		

- 1) At reference conditions
- 2) 35°C for Full-feature compressors; 40°C for Full-feature compressors designed for operation in tropical conditions (consult Atlas Copco)
- 3) Figures between brackets refer to water-cooled compressors
- 4) For water-cooled compressors. Figures between brackets refer to Full-feature compressors
- 5) For air-cooled compressors. Figures between brackets refer to Full-feature compressors

7 Installation

7.1 Dimension drawings (Figs. 15)

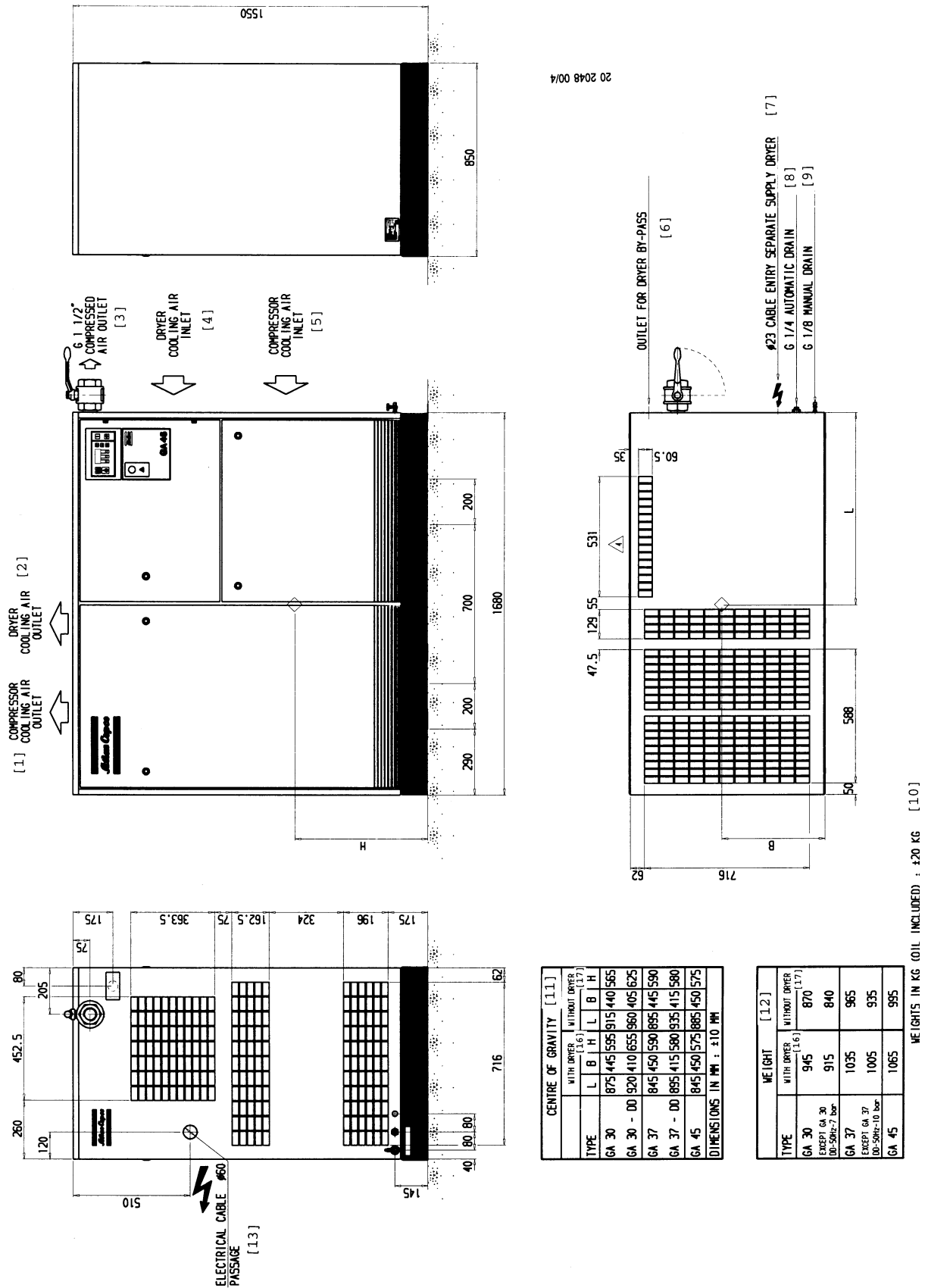
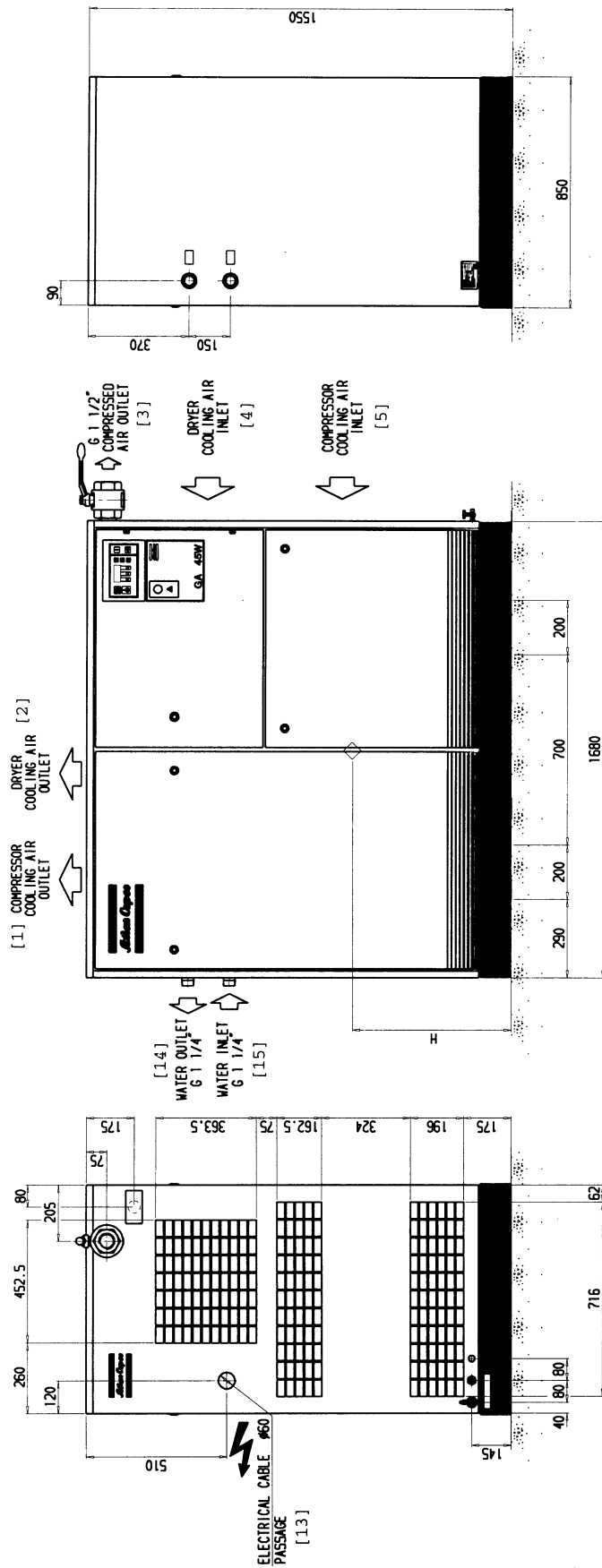
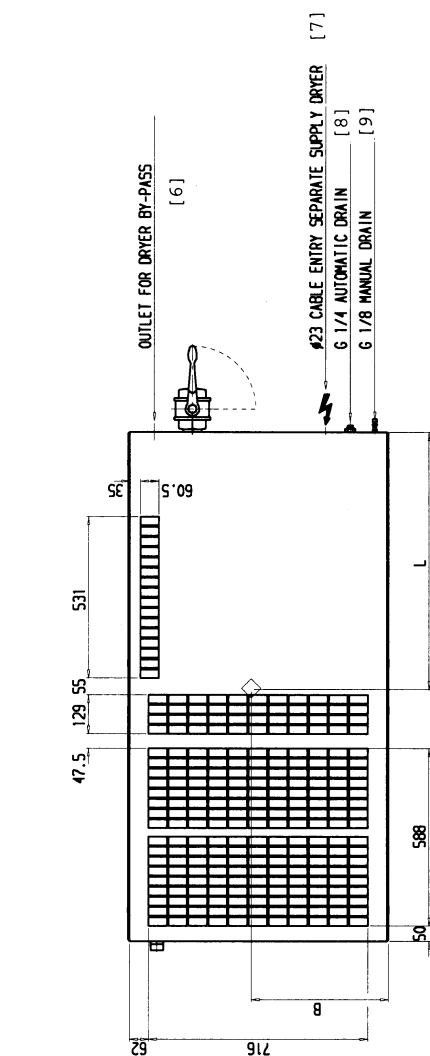


Fig. 15a. Dimension drawing, air-cooled compressors



20 2048 01/0



CENTRE OF GRAVITY [1.1]						
TYPE	WITH DRYER [1.6]			WITHOUT DRYER [1.7]		
	L	B	H	L	B	H
GA 30	890	445	655	930	440	625
GA 30 - 00	935	410	715	975	405	685
GA 37	855	450	590	905	445	590
GA 37 - 00	905	415	580	935	415	580
GA 45	865	450	575	895	450	895

DIMENSIONS IN MM : ±10 MM

WEIGHT [1.2]		
TYPE	WITH DRYER [1.6]	WITHOUT DRYER [1.7]
GA 30	960	885
EXCEPT GA 30 00-50Hz-7 bar	930	855
GA 37	995	925
EXCEPT GA 37 00-50Hz-10 bar	965	895
GA 45	1025	955

WEIGHTS IN KG (OIL INCLUDED) : ±20 KG [1.0]

Fig. 15b. Dimension drawing, water-cooled compressors

7.2 Electric cable section

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.

Compressor type	Voltage (V)	Frequency (Hz)	Line current (A)	Cable section (mm ² /AWG size)
GA30/W	230	50	114	50
GA30/W	400	50	67	25
GA30/W	500	50	52	16
GA37/W	230	50	138	70
GA37/W	400	50	80	35
GA37/W	500	50	61	25
GA45/W	230	50	160	95
GA45/W	400	50	92.5	35
GA45/W	500	50	71	25
GA30/W	230	60	127	70 / AWG1
GA30/W	380	60	74	25 / AWG4
GA30/W	440-460	60	64	25 / AWG4
GA30/W	575	60	50	16 / AWG6
GA37/W	230	60	154	95 / AWG00
GA37/W	380	60	88	35 / AWG3
GA37/W	440-460	60	74	25 / AWG4
GA37/W	575	60	60	25 / AWG6
GA45/W	230	60	175	95 / 2 X AWG2
GA45/W	380	60	102	50 / AWG0
GA45/W	440-460	60	88	35 / AWG1
GA45/W	575	60	68	25 / AWG3

7.3 Installation proposal (Figs. 16)

Ref. Description/recommendation

- 1 Install the compressor on a level floor suitable for taking the weight of the compressor.
- 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:

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

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

Qc = free air delivery of compressor in l/s

- 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).

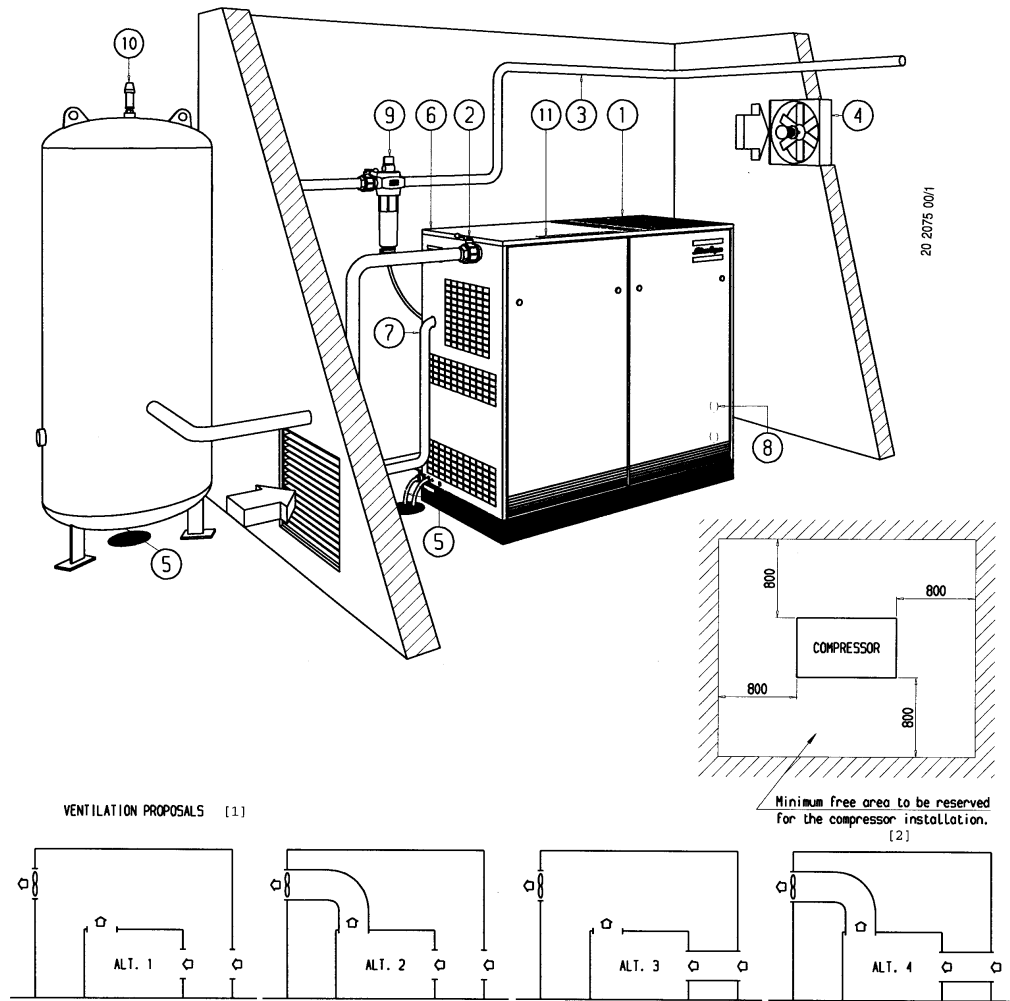


Fig. 16a. Installation proposal

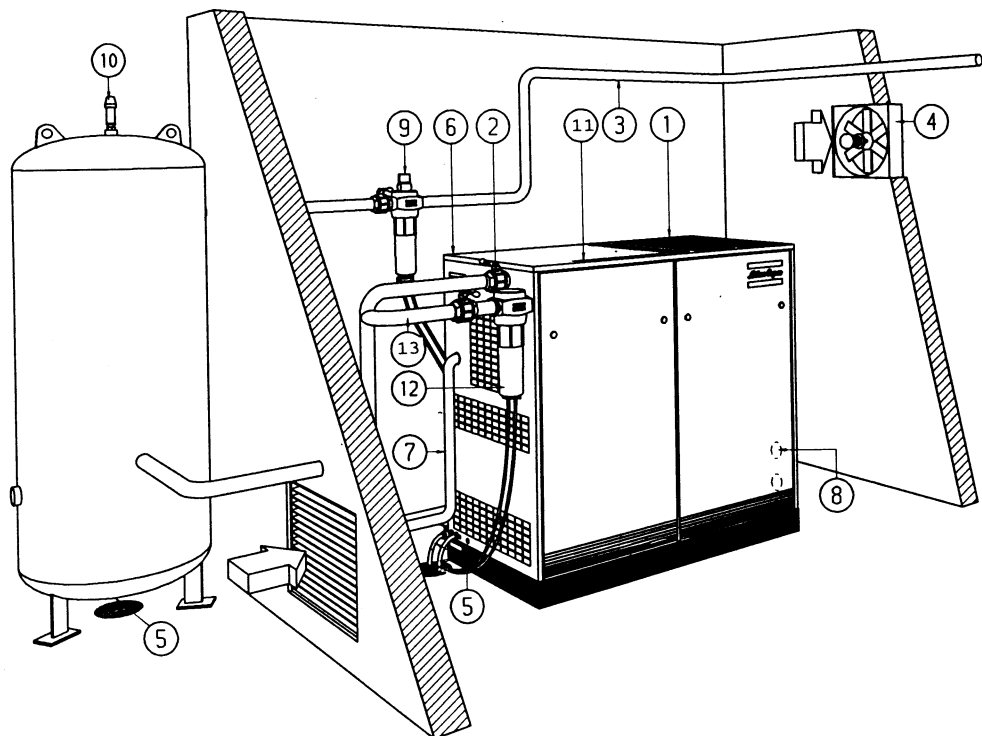


Fig. 16b. Installation proposal (compressor with optional by-pass system)

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 m^3/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.

- 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 to separate the major part of oil from condensate to ensure that the condensate meets the requirements of the environmental codes.
- 6 Position of compressor control module.
- 7 Position of mains cables entry. See section 7.2 for the recommended electric cables. See section 7.4 for connecting the power supply. Provide an isolating switch near the compressor.
- 8 Provision for energy recovery system.
- 9 High-efficiency filter, type PD (optional). Filter traps solid particles down to 0.01 micron with max. oil carry-over of $0.01 \text{ mg}/m^3$. A PD filter must be installed downstream of a DD filter (optional).

If oil vapour and odours are undesirable, a filter of the QD type (optional) should be installed downstream of the PD filter.

- 10 Position of safety valve.
- 11 Position of small grating (is not to be ducted away due to heat dissipation below 1 kW).
- 12 Position of moisture trap in case the optional by-pass system is installed.
- 13 Position of optional by-pass pipe.
- 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:

$$V = \frac{0.25 \times Q_c \times P_1 \times T_o}{f_{max} \times \Delta P \times T_1}$$

- V = volume of air net in l
- Q_c = free air delivery of compressor in l/s
- P_1 = compressor air inlet pressure in bar absolute
- f_{max} = cycle frequency = 1 cycle/30 s
- ΔP = $P_{unload} - P_{load}$ in bar
- T_1 = compressor air inlet temperature in K
- T_o = air receiver temperature in K

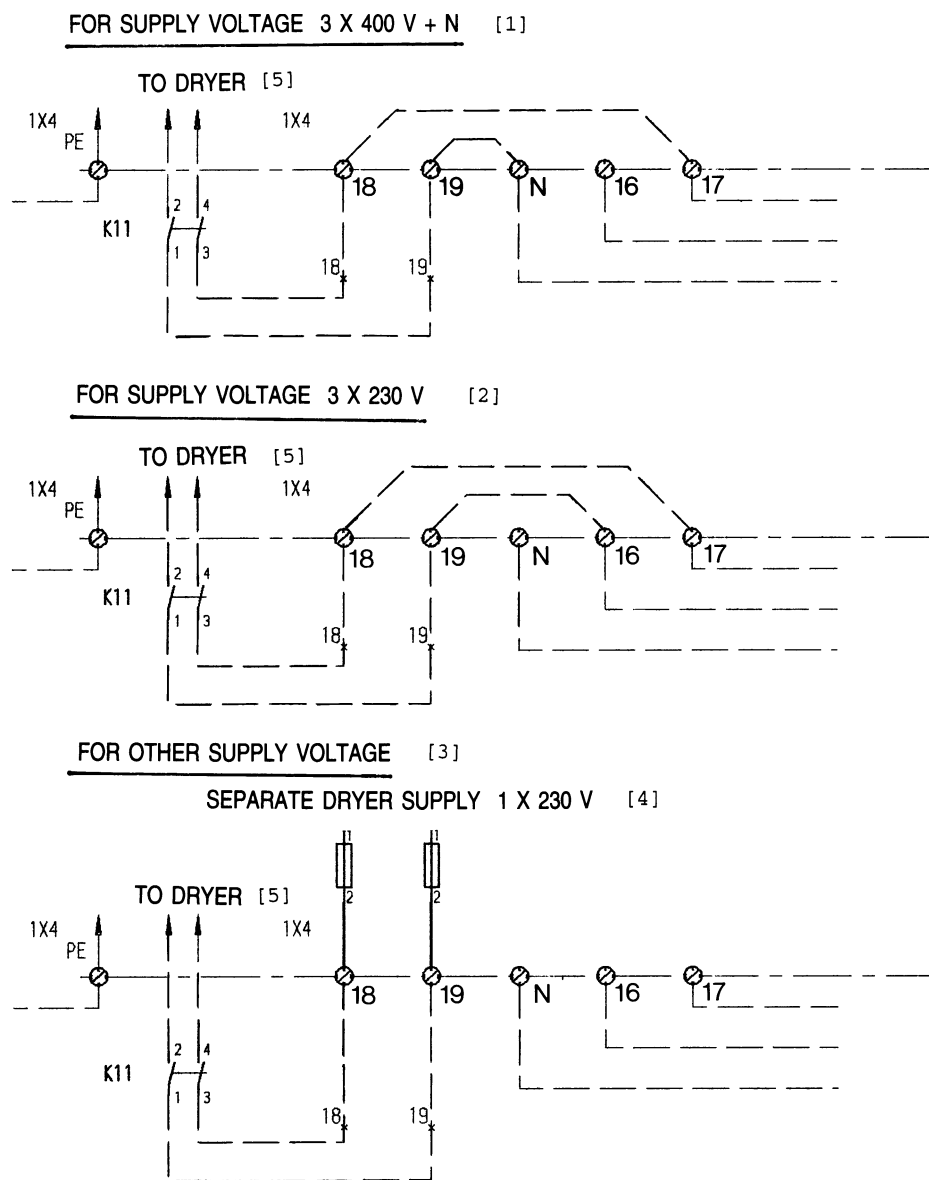
7.4 Electrical connections

General

1. Check the fuses and the setting of the overload relay. See section 6.3.
2. Connect the power supply to terminals (L1, L2 and L3). Connect the earth conductor to connector (PE) and the neutral conductor (if provided) to connector (N). Consult section 7.2.

On GA Full-feature (Fig. 17):

1. For compressor supply voltages of 3 x 400 V plus neutral or 3 x 230 V, the wiring is provided ex-factory. Check that the wiring is as shown.
2. For all other supply voltages, a separate single-phase 220-240 V voltage supply must be provided. Use wiring of minimum 1.5 mm². The system must be protected by fuses. A hole (3-Fig. 3) is provided for the voltage supply cable. Lay out the cable along the inside of the bodywork through plate (9-Fig. 2b). The bottom plate of the cubicle is provided with a hole to pass through the cable.

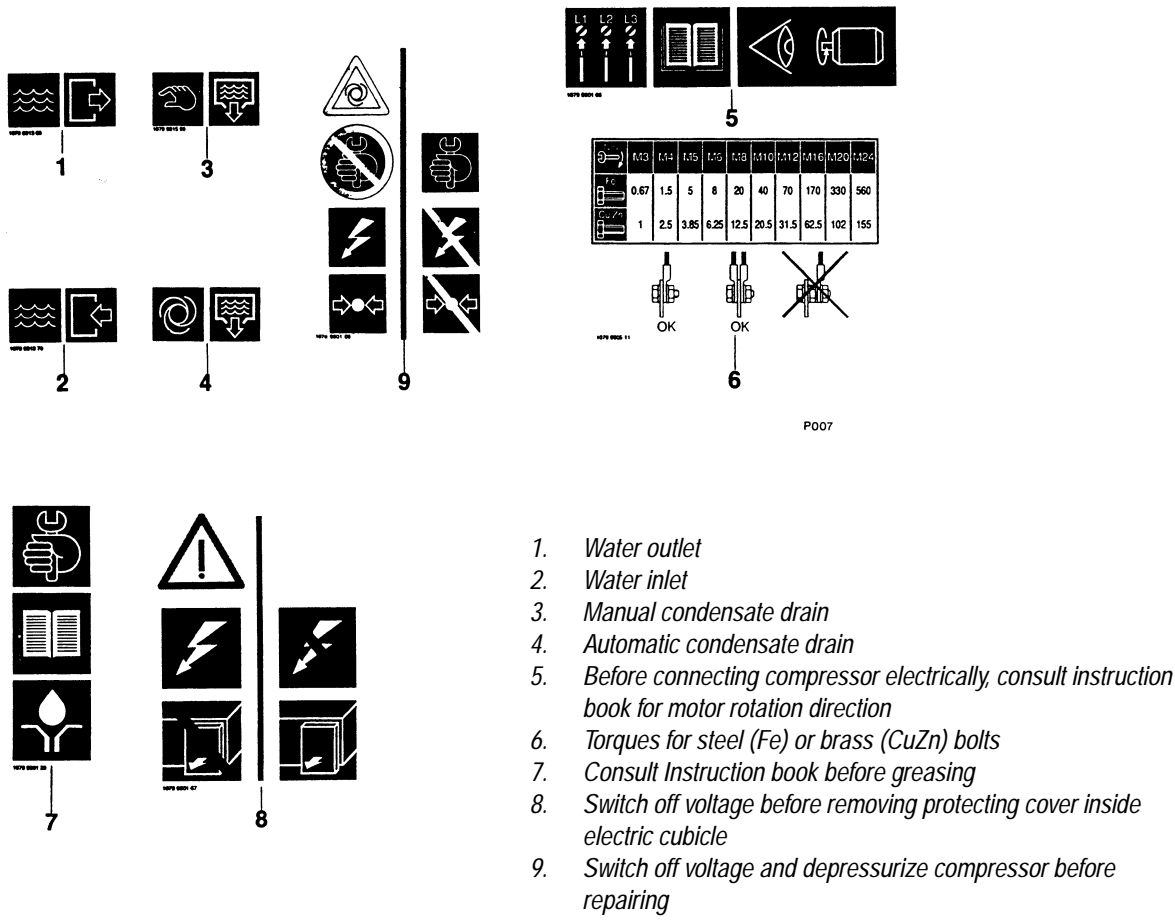


20 2030 32

Fig. 17. Dryer connections on GA Full-feature

7.5 Pictographs

Fig. 18 shows typical examples of pictographs used for GA compressors.



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. 18. Pictographs