

Atlas Copco Stationary Air Compressors

GA11 - GA15 - GA18 - GA22 - GA30C

With Elektronikon I and Elektronikon II regulator

Instruction book

Important

1. From following serial number onwards: AII-268 500
2. This book must be used together with the "User manual for Elektronikon I and II regulators", Printed Matter No. 2920 1461 0x.

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- This instruction book meets the requirements for instructions specified by the machinery directive 98/37/EC and is valid for CE as well as non-CE labelled machines.

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Atlas Copco

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

GA11 up to GA30C are stationary, single-stage, oil-injected screw compressors driven by an electric motor. The compressors are air-cooled.

1.1.1 Compressor variants

GA Pack

GA Pack are enclosed in a sound-insulated bodywork. The compressors are controlled by the Atlas Copco Elektronikon® I regulator (Fig. 1.1). The electronic control module is fitted to the door at the front side. An electric cabinet comprising the motor starter is located behind this panel.

GA Pack FF

GA Pack FF (Full-Feature) are also controlled by the Atlas Copco Elektronikon® I regulator (Fig. 1.1). They are additionally provided with an air dryer integrated in the sound-insulated bodywork. The dryer removes condensate from the compressed air by cooling the air to near freezing point and automatically draining the condensate. See section 1.5.

GA Workplace

GA Workplace are enclosed in a sound-insulated bodywork. The compressors are controlled by the Atlas Copco Elektronikon® II regulator (Fig. 1.2). The electronic control module is fitted to the door at the front side. An electric cabinet comprising the motor starter is located behind this panel. A condensate trap with automatic drain system is provided.

GA Workplace FF

GA Workplace FF (Full-Feature) are also controlled by the Atlas Copco Elektronikon® II regulator (Fig. 1.2). They are additionally provided with an air dryer integrated in the sound-insulated bodywork. The dryer removes condensate from the compressed air by cooling the air to near freezing point and automatically draining the condensate. See section 1.5.

1.1.2 Air flow (Figs. 1.7 and 1.8)

Air drawn through filter (1) and open inlet valve (6) into compressor element (5) is compressed. Compressed air and oil flow through air receiver/oil separator (15) and air cooler (10) to outlet valve (21).

Minimum pressure valve (12) prevents the receiver pressure from dropping below a minimum pressure.

1.1.3 Oil system (Figs. 1.7 and 1.8)

Air pressure forces the oil from air receiver (15) through oil cooler (11) and filter (18) to compressor element (5) and the lubrication points.

The system comprises a by-pass valve (20). When the oil is warm, the valve allows all oil to pass through the cooler.

1.1.4 Cooling system (Figs. 1.7 and 1.8)

The cooling system comprises air cooler (10) and oil cooler (11). The cooling air is generated by fan (9).



Fig. 1.1 Elektronikon I regulator

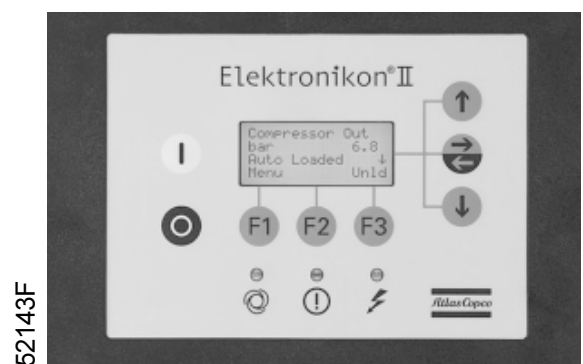


Fig. 1.2 Elektronikon II regulator



- ER II Elektronikon II regulator
- S3 Emergency stop button
- 1 Air outlet

Fig. 1.3 Front view GA30C Workplace Full-feature

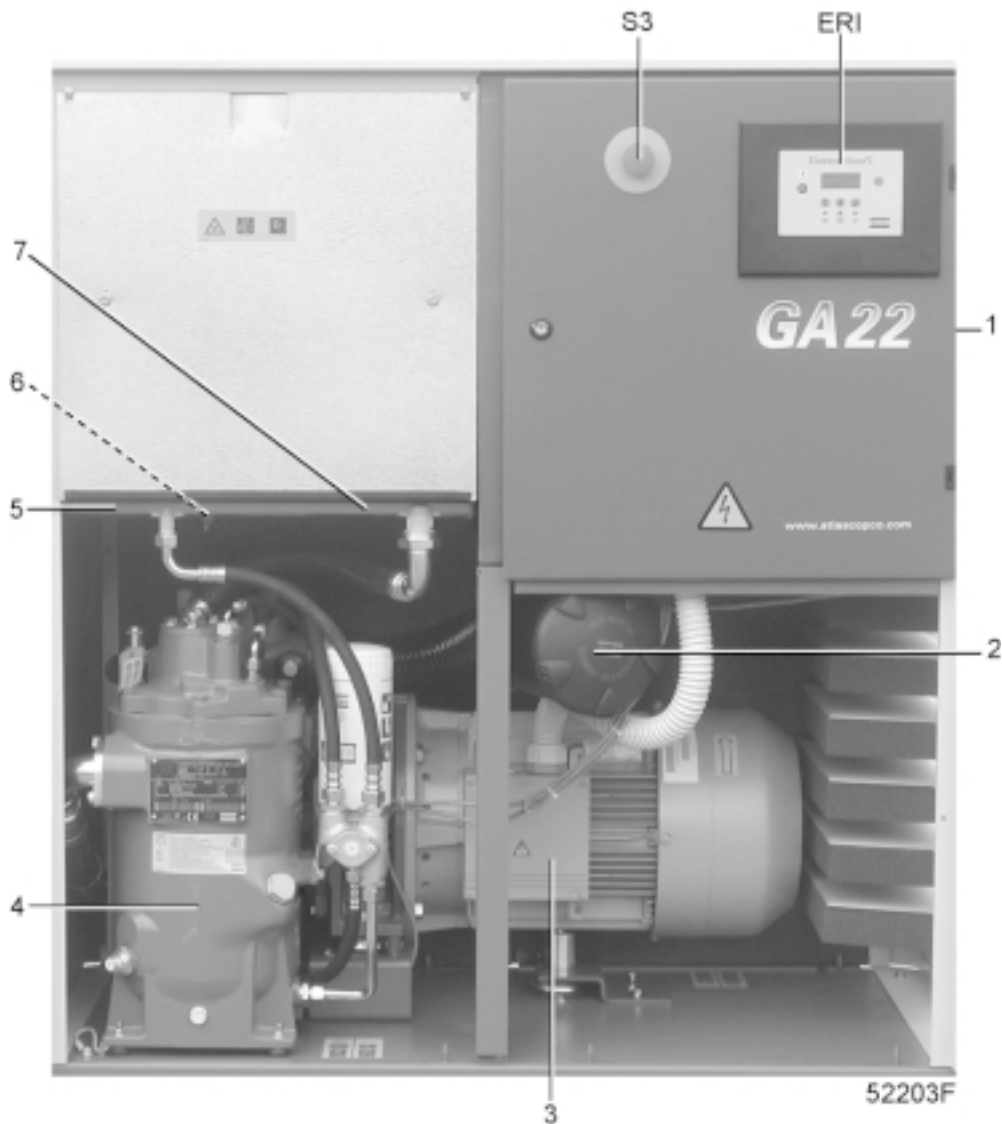
1.1.5 Condensate drain system (Fig. 1.6)

All variants except for GA Pack are provided with a condensate trap in the air outlet system. The trap is equipped with a valve for automatic condensate draining during operation (2) and a manually operated valve (1) for draining after stopping the compressor.

1.2 Unloading/loading system

1.2.1 Unloading (Fig. 1.8)

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:



ERI	Elektronikon I regulator	4	Air receiver/oil separator
1	Air outlet	5	Oil cooler
2	Air filter	6	Oil cooler vent plug
3	Drive motor	7	Air cooler

Fig. 1.4 GA22 Pack

1. The control pressure present in the chambers of loading plunger (22) and unloading valve (4) is vented to atmosphere via solenoid valve (Y1).
2. Loading plunger (22) moves upwards and causes inlet valve (6) to close the air inlet opening.
3. Unloading valve (4) is opened by receiver pressure. The pressure from air receiver (15) is released towards unloader (3).

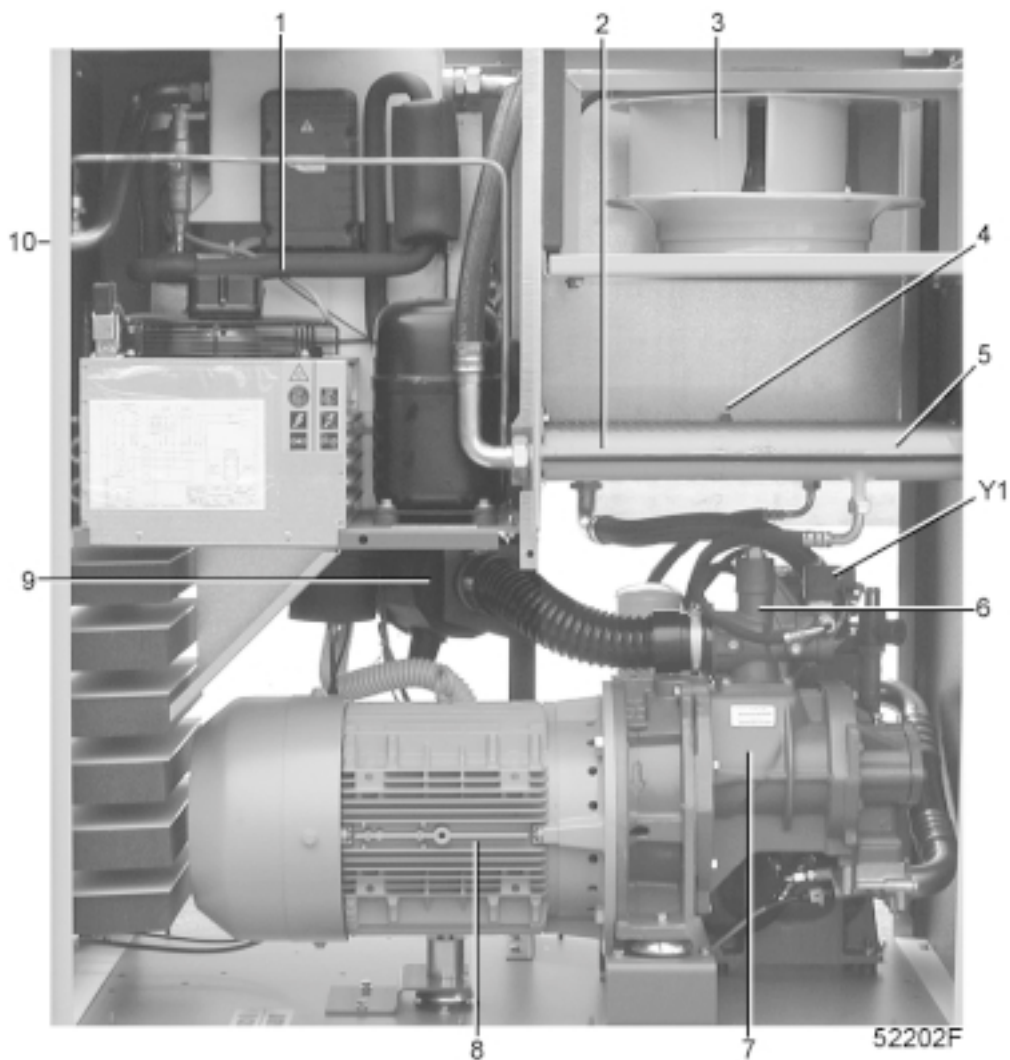
Air output is stopped (0 %), the compressor runs unloaded.

1.2.2 Loading (Fig. 1.7)

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:

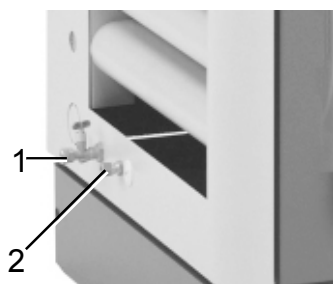
1. Control pressure is fed from air receiver (15) via solenoid valve (Y1) to loading plunger (22) and unloading valve (4).
2. Unloading valve (4) closes the air blow-off opening. Loading plunger (22) moves downwards and causes inlet valve (6) to open fully.

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



- | | | | | | |
|---|----------------------|---|--------------------|----|------------------------|
| 1 | Dryer | 5 | Oil cooler | 9 | Air filter |
| 2 | Air cooler | 6 | Unloader | 10 | Air outlet |
| 3 | Fan | 7 | Compressor element | Y1 | Loading solenoid valve |
| 4 | Oil cooler vent plug | 8 | Drive motor | | |

Fig. 1.5 GA22 Workplace Full-Feature



51100F

- | | |
|---|----------------------------|
| 1 | Condensate drain valve |
| 2 | Automatic condensate drain |

Fig. 1.6 Condensate outlets

GA11-30C

WORKPLACE FULL-FEATURE AT LOADING (8)

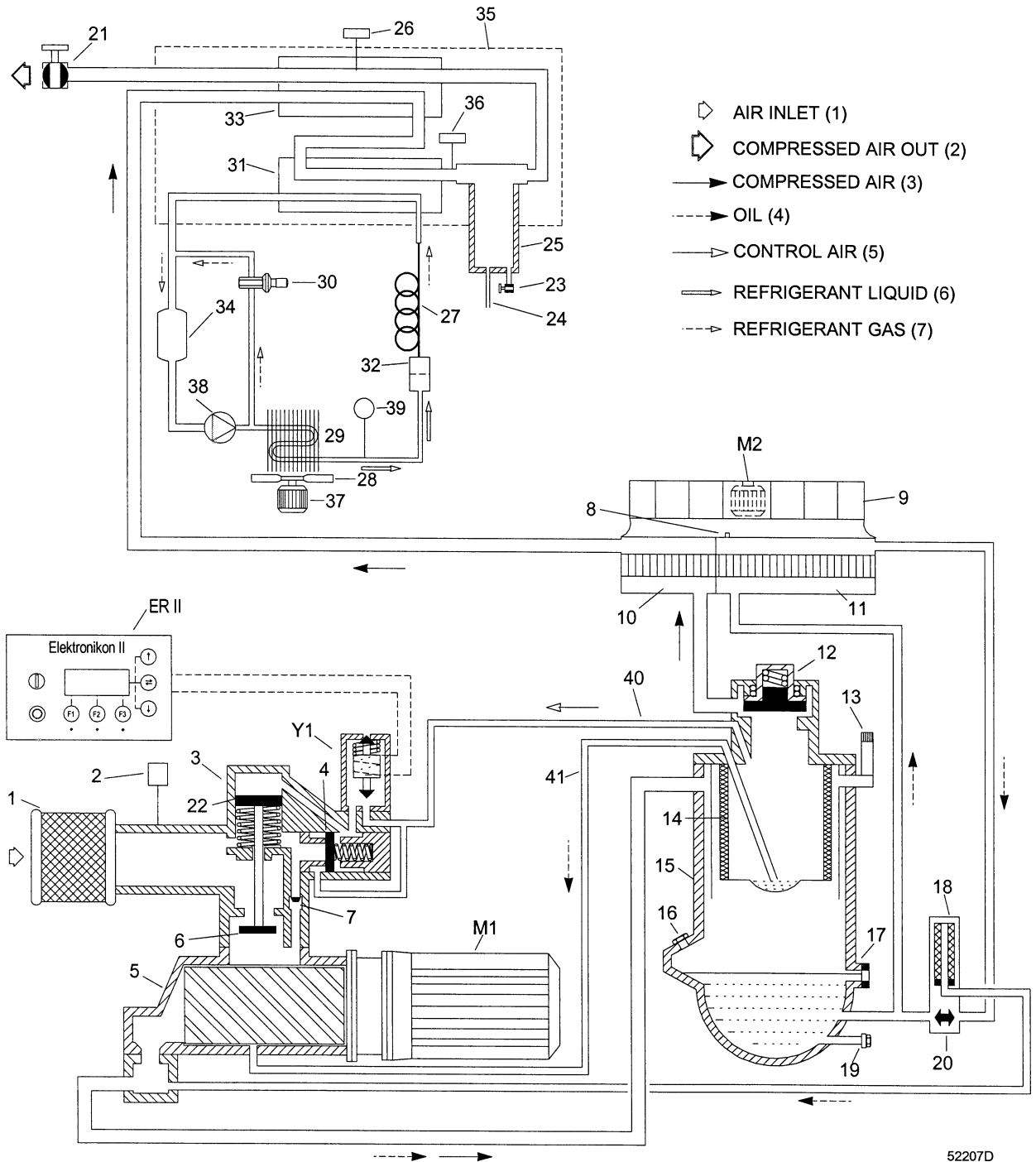


Fig. 1.7 GA Workplace Full-feature during loading

GA11-30C
PACK AT UNLOADING (2)

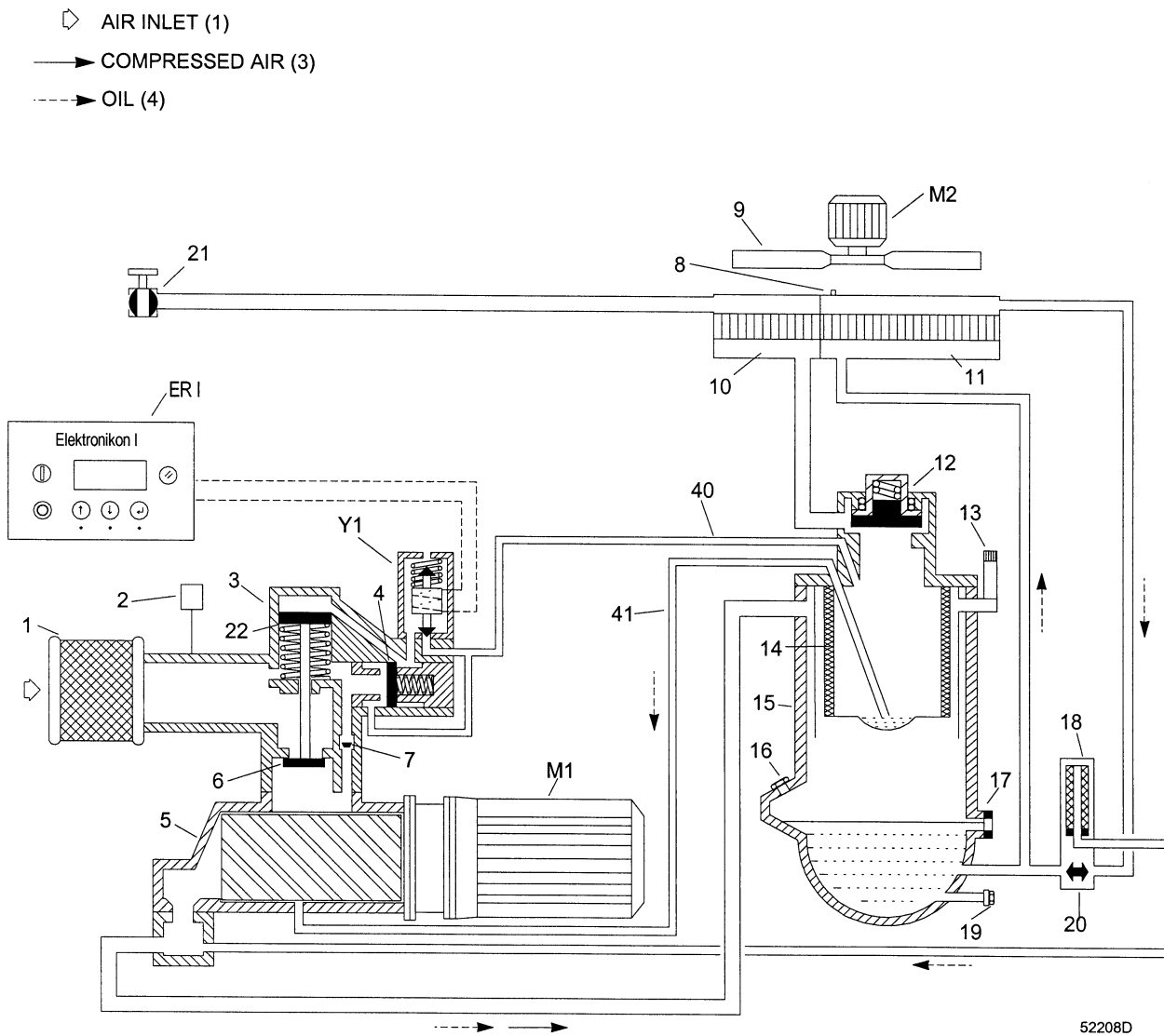


Fig. 1.8 GA Pack during unloading

- | | | | | | |
|-------|-------------------------------|----|-------------------------------|------------------------------|---|
| ER I | Elektronikon I regulator | 12 | Minimum pressure valve | On Full-feature also: | |
| ER II | Elektronikon II regulator | 13 | Safety valve | 26 | Pressure sensor |
| M1 | Drive motor | 14 | Oil separator element | 27 | Capillary tube |
| M2 | Motor, compressor cooling fan | 15 | Air receiver | 28 | Condenser cooling fan |
| Y1 | Loading solenoid valve | 16 | Oil filler plug | 29 | Refrigerant condenser |
| 1 | Air filter | 17 | Oil level indicator | 30 | Hot gas by-pass valve |
| 2 | Air filter service indicator | 18 | Oil filter | 31 | Air/refrigerant heat exchanger/evaporator |
| 3 | Unloader | 19 | Oil drain plug | 32 | Liquid refrigerant dryer/filter |
| 4 | Unloading valve | 20 | Oil cooler by-pass valve | 33 | Air/air heat exchanger |
| 5 | Compressor element | 21 | Air outlet valve | 34 | Accumulator |
| 6 | Inlet valve | 22 | Loading plunger | 35 | Insulating block |
| 7 | By-pass valve | 23 | Manual condensate drain valve | 36 | Temperature sensor |
| 8 | Vent plug, oil circuit | 24 | Automatic condensate outlet | 37 | Motor, condenser fan |
| 9 | Compressor cooling fan | 25 | Condensate trap | 38 | Refrigerant compressor |
| 10 | Air cooler | 40 | Flexible, control air | 39 | Fan control switch |
| 11 | Oil cooler | 41 | Flexible, oil scavenging | | |

Figs. 1.7 and 1.8 Air-oil and unloading-loading systems

1.3 Elektronikon II regulator

GA Workplace and Workplace FF are provided with the Elektronikon II regulator (Fig. 1.9).

1.3.1 Main functions

1.3.1.1 Automatic control of 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.

Warning A number of time-based automatic start/stop commands may be programmed (consult the User manual for Elektronikon I and II regulators). Take into account that a start command will be executed (if programmed and activated), even after manually stopping the compressor.

1.3.1.2 Protecting the compressor

Shut-down

If the compressor element outlet temperature exceeds the programmed shut-down level, the compressor will be stopped. This will be indicated on display (3). The compressor will also be stopped in case of overload of the drive motor and the fan motor.

Shut-down warning

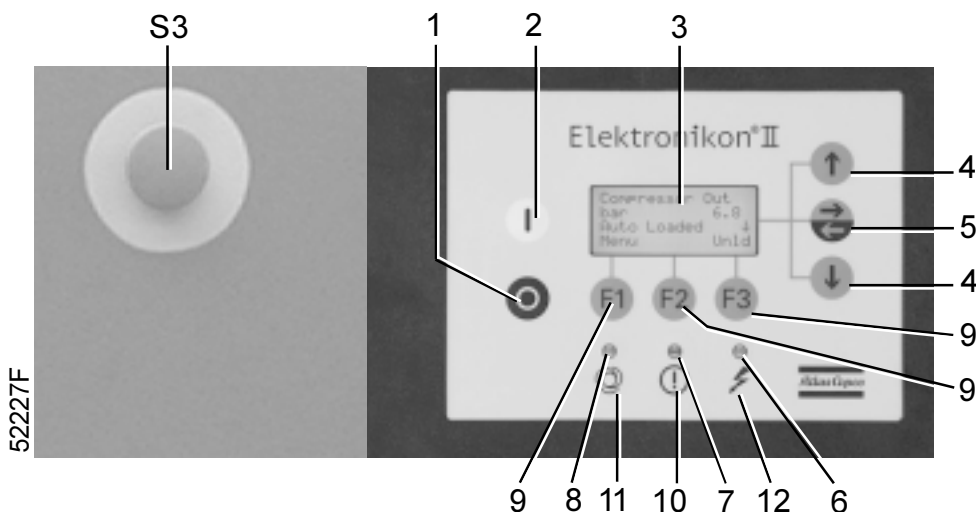
If the compressor element outlet temperature exceeds a programmed value below the shut-down level, this will also be indicated to warn the operator before the shut-down level is reached.

Service warning

A number of service operations are grouped in plans (called Service plans A, B and C). Each Service plan has a programmed time interval. If a time interval is exceeded, a message will appear on display (3) to warn the operator to carry out the service actions belonging to that plan.

Warning

On Full-feature compressors, a warning message also appears if the dewpoint temperature exceeds the warning level.



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

Fig. 1.9 Control panel, Elektronikon II

1.3.1.3 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.*

The power recovery time (the period within which the voltage must be restored to have an automatic restart) can be set between 10 and 600 seconds or to Infinite. If the power recovery time is set to Infinite, the compressor will always restart after a voltage failure, no matter how long it takes to restore the voltage. A restart delay can also be programmed, allowing e.g. two compressors to be restarted one after the other.

1.3.2 Control panel (Fig. 1.9)

Ref.	Designation	Function
1	Stop button	Push button to stop the compressor. LED (8) goes out. The compressor will stop after running in unloaded condition for about 30 seconds.

Ref.	Designation	Function
2	Start button	Push button to start the compressor. LED (8) lights up indicating that the regulator is operative (in automatic operation). The LED goes out after unloading the compressor manually.
3	Display	Indicates messages concerning the compressor operating condition, a service need or a fault.
4	Scroll keys	Keys to scroll through the display.
5	Tabulator key	Key to select the parameter indicated by a horizontal arrow. Only the parameters followed by an arrow pointing to the right are accessible for modifying.
6	Voltage on LED	Indicates that the voltage is switched on.
7	General alarm LED	Is alight if a warning, service warning or shut-down warning condition exists or if a sensor is out of order.
7	General alarm LED	Blinks in case of shut-down, if a sensor with shut-down function is out of order or after an emergency stop.

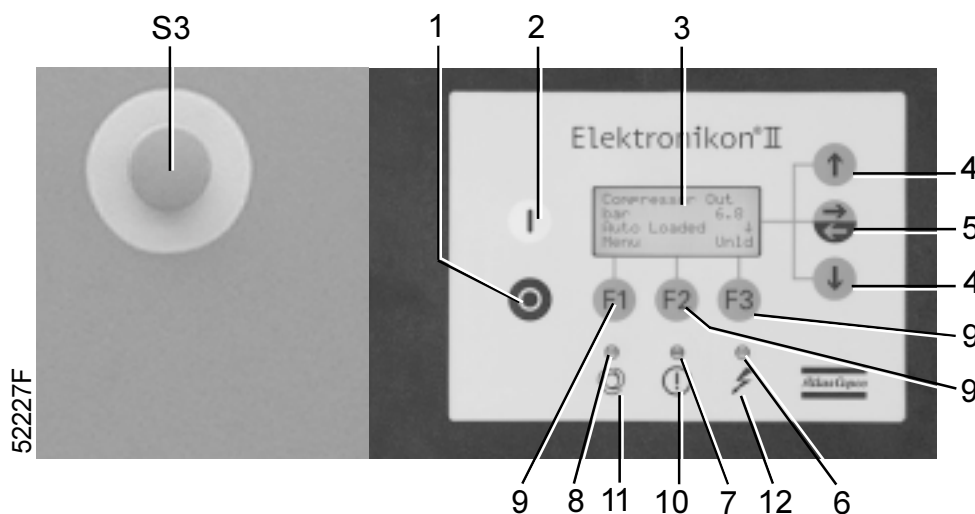
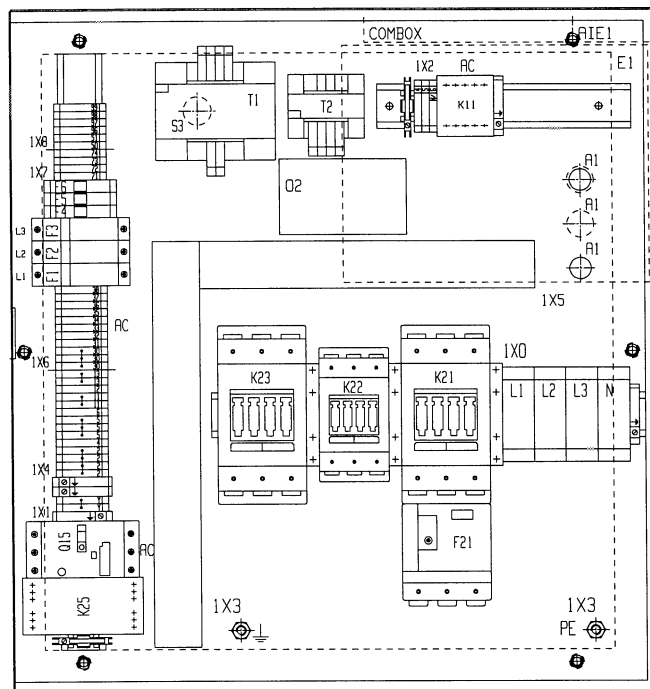


Fig. 1.9 Control panel, Workplace / Workplace FF

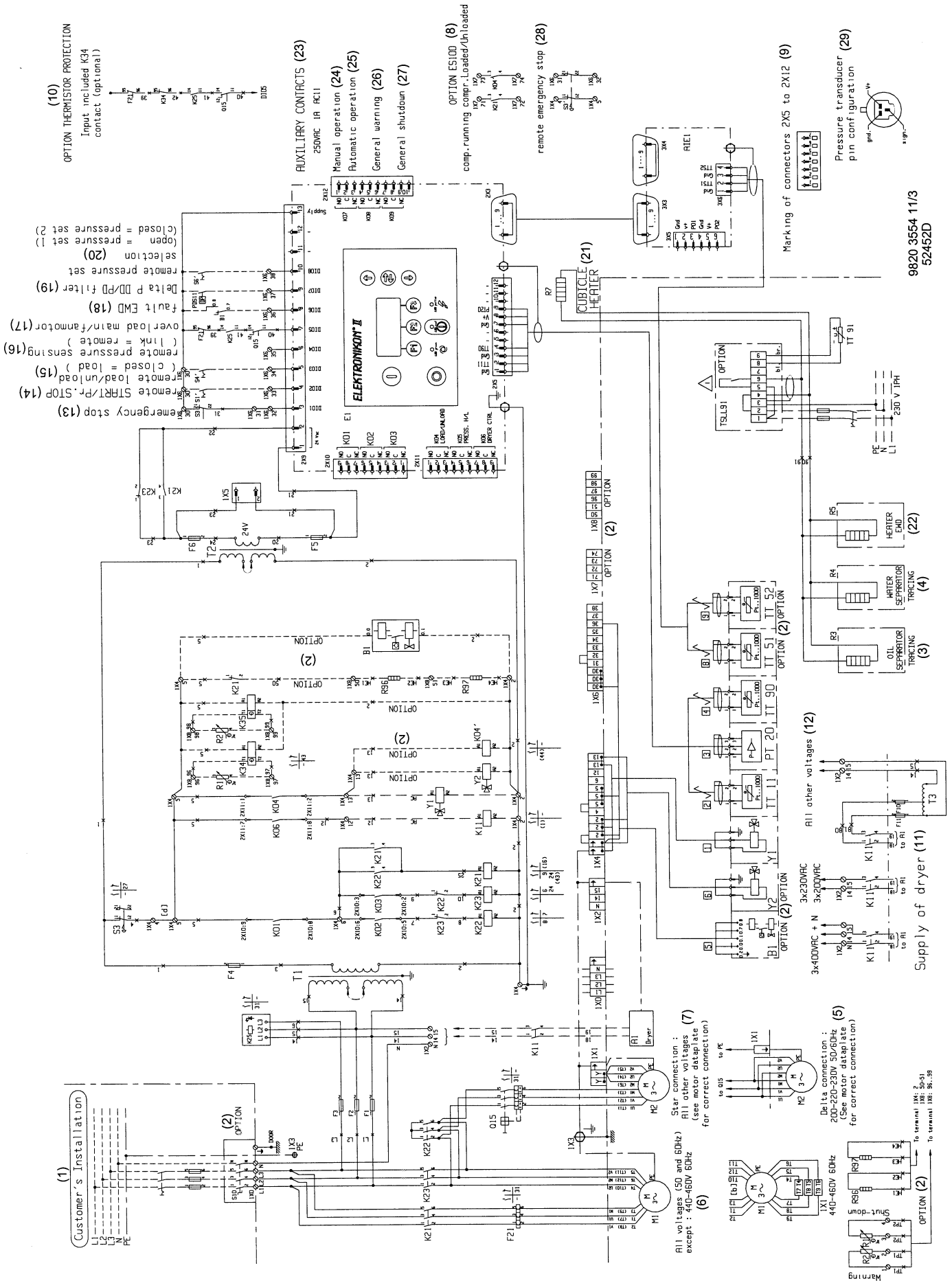
Ref.	Designation	Function
8	Automatic operation LED	Indicates that the regulator is automatically controlling the compressor: the compressor is loaded, unloaded, stopped and restarted depending on the air consumption and the limitations programmed in the regulator.
9	Function keys	Keys to control and program the compressor. See below.
10	Pictograph	Alarm
11	Pictograph	Automatic operation
12	Pictograph	Voltage on
S3	Emergency stop button	Push button to stop the compressor immediately in case of emergency. After remedying the trouble, unlock the button by pulling it out.



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See Fig. 1.11 for denomination of components

Fig. 1.10 Electric cabinet, GA Workplace / Workplace FF (typical example)



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SENSORS/SOLENOID VALVES/ ELECTRONIC DRAIN	Q15	Circuit breaker	DRYER	
PT20	T1/T2	Transformers	A1	Dryer (Full-Feature)
TT11	T3	Transformer, dryer	OPTIONAL EQUIPMENT	
	1X0/1X8	Terminal strips	AIE1	Expansion module, analog input
TT90			B1	Electronic water drain (EWD)
Y1			PDS11	DP switch for DD filter
			R1/K34	Drive motor thermistor protection, shut-down
MOTORS			R2/K35	Drive motor thermistor protection, warning
M1			R3/R4	Heaters, freeze protection
M2			R5	Heater, electronic water drain
			R7	Heater, cubicle
			R96/97	Anti-condensation heaters
ELECTRIC CABINET			S10	Main power isolating switch
F1/F11			TSSL91	Thermostat, cubicle freeze protection
F21			TT51/52	Temperature sensors, energy recovery
K11			Y2	Solenoid valve, modulating control
K21				
K22				
K23				
K25				

Fig. 1.11 Electrical diagram, GA Workplace / Workplace FF - 50 Hz with star-delta starter (typical example)

1.3.3 Display

Normally, the display shows the operation status of the compressor, the air outlet pressure and the abbreviations of function keys F1, F2 and F3.

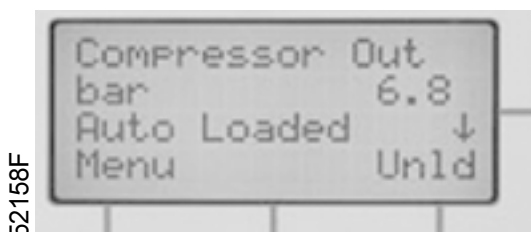


Fig. 1.12 Example of the main display

1.3.4 Calling up other menus

Starting from the Main display (Fig. 1.12):

- Use the ↓ key (4-Fig. 1.9) for a quick look at the actual compressor status
- Press the key Menu (F1), the option "Status data" will be followed by a horizontal arrow:
 - either press the tabulator key (5-Fig. 1.9) to select this menu
 - or use the ↓ key to scroll until the desired submenu is followed by a horizontal arrow and then press the tabulator key (5) to select this menu.

For detailed instructions, consult the User manual for Elektronikon I and II regulators.

1.4 Elektronikon I regulator

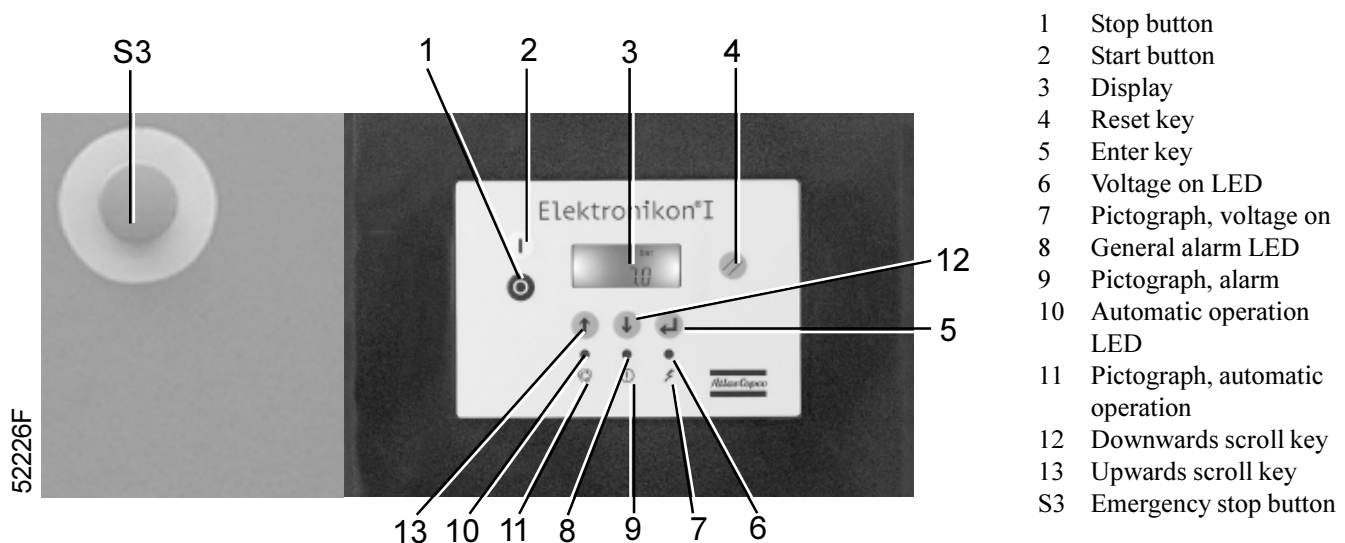


Fig. 1.13 Control panel, Elektronikon I

GA Pack and Pack FF are provided with the Elektronikon I regulator (Fig. 1.13).

1.4.1 Main functions

1.4.1.1 Automatic control of 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.

1.4.1.2 Protecting the compressor

Shut-down

If the compressor element outlet temperature exceeds the programmed shut-down level, the compressor will be stopped. This will be indicated on display (3). The compressor will also be stopped in case of overload of the drive motor (M1) and the fan motor (M2).

Shut-down warning

If the compressor element outlet temperature or dewpoint temperature (Full-Feature) 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.

Service warning

If the service timer exceeds a programmed value, this will be indicated to warn the operator to carry out some service actions.

1.4.1.3 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.*

1.4.2 Control panel (Fig. 1.13)

Ref.	Designation	Function
1	Stop button	Push button to stop the compressor. LED (10) goes out. The compressor will stop after running in unloaded condition for about 30 seconds.
2	Start button	Push button to start the compressor. LED (10) lights up indicating that the regulator is operative (in automatic operation).

Ref.	Designation	Function
3	Display	Indicates the compressor operating condition, actually measured values and programmed parameters.
4	Reset key	Key to reset the service timer, a shut-down condition, etc.
5	Enter key	Key to select or validate a parameter, to open a sub-display or to return to a previous display.
6	Voltage on LED	Indicates that the voltage is switched on.
7	Pictograph	Voltage on
8	General alarm LED	Is alight if a warning condition exists.
8	General alarm LED	Blinks in case of a shut-down or emergency stop condition.
9	Pictograph	Alarm
10	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.
11	Pictograph	Automatic operation
12	Downwards scroll key	Key to scroll downwards through the screens or to decrease a setting.
13	Upwards scroll key	Key to scroll upwards through the screens or to increase a setting.
S3	Emergency stop button	Push button to stop the compressor immediately in case of emergency. After remedying the trouble, unlock the button by pulling it out and press reset key 4.

Fig. 1.13 Control panel, Elektronikon I

1.4.3 Display

Normally, the display shows the operation status of the compressor by means of pictographs and the air outlet pressure:



bar
6.6

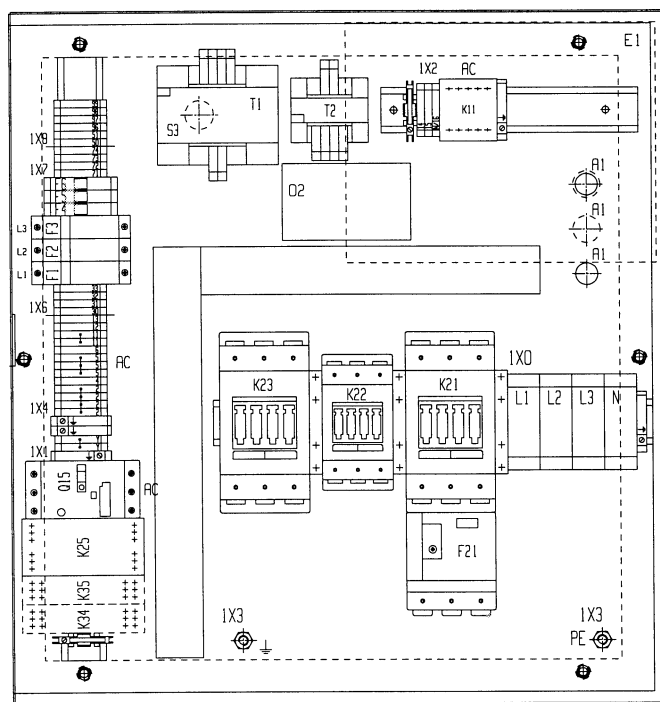
Fig. 1.14 Main screen, typical example

1.4.4 Scrolling through all screens

It is possible to scroll downwards and upwards through a number of screens by means of the upwards/downwards arrow keys (12 and 13-Fig. 1.13) on the control panel.

1.4.5 Pictographs used on the screen

Pictograph	Explanation
	Compressor status LOAD (during loaded running, the horizontal arrow blinks)
	Compressor status UNLOAD
	Running hours
	Element outlet temperature
	Dewpoint temperature
	Motor or fan motor overload



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See Fig. 1.16 for denomination of components

Fig. 1.15 Electric cabinet, GA Pack / Pack FF (typical example)

SENSORS/SOLENOID VALVES/ELECTRONIC DRAIN/ HEATER

PT20	Pressure sensor, air outlet
TT11	Temperature sensor, compressor element outlet
TT90	Temperature sensor, dewpoint (Full-Feature)
Y1	Loading solenoid valve

MOTORS

M1	Drive motor
M2	Fan motor, compressor coolers (air-cooled compressors)

ELECTRIC CABINET

F1/F11	Fuses
F21	Overload relay, drive motor
K11	Auxiliary contactor for dryer (Full-Feature)
K21	Line contactor
K22	Star contactor
K23	Delta contactor
K25	Phase sequence protection
Q15	Circuit breaker
T1/T2	Transformers
T3	Transformer, dryer
IX0/8	Terminal strips

CONTROL MODULE (E1)

I	Start button
K01	Blocking relay
K02	Auxiliary relay, star contactor
K03	Auxiliary relay, delta contactor
K04	Auxiliary relay, load/unload
K05	Auxiliary relay, dryer
K06	Auxiliary relay, shut-down
0	Stop button
S3	Emergency stop button

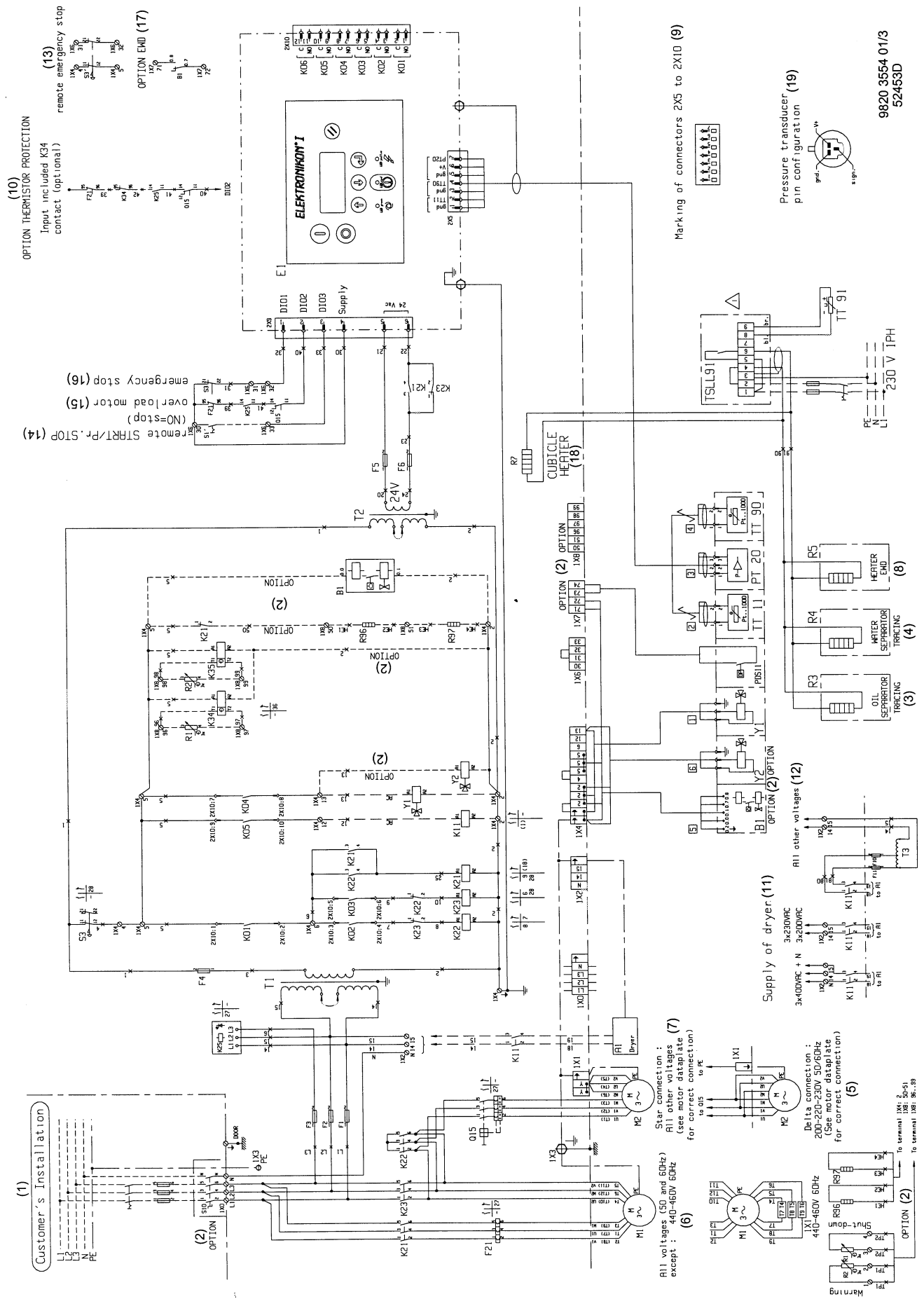
DRYER

A1	Dryer (Full-Feature)
----	----------------------

OPTIONAL EQUIPMENT

B1	Electronic water drain (EWD)
PDS11	DP switch for DD filter
R1/K34	Drive motor thermistor protection, shut-down
R2/K35	Drive motor thermistor protection, warning
R3/R4	Heaters, freeze protection
R5	Heater, electronic water drain
R7	Heater, cubicle
R96/97	Anti-condensation heaters
S10	Main power isolating switch
TSLL91	Thermostat, cubicle freeze protection
Y2	Solenoid valve, modulating control

Fig. 1.16 Electrical diagram, GA Pack/Pack FF-50 Hz with star-delta starter (typical example)



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1.5 Air dryer (Fig. 1.7)

GA Workplace FF and GA Pack FF are provided with a dryer which removes condensate from compressed air.

1.5.1 Compressed air circuit

Compressed air enters heat exchanger (33) and is cooled by the outgoing, dried air. Moisture in the incoming air starts to condense. The air then flows through heat exchanger/evaporator (31) 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 (25) where all condensate is separated from the air. The condensate is automatically drained. The cold, dried air flows through heat exchanger (33), where it is warmed up by the incoming air.

1.5.2 Refrigerant circuit

Compressor (38) delivers high-pressure refrigerant gas which flows through condenser (29) where most of the refrigerant condenses. The liquid flows through liquid refrigerant dryer/filter (32) to capillary tube (27). The refrigerant leaves the capillary tube at evaporating pressure. The refrigerant enters evaporator (31) 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.

By-pass valve (30) regulates the refrigerant flow. Fan (37) is switched on or off by switch (39) depending on the loading degree of the refrigerant circuit.

The compressor motor has a built-in thermic protection. In case the compressor motor stops after tripping of the thermic protection, it may take up to 2 hours to cool down the motor windings.

2 Installation

2.1 Dimension drawing (Fig. 2.1)

See opposite page.

2.2 Installation proposal (Fig. 2.2)

See page 20.

Ref.	Description/recommendation
1	Install the compressor on a solid, level floor suitable for taking the weight.
2	Position of the compressed air outlet valve.
3	The pressure drop over the delivery pipe can be calculated as follows: $dp = (L \times 450 \times Qc^{1.85}) / (d^5 \times P)$ <p>dp = pressure drop (recommended maximum = 0.1 bar) L = length of delivery pipe in m d = inner diameter of the delivery pipe in mm P = absolute pressure at the compressor outlet in bar(a) Qc = free air delivery of the compressor in l/s</p>
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 exceeding this value, a fan is needed at the outlet of the ducts. Consult Atlas Copco.

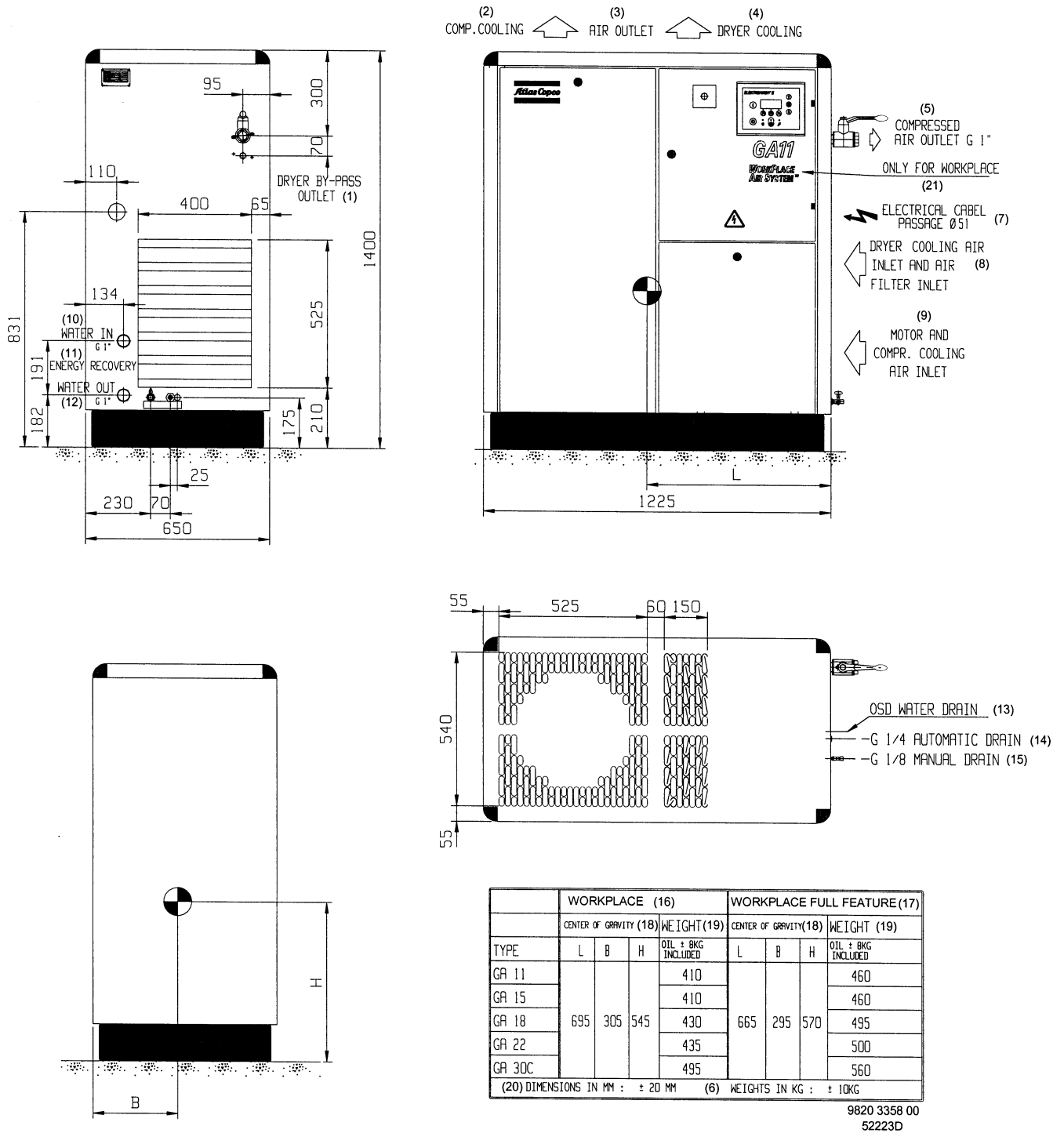


Fig. 2.1 Dimension drawing

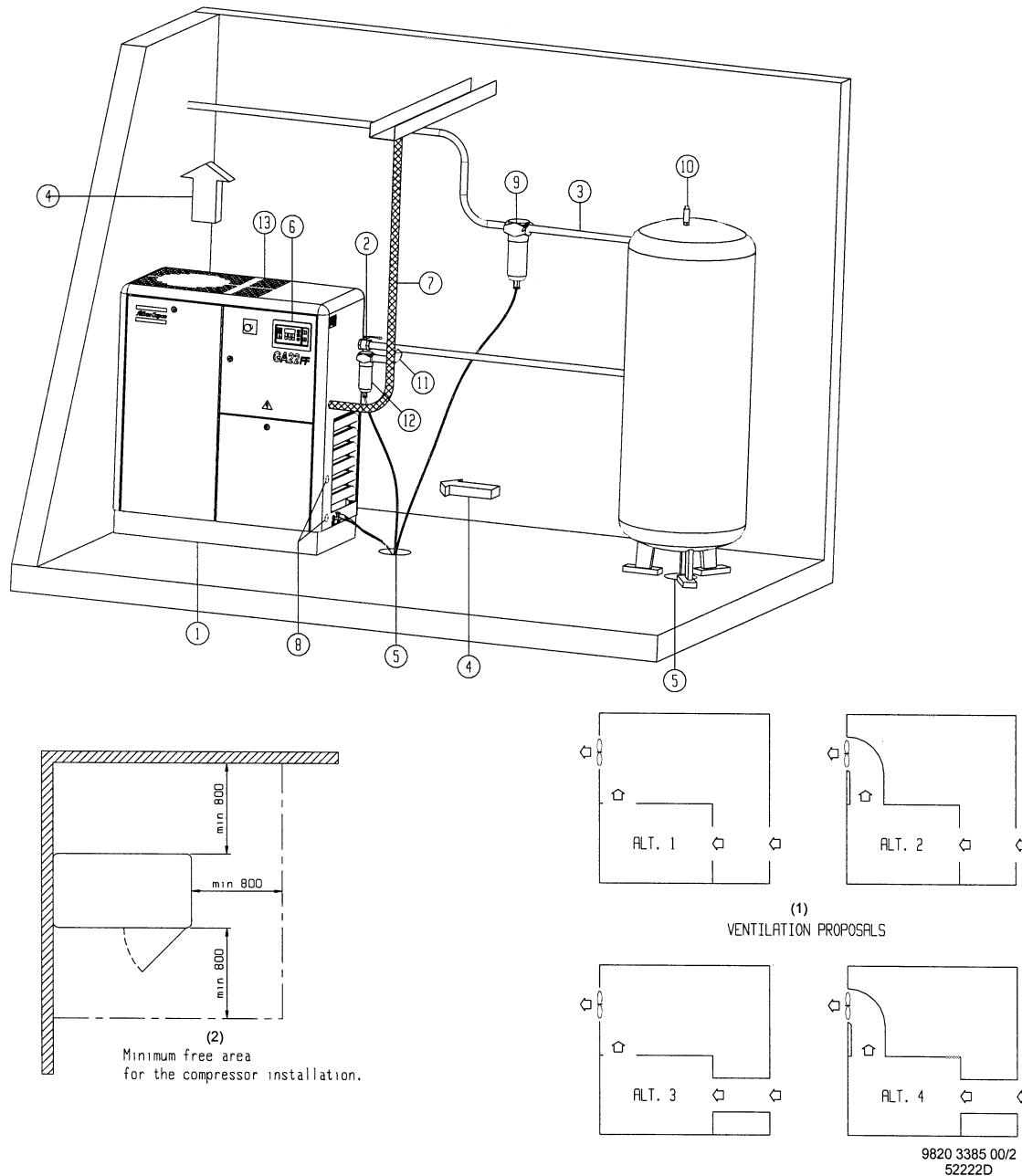


Fig. 2.2 Installation proposal

Ref. Description/recommendation

- For alternatives 1 and 3, the required ventilation capacity to limit the compressor room temperature can be calculated as follows:

$$Q_v = 1.06 N / dT \text{ for GA Pack/Workplace}$$

$$Q_v = (1.06 N + 1.3) / dT \text{ for GA Pack FF/Workplace FF}$$

Ref. Description/recommendation

- Q_v = required ventilation capacity in m^3/s
- N = nominal motor power of compressor in kW
- dT = 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 over the air ducts.

Ref. Description/recommendation

- 5 The drain pipes to the drain collector must not dip into the water of the drain collector. Atlas Copco has oil/water separators (type OSD) to separate the major part of the oil from the condensate to ensure that the condensate meets the requirements of the environmental codes.
- 6 Position of the control panel.
- 7 Position of the mains cable.
- 8 Provision for the inlet and outlet of the optional energy recovery system.
- 9 Filter, type DD, for general purpose filtration (optional). The filter traps solid particles down to 1 micron with a max. oil carry-over of 0.5 mg/m³. A high-efficiency filter, type PD (optional), may be installed downstream of a DD filter. This filter traps solid particles down to 0.01 micron with a max. oil carry-over of 0.01 mg/m³. If oil vapour and odours are undesirable, a filter of the QD type (optional) should be installed downstream of the PD filter.
It is recommended to provide by-pass pipes and valves over the filters to isolate the filters during maintenance without disturbing the compressor.
- 10 The air receiver (optional) should be installed in a frost-free room on a solid, level floor.
- For normal air consumption, the volume of the air net (receiver and piping) can be calculated as follows:
- $$V = (0.25 \times Q_c \times P_1 \times T_o) / (f_{max} \times dP \times T_1)$$
- V = volume of air net in l
 Q_c = free air delivery of compressor in l/s
 P₁ = compressor air inlet pressure in bar absolute
 f_{max} = cycle frequency = 1 cycle/30 s
 dP = P_{unload} - P_{load} in bar
 T₁ = compressor air inlet temperature in K
 T_o = air receiver temperature in K
- 11 Position of the by-pass system (optional) to by-pass the dryer during service operations. Consult Atlas Copco.
- 12 Position of the water separator, which removes most of the condensate in the compressed air when by-passing the dryer.
-

2.3 Electrical connections

General

- Provide an isolating switch.
- Check that the motor cables and wires inside the electric cabinet are clamped tight to their terminals.
- Check the fuses and the setting of the overload relay. See section 7.
- Connect the power supply cables to terminals (L1, L2 and L3-Figs. 1.10/1.15)
- Connect the earth conductor to earth bolt (PE-Figs. 1.10/1.15) and the neutral conductor to connector (N).
- Later production compressors are provided with a phase sequence relay (K25-Fig. 1.10/1.15). If it is an adjustable version, check that "Un" is adjusted according to the voltage supply and that "T" is adjusted to 3 seconds.

On Pack FF/Workplace FF (except for 440/460 V - 60 Hz) (Fig. 1.11):

The voltage supply to the dryer must be 230 V single-phase. The voltage to the dryer is supplied over the contacts of relay (K11), which close when the compressor is started. For compressor supply voltages different from 3 x 400 V plus neutral, 3 x 200 V or 3 x 230V, the power to the dryer is supplied by a transformer.

On Pack FF/Workplace FF (440/460 V - 60 Hz) (Fig. 1.11):

These compressors have a 3-phase dryer. The voltage to the dryer is supplied over the contacts of relay (K11), which close when the compressor is started.

2.4 Electric cable size

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 degrees celsius, cables in free air or in raceway, copper conductors.

For star-delta starter (IEC)

Supply voltage (V)	Frequency (Hz)	GA11 mm ²	GA15 mm ²	GA18 mm ²	GA22 mm ²	GA30C mm ²
200-220	50/60	16	25	35	50	70
230	50/60	16	25	35	50	70
380	50/60	10	10	16	25	35
400	50	6	10	16	25	35
500	50	6	10	10	16	25

For direct-on-line starter (CSA/UL)

Supply voltage (V)	Frequency (Hz)	GA11 AWG	GA11 mm ²	GA15 AWG	GA15 mm ²	GA18 AWG	GA18 mm ²	GA22 AWG	GA22 mm ²	GA30C AWG	GA30C mm ²
200	60	4	16	3	25	1	35	2/0	50	--	--
220-230	60	4	16	3	25	2	35	1	35	--	--
440-460	60	8	8	6	10	6	10	4	16	3	25
575	60	10	6	8	8	8	8	6	10	4	16

2.5 Pictographs (Fig. 2.3)

Read the warnings attentively and act accordingly.

Note

For compressors equipped with an Elektronikon I regulator, also consult section 1.4.5.

- 1 Warning: stop compressor before repairing fans
- 2 Manual condensate drain
- 3 Warning: voltage
- 4 Automatic condensate drain
- 5 Warning: before connecting compressor electrically, consult Instruction book for motor rotation direction
- 6 Warning: switch off voltage and depressurize compressor before repairing
- 7 Torques for steel (Fe) or brass (CuZn) bolts
- 8 Lightly oil gasket of oil filter, screw it on and tighten by hand (approx. half a turn)
- 9 Consult Instruction book before greasing
- 10 Warning: switch off voltage before removing protecting cover inside electric cubicle
- 11 Consult Instruction book before carrying out maintenance
- 12 Warning: potential risk of sudden releasing of spring underneath cover of unloader during disassembling, have possible repairs carried out by Atlas Copco

Fig. 2.3 Pictographs (typical examples)

3 Operating instructions

3.1 Before initial start-up

3.1.1 Safety

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

3.1.2 User manual

Read the related "User manual for Elektronikon I and II regulators" as mentioned on the first page of this book 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 degrees Celsius, precautions must be taken. In this case, and also if operating at high altitude, consult Atlas Copco.

3.2 External compressor status indication/remote control (Elektronikon II)

GA Workplace and Workplace FF are provided with the Elektronikon II regulator (Fig. 1.9). These regulators allow:

- external indication of the compressor status
- remote control of the compressor

Attention

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.

3.2.1 External compressor status indication

Auxiliary contacts (K07, K08 and K09) are provided at the back of the electronic module (Fig. 1.9) for external indication of:

- manual load/unload or automatic operation (K07)
- warning condition (K08)
- shut-down condition (K09)

Maximum load for these contacts: 1 A / 250 V AC.

3.2.2 Remote control

Consult the User manual for Elektronikon I and II regulators (Part 2, section 14.1) if it is desired to switch to another control mode.

Following control modes can be selected:

3.2.2.1 Local control

The compressor will react to commands entered by the buttons on the control panel. Compressor start/stop commands via function "Clock function" are active, if programmed.

3.2.2.2 Remote control

The compressor will react to commands from external switches. Emergency stop button (S3-Fig. 1.9) remains active. Compressor start/stop commands via function "Clock function" are still possible.

For remote starting and stopping: Connect a start/programmed stop button between terminals 30 and 33 of terminal strip (1X6-Fig. 1.10).

Bridge terminals 30 and 34: 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 30 and 34 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 terminals 30 and 35 and connect a load/unload switch between terminals 30 and 34. This results in loading and unloading of the compressor at the closing and opening pressures of the external pressure switch respectively.

3.2.2.3 LAN control

The compressor can be controlled via a LAN (local area network). Consult Atlas Copco.

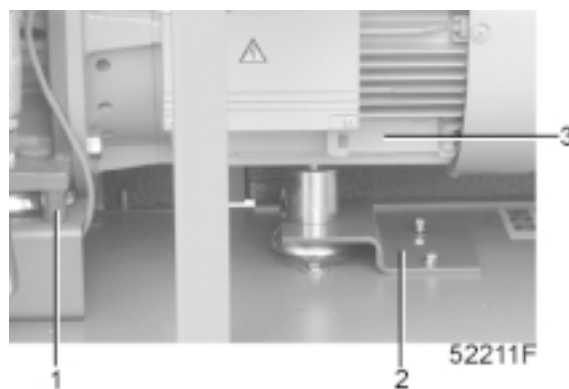
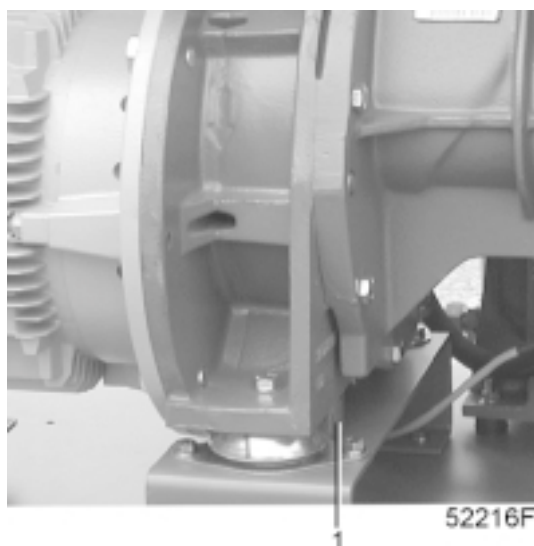
3.3 Remote starting/stopping (Elektronikon I)

GA Pack and Pack FF are provided with the Elektronikon I regulator (Fig. 1.13). These regulators allow remote starting and stopping.

Attention

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.

Remote starting and stopping: connect a start/programmed stop button between terminals 30 and 33 of terminal strip (1X6-Fig. 1.15).



- 1 Transport bush, to be removed
- 2 Transport support, to be removed
- 3 Drive motor

Fig. 3.1 Transport fixations

3.4 Initial start-up

1. Remove transport spacers (1-Fig. 3.1) and transport support (2-Fig. 3.1).
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 transformer (T1-Figs. 1.10/1.15) for correct connection, the settings of drive motor overload relay (F21) and fan motor circuit breaker (Q15). Also check that overload relay (F21) is set for manual resetting.
4. Fit air outlet valve (1-Figs. 3.4/3.6). Close the valve. Connect the air net to the valve.
5. Fit the manual condensate drain valve (1-Fig. 3.2) (not provided on GA Pack). Close the valve. Connect the valve to a drain collector.
6. Connect the automatic drain outlet (2-Fig. 3.2) (not provided on GA Pack) to a drain collector.
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 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 pointer of level gauge (7-Fig. 3.3) should register in the green range or above it.
9. A label dealing in short with the operating instructions and explaining the pictographs is delivered with the literature set. Affix it next to the control panel. Make yourself familiar with the instructions and pictographs explained (see also section 2.5).
10. Check the compressor drive motor (3-Fig. 3.1) for correct rotation direction. The correct direction is clockwise when looking at the motor fan (seen from the non-drive end of the motor). An arrow is stuck on the motor. Switch on the voltage, start the compressor and **stop it immediately** while observing the motor fan. Check the

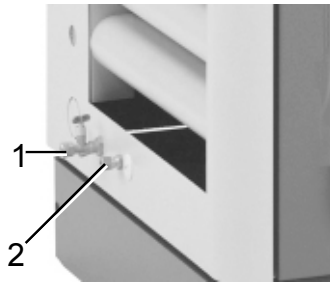
rotation direction while the motor starts running. Confirm the check while the compressor is coasting to a stop. Note that it is normal that the rotation direction reverses just before stopping.

If the rotation direction is incorrect, switch off the voltage and reverse two of the voltage supply lines.

Important

Incorrect rotation direction of the drive motor may result in damaging the compressor.

11. Later production compressors are provided with a phase sequence relay (K25-Figs. 1.10/1.15):
Check the compressor drive motor (3-Fig. 3.1) for correct rotation direction. The correct direction is clockwise when looking at the motor fan (seen from the non-drive end of the motor). An arrow is stuck on the motor. Switch on the voltage and start the compressor. If the compressor has failed to start, check the display (Fig. 1.12). If the message "Overload mot / Fan mot" (Elektronikon II) or the pictograph for motor or fan motor overload (Elektronikon I, see section 1.4.5) appears, check the phase sequence relay (K25):
 - If the yellow LED is out, the rotation direction is incorrect. In this case, switch off the voltage and reverse two of the voltage supply lines.
 - If the yellow LED is alight, switch off the voltage and reset the overload relay (F21-Figs. 1.10/1.15).
12. Check also the rotation direction of the compressor cooling fan (3-Fig. 1.5). The correct direction is anti-clockwise when looking at the fan from the top of the compressor. If the rotation direction is incorrect, switch off the voltage and reverse two incoming electric lines at the connections of circuit breaker (Q15-Figs. 1.10/1.15).
13. Check the programmed settings. Consult the User manual for the Elektronikon I and II regulators.
14. Start and run the compressor for a few minutes. Check that the compressor operates normally.



51100F

- 1 Condensate drain valve
- 2 Automatic condensate drain

Fig. 3.2 Condensate outlets

3.5 Before starting

1. Check the oil level (7-Fig. 3.3). The pointer should register in the upper field of the green range or above it.
2. If the red part of service indicator (3-Fig. 3.3) shows full out, replace air filter element (1-Fig. 5.1). Reset the service indicator by pushing the knob in the extremity of the body and reset the service warning (see the User manual for the Elektronikon regulator).

3.6 Operating GA Workplace/Workplace FF

GA Workplace and Workplace FF are provided with the Elektronikon II regulator (Fig. 3.5).

3.6.1 Starting

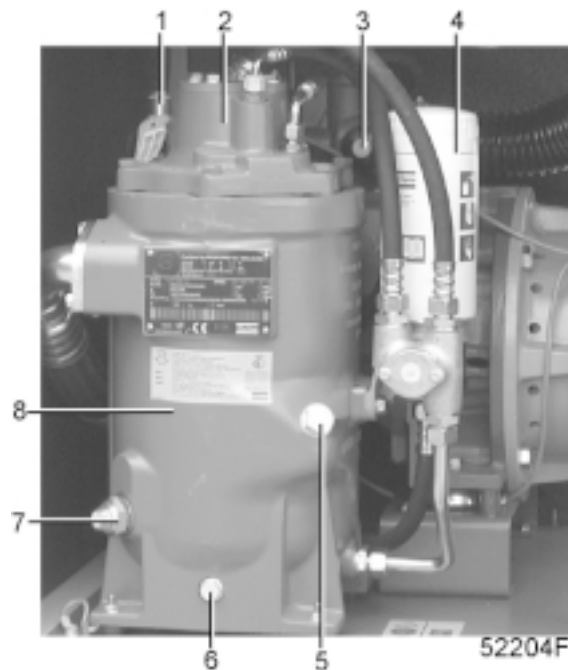
1. Switch on the voltage. Check that voltage on LED (6-Fig. 3.5) lights up.
2. Open air outlet valve (1-Fig. 3.4).
3. Close condensate drain valve (1-Fig. 3.2).
4. Press start button (2-Fig. 3.5). The compressor starts running and automatic operation LED (8) lights up. Ten seconds (programmable) after starting, the drive motor switches over from star to delta. At the same time (programmable), the compressor starts running loaded. The message on display (3) changes from "Auto unloaded" to "Auto loaded".

3.6.2 During operation

1. Check the oil level **during loaded operation**: the pointer of level gauge (7-Fig. 3.3) must register in the green range.
2. When automatic operation LED (8-Fig. 3.5) is alight, the regulator is automatically controlling the compressor, i.e. loading, unloading, stopping of the motors and restarting.

3.6.3 Checking the display

1. Regularly check display (3-Fig. 3.5) for readings and messages. Normally, the display shows the compressor outlet pressure, the status of the compressor and the abbreviations of the functions of the keys below the display.
2. Always check display (3-Fig. 3.5) and remedy the trouble if alarm LED (7) is alight or blinks. Consult the User manual for Elektronikon I and II regulators, Part 2, sections 5 and 15.



- 1 Safety valve
- 2 Minimum pressure valve
- 3 Service indicator, air filter
- 4 Oil filter
- 5 Oil filler plug
- 6 Oil drain plug
- 7 Oil level gauge
- 8 Air receiver/oil separator

Fig. 3.3 Oil system components and transport fixations



- 1 Air outlet valve
- S3 Emergency stop button

Fig. 3.4 GA30C Workplace FF

Manually unloading

Press key "Unld" (F3). LED (8) goes out. The message "Manual Unload" appears on the display. The compressor remains running unloaded unless it is loaded again manually.

Manually loading

Press the key "Load" (F3). LED (8) lights up. The command will switch the compressor to automatic operation again: the compressor will be loaded if the air net pressure drops below the programmed level.

Manually starting

In automatic operation, the regulator limits the number of motor starts. If the compressor is stopped manually, it must not be restarted manually within 5 minutes after the last stop.

Note

If the "Load" or "Unld" (unload) function is not indicated on the bottom line of display (3), press key "Menu" (9) until the function "Main" appears above key (F1), then press the key "Main".

3.6.5 Stopping (Fig. 3.5)

1. Press stop button (1). LED (8) goes out. The message "Programmed stop" appears. The compressor runs unloaded for 30 seconds and then stops.

3. The display (3) will show a service message if a service plan interval has been exceeded or if a service level for a monitored component has been exceeded. Carry out the service actions of the indicated plans or replace the component and reset the relevant timer.

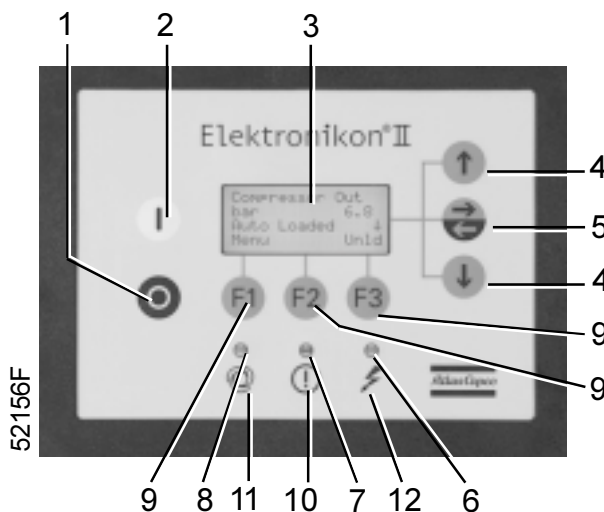
Warning Before carrying out any maintenance, repair or adjustment, stop the compressor, press emergency stop button (S3-Fig. 3.4), switch off the voltage and depressurize the compressor.

Notes

- Whenever a warning, service request, sensor error or motor overload message is displayed, the free spaces on the display between function keys (9-Fig. 3.4) 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.

3.6.4 Manual control (Fig. 3.5)

Normally, the compressor runs in automatic operation, i.e. the electronic regulator loads, unloads, stops and restarts the compressor automatically. LED (8) is then alight.



- | | |
|---------------------|------------------------------------|
| 1 Stop button | 8 Automatic operation LED |
| 2 Start button | 9 Function keys |
| 3 Display | 10 Pictograph, alarm |
| 4 Scroll keys | 11 Pictograph, automatic operation |
| 5 Tabulator key | 12 Pictograph, voltage on |
| 6 Voltage on LED | |
| 7 General alarm LED | |

Fig. 3.5 Control panel, Elektronikon II

2. **To stop the compressor in case of emergency**, press button (S3-Fig. 3.4). Alarm LED (7) blinks. After remedying the fault, unlock the button by pulling it out and press key "Rset" (9) before restarting. The message "All conditions are OK" appears. Press keys "Menu" and "Main".
3. Close air outlet valve (1- Fig. 3.4) and switch off the voltage.
4. Open condensate drain valve (1-Fig. 3.2).

3.7 Operating GA Pack/Pack FF

GA Pack and Pack FF are provided with the Elektronikon I regulator (Fig. 3.7).

3.7.1 Starting

1. Switch on the voltage. Check that voltage on LED (6-Fig. 3.7) lights up.
2. Open air outlet valve (1-Fig. 3.6).
3. On GA Pack FF, close condensate drain valve (1-Fig. 3.2).
4. Press start button (2-Fig. 3.7). The compressor starts running and automatic operation LED (10) lights up. Ten

seconds after starting, the drive motor switches over from star to delta and the compressor starts running loaded.

3.7.2 During operation

1. Check the oil level **during loaded operation**: the pointer of level gauge (7-Fig. 3.3) must register in the green range.
2. When automatic operation LED (10) is alight, the regulator is automatically controlling the compressor, i.e. loading, unloading, stopping of the motors and restarting.

3.7.3 Checking the display

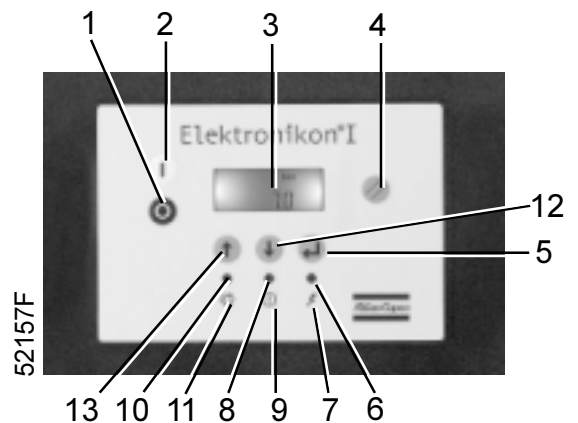
1. Regularly check display (3-Fig. 3.7): the compressor status is indicated by pictographs, see section 1.4.5.
2. Remedy the trouble if alarm LED (8) is alight or blinks. Consult the User manual for Elektronikon I and II regulators, Part 1, sections 4 up to 7.

Warning Before carrying out any maintenance, repair or adjustment, stop the compressor, press emergency stop button (S3-Fig. 3.6), switch off the voltage and depressurize the compressor.



- 1 Air outlet valve
- S3 Emergency stop button

Fig. 3.6 GA22 Pack



- | | |
|--------------------------|------------------------------------|
| 1 Stop button | 8 General alarm LED |
| 2 Start button | 9 Pictograph, alarm |
| 3 Display | 10 Automatic operation LED |
| 4 Reset key | 11 Pictograph, automatic operation |
| 5 Enter key | 12 Downwards scroll key |
| 6 Voltage on LED | 13 Upwards scroll key |
| 7 Pictograph, voltage on | |

Fig. 3.7 Control panel, Elektronikon I

3.7.4 Stopping

1. Press stop button (1-Fig. 3.7). LED (10) goes out. The compressor runs unloaded for 30 seconds and then stops.
2. **To stop the compressor in case of emergency**, press button (S3-Fig. 3.6). Alarm LED (8) and a pictograph representing the button blink. After remedying the fault, unlock the button by pulling it out and press key (4) before restarting.
3. Close air outlet valve (1-Fig. 3.6) and switch off the voltage.
4. On GA Pack FF, open condensate drain valve (1-Fig. 3.2).

3.8 Taking out of operation at end of compressor service life

At the end of the service life of the compressor, proceed as follows:

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 (5-Fig. 3.3) one turn and by opening valve (1-Fig. 3.2).
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 and condensate circuits.
6. Disconnect the condensate piping from the condensate net.

4 Maintenance

Attention

Apply all relevant safety precautions, including those mentioned in this book.

Before starting any maintenance or repairs:

1. **For GA Workplace/Workplace FF**, press stop button (1-Fig. 3.5), wait until the compressor has stopped (approx. 30 seconds), press emergency stop button (S3-Fig. 3.4) and switch off the voltage.
For Pack/Pack FF, press stop button (1-Fig. 3.7), wait until the compressor has stopped (approx. 30 seconds), press emergency stop button (S3-Fig. 3.6) and switch off the voltage.
2. Close air outlet valve (1-Figs. 3.4/3.6) and depressurize by opening plug (5-Fig. 3.3) one turn and by opening valve (1-Fig. 3.2) (not provided on GA Pack).
3. The air outlet valve (1-Figs. 3.4/3.6) 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 Drive motor (3- Fig. 3.1)

The motor bearings are greased for life

4.2 Service actions for GA Pack/Pack FF

GA Pack and Pack FF are provided with the Elektronikon I regulator (Fig. 3.7).

Besides the daily and 3-monthly checks, the service operations are grouped in time intervals (running hours); see section 4.4. The regulator has a programmable service timer. When the timer reaches the programmed interval, LED (8-Fig. 3.7) will light up. Press key (12-Fig. 3.7), "r000" appears. Press key (5-Fig. 3.7), "S" (S standing for "Service") appears. In this case, check the running hours. Carry out the service operations corresponding to the running hours as specified in the schedule of section 4.4.

Reset the service timer after servicing. For detailed information, consult the User manual for Elektronikon I and II regulators, Part 1, section 6.

Important

If using mineral oil instead of Atlas Copco Roto-injectfluid, the service timer interval has to be decreased: 500 running hours for 13 bar (175 psi) units and 1000 running hours for 7.5-10 bar (100-150 psi) units.

4.3 Service plans for GA Workplace/ Workplace FF

GA Workplace and Workplace FF are provided with the Elektronikon II regulator (Fig. 3.5).

Besides the daily and 3-monthly checks, the service operations are grouped in plans, called Service plans A, B or C; see section 4.4.

Each plan has a programmed time interval at which all service actions belonging to that plan are to be carried out.

When reaching the interval, a message will appear on the screen indicating which Service plans are to be carried out. After servicing, the intervals are to be reset. For detailed information, consult the User manual for Elektronikon I and II regulators, Part 2, sections 5, 12 and 15.

Important

Always consult Atlas Copco in case any timer setting should be changed.

4.4 Preventive maintenance schedule 1)

Period	See section	See notes below table	Service operation
Daily	3	-	Check oil level
"	3 and 7	-	Check readings on display
"	--	-	Check that condensate is discharged during loading
"	3	-	Check air filter service indicator
"	3	-	Drain condensate
3-monthly	5	-	Check coolers and condenser of dryer; clean if necessary
"	5	1	Remove and inspect air filter element.

Service actions

Running hours	See section	See notes below table	Service plan (GA Workplace)	Service operation
4000	4	2/4	A	If Atlas Copco Roto-injectfluid is used, change oil and oil filter
500	4	2/4/3	A	For GA 13 bar (175 psi) compressors: If oil as specified in section 4.5.2 is used, change oil and oil filter
1000	4	2/4/3	A	For GA 7.5 - 10 bar (100 - 150 psi) compressors: If oil as specified in section 4.5.2 is used, change oil and oil filter
4000	--	-	B	Check pressure and temperature readings
"	--	-	B	Carry out a LED/display test
"	--	5	B	Check for possible air leakage
"	4 and 5	1/2	B	Replace air filter element
"	--	-	B	Remove, dismantle and clean float valve of condensate trap
"	--	-	B	Test temperature shut-down function
"	5	-	B	Have safety valve tested
8000	--		C	Have oil separator replaced

Notes

1. More frequently when operating in a dusty atmosphere. Replace damaged or heavily contaminated elements.
2. Use genuine Atlas Copco filters.
3. For GA Workplace/Workplace FF, the interval for Service plan A is to be reduced to the mentioned interval in case mineral oil is used instead of Roto-injectfluid.
4. Recommended oil: Atlas Copco Roto-injectfluid. The normal change interval for Roto-injectfluid is 4000 hours. If the compressor runs at unfavourable conditions (polluted air, element outlet temperature continuously above 100°C or below condensation limit), change the oil more often. A yearly oil and oil filter change may be necessary. In this case, also reset the timer yearly (Service plan A). Consult Atlas Copco if in any doubt
5. Any leakage should be attended to immediately. Damaged flexibles or flexible joints must be replaced.

4.5 Oil specifications

Attention

Never mix oils of different brands or types. Use only non-toxic oils.

4.5.1 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.

Roto-injectfluid can be ordered in following quantities:

Roto-injectfluid	Ordering number
20-litre can	2901 0522 00
209-litre drum	2901 0045 01

4.5.2 Mineral oil

Although Roto-injectfluid is strongly recommended, mineral oil can be used after taking following precautions:

- the previously used oil should first be drained and the system flushed
- the oil filter and oil separator should be replaced
- the oil must contain oxidation inhibitors and must have anti-foam and anti-wear properties
- the viscosity grade and index must be:

Ambient temperature	Viscosity grade	Viscosity index
Consistently above 25 degrees celsius	ISO VG 68	Minimum 95
Between 25 and 0 degrees celsius	ISO VG 46	Minimum 95

Consult Atlas Copco.

4.6 Oil and oil filter change (Fig. 3.3)

1. Run the compressor until warm. Stop it and close the outlet valve (1-Figs. 3.4/3.6). Wait a few minutes. Depressurize the oil system by opening oil filler plug (5) one turn to permit any pressure to escape.
2. Remove plug (4-Fig. 1.5). Drain the oil by unscrewing plug (6). Collect the oil in a collector and deliver it to the local oil collection service. Reinstall the plugs.
3. Remove oil filter (4).
4. Clean the filter seat on the manifold. Oil the gasket of the new element. Screw the element into place and tighten firmly by hand.
5. Remove filler plug (5) and fill with oil until the level reaches the plug. Reinstall and tighten plug (5).
6. Run the compressor for a few minutes. Stop the compressor and wait a few minutes to allow the oil to settle. Depressurize the system by unscrewing filler plug (5) one turn to permit any pressure in the system to escape. Fill the receiver with oil until the level reaches the filler plug. Tighten plug (5).
7. Reset the service warning. Consult the User manual for Elektronikon I and II regulators: Part 1, section 7 for Elektronikon I or Part 2, section 15 for Elektronikon II.

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.

See section 4.5.1 for the ordering number for Atlas Copco Roto-injectfluid.

Footnote chapter 4

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

5 Adjustments and servicing procedures

5.1 Air filter (1-Fig. 5.1)

1. Stop the compressor. Remove the air filter cover by turning it anti-clockwise. Remove the air filter element. Discard damaged elements.
2. If necessary, clean the cover. Fit the new element and the cover.
3. Reset service indicator (3-Fig. 3.3) by pushing the knob in the extremity of the body.
4. Reset the service warning. Consult the User manual for Elektronikon I and II regulators: Part 1, section 7 for Elektronikon I or Part 2, section 15 for Elektronikon II.

5.2 Coolers

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 while covering all compressor parts under the coolers. If it is necessary to wash the coolers with a cleansing agent, consult Atlas Copco.

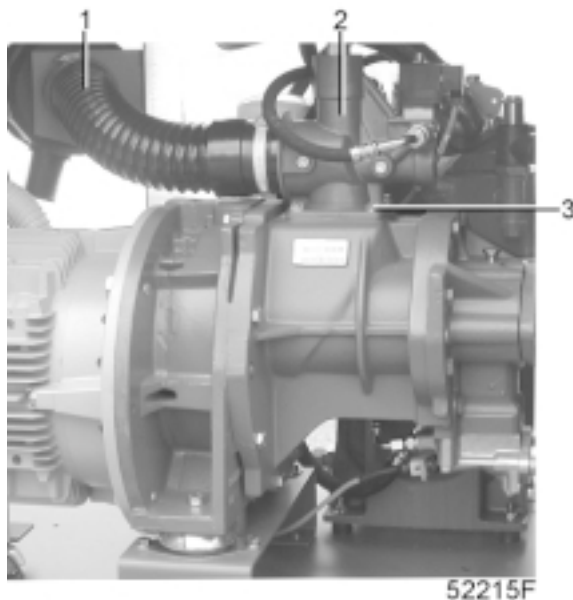
5.3 Safety valve (1-Fig. 3.3)

Operate the safety valve by unscrewing the cap one or two turns and retightening it (or by pulling the valve lifting lever, if provided).

Testing

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

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



- 1 Air filter
- 2 Unloader
- 3 Bolt

Fig. 5.1 Air filter and unloader

6 Problem solving

If alarm LED (7-Fig. 3.5) is alight or blinks, consult the User manual, Part 2, sections 5 and 15.

If alarm LED (8-Fig. 3.7) is alight or blinks, consult the User manual, Part 1, sections 4 up to 7.

Attention

Apply all relevant safety precautions, including those mentioned in this book.

Before starting any maintenance or repairs:

1. **For GA Workplace/Workplace FF**, press stop button (1-Fig. 3.5), wait until the compressor has stopped (approx. 30 seconds), press emergency stop button (S3-Fig. 3.4) and switch off the voltage.
For Pack/Pack FF, press stop button (1-Fig. 3.7), wait until the compressor has stopped (approx. 30 seconds), press emergency stop button (S3-Fig. 3.6) and switch off the voltage.
2. Close air outlet valve (1-Figs. 3.4/3.6) and depressurize by opening plug (5-Fig. 3.3) one turn and by opening valve (1-Fig. 3.2) (not provided on GA Pack).
3. The air outlet valve (1-Figs. 3.4/3.6) 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.

Mechanical faults and suggested remedies (Figs. 1.7 and 1.8)

1 Compressor starts running, but does not load after a delay time

- a Solenoid valve out of order
- a Replace valve
- b Inlet valve stuck in closed position
- b Have valve checked
- c Leak in control air flexibles
- c Have leaking flexible replaced
- d Minimum pressure valve leaking (when net is depressurized)
- d Have valve checked

2 Compressor does not unload, safety valve blows

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

3 Condensate is not discharged from condensate trap during loading

- a Discharge flexible clogged
- a Check and correct as necessary
- b Float valve malfunctioning
- b Remove float valve assembly, clean and check

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
- b Replace filter element
- c Solenoid valve malfunctioning
- c See 1a
- d Leak in control air flexibles
- d See 1c
- e Inlet valve does not fully open
- e See 1b
- f Oil separator element clogged
- f Have element replaced
- g Air leakage
- g See 1c
- h Safety valve (SV) leaking
- h Have valve replaced
- i Compressor element (E) out of order
- i Consult Atlas Copco

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

- a Oil level too high
- a Check for overfilling. Release pressure and drain oil to correct level
- b Incorrect oil causing foam
- b Change to correct oil
- c Oil separator element defective
- c Have element checked. Replace, if necessary.

6 Safety valve blows after loading

- a Inlet valve malfunctioning
- a See 1b
- b Minimum pressure valve malfunctioning
- b See 1d
- c Safety valve out of order
- c See 4h
- d For units with dryer: dryer pipes clogged by formation of ice
- d Have refrigerant system checked. Consult Atlas Copco

7 Element outlet 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.
- b Oil level too low
- b Check and correct as necessary
- c Oil cooler clogged
- c Clean cooler
- d By-pass valve malfunctioning
- d Have valve tested
- e Air cooler clogged
- e Clean cooler
- f Compressor element out of order
- f See 4i

7 Principal data

7.1 Readings on display (Figs. 1.9/1.13)

Ref.	Reading
Air outlet pressure	Modulates between programmed unloading and loading pressures
Compressor element outlet temperature	50-60 degrees Celsius above cooling air temperature
Dewpoint temperature	Approx. 3 degrees Celsius

7.2 Motor overload relay, fuses and circuit breaker

7.2.1 Drive motor overload relay - main fuses

For star-delta starter (IEC)

Supply voltage (V)	Frequency (Hz)	GA11 Relay (A)	GA11 Fuse (A)	GA15 Relay (A)	GA15 Fuse (A)	GA18 Relay (A)	GA18 Fuse (A)	GA22 Relay (A)	GA22 Fuse (A)	GA30C Relay (A)	GA30C Fuse (A)
200	50	29.1	63	39.8	80	48.3	100	58.9	125	81.7	160
230	50	25.9	63	34.4	80	42.5	100	52.8	125	70.7	160
380	50	15.6	50	20.9	50	25.7	63	31.9	80	43.0	100
400	50	14.9	35	19.9	50	24.6	63	30.4	80	40.8	100
500	50	11.9	35	16.0	50	19.8	50	24.2	63	32.7	80
220-230	60	26.2	63	34.9	80	42.9	100	52.4	125	71.7	160
440-460	60	13.1	35	17.5	50	21.5	50	26.2	63	35.9	80
380	60	15.6	50	20.4	50	25.1	63	31.6	80	43.0	100

For direct-on-line starter (CSA/UL)

Supply voltage (V)	Frequency (Hz)	GA11 Relay (A)	GA11 Fuse (A)	GA15 Relay (A)	GA15 Fuse (A)	GA18 Relay (A)	GA18 Fuse (A)	GA22 Relay (A)	GA22 Fuse (A)	GA30C Relay (A)	GA30C Fuse (A)
200	60	51.7	90	66.8	110	83.2	150	104.6	175	--	--
220-230	60	45.4	80	60.5	100	74.3	125	90.7	175	--	--
440-460	60	22.7	40	30.2	50	37.2	70	45.4	80	62.1	100
575	60	17.9	30	23.3	40	28.4	45	36.5	70	49.2	90

7.2.2 Circuit breaker of fan motor

For star-delta starter (IEC)

Supply voltage (V)	Frequency (Hz)	GA11-22 radial fan Elektronikon II (A)	GA11-22 axial fan Elektronikon I (A)	GA30C radial fan Elektronikon I and II (A)
200	50	2.5	3.8	4.2
230	50	2.2	3.3	3.7
400	50	1.3	1.9	2.1
500	50	1.0	1.5	1.7
220-230	60	2.3	3.2	3.5
440-460	60	1.3	1.9	2.0
380	60	1.3	1.9	2.4

For direct-on-line starter (CSA/UL)

Supply voltage (V)	Frequency (Hz)	GA11-22 radial fan Elektronikon II (A)	GA11-22 axial fan Elektronikon I (A)	GA30C radial fan Elektronikon I and II (A)
200	60	2.6	3.7	—
220-230	60	2.3	3.2	—
440-460	60	1.3	1.9	2.0
575	60	1.1	1.5	1.5

7.3 Fan control switch (Full-feature)

Cut-out pressure 7.9 bar(e)

Switch-on pressure 9 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 air inlet temperature	C	40
Minimum air inlet temperature	C	0

7.4.3 Specific data of GA 7.5 bar 1)

Compressor	GA11	GA15	GA18	GA22	GA30C
Frequency Hz	50	50	50	50	50
Maximum (unloading) pressure					
- Pack/Workplace bar(e)	7.5	7.5	7.5	7.5	7.5
- Pack FF/Workplace FF bar(e)	7.25	7.25	7.25	7.25	7.25
Nominal working pressure bar(e)	7	7	7	7	7
Power input					
- Pack kW	14.8	20.1	24.6	28.8	35.3
- Workplace kW	14.5	19.8	24.3	28.5	35.3
- Pack FF kW	15.7	21.1	25.7	30.1	36.7
- Workplace FF kW	15.4	20.8	25.4	29.8	36.7
Temperature of air at outlet valve					
- Pack/Workplace C	25	25	26	26	27
- Pack FF/Workplace FF C	20	20	23	23	23
Motor shaft speed r/min	2940	2940	2940	2940	2960
Oil capacity l	6.7	7	7.5	8	11.1
Maximum sound pressure level 2)					
- Workplace/Workplace FF dB(A)	63	64	66	67	69
- Pack/Pack FF dB(A)	68	69	70	71	69
Pressure dewpoint, Pack FF/Workplace FF 3) C	3	3	3	3	3

7.4.4 Specific data of GA 8.5 bar 1)

Compressor	GA11	GA15	GA18	GA22	GA30C
Frequency Hz	50	50	50	50	50
Maximum (unloading) pressure					
- Pack/Workplace bar(e)	8.5	8.5	8.5	8.5	8.5
- Pack FF/Workplace FF bar(e)	8.25	8.25	8.25	8.25	8.25
Nominal working pressure bar(e)	8	8	8	8	8
Power input					
- Pack kW	14.9	19.6	25.0	29.3	37.3
- Workplace kW	14.6	19.3	24.7	29.0	37.3
- Pack FF kW	15.9	20.6	26.1	30.5	38.5
- Workplace FF kW	15.6	20.3	25.8	30.2	38.5
Temperature of air at outlet valve					
- Pack/Workplace C	25	25	26	26	27
- Pack FF/Workplace FF C	20	20	23	23	23
Motor shaft speed r/min	2940	2940	2940	2940	2960
Oil capacity l	6.7	7	7.5	8	11.1
Maximum sound pressure level 2)					
- Workplace/Workplace FF dB(A)	63	64	66	67	69
- Pack/Pack FF dB(A)	68	69	70	71	69
Pressure dewpoint, Pack FF/Workplace FF 3) C	3	3	3	3	3

7.4.5 Specific data of GA 10 bar 1)

Compressor	GA11	GA15	GA18	GA22	GA30C
Frequency Hz	50	50	50	50	50
Maximum (unloading) pressure					
- Pack/Workplace bar(e)	10	10	10	10	10
- Pack FF/Workplace FF bar(e)	9.75	9.75	9.75	9.75	9.75
Nominal working pressure bar(e)	9.5	9.5	9.5	9.5	9.5
Power input					
- Pack kW	14.3	19.5	23.4	27.9	37.2
- Workplace kW	14.0	19.2	23.1	27.6	37.2
- Pack FF kW	15.3	20.4	24.6	29.2	38.5
- Workplace FF kW	15.0	20.1	24.3	28.9	38.5
Temperature of air at outlet valve					
- Pack/Workplace C	25	25	26	26	27
- Pack FF/Workplace FF C	20	20	23	23	23
Motor shaft speed r/min	2940	2940	2940	2940	2960
Oil capacity l	6.7	7	7.5	8	11.1
Maximum sound pressure level 2)					
- Workplace/Workplace FF dB(A)	63	64	66	67	69
- Pack/Pack FF dB(A)	68	69	70	71	69
Pressure dewpoint, Pack FF/Workplace FF 3) C	3	3	3	3	3

7.4.6 Specific data of GA 13 bar 1)

Compressor	GA11	GA15	GA18	GA22	GA30C
Frequency Hz	50	50	50	50	50
Maximum (unloading) pressure					
- Pack/Workplace bar(e)	13.0	13.0	13.0	13.0	13.0
- Pack FF/Workplace FF bar(e)	12.75	12.75	12.75	12.75	12.75
Nominal working pressure bar(e)	12.5	12.5	12.5	12.5	12.5
Power input					
- Pack kW	14.0	19.7	23.8	28.5	37.2
- Workplace kW	13.7	19.4	23.5	28.2	37.2
- Pack FF kW	14.9	20.8	25.0	29.7	38.5
- Workplace FF kW	14.6	20.5	24.7	29.4	38.5
Temperature of air at outlet valve					
- Pack/Workplace C	25	25	26	26	27
- Pack FF/Workplace FF C	20	20	23	23	23
Motor shaft speed r/min	2940	2940	2940	2940	2960
Oil capacity l	6.7	7	7.5	8	11.1
Maximum sound pressure level 2)					
- Workplace/Workplace FF dB(A)	63	64	66	67	69
- Pack/Pack FF dB(A)	68	69	70	71	69
Pressure dewpoint, Pack FF/Workplace FF 3) C	3	3	3	3	3

7.4.7 Specific data of GA 100 psi 1)

Compressor	GA11	GA15	GA18	GA22	GA30C
Frequency Hz	60	60	60	60	60
Maximum (unloading) pressure					
- Pack/Workplace bar(e)	7.4	7.4	7.4	7.4	7.4
- Pack FF/Workplace FF bar(e)	7.15	7.15	7.15	7.15	7.15
Nominal working pressure bar(e)	6.9	6.9	6.9	6.9	6.9
Power input					
- Pack kW	14.8	20.0	24.1	28.8	36.2
- Workplace kW	14.5	19.7	23.8	28.5	36.2
- Pack FF kW	15.9	21.1	25.6	30.2	37.8
- Workplace FF kW	15.6	20.8	25.3	29.9	37.8
Temperature of air at outlet valve					
- Pack/Workplace C	25	25	26	26	27
- Pack FF/Workplace FF C	20	20	23	23	23
Motor shaft speed r/min	3545	3540	3550	3550	3560
Oil capacity l	6.7	7	7.5	8	11.1
Maximum sound pressure level 2)					
- Workplace/Workplace FF dB(A)	63	64	66	67	69
- Pack/Pack FF dB(A)	68	69	70	71	69
Pressure dewpoint, Pack FF/Workplace FF 3) C	3	3	3	3	3

7.4.8 Specific data of GA 125 psi 1)

Compressor	GA11	GA15	GA18	GA22	GA30C
Frequency Hz	60	60	60	60	60
Maximum (unloading) pressure					
- Pack/Workplace bar(e)	9.1	9.1	9.1	9.1	9.1
- Pack FF/Workplace FF bar(e)	8.85	8.85	8.85	8.85	8.85
Nominal working pressure bar(e)	8.6	8.6	8.6	8.6	8.6
Power input					
- Pack kW	14.6	19.6	24.1	28.7	36.6
- Workplace kW	15.0	20.0	24.5	29.1	36.6
- Pack FF kW	15.7	20.7	25.6	30.2	38.2
- Workplace FF kW	16.2	21.1	26.0	30.6	38.2
Temperature of air at outlet valve					
- Pack/Workplace C	25	25	26	26	27
- Pack FF/Workplace FF C	20	20	23	23	23
Motor shaft speed r/min	3545	3540	3550	3550	3560
Oil capacity l	6.7	7	7.5	8	11.1
Maximum sound pressure level 2)					
- Workplace/Workplace FF dB(A)	63	64	66	67	69
- Pack/Pack FF dB(A)	68	69	70	71	69
Pressure dewpoint, Pack FF/Workplace FF 3) C	3	3	3	3	3

7.4.9 Specific data of GA 150 psi 1)

Compressor	GA11	GA15	GA18	GA22	GA30C
Frequency Hz	60	60	60	60	60
Maximum (unloading) pressure					
- Pack/Workplace bar(e)	10.8	10.8	10.8	10.8	10.8
- Pack FF/Workplace FF bar(e)	10.55	10.55	10.55	10.55	10.55
Nominal working pressure bar(e)	10.3	10.3	10.3	10.3	10.3
Power input					
- Pack kW	14.5	19.9	24.0	28.5	37.6
- Workplace kW	14.9	20.4	24.4	28.9	37.6
- Pack FF kW	15.6	21.0	25.5	30.0	39.2
- Workplace FF kW	16.1	21.4	25.9	30.4	39.2
Temperature of air at outlet valve					
- Pack/Workplace C	25	25	26	26	27
- Pack FF/Workplace FF C	20	20	23	23	23
Motor shaft speed r/min	3545	3540	3550	3550	3560
Oil capacity l	6.7	7	7.5	8	11.1
Maximum sound pressure level 2)					
- Workplace/Workplace FF dB(A)	63	64	66	67	69
- Pack/Pack FF dB(A)	68	69	70	71	69
Pressure dewpoint, Pack FF/Workplace FF 3) C	3	3	3	3	3

7.4.10 Specific data of GA 175 psi 1)

Compressor	GA11	GA15	GA18	GA22	GA30C
Frequency Hz	60	60	60	60	60
Maximum (unloading) pressure					
- Pack/Workplace bar(e)	12.5	12.5	12.5	12.5	12.5
- Pack FF/Workplace FF bar(e)	12.25	12.25	12.25	12.25	12.25
Nominal working pressure bar(e)	12	12	12	12	12
Power input					
- Pack kW	14.0	19.0	23.4	28.5	37.8
- Workplace kW	14.4	19.5	23.9	28.9	37.8
- Pack FF kW	15.1	20.1	24.9	30.0	39.4
- Workplace FF kW	15.5	20.5	25.3	30.4	39.4
Temperature of air at outlet valve					
- Pack/Workplace C	25	25	26	26	27
- Pack FF/Workplace FF C	20	20	23	23	23
Motor shaft speed r/min	3545	3540	3550	3550	3560
Oil capacity l	6.7	7	7.5	8	11.1
Maximum sound pressure level 2)					
- Workplace/Workplace FF dB(A)	63	64	66	67	69
- Pack/Pack FF dB(A)	68	69	70	71	69
Pressure dewpoint, Pack FF/Workplace FF 3) C	3	3	3	3	3

7.5 Conversion list of SI units into US/ British units

1 bar = 14.504 psi
 1 g = 0.035 oz
 1 kg = 2.205 lb
 1 km/h = 0.621 mile/h
 1 kW = 1.341 hp (UK and US)
 1 l = 0.264 US gal
 1 l = 0.220 Imp gal (UK)
 1 l = 0.035 cu.ft
 1 m = 3.281 ft
 1 mm = 0.039 in
 1 m³/min = 35.315 cfm
 1 mbar = 0.401 in wc
 1 N = 0.225 lbf
 1 Nm = 0.738 lbf.ft
 x degrees celsius = (32 + 1.8x) degrees fahrenheit **4)**

8 Instructions for use of air receiver

1. This vessel can contain pressurized air; be aware of its potential danger in case of misuse.
2. This vessel shall only be used as compressed air/oil separator and be operated within the specified limits as mentioned on the data plate.
3. No alterations shall be made to this vessel by welding, drilling or other methods of mechanical work without written permission of the manufacturer.
4. Original bolts have to be used after opening for inspection. The maximum torque has to be taken into consideration: for M12 bolts 73 Nm (+/- 18), for M16 bolts 185 Nm (+/- 45).
5. Pressure and temperature of this vessel must be clearly indicated.
6. The safety valve must correspond with pressure surges of 1.1 times the maximum allowable operating pressure. It should guarantee that the pressure will not permanently exceed the maximum allowable operating pressure of the vessel.
7. Use only oil as specified by the manufacturer.
8. This vessel has been designed and built to guarantee an operational lifetime in excess of 20 years and an infinite number of pressure load cycles. Therefore, there is no intrinsic need for in service inspection of the vessel when used within the design limits and in its intended application. However, national legislation may require in service inspection.

Footnotes chapter 7

- 1) At reference conditions
- 2) According to PNEUROP PN8NTC2.2
- 3) At 20 degrees celsius / 100% relative humidity.
- 4) A temperature difference of 1 degree celsius = a temperature difference of 1.8 degrees fahrenheit