جهان کمپرسور
Jahan Compressor

Atlas Copco Stationary Air Compressors

ZT55-ZT75-ZT90
ZR55-ZR75-ZR90

Instruction book

From following serial number onwards: AIF-077 519

Copyright 2003, Atlas Copco Airpower n.v., Antwerp, Belgium.
Any unauthorized use or copying of the contents or any part thereof is prohibited. This applies in particular to trademarks, model denominations, part numbers and drawings.

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

Important
This book must be used together with the related User manual for Elektronikon® regulator, Printed Matter No. 2920 1478 xx.

No. 2920 1452 02
(Replaces 2920 1452 01)

Registration code: APC Z55-90 / 38 / 994

2003-3

www.atlascopco.com

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

Read this book before putting the machine into operation to ensure correct handling, operation and proper maintenance from the beginning. The maintenance schedule comprises measures for keeping the compressor in good repair.

Keep the book available for the operator(s) and make sure that the compressor is operated and that maintenance is carried out according to the instructions. Record all operating data, maintenance work effected, etc. in an operator's logbook available from Atlas Copco. Follow all applicable safety precautions, amongst others those mentioned in this book.

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

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

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

1 LEADING PARTICULARS

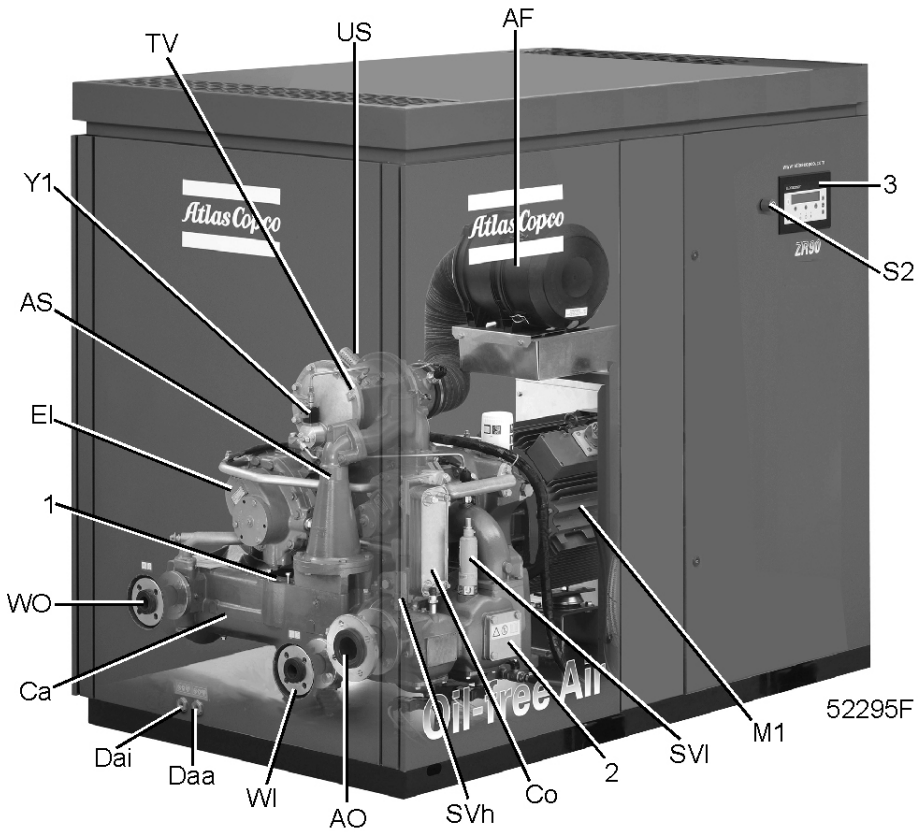
1.1 General description

ZR55-ZR75-ZR90 and ZT55-ZT75-ZT90 are two-stage screw compressors, driven by an electric motor. The compressors deliver oil-free, pulsation-free air.

ZR compressors are water-cooled, whereas ZT compressors are air-cooled.

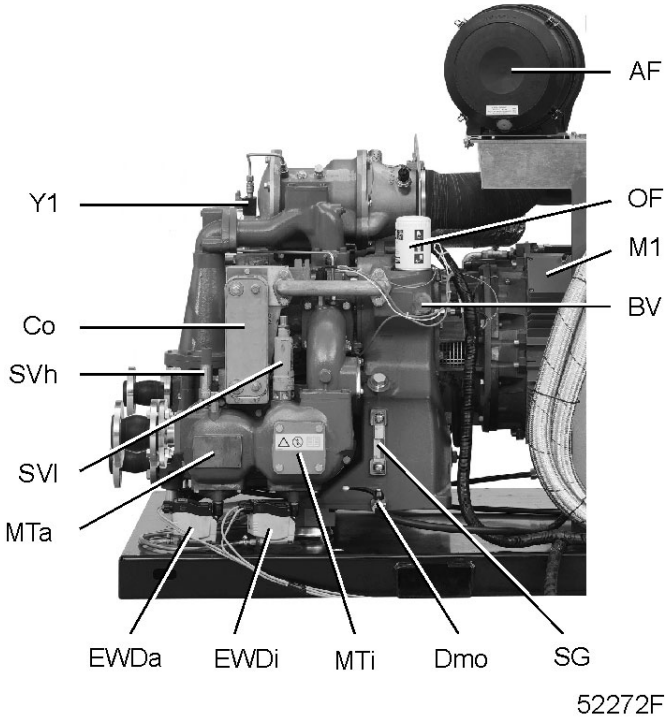
ZR/ZT Full-Feature compressors are additionally provided with an air dryer which removes moisture from compressed air.

The compressors are enclosed in a sound-insulated bodywork and include mainly:
- Air filter (AF)
- Load/no-load valve (TV)
- Low-pressure compressor element (El)
- Intercooler (Ci)
- High-pressure compressor element (Eh)
- Aftercooler (Ca)
- Electric motor (M1)
- Drive coupling
- Gear casing
- Elektronikon® regulator (3-Fig. 1.1)
- Safety valves (SVh, SVl)



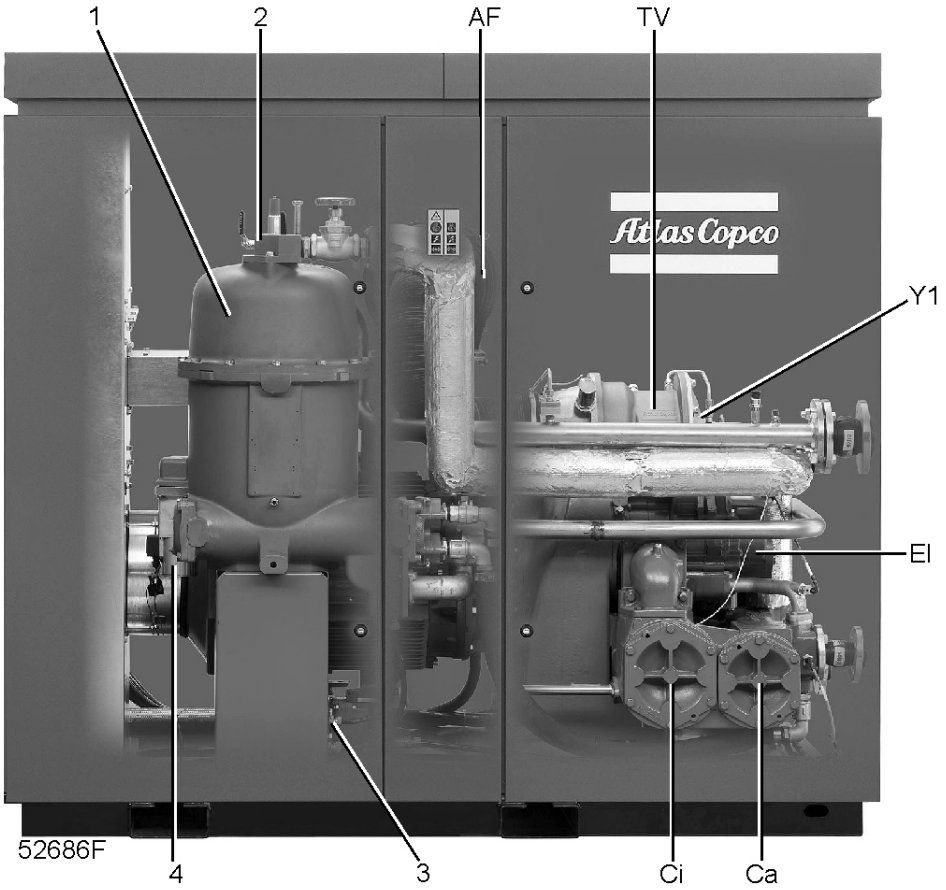
AF	Air filter
AO	Air outlet
AS	Silencer
Ca	Aftercooler
Co	Oil cooler
Daa	Automatic condensate outlet, aftercooler
Dai	Automatic condensate outlet, intercooler
EI	Low-pressure compressor element
M1	Drive motor
SVh	High-pressure safety valve
SVl	Low-pressure safety valve
S2	Emergency stop button
TV	Load/no-load valve
US	Silencer
WI	Cooling water inlet
WO	Cooling water outlet
Y1	Loading solenoid valve
1	Flange, connection to MD dryer
2	Flange, access to silica gel bags
3	Elektronikon regulator

Fig. 1.1 General view, ZR90



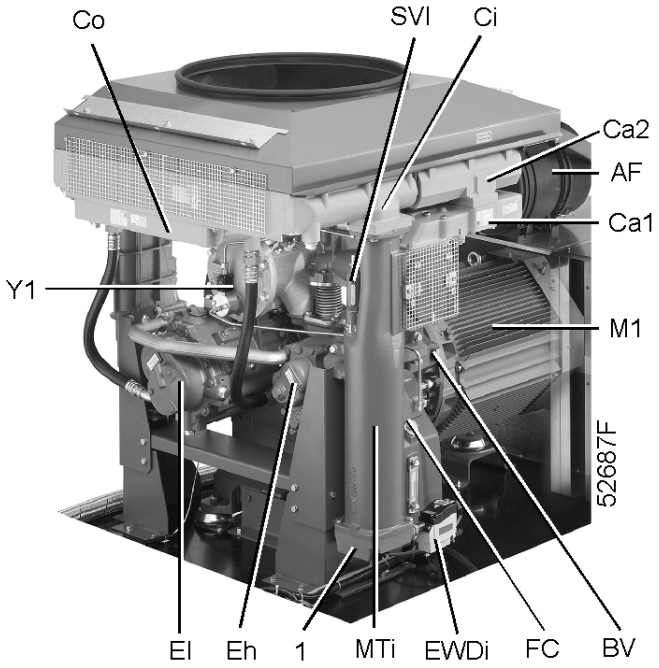
AF	Air filter
BV	By-pass valve
Co	Oil cooler
Dmo	Oil drain valve, gear casing
EWDa	Electronic water drain, aftercooler
EWDi	Electronic water drain, intercooler
MTa	Moisture trap, aftercooler
MTi	Moisture trap, intercooler
M1	Drive motor
OF	Oil filter
SG	Oil level sight-glass
SVh	High-pressure safety valve
SVl	Low-pressure safety valve
Y1	Loading solenoid valve

Fig. 1.2 Front view, ZR90



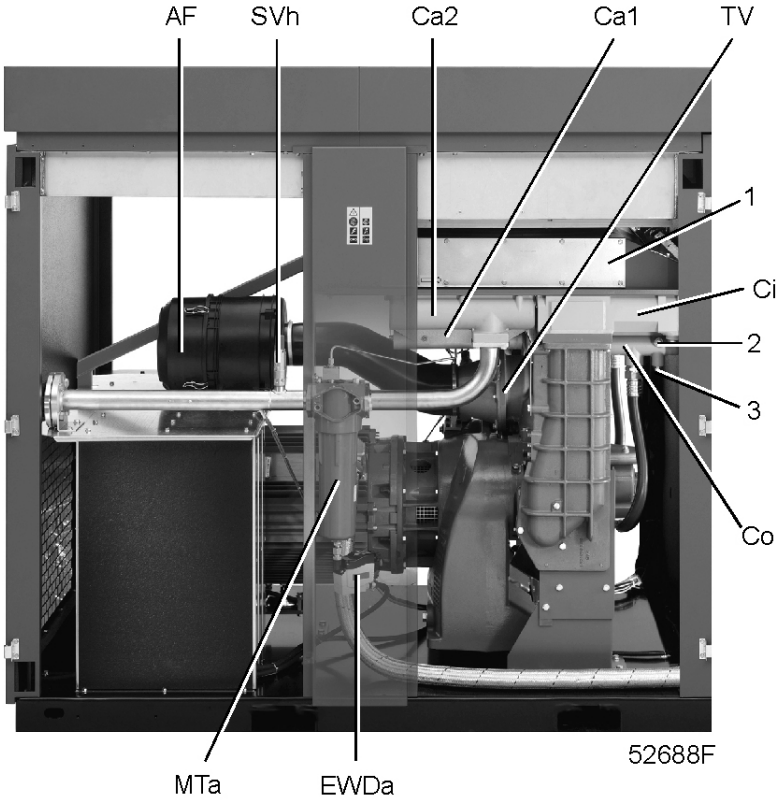
AF Air filter
Ca Aftercooler
Ci Intercooler
EI Low-pressure compressor element
TV Load/no-load valve
Y1 Loading solenoid valve
1 Dryer
2 Throttle valve, regeneration air inlet
3 Electronic water drains (EWD)
4 Rotor drive assembly

Fig. 1.3 Rear view, ZR90 Full-Feature



AF	Air filter
BV	By-pass valve
Ca1	Pre-aftercooler
Ca2	Aftercooler
Ci	Intercooler
Co	Oil cooler
Eh	High-pressure compressor element
El	Low-pressure compressor element
EWDi	Electronic water drain, intercooler
FC	Oil filler cap
MTi	Moisture trap, intercooler
M1	Drive motor
SVl	Low-pressure safety valve
Y1	Loading solenoid valve
1	Flange, moisture trap intercooler

Fig. 1.4 General view, ZT90



AF	Air filter
Ca1	Pre-aftercooler
Ca2	Aftercooler
Ci	Intercooler
Co	Oil cooler
EWDa	Electronic water drain, aftercooler
MTa	Moisture trap, aftercooler
SVh	High-pressure safety valve
TV	Load/no-load valve
1	Plate
2	Vent plug, oil cooler
3	Drain plug, oil cooler

Fig. 1.5 Rear view, ZT90

1.2 Air flow (Figs. 1.6 and 1.7)

Pack compressors
Air drawn through filter (AF) is compressed in low-pressure compressor element (El) and discharged to intercooler (Ci). The cooled air is further compressed in high-pressure compressor element (Eh) and discharged through silencer (AS) and aftercooler(s) (Ca for ZR and Ca1 and Ca2 for ZT) towards the air net. A check valve (CV) is provided.

Full-Feature compressors
Air drawn through filter (AF) is compressed in low-pressure compressor element (El) and discharged to intercooler (Ci). The cooled air is further compressed in high-pressure compressor element (Eh) and discharged through silencer (AS) and aftercooler(s) (Ca for ZR and Ca1 and Ca2 for ZT) towards the air dryer. A check valve (CV) is provided.

The wet air from aftercooler (Ca) enters water separator (18) via the nozzle of ejector (14). In the demister (19), the water droplets are removed from the air. The air is then led through rotor (12), which adsorbs the water vapour.

Hot regeneration air is branched off from aftercooler (Ca). The regeneration air passes through shut-off valve (8), throttle valve (7) and strainer (9) to inlet sealing sector (10), and is blown through the wet rotor channels.

The hot saturated air is then cooled down in regeneration air cooler (11). The regeneration air is then mixed with the wet compressed air from the compressor aftercooler.

1.3 Condensate drain system (Figs. 1.6, 1.7 and 1.8)

1.3.1 Description

Condensate traps are installed: one downstream of the intercooler (MTi) to prevent condensate from entering compressor element (Eh) and one downstream of the aftercooler (MTa) to prevent condensate from entering the air outlet pipe. The condensate traps are connected to Electronic Water Drains (EWDi and EWDa respectively). **Full-Feature compressors** are provided with extra Electronic Water Drains (16, 17 and on ZT compressors also 15).

EWDi and EWDa
The condensate enters the electronic water drain via inlet (1) and accumulates in collector (2). A capacitive sensor (3) continuously measures the liquid level. As soon as the collector is filled up to a certain level, a drain delay timer is started. When the delay time has expired, pilot valve (4) is activated and diaphragm (5) opens outlet (6), discharging the condensate. When the collector has been emptied, the outlet closes quickly without wasting compressed air.

EWD (15, 16 and 17)
The condensate enters the electronic water drain via inlet (1) and accumulates in collector (2). A capacitive sensor (3) continuously measures the liquid level. As soon as the collector is filled up to a certain level, pilot valve (4) is activated and diaphragm (5) opens outlet (6), discharging the condensate. When the liquid level drops to a certain level the outlet closes quickly without wasting compressed air.

When the controller registers a malfunction, the red alarm LED (Fig. 1.10) starts flashing and the display of the Elektronikon module will show a fault message. The electronic drain valve will automatically change to the alarm mode, opening and closing the valve according to a sequence as shown in Fig. 1.9. This condition continues until the fault is remedied. If the fault is not remedied automatically, maintenance is required.

1.3.2 Testing the electronic water drain

Functional test
Briefly press the TEST button (Fig. 1.10) and check that the valve opens for condensate discharge.

Note
If the pressure is lower than 0.8 bar(e), the valve will open but no condensate will be discharged.

Checking the alarm signal

- Press the test button for at least 1 minute.
- Check that the alarm LED flashes.
- Release the test button.

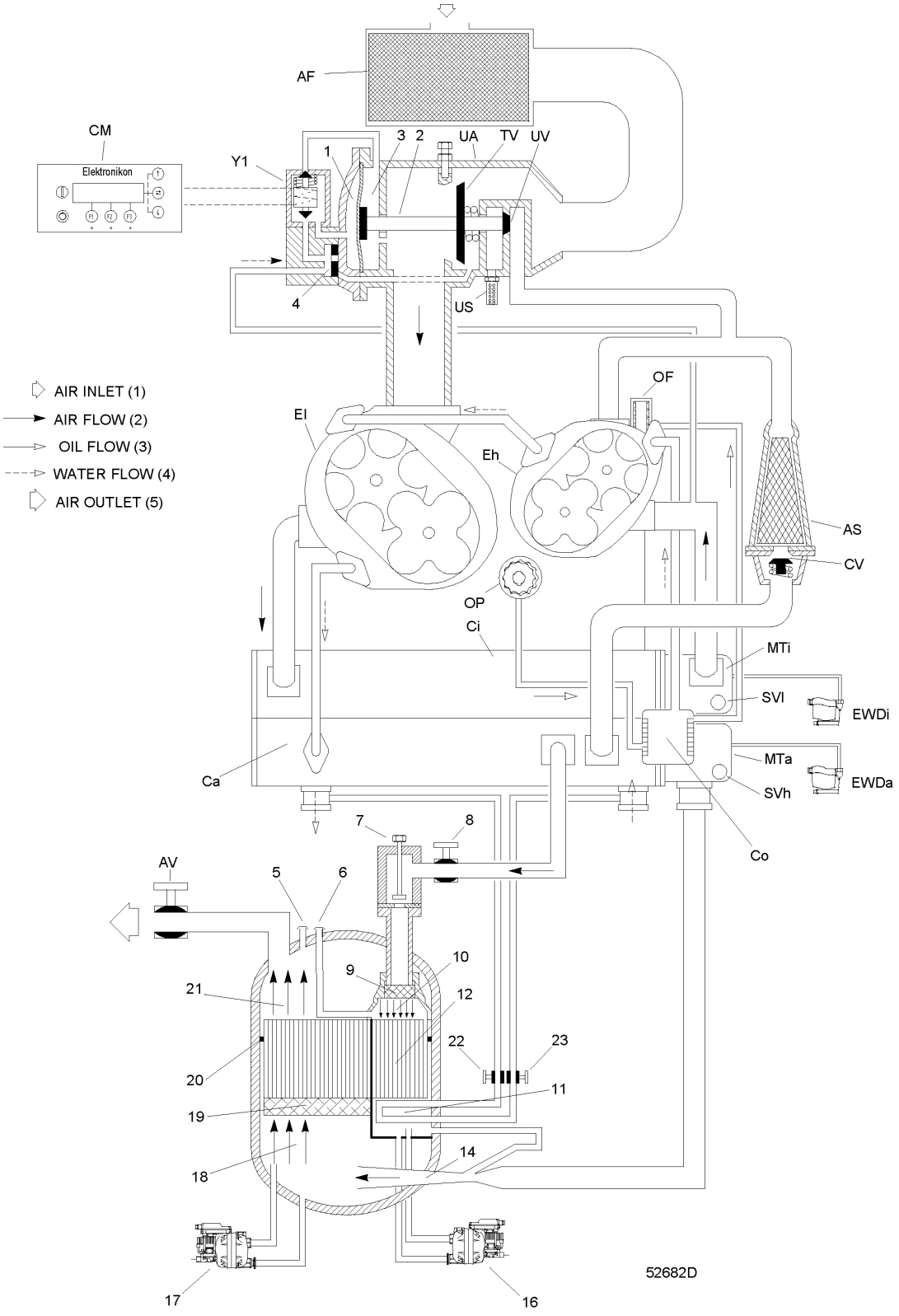


Fig. 1.6 Flow diagram/regulating system, ZR

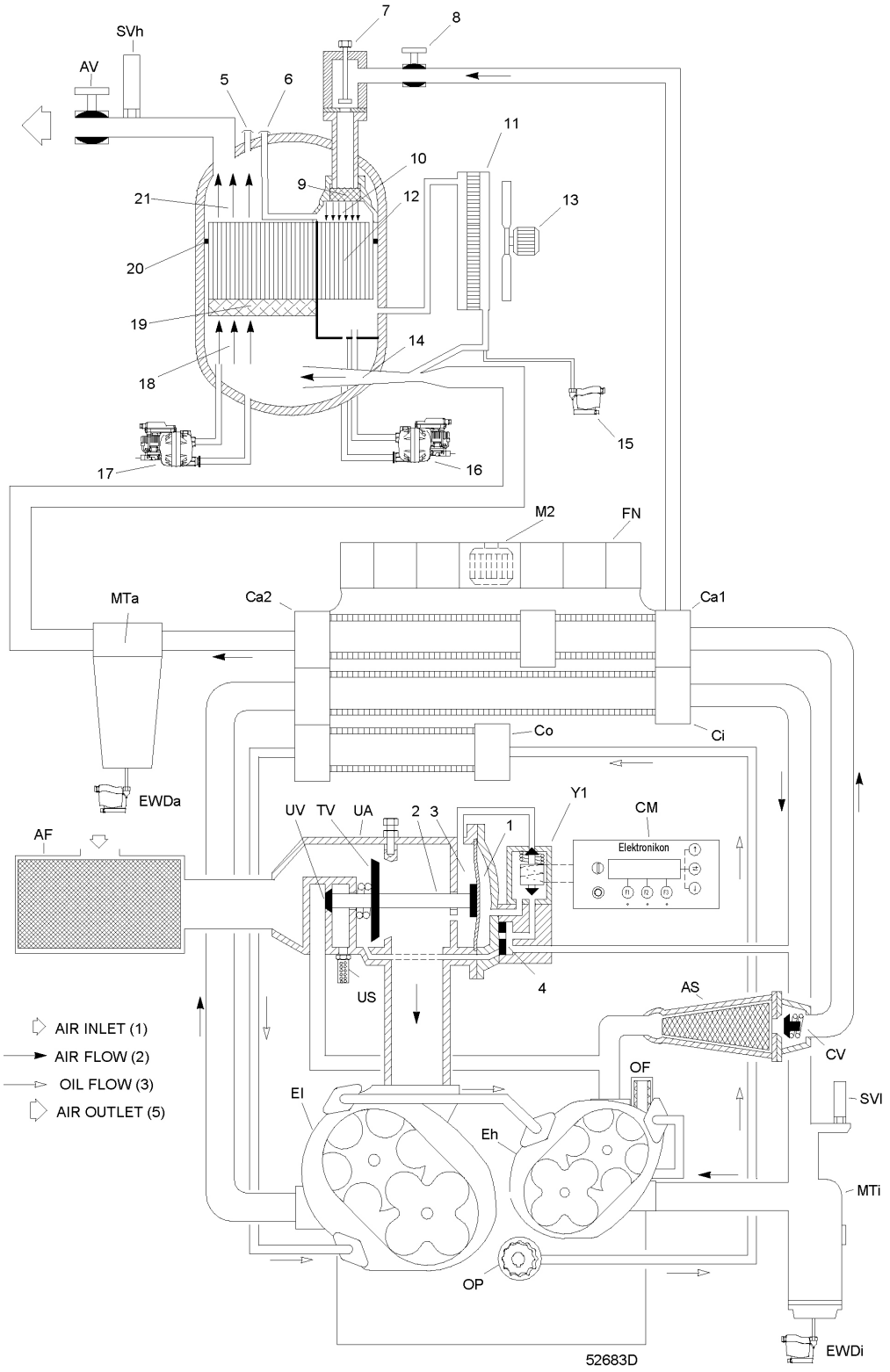


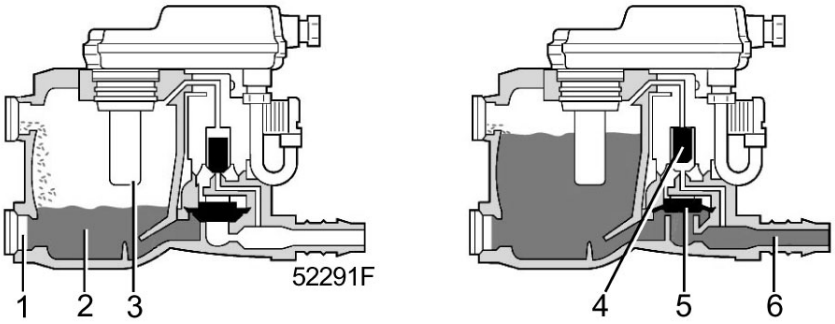
Fig. 1.7 Flow diagram/regulating system, ZT

AF	Air filter	2	Plunger
AS	Silencer	3	Chamber
AV	Air outlet valve (customer's installation)	4	Diaphragm
Ca	Aftercooler	5	Valve for (+) connection, pressure difference gauge
Ca1	Pre-aftercooler		
Ca2	Aftercooler	6	Valve for (-) connection, pressure difference gauge
Ci	Intercooler		
CM	Elektronikon regulator	7	Throttle valve, regeneration inlet air
Co	Oil cooler	8	Shut-off valve, hot regeneration inlet air
CV	Check valve	9	Strainer
Eh	High-pressure compressor element	10	Sealing sector, regeneration air inlet (unsaturated side)
El	Low-pressure compressor element		
EWDa	Electronic water drain, aftercooler	11	Regeneration air cooler
EWDi	Electronic water drain, intercooler	12	Rotor
FN	Cooling fan	13	Fan, regeneration cooler (ZT only)
MTa	Condensate trap, aftercooler	14	Ejector
MTi	Condensate trap, intercooler	15	Electronic water drain, regeneration air cooler (ZT only)
M2	Fan motor		
OF	Oil filter	16	Electronic water drain, regeneration air
OP	Oil pump	17	Electronic water drain, inlet air
SVh	High-pressure safety valve	18	Water separator, inlet air
SVl	Low-pressure safety valve	19	Demister
TV	Load/no-load valve	20	Rotor sealing arrangement
UA	Unloader	21	Dry air outlet compartment
US	Silencer	22	Shut-off valve, regeneration air cooler water outlet (ZR only)
UV	Unloading valve		
Y1	Loading solenoid valve	23	Shut-off valve, regeneration air cooler water inlet (ZR only)
1	Chamber		

Figs. 1.6 and 1.7 Flow diagrams/regulating systems

Text on Figs. 1.6 and 1.7

(1) Air inlet
(2) Air flow
(3) Oil flow
(4) Water flow
(5) Air outlet



1 Inlet
2 Collector
3 Sensor
4 Pilot valve
5 Diaphragm
6 Outlet

Fig. 1.8 Electronic water drain

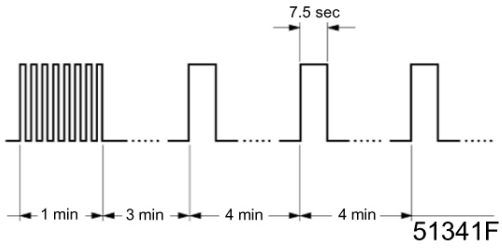


Fig. 1.9 Drain frequency during alarm condition

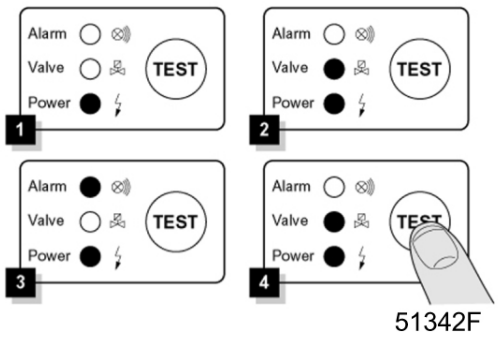


Fig. 1.10 Control panel, electronic water drain

1.4 Oil system

ZR compressors (Fig. 1.6)
Oil is circulated by pump (OP) from the sump of the gear casing through cooler (Co) and filter (OF) towards the bearings and timing gears. Valve (BV-Fig. 1.2) opens if the oil pressure should rise above a given value.

ZT compressors (Fig. 1.7)
Oil is circulated by pump (OP) from the sump of the gear casing through cooler (Co), the cooling jackets of compressor elements (El and Eh) and filter (OF) towards the bearings and timing gears. Valve (BV-Fig. 1.4) opens if the oil pressure should rise above a given value.

1.5 Cooling system

ZR compressors (Fig. 1.6)
The cooling system has two circuits:
- one for the oil cooler (Co) and the cooling jackets of both compressor elements (Eh and El)
- one for intercooler (Ci) and aftercooler (Ca).

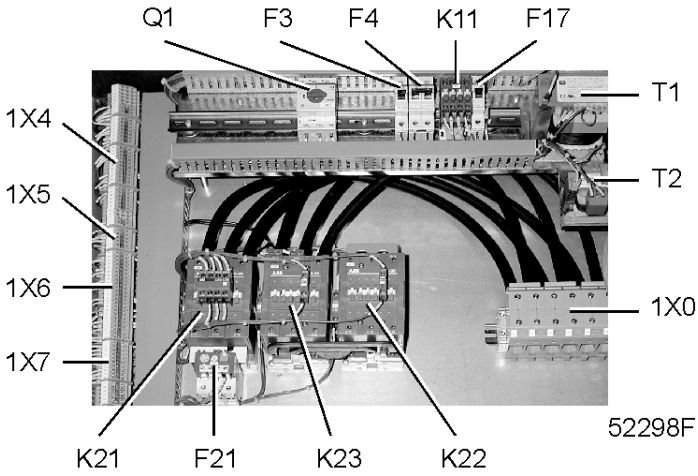
ZR Full-Feature compressors have an extra cooling circuit for the regeneration air cooler.

ZT compressors (Fig. 1.7)
The compressors are provided with an air-cooled oil cooler (Co), intercooler (Ci), pre-aftercooler (Ca1) and aftercooler (Ca2). An electric motor driven fan (FN) generates the cooling air.

ZT Full-Feature compressors have an additional regeneration air cooler (11), the cooling air for this cooler is generated by an extra fan (13).

1.6 Electrical system

The system mainly includes:
- Elektronikon® regulator (3-Fig. 1.1)
- Emergency stop button (S2-Fig. 1.1)
- Electric cabinet (Fig. 1.11)
- Drive motor (M1-Figs. 1.1 and 1.4)
- Pressure and temperature sensors



F3/4	Circuit breakers, control circuit
F17	Circuit breaker for electronically controlled automatic condensate drains
F21	Overload relay, drive motor
K11	Auxiliary relay, loading
K21	Line contactor
K22	Star contactor
K23	Delta contactor
Q1	Circuit breaker, control circuit
T1	Main transformer
T2	Transformer, control circuit
1X0	Power supply terminals
1X4/5/6/7	Terminal strips

Fig. 1.11 Electric cabinet, typical example

1.7 Elektronikon control system

In general, the Elektronikon regulator has following functions:
- automatic control of the compressor
- protecting the compressor
- monitoring components - service warning
- automatic restart after voltage failure

1.7.1 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. Take into account that a start command will be executed (if programmed and activated), even after manually stopping the compressor.

1.7.2 Protecting the compressor

Shut-down and motor overload
Several temperature and pressure sensors are provided on the compressor. If one of these measurements (temperature at LP element outlet, at HP element inlet, at HP element outlet, intercooler pressure, oil temperature (ZR only) as well as oil pressure) exceeds the programmed shut-down level, the compressor will be stopped. This will be indicated on the control display.

The compressor will also be stopped in case of overload of the drive motor and on ZT compressors in case of overload of the fan motor.

Consult the safety precautions as mentioned in section 4 and remedy the trouble. See also the User manual for Elektronikon regulator, section Status data menu.

Shut-down warning
If a temperature or pressure exceeds the programmed shut-down warning level, a message will appear on the control panel to warn the operator that the shut-down level is almost reached.

The message disappears as soon as the warning condition disappears.

1.7.3 Service warning

A number of service operations are grouped (called Level A, B, C, ...). Each level has a programmed time interval. If a time interval is exceeded, a message will appear on display (2-Fig. 1.12) to warn the operator to carry out the service actions belonging to that level. See section 4.

1.7.4 Automatic restart after voltage failure

The regulator has a built-in function to automatically restart the compressor when the voltage is restored 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 255 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.

1.8 Control panel

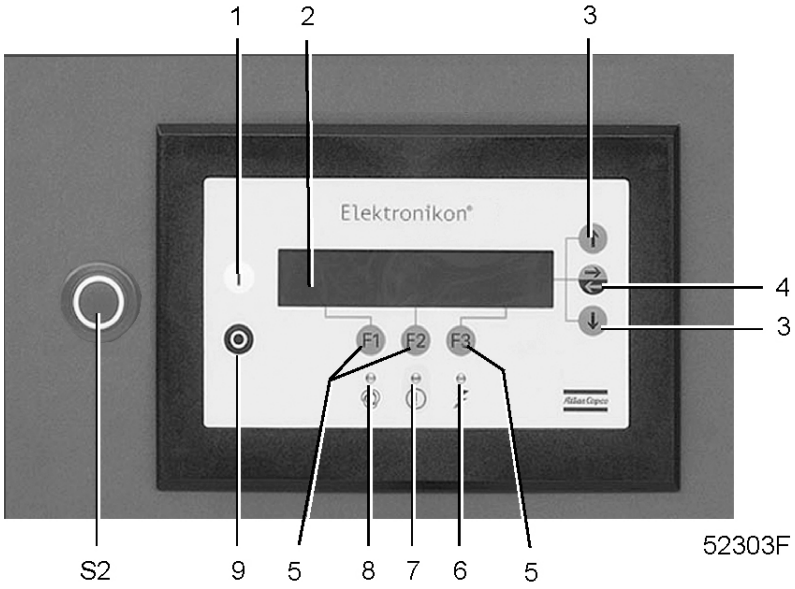


Fig. 1.12 Control panel

Ref.	Designation	Function
1	Start button	Push button to start the compressor. LED (8) lights up indicating that the Elektronikon regulator is operative.
2	Display	Indicates messages concerning the compressor operating condition, a service need or a fault.
3	Scroll keys	Keys to scroll upwards or downwards through the display.
4	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.
5	Function keys	Keys to control and program the compressor. See section 1.8.1.
6	Voltage on LED	Indicates that the voltage is switched on.
7	General alarm LED	Is alight if a shut-down warning condition exists. See section 1.7.
7	General alarm LED	Blinks if a shut-down condition exists, if an important sensor is out of order or after an emergency stop. See section 1.7.
8	Automatic operation LED	Indicates that the regulator is automatically controlling the compressor.
9	Stop button	Push button to stop the compressor. LED (8) goes out.
S2	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.

Compressor Outlet		7.0 bar	
Automatically Loaded			↓
Menu		Unload	
F1	F2	F3	

Fig. 1.13 Example of the main screen

1.8.1 Function keys (5-Fig. 1.12)

The keys are used:
- to manually load/unload the compressor
- to call up or program settings
- to reset an active motor overload, shut-down or service message, or an emergency stop
- to have access to all data collected by the regulator

The functions of the keys vary depending on the displayed menu. The actual function is indicated on the bottom line of the display just above the relevant key.

The most common functions are listed below:

Designation	**Function**
Add	To add compressor start/stop commands (day/hour)
Back	To return to a previously shown option or menu
Cancel	To cancel a programmed setting when programming parameters
Delete	To delete compressor start/stop commands
Help	To find the Atlas Copco internet address
Limits	To show limits for a programmable setting
Mainscreen	To return from a menu to the main screen (Fig. 1.13)
Menu	Starting from the main screen (Fig. 1.13), to have access to submenus
Menu	Starting from a submenu, to return to a previous menu
Modify	To modify programmable settings
Program	To program modified settings
Reset	To reset a timer or message
Return	To return to a previously shown option or menu
Extra	To find information regarding the installed modules

1.8.2 External compressor status indication

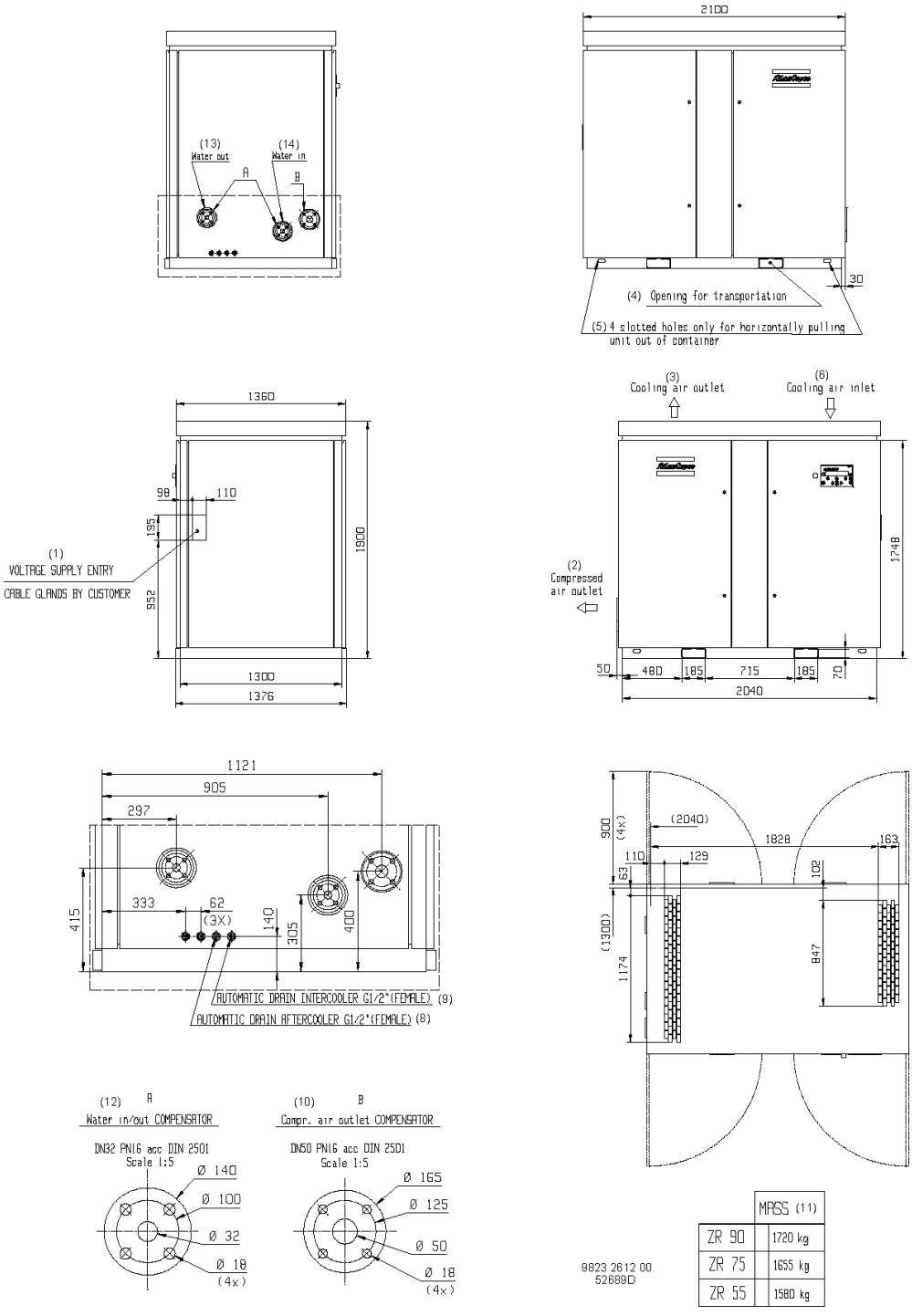
Terminal strip (1X7-Fig. 1.11) is provided with auxiliary contacts for external indication of:

Indication	**Relay**	**Terminals on strip 1X7**	**Max. load**
Automatic operation	K07	11-12	10 A / 230 V AC
Warning	K08	13-14	10 A / 230 V AC
Shut-down	K09	15-16	10 A / 230 V AC
Compressor running	K21	17-18	6 A / 230 V AC
Compressor loaded	K11	19-20	6 A / 230 V AC

Warning
Before connecting external equipment, stop the compressor and apply all safety precautions as mentioned in section 4.

2 INSTALLATION

2.1 Dimension drawings



	MASS (11)
ZR 90	1720 kg
ZR 75	1655 kg
ZR 55	1580 kg

Fig. 2.1 Dimension drawing, ZR

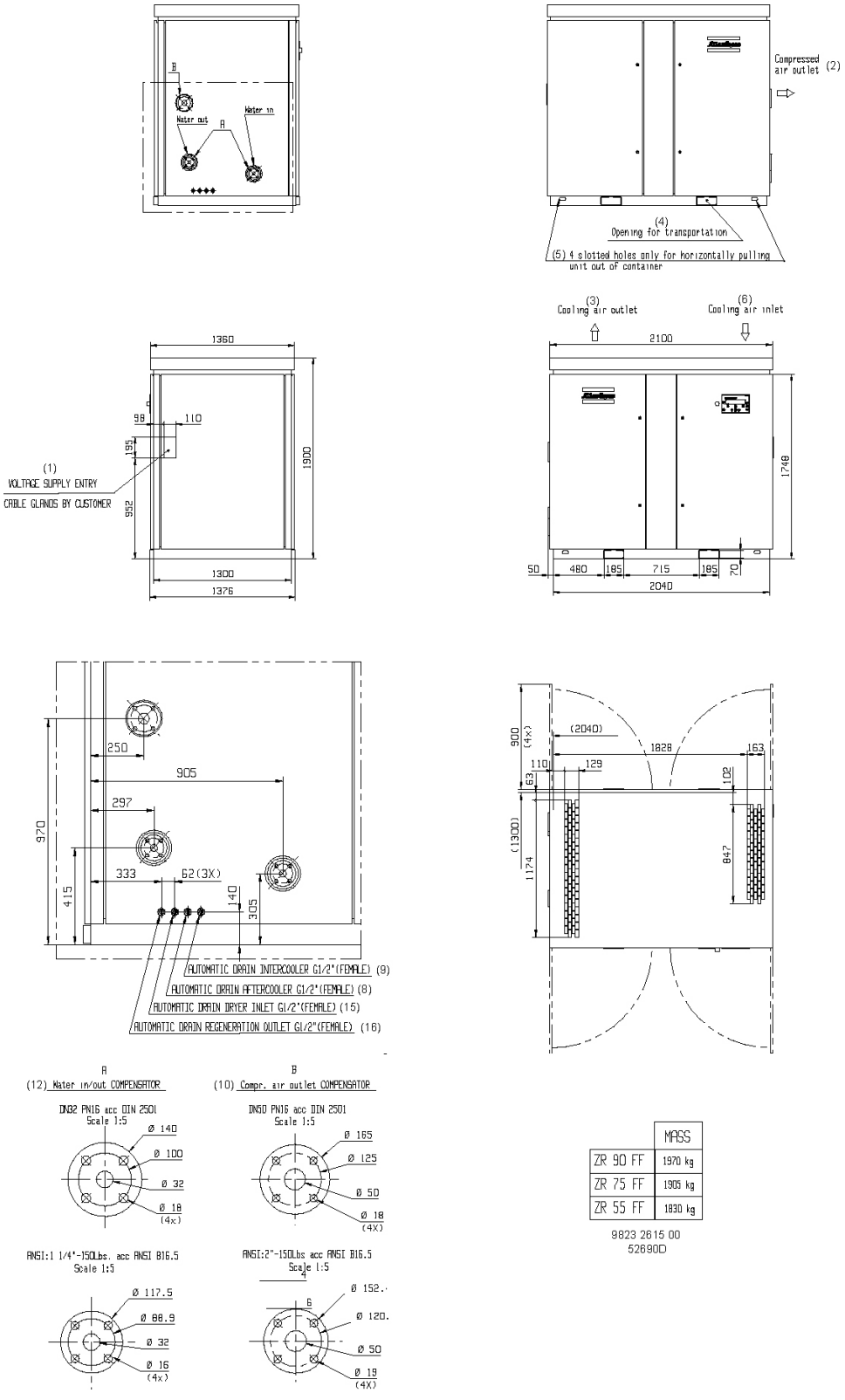
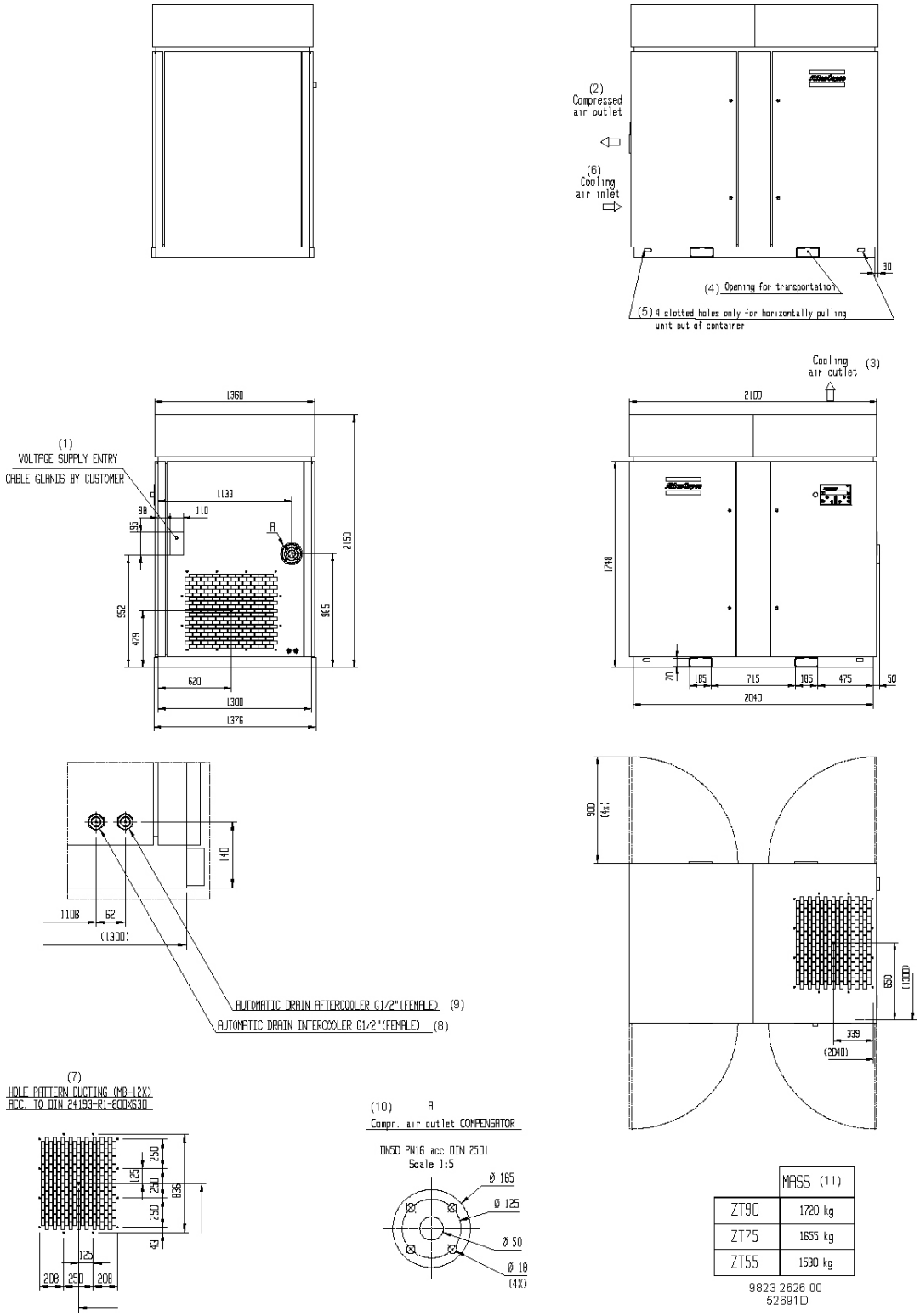


Fig. 2.2 Dimension drawing, ZR Full-Feature



	MASS (11)
ZT90	1720 kg
ZT75	1655 kg
ZT55	1580 kg

9823 2626 00
52691D

Fig. 2.3 Dimension drawing, ZT

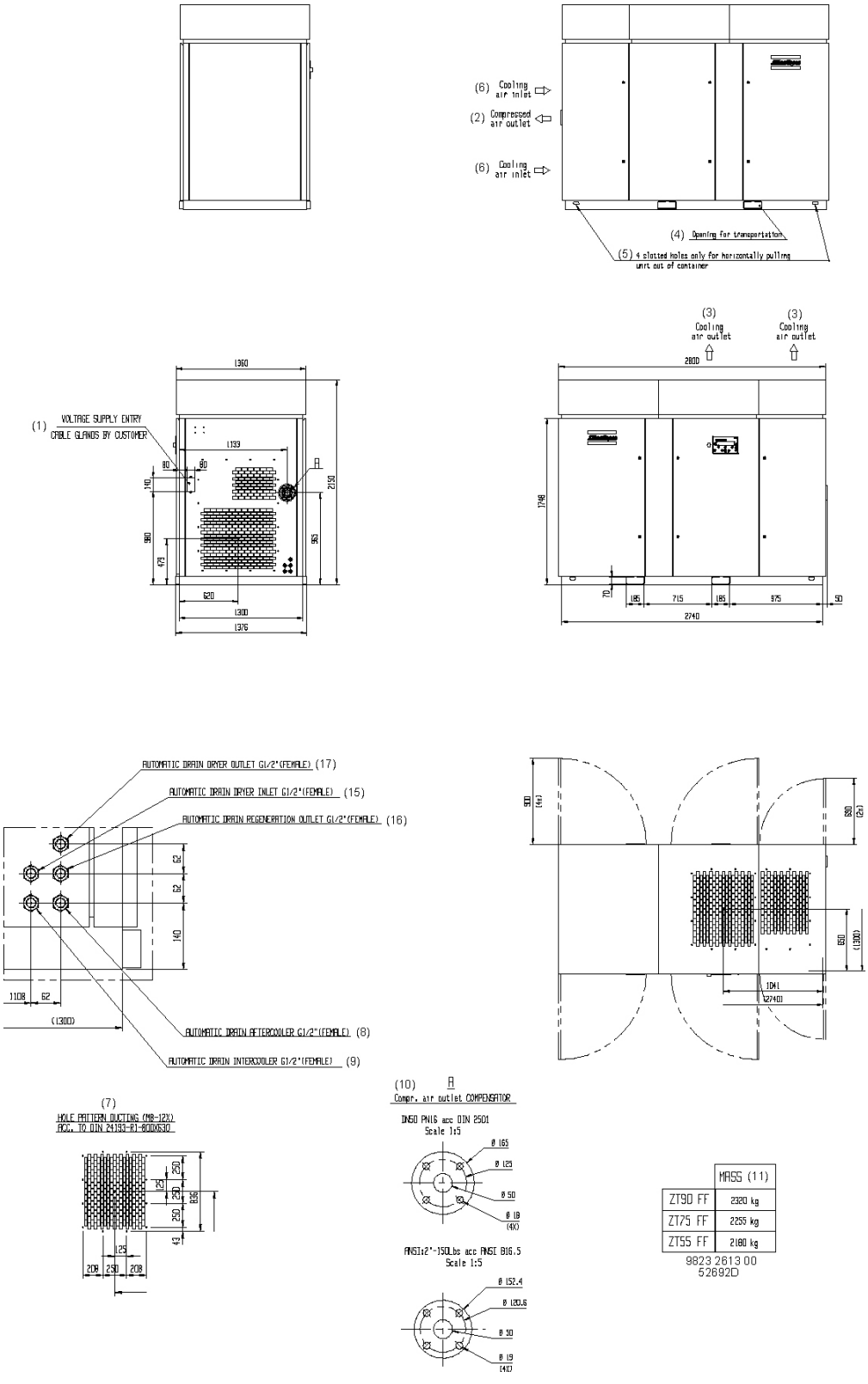


Fig. 2.4 Dimension drawing, ZT Full-Feature

Text on Figs. 2.1up to 2.4

(1) Voltage supply entry
(2) Compressed air outlet
(3) Cooling air inlet
(4) Opening for transportation
(5) 4 slotted holes for horizontally pulling out of container only
(6) Cooling air outlet
(7) Hole pattern ducting
(8) Automatic drain, aftercooler
(9) Automatic drain, intercooler
(10) Compressed air outlet, compensator
(11) Mass
(12) Water in/out, compensator
(13) Water out
(14) Water in
(15) Automatic drain, dryer inlet
(16) Automatic drain, regeneration air outlet
(17) Automatic drain, dryer outlet

2.2 Installation proposals (Figs. 2.5 and 2.8)

Ref.	Description
1.	Install the compressor on a level floor suitable for taking the weight of the compressor. Recommended minimum distance between the top of the bodywork and the ceiling: 1200 mm.
2.	Remove the plastic plug (if provided) from the compressor air outlet pipe and install an air outlet valve. Close the valve and connect it to the air net.
3.	The pressure drop over the delivery pipe can be calculated as follows:
	dp = (L x 450 x Qc1.85) / (d5 x 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 The connection of the compressor air delivery pipe should be made on top of the main air net pipe to minimize carry-over of possible remainder of condensate.
4.	The inlet grids and ventilation fan should be installed in such a way that any recirculation of cooling air to the compressor is avoided. The air velocity to the grids should be limited to 5 m/s. The required ventilation capacity (per compressor installed) to limit the compressor room temperature can be calculated as follows: **For ZR compressors:** Qv =0.1 N / dT

	For ZT compressors: Qv =0.92 N / dT Qv = required ventilation capacity in m³/s N = shaft input of the compressor in kW dT = temperature rise over ambient in °C If cooling air ducts are installed, the maximum allowable pressure drop over the ducts is 30 Pa. Common ducting for several compressors is not allowed. For detailed information regarding ventilation proposals, contact your Atlas Copco Service Centre.
5.	Lay out the drain piping from automatic condensate outlets (EWD) towards the condensate collector. The drain pipes must not dip into the water of the collector. It is recommended to provide a funnel to allow visual inspection of the condensate flow.
6.	Elektronikon control system with control panel.
7.	See section 2.3 for the recommended cable size of the supply cables. Check that the electrical connections correspond to the local codes. The installation must be earthed and protected against short circuits by fuses in all phases. An isolating switch must be installed near the compressor.
8.	Provide a condensate drain valve in the lowest part of the pipe between the compressor outlet valve and the air net.
9.	**On ZR**, remove the plastic plugs (if provided) from the compressor water pipes (WI and WO-Fig. 1.1) and connect the pipes to the cooling water circuit. Provide a valve in the compressor water inlet pipe and outlet pipe.

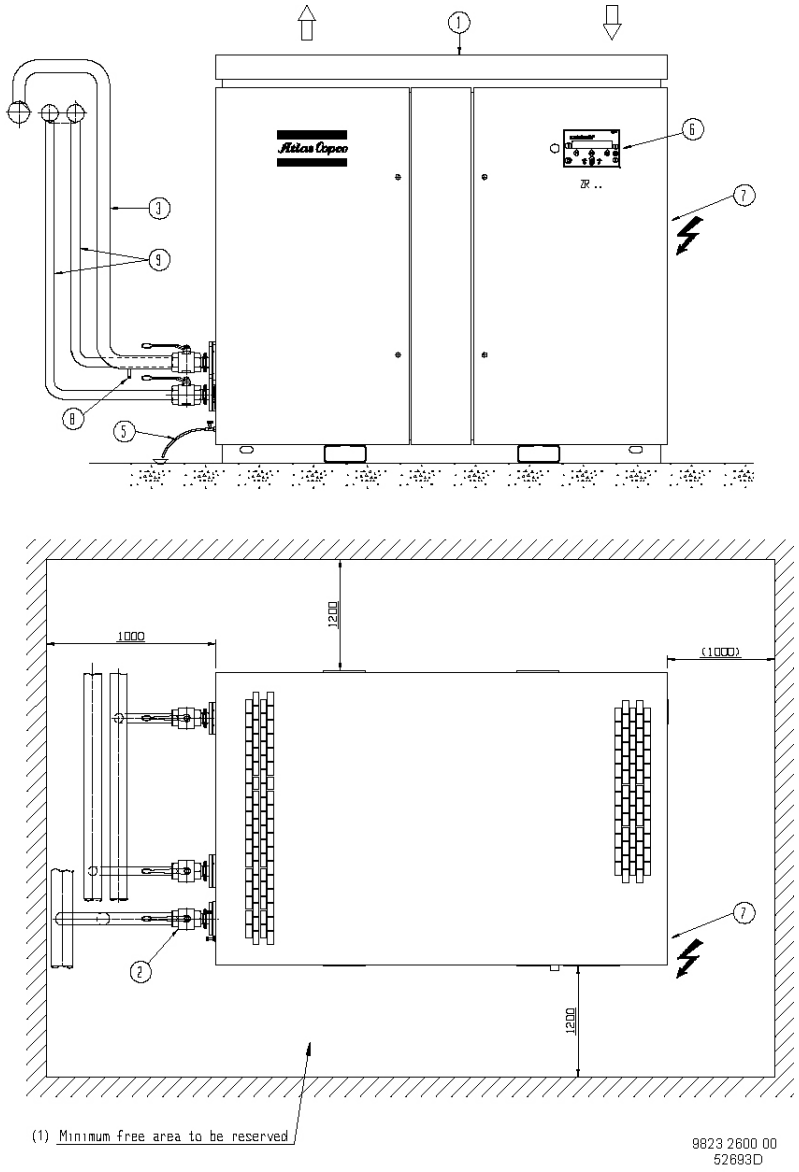


Fig. 2.5 Installation proposal, ZR

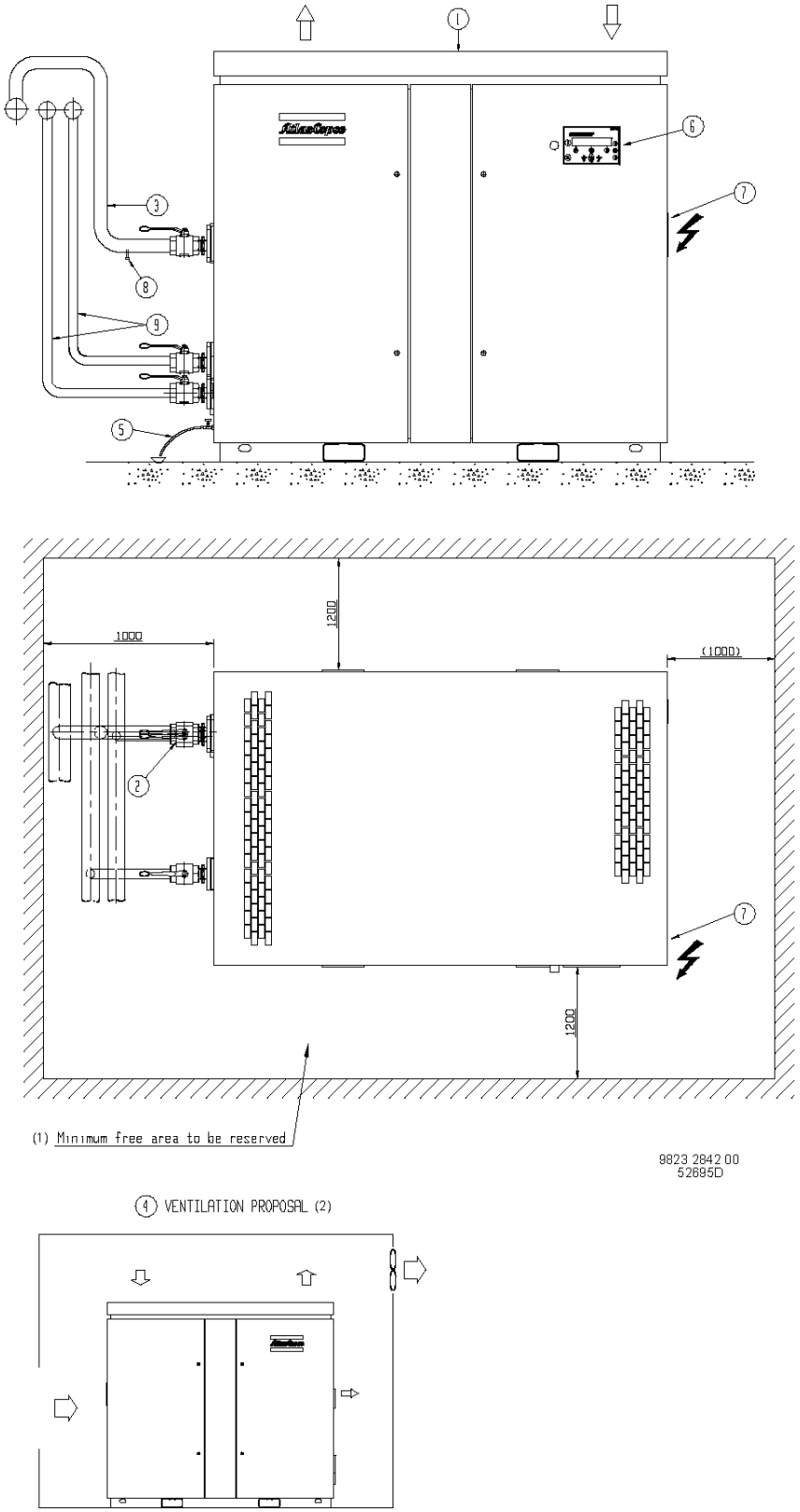


Fig. 2.6 Installation proposal, ZR Full-Feature

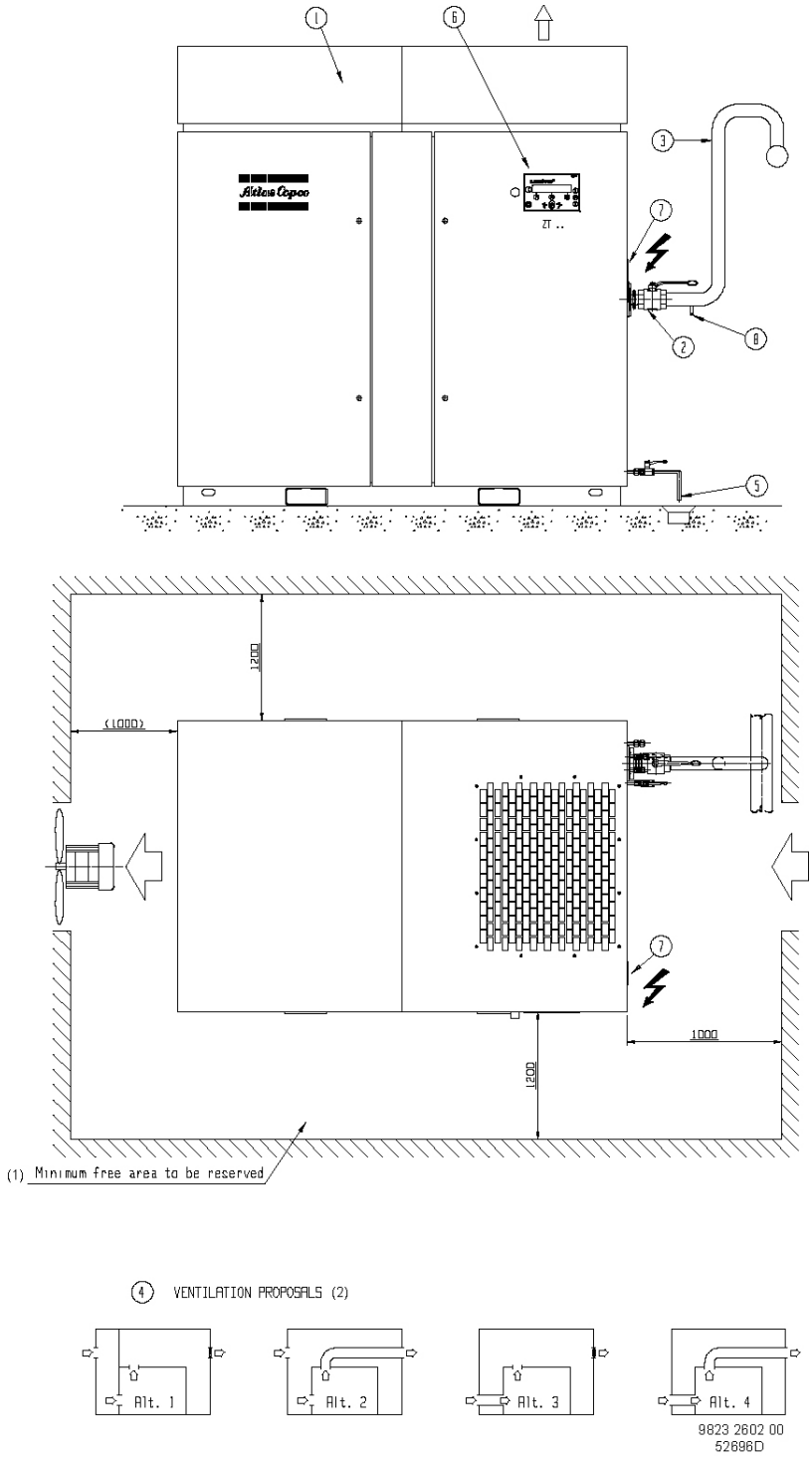


Fig. 2.7 Installation proposal, ZT

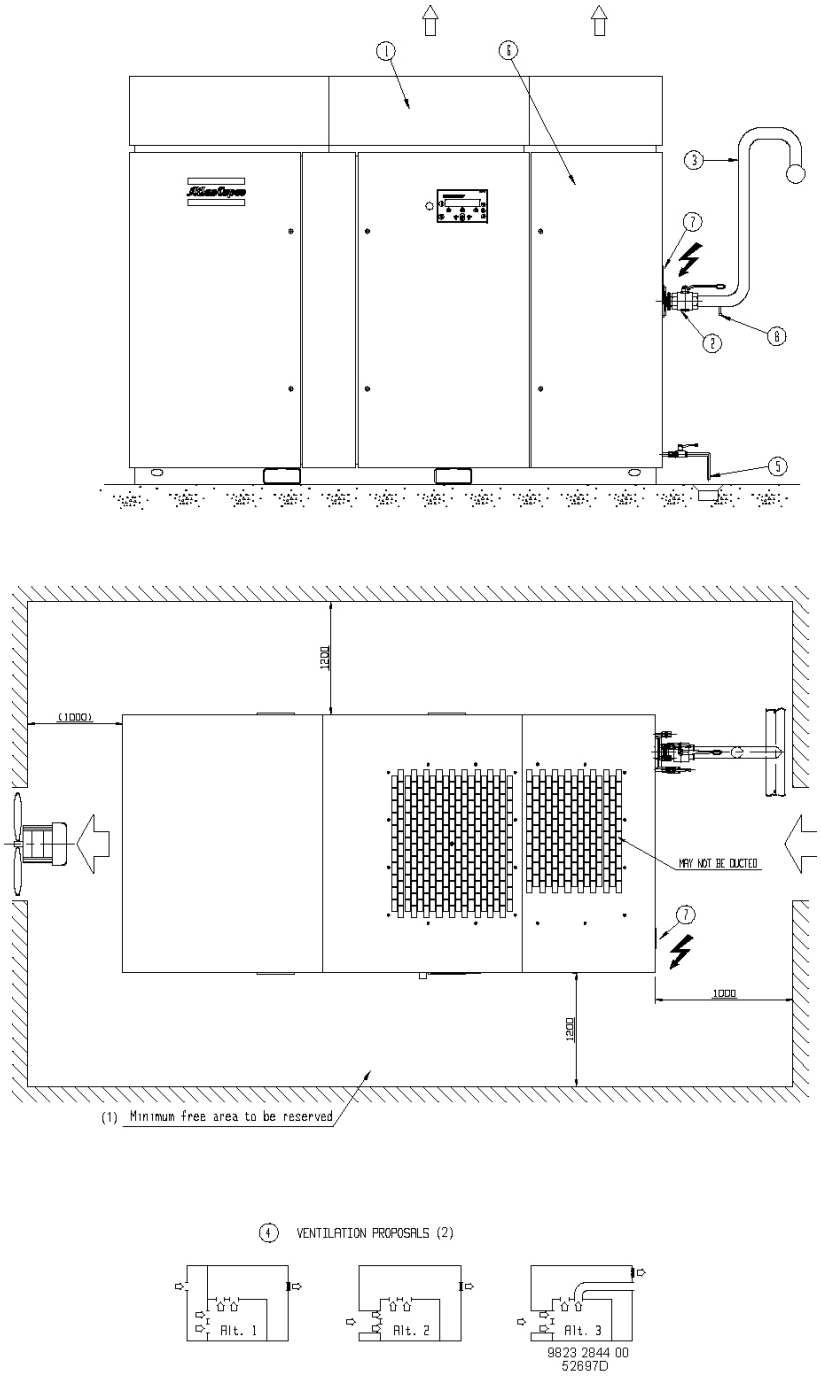


Fig. 2.8 Installation proposal, ZT Full-Feature

Text on Figs. 2.5 up to 2.8

(1) Minimum free area
(2) Ventilation proposals

2.3 Electric cables

Mains + earth cable

50Hz IEC

Compressor	Voltage	Supply cables
ZR/ZT55	200V	2x (3 x 70 + 35) mm²
ZR/ZT55	230V	2x (3 x 70 + 35) mm²
ZR/ZT55	400V	3 x 50 + 25 mm²
ZR/ZT55	500V	3 x 35 + 16 mm²

50Hz IEC

Compressor	Voltage	Supply cables
ZR/ZT75	200V	2x (3 x 120 + 70) mm²
ZR/ZT75	230V	2x (3 x 95 + 50) mm²
ZR/ZT75	400V	3 x 95 + 50 mm²
ZR/ZT75	500V	3 x 70 + 35 mm²

50Hz IEC

Compressor	Voltage	Supply cables
ZR/ZT90	230V	2x (3 x 120 + 70) mm²
ZR/ZT90	400V	3 x 120 + 70 mm²
ZR/ZT90	500V	3 x 70 + 35 mm²

60Hz IEC

Compressor	Voltage	Supply cables
ZR/ZT55	200V	2x (3 x 70 + 35) mm²
ZR/ZT55	220-230V	2x (3 x 70 + 35) mm²
ZR/ZT55	380V	3 x 70 + 35 mm²
ZR/ZT55	440-460V	3 x 50 + 25 mm²
ZR/ZT55	575V	3 x 35 + 16 mm²

60Hz IEC

Compressor	Voltage	Supply cables
ZR/ZT75	200V	2x (3 x 120 + 70) mm²
ZR/ZT75	220-230V	2x (3 x 95 + 50) mm²
ZR/ZT75	380V	3 x 120 + 70 mm²
ZR/ZT75	440-460V	3 x 95 + 50 mm²
ZR/ZT75	575V	3 x 70 + 25 mm²

60Hz IEC

Compressor	Voltage	Supply cables
ZR/ZT90	200V	2x (3 x 120 + 70) mm²
ZR/ZT90	220-230V	2x (3 x 120 + 70) mm²
ZR/ZT90	380V	2x (3 x 50 + 25) mm²
ZR/ZT90	440-460V	3 x 95 + 50 mm²
ZR/ZT90	575V	3 x 70 + 35 mm²

60Hz CSA/UL

Compressor	Voltage	Supply cables
ZR/ZT55	200V	2x (3 x AWG2/0 + AWG4)
ZR/ZT55	220-230V	2x (3 x AWG2/0 + AWG4)
ZR/ZT55	380V	3 x AWG2/0 + AWG4
ZR/ZT55	440-460V	3 x AWG1 + AWG6
ZR/ZT55	575V	3 x AWG3 + AWG8

60Hz CSA/UL

Compressor	Voltage	Supply cables
ZR/ZT75	200V	2x (3 x MCM250 + AWG2)
ZR/ZT75	220-230V	2x (3 x AWG4/0 + AWG2)
ZR/ZT75	380V	3 x AWG4/0 + AWG2
ZR/ZT75	440-460V	3 x AWG3/0 + AWG3
ZR/ZT75	575V	3 x AWG1/0 + AWG4

60Hz CSA/UL

Compressor	Voltage	Supply cables
ZR/ZT90	200V	2x (3 x AWG4/0 + AWG2) RADOX
ZR/ZT90	220-230V	2x (3 x MCM250 + AWG2)
ZR/ZT90	380V	3 x AWG4/0 + AWG2 RADOX
ZR/ZT90	380V	2x (3 x AWG2/0 + AWG4)
ZR/ZT90	440-460V	3 x AWG4/0 + AWG2
ZR/ZT90	575V	3 x AWG2/0 + AWG4

Remarks
The size is valid at maximum ambient temperature of 40°C.

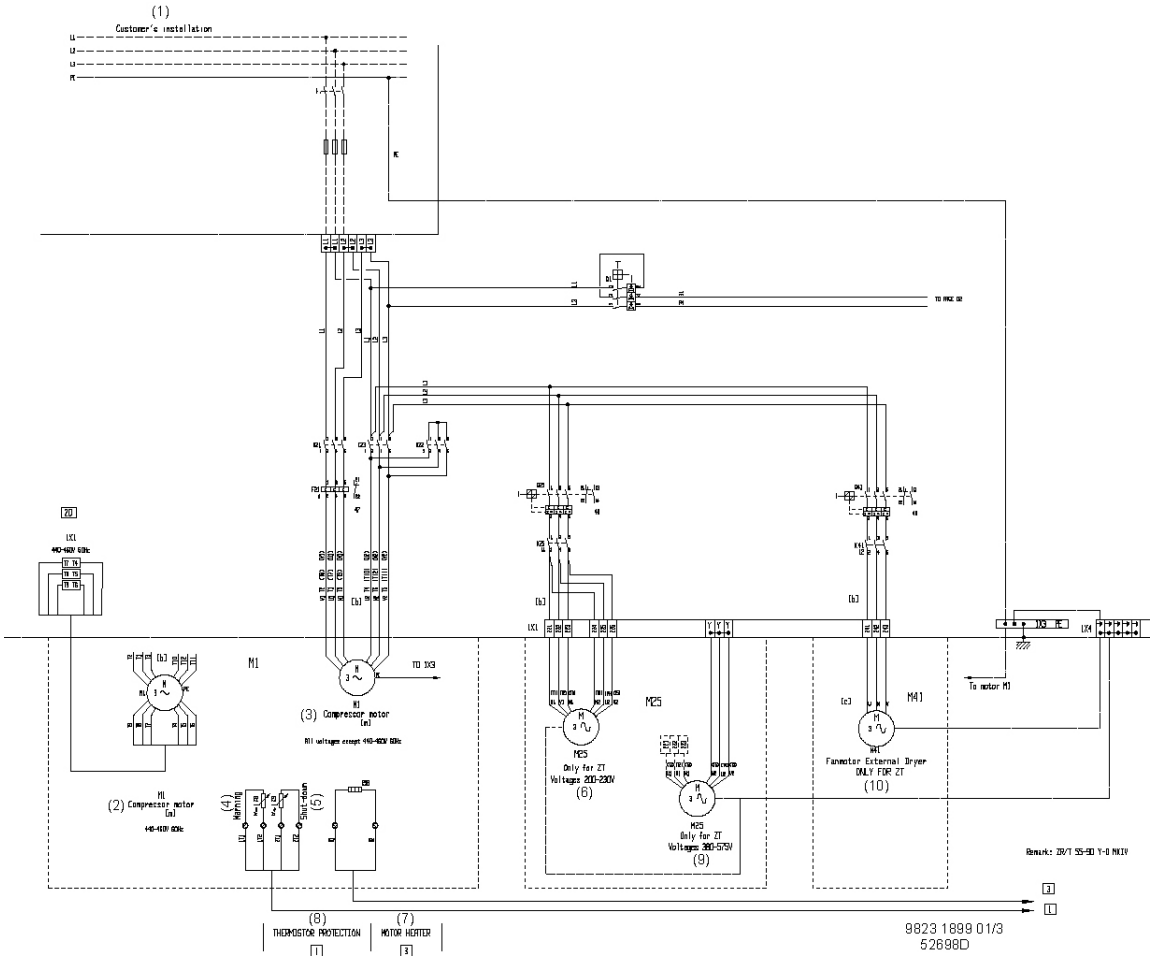


Fig. 2.9 Electrical connections

Text on Fig. 2.9

(1) Customer's installation
(2) Compressor motor, 440-460V 60Hz
(3) Compressor motor, all voltages except for 440-460V 60Hz
(4) Warning
(5) Shut-down
(6) Only for ZT 200-230V
(7) Motor heater
(8) Thermistor protection
(9) Only for ZT 380-575V
(10) Fan motor, external dryer. Only for ZT

2.4 Cooling water requirements

The cooling water quality must meet certain minimum requirements.

No general recommendation can encompass the effects of all combinations of the various compounds, solids and gases typically found in cooling water in interaction with different materials.

This recommendation is a general guide line for acceptable coolant quality.

2.4.1 Type of the system

Closed system
In a closed system, the same cooling water is circulating through a system without contact with air.

Open system
An open system is a pass-through system, or a circulating system with a cooling tower. In the latter case, the composition of the water that enters the cooler must be considered, and not the composition of the make-up water. Due to the evaporative effect in the cooling tower, much higher concentrations of ions can be obtained in the circulating water than in the make-up water.

2.4.2 Cooling water parameters

The Rysnar stability index (RSI)

The Rysnar Index (RSI) is a parameter for predicting whether water will tend to dissolve or precipitate calcium carbonate. The adhesion of scaling deposits and their effect are different on different materials, but the equilibrium of the water (scaling or corrosive) is only determined by its actual pH value and by the saturation pH value (pHs).

The saturation pH value is determined by the relationship between the calcium hardness, the total alkalinity, the total solids concentration and the temperature.

The Rysnar Index is calculated as follows :

$RSI = 2*pH_s - pH$

where pH = measured pH (at room temperature) of water sample
pH_s= pH at saturation

The pH_s is calculated by using :

$pH_s = (9.3 + A + B) - (C + D)$

A : depends on the total solids concentration (mg/l).

B : depends on the highest cooling water temperature (°C),
For ZR units take T = 65°C

C : depends on the calcium hardness (ppm $CaCO_3$).

D : depends on the HCO_3^- concentration or M-alkalinity (mval/l).

The values from A, B, C and D are found in the table below.

Total Dissolved solids (mg/l)	A	Temperature (°C)	B	Ca-hardness (ppm $CaCO_3$)	C	M-Alkalinity (mval/l)	
50 - 300	0.1	0 - 1	2.6	10 - 11	0.6	0.20 - 0.22	1.0
400 - 1000	0.2	2 - 6	2.5	12 - 13	0.7	0.24 - 0.26	1.1
		7 - 9	2.4	14 - 17	0.8	0.28 - 0.34	1.2
		10 - 13	2.3	18 - 22	0.9	0.36 - 0.44	1.3
		14 - 17	2.2	23 - 27	1.0	0.46 - 0.54	1.4
		18 - 21	2.1	28 - 34	1.1	0.56 - 0.70	1.5
		22 - 27	2.0	35 - 43	1.2	0.72 - 0.88	1.6
		28 - 31	1.9	44 - 55	1.3	0.90 - 1.10	1.7
		32 - 37	1.8	56 - 69	1.4	1.12 - 1.38	1.8
		38 - 44	1.7	70 - 87	1.5	1.40 - 1.76	1.9
		45 - 50	1.6	88 - 110	1.6	1.78 - 2.20	2.0
		51 - 56	1.5	111 - 138	1.7	2.22 - 2.78	2.1
		57 - 63	1.4	138 - 174	1.8	2.80 - 3.54	2.2
		64 - 71	1.3	175 - 220	1.9	3.54 - 4.40	2.3
		72 - 80	1.2	230 - 270	2.0	4.6 - 5.4	2.4
				280 - 340	2.1	5.6 - 7.0	2.5
				350 - 430	2.2	7.2 - 8.8	2.6
				440 - 550	2.3	9.0 - 11.0	2.7
				560 - 690	2.4	11.2 - 13.8	2.8
				700 - 870	2.5	14.0 - 17.6	2.9
				880 - 1000	2.6	17.8 - 20.0	3.0

The interpretation of the values obtained is :

RSI < 6 boiler scale formation
RSI 6 - 7 neutral water
RSI > 7 corrosive water

A more detailed interpretation follows below :

RSI	Tendency of the water	Action
RSI < 3.9	Very high scale formation	Water cannot be used
4.0 < RSI < 5.5	High boiler scale formation	Regular control and descaling operation necessary
5.6 < RSI < 6.2	Slight boiler scale formation	Water treatment not necessary Occasional inspection recommended
6.3 < RSI < 6.8	Neutral water	Water treatment not necessary Occasional inspection recommended
6.9 < RSI < 7.5	Slight corrosion at higher temperature	Water treatment not necessary Occasional inspection recommended
7.6 < RSI < 9.0	Strong corrosion	Regular control necessary, use of corrosion inhibitor recommended
9.1 < RSI < 11	Very strong corrosion	Regular control necessary, use of corrosion inhibitor required
RSI > 11	Very strong corrosion in complete water system	Water should not be used

This table indicates that distilled or demineralised water should never be used, as their RSI is >11.

The RSI only indicates the equilibrium of scaling – descaling. Cooling water showing good RSI conditions can still be unsuitable due to other factors.

From the table above, the RSI index should be between 5.6 and 7.5; otherwise, contact a specialist.

pH
The effect of pH is already calculated in the Rysnar index, but the pH itself has some additional limitations:

Z-units 6.8 < pH < 8.5

Total Dissolved solids (TDS)
This is the sum of all ions in the water. It can be derived from the dry residue after evaporation (but not including suspended solids), or it can be estimated from the electrical conductivity.

In a closed system, the following limits apply :

All units TDS < 3000 mg/l (<3800 µS/cm)

For an open system, the following limits apply :

Z-units TDS < 750 mg/l (< 960 µS/cm)

Chlorides (Cl^-)
Chloride ions will create pitting corrosion on stainless steel. Their concentration should be limited :

Closed cooling system : Chlorides < 500 ppm
Open cooling system : Chlorides < 150 ppm

However, if the water is scaling, lower limits should be used. (See The Rysnar stability index (RSI)).

Free chlorine (Cl_2)
Continuously, a level of 0.5 ppm should not be exceeded.
For shock treatments, a maximum limit of 2 ppm for maximum 30 minutes/day applies.

Sulphates ($SO4^{--}$)
Closed cooling system : Sulphates < 400 ppm
Open cooling system : Sulphates < 150 ppm

Carbonate hardness
Closed cooling system : 50-1000 ppm $CaCO_3$
Open cooling system : 50-500 ppm $CaCO_3$

HCO_3^- / SO_4^{2-} should be >1

Ammonia
< 0.5 ppm

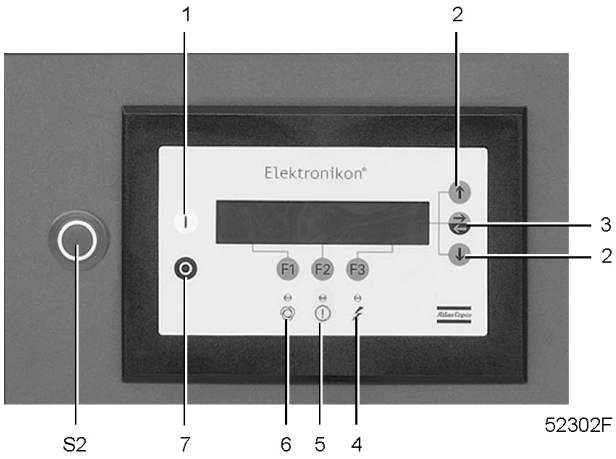
Copper
< 1 ppm

Iron and Manganese
< 1 ppm

Organics
No algae.
No oil.

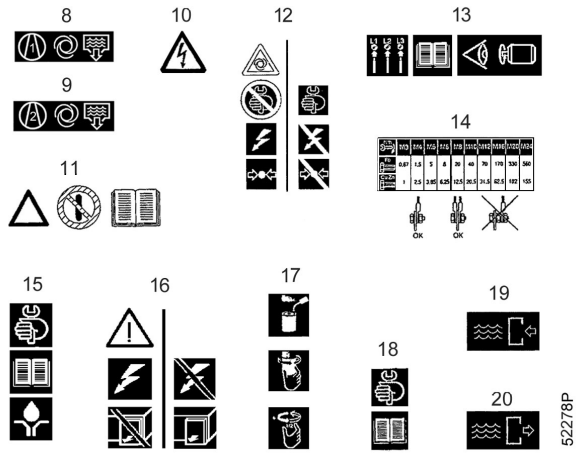
Suspended solids
Non-soluble particles, size < 1mm.
< 10 ppm

2.5 Pictographs (Figs. 2.10 and 2.11)



1 Start
2 Scroll keys
3 Tabulator key
4 Voltage on
5 Alarm
6 Automatic operation
7 Stop
S2 Emergency stop

Fig. 2.10 Pictographs on control panel



8 Automatic condensate outlet, intercooler
9 Automatic condensate outlet, aftercooler
10 Warning: under tension
11 Read Instruction book before starting the compressor
12 Switch off the voltage and depressurize the compressor before maintenance or repair
13 Before connecting the compressor electrically, consult the Instruction book for the motor rotation direction
14 Torques for steel (Fe) or brass (CuZn) bolts
15 Consult the Instruction book before greasing
16 Switch off the voltage before removing the protecting cover inside the electric cabinet
17 Oil the gaskets, screw on the filters and tighten by hand (approx. one half turn)
18 Consult the Instruction book before maintenance or repair
19 Cooling water inlet
20 Cooling water outlet

Fig. 2.11 Pictographs at other locations

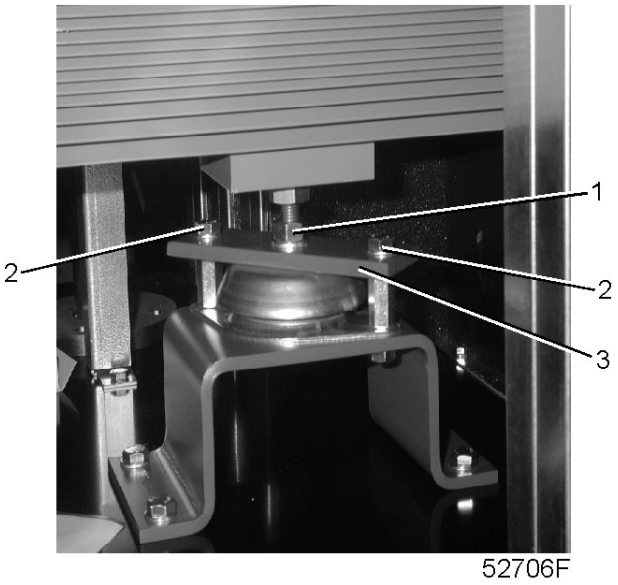
Figs. 2.10 and 2.11 Pictographs

3 OPERATING INSTRUCTIONS

Safety precautions
The operator must apply all related safety precautions including those mentioned in this book.

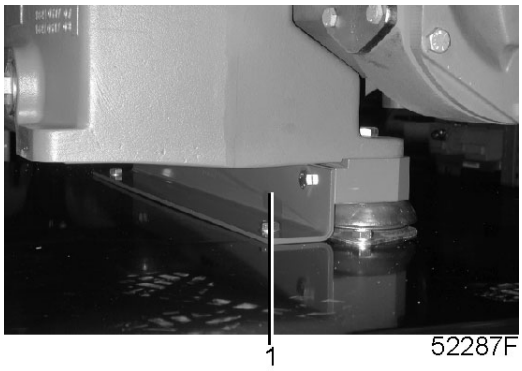
Ambient conditions
Consult section 7 for the limitations with regard to the ambient conditions and altitude operation.

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.



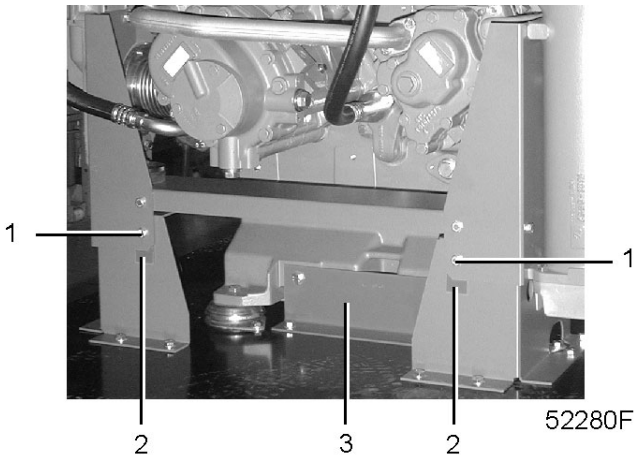
1 Nut
2 Transport bolts, to be removed
3 Transport bracket

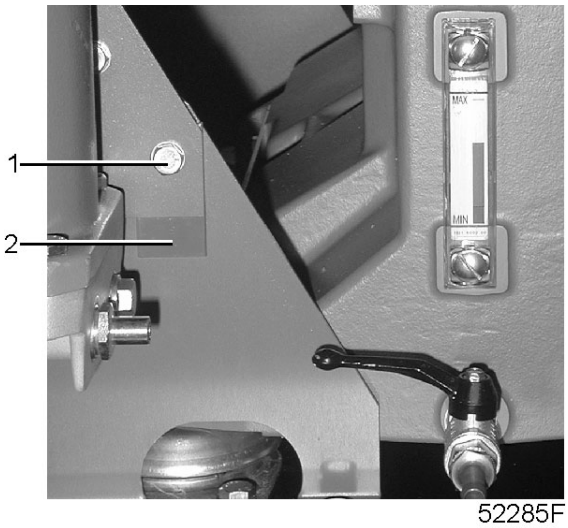
Fig. 3.1 Motor transport fixation

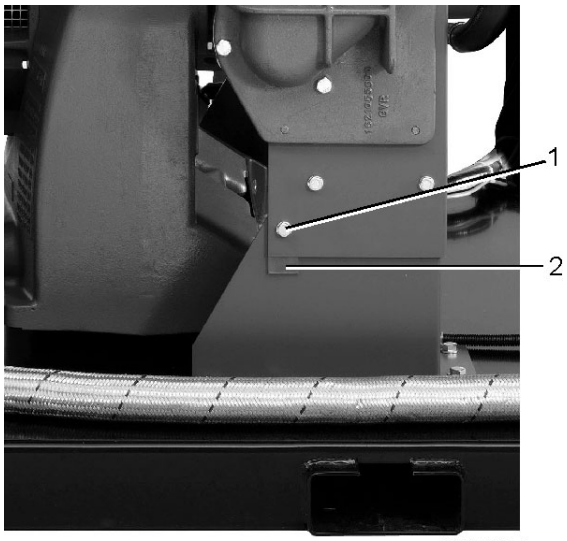


1 Transport support (painted red), to be removed

Fig. 3.2 Gear casing transport support, ZR







52286F

1 Transport bolt, to be removed
2 Transport supports (painted red), to be removed
3 Transport support (painted red), to be removed

Figs. 3.3 Transport supports for gear casing and coolers, ZT

3.1 Initial start-up

1. Read the User manual for Elektronikon® regulator to familiarize yourself with all regulator functions.
2. Consult section 2 for the electric cable size, installation proposals and dimension drawings.
3. A sticker dealing in short with the operation instructions is delivered with the literature set. Affix the sticker next to the control panel.
4. A number of VCI (Volatile Corrosion Inhibitor) plates are provided inside the bodywork to protect the compressor against corrosion. Remove the plates.
5. The compressor and motor are secured to the frame, immobilizing the vibration dampers during transport:
   - At the motor side (Fig. 3.1), loosen nut (1), remove bolts (2) and turn bracket (3) 90°. Tighten nut (1).
   - **On ZR**, at the gear casing side (Fig. 3.2), remove support (1).
   - **On ZT** (Fig. 3.3), remove bolts (1) and supports (2) immobilizing the vibration dampers of the coolers. Remove support (3), immobilizing the vibration dampers of the gear casing.
6. Remove flange (1-Figs. 1.4 and 3.4) and take out the silica gel bags installed in the intercooler at the condensate drain receiver side. Refit the flange.
7. **On ZR**, fit the water drain plugs that are fixed to the water pipe of one of the compressor elements in a plastic bag. The plugs are painted green and their positions are shown on Figs. 3.5 and 3.6.
8. **On ZR,** check that the cooling water drain valves (customer's installation) in the inlet and outlet lines are closed. **Open the water inlet valve and outlet valve** (customer's installation) and check for water flow.

On ZR Full-Feature, the inlet and outlet valves of the cooling water circuit of the regeneration cooler must be opened completely.

9. Check that the gear casing is filled with oil: oil must be visible in sight-glass (SG-Fig. 3.4).
10. Check that the electrical connections correspond to the local codes. The installation must be earthed and protected by fuses in all phases. An isolating switch must be provided.
11. Check the connections at the primary sides of transformers (T1 and T2-Fig. 1.11).
12. Switch on the voltage. Start the compressor and stop it immediately. Check for correct direction of rotation while the motor is coasting to a stop. An arrow on the gear casing indicates the correct rotation direction. If the rotation direction is wrong, switch off the voltage and reverse two incoming electric lines.
    On ZT, remove panel (1-Fig. 1.5) and check the rotation direction of the fan motor. If the rotation direction is wrong, switch off the voltage and reverse connections at terminals 221 up to 226 of terminal strip (1X1).
13. Run the compressor for a few minutes and check that it operates normally.
14. Stop the compressor. If necessary, top up the gear casing with oil to the middle of sight-glass (SG-Fig. 3.4).

On Full-Feature compressors, adjust the pressure difference of the dryer compartments as follows:

1. Start and load the compressor.
2. Check the rotation direction of the dryer motor, the correct rotation direction is indicated by an arrow on the motor housing.
3. Close valves (5 and 6-Figs. 1.6 and1.7). Fill a transparent tube halfway with water. Install the tube to the valves. Open valve (6) marked (-) of the U-tube. Slightly open valve (5) marked (+), while watching the water levels in the U-tube. Two conditions are possible:
   - The water level in the leg marked (+) rises. Close valve (5) at once, decrease the regeneration air inlet pressure (see step 4). Do this as often as necessary, until the water level drops.
   - The water level in the leg marked (-) rises, which should normally be the case. If the level in this leg rises 30 mm above the level in the leg marked (+), close valve (5) at once, as there is a risk that the water will be ejected from the U-tube and disappear into the pressure vessel. Increase the regeneration air inlet pressure (see step 4) and open valve (5) again.
4. Once the water column has stabilized, adjust the pressure differential as follows:
   Remove the protecting cap from the adjusting screw, loosen its check nut and turn the screw in to increase or out to decrease the pressure differential. Tighten the check nut and reinstall the protection cap.
   The water level in the leg marked (-) must be between 20 and 40 mm above that in the leg marked (+). Monitor the water level for about 10 minutes.
   Check that the moisture indicator shows blue after approximately 30 minutes of operation. If the moisture indicator still shows pink after 2 hours of operation, the pressure dewpoint is too high; consult section 6.
5. Stop the compressor.

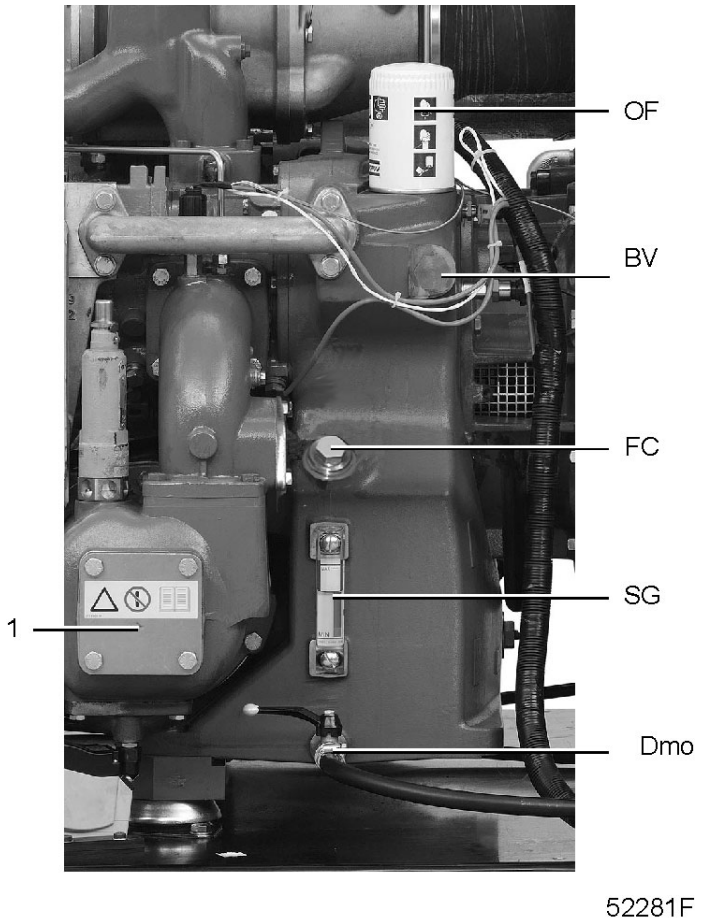
3.2 Before starting

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

On ZR, in case the water system was drained (see section 3.5), close the drain valves and fit the drain plugs.

1. Check the oil level, which must be in the middle of sight-glass (SG-Fig. 3.4). Top up, if necessary, with the correct type of oil.

2. **On ZR**, open the water inlet valve and outlet valve (customer's installation). Opening of the water outlet valve can be overlooked if, after previous operation, the setting of this valve has not been disturbed.



BV By-pass valve
Dmo Oil drain valve, gear casing
FC Oil filler cap
OF Oil filter
SG Oil level sight-glass
1 Flange, intercooler moisture trap

Fig. 3.4 Oil system components

3.3 Starting (Fig. 1.12)

1. Open the air outlet valve (customer's installation).
2. Switch on the voltage and check that voltage on LED (6) lights up.
3. Press start button (1). The compressor starts running and automatic operation LED (8) lights up.

4. **On ZR**, regulate the water flow with the compressor running loaded. Consult section 7 for the cooling water temperature and cooling water consumption.
   The water flow is regulated by the cooling water outlet valve (customer's installation).

Warning
- When the compressor is stopped and automatic operation LED (8) is alight, the compressor may start automatically.
- If the start/stop timer is active, the compressor may start automatically, even if it was stopped manually.

3.4 During operation (Fig. 1.12)

When automatic operation LED (8) is alight, the Elektronikon regulator is automatically controlling the compressor: the air delivery is matched to the air consumption, the compressor will start and stop whenever necessary.

On Full-Feature compressors, avoid short compressor loading periods (minimum 50 % load) and operation at very low working pressures as otherwise the performance of the dryer will diminish. Avoid operation at too low a regeneration air inlet temperature (minimum 130°C).

Keep all doors closed during operation.

Checking the display (2-Fig. 1.12)

1. Daily check the display for readings and messages. Normally, the main screen (Fig. 1.13) is shown, indicating the compressor outlet pressure, the status of the compressor and the functions of the keys below the display.
2. Always check the display and remedy the trouble if alarm LED (7) is alight or blinks. Consult section 1.7.
3. The display 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. Consult your Atlas Copco Customer Centre. See also section 4.1.
4. Regularly check the actual compressor status by pressing the ↓ key from the main screen.

Warning
- Before starting any maintenance or repairs, stop the compressor.
- Close the air outlet valve and press the test buttons on top of the electronic water drains to depressurize the air system.
- Press the emergency stop button and open the isolating switch (customer's installation) to switch off the voltage to the compressor.

3.5 Stopping (Fig. 1.12)

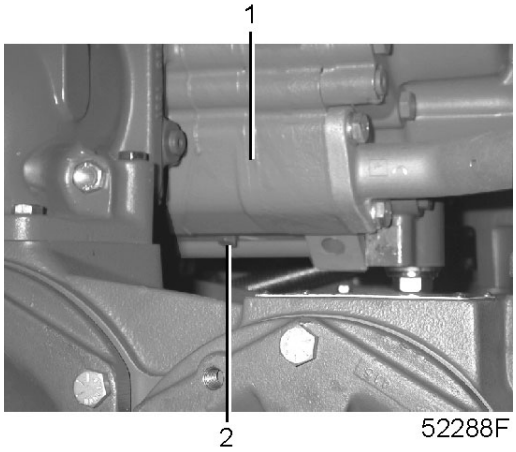
1. Press the test button on top of the electronic water drains while the compressor is running loaded.
2. Press stop button (9): the compressor will stop and LED (8) will go out.
3. Close the air outlet valve.
4. To stop the compressor immediately in case of emergency, press emergency stop button (S2).
5. Close the cooling water inlet valve.

6. For ZR, if the compressor is installed in a room where freezing temperatures are expected, drain the cooling system completely:
   - by opening the main drain valves in the water inlet and outlet pipes (customer's installation)
   - by removing the drain plugs:
     - 2-Fig. 3.5 underneath the LP compressor element
     - 2-Fig. 3.6 underneath the HP compressor element
     - DP1-Fig. 3.7 on the oil cooler
     - DP2/3-Fig. 3.8 underneath the cooler block

3.6 Taking out of operation

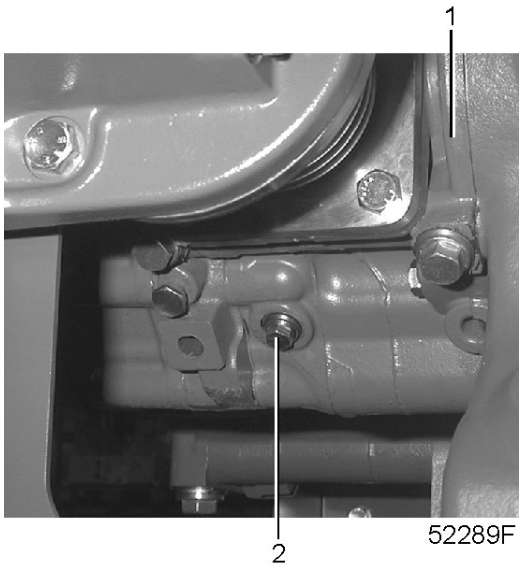
At the end of the service life of the compressor, proceed as follows:

1. Close the air outlet valve, stop the compressor and drain the condensate circuits. Note that the electronic water drains will not work unless a minimum pressure of 0.8 bar(e) is present in the system. If no pressure is available, the electronic drains must be dismounted and emptied manually.
2. Press the emergency stop button. Switch off the voltage and open the isolator switch (customer's installation). Disconnect the compressor from the mains.
3. 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.
4. Drain the oil circuit.
5. Disconnect the compressor condensate piping from the condensate drain net.
6. On ZR, drain the cooling water circuit and disconnect the cooling water pipes from the compressor.



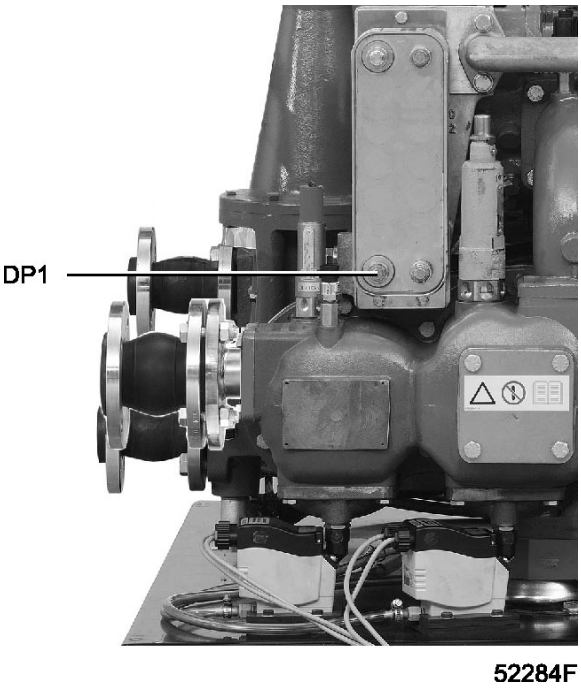
1 Low-pressure compressor element
2 Water drain plug (painted green)

Fig. 3.5 Water drain plug, LP compressor element (ZR compressors only)



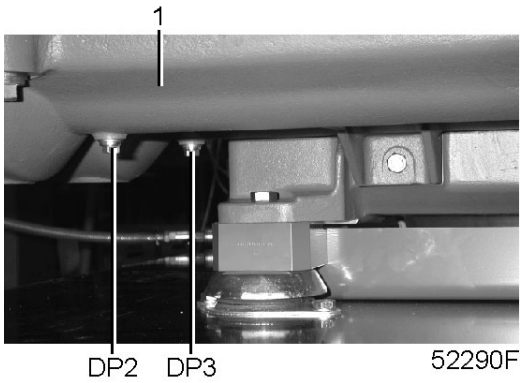
1 High-pressure compressor element
2 Water drain plug (painted green)

Fig. 3.6 Water drain plug, HP compressor element (ZR compressors only)



DP1 Water drain plug, oil cooler

Fig. 3.7 Water drain plug, oil cooler (ZR compressors only)



DP2/3 Water drain plugs (painted green)
1 Cooler block

Fig. 3.8 Water drain plugs, cooler block (ZR compressors only)

4 MAINTENANCE

Warning
Before starting any maintenance or repairs:
- Stop the compressor. Close the air outlet valve.
- Press the test buttons on top of the electronic water drains to depressurize the air system.
- Press the emergency stop button (S2-Fig. 1.12).
- Open the isolating switch (customer's installation to switch off the voltage to the compressor..

Warranty-Product Liability
Use only Atlas Copco authorized genuine parts. Any damage or malfunction caused by the use of unauthorized parts is not covered by Warranty or Product Liability.

4.1 Preventive maintenance schedule for the compressor

4.1.1 Regular service operations

To ensure safe operation and long service life carry out following operations at the interval (period or running hours) which comes first. The "longer interval" checks must also include the "shorter interval" checks.

The local Atlas Copco Customer Centre may overrule the maintenance schedule, depending on the environmental and working conditions of the compressor.

Period	Running hours	Operation
Daily	8	Check readings on display.
Daily	8	Check that condensate is discharged during loading.
Daily	--	Check oil level. Before starting, the level should be in the middle of the sight-glass.
Weekly	50	**On Full-Feature compressors,** check that moisture indicator shows blue
Monthly	--	**On Full-Feature compressors,** check pressure differential of rotor compartments. Adjust if necessary.
3-monthly	--	Clean compressor.
3-monthly	--	Check for possible leaks.
3-monthly	500	Check coolers, clean if necessary.
2-yearly	16000	**On Full-Feature compressors,** replace demister sponge
When displayed	--	Carry out service actions according to the displayed service plans (see section 4.1.4)

4.1.2 Service kits

Atlas Copco Customer Centres will be glad to provide you with a wide range of service kits. Service kits comprise all parts needed for servicing components and offer the benefits of genuine Atlas Copco parts while keeping the maintenance budget low. See also section 4.5.

4.1.3 Service agreements

Atlas Copco Customer Centres have a range of service agreements to suit your needs:

- An Inspection plan
- A Preventive maintenance plan
- A Total responsibility plan

Contact your Customer Centre to agree on a tailor-made service agreement. It will ensure optimum operational efficiency, minimise downtime and reduce the total life cycle costs.

4.1.4 Service plan

A number of service operations are grouped (called Level A, Level B, Level C, ...). Each level stands for a number of service actions to be carried out at the time intervals programmed in the Elektronikon regulator.

When reaching a level, a message will appear on the screen. After carrying out all service actions, the interval timers are to be reset using the key "Reset" in menu "Service". Consult your Atlas Copco Customer Centre.

4.2 Motor greasing

4.2.1 Fan motor of ZT compressors

The bearings of the fan motor are greased for live. Contact your Customer Centre for the replacement interval of the motor bearings.

4.2.2 Drive motor (M1-Figs. 1.1 and 1.4)

Important
Do not mix greases of different types.

The motor bearings must be regreased every:
- 3600 hrs for 50Hz motors
- 4000 hrs for 60Hz motors

Quantity: 16g per bearing

Recommended grease: KLÜBERQUIET BQH 72-102.

4.3 Oil specifications

Use Atlas Copco Roto-Z oil which has been specially developed for oil-free rotary compressors. This oil has a long service life and ensures optimum lubrication.

Important
Never mix oils of different brands or types.

4.4 Storage after installation

Run the compressor, e.g. twice a week, until warm.

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

4.5 Service kits

Service kits
Service kits comprise all parts needed for servicing components and offer the benefits of genuine Atlas Copco parts while keeping the maintenance budget low. All service kits are mentioned in the relevant Parts Lists.

Atlas Copco Roto-Z oil
Atlas Copco Roto-Z oil can be ordered in following quantities:

Quantity	Ordering number
20-litre can	2908 8501 01
209-litre drum	2908 8500 00

5 SERVICING PROCEDURES

5.1 Air filter (AF-Figs. 1.1/1.4)

1. Stop the compressor and switch off the voltage to the compressor. Remove the filter.
2. Fit the new filter.
3. After carrying out the service actions of the related service plan, the service warning must be reset. See also section 4.1.

5.2 Oil and oil filter change (Fig. 3.4)

1. Run the compressor until warm.
2. Press stop button (9-Fig. 1.12), wait until the compressor has stopped, press emergency stop button (S2-Fig. 1.12) and switch off the voltage to the compressor.
3. Remove filler plug (FC). Drain the compressor sump by opening valve (Dmo). Close the valve after draining. Drain the oil cooler by removing the drain and vent plug.
   On ZT, drain the oil from the compressor elements by removing their yellow-painted drain plugs.
4. Remove the oil filter (OF). Clean the filter seat, oil the gasket of the new filter and screw it into place until the gasket contacts the seat. Then tighten by hand.
5. Fill the compressor sump to the middle of the oil level sight-glass (SG) with oil as specified in section 4.3. Reinstall the filler plug.
6. Switch on the voltage. Unlock the emergency stop button.
7. Run the compressor for a few minutes. Stop the compressor. If necessary, top up the gear casing with oil to the middle of the sight-glass (SG).
8. After carrying out the maintenance operations of the related service plan, the service warning must be reset. See also section 4.1.

5.3 Safety valves

Testing
The valves can be tested on a separate compressed air line. If a valve does not open at the pressure specified in section 7.2, consult Atlas Copco.

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

6 PROBLEM SOLVING

Warning
- Before starting any maintenance or repairs, stop the compressor.
- Close the air outlet valve and press the test button on top of the electronic water drains to depressurize the air system.
- Push the emergency stop button and open the isolator switch (customer's installation) to switch off the voltage to the compressor.

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

1 Compressor capacity or working pressure lower than normal
a Air consumption exceeds capacity of compressor
a Check pneumatic plant
b Safety valves leaking
b Remove leaking valve and have it inspected

2 Oil pressure too low
a Oil level too low
a Top up level to the middle of the oil level sight-glass
b Oil filter clogged
b Replace filter

3 Air temperature above normal
a Inlet temperature too high due to bad room ventilation or recirculation of cooling air
a Improve ventilation of compressor room and avoid cooling air recirculation
b Air filter clogged
b Replace filter
c On ZR, insufficient cooling water flow
c Check water temperature and increase cooling water flow
d On ZR, restriction in cooling water system due to formation of scale or settling down of dirt
d Consult Atlas Copco

4 Condensate is not discharged from condensate traps during operation
a Discharge flexible clogged
a Check and correct as necessary
b Electronic water drain malfunctioning
b Consult Atlas Copco

On Full-Feature compressors:

5 Pressure dewpoint too high
a Compressor loading periods repeatedly too short
a Take necessary action to increase duration of loading periods
b Incorrect pressure difference between dryer compartments
b Check pressure difference which should be within the range specified in section 3.1. Never operate the dryer with a pressure difference beyond the specified range. Always be sure that the connections of the U-tube are airtight
c Operating pressure too low
c Do not operate dryer at a pressure less than 4 bar(e)
d Rotor does not turn
d Consult Atlas Copco
e Rotor compartment sealing ring, sealing sectors and rotor need inspection
e Consult Atlas Copco

f Aftercooler air outlet temperature too high
f On water-cooled compressors, check cooling water inlet temperature and increase water flow. If temperature cannot be decreased sufficiently, consult Atlas Copco
On air-cooled compressors, clean cooler externally. If temperature cannot be decreased sufficiently, consult Atlas Copco
g Regeneration cooler air outlet temperature too high
g See 5f
h Regeneration cooler air outlet temperature too low
h Consult Atlas Copco
i Drain system malfunctioning
i Inspect system and replace parts where necessary

6 Dryer air inlet temperature is higher than aftercooler air outlet temperature
a Regeneration cooler air outlet temperature too high
a On water-cooled dryers, increase water flow through regeneration air cooler
On air-cooled dryers, clean cooler externally
b On water-cooled dryers, cooling water temperature too high
b Arrange so as to decrease temperature
c Regeneration cooler clogged internally
c Consult Atlas Copco

7 Only on water-cooled dryers, water flows from one or both electronic water drains during unloaded operation and after dryer has been stopped
a Regeneration air cooler core tube broken
a Remove cooler, plug broken tube or replace cooler core

8 Regeneration air inlet temperature too low
a Hot-air shut off valve (8-Figs. 1.6 and 1.7) closed
a Open the valve
b Compressor loading periods too short
b See 5a
c Nozzle of ejector partly obstructed
c Remove and clean nozzle. Investigate cause

9 LED's of electronic water drain do not light up
a For EWDi, EWDa and 15-Figs 1.6 and 1.7, compressor is running unloaded
a LED's will light up when the compressor is loaded again.
b Power supply to EWD's faulty
b Check power supply. Compare power supply with voltage mentioned on data label of EWD
c Power supply board defective
c Check and replace as necessary

10 No condensate discharged when pressing test button on EWD
a For EWDi and EWDa-Figs 1.6 and 1.7, system pressure lower than 0.8 bar(e)
a Load the compressor; as soon as the system pressure exceeds 0.8 bar(e), condensate will be discharged
b Condensate inlet and/or outlet blocked
b Check and correct as necessary
c Control board defective
c Check and replace if necessary
d Solenoid valve defective
d Check and replace if necessary

11 Condensate only discharged when test button is pressed

a Sensor dirty
a Clean sensor
b Air pressure below minimum pressure
b Increase air pressure

12 EWD continuously discharges air

a Control air blocked
a Check and correct as necessary
b Sensor dirty
b Clean sensor

7 PRINCIPAL DATA

7.1 Readings on display (Fig. 1.12)

Outlet pressure	bar(e)	Depends on pressure setpoint
Maximum working pressure	bar(e)	See section 7.4

7.2 Settings of safety valves

Low-pressure safety valve	bar(e)	3.7
High-pressure safety valve **for ZT/ZR90 7.25 bar 60Hz** compressors	bar(e)	11.0
High-pressure safety valve for **all other ZT/ZR 7.25 bar and 7.5 bar** compressors	bar(e)	9.3
High-pressure safety valve for **all ZT/ZR 8.6 bar, 9.0 bar, 10.0 bar and 10.4 bar** compressors	bar(e)	11.0

7.3 Settings of circuit breakers - fuses

50Hz IEC

Compressor	Voltage	F21 (A)	Q25 (A)	Q41 (A)	Q1 (A)	Fuses Type 2gG (A)
ZR/ZT55	200V	148	10.6	1.79	6	355
ZR/ZT55	230V	129	9.1	1.79	6	315
ZR/ZT55	400V	74	5.3	1.05	4	200
ZR/ZT55	500V	59	4.2	0.88	3	160

50Hz IEC

Compressor	Voltage	F21 (A)	Q25 (A)	Q41 (A)	Q1 (A)	Fuses Type 2 gG (A)
ZR/ZT75	200V	205	15.4	-	8	500
ZR/ZT75	230V	176	13.2	4.95	6	400
ZR/ZT75	400V	102	7.7	2.86	4	250
ZR/ZT75	500V	82	6.2	2.31	4	200

50Hz IEC

Compressor	Voltage	F21 (A)	Q25 (A)	Q41 (A)	Q1 (A)	Fuses Type 2 gG (A)
ZR/ZT90	200V	236	15.4	-	10	630
ZR/ZT90	230V	205	13.2	4.95	8	500
ZR/ZT90	400V	118	7.7	2.86	6	250
ZR/ZT90	500V	95	6.2	2.31	4	250

60Hz IEC

Compressor	Voltage	F21 (A)	Q25 (A)	Q41 (A)	Q1 (A)	Fuses Type 2 gG (A)
ZR/ZT55	200V	156	11.6	5.28	6	355
ZR/ZT55	220-230V	144	9.1	5.28	6	315

ZR/ZT55	380V	82	5.3	3.08	4	250
ZR/ZT55	440-460V	72	5.1	3.08	4	200
ZR/ZT55	575V	55	4.1	2.37	3	160

60Hz IEC

Compressor	Voltage	F21 (A)	Q25 (A)	Q41 (A)	Q1 (A)	Fuses Type 2 gG (A)
ZR/ZT75	200V	218	16.5	5.28	10	630
ZR/ZT75	220-230V	193	14.9	5.28	8	500
ZR/ZT75	380V	114	8	3.08	6	315
ZR/ZT75	440-460V	96	7.3	3.08	4	250
ZR/ZT75	575V	76	5.8	2.37	4	200

60Hz IEC

Compressor	Voltage	F21 (A)	Q25 (A)	Q41 (A)	Q1 (A)	Fuses Type 2 gG (A)
ZR/ZT90	200V	255	16.5	5.28	10	630
ZR/ZT90	220-230V	225	14.85	5.28	10	500
ZR/ZT90	380V	134	8	3.08	6	315
ZR/ZT90	440-460V	112	7.3	3.08	6	315
ZR/ZT90	575V	89	5.8	2.37	4	250

60Hz CSA/UL

Compressor	Voltage	F21 (A)	Q25 (A)	Q41 (A)	Q1 (A)	Fuses Type 2 gG (A)
ZR/ZT55	200V	156	11.6	5.28	6	400
ZR/ZT55	220-230V	144	9.1	5.28	6	350
ZR/ZT55	380V	82	5.3	3.08	4	250
ZR/ZT55	440-460V	72	5.1	3.08	4	175
ZR/ZT55	575V	55	4.1	2.37	3	125

60Hz CSA/UL

Compressor	Voltage	F21 (A)	Q25 (A)	Q41 (A)	Q1 (A)	Fuses Type 2 gG (A)
ZR/ZT75	200V	218	16.5	5.28	10	500
ZR/ZT75	220-230V	193	14.9	5.28	8	400
ZR/ZT75	380V	114	8	3.08	6	350
ZR/ZT75	440-460V	96	7.3	3.08	3	250
ZR/ZT75	575V	76	5.8	2.37	2	175

60Hz CSA/UL

Compressor	Voltage	F21 (A)	Q25 (A)	Q41 (A)	Q1 (A)	Fuses Type 2 gG (A)
ZR/ZT90	200V	255	16.5	5.28	10	600
ZR/ZT90	220-230V	225	14.85	5.28	10	500
ZR/ZT90	380V	134	8	3.08	6	350
ZR/ZT90	440-460V	112	7.3	3.08	6	300
ZR/ZT90	575V	89	5.8	2.37	4	250

Note
See Figs. 1.11 and 2.9.

7.4 Compressor specifications

7.4.1 Reference conditions

Absolute inlet pressure	bar(a)	1
Nominal working pressure	bar(e)	See below
Relative air humidity	%	0
Air inlet temperature	°C	20
Cooling water inlet temperature	°C	20

7.4.2 Limitations

Maximum air inlet temperature	°C	40
Minimum air inlet temperature	°C	0
Maximum cooling water temperature at inlet (at temperature rise of 15°C)	°C	35
Maximum cooling water temperature at inlet (at temperature rise of 10°C)	°C	40
Maximum cooling water temperature at outlet	°C	50
On Full-Feature compressors also		
Maximum temperature rise of cooling water	°C	10

7.4.3 Specific data, ZR - 7.5 bar - 50Hz

	Unit	**ZR55**	**ZR75**	**ZR90**
Nominal working pressure	bar(e)	7	7	7
Maximum working pressure				
- Pack	bar(e)	7.5	7.5	7.5
- Full-Feature	bar(e)	7.25	7.25	7.25
Power input at maximum working pressure				
- Pack	kW	62.3	81.3	95.1
- Full-Feature	kW	61.3	80.8	94.4
Oil capacity	l	35	35	35
Sound pressure level **1)**	dB(A)	65	65	65
Cooling water consumption				
- Pack (temperature rise of 15°C)	l/s	0.9	1.2	1.4
- Full-Feature (temperature rise of 10°C)	l/s	1.4	1.8	2.1

7.4.4 Specific data, ZR - 8.6 bar - 50Hz

	Unit	**ZR55**	**ZR75**	**ZR90**
Nominal working pressure	bar(e)	8	8	8
Maximum working pressure				

- Pack	bar(e)	8.6	8.6	8.6
- Full-Feature	bar(e)	8.35	8.35	8.35
Power input at maximum working pressure				
- Pack	kW	61.5	83.4	96.7
- Full-Feature	kW	61.1	82.9	96.0
Oil capacity	l	35	35	35
Sound pressure level **1)**	dB(A)	65	65	65
Cooling water consumption				
- Pack (temperature rise of 15°C)	l/s	0.9	1.2	1.4
- Full-Feature (temperature rise of 10°C)	l/s	1.4	1.8	2.1

7.4.5 Specific data, ZR - 10 bar - 50Hz

	Unit	**ZR55**	**ZR75**	**ZR90**
Nominal working pressure	bar(e)	9	9	9
Maximum working pressure				
- Pack	bar(e)	10	10	10
- Full-Feature	bar(e)	9.75	9.75	9.75
Power input at maximum working pressure				
- Pack	kW	61.3	84.6	99.4
- Full-Feature	kW	60.8	84.0	98.7
Oil capacity	l	35	35	35
Sound pressure level **1)**	dB(A)	65	65	65
Cooling water consumption				
- Pack (temperature rise of 15°C)	l/s	0.9	1.2	1.5
- Full-Feature (temperature rise of 10°C)	l/s	1.4	1.8	2.1

7.4.6 Specific data, ZR - 7.25 bar - 60Hz

	Unit	**ZR55**	**ZR75**	**ZR90**
Nominal working pressure	bar(e)	7	7	7
Maximum working pressure				
- Pack	bar(e)	7.25	7.25	7.25
- Full-Feature	bar(e)	7.0	7.0	7.0
Power input at maximum working pressure				
- Pack	kW	66.6	88.4	105.8
- Full-Feature	kW	66.1	87.7	105.0
Oil capacity	l	35	35	35
Sound pressure level **1)**	dB(A)	65	65	65
Cooling water consumption				
- Pack (temperature rise of 15°C)	l/s	1.0	1.3	1.6
- Full-Feature (temperature rise of 10°C)	l/s	1.5	2.0	2.4

7.4.7 Specific data, ZR - 9 bar - 60Hz

	Unit	**ZR55**	**ZR75**	**ZR90**
Nominal working pressure	bar(e)	8	8	8
Maximum working pressure				

- Pack	bar(e)	9	9	9
- Full-Feature	bar(e)	8.75	8.75	8.75
Power input at maximum working pressure				
- Pack	kW	66.5	89.9	106.3
- Full-Feature	kW	66.0	89.3	105.6
Oil capacity	l	35	35	35
Sound pressure level **1)**	dB(A)	65	65	65
Cooling water consumption				
- Pack (temperature rise of 15°C)	l/s	1.0	1.3	1.6
- Full-Feature (temperature rise of 10°C)	l/s	1.5	2.0	2.4

7.4.8 Specific data, ZR - 10.4 bar - 60Hz

	Unit	**ZR55**	**ZR75**	**ZR90**
Nominal working pressure	bar(e)	9	9	9
Maximum working pressure				
- Pack	bar(e)	10.4	10.4	10.4
- Full-Feature	bar(e)	10.15	10.15	10.15
Power input at maximum working pressure				
- Pack	kW	66.3	92.5	109.6
- Full-Feature	kW	65.8	91.9	108.9
Oil capacity	l	35	35	35
Sound pressure level **1)**	dB(A)	65	65	65
Cooling water consumption				
- Pack (temperature rise of 15°C)	l/s	1.0	1.4	1.6
- Full-Feature (temperature rise of 10°C)	l/s	1.5	2.0	2.4

7.4.9 Specific data, ZT - 7.5 bar - 50Hz

	Unit	**ZT55**	**ZT75**	**ZT90**
Nominal working pressure	bar(e)	7	7	7
Maximum working pressure				
- Pack	bar(e)	7.5	7.5	7.5
- Full-Feature	bar(e)	7.25	7.25	7.25
Power input at maximum working pressure				
- Pack	kW	64.9	86.2	102.1
- Full-Feature	kW	65.9	87.1	102.9
Oil capacity	l	45	45	45
Sound pressure level **1)**	dB(A)	72	72	72

7.4.10 Specific data, ZT - 8.6 bar - 50Hz

	Unit	**ZT55**	**ZT75**	**ZT90**
Nominal working pressure	bar(e)	8	8	8
Maximum working pressure				
- Pack	bar(e)	8.6	8.6	8.6
- Full-Feature	bar(e)	8.35	8.35	8.35
Power input at maximum working pressure				

- Pack	kW	64.1	88.3	103.7
- Full-Feature	kW	65.1	89.2	104.4
Oil capacity	l	45	45	45
Sound pressure level **1)**	dB(A)	72	72	72

7.4.11 Specific data, ZT - 10 bar - 50Hz

	Unit	**ZT55**	**ZT75**	**ZT90**
Nominal working pressure	bar(e)	9	9	9
Maximum working pressure				
- Pack	bar(e)	10	10	10
- Full-Feature	bar(e)	9.75	9.75	9.75
Power input at maximum working pressure				
- Pack	kW	63.9	89.0	104.7
- Full-Feature	kW	64.9	89.8	105.5
Oil capacity	l	45	45	45
Sound pressure level **1)**	dB(A)	72	72	72

7.4.12 Specific data, ZT - 7.25 bar - 60Hz

	Unit	**ZT55**	**ZT75**	**ZT90**
Nominal working pressure	bar(e)	7	7	7
Maximum working pressure				
- Pack	bar(e)	7.25	7.25	7.25
- Full-Feature	bar(e)	7.0	7.0	7.0
Power input at maximum working pressure				
- Pack	kW	68.9	93.5	112.5
- Full-Feature	kW	71.1	95.3	114.1
Oil capacity	l	45	45	45
Sound pressure level **1)**	dB(A)	72	72	72

7.4.13 Specific data, ZT - 9 bar - 60Hz

	Unit	**ZT55**	**ZT75**	**ZT90**
Nominal working pressure	bar(e)	8	8	8
Maximum working pressure				
- Pack	bar(e)	9	9	9
- Full-Feature	bar(e)	8.75	8.75	8.75
Power input at maximum working pressure				
- Pack	kW	68.8	95.1	113.0
- Full-Feature	kW	70.7	96.9	114.6
Oil capacity	l	45	45	45
Sound pressure level **1)**	dB(A)	72	72	72

7.4.14 Specific data, ZT - 10.4 bar - 60Hz

	Unit	ZT55	ZT75	ZT90
Nominal working pressure	bar(e)	9	9	9
Maximum working pressure				
- Pack	bar(e)	10.4	10.4	10.4
- Full-Feature	bar(e)	10.15	10.15	10.15
Power input at maximum working pressure				
- Pack	kW	68.6	97.1	114.5
- Full-Feature	kW	70.5	98.8	116.2
Oil capacity	l	45	45	45
Sound pressure level **1)**	dB(A)	72	72	72

7.5 Conversion list of SI units into British/American 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 °C = (32 + 1.8 x) °F **2)**

Footnotes chapter 7

1) According to PNEUROP/CAGI test code with a tolerance of +/- 3dB under free field conditions at 1 m distance.
2) A temperature difference of 1°C = a temperature difference of 1.8°F.

OWNERSHIP DATA

Compressor type: .....
Air dryer type: .....
Motor type: .....
Delivery date: .....
Service Plan: .....

Unit serial No. compressor: .....
Unit serial No. dryer: .....
Motor serial No.: .....
First start-up date: .....
Owner's machine No.: .....

Selected lubricants

Compressor: .....
Bearing grease type, electric motor: .....
Dryer gearbox .....

Capacity: .....

Capacity .....

Printed Matter Nos.

Atlas Copco compressor instruction book: .....
Atlas Copco compressor parts list: .....
Atlas Copco logbook: .....

Atlas Copco air dryer instruction book: .....
Atlas Copco air dryer parts list: .....

Local Atlas Copco Representative

Name: .....
Address: .....
Telephone: .....
Telex: .....
E-mail .....

Contact persons:

Service: .....
Parts: .....

SAFETY PRECAUTIONS

To be read attentively and acted accordingly before installing, operating or repairing the unit.

These recommendations apply to machinery processing or consuming air or inert gas. Processing of any other gas requires additional safety precautions typical to the application which are not included herein.

In addition to normal safety rules which should be observed with stationary air compressors and equipment, the following safety directions and precautions are of special importance.

When operating this unit, the operator must employ safe working practices and observe all related local work safety requirements and ordinances.

The owner is responsible for maintaining the unit in a safe operating condition. Parts and accessories shall be replaced if unsuitable for safe operation.

Installation, operation, maintenance and repair shall only be performed by authorized, trained, competent personnel.

Normal ratings (pressures, temperatures, time settings, etc.) shall be durably marked.

Any modification on the compressor or air dryer shall only be performed in agreement with Atlas Copco and under supervision of authorized, competent personnel.

If any statement in this book, especially with regard to safety, does not comply with local legislation, the stricter of the two shall apply.

These precautions are general and cover several machine types and equipment; hence some statements may not apply to the unit(s) described in this book.

Installation

Apart from general engineering practice in conformity with the local safety regulations, the following directives are specially stressed:

1. A compressor or air dryer shall be lifted only with adequate equipment in conformity with local safety rules.

   Loose or pivoting parts shall be securely fastened before lifting. It is strictly forbidden to dwell or stay in the risk zone under a lifted load. Lifting acceleration and retardation shall be kept within safe limits.

   Wear a safety helmet when working in the area of overhead or lifting equipment.

2. Any blanking flanges, plugs, caps and desiccant bags shall be removed before connecting up the pipes. Distribution pipes and connections shall be of correct size and suitable for the working pressure.

3. Place the unit where the ambient air is as cool and clean as possible. If necessary, install a suction duct. Never obstruct the air inlet. Care shall be taken to minimize the entry of moisture with the inlet air.

4. The aspirated air shall be free from flammable fumes or vapours, e.g. paint solvents, that can lead to internal fire or explosion.

5. Air-cooled units shall be installed in such a way that an adequate flow of cooling air is available and that the exhausted air does not recirculate to the inlet.

6. Arrange the air intake so that loose clothing of people cannot be sucked in.

7. Ensure that the discharge pipe from the compressor to the aftercooler, air dryer or air net is free to expand under heat and that it is not in contact with or close to flammable material.

8. No external force may be exerted on the air outlet valve; the connected pipe must be free of strain.

9. If remote control is installed, the unit shall bear an obvious sign reading:

   DANGER: This machine is remotely controlled and may start without warning.

   As a further safeguard, persons switching on remotely controlled units shall take adequate precautions to ensure that there is no one checking or working on the machine. To this end, a suitable notice shall be affixed to the start equipment.

10. On units with automatic start-stop system, a sign stating "This machine may start without warning" shall be attached near the instrument panel.

11. In multiple compressor systems manual valves shall be installed to isolate each compressor. Non-return valves (check valves) shall not be relied upon for isolating pressure systems.

12. Never remove or tamper with the safety devices, guards or insulations fitted on the unit. Every pressure vessel or auxiliary installed outside the unit to contain air above atmospheric pressure shall be protected by a pressure-relieving device or devices as required.

13. Pipework or other parts with a temperature in excess of 80 degrees celsius and which may be accidentally touched by personnel in normal operation shall be guarded or insulated. Other high-temperature pipework shall be clearly marked.

(continued on inside of cover)

14. If the ground is not level or can be subject to variable inclination, consult Atlas Copco.

15. The electrical connections shall correspond to the local codes. The units shall be grounded and protected against short circuits by fuses.

Operation

1. Air hoses shall be of correct size and suitable for the working pressure. Never use frayed, damaged or deteriorated hoses. Use only the correct type and size of hose end fittings and connections. When blowing through a hose or air line, ensure that the open end is held securely. A free end will whip and may cause injury. Make sure that a hose is fully depressurized before disconnecting it.

   Never play with compressed air. Do not apply it to your skin or direct an air stream at people. Never use it to clean dirt from your clothes. When using it to clean equipment, do so with extreme caution and use eye protection.

2. The compressor is not considered as capable of producing air of breathing quality. For breathing air quality, the compressed air must be adequately purified according to local legislation and standards.

3. Never operate the units when there is a possibility of taking in flammable or toxic fumes.

4. Never operate the units at pressures below or in excess of their limit ratings as indicated on the Principal Data sheet.

5. Keep all bodywork doors shut during operation. The doors may be opened for short periods only, e.g. to carry out checks. Wear ear protectors when opening a door.

6. People staying in environments or rooms where the sound pressure level reaches or exceeds 90 dB(A) shall wear ear protectors.

7. Periodically check that:
   a. All guards are in place and securely fastened
   b. All hoses and/or pipes inside the unit are in good condition, secure and not rubbing
   c. There are no leaks
   d. All fasteners are tight
   e. All electrical leads are secure and in good order
   f. Safety valves and other pressure-relief devices are not obstructed by dirt or paint
   g. Air outlet valve and air net, i.e. pipes, couplings, manifolds, valves, hoses, etc. are in good repair, free of wear or abuse

8. If warm cooling air from compressors is used in air heating systems, e.g. to warm up a workroom, take precautions against air pollution and possible contamination of the breathing air.

9. Do not remove any of, or tamper with, the sound-damping material.

Maintenance

Maintenance and repair work shall only be carried out under supervision of someone qualified for the job.

1. Use only the correct tools for maintenance and repair work.

2. Use only genuine spare parts.

3. All maintenance work, other than routine attention, shall only be undertaken when the unit is stopped, the main power supply is switched off and the machine has cooled down. Take positive precaution to ensure that the unit cannot be started inadvertently.

   In addition, a warning sign bearing a legend such as "work in progress; do not start" shall be attached to the starting equipment.

4. Before removing any pressurized component, effectively isolate the unit from all sources of pressure and relieve the entire system of pressure.

5. Never use flammable solvents or carbon tetrachloride for cleaning parts. Take safety precautions against toxic vapours of cleaning liquids.

6. Scrupulously observe cleanliness during maintenance and repair. Keep dirt away by covering the parts and exposed openings with a clean cloth, paper or tape.

7. Never weld or perform any operation involving heat near the oil system. Oil tanks must be completely purged, e.g. by steam-cleaning, before carrying out such operations.

   Never weld on, or in any way modify, pressure vessels.

   Whenever there is an indication or any suspicion that an internal part of a machine is overheated, the machine shall be stopped but no inspection covers shall be opened before sufficient cooling time has elapsed; this to avoid the risk of spontaneous ignition of the oil vapour when air is admitted.

   Never use a light source with open flame for inspecting the interior of a machine, pressure vessel, etc.

8. Make sure that no tools, loose parts or rags are left in or on the unit.

9. Before clearing the unit for use after maintenance or overhaul, check that operating pressures, temperatures and time settings are correct and that the control and shut-down devices function correctly. If removed, check that the coupling guard of the compressor drive shaft has been reinstalled.

10. Every time the separator element is renewed, examine the discharge pipe and the inside of the oil separator vessel for carbon deposits; if excessive, the deposits should be removed.

11. Protect the motor, air filter, electrical and regulating components, etc. to prevent moisture from entering them, e.g. when steam-cleaning.

12. Make sure that all sound-damping material, e.g. on the bodywork and in the air inlet and outlet systems of the compressor, is in good condition. If damaged, replace it by genuine Atlas Copco material to prevent the sound pressure level from increasing.

13. Never use caustic solvents which can damage materials of the air net, e.g. polycarbonate bowls.

14. The following safety precautions are stressed when handling refrigerant:

    a. Never inhale refrigerant vapours. Check that the working area is adequately ventilated; if required, use breathing protection.

    b. Always wear special gloves. In case of refrigerant contact with the skin, rinse the skin with water. If liquid refrigerant contacts the skin through clothing, never tear off or remove the latter; flush abundantly with fresh water over the clothing until all refrigerant is flushed away; then seek medical first aid.

    c. Always wear safety glasses.

15. Protect hands to avoid injury from hot machine parts, e.g. during draining of oil.

Note: With stationary machine units driven by an internal combustion engine, allowance has to be made for extra safety precautions, e.g. spark arrestors, fuelling care, etc. Consult Atlas Copco.

All responsibility for any damage or injury resulting from neglecting these precautions, or by non-observance of ordinary caution and due care required in handling, operating, maintenance or repair, even if not expressly mentioned in this book, will be disclaimed by Atlas Copco.