

# Atlas Copco Stationary Air Compressors

ZT18-ZT22-ZT30-ZT37-ZT45-ZT55-ZT75-ZT90

ZR45-ZR55-ZR75-ZR90

with Elektronikon<sup>®</sup> regulator

## Instruction Book

From following serial number onwards: AIF-048 124

**Important:** This book must be used together with the "User manual for the Elektronikon<sup>®</sup> regulator", printed matter No. 2920 1291 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.

No. 2920 1345 01

[www.atlascopco.com](http://www.atlascopco.com)

Replaces No. 2920 1345 00

**Registration code:** APC Z ≤ 90 / 38 / 984

2001-03



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**Atlas Copco**

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.**

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# 1 LEADING PARTICULARS

## 1.1 General description

ZT18 up to ZT55, ZR45 and ZR55 are two-stage tooth compressors. ZT75, ZT90, ZR75 and ZR90 are two-stage screw compressors. The compressors are driven by an electric motor and deliver oil-free, pulsation-free air. ZT are air-cooled, whereas ZR are water-cooled.

ZT18 up to 30 HAT (High Ambient Temperature) are provided with a larger intercooler, the cooling air of which is generated by an extra fan.

The compressors are available in following pressure variants:

Type	Frequency Hz	Maximum working pressure bar(e)
ZT18 HAT	50 or 60	8.6
ZT22 HAT	50 or 60	8.6
ZT30 HAT	50 or 60	8.6
ZT18	50 or 60	7.5 or 8.6
ZT22	50 or 60	7.5 or 8.6
ZT30	50 or 60	7.5 or 8.6
ZT37	50 or 60	7.5 or 8.6
ZT/ZR 45	50 or 60	7.5 or 8.6
ZT/ZR 55	50 or 60	7.5 or 8.6
ZT75/90	50	8
ZT75/90	60	7.5 or 8.6
ZR75/90	50	8 or 10
ZR75/90	60	7.5, 8.6 or 10



- |   |                         |   |  |
|---|-------------------------|---|--|
| 1 | Compressor data plate   | 5 | Automatic condensate drain outlet, aftercooler moisture trap |
| 2 | Elektronikon® regulator | 6 | Manual condensate drain valve, aftercooler moisture trap     |
| 3 | Electric cabinet        |   |  |
| 4 | Air outlet valve        |   |  |

Fig. 1.1 General view of ZT37

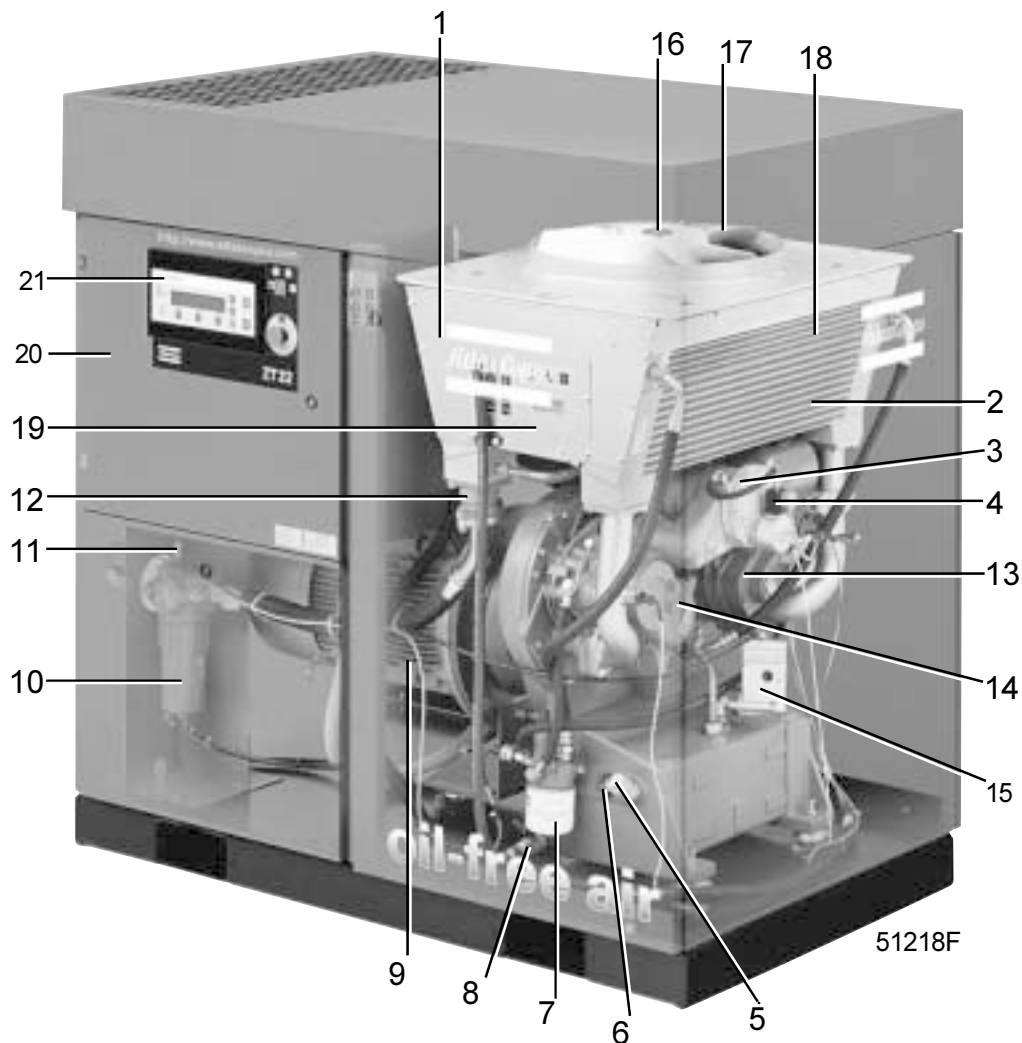


Fig. 1.2 View of ZT22

- |                               |                                     |  |
|-------------------------------|-------------------------------------|--|
| 1 Aftercooler                 | 11 High-pressure safety valve       | 21 Elektronikon® regulator                                     |
| 2 Intercooler                 | 12 Check valve                      | 22 Air filter  |
| 3 Full-load/no-load valve     | 13 High-pressure compressor element | 23 Pulsation damper  |
| 4 Loading solenoid valve      | 14 Low-pressure compressor element  | 24 Low-pressure safety valve                                   |
| 5 Oil filler plug             | 15 Breather                         | 25 Moisture trap, intercooler                                  |
| 6 Oil level sight-glass       | 16 Fan motor                        | 26 Vibration damper  |
| 7 Oil filter                  | 17 Cooling fan                      | 27 Pre-aftercooler   |
| 8 Oil drain valve             | 18 Oil cooler                       | 28 Regulating valve, water flow through oil cooler/intercooler |
| 9 Compressor motor            | 19 Door, access to coolers          | 29 Regulating valve, water flow through aftercooler            |
| 10 Moisture trap, aftercooler | 20 Electric cabinet                 |  |

Figs. 1.2 up to 1.8 General views

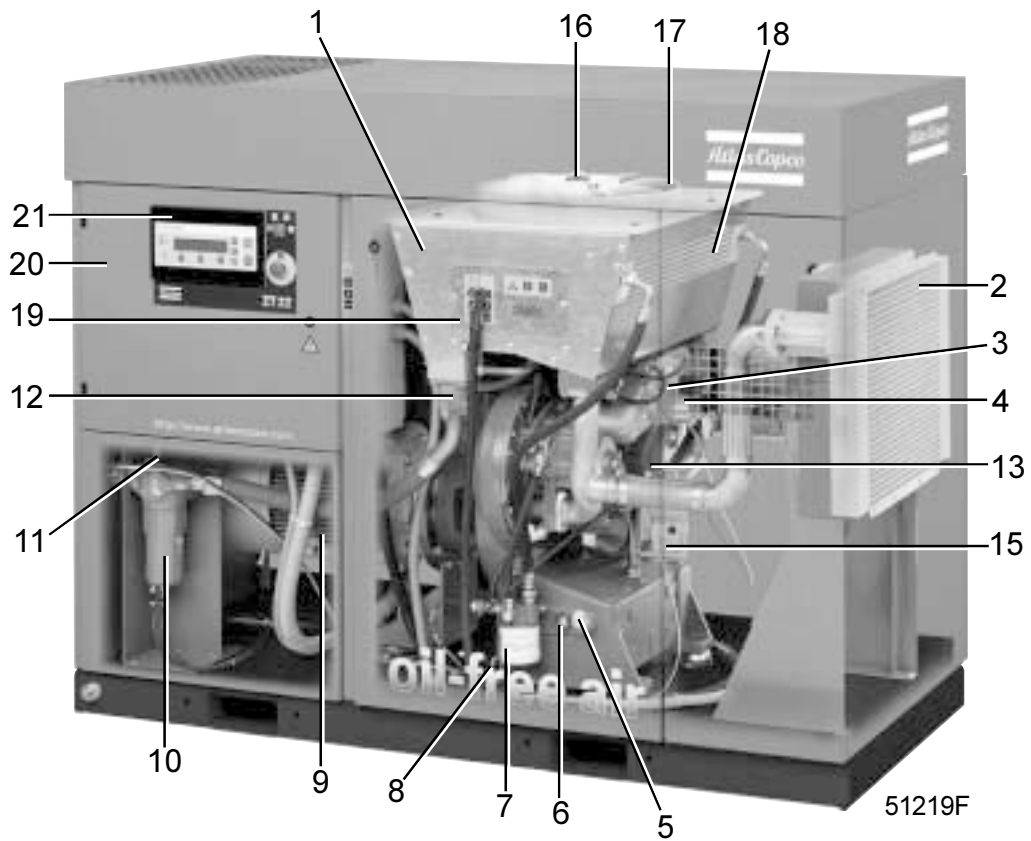


Fig. 1.3 View of ZT22 HAT

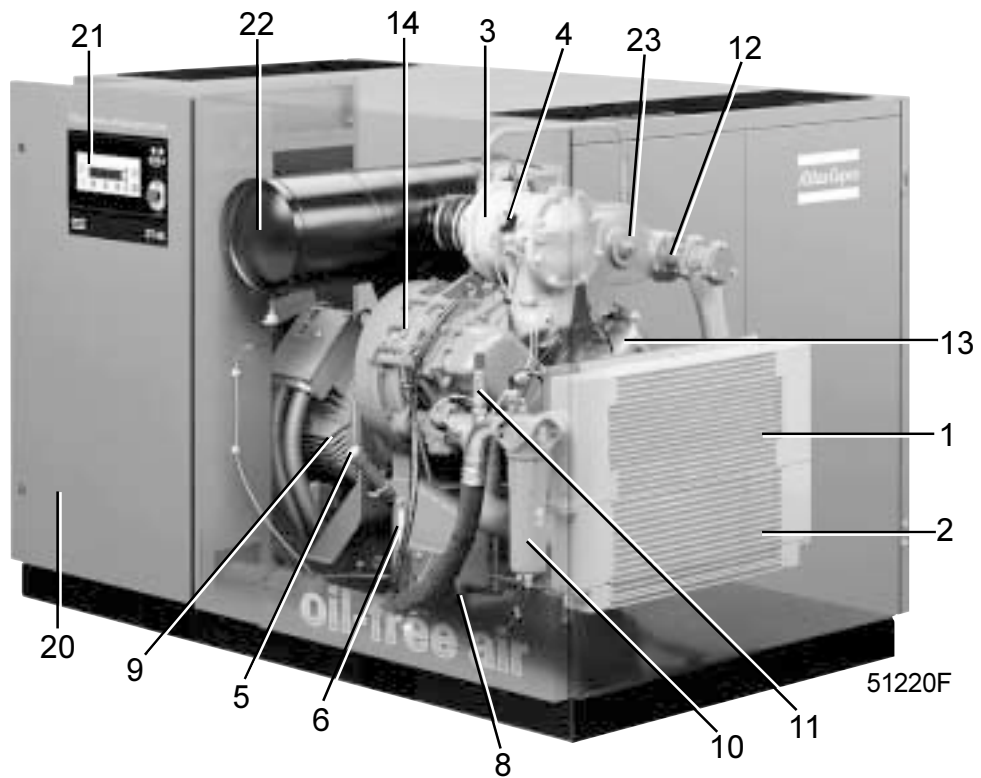


Fig. 1.4 View of ZT45

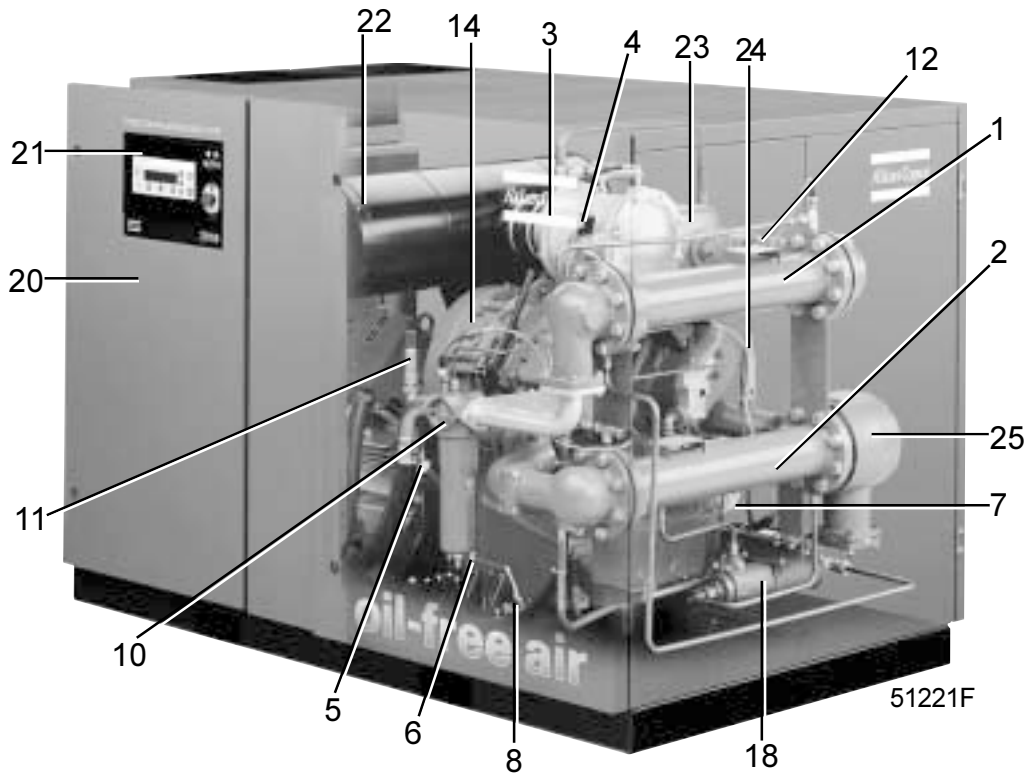


Fig. 1.5 View of ZR55

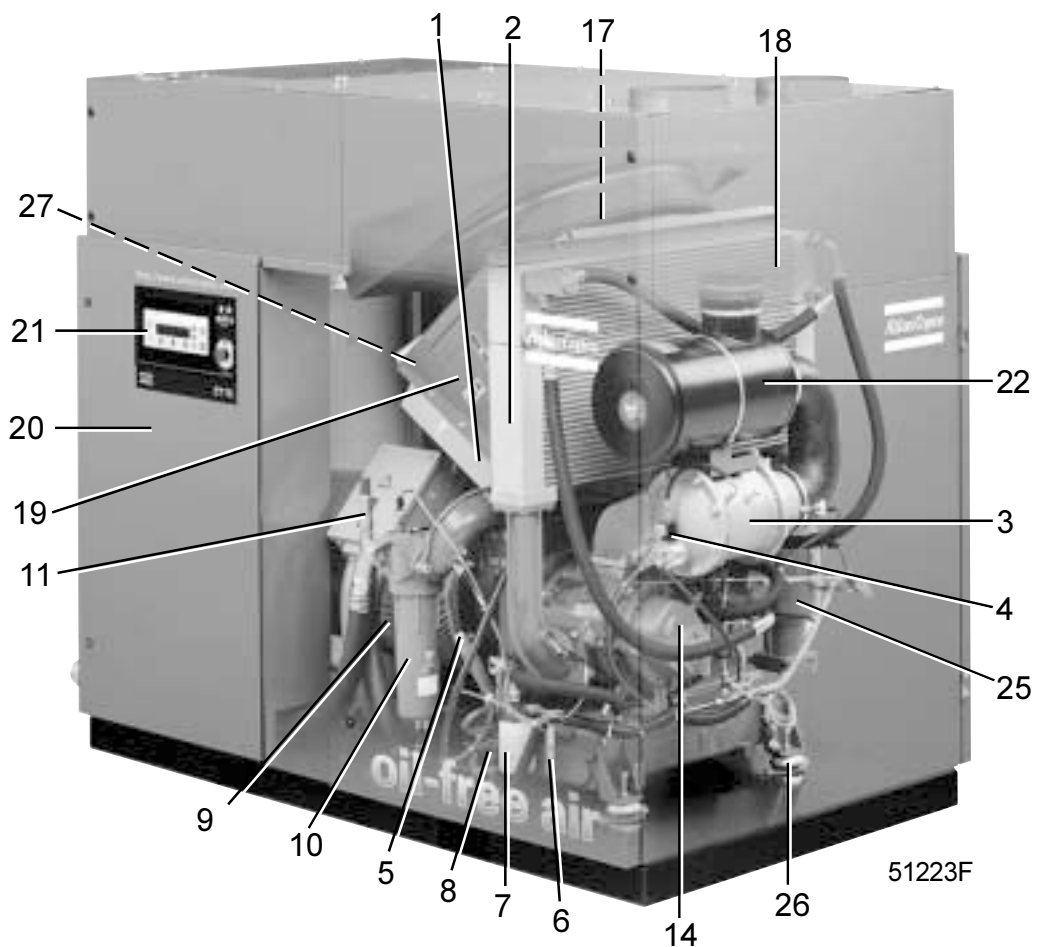


Fig. 1.6 View of ZT75

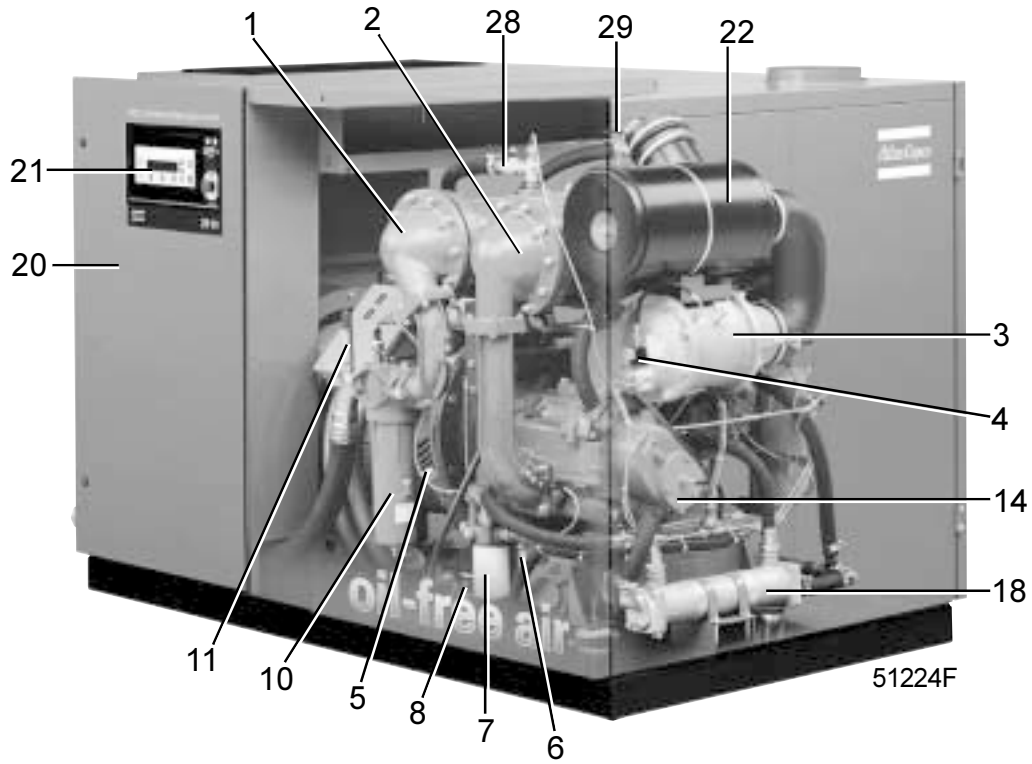


Fig. 1.7 Front view of ZR90

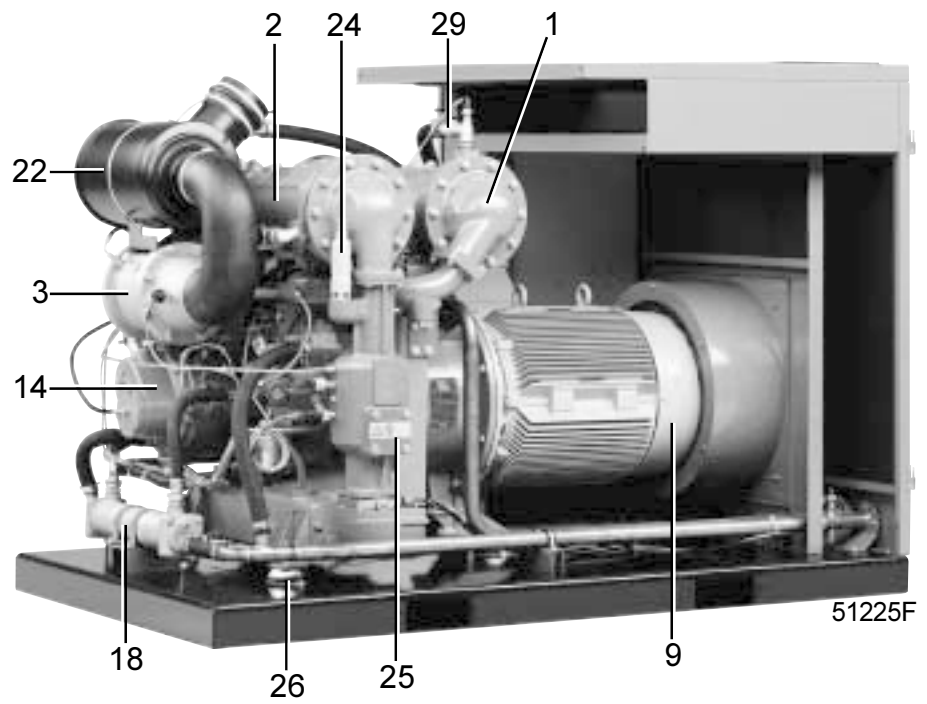


Fig. 1.8 Rear view of ZR90

The compressors are enclosed in a sound-insulated bodywork and include mainly:

- Air filter
- Low-pressure compressor element
- Intercooler
- High-pressure compressor element
- Aftercooler
- Electric motor
- Drive coupling
- Gear casing
- Elektronikon® control system
- Safety valves

## 1.2 Elektronikon® control system

### 1.2.1 Elektronikon® regulator (Fig. 1.9)

#### 1.2.1.1 Automatic control of compressor operation

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

#### 1.2.1.2 Protecting the compressor

##### Shut-down

The compressor will be shut down if:

- the motor current exceeds the permissible maximum
- the air outlet temperature of the low- or high-pressure compressor element exceeds the pre-set value
- the air inlet temperature of the high-pressure compressor element exceeds the pre-set value
- the oil pressure drops below the pre-set value

Remedy the trouble and reset the message on display (4-Fig. 1.9) before restarting. See "User manual for Elektronikon® regulator", section "Status data submenu".

##### Shut-down warning

Before any shut-down level is reached, except for the motor overload, a message will appear on display (4-Fig. 1.9) and

general alarm LED (3) will light up, to warn the operator that the shut-down warning level is exceeded. The shut-down warning level is a programmable setting below the shut-down level.

The message disappears as soon as the cause of the trouble is remedied.

### 1.2.1.3 Monitoring components subject to service

The regulator continuously monitors the oil, motor grease, oil filter and air filter. Each input is compared to programmed time intervals or pressure drops. If these limits are exceeded, a message will appear on display (4) to warn the operator to replace the indicated component, to change the oil or to grease the motor as the case may be.

#### 1.2.1.4 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 regulator was in the automatic operation mode and the compressor control mode (local, remote 1 or remote 2 - see section 1.2.3) was not changed during the voltage failure, the compressor will automatically restart if the supply voltage to the module is restored within a programmed time period (this time period is called the **power recovery time**).*

*The power recovery time can be set between 1 and 254 seconds or to 0. If the power recovery time is set to 0, the compressor will always restart after a voltage failure, no matter how long it takes to restore the voltage.*

### 1.2.2 Control panel (Fig. 1.9)

#### Indicators, keys and buttons

- 1 Automatic operation LED  
Indicates that the electronic regulator is automatically controlling the compressor: the compressor is loaded, unloaded, stopped and restarted depending on the air consumption and the limitations programmed in the regulator.
- 2 Voltage on LED  
Indicates that the voltage is switched on.



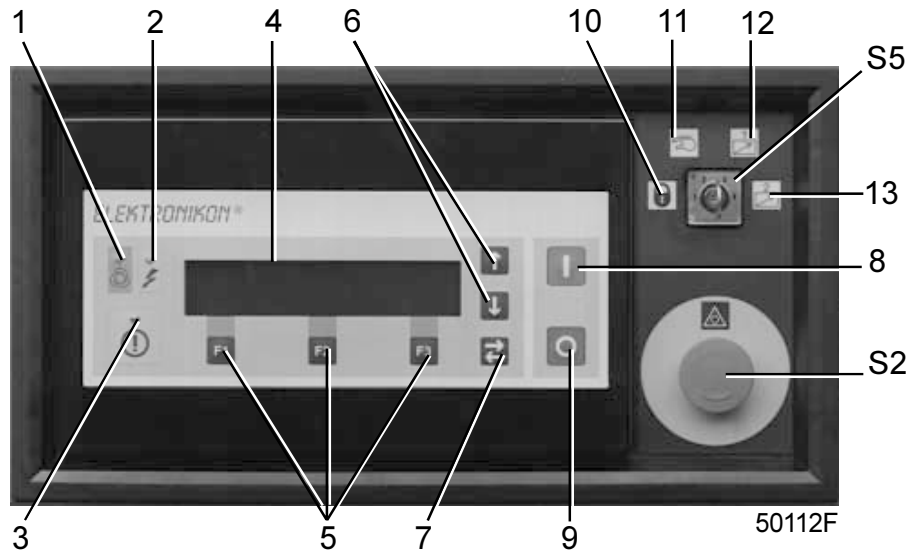


Fig. 1.9. Control panel

**Indicators, keys and buttons**

- 3 General alarm LED  
Is alight if a shut-down warning condition exists. See section 1.2.1. Blinks if a shut-down condition exists, if a sensor used to protect the compressor is out of order or after an emergency stop. See section 1.2.1
- 4 Display  
Indicates messages concerning the compressor operating condition, a service need or a fault. See "User manual for Elektronikon® regulator", sections "Status data submenu" and "Service submenu".
- 5 Function keys  
Keys to control and program the compressor. See below.
- 6 Scroll keys  
Keys to scroll through the display.
- 7 Tabulator key  
Key to go to the next field of the display.
- 8 Start button  
Push button to start the compressor. LED (1) lights up indicating that the electronic regulator is operative (in automatic operation). The LED goes out after unloading the compressor manually.

**Indicators, keys and buttons**

- 9 Stop button  
Push button to stop the compressor. LED (1) goes out. The compressor will run unloaded for 3 seconds before stopping.
- 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.
- S5 Control mode switch  
Key switch to select the compressor control modes. See section 1.2.3.

**Selecting a menu**

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

**Function keys**

The functions of the keys vary depending on the displayed menu. The actual function is indicated just above the relevant key. The most common functions are listed below:

Designation (4-Fig. 1.9)	Function
Add	To add compressor start/stop commands (day/hour)
Cancel	To cancel a programmed setting when programming parameters
Delete	To delete compressor start/stop commands
Limits	To show limits for a programmable setting
List	To list programmed start/stop commands (day/hour)
Load	To load the compressor manually
Main Screen	To return from a menu to the main display (Fig. 1.10)
Menu	Starting from the main display (Fig. 1.10), to initiate the main menu (Fig. 1.11) which gives access to submenus Starting from a submenu, to return to the main menu (Fig. 1.11)
Modify	To modify programmable settings
Show More	To have a quick look at the compressor status
Program	To program modified settings
Reset	To reset a timer or message
Return	To return to a previously shown option or menu
Select	To select a submenu or to read more details of a selection shown on the display
Unload	To unload the compressor manually

Compressor outlet	7.5 bar
Oil	2.1 bar
Automatically Loaded	
Menu	Show More Unload
F1	F2 F3

Fig. 1.10. Example of the main display

Status data	
Main Screen	Select ↓
F1	F2 F3

Fig. 1.11. Example of a main menu

### 1.2.3 Compressor control modes

Key switch (S5-Fig. 1.9) allows the operator to select four control modes:

Key position	Compressor control mode
10	Compressor off.
11	Local control mode (remote control mode is made inactive). The compressor can only be controlled by the buttons on the control panel. The compressor can be started and stopped via function <b>Timer</b> (see section 1.2.1), if programmed and activated.
12	Remote control mode 1 (local control is made inactive). The compressor can only be started and stopped by an ES100 sequence controller or by external switches. Compressor start/stop commands via function <b>Timer</b> (see section 1.2.1) are still possible, if programmed and activated. Emergency stop button (S2-Fig. 1.9) remains active.
13	Remote control mode 2. The compressor can be controlled by an ES-type controller or by computer. Consult Atlas Copco.

#### Important

- The control module will only react to a new control mode if the new position of the control mode switch is maintained for 3 seconds.
- To avoid unauthorized switching over to another control mode, take out the key after selecting the required mode.

### 1.2.4 External compressor status indication

Terminal strip (1X1-Figs. 1.13 and 1.14) is provided with auxiliary contacts for external indication of:

Indication	Relay	Terminals on strip 1X1
Automatic operation	K06	11-12
Warning	K07	13-14
Shut-down	K08	15-16
Compressor loaded	K11	17-18
Control mode REMOTE 1	--	21-22

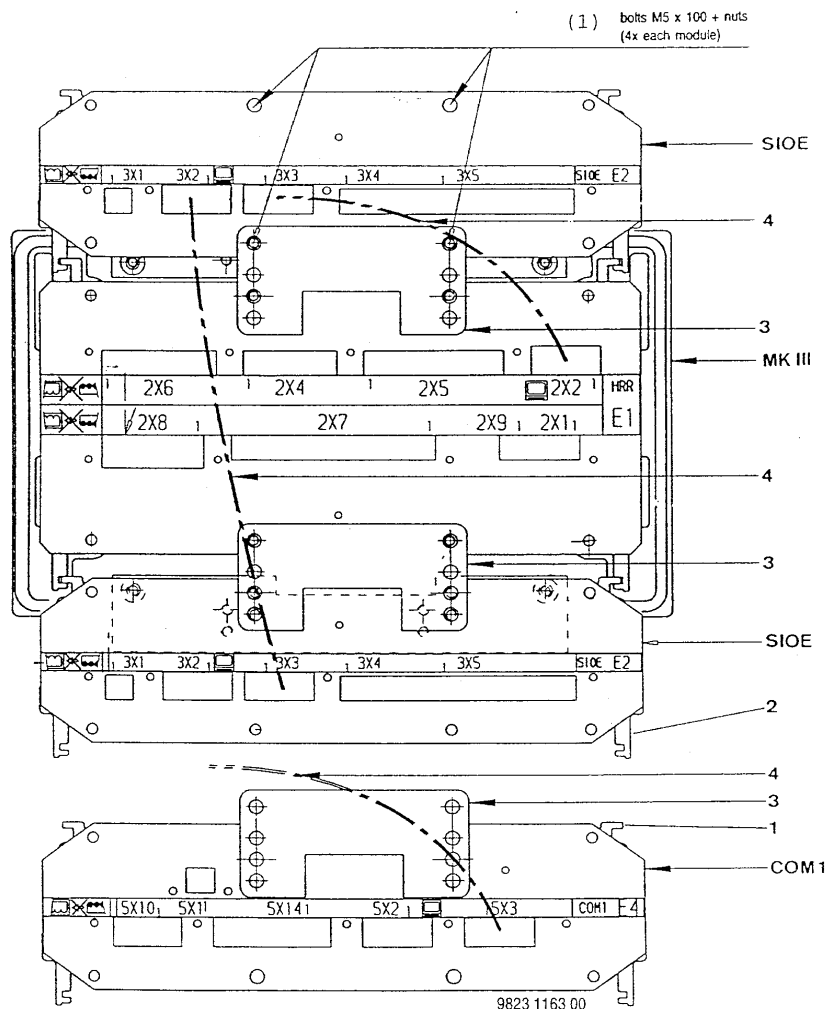
Stop the compressor and switch off the voltage before connecting external equipment. Check the service diagram stuck inside the electric cubicle for the maximum load. Consult Atlas Copco.

**1.2.5 External communication**

If it is desired to connect the compressor to an Atlas Copco ES system (e.g. to an ES100 sequence selector), an optional communication module (COM1) needs to be installed.

**Installation (Fig. 1.12)**

1. Fit the communication module (COM1) and fix it using plate (3).
2. Connect the 24V power supply from terminals (6 and 7) of terminal strip (1X1) to connector (5X1) of communication module (COM1).
3. Connect an earth cable between module (COM1) and the module of the compressor regulator.
4. Connect the cable delivered with the COM1 module from connector (5X3) of the COM1 module to a free ..X2 connector on a module of the compressor regulator.
5. Consult Atlas Copco to check the installation and to have the communication software loaded.



COM1	Communication module	1	Guide
MKIII	Elektronikon regulator	2	Slot
SIOE	Expansion modules 2)	3	Plate
		4	Cable

Fig. 1.12 Installation of communication module (example)

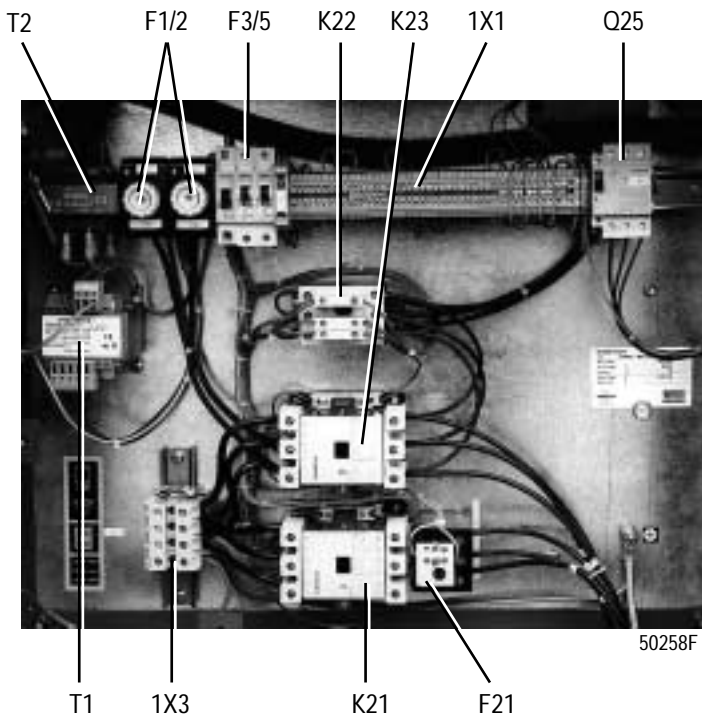


Fig. 1.13 Electric cabinet, ZT18/37 (typical example)

- F1/2 Fuses
- F3/5 Circuit breakers
- F21 Compressor motor overload relay
- K11 Auxiliary relay, loading
- K21 Line contactor
- K22 Star contactor
- K23 Delta contactor
- Q25 Fan motor circuit breaker (ZT18/37 and ZT75/90 only)
- T1/T2 Transformers
- 1X1 Terminal strip
- 1X3 Terminal strip, supply from main

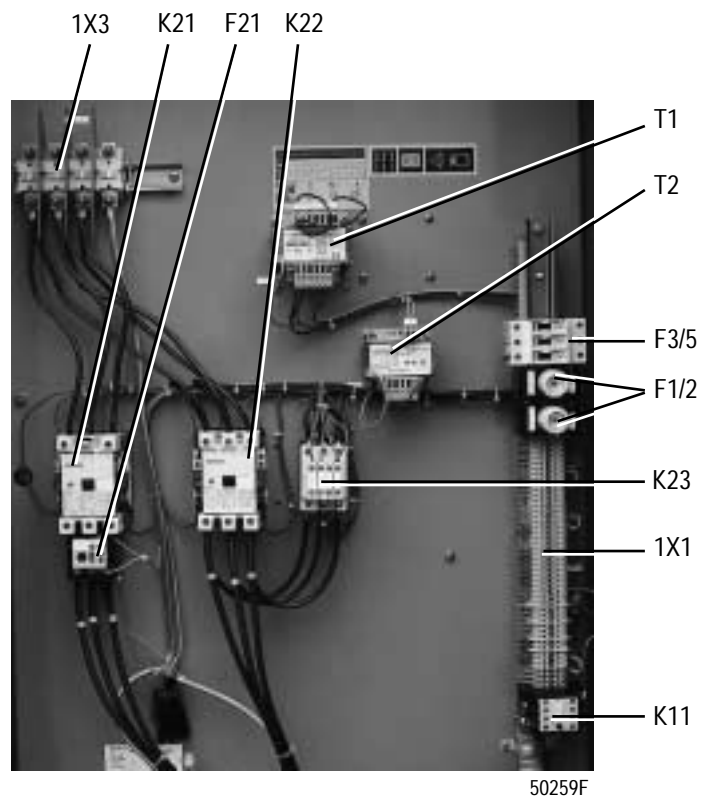


Fig. 1.14 Electric cabinet, ZR/ZT 45/90 (typical example)

Figs. 1.13 and 1.14 Electric cabinet

### 1.3 Regulating system (Figs. 1.15 up to 1.17)

#### 1.3.1 Air flow

Air drawn through filter (1) is compressed in low-pressure compressor element (12) and discharged to intercooler (13). The cooled air is further compressed in high-pressure compressor element (15) and discharged through pulsation damper (16) to aftercooler (17). The cooled air is discharged through moisture trap (19) and outlet valve (21) towards the air net. Check valve (18) is provided upstream of the aftercooler (downstream of it on ZT18/37).

#### 1.3.2 Condensate drain system

A moisture trap (19) is installed downstream of aftercooler (17) to prevent condensate from entering the air outlet pipe.

ZT75/90 and ZR are also provided with a moisture trap (28) downstream of intercooler (13) to prevent condensate from

entering high-pressure compressor element (15).

Each trap is provided with a float valve to automatically drain condensate and with a manual drain valve.

#### 1.3.3 Oil system

##### ZT18/55 and ZR

Oil is circulated by pump (24) from the sump of the gear casing through cooler (25) and filter (26) towards the bearings and timing gears.

##### ZT75/90

Oil is circulated by pump (24) from the sump of the gear casing through cooler (25), the cooling jackets of compressor elements (12 and 15) and filter (26) towards the bearings and timing gears.

Valve (27) by-passes oil cooler (25) when starting the compressor from cold condition to ensure rapid warming of the oil to normal working temperature.

ZT18/37  
DURING LOADING (6)

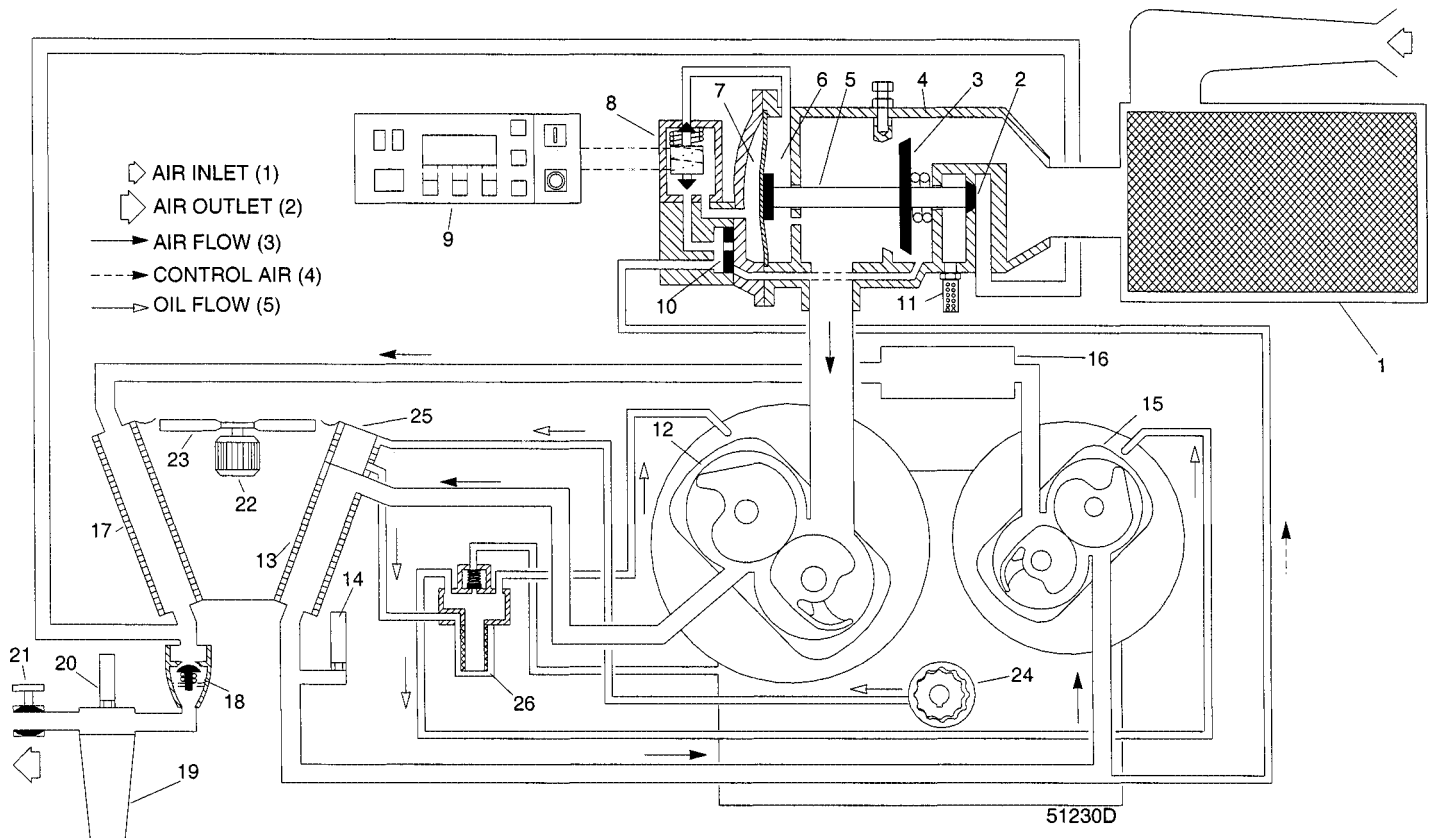


Fig. 1.15 ZT18/37 during loading

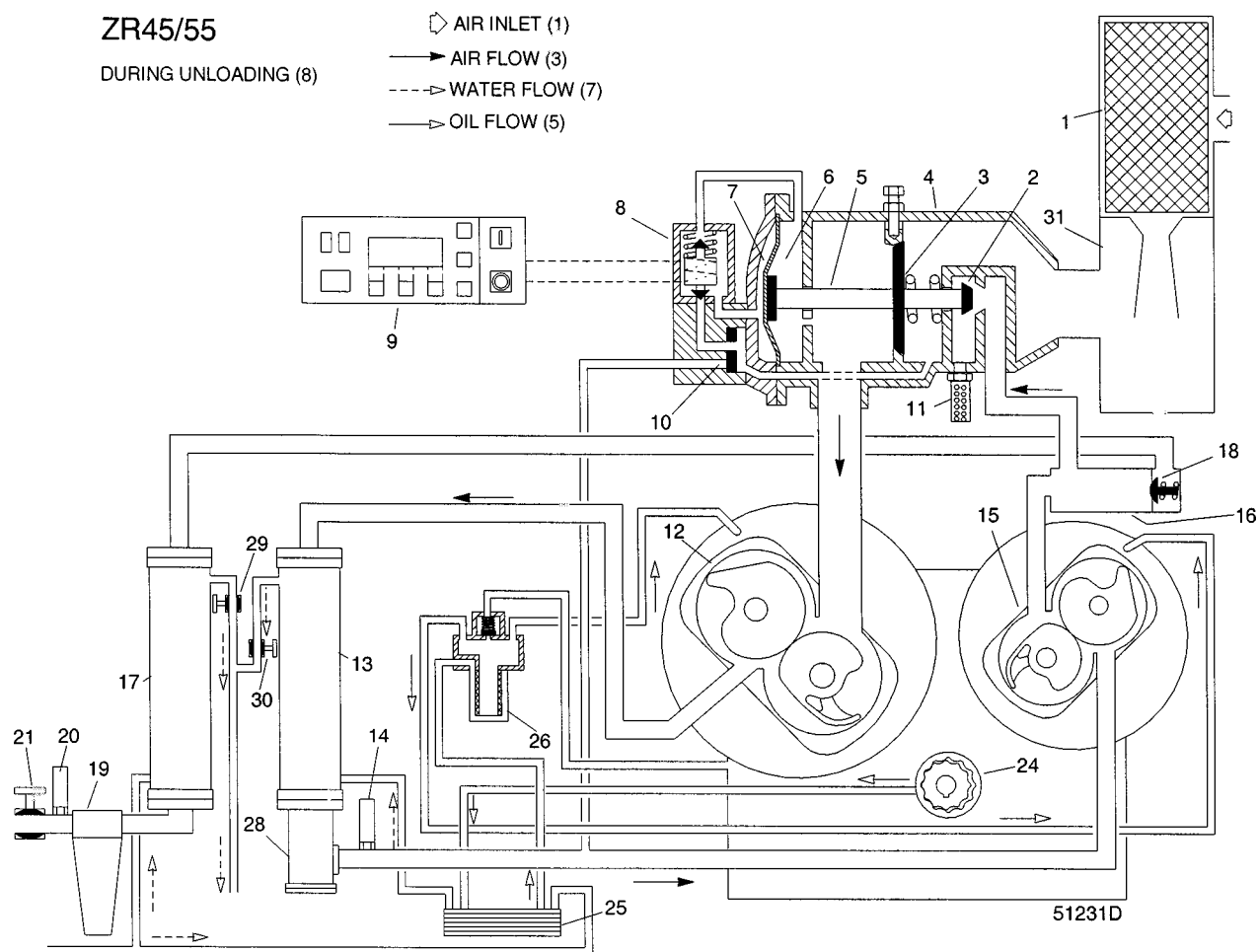


Fig. 1.16 ZR45/55 during unloading

### 1.3.4 Cooling system

The compressors are provided with an oil cooler (25), intercooler (13) and aftercooler (17). In addition, ZT75/90 are equipped with a pre-aftercooler (32).

**ZT18/90** are air-cooled. On ZT18/37 and ZT75/90, the fan (23) is driven by electric motor (22). On ZT45/55, the fan is driven by the main shaft of the compressor. **On ZT18/30 HAT** two fans are provided, one for generating the cooling air of the intercooler, another for generating the cooling air of the oil cooler and aftercooler.

**ZR45/55** are water-cooled; the cooling system has two circuits:

- one for oil cooler (25) and intercooler (13)
- one for aftercooler (17)

**ZR75/90** are water-cooled; the cooling system has two circuits:

- one for oil cooler, low-pressure compressor element and intercooler
- one for high-pressure compressor element and aftercooler

### 1.3.5 Regulating system

The system is controlled by Elektronikon® regulator (9) which keeps the net pressure within programmable pressure limits by automatically loading and unloading the compressor depending on the air consumption.

#### During unloading

If the air consumption is less than the air delivery of the compressor, the net pressure increases. When the net pressure reaches the upper limit of the working pressure (unloading pressure), solenoid valve (8) is de-energized. The plunger of solenoid valve (8) moves downwards by spring force shutting off the supply of control air to unloader (4):

1. Control pressure is vented from chamber (7) of unloader (4) through solenoid valve (8) and chamber (6) towards the inlet of low-pressure compressor element (12).
2. As there is no longer any pressure difference between chambers (6 and 7), plunger (5) returns by spring force

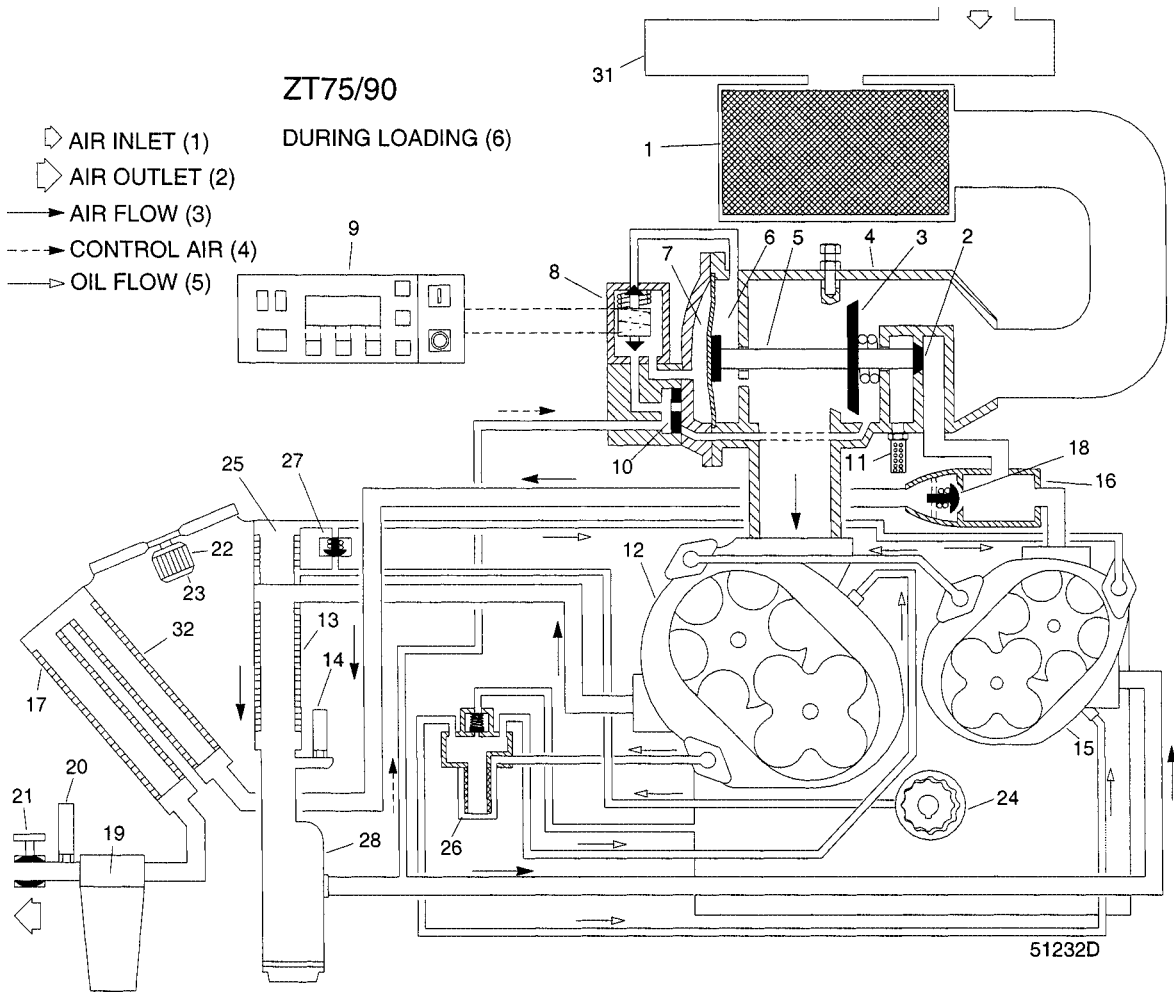


Fig. 1.17 ZT75/90 during loading

- |    |                         |    |                                  |    |   |
|----|-------------------------|----|----------------------------------|----|---|
| 1  | Air filter              | 12 | Low-pressure compressor element  | 23 | Fan   |
| 2  | Unloading valve         | 13 | Intercooler                      | 24 | Oil pump                                    |
| 3  | Full-load/no-load valve | 14 | Low-pressure safety valve        | 25 | Oil cooler                                  |
| 4  | Unloader                | 15 | High-pressure compressor element | 26 | Oil filter                                  |
| 5  | Plunger                 | 16 | Pulsation damper                 | 27 | Oil cooler by-pass valve                    |
| 6  | Chamber                 | 17 | Aftercooler                      | 28 | Moisture trap, intercooler                  |
| 7  | Chamber                 | 18 | Check valve                      | 29 | Regulating valve, aftercooler water circuit |
| 8  | Loading solenoid valve  | 19 | Moisture trap, aftercooler       | 30 | Regulating valve, intercooler water circuit |
| 9  | Elektronikon® regulator | 20 | High-pressure safety valve       | 31 | Silencer                                    |
| 10 | Diaphragm               | 21 | Air outlet valve                 | 32 | Pre-aftercooler                             |
| 11 | Silencer                | 22 | Fan motor                        |    |   |

Figs. 1.15 up to 1.17 Regulating systems

keeping full-load/no-load valve (3) closed and unloading valve (2) open.

3. Compressed air between check valve (18) and valve (2) is blown off through silencer (11). Check valve (18) closes.
4. As vacuum prevails in intercooler (13), diaphragm (10) switches to the left.

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

**During loading**

When the net pressure decreases to the lower limit of the working pressure (loading pressure), solenoid valve (8) is energized. The plunger of solenoid valve (8) moves upwards against spring force opening the supply port of control air to unloader (4):

1. Atmospheric pressure is allowed through solenoid valve (8) to chamber (7) of unloader (4). As this pressure is higher than the pressure in chamber (6), full-load/no-load valve (3) starts opening.
2. Intercooler pressure is building up causing diaphragm (10) to switch to the right. As the pressure difference between

chambers (7 and 6) increases, plunger (5) moves further against spring force until full-load/no-load valve (3) is fully open and unloading valve (2) closed.

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

**Footnotes chapter 1**

- 1) This function is called the **Timer** function. See "User manual for Elektronikon® regulator", section "Timer submenu".
- 2) Not installed on all compressor types.

**2 INSTALLATION**

**2.1 Dimension drawings (Figs. 2.1 up to 2.7)**

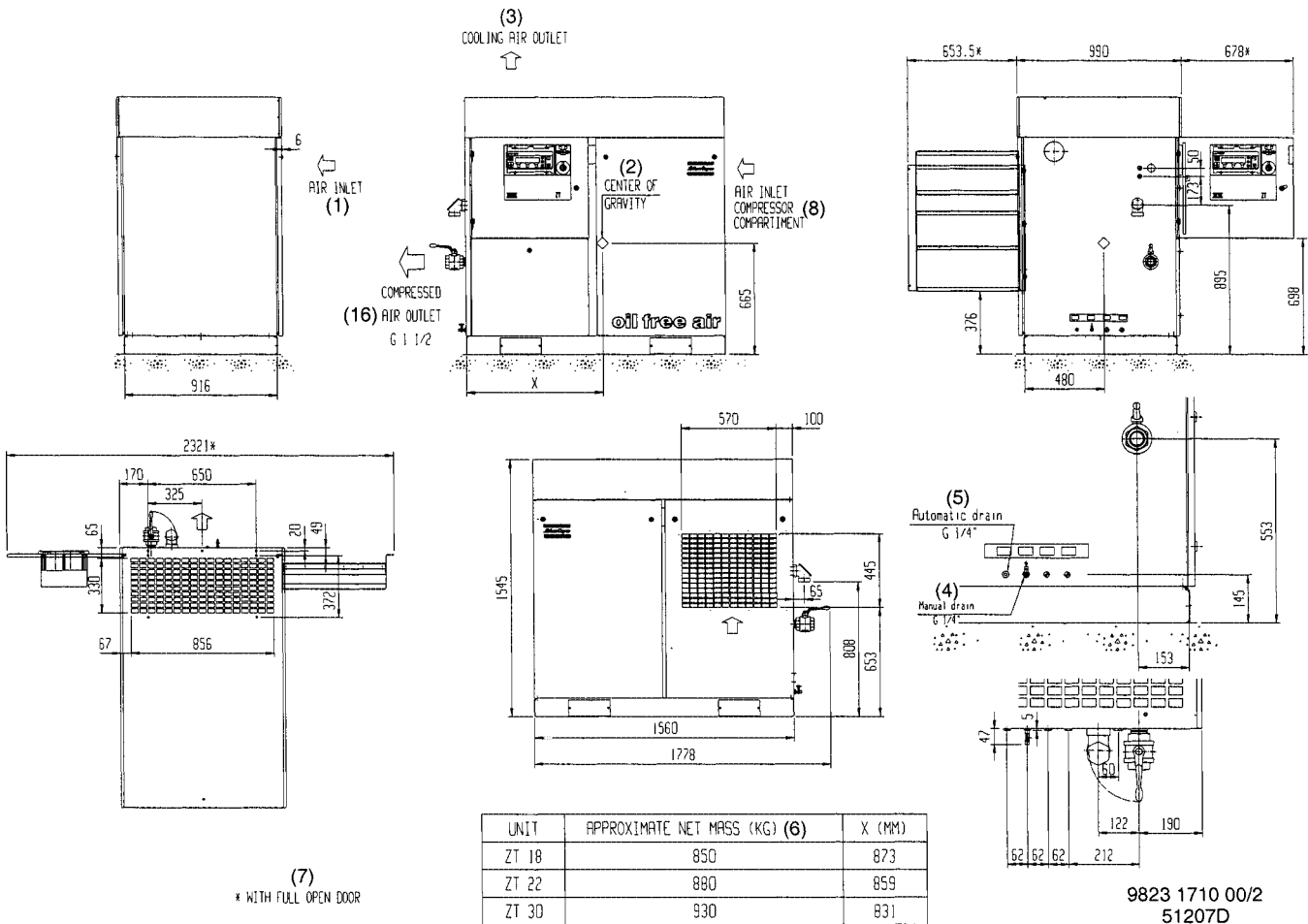


Fig. 2.1 Dimension drawing, ZT18/30



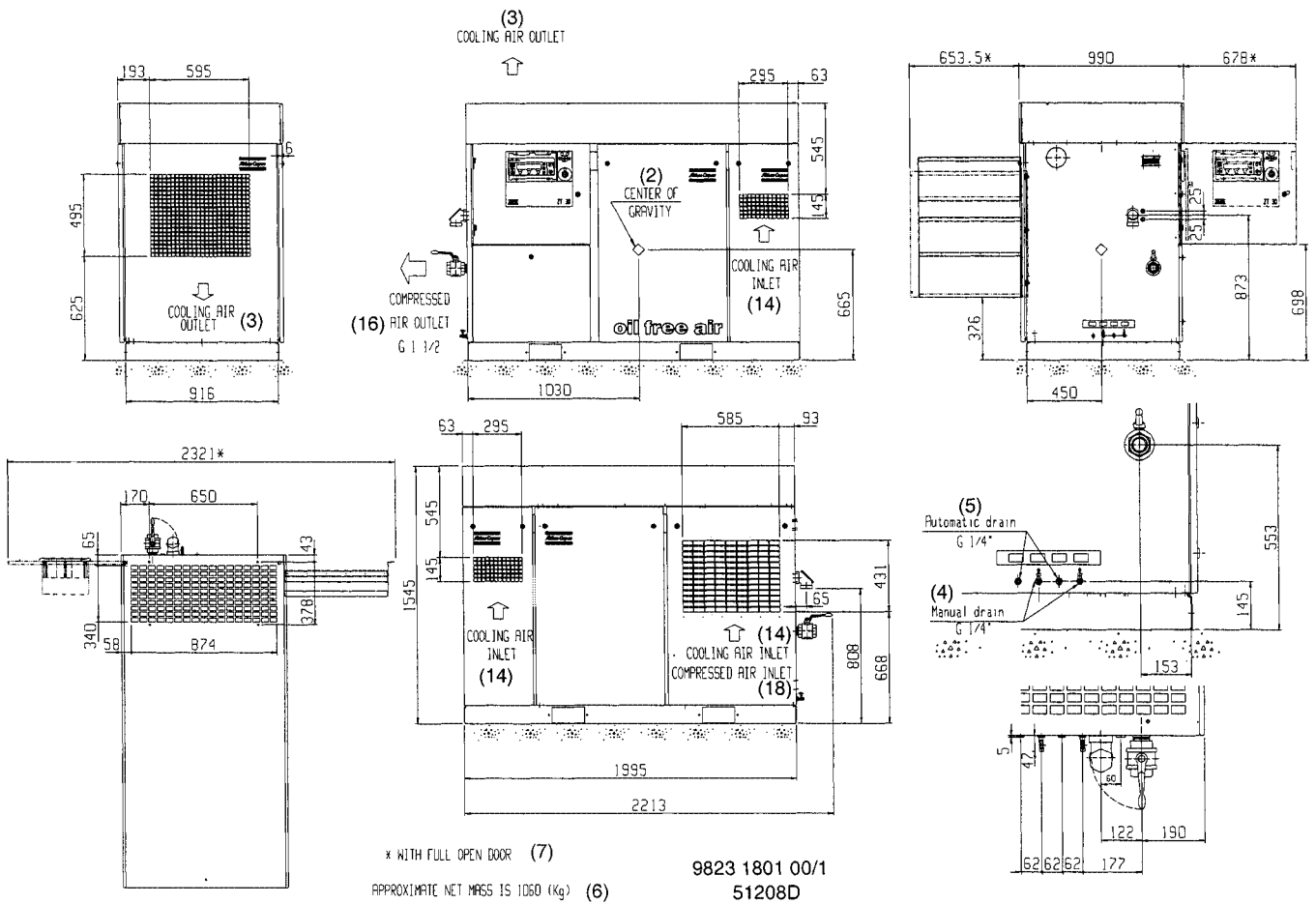


Fig. 2.2 Dimension drawing, ZT18/30 HAT

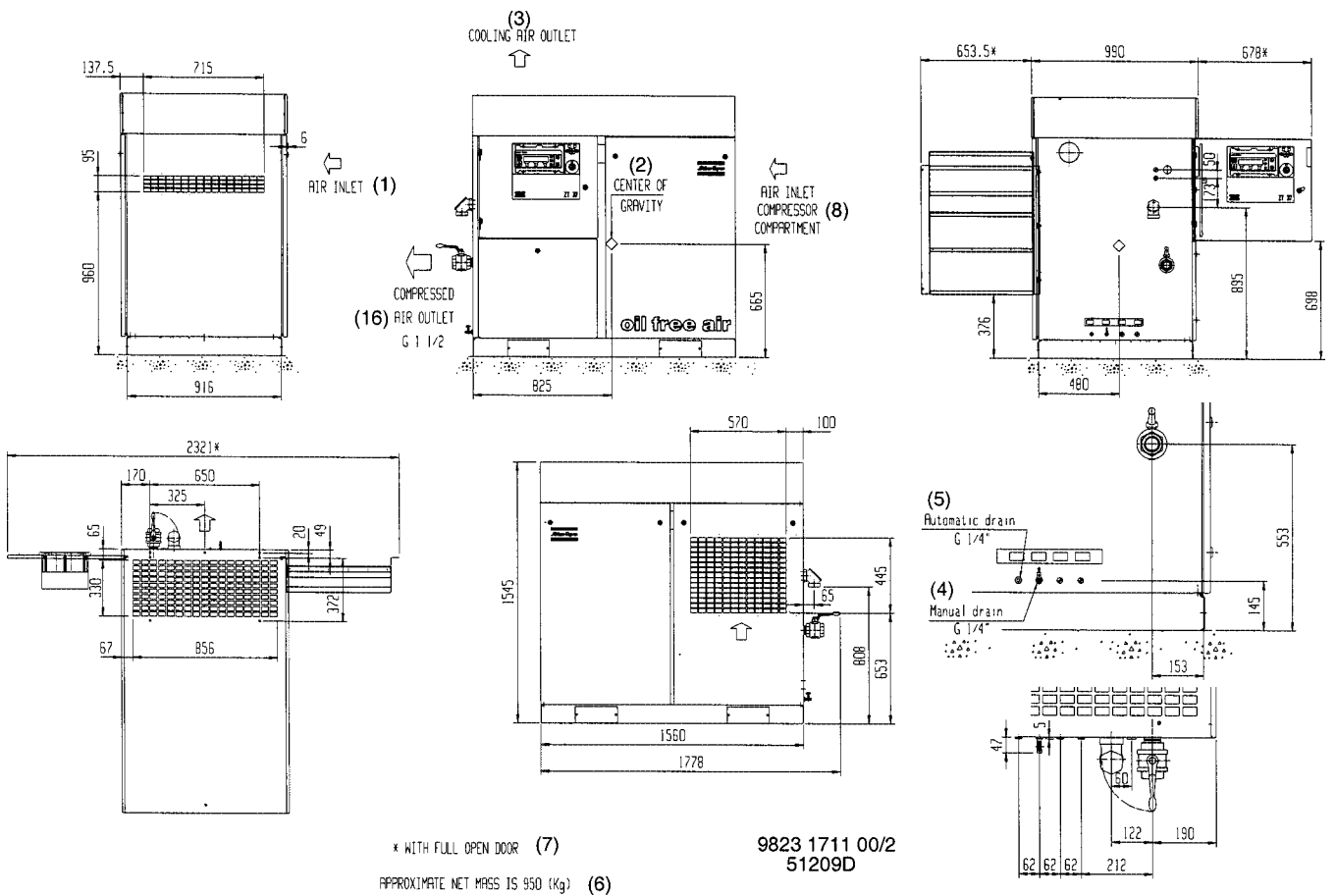


Fig. 2.3 Dimension drawing, ZT37

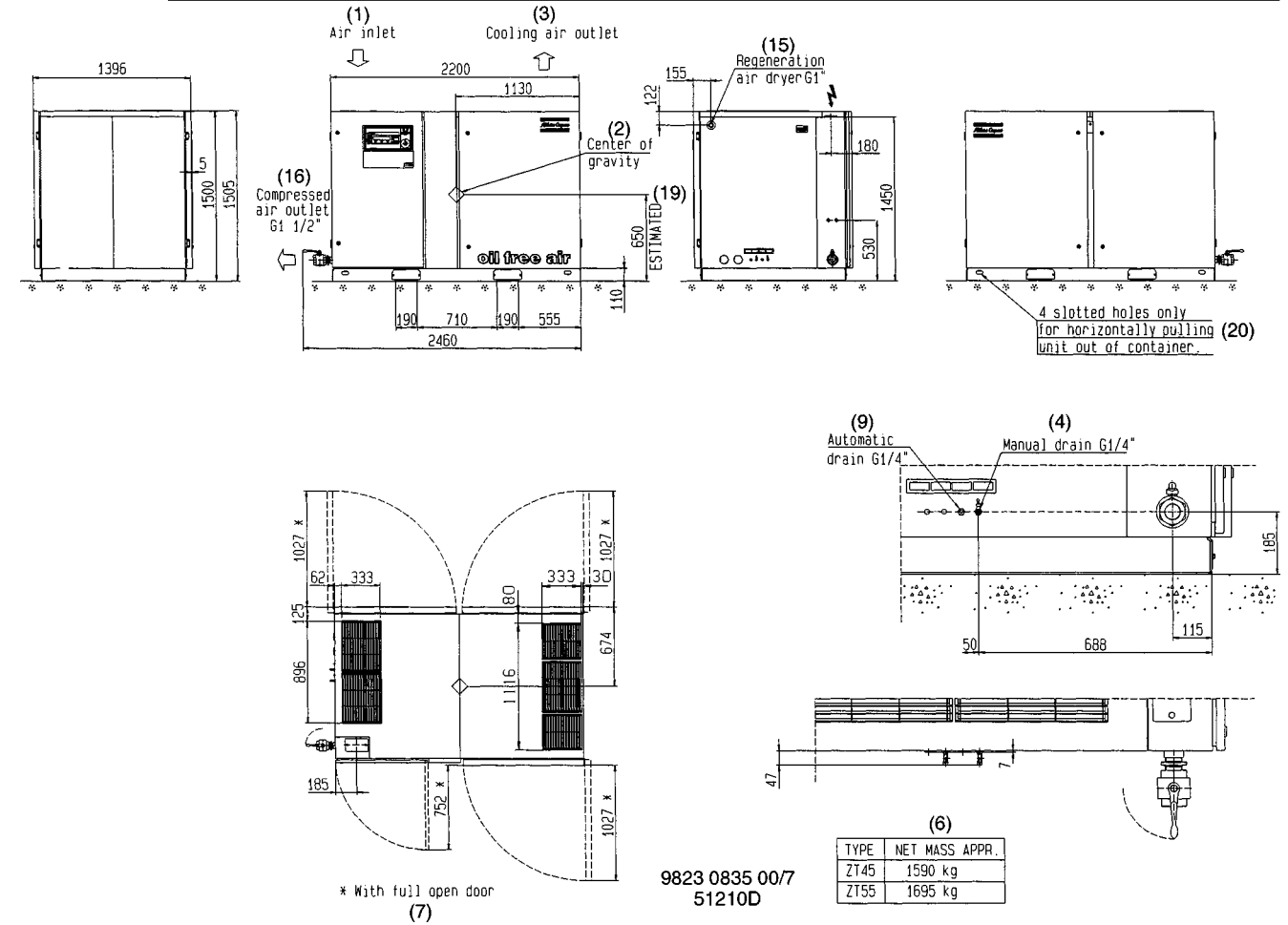


Fig. 2.4 Dimension drawing, ZT45/55

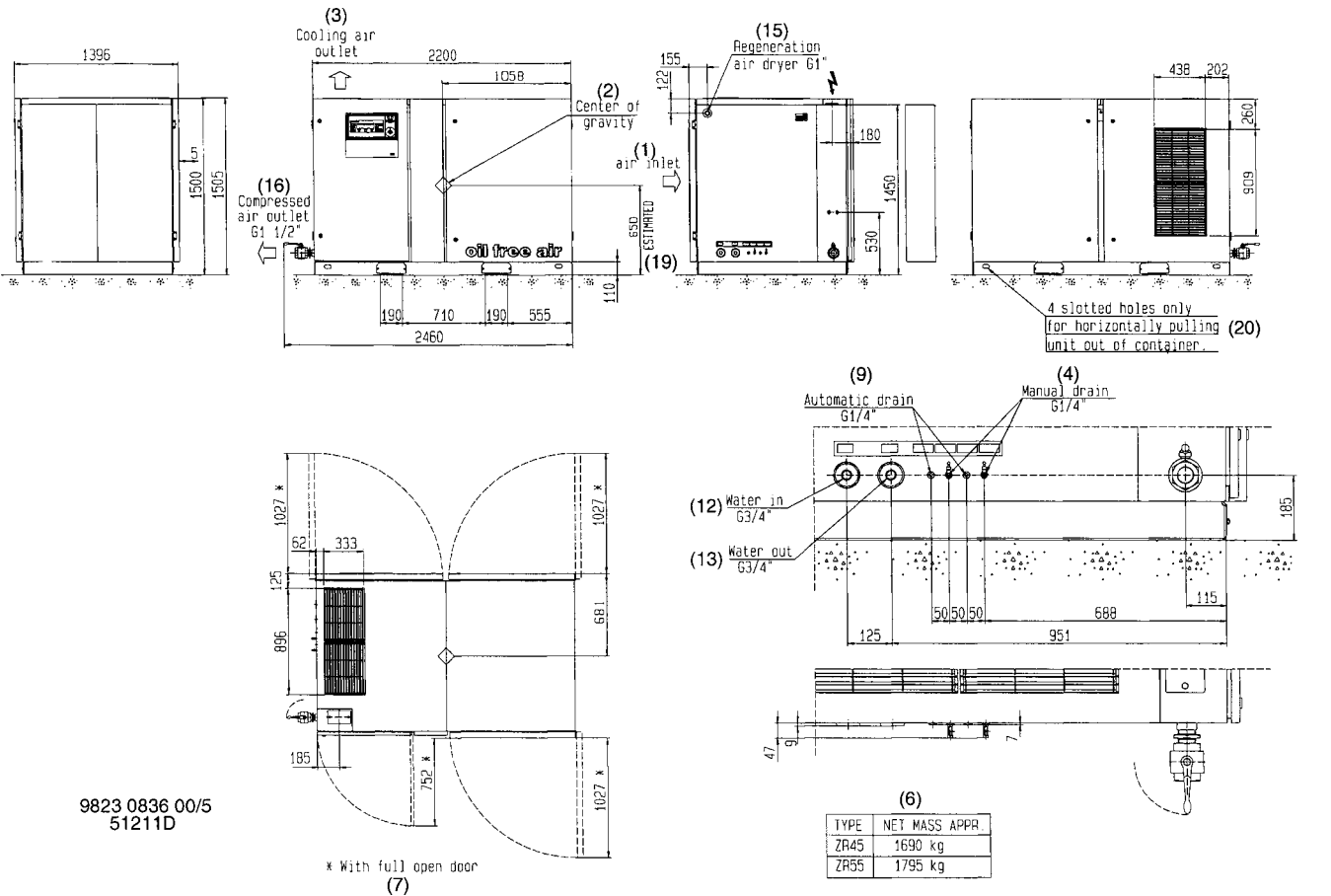


Fig. 2.5 Dimension drawing, ZR45/55

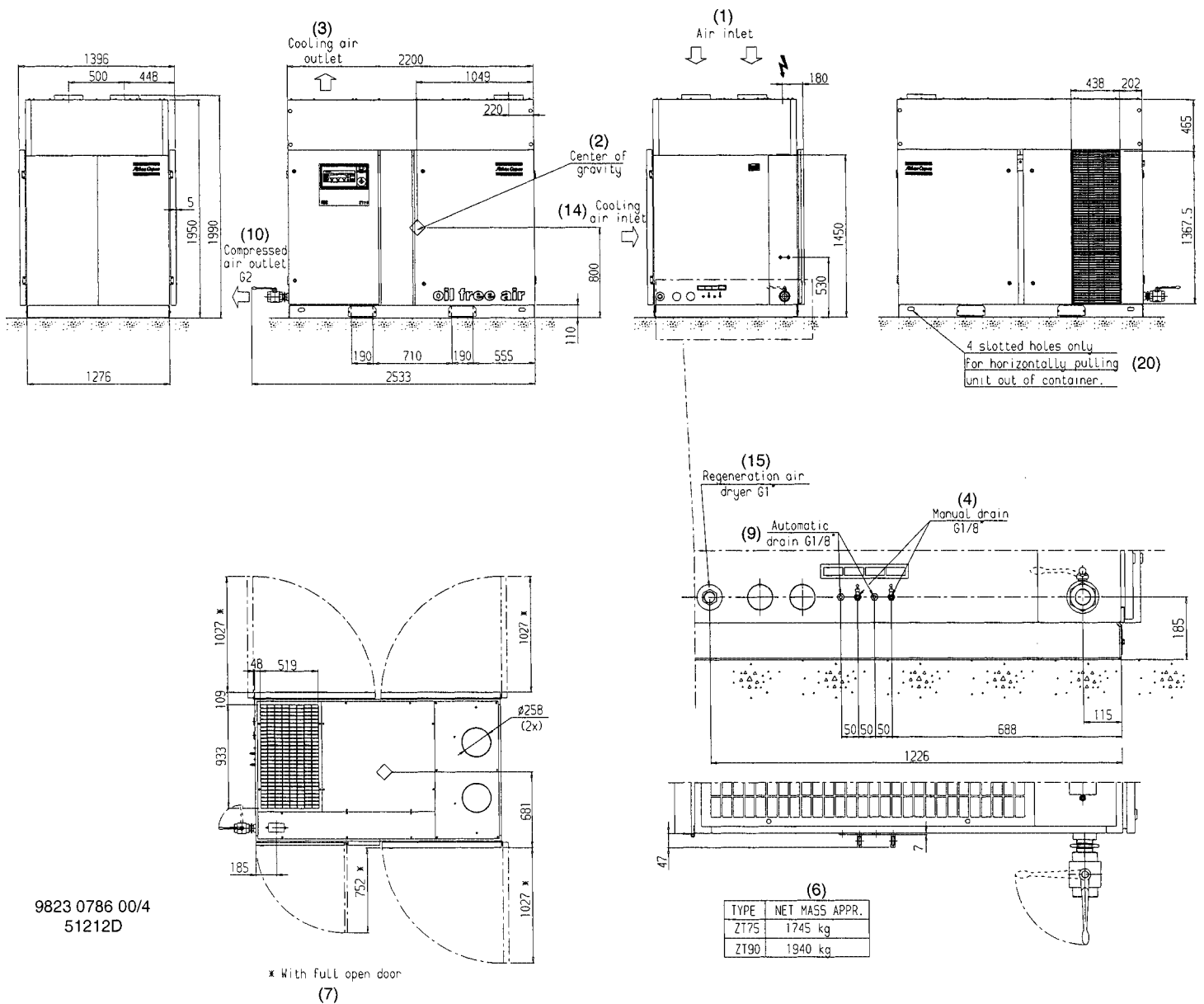


Fig. 2.6 Dimension drawing, ZT75/90

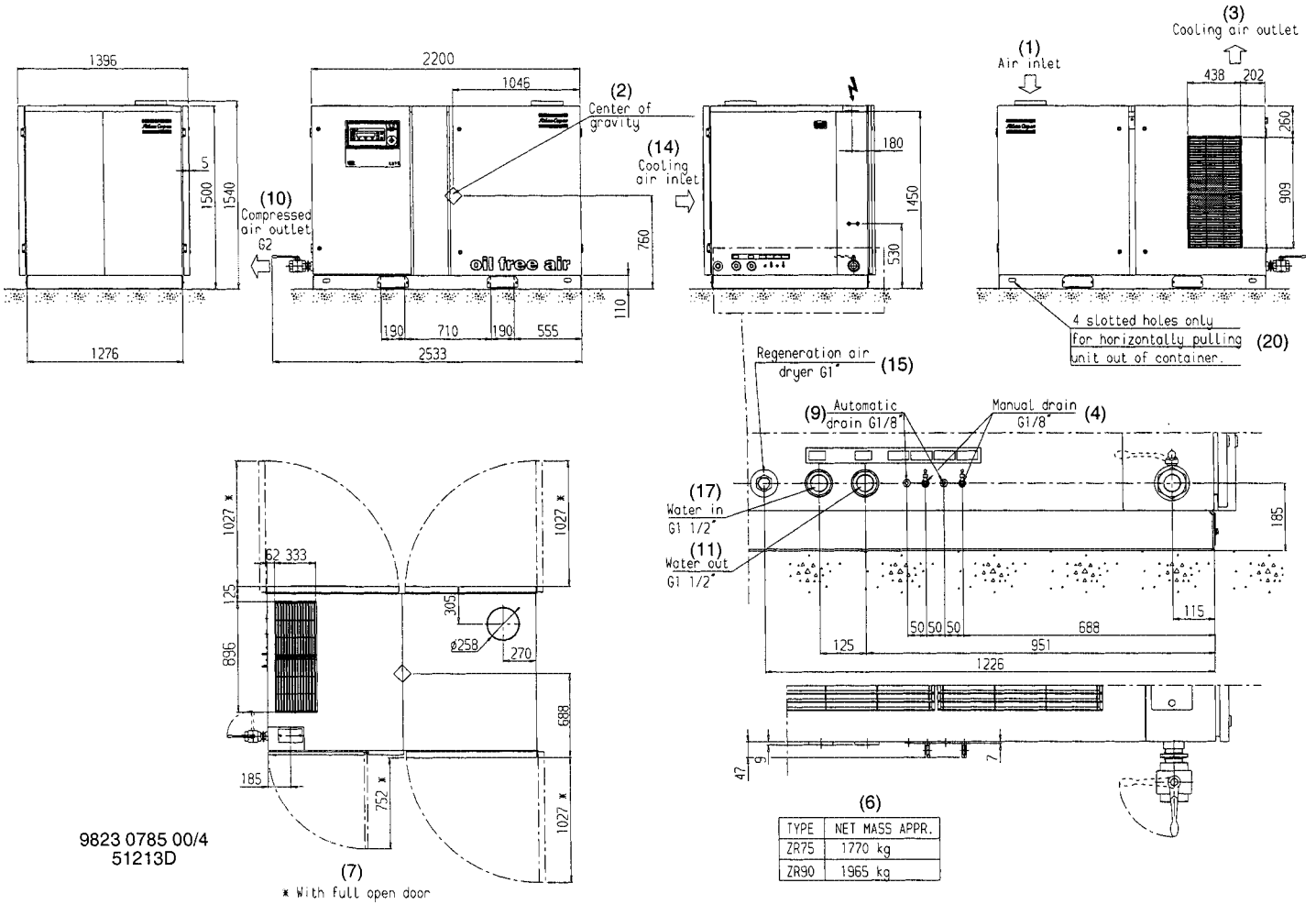


Fig. 2.7 Dimension drawing, ZR75/90

## 2.2 Installation proposals (Figs. 2.8 up to 2.13)

### 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 from the air outlet pipe and fit the air outlet valve (7-Fig. 3.2). Close the valve and connect it to the air net.

3. The pressure drop over the delivery pipe can be calculated as follows:

$$dP = (L \times 450 \times Qc^{1.85}) / (d^5 \times P)$$

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 = the absolute pressure at the compressor outlet in bar(a)

Qc = free air delivery of the compressor in l/s

It is recommended that the connection of the compressor air delivery pipe is made on top of the main air net pipe to minimize carry-over of possible remainder of condensate.

As a rule of thumb, following formula can be used to calculate the recommended volume of the air net:

$$V = (30 \times C \times p \times Q) / dP$$

V = recommended air net volume in l

dP = pressure difference between unloading and loading pressures in bar (recommended minimum = 0.5)

p = compressor inlet pressure in bar absolute

Q = free air delivery of compressor in l/s

C = correction factor, see below

#### Air consumption divided by compressor air delivery

	C
0.9	0.10
0.8	0.15
0.7	0.20
0.5	0.25
0.3	0.20
0.2	0.15
0.1	0.10

Example: air consumption = 130 l/s  
 compressor air delivery = 180 l/s  
 inlet pressure = 1 bar absolute  
 unloading pressure = 7.5 bar(e)  
 loading pressure = 6.8 bar(e)

Recommended air net volume (sum of receiver volume and volume of pipe net) = 1540 l. Consult Atlas Copco if in any doubt.

4. The inlet grids and ventilation fan should be installed in such a way that any recirculation of cooling air to the compressor or dryer (optional) is avoided. The air velocity to the grids is limited to 5 m/s.

If cooling air ducts are installed as for proposal 2 (ALT 2), consult Atlas Copco for the maximum allowable pressure drop over the ducts. Common ducting for several compressors is not allowed.

The required ventilation capacity (per compressor installed) to limit the compressor room temperature can be calculated as follows:

#### For ZT18/30 HAT

$$Qv = 1.55 N/dT$$

#### For all other ZT compressors

For compressors installed as indicated on proposal 1 (ALT 1) or 3 (ALT 3):

$$Qv = 1.05 N/dT$$

#### For ZR

$$Qv = 0.1 N/dT$$

Qv = required ventilation capacity in m<sup>3</sup>/s

N = shaft input of the compressor in kW

dT = temperature rise over ambient in degrees Celsius

5. Remove the plastic plugs from the condensate pipes (Fig. 3.2). Fit the manual condensate drain valves (4/6). Lay out the drain piping from valves (4/6) and automatic condensate outlets (3/5) 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. **For ZR**, remove the plastic plugs from the compressor water pipes (1 and 2-Fig. 3.2) and connect the pipes to the cooling water circuit. Provide a valve in the compressor water inlet pipe and outlet pipe. See section 2.4 for the water requirements.

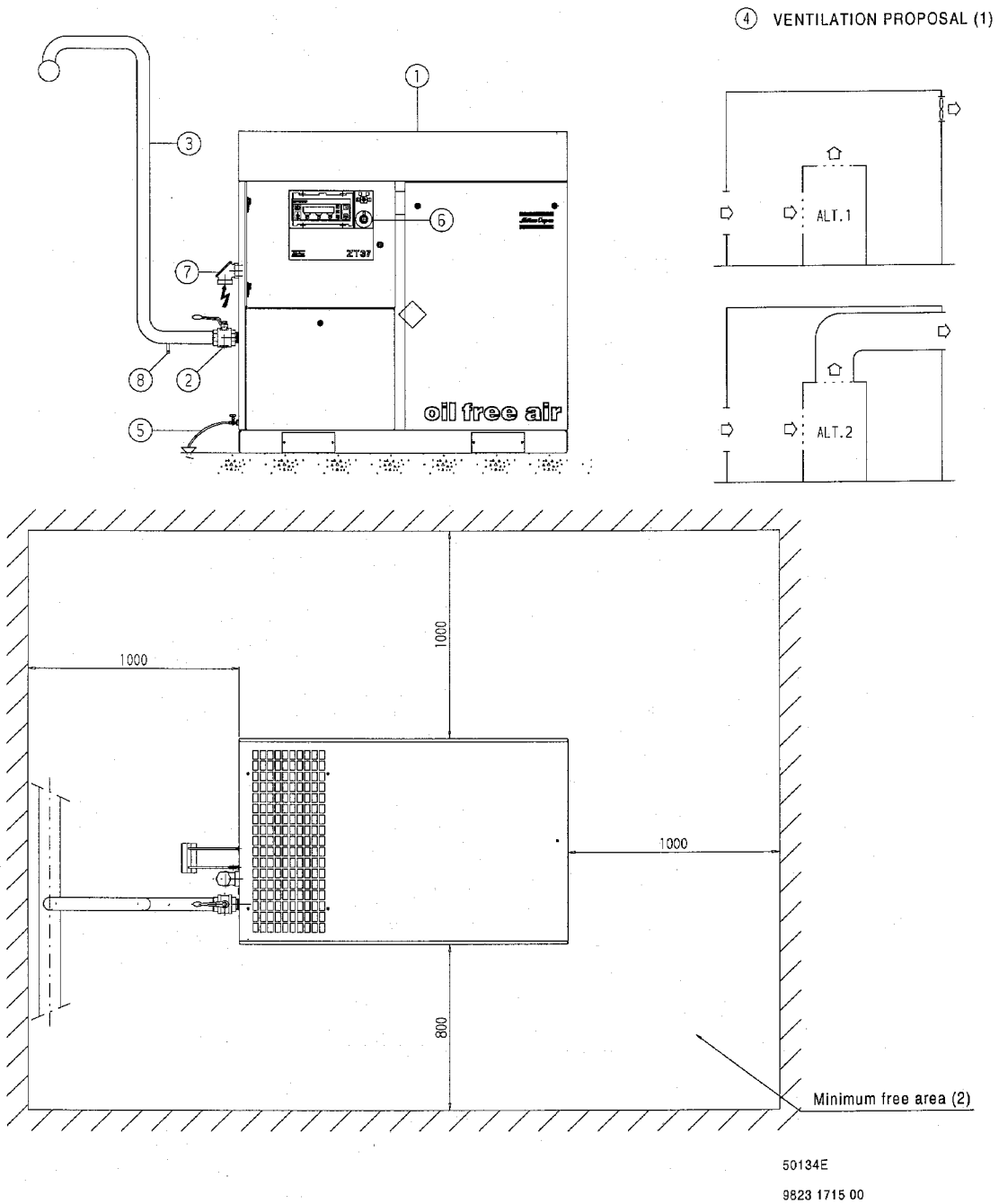


Fig. 2.8 Installation proposal, ZT18/37

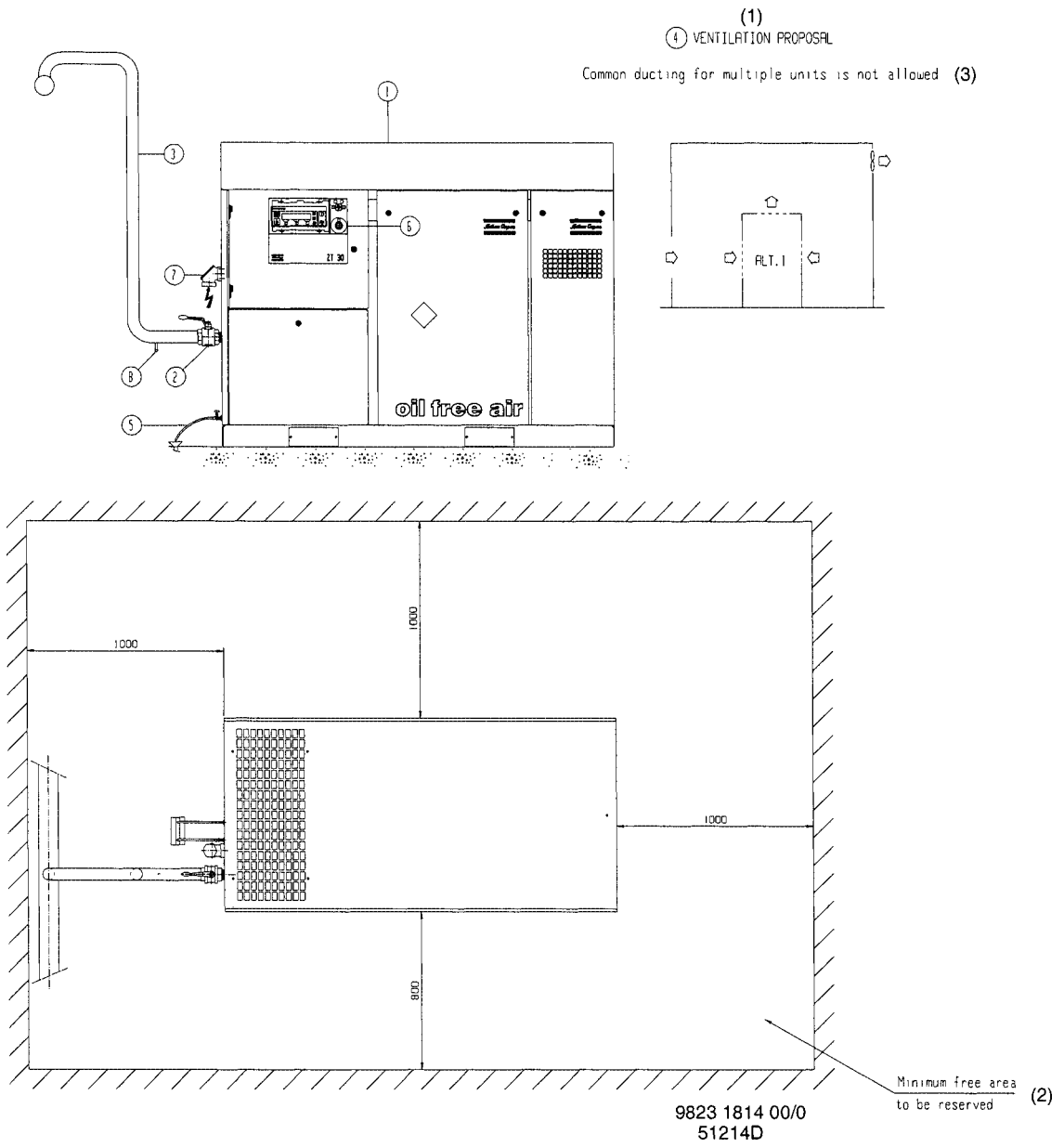


Fig. 2.9 Installation proposal, ZT18/30 HAT

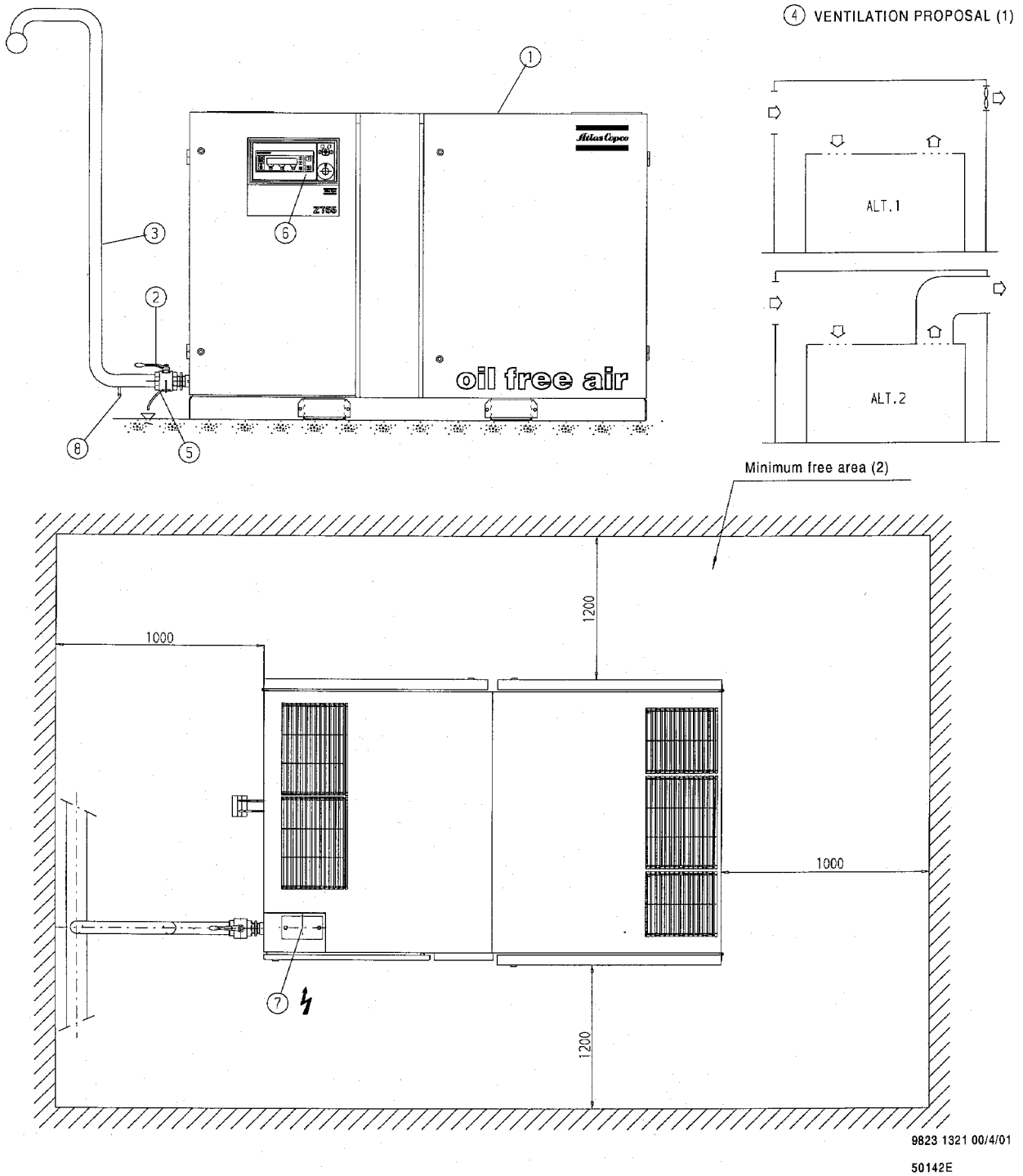


Fig. 2.10 Installation proposal, ZT45/55



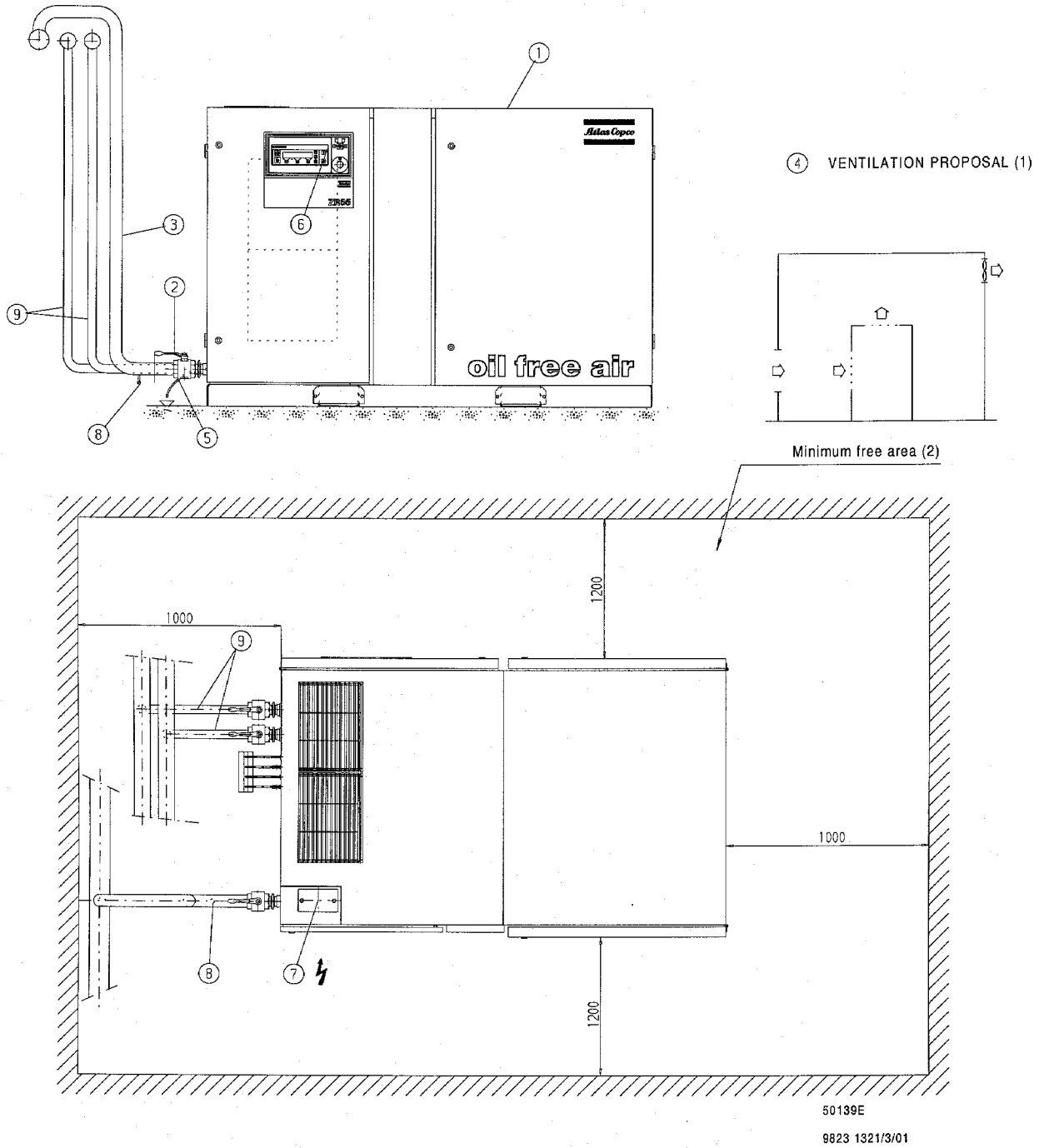


Fig. 2.11 Installation proposal, ZR45/55

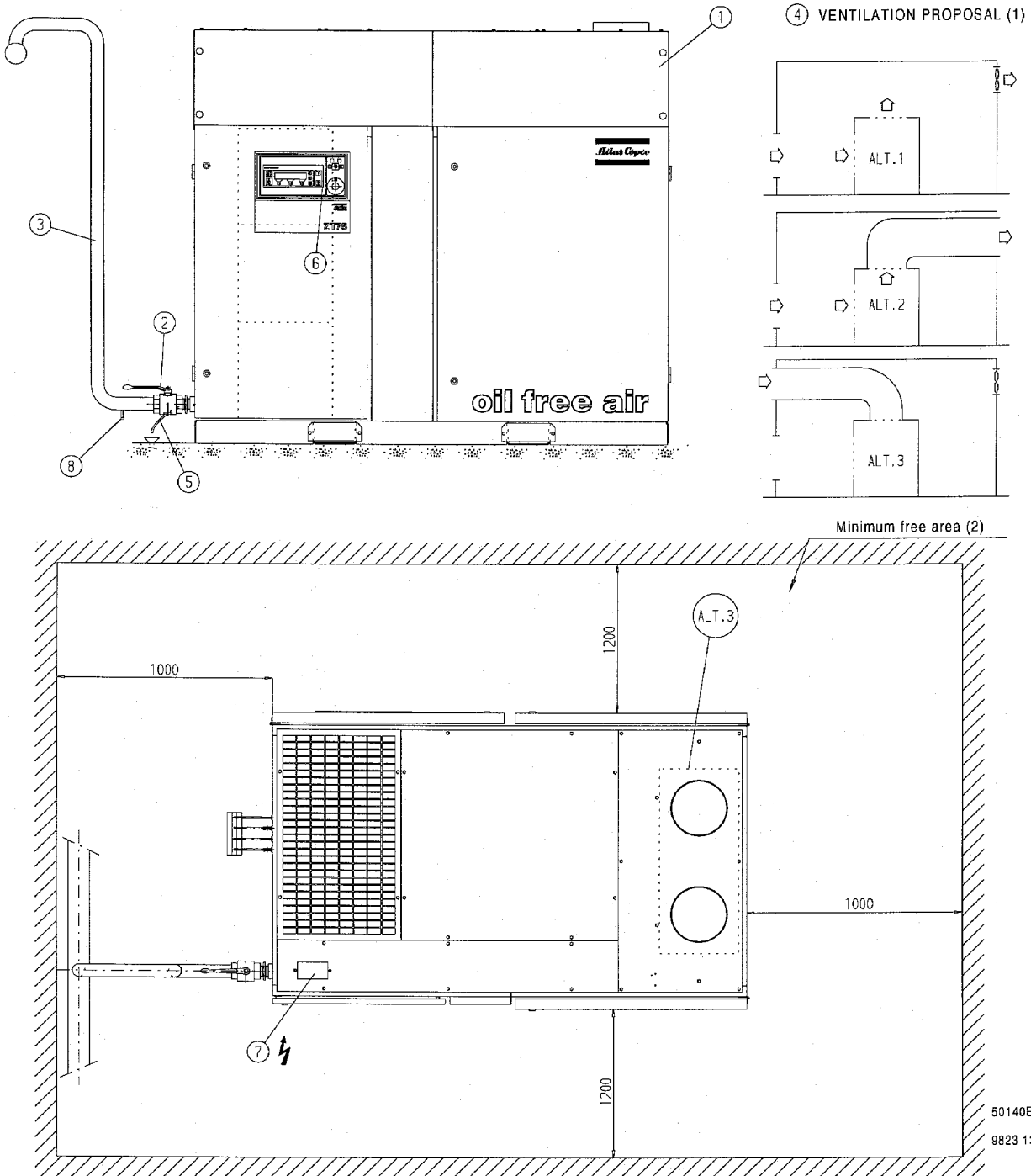
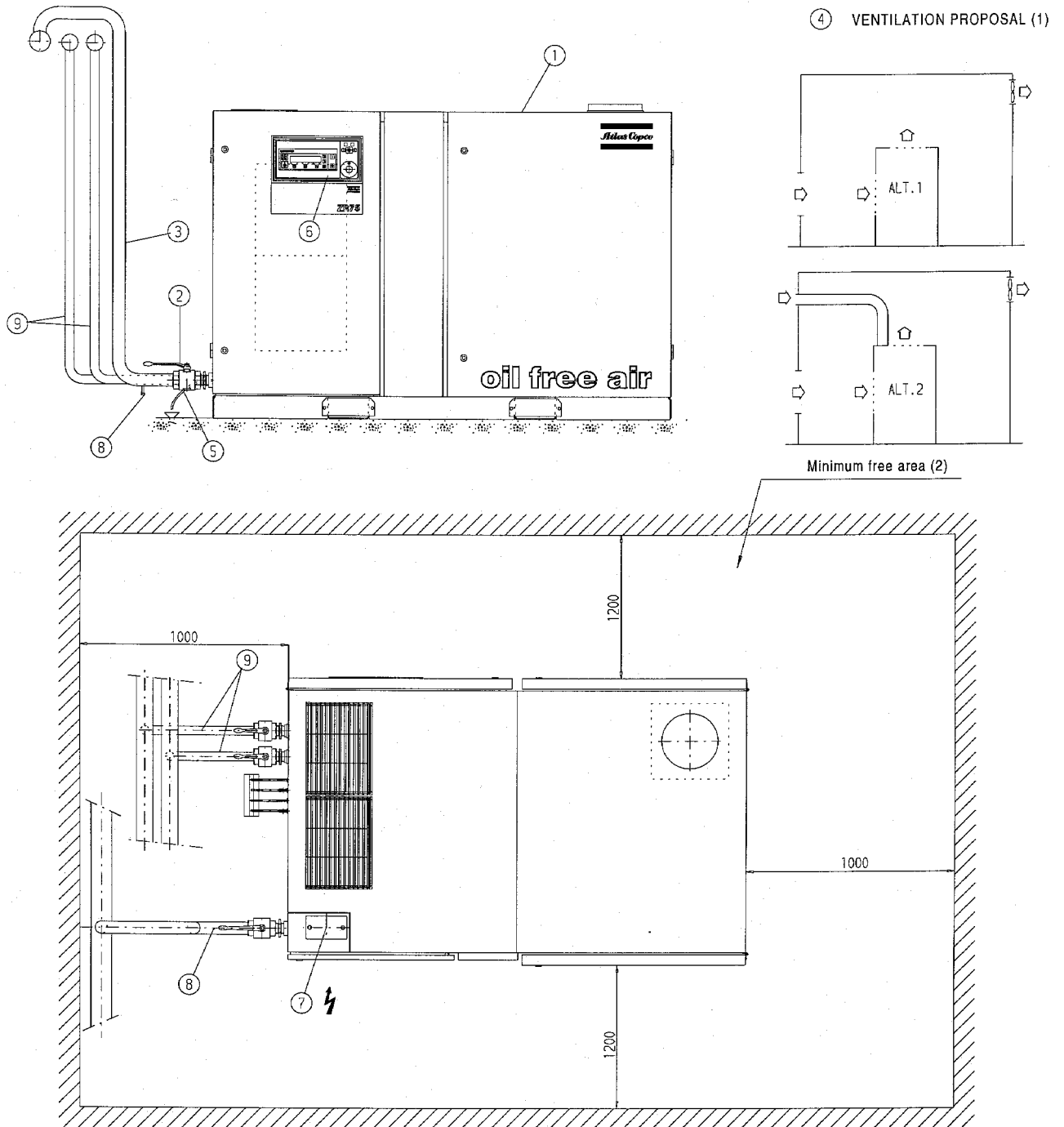


Fig. 2.12 Installation proposal, ZT75/90



50141E  
9823 1321 00/1/01

Fig. 2.13 Installation proposal, ZR75/90

## 2.3 Electric cables

### 2.3.1 Size

**Remark:** Local regulations remain applicable if they are stricter than the values proposed below.

#### Mains + earth cable for 50 Hz compressors

For cable PVC 70 degrees Celsius, at ambient temperature 40 degrees Celsius according to EN60204.

	230 V	400 V	500 V
ZT18 HAT	--	3x10 mm <sup>2</sup> + 10 mm <sup>2</sup>	--
ZT18	3x25 mm <sup>2</sup> + 16 mm <sup>2</sup>	3x10 mm <sup>2</sup> + 10 mm <sup>2</sup>	3x6 mm <sup>2</sup> + 6 mm <sup>2</sup>
ZT22 HAT	--	3x16 mm <sup>2</sup> + 16 mm <sup>2</sup>	--
ZT22	3x35 mm <sup>2</sup> + 16 mm <sup>2</sup>	3x10 mm <sup>2</sup> + 10 mm <sup>2</sup>	3x10 mm <sup>2</sup> + 10 mm <sup>2</sup>
ZT30 HAT	--	3x16 mm <sup>2</sup> + 16 mm <sup>2</sup>	--
ZT30	3x50 mm <sup>2</sup> + 25 mm <sup>2</sup>	3x16 mm <sup>2</sup> + 16 mm <sup>2</sup>	3x10 mm <sup>2</sup> + 10 mm <sup>2</sup>
ZT37	3x70 mm <sup>2</sup> + 35 mm <sup>2</sup>	3x25 mm <sup>2</sup> + 16 mm <sup>2</sup>	3x16 mm <sup>2</sup> + 16 mm <sup>2</sup>
ZT/ZR 45	3x70 mm <sup>2</sup> + 35 mm <sup>2</sup>	3x35 mm <sup>2</sup> + 16 mm <sup>2</sup>	3x25 mm <sup>2</sup> + 16 mm <sup>2</sup>
ZT/ZR 55	3x95 mm <sup>2</sup> + 50 mm <sup>2</sup>	3x50 mm <sup>2</sup> + 25 mm <sup>2</sup>	3x25 mm <sup>2</sup> + 16 mm <sup>2</sup>
ZT75	3x150 mm <sup>2</sup> + 95 mm <sup>2</sup>	3x95 mm <sup>2</sup> + 35 mm <sup>2</sup>	3x50 mm <sup>2</sup> + 25 mm <sup>2</sup>
ZR75	3x150 mm <sup>2</sup> + 95 mm <sup>2</sup>	3x70 mm <sup>2</sup> + 35 mm <sup>2</sup>	3x50 mm <sup>2</sup> + 25 mm <sup>2</sup>
ZT90	3x240 mm <sup>2</sup> + 120 mm <sup>2</sup>	3x95 mm <sup>2</sup> + 50 mm <sup>2</sup>	3x70 mm <sup>2</sup> + 35 mm <sup>2</sup>
ZR90	3x185 mm <sup>2</sup> + 95 mm <sup>2</sup>	3x95 mm <sup>2</sup> + 50 mm <sup>2</sup>	3x70 mm <sup>2</sup> + 35 mm <sup>2</sup>

#### Mains + earth cable for 60 Hz compressors (except for Canada and USA)

For cable PVC 70 degrees Celsius, at ambient temperature 40 degrees Celsius according to EN60204.

	220/230 V	380 V	440/460 V
ZT18 HAT	3x25 mm <sup>2</sup> + 16 mm <sup>2</sup>	3x10 mm <sup>2</sup> + 10 mm <sup>2</sup>	3x10 mm <sup>2</sup> + 10 mm <sup>2</sup>
ZT18	3x25 mm <sup>2</sup> + 16 mm <sup>2</sup>	3x10 mm <sup>2</sup> + 10 mm <sup>2</sup>	3x10 mm <sup>2</sup> + 10 mm <sup>2</sup>
ZT22 HAT	3x50 mm <sup>2</sup> + 16 mm <sup>2</sup>	3x16 mm <sup>2</sup> + 16 mm <sup>2</sup>	3x16 mm <sup>2</sup> + 10 mm <sup>2</sup>
ZT22	3x35 mm <sup>2</sup> + 16 mm <sup>2</sup>	3x10 mm <sup>2</sup> + 10 mm <sup>2</sup>	3x10 mm <sup>2</sup> + 10 mm <sup>2</sup>
ZT30 HAT	3x70 mm <sup>2</sup> + 35 mm <sup>2</sup>	3x25 mm <sup>2</sup> + 16 mm <sup>2</sup>	3x16 mm <sup>2</sup> + 16 mm <sup>2</sup>
ZT30	3x70 mm <sup>2</sup> + 35 mm <sup>2</sup>	3x25 mm <sup>2</sup> + 16 mm <sup>2</sup>	3x16 mm <sup>2</sup> + 16 mm <sup>2</sup>
ZT37	3x70 mm <sup>2</sup> + 35 mm <sup>2</sup>	3x25 mm <sup>2</sup> + 16 mm <sup>2</sup>	3x25 mm <sup>2</sup> + 16 mm <sup>2</sup>
ZT/ZR 45	3x95 mm <sup>2</sup> + 50 mm <sup>2</sup>	3x35 mm <sup>2</sup> + 16 mm <sup>2</sup>	3x35 mm <sup>2</sup> + 16 mm <sup>2</sup>
ZT/ZR 55	3x120 mm <sup>2</sup> + 70 mm <sup>2</sup>	3x50 mm <sup>2</sup> + 25 mm <sup>2</sup>	3x35 mm <sup>2</sup> + 16 mm <sup>2</sup>
ZT/ZR 75	3x185 mm <sup>2</sup> + 95 mm <sup>2</sup>	3x95 mm <sup>2</sup> + 50 mm <sup>2</sup>	3x70 mm <sup>2</sup> + 35 mm <sup>2</sup>
ZT/ZR 90	3x240 mm <sup>2</sup> + 120 mm <sup>2</sup>	3x120 mm <sup>2</sup> + 70 mm <sup>2</sup>	3x95 mm <sup>2</sup> + 50 mm <sup>2</sup>

**Mains + earth cable for 60 Hz compressors (for Canada and USA)**

For cable PVC 90 degrees Celsius at ambient temperature 40 degrees Celsius according to CE code Part I Tables 2, 5A, 17 and rules 28-106, 28-108, 28-110.

	440/460 V	575 V
ZT18 HAT	3xAWG6 + AWG6	--
ZT18	3xAWG6 + AWG6	3xAWG8 + AWG8
ZT22 HAT	3xAWG4 + AWG4	--
ZT22	3xAWG6 + AWG6	3xAWG8 + AWG8
ZT30 HAT	3xAWG3 + AWG3	--
ZT30	3xAWG4 + AWG4	3xAWG6 + AWG6
ZT37	--	3xAWG6 + AWG6
ZT/ZR 45	3xAWG3 + AWG3	3xAWG4 + AWG4
ZT/ZR 55	3xAWG2 + AWG4	3xAWG3 + AWG3
ZT/ZR 75	3xAWG00 + AWG4	3xAWG1 + AWG4
ZT90	3xAWG3/0 + AWG1	3xAWG00 + AWG4
ZR90	3xAWG3/0 + AWG1	3xAWG0 + AWG3

**2.3.2 Connection**

The connections are shown on Figs. 2.14 up to 2.16.

**2.4 Cooling water requirements**

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

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

**Remarks**

- No algae nor oil.
- Chloride and sulphate are interactive. In open systems the sum of the squares of these values must not exceed 85,000. For recirculating systems with proper controls and treatment, the sum of the squares may be up to 520,000. Note that the sulphate value must include any sulphite present.

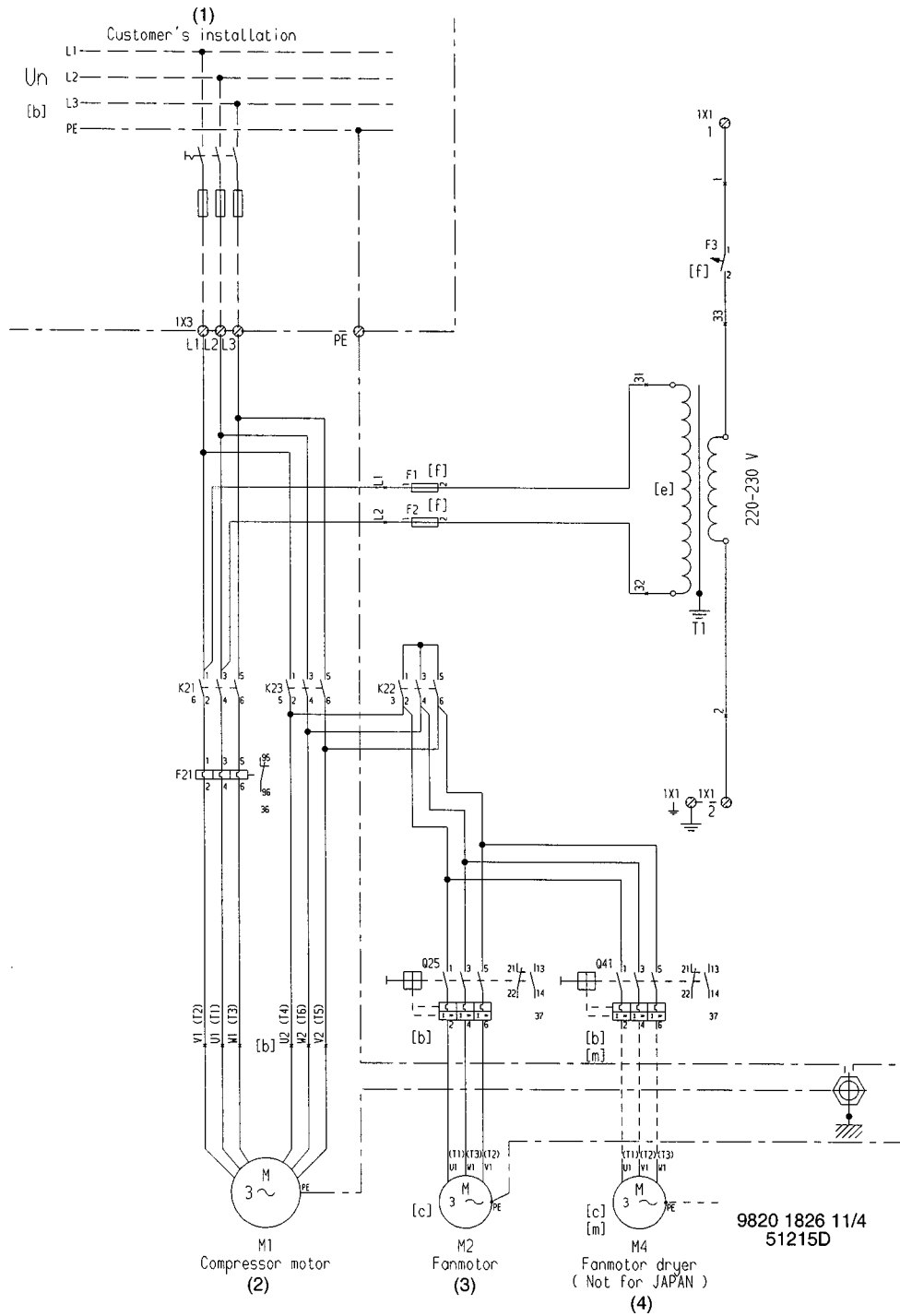


Fig. 2.14 ZT18/37

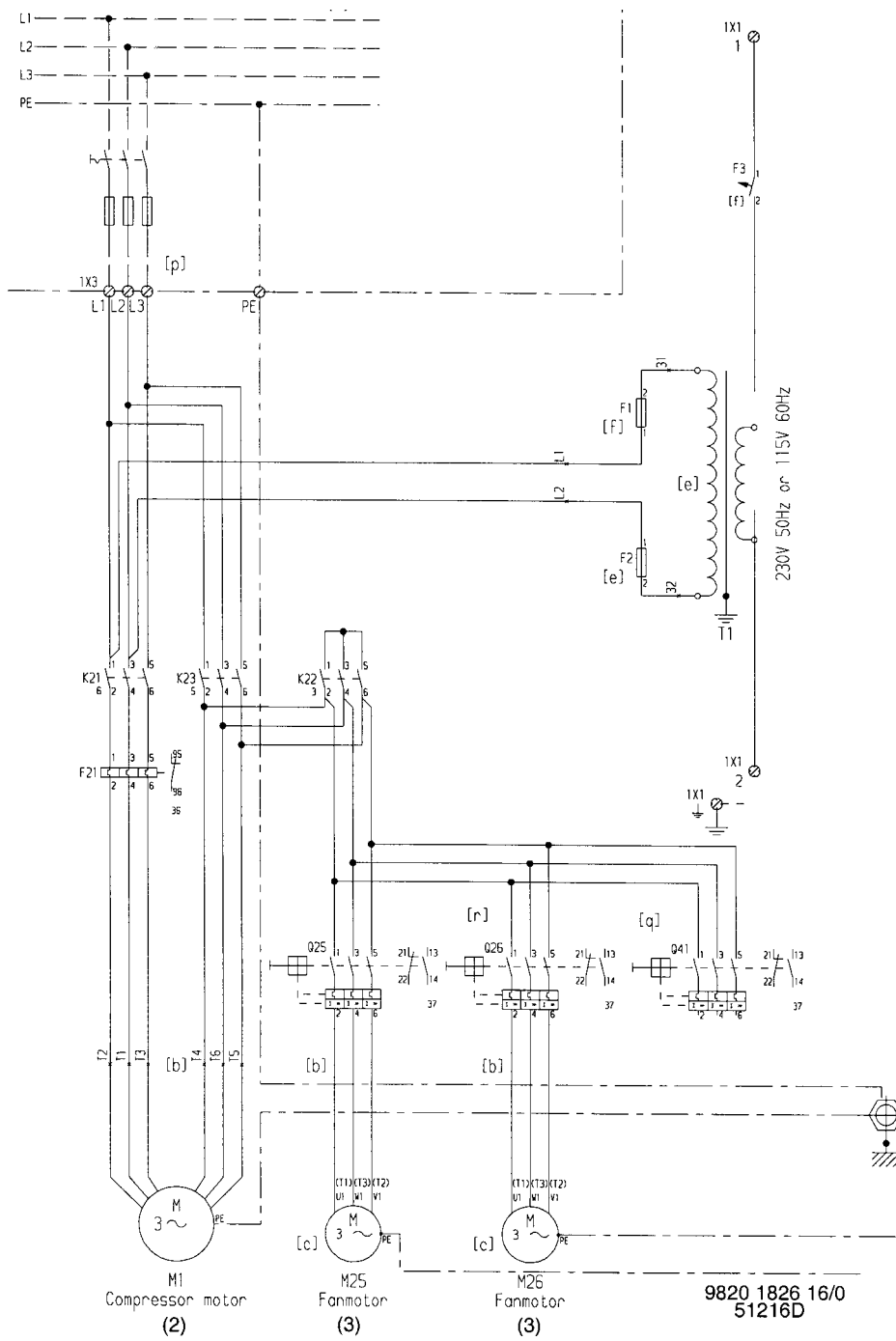


Fig. 2.15 ZT18/30 HAT

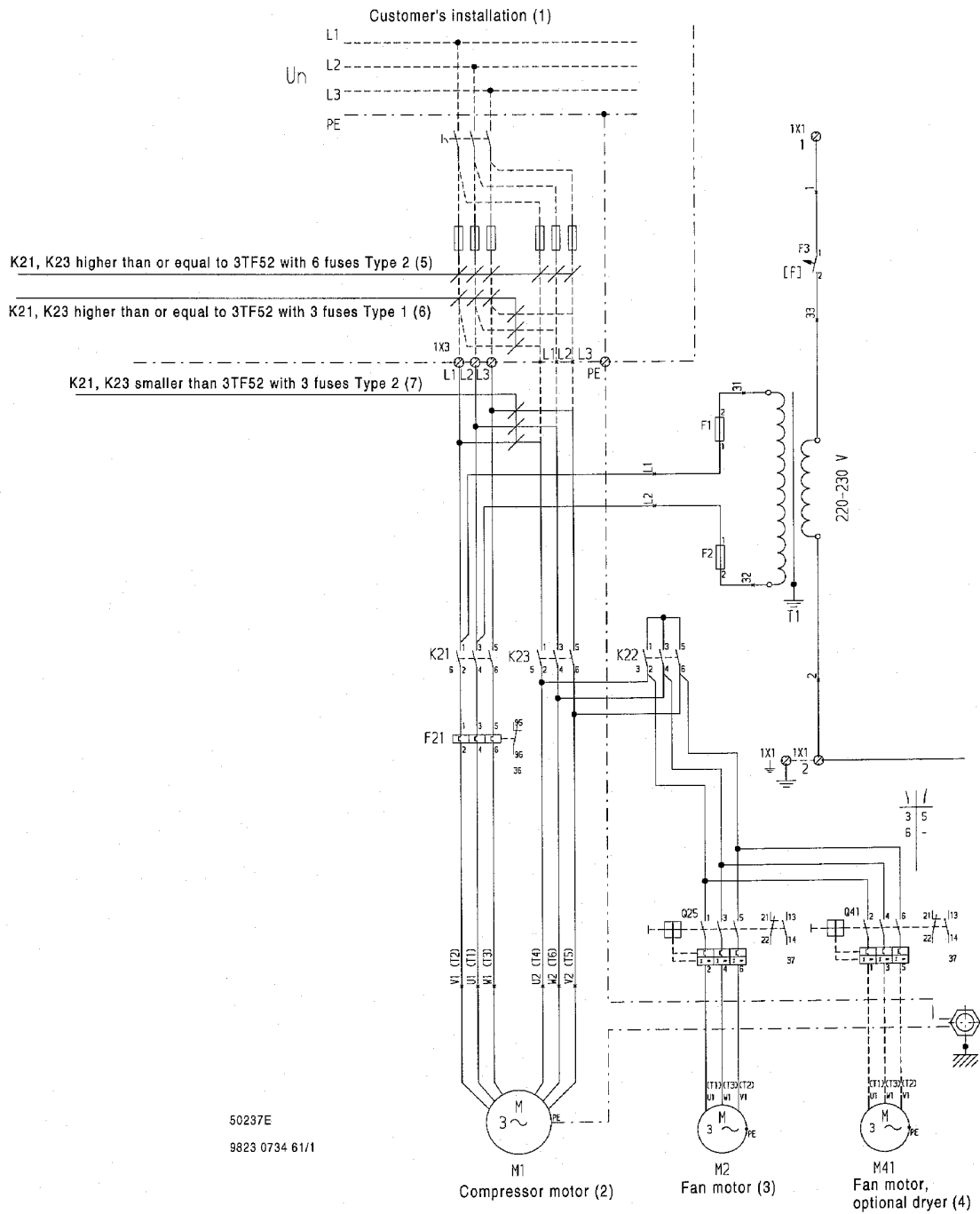
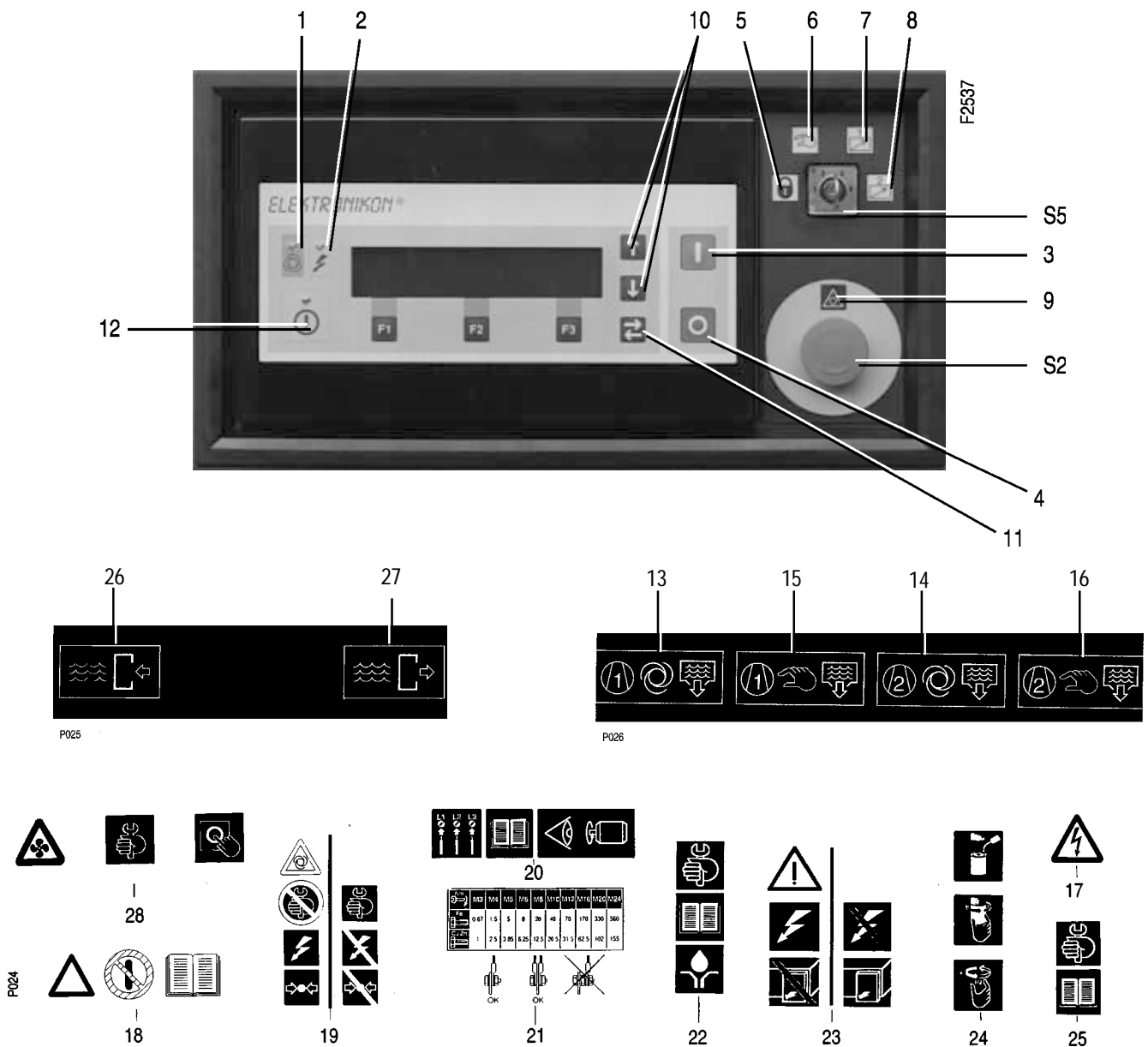


Fig. 2.16 ZR/ZT 45/90

Figs. 2.14, 2.15 and 2.16 Electrical connections (typical examples)



## 2.5 Pictographs (Fig. 2.17)



- |    |  |    |  |    |   |
|----|--|----|--|----|---|
| 1  | Automatic operation                      | 14 | Automatic condensate outlet, aftercooler   | 22 | Consult the instruction book before greasing  |
| 2  | Voltage on                               | 15 | Condensate valve, intercooler  | 23 | Switch off the voltage before removing the protecting cover inside the electric cabinet |
| 3  | Start                                    | 16 | Condensate valve, aftercooler  | 24 | Oil the gasket, screw on the filter and tighten by hand (approx. one half turn)         |
| 4  | Stop                                     | 17 | Warning: under tension   | 25 | Consult the Instruction book before starting maintenance or repair                      |
| 5  | Compressor locked (in off position)      | 18 | Read Instruction book before starting the compressor   |    |   |
| 6  | Local control                            | 19 | Switch off the voltage and depressurize the compressor before starting maintenance or repair                 |    |   |
| 7  | Remote control (by external switches)    | 20 | Before connecting the compressor electrically, consult the Instruction book for the motor rotation direction |    |   |
| 8  | Remote control (by computer)             | 21 | Torques for steel (Fe) or brass (CuZn) bolts   |    |   |
| 9  | Emergency stop                           |    |  |    |   |
| 10 | Keys to scroll through display           |    |  |    |   |
| 11 | Key to go to next field on display       |    |  |    |   |
| 12 | Alarm                                    |    |  |    |   |
| 13 | Automatic condensate outlet, intercooler |    |  |    |   |

Fig. 2.17 Pictographs

## 3 OPERATING INSTRUCTIONS

### Safety precautions

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

### 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 for altitude operation, consult Atlas Copco.

### 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.

### 3.1 Preparation for initial start-up (Figs. 1.2 up to 1.8)

1. Consult section 2 for the electric cable sizes, installation proposals and dimension drawings.
2. Read the "User manual for Elektronikon® regulator" to familiarize yourself with all regulator functions.
3. A sticker dealing in short with the operating instructions is delivered with the literature set. Affix the sticker next to the control panel.
4. The compressor gear casing and motor are secured to the frame immobilizing the vibration dampers during transport. After installing the compressor, loosen the nut (2 or 4 – Fig. 3.1) of the long central bolt of each damper, unscrew the bolt (1 or 3) as far out as indicated on Fig. 3.1 and tighten the nut again.
5. **On ZT/ZR 45/55**, silicagel bags are installed at different locations:
  - Remove the cover of the air filter housing (22) and the air filter. Take out the silicagel bag. Remove the tape closing off the air inlet opening on the inside of the air filter housing. Reinstall the air filter and cover.
  - Remove the flange of pulsation damper (23) and take out the silicagel bags. Reinstall the flange.
6. For water-cooled compressors, the drain plugs of the water system are delivered loose in a plastic bag inside the bodywork. Fit and tighten the plugs:
 

**For ZR45/55**

  - underneath the oil cooler

**For ZR75/90**

  - underneath the aftercooler, intercooler and oil cooler
  - (3-Fig. 3.4 and 2-Fig. 3.5) underneath the compressor elements
7. 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.

8. Check that the compressor sump is filled with oil: the level should be in the middle of sight-glass (6). If necessary, top up with oil as specified in section 4.3.
9. Check the voltage selecting wires at transformer (T1-Figs. 1.13 and 1.14) for correct connection. Check the setting of overload relay (F21) and that the relay is set for automatic resetting. See section 7.4.
10. Switch on the voltage. Start the motor and stop it immediately. **Check for correct direction of rotation** of the compressor motor (9) as indicated by the arrow on the coupling housing. A grating is provided through which the coupling can be observed. **For ZT18/37 and ZT75/90**, check the fan motor (16) for correct direction of rotation, **for ZT18/30 HAT** also check the rotation direction of the extra fan motor of the intercooler. When facing the drive end of the motors, the correct direction of rotation is counter-clockwise. First check the compressor motor. If the rotation direction is wrong, switch off the voltage and reverse two incoming lines. Then check the fan motor(s). If the cooling air from the fan is not blown through the outlet grating on the roof (see Figs. 2.1 up to 2.7), switch off the voltage and reverse two connections at the terminals of circuit breaker (Q25-Figs. 1.13 and 1.14). **On ZT18/30 HAT**, if the cooling air of the intercooler is not blown through the outlet grating in the side panel (see Fig. 2.2), switch off the voltage and reverse two connections at the terminals of circuit breaker (Q26-Fig. 2.15).
11. Run the compressor for a few minutes; check the oil level. Top up, if necessary, to the middle of sight-glass (6).

### 3.2 Before starting

#### Attention

- The operator must apply all relevant safety precautions, including those mentioned in this instruction book.
  - In case the water system was drained or condensate drain plugs were removed (see section 3.7), close the drain valves and fit the drain plugs.
1. Check the oil level, which must be in the middle of sight-glass (6-Figs. 1.2 up to 1.8). Top up, if necessary, with the correct type of oil.
  2. Close condensate drain valves (4 and 6-Fig. 3.2). **1**
  3. Open the air outlet valve (7-Fig. 3.2).
  4. **On ZR**, check that the water drain valves are closed. Open the water inlet valve and outlet valve (customer's installation).
  5. **On ZR**, open water flow regulating valves (2 and 3-Fig. 3.3). Opening of these valves can be overlooked if, after previous operation, the setting has not been disturbed.
  6. Switch on the voltage and check that voltage on LED (2-Fig. 1.9) lights up.

### 3.3 Starting (Fig. 1.9)

#### 3.3.1 Routine starting

1. Press start button (8). The compressor starts running in unloaded condition and automatic operation LED (1) lights up.
2. Approx. 25 seconds later (programmable), the compressor starts running loaded. The message on display (4) changes from <<Automatically unloaded>> to <<Automatically loaded>>.
3. Regulate the water flow **with the compressor running loaded**. Consult section 7.1 for the cooling water temperature and sections 7.5.3 up to 7.5.9 for the cooling water consumption and air outlet temperature.

On ZR45/55 (Fig. 3.3), the water flow is regulated by:

- valve (3) for the oil cooler/intercooler
- valve (2) for the aftercooler

On ZR75/90 (Fig. 1.7), the water flow is regulated by:

- valve (28) for oil cooler/intercooler/LP element
- valve (29) for the aftercooler/HP element

#### Important

- If the motor is stopped and automatic operation LED (1) is alight, the motor may start automatically.
- If the start/stop timer is active (see section 1.2.1), the compressor can start automatically, even if it was stopped manually.

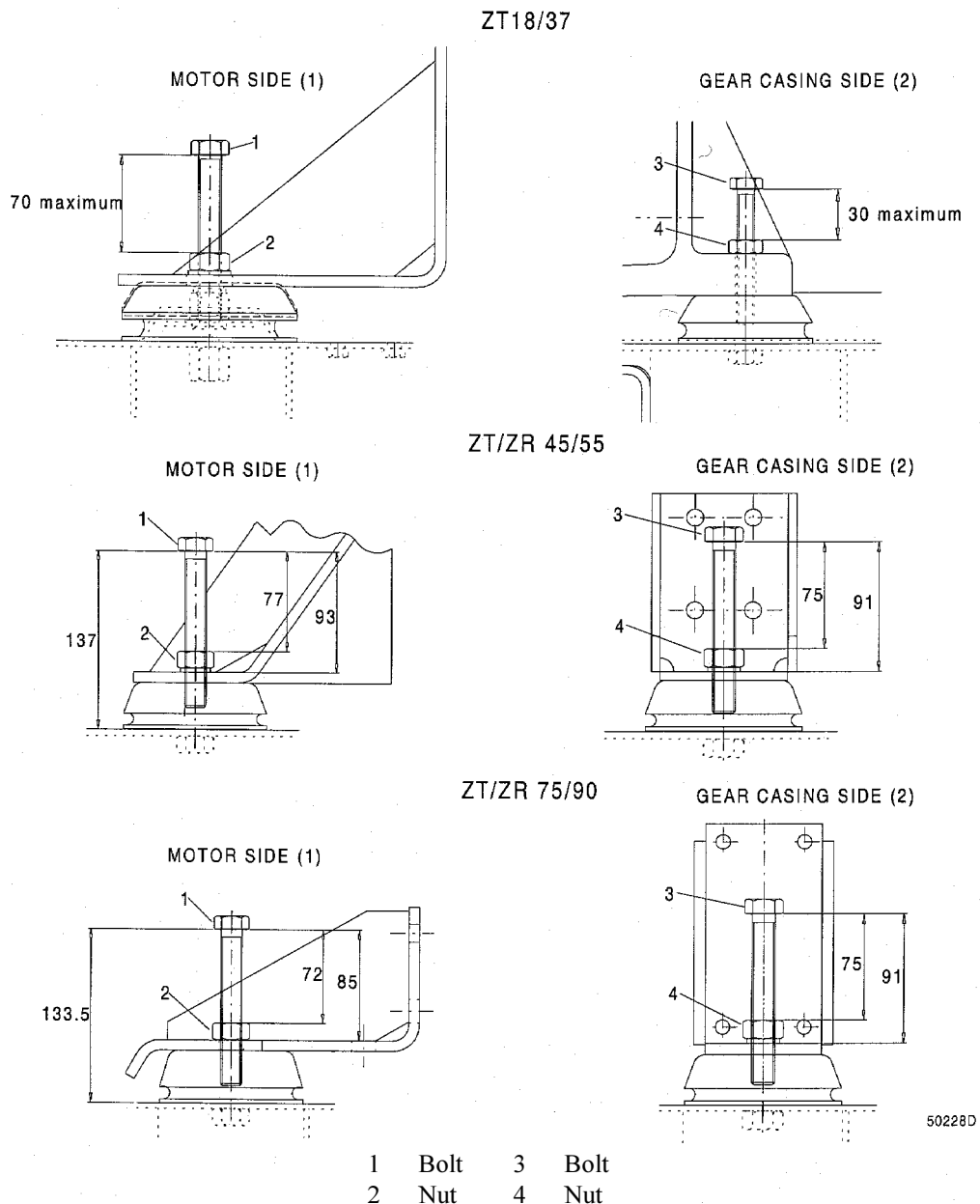


Fig. 3.1 Vibration dampers

### 3.3.2 Starting after emergency stopping or shut-down

Press the emergency stop button (S2-Fig. 1.9) (if not yet done so), switch off the voltage and then depressurize the compressor. After remedying the fault, unlock the emergency button by pulling it out and restart the compressor as described above.

If the automatic restart function after voltage failure is activated (see section 1.2.1) and the duration of repair is shorter than the programmed power recovery time, reset the display after remedying the fault: press the key <<Reset>>, the message <<All protection functions are OK>> will appear, whereafter the compressor can be restarted. Press the keys <<Menu>> and <<Main Screen>> to return to the main display (Fig. 1.10).

#### Minimum stop time

The compressor will not be allowed to restart within a programmed time (20 s) after a stop for whatever reason. A start command given during the minimum stop time will be memorized; automatic operation LED (1) lights up. The compressor will start when the minimum stop time has run out.

### 3.3.3 Manual restarting

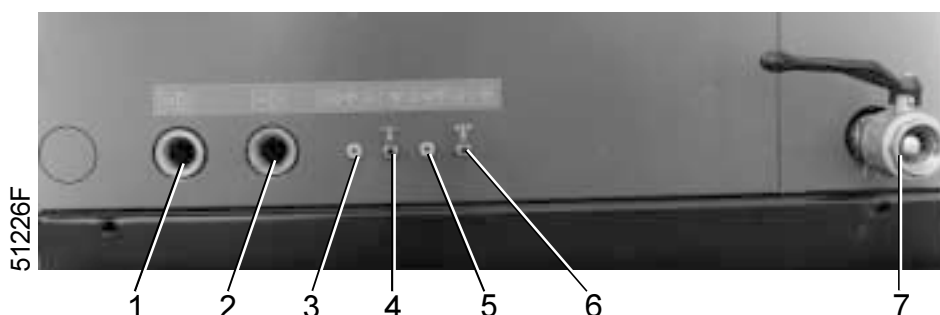
In automatic operation, the regulator limits the number of motor starts. For low-voltage motors, observe an interval of minimum 20 minutes between each manual start.

### 3.4 During operation (Fig. 1.9)

1. When automatic operation LED (1) is alight, starting and stopping of the motor are automatically controlled: when the motor is stopped, it may restart automatically.
2. Check the readings on display (4). See section 3.5.
3. On reaching the pre-set unloading pressure, shown on display (4), the compressor will run unloaded. From now on, the electronic control module will calculate the optimum moment to stop and restart the compressor motor automatically, depending on the maximum permissible number of motor starts and on the air consumption.
4. To unload the compressor manually, press the key <<Unload>> (5) **2**. To put the compressor back into automatic operation, press the key <<Load>> (5) **2**.

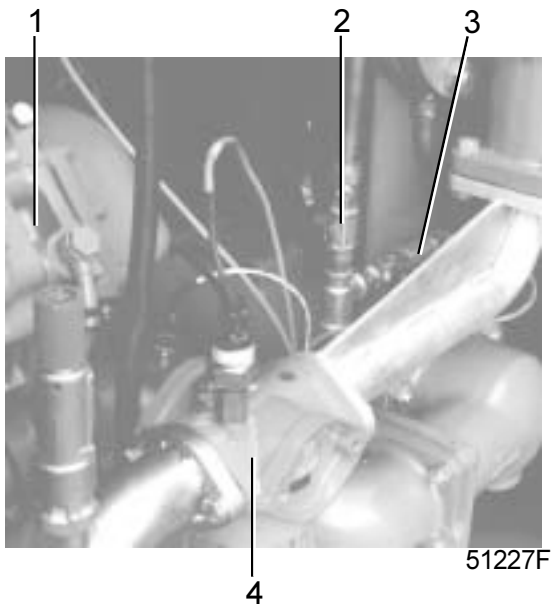
#### Important

- If the compressor is stopped, it may start automatically. See also section 1.2.1.
- Key switch (S5-Fig. 1.9) allows the operator to select four control modes, see section 1.2.3. To avoid unauthorized switching over to another control mode, take out the key after selecting the required mode.
- The control module will only react to a new control mode if the new position of the control mode switch is maintained for 3 seconds.



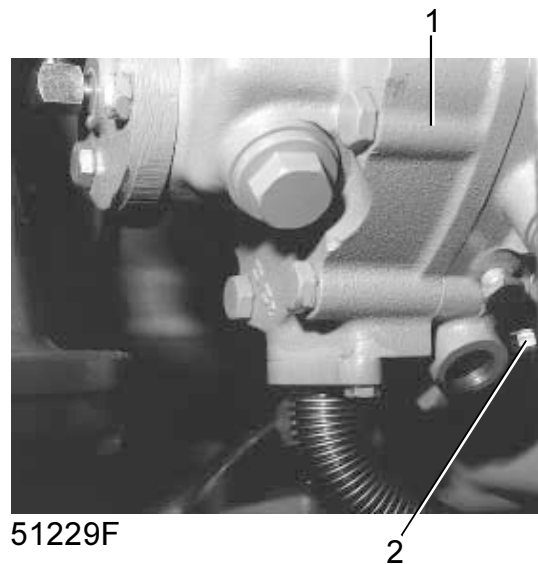
- 1 **4**) Cooling water inlet pipe
- 2 **4**) Cooling water outlet pipe
- 3 **3**) Automatic condensate drain outlet, intercooler moisture trap
- 4 **3**) Manual condensate drain valve, intercooler moisture trap
- 5 Automatic condensate drain outlet, aftercooler moisture trap
- 6 Manual condensate drain valve, aftercooler moisture trap
- 7 Air outlet valve

Fig. 3.2 Air, water and condensate connections (ZR/ZT 45/90)



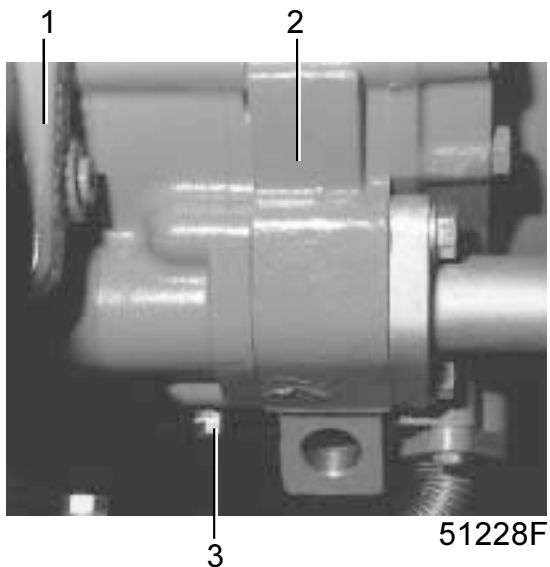
- 1 Low-pressure compressor element
- 2 Regulating valve, water flow through aftercooler
- 3 Regulating valve, water flow through oil cooler/intercooler
- 4 Moisture trap, aftercooler

Fig. 3.3 Water regulating valves on ZR45/55



- 1 High-pressure compressor element
- 2 Water drain plug

Fig. 3.5 Water drain plug on high-pressure compressor element of ZR75/90



- 1 Air pipe to intercooler
- 2 Low-pressure compressor element
- 3 Water drain plug

Fig. 3.4 Water drain plug on low-pressure compressor element of ZR75/90

### 3.5 Checking the display (4-Fig. 1.9)

1. Regularly check the display for readings and messages. Normally, the main display (Fig. 1.10) 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 (3-Fig. 1.9) is alight or blinks. Consult section 1.2 and the "User manual for Elektronikon® regulator", section "Status data submenu".
3. The display will show a service message if one of the monitored components is to be serviced; replace the component, change the oil or grease the compressor motor as the case may be. Reset the relevant timer. Consult the "User manual for Elektronikon® regulator", section "Service submenu".

**Warning** Before carrying out any maintenance, repair or adjustment, stop the compressor, press emergency stop button (S2-Fig. 1.9), 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 the function keys (5-Fig. 1.9) are filled with blinking indicators (\*\*).
- When more than one message needs to be displayed (e.g. both warning and service), the messages are continuously displayed for 3 seconds each.

4. Regularly press the key <<Show more>> (5-Fig. 1.9) **5** to call up the actual compressor condition:
    - the status of controlling the compressor (automatic or manual, local or remote)
    - the status of the compressor start/stop timer (active or not) **6**
    - the maximum working pressure
    - the outlet pressure
    - the pressure drop over the air filter (not on ZT18/37)
    - the oil pressure
    - the intercooler pressure
    - the outlet temperature (not on ZT18/37)
    - the temperatures of the compressor elements
    - the cooling water temperatures (not on ZT)
    - the status of the overload protection of the compressor motor (normal or not)
    - the total running and loading hours
  4. Open the drain valves (4 and 6-Fig. 3.2). **1**
  5. **On ZR**, close the cooling water inlet valve.
  6. **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) and by removing following plugs:
    - For ZR45/55**
      - underneath the oil cooler
    - For ZR75/90**
      - underneath the aftercooler, intercooler and oil cooler
      - (3-Fig. 3.4 and 2-Fig. 3.5) underneath the compressor elements
- On ZT45/55**, remove the condensate drain plug from the intercooler and aftercooler. Reinstall them before restarting.

### 3.6 Manual unloading/loading (Fig. 1.9)

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

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

#### 3.6.1 Manual unloading **2**)

Press the key <<Unload>> (5). LED (1) goes out. The message <<Manually Unloaded>> appears on the display.

#### 3.6.2 Manual loading **2**)

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

### 3.7 Stopping (Fig. 1.9)

1. Close the air outlet valve (7-Fig 3.2).
2. Press stop button (9). The compressor will run unloaded for 3 seconds, after which it will stop.
3. **To stop the compressor immediately**, press emergency stop button (S2). Alarm LED (3) starts blinking. After remedying the trouble, unlock the emergency stop button by pulling it out.

### 3.8 Taking out of operation

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

1. Close the air outlet valve and stop the compressor.
2. Switch off the voltage and 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. **On ZR**, drain the water circuit and disconnect the cooling water pipes from the compressor.
5. Drain the oil and condensate circuits.
6. Disconnect the compressor condensate piping from the condensate drain net.

#### Footnotes chapter 3

- 1) Condensate drains for the intercooler moisture trap are only provided on ZR and ZT75/90
- 2) If the <<Load>> or <<Unload>> function is not indicated on the bottom line of display (4), press key <<Menu>> (5) until the function <<Main Screen>> appears above key (F1), then press the key <<Main Screen>>.
- 3) ZR and ZT75/90 only.
- 4) ZR only.
- 5) If the function <<Show More>> is not indicated on the bottom line of display (4-Fig. 1.9), press key <<Menu>> (5) until function <<Main Screen>> appears above key (F1), then press the key <<Main Screen>>.
- 6) The compressor is automatically started and stopped if these start/stop commands are programmed and activated; consult section 1.2.1.

## 4 MAINTENANCE

### Attention

Before carrying out any maintenance or repair, stop the compressor, press the emergency stop button and switch off the voltage. Safeguard against unintentional "switch-on". Apply all relevant safety precautions, including those mentioned in this book.

### 4.1 Preventive maintenance schedule for the compressor 1)

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

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

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

Period 2)	Running hours 2)	Consult section	See notes below table	Operation
<b>Daily</b>	--	--	1	Check oil level
"	<b>8</b>	3.5/7.1	--	Check readings on display; <b>on ZT18/37</b> , also check air filter service indicator
"	<b>8</b>	--	--	Check that condensate is discharged from the moisture traps during loading
"	--	3.7	--	Drain the aftercooler and intercooler moisture traps after stopping
<b>Weekly</b>	--	7.2	--	Check programmed settings
"	--	--	--	Drain condensate from air receiver, if installed
"	--	--	4	Check for possible leaks
<b>3-monthly</b>	--	4.5/5.1	5	Remove air filter and inspect
"	--	5.4	--	Clean compressor; inspect coolers
<b>Yearly</b>	<b>8000</b>	--	--	Replace filter of gear casing breather
"	<b>8000</b>	--	2	Carry out a LED/display test
"	<b>8000</b>	4.5/5.2	--	Replace oil filter
"	--	4.5/5.1	--	Replace air filter
"	--	5.3	3	Have safety valves tested
"	--	--	--	Have efficiency of coolers tested
"	--	--	--	Have the compressor inspected by an Atlas Copco Service representative
"	--	--	--	Have operation of sensors, electrical interlockings and components tested by an electrician
<b>2-Yearly</b>	<b>16000</b>	4.3/5.2	--	If Roto-Z is used, change oil

### Notes

1. Maintain the level in the middle of the oil level sight-glass.
2. See "User manual for Elektronikon® regulator".
3. Preferably to be carried out by an Atlas Copco Service representative.
4. Any leak should be attended to immediately.
5. More frequently in very dusty surroundings.

## 4.2 Motors

### 4.2.1 Fan motor bearings

ZT18/37 and ZT75/90 are provided with a fan driven by an electric motor, ZT18/30 HAT are provided with an extra fan motor for the intercooler. The bearings of this motor must be replaced after 25,000 operating hours.

### 4.2.2 Compressor motor greasing

Use a lithium-soap-based grease according to DIN 51 825 K3N. Stop the compressor before greasing. Reset the regreasing service warning **3**) after regreasing. The data below are valid for an air intake temperature of maximum 40 degrees Celsius.

Compressor type	Interval (hours)	Quantity (g)
ZT18 HAT	3000	15
ZT18	3000	15
ZT22 HAT	3000	15
ZT22	3000	15
ZT30 HAT	3000	15
ZT30	3000	15
ZT37	3000	15
ZT/ZR 45	2000	20
ZT/ZR 55	2000	20
ZT/ZR 75	2000	20
ZT/ZR 90	2000	20

## 4.3 Oil specifications

### Attention

Never mix different oils.

### 4.3.1 Roto-Z lubricating oil

It is strongly recommended to use Atlas Copco Roto-Z oil which is specially developed for oil-free rotary compressors. This oil has a long service life and ensures optimum lubrication.

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

Quantity	Ordering number
5 l can	2908 8503 00
20 l can	2908 8501 01
209 l drum	2908 8500 00

## 4.4 Storage after installation

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

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 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.

Use following service kits for the oil filters and air filters:

Compressor type	Service kit ordering number
ZT18/37	2906 0545 00 (air filter/oil filter)
ZT18/37	2906 0549 00 (yearly maintenance)
ZT/ZR 45/55	2906 0194 00 (yearly maintenance)
ZT/ZR 75/90	2906 0182 00 (yearly maintenance)

### Footnotes chapter 4

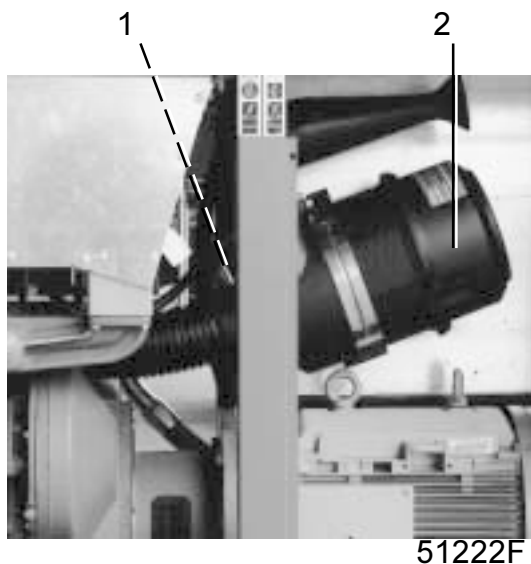
- 1) Use only authorized parts. Any damage or malfunction caused by the use of unauthorized parts is not covered by Warranty or Product Liability.
- 2) Whichever interval comes first. The local Atlas Copco Sales Company may overrule the maintenance schedule, especially the service intervals, depending on the environmental and working conditions of the compressor.
- 3) See "User manual for Elektronikon® regulator", section "Service submenu".



## 5 SERVICING PROCEDURES

### 5.1 Air filter

1. For **ZT18/37**, the filter must be replaced yearly or when the red piston of the service indicator (1-Fig. 5.1) shows completely.
2. For **ZT/ZR 45/90**, the filter must be replaced as soon as the service warning appears on display (4-Fig. 1.9) or yearly.
3. Stop the compressor, press the emergency stop button and switch off the voltage.
4. Remove the filter. Take care that no dirt drops into the inlet pipe.
5. Install the new filter. Never install damaged or clogged filters.
6. Switch on the voltage and unlock the emergency stop button.
7. For **ZT/ZR 45/90**, reset the air filter service warning. **1)** For **ZT18/37**, reset the service indicator (1-Fig. 5.1) by pushing the reset knob.



- 1 Vacuum indicator
- 2 Air filter

Fig. 5.1 Air filter on ZT18/37

### 5.2 Oil and oil filter change (Figs. 1.2 up to 1.7)

1. Run the compressor until warm. Stop the compressor, press the emergency stop button and switch off the voltage.
2. Remove filler plug (5). Drain the compressor sump by opening drain valve (8). **On ZR45/90**, also remove the drain plug of oil cooler (18). Close the valve and reinstall the plug after draining.
3. Remove the oil filter (7). 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.
4. Fill the compressor sump to the middle of the oil level sight-glass (6) with oil as specified in section 4.3. Reinstall the filler plug.
5. Switch on the voltage, unlock the emergency stop button and reset the oil and oil filter service warnings. **1)**
6. Run the compressor for a few minutes; check the oil level and top up if necessary to the middle of sight-glass (6).

### 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 7.3, consult Atlas Copco.

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

### 5.4 Coolers

**On ZT**, keep the fins of the coolers clean. Remove any dust from both sides of the coolers with a fibre brush. Never use a wire brush or metal objects. Clean by air jet. Consult Atlas Copco if it should be necessary to wash the coolers.

**On ZR**, consult Atlas Copco for cleaning.

#### Footnote chapter 5

- 1) See "User manual for Elektronikon® regulator", section "Service submenu".

## 6 PROBLEM SOLVING

**Warning** Before starting repairs, press stop button (9-Fig. 1.9), wait until the compressor has stopped, press emergency stop button (S2-Fig. 1.9) and switch off the voltage.

Take precautions to avoid an accidental restart. Apply all relevant safety precautions, including those mentioned in this book.

### Faults and suggested remedies

#### 1. A service message appears on display (4-Fig. 1.9)

Replace the indicated component, change the oil or grease the compressor motor as the case may be. Consult the "User manual for Elektronikon® regulator" to reset the message (section "Service submenu")

#### 2. A shut-down warning message appears on display (4-Fig. 1.9)

LED (3-Fig. 1.9) will light up indicating that a shut-down level is almost reached. Consult the "User manual for Elektronikon® regulator" to look for the cause (section "Status data submenu"). Remedy the trouble. The warning message disappears as soon as the cause of the trouble is remedied

#### 3. Compressor is shut-down

LED (3-Fig. 1.9) will blink indicating that the compressor is stopped due to a shut-down function. A message appears on the display. Remedy the trouble. Consult the "User manual for Elektronikon® regulator" to reset the message (section "Status data submenu")

#### 4. Compressor capacity or working pressure lower than normal

- a. Air consumption exceeds capacity of compressor
- a. Check pneumatic plant
- b. Safety valve(s) leaking
- b. Remove leaking valve and have it inspected
- c. Unloading pressure incorrectly set
- c. See "User manual for Elektronikon® regulator", section "Modify settings submenu"

#### 5. 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

#### 6. 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
- b. For ZR, insufficient cooling water flow or water inlet temperature too high
- b. Check and increase cooling water flow or decrease water inlet temperature, if possible
- c. For ZR, restriction in cooling water system due to formation of scale or settling down of dirt
- c. Consult Atlas Copco

#### 7. Push button I is pressed, compressor starts running, but does not load after delay time

- a. Pressure in air net is above pre-set loading pressure
- a. Compressor will load when pressure in air net drops to pre-set loading pressure

## 7 PRINCIPAL DATA

### 7.1 Readings on display 1) (Fig. 1.9)

Maximum working pressure . . . . .	See sections 7.5.3 up to 7.5.9
Outlet pressure . . . . .	Depends on compressor type
dP air filter . . . . .	Below 0.050 bar 3)
Intercooler pressure . . . . .	<b>During unloading 2)</b>
	ZT18/37 -0.6 bar
	ZT/ZR 45/55 -0.4 bar
	ZT/ZR 75/90 -0.6/0.65 bar
	<b>During loading 2)</b>
	Approx. 2.4 bar(e)
Oil pressure . . . . .	Approx. 1.8 bar(e) 2)
Air temperature element 1 out . . . . .	Approx. 165 degrees Celsius 2)
Air temperature element 2 out . . . . .	Approx. 170 degrees Celsius 2)
Air temperature element 2 in . . . . .	ZT: Approx. 45 degrees Celsius 2)
	ZR: Approx. 35 degrees Celsius 2)
Air outlet temperature . . . . .	Approx. 30 degrees Celsius 2) 3)
Cooling water inlet temperature . . . . .	Below 35 degrees Celsius 4)
Cooling water outlet temperature . . . . .	Below 50 degrees Celsius 4)

### 7.2 Programmable settings

A number of regulation settings (e.g. loading and unloading pressures), protection settings (e.g. shut-down level for the temperatures of the compressor elements) and service settings (e.g. oil service life) are programmable. The "User manual for Elektronikon® regulator" deals elaborately with this matter (section "Modify settings submenu").

### 7.3 Settings of safety valves

Safety valves	Opening pressure in bar(e)
Low-pressure safety valve(s) . . . . .	3.7
High-pressure safety valve:	
Compressors with max. working pressure(e) up to 7.5 bar . . . . .	8.8
Compressors with max. working pressure(e) up to 8.6 bar . . . . .	9.3
Compressors with max. working pressure(e) above 8.6 bar . . . . .	11

## 7.4 Motor type - settings of overload relay and circuit breaker - main fuses

### 7.4.1 Motor type - settings of motor overload relay - main fuses for 50 Hz compressors

Compressor type	Motor type	Supply voltage (V)	Maximum setting of overload relay F21 (A)	Maximum fuse ratings gL/gG Type 2 <b>6)</b> (A)
ZT18 HAT	1LA5 183-2	400	25	3x50
ZT18	1LA5 166-2	230	38	3x100
ZT18	1LA5 166-2	400	22.5	3x50
ZT18	1LA5 166-2	500	18	3x50
ZT22 HAT	1LA5 206-2	400	33.5	3x80
ZT22	1LA5 183-2	230	43	3x100
ZT22	1LA5 183-2	400	25	3x80
ZT22	1LA5 183-2	500	20	3x50
ZT30 HAT	1LA5 207-2	400	42	3x100
ZT30	1LA5 206-2	230	58	3x125
ZT30	1LA5 206-2	400	33	3x80
ZT30	1LA5 206-2	500	27	3x80
ZT37	1LA5 207-2	230	72	3x160
ZT37	1LA5 207-2	400	42	3x100
ZT37	1LA5 207-2	500	33	3x80

Compressor type	Motor type	Supply voltage (V)	Maximum setting of overload relay F21 (A)	Maximum fuse ratings gL/gG Type 2 <b>6)</b> (A)	Type 1 <b>5)</b> (A)
ZT/ZR 45	1LA6 223-2	230	84	3x160	--
ZT/ZR 45	1LA6 223-2	400	49	3x100	--
ZT/ZR 45	1LA6 223-2	500	39	3x80	--
ZT/ZR 55	1LA6 228-2	230	105	3x224	--
ZT/ZR 55	1LA6 228-2	400	61	3x125	--
ZT/ZR 55	1LA6 228-2	500	48	3x100	--
ZT/ZR 75	1LA6 258-2	230	143	2x (3x200)	3x315
ZT/ZR 75	1LA6 258-2	400	83	3x200	--
ZT/ZR 75	1LA6 258-2	500	67	3x160	--
ZT/ZR 90	1LA6 250-2	230	169	2x (3x224)	3x400
ZT/ZR 90	1LA6 250-2	400	96	3x200	--
ZT/ZR 90	1LA6 250-2	500	77	3x160	--

**7.4.2 Motor type - settings of motor overload relay - main fuses for 60 Hz compressors (Y/D starter)**

Compressor type	Motor type	Supply voltage (V)	Maximum setting of overload relay F21 CSA/UL (A)	Maximum fuse ratings gL/gG	
				CSA HRC (A)	UL Class K5 (A)
ZT18 HAT	1LA5 183-2	220-230	54	3x80	3x70
ZT18 HAT	1LA5 183-2	380	31	3x60	3x60
ZT18 HAT	1LA5 183-2	440-460	27	3x60	3x60
ZT18	1LA5 166-2	220-230	47	3x80	3x70
ZT18	1LA5 166-2	380	27	3x60	3x60
ZT18	1LA5 166-2	440-460	23	3x60	3x60
ZT18	1LA5 166-2	575	18	3x60	3x60
ZT22 HAT	1LA5 206-2	220-230	70	3x125	3x150
ZT22 HAT	1LA5 206-2	380	40	3x80	3x70
ZT22 HAT	1LA5 206-2	440-460	35	3x80	3x70
ZT22	1LA5 183-2	220-230	54	3x80	3x70
ZT22	1LA5 183-2	380	31	3x60	3x60
ZT22	1LA5 183-2	440-460	27	3x60	3x60
ZT22	1LA5 183-2	575	20	3x60	3x60
ZT30 HAT	1LA5 207-2	220-230	87	3x200	3x175
ZT30 HAT	1LA5 207-2	380	50	3x80	3x70
ZT30 HAT	1LA5 207-2	440-460	43	3x80	3x70
ZT30	1LA5 206-2	220-230	70	3x125	3x150
ZT30	1LA5 206-2	380	40	3x80	3x70
ZT30	1LA5 206-2	440-460	35	3x80	3x70
ZT30	1LA5 206-2	575	27	3x80	3x70
ZT37	1LA5 207-2	220-230	87	3x200	3x175
ZT37	1LA5 207-2	380	50	3x80	3x70
ZT37	1LA5 207-2	440-460	43	3x80	3x70
ZT37	1LA5 207-2	575	33	3x80	3x70

Compressor type	Motor type	Supply voltage (V)	Maximum setting of overload relay F21 (A)	Maximum fuse ratings			
				gL/gG Type 2 <b>6)</b> (A)	gL/gG Type 1 <b>5)</b> (A)	CSA HRC (A)	UL Class K5 (A)
ZT/ZR 45	1LA6 223-2	220-230	97	3x200	--	--	--
ZT/ZR 45	1LA6 223-2	380	57	3x125	--	--	--
ZT/ZR 45	1LA6 223-2	440-460	48	--	--	3x80	3x70
ZT/ZR 45	1LA6 223-2	575	38	--	--	3x80	3x70
ZT/ZR 55	1LA6 228-2	220-230	121	3x224	--	--	--
ZT/ZR 55	1LA6 228-2	380	70	3x125	--	--	--
ZT/ZR 55	1LA6 228-2	440-460	60	--	--	3x125	3x125
ZT/ZR 55	1LA6 228-2	575	47	--	--	3x80	3x70
ZT/ZR 75	1LA6 258-2	220-230	165	2x (3x200)	3x355	--	--
ZT/ZR 75	1LA6 258-2	380	93	3x200	--	--	--
ZT/ZR 75	1LA6 258-2	440-460	83	--	--	3x150	3x150
ZT/ZR 75	1LA6 258-2	575	64	--	--	3x125	3x125
ZT/ZR 90	1LA6 250-2	220-230	201	2x (3x224)	3x355	--	--
ZT/ZR 90	1LA6 250-2	380	115	3x200	--	--	--
ZT/ZR 90	1LA6 250-2	440-460	100	--	--	3x200	3x175
ZT/ZR 90	1LA6 250-2	575	77	--	--	3x175	3x175

### 7.4.3 Setting of fan motor circuit breaker for 50 Hz compressors

Compressor type	Supply voltage (V)	Maximum setting of circuit breaker Q25 (A)	Maximum setting of circuit breaker Q26 (A)
ZT18/30 HAT	380-415	2.6	2.0
ZT18/37	200-240	4.5	--
ZT18/37	380-415	2.6	--
ZT18/37	500	1.75	--
ZT75/90	200-240	12.1	--
ZT75/90	380-415	7.0	--
ZT75/90	500	4.7	--

### 7.4.4 Setting of fan motor circuit breaker for 60 Hz compressors

Compressor type	Supply voltage (V)	Maximum setting of circuit breaker Q25 (A)	Maximum setting of circuit breaker Q26 (A)
ZT18/30 HAT	220-230	5.9	9.3
ZT18/30 HAT	380-460	2.8	2.25
ZT18/30 HAT	575	2.8	1.96
ZT18/37	220-230	4.8	--
ZT18/37	380-460	2.8	--
ZT18/37	575	2.15	--
ZT75/90	220-230	10.5	--
ZT75/90	380-460	5.9	--
ZT75/90	575	4.4	--

## 7.5 Compressor specifications

### 7.5.1 Reference conditions

Absolute inlet pressure	bar(a)	1
Relative air humidity	%	0
Air inlet temperature	Celsius	20
Nominal effective working pressure	bar(e)	see sections 7.5.3 up to 7.5.9
Cooling water inlet temperature (ZR only)	Celsius	20

### 7.5.2 Limitations

Maximum air inlet temperature		
- ZT18/30 HAT	Celsius	50
- Others	Celsius	40
Minimum ambient temperature	Celsius	0
Maximum effective working pressure	bar(e)	see sections 7.5.3 up to 7.5.9
Maximum cooling water temperature:		
At inlet	Celsius	35
At outlet	Celsius	50
Maximum cooling water inlet pressure	bar(e)	7

### 7.5.3 Specific data of ZT18/37 - 50 Hz 1)

#### ZT18/30 HAT

		ZT18	ZT22	ZT30
Maximum working pressure	bar(e)	8.6	8.6	8.6
Nominal working pressure	bar(e)	8	8	8
Air temperature at outlet valve	Celsius	26	27	28
Motor shaft speed	r/min	2940	2945	2945
Power input at maximum working pressure 9)	kW	22.8	26.5	35.3
Oil capacity	l	21	21	21
Sound pressure level 8)	dB(A)	79	79	79

**Others**

	ZT18	ZT22	ZT30	ZT37	ZT18	ZT22	ZT30	ZT37
Maximum working pressure . . . bar(e)	7.5	7.5	7.5	7.5	8.6	8.6	8.6	8.6
Nominal working pressure . . . bar(e)	7	7	7	7	8	8	8	8
Air temperature at outlet valve . . . . . Celsius	26	27	28	30	26	27	28	30
Motor shaft speed . . . . . r/min	2930	2940	2945	2945	2930	2940	2945	2945
Power input at maximum working pressure <b>9)</b> . . . . . kW	21.8	25.4	34.4	42.6	21.3	25	34.3	41.6
Oil capacity . . . . . l	21	21	21	21	21	21	21	21
Sound pressure level <b>8)</b> . . . . . dB(A)	70	72	75	76	70	72	75	76

**7.5.4 Specific data of ZT18/37 - 60 Hz 1)**

**ZT18/30 HAT**

	ZT18	ZT22	ZT30
Maximum working pressure . . . . . bar(e)	8.6	8.6	8.6
Nominal working pressure . . . . . bar(e)	8	8	8
Air temperature at outlet valve . . . . . Celsius	26	27	28
Motor shaft speed . . . . . r/min	3540	3545	3545
Power input at maximum working pressure <b>9)</b> . . . . . kW	26	29.8	39.3
Oil capacity . . . . . l	21	21	21
Sound pressure level <b>8)</b> . . . . . dB(A)	79	79	79

**Others**

	ZT18	ZT22	ZT30	ZT37	ZT18	ZT22	ZT30	ZT37
Maximum working pressure . . . bar(e)	7.5	7.5	7.5	7.5	8.6	8.6	8.6	8.6
Nominal working pressure . . . bar(e)	7	7	7	7	8	8	8	8
Air temperature at outlet valve . . . . . Celsius	26	27	28	30	26	27	28	30
Motor shaft speed . . . . . r/min	3530	3540	3545	3545	3530	3540	3545	3545
Power input at maximum working pressure <b>9)</b> . . . . . kW	24.2	27.9	37.7	44.1	24.4	28.2	37.7	44.7
Oil capacity . . . . . l	21	21	21	21	21	21	21	21
Sound pressure level <b>8)</b> . . . . . dB(A)	70	72	75	76	70	72	75	76



**7.5.5 Specific data of ZT/ZR 45/55 - 50 Hz 1)**

	ZT45	ZT55	ZT45	ZT55	ZR45	ZR55	ZR45	ZR55
Maximum working pressure . . . bar(e)	7.5	7.5	8.6	8.6	7.5	7.5	8.6	8.6
Nominal working pressure . . . bar(e)	7	7	8	8	7	7	8	8
Air temperature at outlet valve . . . . . Celsius	30	30	30	30	30	32	30	32
Motor shaft speed . . . . . r/min	2960	2965	2960	2965	2960	2965	2960	2965
Power input at maximum working pressure 9) . . . . . kW	49.4	61.2	48.2	60.4	49.8	58.8	48.4	60.4
Oil capacity . . . . . l	34	34	34	34	34	34	34	34
Sound pressure level 8) . . . . . dB(A)	75	76	75	76	75	76	75	76
Cooling water consumption at temperature rise of 15 Celsius . . . . . l/s	--	--	--	--	0.68	0.80	0.66	0.82

**7.5.6 Specific data of ZT/ZR 45/55 - 60 Hz 1)**

**USA version**

	ZT45	ZT55	ZT45	ZT55	ZR45	ZR55	ZR45	ZR55
Maximum working pressure . . . bar(e)	7.5	7.5	8.6	8.6	7.5	7.5	8.6	8.6
Nominal working pressure . . . bar(e)	7	7	8	8	7	7	8	8
Air temperature at outlet valve . . . . . Celsius	30	30	30	30	30	32	30	32
Motor shaft speed . . . . . r/min	3560	3570	3560	3570	3560	3570	3560	3570
Shaft input at maximum working pressure 9) . . . . . kW	48.5	61.2	48.4	60.1	48.7	60.9	48.6	60.8
Oil capacity . . . . . l	34	34	34	34	34	34	34	34
Sound pressure level 8) . . . . . dB(A)	75	76	75	76	75	76	75	76
Cooling water consumption at temperature rise of 15 Celsius . . . . . l/s	--	--	--	--	0.71	0.89	0.71	0.89

**Others**

	ZT45	ZT55	ZT45	ZT55	ZR45	ZR55	ZR45	ZR55
Maximum working pressure . . . bar(e)	7.5	7.5	8.6	8.6	7.5	7.5	8.6	8.6
Nominal working pressure . . . bar(e)	7	7	8	8	7	7	8	8
Air temperature at outlet valve . . . . . Celsius	30	30	30	30	30	32	30	32
Motor shaft speed . . . . . r/min	3545	3555	3545	3555	3545	3555	3545	3555
Power input at maximum working pressure 9) . . . . . kW	51.4	64.8	51.4	63.6	51.9	64.9	51.8	64.7
Oil capacity . . . . . l	34	34	34	34	34	34	34	34
Sound pressure level 8) . . . . . dB(A)	75	76	75	76	75	76	75	76
Cooling water consumption at temperature rise of 15 Celsius . . . . . l/s	--	--	--	--	0.71	0.89	0.71	0.89

**7.5.7 Specific data of ZT/ZR 75/90 - 50 Hz 1)**

	ZT75	ZT90	ZR75	ZR90	ZR75	ZR90
Maximum working pressure . . . . . bar(e)	8	8	8	8	10	10
Nominal working pressure . . . . . bar(e)	7.5	7.5	7.5	7.5	9.5	9.5
Air temperature at outlet valve . . . . . Celsius	28	30	29	32	30	32
Motor shaft speed . . . . . r/min	2970	2970	2970	2970	2970	2970
Power input at maximum working pressure 9) . . . . . kW	84.1	100.6	82.6	97.7	83.2	98.3
Oil capacity . . . . . l	34.5	34.5	29.5	29.5	29.5	29.5
Sound pressure level 8) . . . . . dB(A)	75	76	75	76	75	76
Cooling water consumption at temperature rise of 15 Celsius . . . . . l/s	--	--	1.1	1.4	1.1	1.4

**7.5.8 Specific data of ZT75/90 - 60 Hz 1)**

	ZT75	ZT90	ZT75	ZT90
Maximum working pressure . . . . . bar(e)	7.5	7.5	8.6	8.6
Nominal working pressure . . . . . bar(e)	7	7	8	8
Air temperature at outlet valve . . . . . Celsius	28	32	28	34
Motor shaft speed . . . . . r/min	3565	3565	3565	3565
Power input at maximum working pressure 9) . . . . . kW	92.6	105.6	90.6	106
Oil capacity . . . . . l	34.5	34.5	34.5	34.5
Sound pressure level 8) . . . . . dB(A)	75	76	75	76

**7.5.9 Specific data of ZR75/90 - 60 Hz 1)**

	ZR75	ZR90	ZR75	ZR90	ZR75	ZR90
Maximum working pressure . . . . . bar(e)	7.5	7.5	8.6	8.6	10	10
Nominal working pressure . . . . . bar(e)	7	7	8	8	9.5	9.5
Air temperature at outlet valve . . . . . Celsius	30	32	30	32	30	32
Motor shaft speed . . . . . r/min	3565	3565	3565	3565	3565	3565
Power input at maximum working pressure 9) . . . . . kW	90.6	107	88.9	107	90.3	109
Oil capacity . . . . . l	29.5	29.5	29.5	29.5	29.5	29.5
Sound pressure level 8) . . . . . dB(A)	75	76	75	76	75	76
Cooling water consumption at temperature rise of 15 Celsius . . . . . l/s	1.2	1.5	1.2	1.5	1.2	1.5

## 7.6 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 m<sup>3</sup>/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 + 1.8 x) degrees fahrenheit 7)

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### Footnotes chapter 7

- 1) At reference conditions. See section 7.5.1.
- 2) The readings are typical values which may differ depending on the compressor type.
- 3) Not shown on ZT18/37.
- 4) Not on ZT.
- 5) Disturbance of contactor and/or overload relay may occur (if damaged, the component must be replaced).
- 6) No damage will occur at the overload relay.
- 7) A temperature difference of 1 degree Celsius = a temperature difference of 1.8 degrees fahrenheit.
- 8) According to PNEUROPE / CAGI test code under free field conditions at 1 m distance with a tolerance of  $\pm 3$ dB.
- 9) Values may differ up to 0.5% depending on the supply voltage.