Controller Instruction

1 General information

ES 4000 STANDARD

Printed Matter Number	:	2946 7002 09
Applicable to	:	MB compressors
Preliminary Operations:	:	–
Safety Instructions	:	General
Persons Required	:	1
Special Tools	:	–
Consumables	:	–

2 Document Overview

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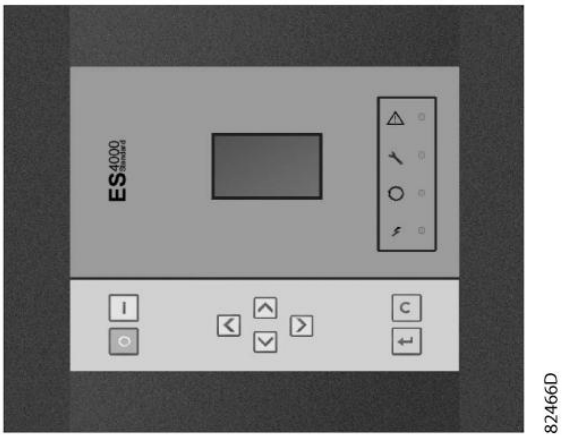


View of the ES 4000 Standard controller

3.1 Introduction

The electronic controller has following functions:

- Controlling the compressor
- Protecting the compressor
- Monitoring components subject to service
- Automatic restart after voltage failure

3.2 Automatic control of the compressor

The controller 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 controller stops the compressor whenever possible to reduce the power consumption and restarts it automatically when the net pressure decreases. If the expected unloading period is to short, the compressor is kept running to prevent too short stand-still periods.

3.3 Protecting the compressor

3.3.1 Shut-down

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

Air-cooled compressors will also be stopped in the event of overload of the fan motor.

Before remedying, consult the Safety precautions in the Instruction book.

3.3.2 Shut-down warning

A shut-down warning level is a programmable level below the shut-down level.

If one of the measurements exceeds the programmed shut-down warning level, this will also be indicated to warn the operator before the shut-down level is reached.

3.4 Service warning

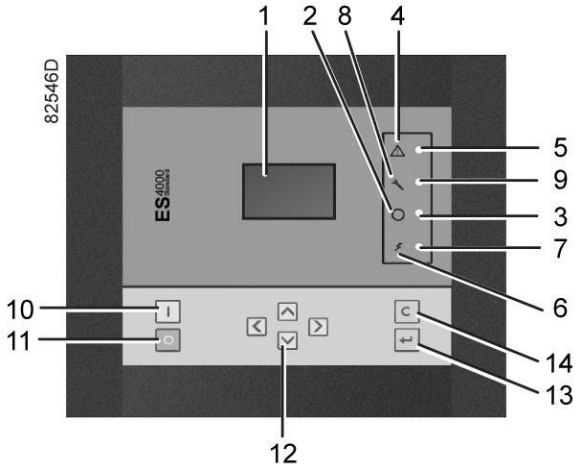
If the service timer exceeds a programmed value, this will be indicated on the display to warn the operator to carry out some service actions.

3.5 Automatic restart after voltage failure

The controller has a built-in function to automatically restart the compressor when the voltage is restored after voltage failure.

Provided the controller is in the automatic operation mode, the compressor will automatically restart when the supply voltage to the module is restored.

4 Detailed description of the control panel

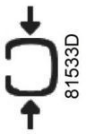
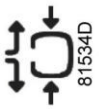
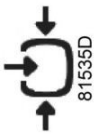


Function keys of the controller

Ref.	Designation	Function
1	Display	Shows icons and operating conditions.
2	Automatic operation symbol	
3	LED, Automatic operation	Indicates that the regulator is automatically controlling the compressor: the compressor is loaded, unloaded, stopped and restarted depending on the air consumption and the limitations programmed in the regulator.
4	Warning symbol	
5	LED, Warning	Is lit if a warning condition exists.
6	Voltage symbol	
7	LED, Voltage on	Indicates that the voltage is switched on.
8	Service symbol	
9	LED, Service	Is lit when service is needed.
10	Start button	This button starts the compressor. Automatic operation LED (3) lights up. The Elektronikon is operative.
11	Stop button	This button is used to stop the compressor. Automatic operation LED (3) goes out.
12	Scroll buttons	Use these buttons to scroll through the menu.
13	Enter button	Use this button to confirm the last action.
14	Escape button	Use this button to go to previous screen or to end the current action.

5 Icons used

5.1 Status icons

Name	Icon	Description
Compressor status		When the compressor is stopped, the icon stands still. When the compressor is running, the icon is rotating.
		Motor stopped
		Running unloaded
		Running loaded
Machine control mode		Remote start / stop
		LAN control
Automatic restart after voltage failure		Automatic restart after voltage failure is active
Timer		
Active protection functions		Emergency stop
Service		Service required
Units		Pressure unit (Mega Pascal)
		Pressure unit (pounds per square inch)
		Pressure unit (bar)
		Temperature unit

Name	Icon	Description
		Temperature unit
		Hours (always shown together with seconds)
		Percent
		The value shown must be multiplied by 10 to get the actual value
		The value shown must be multiplied by 100 to get the actual value
		The value shown must be multiplied by 1000 to get the actual value
		Motor (overload)
		Element outlet temperature
		Filter
		Drain
		Energy saving (dryer)
		Ambient temperature
		Dewpoint temperature

6 Main screen

When the voltage is switched on, the first screen is a test screen. The next screen is the Main screen, shown automatically.

The Main screen shows:

- The compressor status by means of pictographs
- The air outlet pressure

Always consult your supplier if the pressure on the display is preceded by a "t".

7 Shut-down warning

7.1 Description

A shut-down warning will appear in the event of:

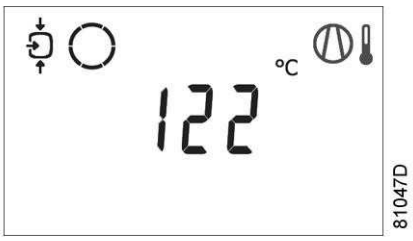
- Too high a temperature at the outlet of the compressor element.
- Too high a dewpoint temperature (Full-Feature compressors).

7.2 Compressor element outlet temperature

If the outlet temperature of the compressor element exceeds the shut-down warning level (see section Programmable settings), warning LED (5) starts blinking.

1. Press the Scroll down button.

The screen shows the temperature at the compressor element outlet.



The screen shows that the temperature at the element outlet is 122 °C

It remains possible to scroll through other screens, using the Scroll buttons up and down (12) to check the actual status of other parameters.

2. Press button (11) to stop the compressor and wait until the compressor has stopped.

3. Switch off the voltage, inspect the compressor and remedy.

The warning message will disappear as soon if the warning condition disappears.

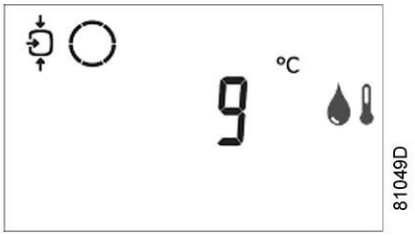
7.3 Dewpoint temperature

On compressors with integrated dryer, alarm LED (5) will light up and the related pictograph will appear flashing if the dewpoint temperature exceeds the warning level (programmable).

Main screen with the dewpoint temperature warning

The related pictograph will appear flashing:

1. Press the Scroll button (12) until the actual dewpoint temperature appears.



Warning screen, dewpoint temperature

The screen shows that the dewpoint temperature is 9˚C.

It remains possible to scroll through other screens (using Scroll buttons 12) to check the actual status of other parameters.

2. Press button (11) to stop the compressor.

Wait until the compressor has stopped.

3. Switch off the voltage, inspect the compressor and remedy.

The warning message will disappear as soon as the warning condition disappears.

8 Shut-down

8.1 Description

The compressor will be shut down:

- In case the temperature at the outlet of the compressor element exceeds the shut-down level.
- In case of error of the outlet pressure sensor.
- In case of overload of the drive motor.
- In case of overload of the fan motor on air-cooled compressors.

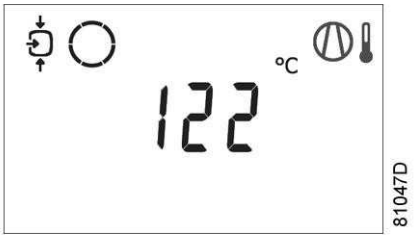
8.2 Compressor element outlet temperature

If the outlet temperature of the compressor element exceeds the shut-down level (factory setting 120 °C/248 °F, programmable) the compressor will be shut-down, alarm LED (5) will flash, automatic operation LED (3) will go out and the following screen will appear.

Main screen with shut-down indication, element outlet temperature

The related pictograph will appear flashing:

1. Press the Scroll button (12) until the actual compressor element temperature appears.



Shut-down screen, element outlet temperature

The screen shows that the temperature at the outlet of the compressor element is 122 °C.

2. Switch off the voltage.

3. Remedy the trouble.

4. After remedying and when the shut-down condition has disappeared, switch on the voltage.

5. Restart the compressor.

8.3 Motor overload

In the event of motor overload, the compressor will be shut-down, alarm LED (5) will flash, automatic operation LED (3) will go out and the following screen will appear.

Main screen with shut-down indication, motor overload

1. Switch off the voltage.
2. Remedy the trouble.
3. After remedying and when the shut-down condition has disappeared, switch on the voltage.
4. Restart the compressor.

9 Service warning

9.1 Description

A service warning will appear when the service timer has reached the programmed time interval.

If the service timer exceeds the programmed time interval, alarm LED (5) will light up.

1. Press Scroll buttons (12) to scroll to <**d.6**>.

   The service symbol is shown.

2. Press button (13).

   The actual reading of the service timer appears and is shown in <hrs> or <x1000 hrs> (if the service timer value is higher than 9999).

Example of service timer screen

   The screen shows that the reading of the service timer is 4002.

3. Press Scroll button (12) to scroll to <**d.1**>.

   The running hours symbol is shown.

4. Press button (13).

   The actual reading of the service timer appears and is shown in <hrs> or <x1000 hrs> (if the service timer value is higher than 9999).

Example of running hours screen

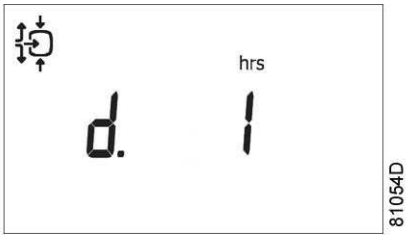
The longer interval service actions must also include the shorter interval actions. In the example above, carry out all service operations belonging to the 8000 running hours interval as well as those belonging to the 4000 running hours interval.
The setting of the service timer can be changed in function of the operating conditions See section Preventive maintenance schedule.

5. After servicing, reset the service timer. See section Calling up/resetting the service timer.

10.1 Description

Scroll buttons (12) can be used to scroll through all screens. The screens are divided into register screens, measured data screens, digital input screens (numbered as <d.in>, <d.1>, ...), parameter screens (numbered as <P.01>, <P.02>, ...), protections screens (numbered as <Pr.01>,...) and test screens (numbered as <t.01>,...).

During scrolling, the numbers of the screens appear consecutively. For most screens, the unit of measurement and the related pictograph are shown together with the screen number.



Example

The screen shows the screen number <**d.1**>, the unit used <**hrs**> and the related symbol for running hours.

Press **Enter** key (13) to call up the actual running hours.

10.2 Overview of the screens

10.2.1 Overview of the Digital input screens

Digital input screens	Designation	Related topic
<d.in>	Digital input status	
<d.1>	Running hours (hrs or x 1000 hrs)	See section Calling up running hours
<d.2>	Motor starts (x 1 or x 1000)	See section Calling up motor starts
<d.3>	Module hours (hrs or x 1000 hrs)	See section Calling up module hours
<d.4>	Loading hours (hrs or x1000 hrs)	See section Calling up loading hours
<d.5>	Load relay (x1 or x 1000)	See section Calling up load relay
<d.6>	Service timer reading (hrs or x 1000 hrs)	See section Calling up/resetting the service timer
<d.7>	Actual program version	

10.2.2 Overview of the Parameter screens

Parameter screens	Designation	Related topic
<P.01>	Selection between local, remote or LAN control	See section Selection between local, remote or LAN control
<P.02>	Setting a node ID for LAN control and the channels for Mk 4 and Mk 5	See section Calling up/modifying CAN address control
<P.03>	Settings for IP, gateway and Subnet mask	See section Calling up/modifying IP, Gateway and Subnetmask

Parameter screens	Designation	Related topic
<P.04>	Pressure band settings	See section Calling up/modifying pressure band settings
<P.05>	Setting a pressure band selection	See section Modifying the pressure band selection
<P.06>	Modifying a service timer	See section Calling up/modifying service timer settings
<P.07>	Setting of unit for temperature	See section Calling up/modifying the unit of temperature
<P.08>	Setting of unit for pressure	See section Calling up/modifying unit of pressure
<P.09>	Selection for function: Automatic restart after voltage failure	See section Activating automatic restart after voltage failure
<P.10>	Selection between Y-D or DOL starting	See section Selection between Y-D or DOL starting
<P.11>	Setting of load delay time	See section Calling up modifying load delay time
<P.12>	Setting of minimum stop time	See section Calling up modifying minimum stop time
<P.13>	Setting a password	See section Activating password protection
<P.14>	Remote pressure sensing	See section Activate load/unload remote pressure sensing

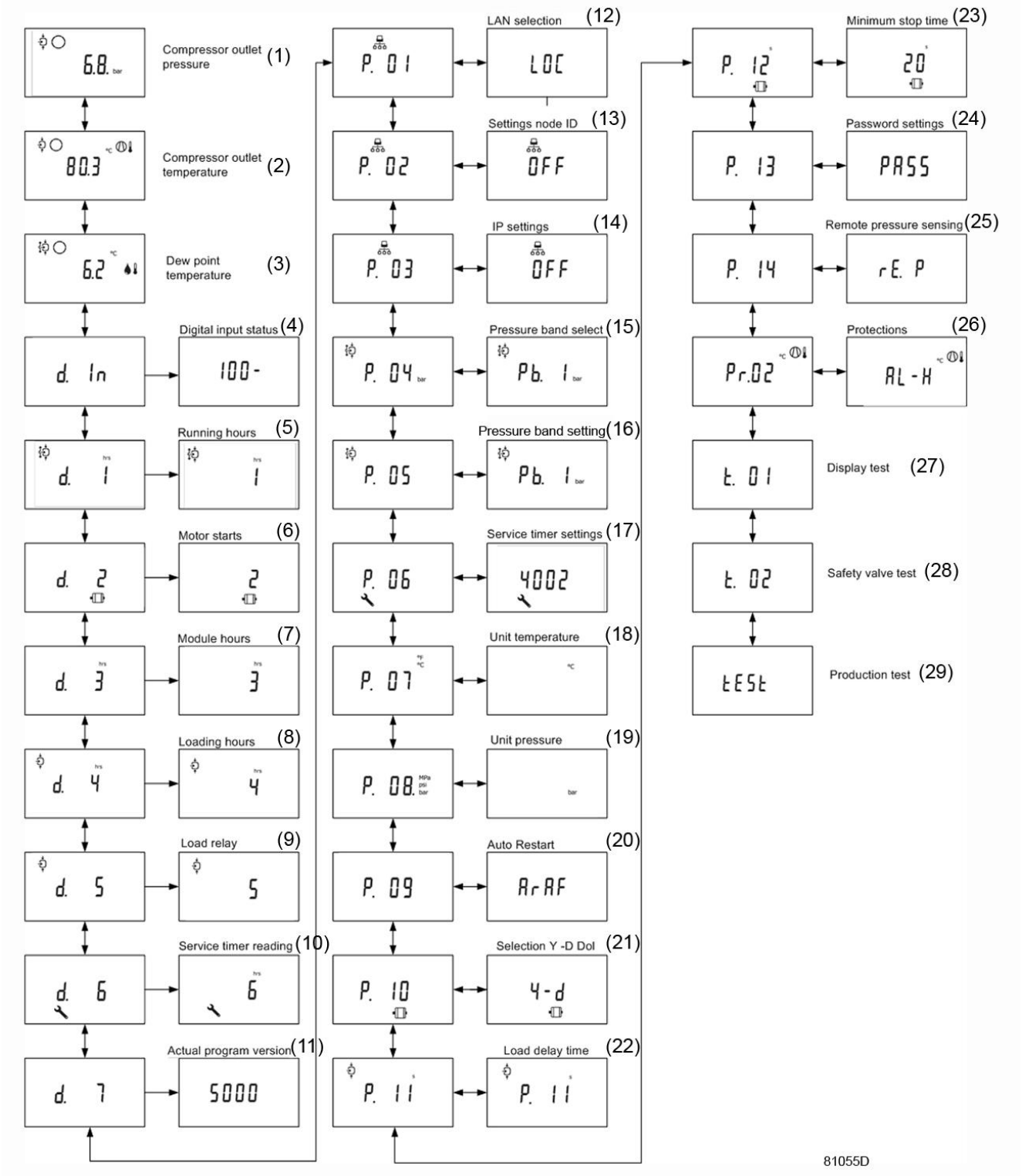
10.2.3 Overview of the Protections screens

Protections screens	Designation	Related topic
<Pr.01>	Protections screens	See section Calling up/modifying protection settings
<Pr.02>		
<Pr.03>		

10.2.4 Overview of the Test screens

Test screens	Designation	Related topic
<t.01>	Display test	See section Test screens
<t.02>	Safe valve test	See section Test screens
<t.03>	Production test	See section Test screens

10.3 Menu flow



Simplified menu flow

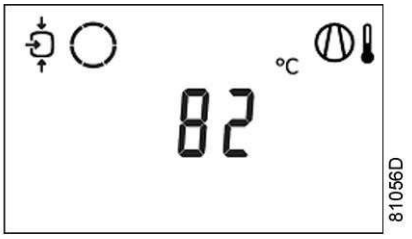
(1)	Compressor outlet pressure	(16)	Pressure band setting
(2)	Compressor outlet temperature	(17)	Service timer settings
(3)	Dewpoint temperature	(18)	Temperature unit
(4)	Digital input status	(19)	Unit pressure
(5)	Running hours	(20)	Auto restart
(6)	Motor starts	(21)	Selection Y-D/DOL
(7)	Module hours	(22)	Load delay time
(8)	Loading hours	(23)	Minimum stop time
(9)	Load relay	(24)	Password settings
(10)	Service timer reading	(25)	Remote pressure sensing
(11)	Actual program version	(26)	Protections
(12)	LAN selection	(27)	Display test
(13)	Settings node ID	(28)	Safety valve test
(14)	IP settings	(29)	Production test
(15)	Pressure band selection		

11 Calling up outlet and dewpoint temperatures

Starting from the Main screen:

1. Press Scroll button (12).

The outlet temperature will be shown.

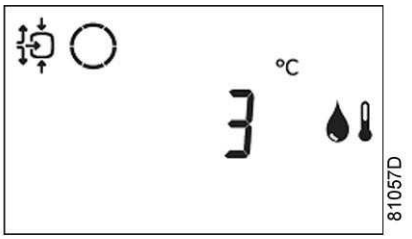


The screen shows that the outlet temperature is 82 ˚C.

For Full-Feature compressors:

1. Press Scroll button (12).

The dewpoint temperature will be shown:



The screen shows that the dewpoint temperature is 3 ˚C.

2. Press Scroll button (12) to scroll downwards or upwards through the screens.

12 Calling up running hours

Starting from the Main screen:

1. Press Scroll button (12) until <**d.1**> is shown.
2. Press **Enter** button (13).

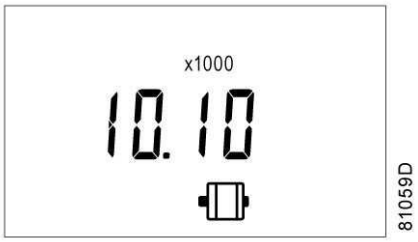
The screen shows the unit used (x1000 hrs) and the value (11.25): the running hours of the compressor are 11250 hours.

13 Calling up motor starts

Starting from the Main screen:

1. Press Scroll button (12) until <**d.2**> is shown.
2. Press **Enter** button (13).

A screen similar to the following appears



This screen shows the number of motor starts (x 1 or - if <x1000> lights up - x 1000). In the above example, the number of motor starts is 10100.

14 Calling up module hours

Starting from the Main screen:

1. Press Scroll button (12) until <**d.3**> is shown.
2. Press **Enter** button (13).

   A screen similar to the following appears

   The screen shows the unit used (hrs) and the value (5000): the regulator module has been in service during 5000 hours.

15 Calling up loading hours

Starting from the Main screen:

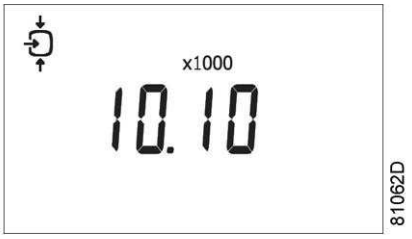
1. Press Scroll button (12) until <**d.4**> is shown.
2. Press **Enter** button (13).

   A screen similar to the following appears

   The screen shows the unit used <hrs> (or <x1000 hrs>) and the value <1755>: the compressor has been running loaded during 1755 hours.

Starting from the Main screen:

1. Press Scroll button (12) until <**d.5**> is shown.
2. Press **Enter** button (13).



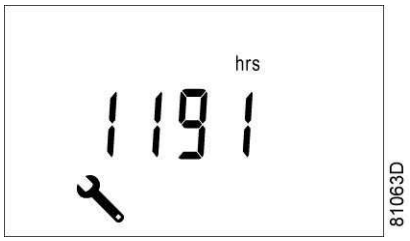
This screen shows the number of unload to load actions (x 1 or - if <x1000> lights up - x 1000). In the above example, the number of unload to load actions is 10100.

17 Calling up/resetting the service timer

17.1 Calling up the service timer

Starting from the Main screen:

1. Press Scroll button (12) until <**d.6**> is shown.
2. Press **Enter** button (13).



This screen shows the unit used <hrs> (or <x1000 hrs>) and the value <1191>. In the example shown, the compressor has run 1191 hours since the previous service.

17.2 Resetting the service timer

After servicing, see section Service warning, the timer has to be reset:

1. Scroll to register screen <**d.6**>.
2. Press **Enter** button (13).

   The reading (e.g. 4000) will appear.
3. Press **Enter** button (13).
4. If a password is set, enter the password.

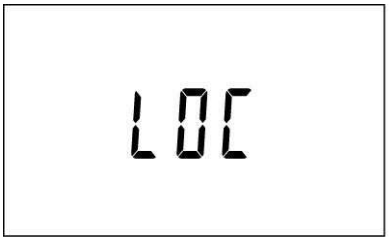
   The icon will flash (indicating that resetting is possible).
5. Press **Enter** button (13) to reset the timer to <0.000> or press the **Escape** button (14) to cancel the operation.

Starting from the Main screen:

1. Press Scroll button (12) until <**P.01**> is shown.
2. Press **Enter** button (13).

   The actually selected control mode is shown:

   - <**LOC**> for local control
   - <**rE**> for remote control
   - <**LAn**> for LAN control



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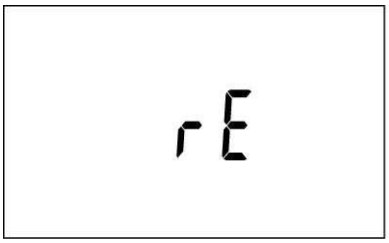
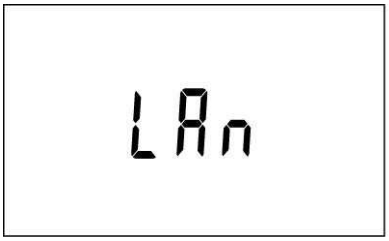


82553D



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To change:

1. Press **Enter** button (13)
2. If necessary - enter the password (see section Activating password protection).

   The actually selected control mode is blinking.
3. Use **Scroll** button (12) to change the control mode.
4. Press **Enter** button (13) to program the new control mode or press **Escape** button (14) to cancel.

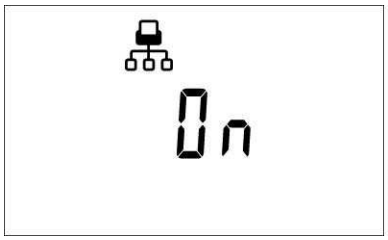
19.1 Calling up

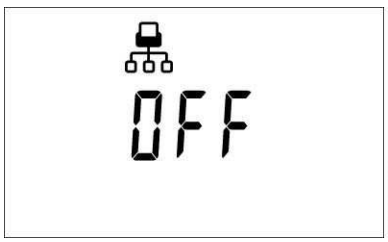
Starting from the Main screen:

1. Press Scroll button (12) until <**P.02**> is shown.
2. Press **Enter** button (13).
3. If necessary enter the password.

   The next screen shows that the function is **ON** or **OFF**.
4. Press the **Enter** button (13) to change this mode.
5. Use the Scroll buttons (12) to select <**ON**> or <**OFF**>.
6. Press **Enter** to program.
7. When this function is **ON**, use the Scroll buttons up or down (12) to see the node ID.
8. If desired the user can change this ID., by pressing the **Enter** button (13).

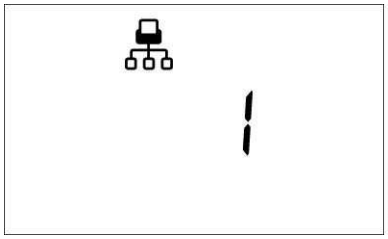
   The node ID value starts blinking.
9. Use the **Scroll** buttons (12) to change the node ID.
10. Press the **Enter** button (13) to program the new node ID or press the **Escape** button (14) to leave this screen or to cancel this operation.



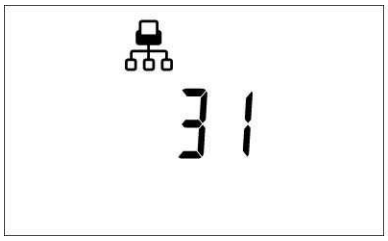


19.2 Modifying the Node ID

The Node ID can be changed; use a value between 1 and 31. When the function is **ON**, the parameters cannot be modified. Change the function to **OFF** to change the node ID.



81066D

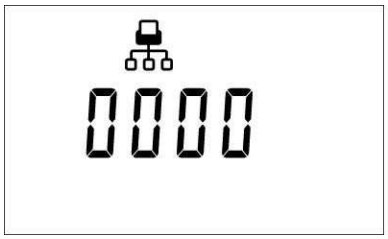


81067D

It is also possible to change the channels. The controller has 4 channels. When changing the channels, the controller can act as a Mk IV controller (a previous version of the controller). To set the channels, go to the screen where the node ID is visible.

1. Press the Scroll button down (12).

The following screen appears.



81068D

2. Press the **Enter** button (13) to modify the setting.

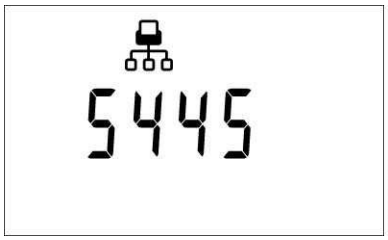
The utmost left value will blink.

3. Change this value by using the **Scroll** buttons (12).

4. Press the **Enter** button (13) to confirm.

5. Change the other values in the same way, as required.

After modifying the settings, the screen may look as follows:



81069D

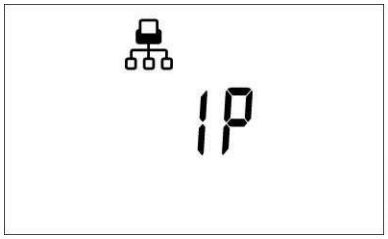
20 Calling up/modifying IP, Gateway and Subnetmask

20.1 Calling up

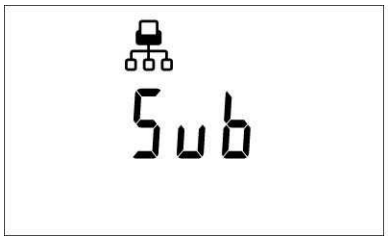
Starting from the Main screen:

1. Press Scroll button (12) until <**P.03**> is shown.
2. Press **Enter** button (13).

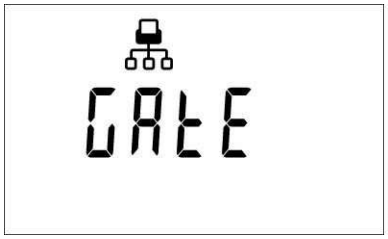
   The next screen shows that the function is **ON** or **OFF**.
3. If **ON**, press the **Enter** button (13) to modify it to **OFF**.
4. Use the **Scroll** buttons Up or Down (12) to scroll between the items in this list:
   - <**IP**> for IP address
   - <**Sub**> for Subnetmask
   - <**GAtE**> for Gateway



81070D



81071D

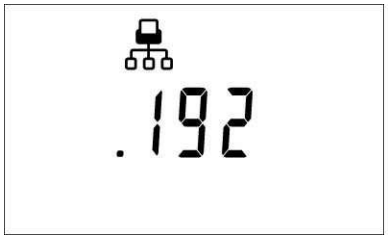


81072D

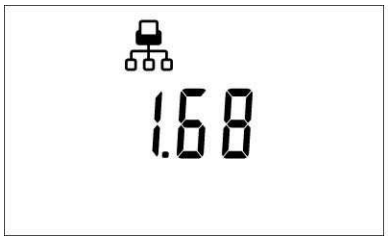
20.2 Modification

1. Press the **Enter** button (13).
2. If necessary enter the password.

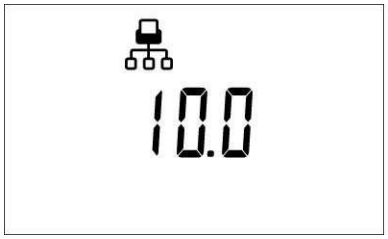
   The first digits are blinking.
3. Use the Scroll buttons Up or Down (12) to modify the settings.
4. Press **Enter** (13) to confirm.
5. Modify the next digits the same way. The standard IP address is set as 192.168.100.100.



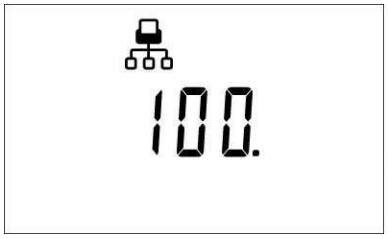
81073D



81074D



81075D



81076D

21.1 Calling up the settings

Starting from the Main screen:

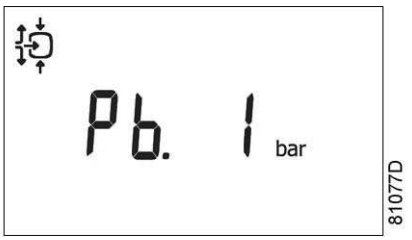
1. Press Scroll button (12) until <**P.04**> is shown.
2. Press **Enter** button (13).

   Pressure band 1 (<**Pb.1**>) is shown on the display.

   Button (12) can be used to scroll to pressure band 2 (<**Pb.2**>).
3. Press the **Enter** button (13) on the desired pressure band.

   The load level of the selected pressure band appears.

   Button (12) can be used to scroll to the unload level.



Loading pressure

Unloading pressure

21.2 Modification

1. Press **Enter** button (13) to modify the load level (value starts blinking).

   A password may be required.
2. Use Scroll buttons (12) to change the loading pressure.
3. Press **Enter** button (13) to program the new values or press the **Escape** button (14) to cancel.

22 Modifying the pressure band selection

Starting from the Main screen:

1. Press Scroll button (12) until <**P.05**> is shown.
2. Press **Enter** button (13).

   The active pressure band 1 (<**Pb.1**>) is shown on the display.
3. Press **Enter** button (13) to modify the pressure band selection (a password may be required).

   The active pressure band <**Pb.1**> starts blinking.
4. Press Scroll button (12) to modify the active pressure band.
5. Press **Enter** button (13) to confirm or the **Escape** button (14) to cancel.

23 Calling up/modifying service timer settings

Starting from the Main screen:

1. Press Scroll button (12) until <**P.06**> is shown.
2. Press **Enter** button (13): the setting of the service timer is shown in <hrs> (hours) or <x1000 hrs> (hours x 1000).

   Example: <4000 hrs> means the timer is set at 4000 running hours.
3. Press **Enter** button (13) to modify this value (a password may be required).

   The value starts blinking.
4. Use the Scroll buttons (12) to modify the setting.
5. Press **Enter** button (13) to program the new value.

24 Calling up/modifying the unit of temperature

Starting from the Main screen:

1. Press Scroll button (12) until <**P.07**> is shown.
2. Press **Enter** button (13).

   The actually used unit is shown.

   Possible settings are <˚**C**> and <˚**F**>.
3. Press **Enter** button (13)

   Unit starts blinking.
4. Use the Scroll buttons (12) to select another unit of temperature.
5. Press **Enter** button (13) to program the new unit or press **Escape** button (14) to return to the parameter screen without changes.

25 Calling up/modifying unit of pressure

Starting from the Main screen:

1. Press Scroll button (12) until <**P.08**> and the possible settings are shown:
   - <**Mpa**>
   - <**psi**>
   - <**bar**>
2. Press **Enter** button (13).

   The actually used unit is shown.
3. Press **Enter** button (13)

   Unit starts blinking.
4. Use the Scroll buttons (12) to select another unit of pressure.
5. Press **Enter** button (13) to program the new unit of pressure.
6. Press **Escape** button (14) to return to the parameter screens.

26 Activating automatic restart after voltage failure

This function allows the compressor to restart automatically after a power failure.

This parameter, accessible in screen <**P.09**>, can only be modified after entering a code. Consult your supplier if this function is to be activated.

27 Selection between Y-D or DOL starting

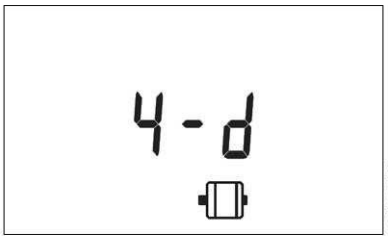
Starting from the Main screen:

1. Press Scroll button (12) until <**P.10**> and the motor pictograph is shown.
2. Press **Enter** button (13).

   The actually used starting mode is shown:

   - <**Y-D**> (star-delta)
   - <**doL**> (Direct-On Line)

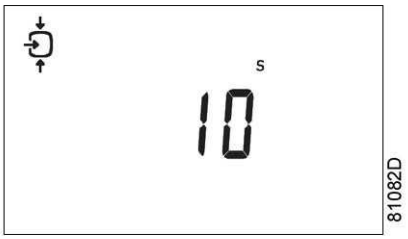
   This parameter can only be modified after entering a code. Consult your supplier if the parameter is to be changed.



28 Calling up modifying load delay time

Starting from the Main screen:

1. Press Scroll button (12) until <**P.11**> and the compressor load pictograph is shown.
2. Press **Enter** button (13).



This screen shows the load delay time (10) and the unit <**s**> seconds.

3. To modify this value press the **Enter** button (13) (a password may be required).

   The value starts blinking.

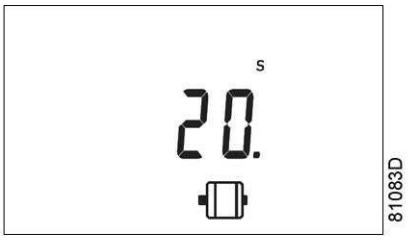
4. Use the Scroll buttons (12) to modify the value.
5. Press the **Enter** button (13) to program the new value.

   The minimum and maximum value depends on the parameters.

29 Calling up modifying minimum stop time

Starting from the Main screen:

1. Press Scroll button (12) until <**P.12**> and the motor pictograph is shown.
2. Press **Enter** button (13).



This screen shows the minimum stop time (20) and the unit <**s**> seconds.

3. To modify this value press the **Enter** button (13).

   The value starts blinking.

4. Use the Scroll buttons (12) to modify the value.
5. Press the **Enter** button (13) to program the new value.

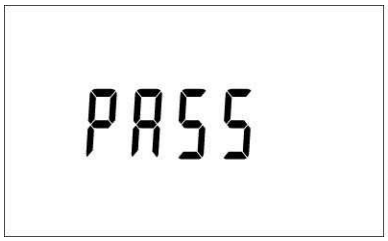
   The minimum and maximum value depends on the parameters.

30 Activating password protection

Important settings such as the setting of the service timer, pressure band setting, control mode settings,... can be protected by a password.

Starting from the Main screen:

1. Press Scroll button (12) until <**P.13**> is shown.
2. Press **Enter** button (13).



Password (<**PASS**>) appears on the screen.

3. Press the **Enter** button (13).

The screen shows the password status:

- ON (<**On**>)
- OFF (<**OFF**>)

4. Press **Enter** button (13) to modify.
5. Change the value with Scroll buttons (12).
6. Select <**On**>.
7. Press **Enter** button (13).
8. Enter the new password.
9. Press **Enter** button (13) to confirm.
10. Enter the password again.
11. Press **Enter** button (13) to confirm.

<**On**> appears on the display.

12. Press **Reset** key to return to the parameter screen.

Note: *Lost passwords cannot be recovered. Save the password carefully.*

31 Activate load/unload remote pressure sensing

Starting from the Main screen:

1. Press Scroll button (12) until <**P.14**> is shown.
2. Press **Enter** button (13).

The function of this screen is to activate the remote load/unload relay. To be able to activate this remote Load/Unload functionality, a physical digital input with function Load/Unload is required.

Once this parameter is activated, the physical digital input can be used to switch the compressor between Load and Unload.

32 Calling up/modifying protection settings

32.1 Available protections

A number of protection settings are provided. The protection screens are labelled <Pr.>. The pictograph shown with the protection screen indicates the purpose of the protection.

Possible combinations are <Pr.> followed by a number and one of the next pictographs:

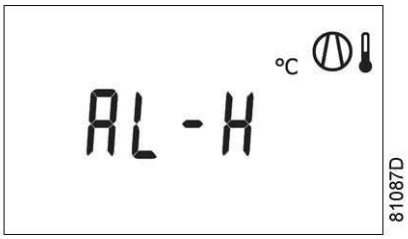
Pictograph	Designation
	<Pr.> shown with the pressure pictograph shows the pressure protections.
	<Pr.> shown with the element outlet temperature pictograph shows the element outlet temperature protections.
	<Pr.> shown with the dewpoint temperature pictograph shows the dewpoint temperature protections.
	<Pr.> shown with the ambient temperature pictograph shows the ambient temperature protections.

Following protection settings are available:

- A low warning level, shown on the display as <**AL-L**>.
- A high warning level, shown on the display as <**AL-H**>.
- A low shut-down level, shown on the display as <**Sd-L**>.
- A high shut-down level, shown on the display as <**Sd-H**>.
- Service level shown on the display as <**SE-L**>.
- Service level shown on the display as <**SE-H**>.

32.2 Example of protection screens

Protection setting element outlet temperature



Warning alarm high element outlet temperature

32.3 Changing the settings

Starting from the Main screen (the example given describes the protection of the element outlet temperatures).

1. Press Scroll buttons (12) until <Pr.> followed by a number and the element outlet temperature pictograph is shown.
2. Press **Enter** button (13).

   The warning level for the high temperature warning level <**AL-H**> and the high temperature shut-down level <**Sd-H**> become visible.
3. Use Scroll keys (12) to move between the warning level (<**AL**>) and the shut-down level (<**Sd**>).
4. Press the **Enter** button (13) to modify the value. An optional password may be required.

   The value starts blinking.
5. Use the Scroll buttons (12) to modify the value.
6. Press the **Enter** button (13) to program the new value.

Note: *Programmable settings can only be modified within allowed limits.*

33 Test screens

33.1 Display test

Starting from the Main screen.

1. Press Scroll buttons (12) until <**t.01**> is shown.
2. Press **Enter** button (13).

   The display now shows all icons that can be displayed.

33.2 Safety valve test

In the test screen <**t.02**>, a safety valve test is provided.

The safety valves can only be tested after entering a code. Consult your supplier if the safety valves are to be tested.

33.3 Production test

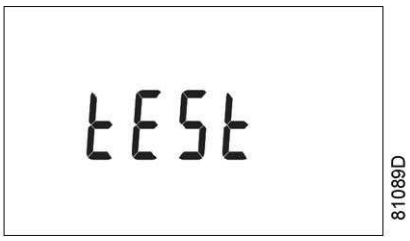
Test screen <**t.03**> is only intended for production test.

If the Main screen shows following screen, the controller is in production test mode.

How to solve?

1. Use the Scroll buttons (12) and scroll to menu <**t.03**>.

   The screen shows:



2. Press the **Enter** button (13).

   The text starts blinking.
3. Press **Enter** button (13).

   The menu disappears.

34 Programmable settings

34.1 Parameters: unloading/loading pressures

	Minimum setting	Factory setting	Maximum setting
Unloading/loading pressures	see Compressor data	see Compressor data	see Compressor data

34.2 Parameters fix speed drive

		Minimum setting	Factory setting	Maximum setting
Motor running time in star	sec	5	10	10
Load delay time (star-delta)	sec	0	0	10
Number of motor starts	starts/day	0	240	480
Minimum stop time	sec	10	20	30
Programmed stop time	sec			
Power recovery time (ARAVF)	sec	15	15	3600
Restart delay	sec	0	0	1200
Communication time-out	sec	10	30	60

34.3 Protections

		Minimum setting	Factory setting	Maximum setting
Compressor element outlet temperature (shut-down warning level)	˚C	50	113	119
	˚F	122	235	246
Compressor element outlet temperature (shut-down level)	˚C	111	120	120
	˚F	232	248	248

34.4 Service plan

The built-in service timer will give a Service warning message after a pre-programmed time interval has elapsed.

Also see section Maintenance schedule in the Instruction book.

Consult your supplier if a timer setting has to be changed. See section Calling up/modifying service timer settings. The intervals must not exceed the nominal intervals and must coincide logically.

34.5 Terminology

Term	Explanation
ARAVF	Activating automatic restart after voltage failure.
Power recovery time	Is the period within which the voltage must be restored to have an automatic restart. Is accessible if the automatic restart is activated. To activate the automatic restart function, consult your supplier.
Restart delay	This parameter allows to program that not all compressors are restarted at the same time after a power failure (ARAVF active).
Compressor element outlet	The regulator does not accept inconsistent settings, e.g. if the warning level is programmed at 95 ˚C (203 ˚F), the minimum limit for the shut-down level changes to 96 ˚C (204 ˚F). The recommended difference between the warning level and shut-down level is 10 ˚C (18 ˚F).
Delay at shut- down signal	Is the time for which the signal must exist before the compressor is shut down. If it is required to program this setting to another value, consult your supplier.
Minimum stop time	Once the compressor has automatically stopped, it will remain stopped for the minimum stop time, whatever happens with the net air pressure. Consult your supplier if a setting lower than 20 seconds is required.
Unloading/ Loading pressure	The regulator does not accept illogical settings, e.g. if the unloading pressure is programmed at 7.0 bar(e) (101 psi(g)), the maximum limit for the loading pressure changes to 6.9 bar(e) (100 psi(g)). The recommended minimum pressure difference between loading and unloading is 0.6 bar (9 psi(g)).