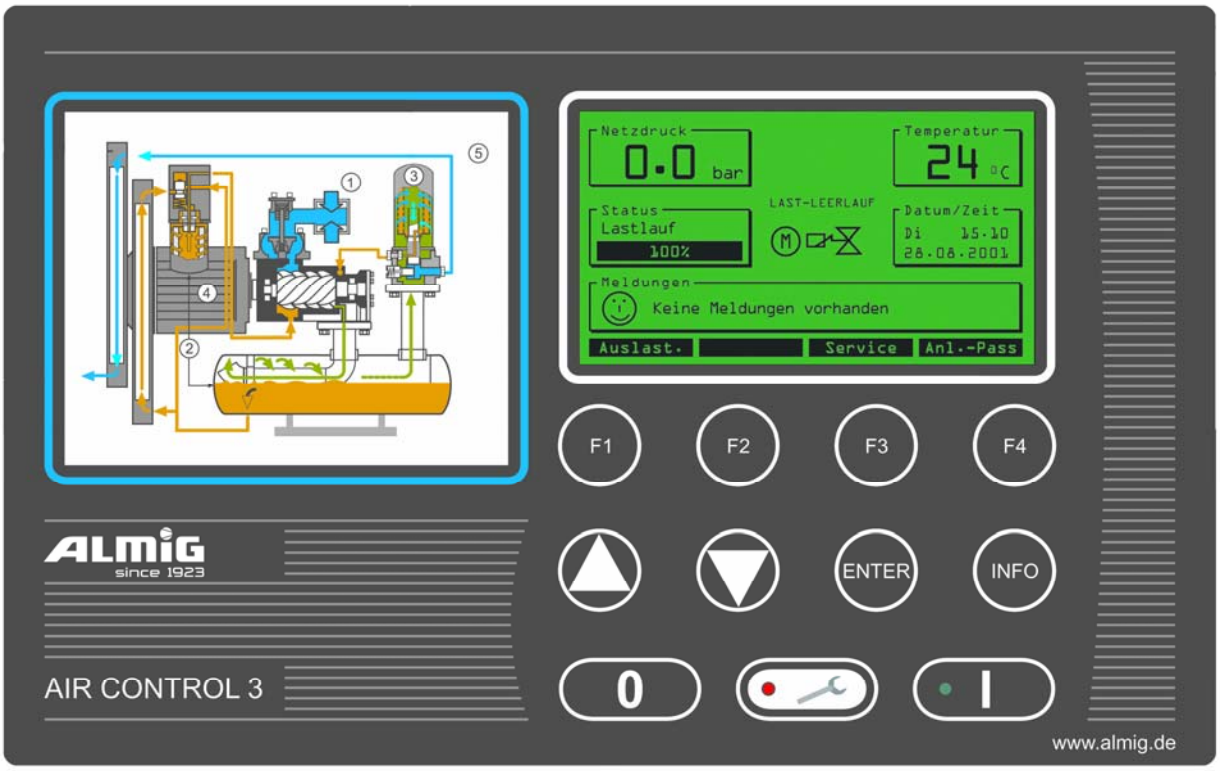

Netzdruck
0.0 bar
Temperatur
24 °C
Status
Lastlauf
100%
LAST-LEERLAUF
Datum/Zeit
Di 15:10
28.08.2001
Meldungen
Keine Meldungen vorhanden
Auslast.
Service
Anl.-Pass
F1
F2
F3
F4
ENTER
INFO
0
ALMiG
since 1923
AIR CONTROL 3
www.almig.de

# Manual

# Contents

# 1 General

**The control unit consists of the following functional blocks:**

- **Microprocessor logic** (with **EEPROM** memory for data back-up) for all control, monitoring and display functions;
- **Keyboard** with 10 keys for switching the compressor on and off, and for entering recommended and limit settings;
- customer-specific **LCD display** for showing the current actual and recommended parameters and the operating status, plus faults/warnings;
- **Analogue processing** of network pressure and compressor temperature;
- **Digital inputs/outputs** for a compressor's control unit;

# 2 Hardware

## 2.1 Micro-processor logic

- 16-bit microcontroller with Watchdog
- Power failure detection (mains failure > 30 ms)
- 512 kbytes Flash EPROM
- 512 byte EEPROM (for data backup)
- 128 kbytes RAM

## 2.2 Keyboard:

- Ruggedized touchpad keyboard
- 10 keys
- Customised finish

## 2.3 Display:

- 240 × 128 pixels LCD graphics display
- LED background lighting
- 2 LEDs (green and red)

## 2.4 Analogue inputs

- Galvanically isolated
- Sensor voltage 18V DC
- 1 × 4-20mA input (equivalent to 0-16 bar/200 ohms load), 10-bit resolution
- 2 inputs for KTY [proprietary description] temperature sensor (measuring current 1mA), 10-bit resolution
  [„AC3-Version 2007“ : Pt1000 – sensor selectable via Jumper ! ]

## 2.5 Digital inputs

- Galvanically isolated
- Sensor voltages 12V DC and 24V DC
- 6 × 24V DC, 10mA standard digital inputs
- 2 inputs for 12V DC PTC temperature sensor
  at client's discretion, can also be used as standard digital inputs

## 2.6 Digital outputs

- 6 relay outputs, contacts with common connection, 250V AC 6A,
  including an output with varistor for solenoid valve connection
  Capacity of the common connection: 250 V AC 6A
- 1 relay output, changeover switch, 250V AC, 6A;

## 2.7 Networking

- RS485 interface

## 2.8 Power supplies, terminals, housing

- Power supplies:
  10V AC (8VA), max pre-circuit-breaker T 1.0 A
  18V AC (8VA), max pre-circuit-breaker T 0.5 A
  ± 10%, 50/60 Hz;

- Phoenix plug-in screw connections (MSTBVA type for relay outputs,
  Mini-Combicon type for remaining connections);
- Compact casing with front panel 298 mm*187 (large version)
  298 mm*160 (small version)
  Case depth 65mm for both versions
- Fixing to the instrument panel by means of four × 3 mm tapped bolts

## 2.9 Pin assignment

| | | |
|---|---|---|
| Pin 1 | Earthing lead for electronics | |
| Pin 2 | 0V (10V AC) | [ „AC3-Version 2007“: not used ] |
| Pin 3 | 10V (10V AC) | [ „AC3-Version 2007“: not used ] |
| Pin 4 | 0V (18V AC) | |
| Pin 5 | 18V (18V AC) | |
| | | |
| Pin 6 | Common terminal for pins 7-12 | |
| Pin 7 | Relay output 1, mains protection | (A01.0) |
| Pin 8 | Relay output 2, star protection | (A01.1) |
| Pin 9 | Relay output 3, delta protection | (A01.2) |
| Pin 10 | Relay output 4, solenoid valve (with varistor) | (A01.3) |
| Pin 11 | Relay output 5, supplementary heating/fan | (A01.4) |
| Pin 12 | Relay output 7, (not used) | |
| | | |
| Pin 13 | Relay 6, contact (normally closed)/busbar fault | (A01.5) |
| Pin 14 | Relay 6, common | |
| Pin 15 | Relay 6, contact | |
| | | |
| Pin 16 | Shielding connection | |
| Pin 17 | Analogue inputs, earth | (AE00 – AE02) |
| Pin 18 | KTY-1, signal (compressor temperature) | (AE02) |
| Pin 19 | KTY-2, signal (oil temperature) | (AE01) |

| | | |
|---|---|---|
| Pin 20 | 4-20mA input signal (network pressure) | (AE00) |
| Pin 21 | 4-20mA input, 18V DC sensor voltage | |
| | | |
| Pin 22 | Digital input 8, LLC (baseload sel.): Load/No load | (E02.7) |
| Pin 23 | Digital input 7, Remote ON/OFF or LLC OK | (E02.6) |
| Pin 24 | Digital input 6, Fault: EMERGENCY SHUTDOWN | (E02.5) |
| Pin 25 | Digital input 5, Fault: Pressure difference, oil separator | (E02.4) |
| Pin 26 | Digital input 4, Fault: | (E02.3) |
| Pin 27 | Digital input 3, Fault: Excess pressure | (E02.2) |
| Pin 28 | Digital input 2, Fault: Current overload | (E02.1) |
| Pin 29 | Digital input 1, (PTC) Fault: Motor temperature | (E02.0) |
| Pin 30 | 12V DC (PTC) sensor voltage | |
| Pin 31 | 24V DC sensor voltage | |

| | | | |
|---|---|---|---|
| Pin 32 | RS485/RS232 common | ⎫ | Option: |
| Pin 33 | RS485/RS232 RXD | ⎬ | Interface |
| Pin 34 | RS485/RS232 TXD | ⎪ | |
| Pin 35 | RS485/RS232 power supply | ⎭ | |

| | | | |
|---|---|---|---|
| Pin 36 | Signal B | ⎫ | |
| Pin 37 | Signal A | ⎪ | Option: |
| Pin 38 | GNDx | ⎬ | Connection for |
| pin 39 | 18V AC | ⎪ | MK200 modules |
| pin 40 | 18V AC | ⎭ | |

| | | | |
|---|---|---|---|
| Kl. 41 | analog output (-) | ⎫ | Option: |
| Kl. 42 | analog output (+) | ⎬ | Connection for |
| Kl. 43 | GNDx (PE) | ⎭ | internal analog output (only: AC3-Version 2007) |

**Please note:**

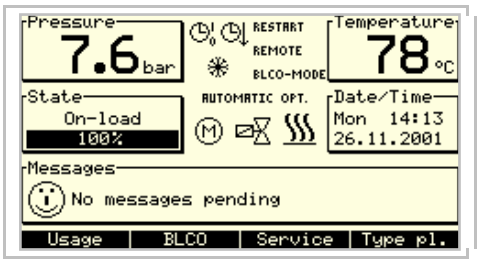
Before plugging in a RS485 module, the 2-pin DIP switch next to pin 35 on the rear of the board must be switched to "OFF".

“AC3-Version 2007” always has got a RS485-Port and with the DIP-switches the terminating-resistors for the RS485-Port can be activated/deactivated.

# 3 Basic screen

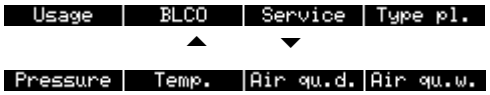
After the power supply is switched on at the control unit, the following welcome screen appears for approximately 4 seconds:


This then switches to the default display:




This shows the current network pressure, the end of compression temperature, date and time, plus some status information. If heating is installed (with a second temperature sensor) the oil temperature can be displayed instead of the compressor temperature by pressing ENTER for 10 seconds. The current oil temperature will flash.

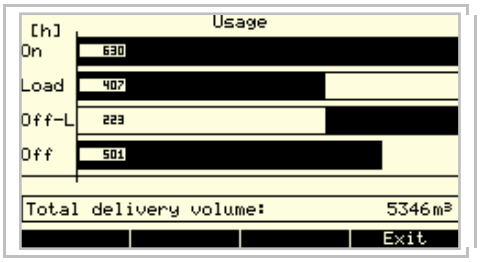
The lower toolbar shows the current assignment of the F1 - F4 function keys. Use the ▲ and ▼ arrow keys in the default display to change this assignment.




Press the relevant function key to display the corresponding information screen.

## 3.1 Loading (F1 loading)

This diagram shows the total, load and no load runtimes, plus the shutdown times, as a bar chart. The bars also show the current value for each parameter.




The topmost bar shows the total runtime. The diagram is scaled to this bar.

The second bar moves from left to right and shows the previous runtime under load.

The third bar moves from right to left and shows the previous runtime under no load. This type of display was chosen to clarify the ratio between the load and no load runtimes.

The sum of the second and third bars gives the total runtime again.

The fourth bar shows the shutdown time. If this bar is longer than the total runtime, then it is cut off behind.

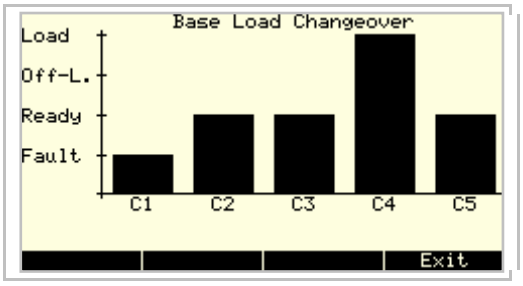
The lower part of the window shows the amount of air in $m^3$ produced by this compressor to date. To calculate this value, the runtime under load and the maximum delivered volume under Configuration are used and summed to the nearest second.

Press F4 to return to the default display.

## 3.2 LLC status (F2 LLC)

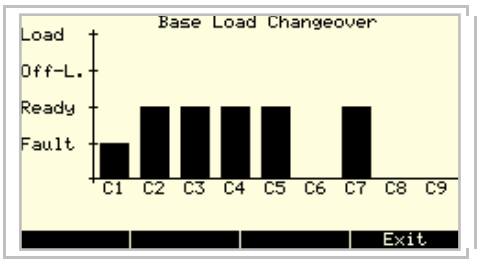
This screen can only be selected if LLC is activated with YES in the baseload selection menu.

The diagram gives a graphical representation of the status of the individual compressors in the LLC series at a LLC of up to five compressors (a LLC supplementary module).




The Fault and No Load stages are only shown for the K2 - K5 compressors if the corresponding reports (Fault and Motor Running) are wired to the supplementary module. Otherwise only the Load stages (compressor is required) [are shown].

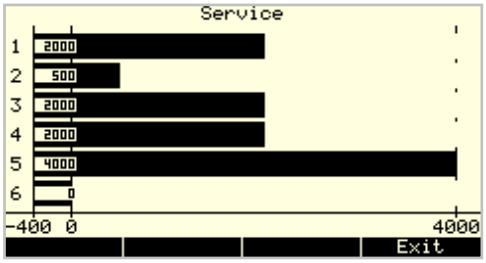
In a LLC with up to nine compressors (two LLC supplementary modules) the graphics appear as follows.




Press F4 to return to the default display.

## 3.3 Service (F3 service)

This diagram shows the status of the servicing intervals.




This means:

1 - Air filter servicing interval (abbreviated in German to ASF)
2 - Oil filter servicing interval (abbreviated in German to OLF)
3 - Oil separator servicing interval (abbreviated in German to OLAB)
4 - Motor lubrication servicing interval
5 - Compressor servicing interval
6 - Optional servicing interval

The length of the bar also represents the duration of the relevant servicing interval. The bar filling and the number displayed shows the hours remaining.

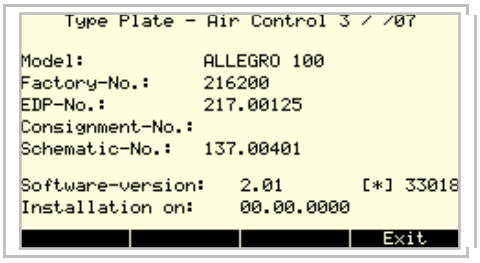
The bar is scaled to represent the longest servicing interval.

When the remaining time before the next service falls below 100 hours, the associated bar starts to flash.

Press F4 to return to the default display.

## 3.4 System information (F4 system info)

This screen displays system-specific data.



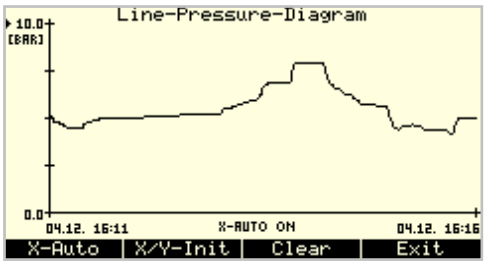

Use the code to change the text/numbers (model, factory, EDP, consignment and schematic diagram) in the menu (see below).

The installation date is taken as the day on which the total runtime first exceeds 10 hours.

Press F4 to return to the default display.

## 3.5 Line pressure diagram (F1 line pressure)

This diagram plots the network pressure against time. Set the sampling rate in the "Anzeigeparameter->Diagramme [Display parameters - Diagrams]" menu.




The scaling of the graph is changed as follows via the scale labelling.

First press the ▲ and ▼ arrow keys to select the setting.
Then press the **ENTER** key to switch to edit mode. This changes the labelling of the function keys.


Now press the ▲ and ▼ arrow keys to change the position with the flashing cursor. Press the **F1** and **F2** keys to move the cursor to the right or to the left. Press **F3** to end entry mode without accepting the setting. Press the **ENTER** key to accept the relevant setting. You revert automatically to select mode if you edit a pressure axis setting or a minute setting on the time axis. If the **ENTER** key is pressed when changing a date or time, then the cursor simply jumps to the right or to the next number.

When changing a scale value on the time axis, ensure that the display is not in X-Auto mode, i.e. delete the X-AUTO ON text at the bottom centre of the display, as entering a time setting is otherwise void. If X-AUTO is activated, then the latest measurements are displayed (number of measurements is set in the "Anzeigeparameter->Diagramme" menu); the time axis settings are also constantly overwritten at the same time. Changing the pressure axis is always possible, independently of X-AUTO.

After the change is completed, the graph is depicted to the new scale.

Function keys in select mode:

Press the **F1** key to activate or de-activate X-AUTO.

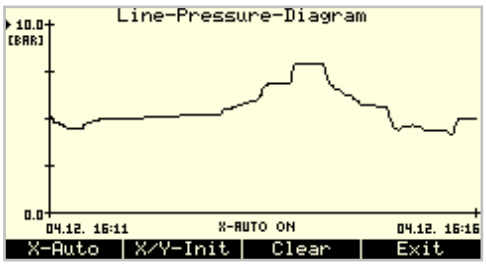
The **F2** key is used to reset the scale division to the default settings set in the "Anzeigeparameter->Diagramme" menu.

The **F3** key deletes the recorded measurements in all time diagrams.

Press **F4** to return to the default display.

## 3.6 Final temperature diagram (F2 final temperature)

This diagram plots the compression final temperature against time. Set the sampling rate in the "Anzeigeparameter->Diagramme [Display parameters - Diagrams]" menu.




The scaling of the graph is changed as follows via the scale labelling.

First press the ▲ and ▼ arrow keys to select the setting.
Then press the **ENTER** key to switch to edit mode. This changes the labelling of the function keys.


Now press the ▲ and ▼ arrow keys to change the position with the flashing cursor. Press the **F1** and **F2** keys to move the cursor to the right or to the left. Press **F3** to end entry mode without accepting the setting. Press the **ENTER** key to accept the relevant setting. You revert automatically to select mode if you edit a temperature axis setting or a minute setting on the time axis. If the **ENTER** key is pressed when changing a date or time, then the cursor simply moves to the right or to the next number.

When changing a scale value on the time axis, ensure that the display is not in X-Auto mode, i.e. delete the X-AUTO ON text at the bottom centre of the display, as entering a time setting is otherwise void. If X-AUTO is activated, then the latest measurements are displayed (number of measurements is set in the "Anzeigeparameter->Diagramme" menu); the time axis settings are also constantly overwritten at the same time. Changing the temperature axis is always possible, independently of X-AUTO.

The graph is depicted to the new scale after the change is completed.

Function keys in select mode:

Press the **F1** key to activate or de-activate X-AUTO.

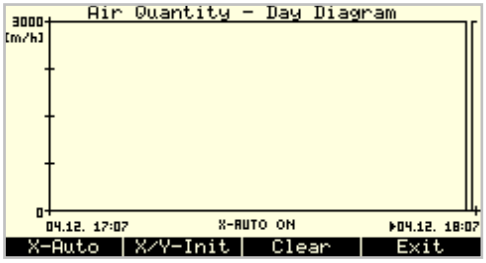
The **F2** key is used to reset the scale division to the default settings set in the "Anzeigeparameter->Diagramme" menu.

The **F3** key deletes the recorded measurements in all time diagrams.

Press **F4** to return to the default display.

## 3.7 Air quantity - Day Diagram (F3 Air qu. d.)

This diagram plots the compressed air delivered against time. Set the sampling rate in the "Anzeigeparameter->Diagramme [Display parameters - Diagrams]" menu.




The scaling of the graph is changed as follows via the scale labelling.

First press the ▲ and ▼ arrow keys to select the setting.
Then press the **ENTER** key to switch to edit mode. This changes the labelling of the function keys.


Now press the ▲ and ▼ arrow keys to change the position with the flashing cursor. Press the **F1** and **F2** keys to move the cursor to the right or to the left. Press **F3** to end entry mode without accepting the setting. Press the **ENTER** key to accept the relevant setting. You revert automatically to select mode if you edit a delivered volume axis setting or a minute setting on the time axis. If the **ENTER** key is pressed when changing a date or time, then the cursor simply jumps to the right or to the next number.

When changing a scale value on the time axis, ensure that the display is not in X-Auto mode, i.e. delete the X-AUTO ON text at the bottom centre of the display, as entering a time setting is otherwise void. If X-AUTO is activated, then the latest measurements are displayed (number of measurements is set in the "Anzeigeparameter->Diagramme" menu); the time axis settings are also constantly overwritten at the same time. Changing the delivered volume axis is always possible, independently of X-AUTO.

The graph is depicted to the new scale after the change is completed.

Function keys in select mode

Press the **F1** key to activate or de-activate X-AUTO.

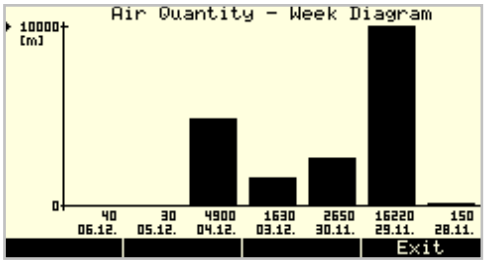
The **F2** key is used to reset the scale division to the default settings set in the "Anzeigeparameter->Diagramme" menu.

The **F3** key deletes the recorded measurements in all time diagrams.

Press **F4** to return to the default display.

## 3.8 Air Quantity – Week Diagram (F4 Air qu. w.)

This diagram shows the daily delivered volumes each day over a week.




The scaling of the bars is changed as follows via the scale labelling.

First press the ▲ and ▼ arrow keys to select the setting.
Then press the **ENTER** key to switch to edit mode. This changes the labelling of the function keys.


Now press the ▲ and ▼ arrow keys to change the position with the flashing cursor. Press the **F1** and **F2** keys to move the cursor to the right or to the left. Press **F3** to end entry mode without accepting the setting. Press the **ENTER** key to accept the relevant setting. You then revert automatically to select mode.

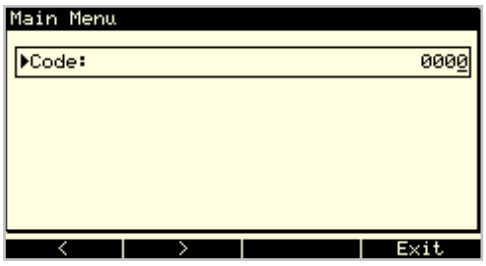
The bars are depicted to the new scale after the change is completed.

Press **F4** to return to the default display.

# 4 Menu system

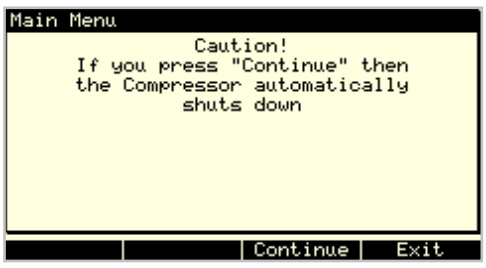
Use the INFO key to access each of the default display screens in the menu.

You will be prompted initially to enter the code:



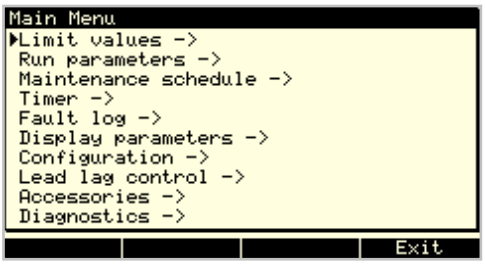

Now press the ▲ and ▼ arrow keys to change the position with the flashing cursor. Press the **F1** and **F2** keys to move the cursor to the right or to the left. Press the **ENTER** key to accept the setting. If a valid code is entered, then the associated authorisation is released and the main menu opened, or the relevant function listed (see Appendix). The main menu also opens if an invalid code is entered, but you cannot then make any changes.

If the service or Almig code is entered in a keyed machine, then a warning message appears, as the parameters for these code levels must only be changed in the OFF state.




Press F4 to return to the default display without having to switch the compressor off. Press **F3** to shut the compressor down and open the main menu.

The main menu contains the following sub-menus:




Press **F4** to return to the default display.

The menu system is operated as follows:

Press the ▲ and ▼ arrow keys to select the desired menu heading.

Selecting sub-menus:

Press the **ENTER** key to branch to the desired sub-menu.

Changing numbers

Press the **ENTER** key, if this is allowed, to switch to edit mode. In edit mode, the selection arrow flashes at the start of menu line and the cursor underneath a number.

Function keys are changed as follows:


Now press the ▲ and ▼ arrow keys to change the position with the flashing cursor. Press the **F1** and **F2** keys to move the cursor to the right or to the left. Press **F3** to end entry mode without accepting the setting. Press the **ENTER** key to accept the setting. You then revert automatically to select mode.

When numbers are changed, the permissible input limits are monitored on each occasion. Thus, if an attempt is made to enter a value outside the permissible range, the value is set to its upper or lower limit after the key is pressed.

Changing text

Some parameters are listed with text rather than numbers, so as to clarify the underlying functionality. These are changed in the same way as parameters with numbers.

If allowed, press the **ENTER** key to switch to edit mode. In edit mode, the selection arrow flashes at the start of menu line and the cursor underneath the text.

Function keys are changed as follows:


Now press the ▲ and ▼ keys to change the text (value). Press **F3** to end entry mode without accepting the setting. Press the **ENTER** key to accept the set text (value). You then revert automatically to select mode.

Again, as with number changes, the permissible input limits are monitored on each occasion.

Changing character sequences (text editing):

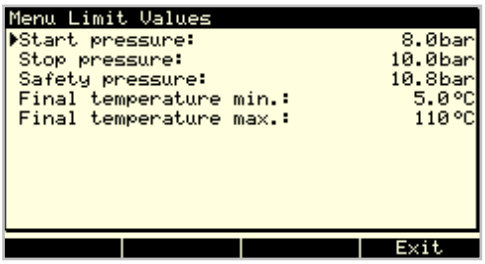
Pressing the **ENTER** key, if this is allowed, switches to edit mode or branches to the desired sub-menu. In edit mode, the selection arrow flashes at the start of menu line and the cursor underneath the letter to be changed.

Function keys are changed as follows:

Now press the ▲ and ▼ arrow keys to change the character with the flashing cursor. Press the **F1** and **F2** keys to move the cursor to the right or to the left. Press **F3** to end entry mode without accepting the setting. Press the **ENTER** key to accept the new character sequence. You then revert automatically to select mode.

## 4.1 Limit values menu

The pressure and temperature limit values are in this menu:

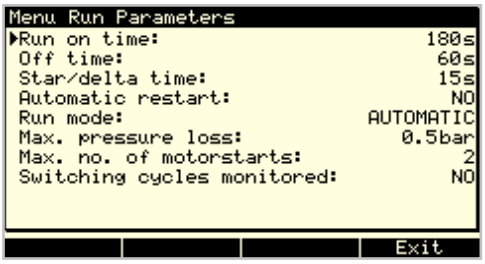



| Title | Description/range/default setting | E |
|---|---|---|
| Switch-on pressure | Lower value for pressure control<br>Range: 3.5 bar – switch-off pressure<br>Default setting dependent on machine type | K |
| Switch-off pressure | Upper value for pressure control<br>Range: Switch-on pressure - maximum pressure (Configuration menu)<br>Default setting dependent on machine type | K |
| Safety pressure | Maximum pressure allowed – exceeding pressure values lead to an error message<br>Fixed value: 0.8 bar above the machine's maximum pressure - Display only | - |
| Minimum pressure | Only relevant for LLC-slave: if the line pressure falls below the minimum pressure a warning “warning: minimum pressure” will be displayed. The compressor will switch to internal pressure control as long as the message is pending and has not been acknowledged.<br>Value range: 0.0bar – (switch-off pressure – 0.1bar)<br>Default: 0.0bar | |
| Minimum final compression temperature | Minimum permissible compression final temperature<br>Fixed value 5°C<br>Display only | - |
| Maximum compression final temperature | Maximum permissible compression final temperature<br>Fixed value 110°C<br>Display only | - |

**Press F4** to return to the main menu.

## 4.2 Menu Run-Parameters

This menu contains the general settings.

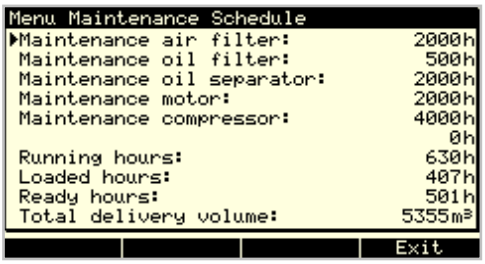



| Title | Description/range/default setting | E |
|---|---|---|
| Run-on time | Motor run-on time in automatic mode<br>Range: 10 - 1200 seconds<br>Default setting: 180 seconds | S |
| Off-time | Motor run-on time at manual cutout and delay for automatic restart<br>Range: 0 - 60 seconds<br>Default setting: 15 seconds | S |
| Star/delta time | Duration of star phase<br>Range: 3 - 30 seconds<br>Default setting: 18 seconds | S |
| Automatic restart | Start after power restored<br>Range: NO/YES<br>Default setting: NO | K |
| Run mode | Behaviour during load switching<br>Range: AUTOMATIC<br>ON/OFF-LOAD<br>AUTOMATIC OPT<br>Default setting: ON/OFF-LOAD | K |
| Maximum pressure loss | Maximum pressure loss<br>Range: 0.0 - 9.9 bar<br>Default setting: 0.5 bar | S |
| Maximum no. of motorstarts | Maximum number of motor starts per hour<br>Range: 1 - 55 per hour<br>Default setting: 2 per hour | S |
| Switching cycles monitored | (de-)activation of monitoring of motor starts<br>Range: NO/YES<br>Default: NO | S |

Press **F4** to return to the main menu.

## 4.3 Menu Maintenance Schedule

This menu contains the recommended maintenance intervals and the run-hours counter.




| Title | Description/range/default setting | E |
|---|---|---|
| Maintenance air filter | Recommended air filter maintenance interval<br>Range: 0 - 20000 hours<br>Default setting: depending on machine type | S |
| Maintenance oil filter | Recommended oil filter maintenance interval<br>Range: 0 - 20,000 hours<br>Default setting: depending on machine type | S |
| Maintenance oil separator | Recommended oil separator maintenance interval<br>Range: 0 - 20,000 hours<br>Default setting: depending on machine type | S |
| Maintenance motor | Recommended motor lubrication maintenance interval<br>Range: 0 - 20,000 hours<br>Default setting: depending on machine type | S |
| Maintenance compressor | Recommended compressor maintenance interval<br>Range: 0 - 20,000 hours<br>Default setting: depending on machine type | S |
| Maintenance *universal* | Maintenance interval for free use: *text for this interval can be entered in the text menu!*<br>Range: 0 – 20,000 hours<br>Default: 0 hours | W |
| Running hours | Elapsed runtime (motor on)<br>Range: 0 - 999999 hours<br>Default setting: 0 hours | W |

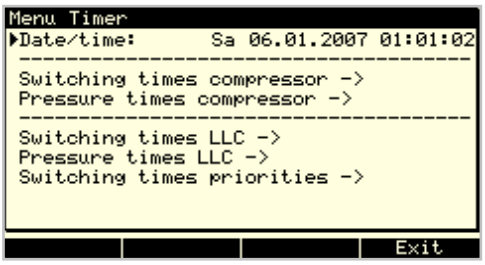
| | | |
|---|---|---|
| Loaded hours | Elapsed runtime on load<br>Range: 0 - 999999 hours<br>Default setting: 0 hours | W |
| Ready hours | Elapsed ready time (system on/motor off)<br>Range: 0 - 999999 hours<br>Default setting: 0 hours | W |
| Total delivery volume | The calculated volume delivered to date by the compressor from the set maximum<br>Range: 0 - 999999999 $m^3$<br>Default setting: 0 $m^3$ | W |

**When the recommended maintenance interval is accepted, the associated interval restarts automatically.**

The acknowledge key (**F3**) is only visible if at least the service code has been entered. Use this key to reset the selected maintenance interval.

Press **F4** to return to the main menu.

## 4.4 Menu Timer

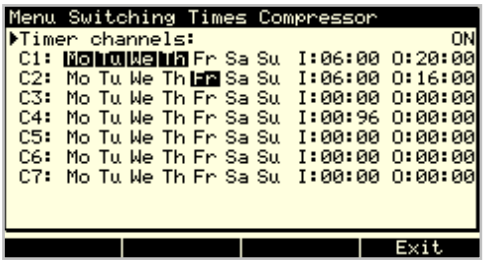



| **Title** | **Description/range/default setting** | **E** |
|---|---|---|
| Date/time | Setting of the current date and time<br>**Please note:** The setting will only be accepted in the real time clock after confirming the seconds by pressing the **ENTER** key**.** | K |

Press **F4** to return to the main menu.

### 4.4.1 Menu Switching Times Compressor

This menu defines the on and off times for the compressor.




There are 7 programming times available (timer-channels C1 to C7). The compressor will be running if at least one channel allows it.

In the example illustrated above, the compressor runs from 6 a.m. to 8 p.m. Monday to Thursday, from 6 a.m. to 4 p.m. on Friday and is off on Saturday and Sunday.

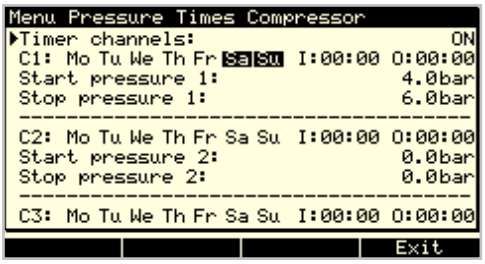
To switch the compressor ON on one or more days, the relevant days must be selected and the timer for each must be set to midnight.

| **Title** | **Description/range/default setting** | **E** |
|---|---|---|
| Timer channels | Switching the compressor timer on and off<br>Range: OFF/ON<br>Default setting: OFF | K |
| C1 - C7 | Timings: Programmed days are displayed inverted (white on black). The timer channel is only accepted if the E**NTER** key is pressed when the minutes of the switch-off time (A) are selected. | K |

Press **F4** to return to the timer menu.

### 4.4.2 Menu Pressure Times Compressor

This menu defines the compressor timings (pressure raising/pressure lowering).




There are 7 programming times and 7 pressure ranges available (channels C1 to C7). The channels are scanned from top to bottom for the programming relevant for the current time. As soon as a valid channel is found, the current lower and upper pressure thresholds (at item 0) are replaced by the values for this channel. If no valid channel is found, then the default settings in the "Grenzwerte [Limit Settings]" menu apply (see item 0).

In the example illustrated above, the compressor's governed pressure range for the whole of Saturday and Sunday is set to switch on at 4.0 bar and to switch off at 6.0 bar.

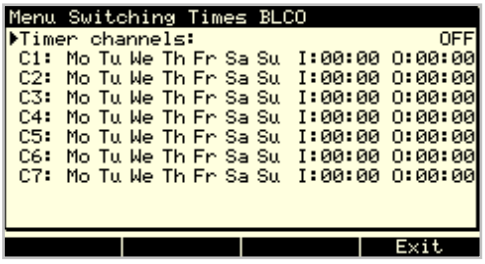
For example, the 2nd channel illustrated above is not active, as no day was selected.

| **Title** | **Description/range/default setting** | **E** |
|---|---|---|
| Timer channels | Switching the compressor timer on and off<br>Range: OFF/ON<br>Default setting: OFF | K |
| CX<br>(X => 1 – 7) | Timings: Programmed days are displayed inverted (white on black). The timer channel is only accepted if the E**NTER** key is pressed when the minutes of the switch-off time (A) are selected. | K |
| start pressure X<br>(X => 1 – 7) | Lower compressor pressure threshold which is to apply during the time programmed in the same channel. | K |
| stop pressure X<br>(X => 1 – 7) | Upper compressor pressure threshold which is to apply during the time programmed in the same channel. | K |

Press **F4** to return to the timer menu.

### 4.4.3 Menu Switching Times LLC

This menu defines the on and off times for the LLC.
**Only for LLC master!**




There are 7 programming times available (timer-channels C1 to C7). These channels are connected as an OR gate, i.e. the LLC is active if at least one channel is active (programming as under item 4.4.1 ).

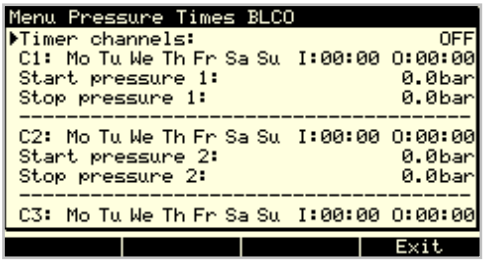
To switch the LLC ON on one or more days, the relevant days must be selected and the timer for each set to midnight.

| **Title** | **Description/range/default setting** | **E** |
|---|---|---|
| Timer channels | Switching the LLC timer on and off<br>Range: OFF/ON<br>Default setting: OFF | K |
| C1 - C7 | Timings: Programmed days are displayed inverted (white on black). The timer channel is only accepted if the E**NTER** key is pressed when the minutes of the switch-off time (A) are selected. | K |

**Press F4 to return to the timer menu.**

### 4.4.4 Menu Pressure Times LLC

This menu defines the LLC pressure timings (raising/lowering).
**Only for LLC master (see item 4.8** Fehler! Verweisquelle konnte nicht gefunden werden.**)**



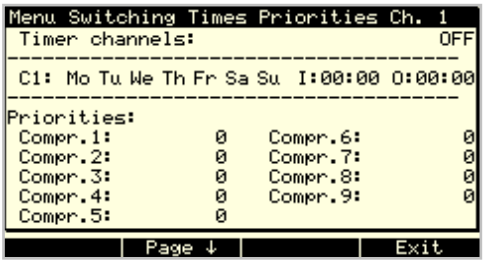

There are 7 programming times and 7 pressure ranges available (channels C1 to C7). The channels are scanned from top to bottom for the programming relevant for the current time. As soon as a valid channel has been found, the current LLC lower and upper pressure thresholds (see item 4.8 are replaced with the values for this channel. If no valid channel is found, then the default settings in the "LLC menu" (see item 4.8 ) apply.

| **Title** | **Description/range/default setting** | **E** |
|---|---|---|
| Timer channels | Switching the compressor timer on and off<br>Range: OFF/ON<br>Default setting: OFF | K |
| CX<br>(X => 1 – 7) | Timings: Programmed days are displayed inverted (white on black). The timer channel is only accepted if the E**NTER** key is pressed when the minutes of the switch-off time (A) are selected. | K |
| Start pressure X<br>(X => 1 – 7) | Baseload selection - lower pressure threshold which is to apply during the time programmed in the same channel. | K |
| Stop pressure X<br>(X => 1 – 7) | Load change - upper pressure threshold which is to apply during the time programmed in the same channel. | K |

**Press F4 to return to the timer menu.**

### 4.4.5 Menu Switching Times Priorities Channel X

IThis menu defines the timings for priority changeover of the LLC
**only for LLC master (see item 0).**



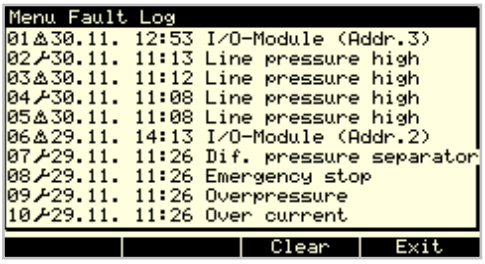

There are 7 programming times and 7 priority lists available (channels C1 to C7). The channels are scanned from top to bottom for the programming relevant for the current time. As soon as a valid channel has been found, the current priorities for compressors in the LLC (see item 4.8 are replaced by the values for this channel. If no valid channel is found, then the default settings in the LLC selection menu (see item 4.8 apply.

| **Title** | **Description/range/default setting** | **E** |
|---|---|---|
| Timer channels | Switching the compressor timer on and off<br>Range: OFF/ON<br>Default setting: OFF | K |
| CX<br>(X => 1 – 7) | Timings: Programmed days are displayed inverted (white on black). The timer channel is only accepted if the **ENTER** key is pressed when the minutes of the switch-off time (A) are selected. | K |
| Start pressure X<br>(X => 1 – 7) | Baseload selection - lower pressure threshold which is to apply during the time programmed in the same channel. | K |
| Stop pressure X<br>(X => 1 – 7) | Load change - upper pressure threshold which is to apply during the time programmed in the same channel. | K |

**Press F4 to return to the timer menu.**

## 4.5 Menu Fault Log

This screen displays the last 20 services, warnings and faults, with information on their date and time.




Entered events are sorted after the time they occurred. The latest entry occupies the first position, etc.

At the start of each line of the fault memory is the item number (01 - 20), followed by a warning triangle for a warning or service, or a tool for a fault. If this symbol is flashing, the relevant message is still active. This is followed by the date (without the year) and time (without the seconds) when the displayed service, warning or fault occurred.

Use the ▲ and ▼ arrow keys to scroll through the fault memory and display faults that are no longer visible.

Press the **F3** key to delete the fault memory from the "Service" code level.

Press **F4** to return to the main menu.

## 4.6 Menu Display Parameters

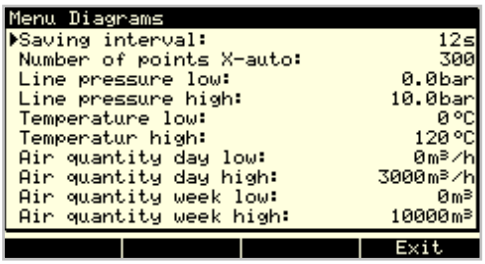
This menu contains some settings which affect the output on the display.


| Title | Description/range/default setting | E |
|---|---|---|
| Pressure dimension | Selection of the unit for displaying the line pressure.<br>Range: BAR/MPA/PSI<br>Default setting: BAR | K |
| Temperature dimension | Selection of the unit for displaying the compressor final temperature.<br>Range: °C/°F/°K<br>Default setting: °C | K |
| Language | Selection of the display language.<br>Range:<br>German/English/French/Italian/Dutch/Swedish/Danish/Rumanian/Polish/Hungarian/Russian/Spanish/Czech<br>Default setting: German | K |
| Volume dimension | Selection of the unit for displaying the delivered volume.<br>Range: $m^3/ft^3$<br>Default setting: $m^3$ | |
| Pressure offset | Adjustment option for the network pressure sensor<br>Range: -0.5 bar - 0.5 bar<br>Default setting: 0.0 bar | S |

Press **F4** to return to the main menu.

### 4.6.1 Menu Diagrams

This menu refers to the various diagrams which can be selected in the default display.



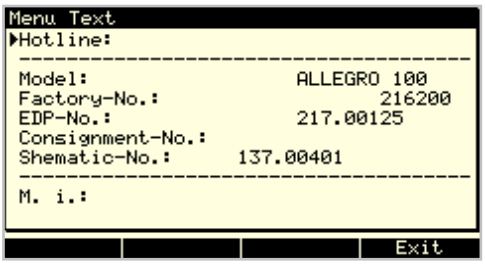

| Title | Description/range/default setting | E |
|---|---|---|
| Saving interval | Saving interval for recording line pressure, compressor final temperature and air quantity. As a maximum of 8000 values can be stored in the control unit at any given time, this parameter concurrently determines the history period.<br>With a storage interval of 12 seconds, a maximum of 12 * 8000 seconds = 96000 seconds = 26.67 hours can be recorded.<br>Range: 1 - 60 seconds<br>Default setting: 12 seconds | K |
| Number of points in X-Auto | Number of recent values that are displayed when the X-Auto function is activated.<br>For example, in order to display the last hour with X-AUTO ON, this value must be set to 300 (with a saving interval of 12 seconds)<br>(12 seconds * 300 = 3600 seconds = 1 hour).<br>Range: 200 - 8000<br>Default setting: 300 | K |
| Line pressure low | Lowest value for the line pressure, which is assumed when using the X/Y-Init function in the line pressure diagram.<br>Range: 0.0 bar - line pressure high<br>Default setting: 0.0 bar | K |

| | | |
|---|---|---|
| Line pressure high | Highest value for the line pressure, which is assumed when using the X/Y-Init function in the line pressure diagram.<br>Range: line pressure low – 16.0 bar<br>Default setting: 10.0 bar | K |
| Temperature low | Lower scale value for the compressor final temperature, which is assumed when using the X/Y-Init function in the compression final temperature diagram.<br>Range: 0°C - Temperature high<br>Default setting: 0°C | K |
| Temperature high | Upper value for the compressor final temperature, which is assumed when uding the X/Y-Init function in the compression final temperature diagram.<br>Range: Temperature low - 120°C<br>Default setting: 120°C | K |
| Air quantity day low | Lower value for the delivered air quantity (day), which is assumed when using the X/Y-Init function in the air quantity day profile.<br>Range: 0 $m^3$/hour – air quantity day high<br>Default setting: 0 $m^3$/hour | K |
| Air quantity day high | Upper value for the delivered air quantity (day), which is assumed when using the X/Y-Init function in the air quantity day profile.<br>Range: air quantity day low – 9999 $m^3$/hour<br>Default setting: 3000 $m^3$/hour | K |
| Air quantity week low | Lower value for the delivered air quantity (week), which is assumed when using the X/Y-Init function in the air quantity week profile (see item 0).<br>Range: 0 $m^3$ - Compressed air - delivered volume per week - Upper limit<br>Default setting: 0 $m^3$ | K |
| Air quantity week high | Upper value for the delivered air quantity (week), which is assumed when using the X/Y-Init function in the air quantity week profile (see item 0).<br>Range: Compressed air- delivered volume weekly - Lower limit - 60000 $m^3$<br>Default setting: 10000 $m^3$ | K |

Press **F4** to return to the display settings menu.

### 4.6.2 Menu Text

This menu refers to the freely definable text for the hotline and system information.

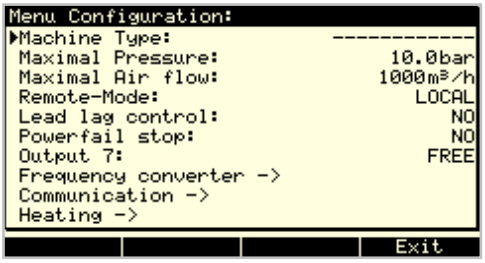



| Title | Description/range/default setting | E |
|---|---|---|
| Hotline | Text for the display below a message in the default screen (e.g. hotline number)<br>Length: 31 characters | S |
| Model | Display text in the System Info screen in the Model field .<br>Length: 15 characters | S |
| Factory no. | Display text in the System Info screen in the Factory No. field.<br>Length: 8 characters | W |
| EDP no. | Display text in the System Info screen in the EDP No. field.<br>Length: 15 characters | W |
| Consignment no. | Display text in the System Info screen in the Consignment No. field.<br>Length: 8 characters | W |
| Schematic no. | Display text in the System Info screen in the Schematic No. field.<br>Length: 20 characters | S |
| M. i. | Name of the maintenance interval „universal“ in the maintenance interval menu<br>Length: 20 characters | |

Press **F4** to return to the display settings menu.

## 4.7 Menu Configuration

This menu provides various fundamental settings for the system.



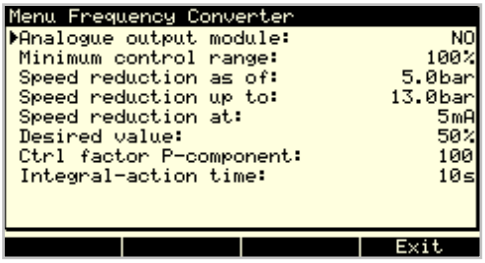

| Title | Description/range/default setting | E |
|---|---|---|
| Machine type | Selection of a predefined machine type. When this setting is accepted, the following values are reset to machine-specific values: maximum pressure, lower and upper pressure thresholds, run-up time, switching, no load time, maintenance intervals, maximum delivered volume, minimum delivered volume, speed lowering to, speed lowering off, speed lowering up to, control factor, adjustment time. | W |
| Maximum pressure | Maximum permissible machine pressure<br>Range: 8.0 bar/10.0 bar/13.0 bar<br>Default setting 10.0 bar | W |
| Maximum air flow | Delivered volume at maximum speed on-load<br>Range: 0 - 3000 $m^3$/hour<br>Default setting: 3000 $m^3$/hour | S |
| Remote mode | Switching to local operation, remote operation, or operation via external LLC with standby output.<br>Range: LOCAL/REMOTE/LLC-OK<br>Default setting: LOCAL | K |
| Lead lag control | Operation with external LLC<br>Range: NO/YES<br>Default setting: NO | K |
| Powerfail stop | Shutdown if powerfail detected<br>Range: NO/YES<br>Default setting: NO | S |

| | | |
|---|---|---|
| Output 7 | Setting for accessories output 7<br>Range: FREE, TIMER / ON, SYSTEM PRESSURE TO LOW, READY TO OPERATE, ON-LOAD, OFF-LOAD, MOTOR ON, VENTILATOR ON / FLAP OPEN, AIR INLET FLAP OPEN, AIR OUTLET FLAP CLOSE, MAINTENANCE, WARNING, SYSTEM PRESSURE/BELT, PRESSURE DEWPOINT TOO HIGH, DRYER ON<br>Default: FREE | |

Press **F4** to return to the main menu.

### 4.7.1 Menu Frequency Converter

This menu contains the frequency converter settings.



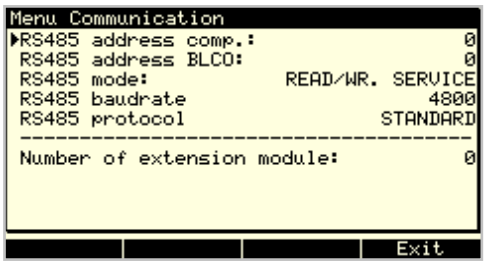

| **Title** | **Description/range/default setting** | **E** |
|---|---|---|
| Analogue output module | Analogue output model available for controlling a frequency converter<br>Range: NO: No analogue output available<br>INTERNAL: Internal plug-in module with analogue output<br>EXTERNAL: Analogue output with external expansion module (2AA) on Address 1<br>Default setting: NO | S |

| | | |
|---|---|---|
| Minimum control range | Percentage minimum value for the speed with a converter-machine (= no load speed). This parameter must be compatible with the setting at the converter and will only be needed to calculate the currently delivered volume.<br>Range: 0 – 100%<br>Default setting 100% | S |
| Speed reduction as of | Pressure from which the maximum recommended value for the frequency converter [FU] is limited.<br>Range: 5.0 bar - Speed reduction up to<br>Default setting: 5.0 bar | S |
| Speed reduction up to | Pressure from which the maximum recommended value for the frequency converter is no longer limited.<br>Range: Speed reduction as of - 13.0 bar<br>Default setting: 13.0 bar | S |
| Speed reduction at | Current at which the maximum recommended value is lowered most.<br>Range: 3 - 8 mA<br>Default setting: 5 mA | S |
| Desired value | Placing of the recommended pressure within the current pressure range. At a setting of "0%", the recommended value is the lower pressure threshold, at a setting of "100%" it is the upper pressure threshold, and otherwise it is in between.<br>Range: 0 – 100%<br>Default setting: 50% | S |
| Ctrl factor P-component | Proportional amplification for the PI controller.<br>Range: 1- 999%/bar<br>Default setting: 100%/bar | S |
| Integral-action time | Adjustment time for the PI controller. The current component of the controller is de-activated at a setting of "0 seconds".<br>Range: 0 - 9999 seconds<br>Default setting: 10 seconds | S |

Press **F4** to return to the configuration menu.

### 4.7.2 Menu Communication

This menu contains the settings for the serial communication.




| Title | Description/range/default setting | E |
|---|---|---|
| RS485 address comp. | Subscriber address for RS484 communication (e.g. viewing, remote service, ...).<br>Range: 0 - 27<br>Default setting: 0 | S |
| RS485 address BLCO | Subscriber address of the internal LLC for LLC via RS485. Only relevant for the LLC master.<br>Range: 28 - 31<br>Default setting: 31 | S |
| RS485 mode | Mode for data exchange via the serial interface<br>Setting options: READ<br>READ/WRITE CUSTOM<br>READ/WRITE SERVICE<br>READ/WRITE FACTORY<br>Default setting: READ/WRITE CUSTOMER | S |
| RS485 baudrate | Transfer rate for the serial interface<br>Setting options: 4800<br>9600<br>19200<br>Default setting: 4800 | S |
| RS485 protocol | Protocol type for the serial interface<br>Setting options: STANDARD<br>MODBUS RTU<br>Default setting: STANDARD | S |

| | | |
|---|---|---|
| Number of expansion modules | Number of 8E4AE modules for viewing. The input status of the modules is only accessible in viewing; Air Control 3 only passes on the values. The modules must be addressed in ascending order starting at address 8.<br>Range: 0 - 24<br>Default setting: 0 | S |

Press **F4** to return to the configuration menu.

### 4.7.3 Menu Heating

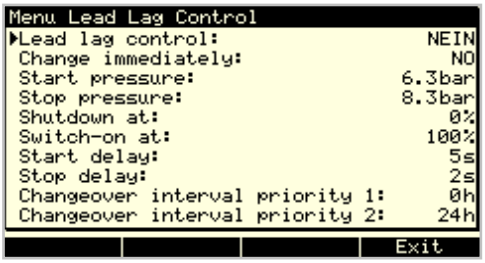
Supplementary heating/cooling is configured in this menu.


| **Title** | **Description/range/default setting** | **E** |
|---|---|---|
| Heating mode | Function of the supplementary heating output<br>Range: WITHOUT/HEATING<br>Default setting: WITHOUT | S |
| Heating-off temperature | Temperature threshold for additional heating, dependent on oil temperature<br>**Only in "Heating/cooling mode = HEATING"**<br>Range: 5 - 80°C<br>Default setting: 80°C | S |

Press **F4** to return to the configuration menu.

## 4.8 Menu Lead Lag Control

This menu contains the settings for LLC master operation.




| Title | Description/range/default setting | E |
|---|---|---|
| Lead lag control | Settings for activation of the LLC master features.<br>Range: NO<br>DIGITAL (supplementary module needed.)<br>RS485 (RS485 networking needed)<br>Default setting: NO | S |
| Change immediately | If set to „YES“ (recommended) the LLC row will rotate imedeately at the end of the change interval, no matter if a start or stop threshold has been reached. If set to „NO“ the changeover will only take place at the defined thresholds.<br>Range: NO/YES<br>Default: YES | |
| Start pressure | Lower threshold for switching a compressor on.<br>Range: 0.0 bar - "Stop pressure"<br>Default setting: 8.0 bar | K |
| Stop pressure | Upper pressure threshold for switching off a compressor<br>Range: "start pressure" - "Maximum pressure"<br>Default setting: 10.0 bar | K |
| Shutdown at | Percentage of master machine power below which the slave compressors will be switched off.<br>If 0% is configured here, then LLC regulation by power will be deactivated. Control will then occur | K |

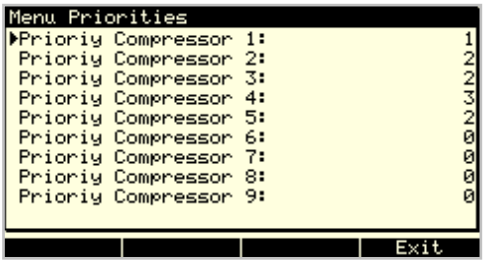
| Title | Description/range/default setting | E |
|---|---|---|
| | exclusively above the fluctuating compressive load.<br>Configurable range: 0 – 100%<br>Default setting 0% (power regulation inactive) | |
| Switch-on at | Percentage of master machine power above which the slave compressors will be switched on.<br>Configurable range: 0 – 100%<br>Default setting 100% | K |
| Start delay | Minimum time between switching on two compressors.<br>Range: 5 - 600 seconds<br>Default setting: 5 seconds | K |
| Stop delay | Minimum time between switching off two compressors.<br>Range: 2 - 60 seconds<br>Default setting: 2 seconds | K |
| Changeover interval priority 1 | Time between additional switches to LLC for compressors with Priority 1.<br>Range: 1 - 168 hours<br>Default setting: 24 hours | K |
| Changeover interval priority 2 | Time between additional switches to LLC for compressors with Priority 2.<br>Range: 1 - 168 hours<br>Default setting: 24 hours | K |
| Changeover interval priority 3 | Time between additional switches to LLC for compressors with Priority 3.<br>Range: 1 - 168 hours<br>Default setting: 24 hours | K |

**In this LLC function, with up to 5 compressors (1 master/4 slaves) one additional module is required and, with 6-9 compressors, two.**

Press **F4** to return to the main menu.

**Menu Priorities**

This menu contains the settings for assigning priorities to individual compressors. The values set in this menu apply only if no timer channel is active.

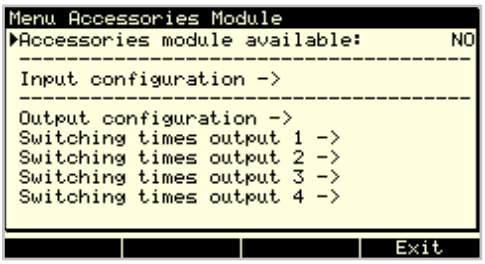



| Title | Description/range/default setting | E |
|---|---|---|
| Priority compressor X<br>(X => 1 – 9) | Selection of the current priority for each compressor<br>Range: 0 – 3<br>0 -> not present<br>1 – 3 -> lowest - highest priority<br>Default setting: 0 | K |

Press **F4** to return to the load changing sub-menu.

## 4.9 Menu Accessories Module

This menu contains the settings for connecting to various accessories.

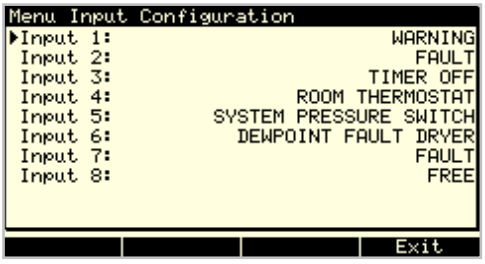


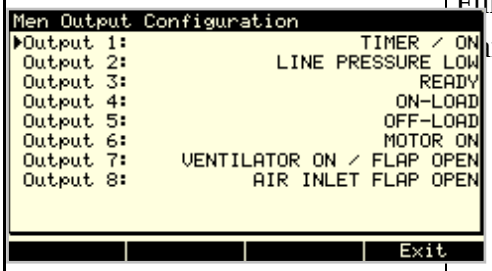

| Title | Description/range/default setting | E |
|---|---|---|
| Accessories module available | Selection of whether an accessory expansion module is connected.<br>Range: NO/YES<br>Default setting: NO | S |

Press **F4** to return to the main menu.

### 4.9.1 Menu Input Configuration

This menu defines the accessory digital input functions.



| Title | Description/range/default setting | E |
|---|---|---|
|  <br>Input X<br>(X => 1 – 8) | Function for the corresponding accessory input.<br>Range: FREE<br>WARNING<br>FAULT<br>TIMER OFF<br>ROOM THERMOSTAT<br>SYSTEM PRESSURE SWITCH<br>DEWPOINT FAULT DRYER<br>FAULT DRYER<br>CONDENSATE DRAINAGE<br>AIR FILTER<br>OIL FILTER<br>SEPARATOR<br>Default setting: FREE | K |

Press **F4** to return to the accessories menu.

### 4.9.2 Menu Output Configuration

This menu defines the accessory digital output functions.

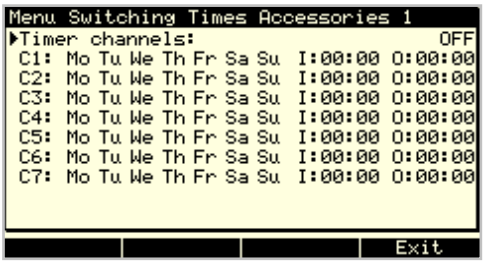
| Title | Description/range/default setting | E |
|---|---|---|
| Output X<br>(X => 1 – 8) | Function for the corresponding accessory output.<br>Range:<br>FREE<br>TIMER / ON: Outputs 1-4 only connected with the associated timer channels; outputs 5-8 always on.<br>SYSTEM PRESSURE TOO LOW: Network pressure at least 1 bar less than the lower pressure threshold<br>READY TO OPERATE: Compressor keyed - no fault<br>ON-LOAD<br>OFF-LOAD<br>MOTOR ON<br>VENTILATOR ON/FLAP OPEN: Compressor runs<br>AIR INLET FLAP OPEN: Thermostat input on.<br>AIR OUTLET FLAP CLOSED Thermostat input on.<br>MAINTENANCE<br>WARNING<br>SYSTEM PRESSURE/ BELT: Load valve open, delay elapsed<br>PRESSURE DEWPOINT TOO HIGH: Dewpoint fault, dehumidifier input<br>DRYER ON: Timer<br>Default setting: FREE | K |

**A second accessory module is necessary for outputs 4-8. These outputs cannot be connected with the timer. The second module is expected automatically if any of outputs 4-8 are set to a value other than "FREE".**

Press **F4** to return to the accessories menu.

### 4.9.3 Menu Switching Times Accessories 1-4

This menu defines the switching times for an accessory relay output.




There are 7 programming times available (timer - channels C1 to C7). These channels are connected as an OR gate, i.e. the output is selected if at least one channel allows it.

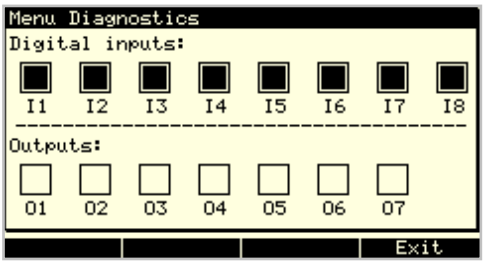
Programming is the same as for the compressor timer (see item 4.4.1 ).

| **Title** | **Description/range/default setting** | **E** |
|---|---|---|
| Timer channels | Timer ON/OFF timings for this accessory output.<br>Range: OFF/ON<br>Default setting: OFF | K |
| C1 - C7 | Timings: Programmed days are displayed inverted (white on black). The timer channel is only accepted if the E**NTER** key is pressed when the minutes of the switch-off time (A) are selected. | K |

Press **F4** to return to the accessories menu.

## 4.10 Menu Diagnostics

This menu contains the current statuses of the digital inputs and outputs.




If this menu is selected under a code level from "Service", then the **F3** key can be used to toggle the outputs on and off individually. In the switched off state, use **F1** or **F2** to select another output. This allows only one output to be active at any given time.

Press **F4** to return to the main menu.

# 5 Program Cycle

## 5.1 Operation States

*a) the compressor is switched off*:

- the green LED is off
- the "Motor" and "Solenoid valve" symbols in the default display are off

*b) the compressor is switched on, but the current pressure is still above the lower pressure threshold (start-up guard).*

- the green LED is flashing
- the "Motor" and "Solenoid valve" symbols in the default display are off

*c) the compressor has been switched on, but the compressor temperature is still below +1°C*

- the green LED is flashing
- the "Motor" and "Solenoid valve" symbols in the default display are off

*d) the compressor is in operation, but the load valve is switched off, i.e. the compressor is not compressing. (run up or no load phase)*

- the green LED is on
- the "Motor" symbol in the default display is on
- the "Load valve" symbol in the default display is off

If the compressor is in "Automatic" or "Optional Automatic" mode and the tracking time is running, then this is shown in the status window.

*e) the compressor is in operation and the load valve is switched on, i.e. the compressor is compressing. (Under load)*

- the green LED is on
- the "Motor" and "Solenoid valve" symbols in the default display are on

## 5.2 Operation Modes

The set mode is shown in clear text in the default display.

*a) AUTOMATIC mode:*

After reaching the upper pressure threshold, the system moves to OFF-LOAD for the duration of the run-on time. To show that the run-on time is active, the text "run-on" with the remaining time is shown in the default display. After the run-on time has elapsed, the motor switches off. After switching off, the green LED => Standby flashes for a new start-up. As soon as the pressure is again less than the lower pressure threshold, the system restarts.

*b) ON-LOAD/OFF-LOAD mode:*

The compressor alternates between on-load and off-load modes, i.e. it tracks with no time restriction.

*c) AUTOMATIC OPT.mode:*

Whenever the system alternates between on-load and off-load modes, then after 10 and 40 seconds respectively, the line pressure is stored. If a pressure drop accurs that exceeds the threshold, then the system remains in off-load mode for the "long" run-on time, otherwise it switches off after a "short" run-on time (45 seconds). To indicate that the run-on time is active, the text "run-on" with the remaining time is shown in the basic screen.

Each time the compressor motor starts up, an internal counter (number of switches) is incremented by 1. As soon as this counter reaches the preset maximum number of cycles, the motor no longer switches off after the run-on time has elapsed, but remains in off-load mode until the counter is again below the switching threshold. After one complete cycle ($\mathbf{t}_{SP}$ = 3600 seconds/max. cycles) the counter is decremented by 1.

## 5.3 Switching on

If the current line pressure is above the set pressure threshold when the compressor is switched on, the green LED flashes (= standby). As soon as the line pressure falls below the threshold the compressor will start and the operating display (green LED) glows permanently.

## 5.4 Switching off

If the compressor is switched off using the **0 key** (or using Remote OFF), it first switches into

off-load mode. The text "run-up" with the remaining time is shown in the status window of the default display. The shutdown time is used as the time here. Only after this time has elapsed the system switches off completely.

## 5.5 Shutdown time

( please refer to: pos. 5.10 / autom. restart )

## 5.6 Safety Pressure

The safety pressure is the set maximum pressure + 0.8 bar.

Example: Maximum pressure = 10.0 bar => Safety pressure = 10.8 bar

If the pressure exceeds the safety pressure – 0.3 bar threshold, a warning message is displayed. If the pressure exceeds the safety pressure threshold, the compressor is switched off and a fault message is displayed.

## 5.7 "Supplementary Heating": ( refer to: 4.7.3)

a) *"no heating"*

If the compressor temperature falls below the threshold (Item 0 / minimum compression final temperature), the supplementary heating output is switched on. As soon as the compressor temperature is again more than 2°C above the threshold, the output is switched off.

b) *"heating"/compressor is OFF/master switch is ON*

If the oil temperature falls below the threshold (Item 0 / minimum compression final temperature), then the supplementary heating output is switched on. As soon as the oil temperature is again more than 2°C above the threshold, the output is switched off.

c) *"heating"/compressor is ON*

If the oil temperature is below the heating switch-off temperature of -3°C (see item 4.7.3 ), then the supplementary heating output is switched on. As soon as the heating switch-off temperature has been reached, or if the compressor is switched off, then the output switches off again.

***In general, the compressor can only be started when the compressor temperature has reached at least the threshold of +1°C.***

If the supplementary heating output is switched on, then this is shown in the basic screen using the corresponding symbol.

## 5.8 Maintenance intervals

( actual values see: 3.2 / recommended values see:4.3 )

The intervals are counted down. As soon as any of these intervals is less than 100 hours, the corresponding message appears and the red light flashes (=> Maintenace). To clear this message, the recommended interval must first be changed or confirmed (**F3**) in the maintenance intervals menu. This resets the relevant interval to the recommended setting.

## 5.9 Grundeinstellung der System-Daten

Enter **CODE 0088** => all variable parameters are set to default settings. Please Note:all data that has been set previously by hand will be overwritten!

## 5.10 Automatic Restart

If automatic restart after a powerfail is programmed, then the waiting time which has been preset in the Shutdown time setting will be observed after the power is restored.

If the system was in operation before the power cut, then it will restart after this time has elapsed, but will otherwise remain in STOP mode. If Restart is activated, the Power Cut fault will **not** be reported after power has been restored.

# 6 Messages

## 6.1 Faults

The Tool symbol flashes in the message window and the relevant fault text is displayed. The text Hotline (refer to 4.6.2 ) also pops up. If there is more than one fault, then the associated texts change every 3 seconds.

| **Fault** | **Description** |
|---|---|
| Fault: Parameter wrong | At least one recommended pressure setting is outside the permissible range, change the recommended pressure settings. |
| Fault: EEPROM? | At least one recommended setting is outside the permissible range; change all settings. |
| Fault: Power low | The power supply has fallen below the permissible value. (only if detection is activated) |
| Fault: Power fail | The power supply has failed. (only if Automatic Restart has not been selected) |
| Fault: Adjustment wrong | The analogue adjustments are incorrect. The control unit must be exchanged. |
| Fault: Emergency stop | The EMERGENCY SHUTDOWN input was opened. |
| Fault: Rotation direction | The direction of rotation input was opened. |
| Fault: Motor temperature | The PTC motor temperature input has triggered |
| Fault: over current | The excess current monitoring input was opened. |
| Fault: overpressure | The excess pressure monitoring input was opened. |
| Fault: Switching cycles exceeded | Allowed number of switching cycles per hour has been exceeded. |
| Fault: Final temperature sensor | Compressor temperature sensor monitoring - sensor has cut in. |
| Fault: oil temperature sensor | Oil temperature sensor monitoring - sensor has cut in. |
| Fault: pressure sensor | Line pressure sensor monitoring - sensor has cut in. |

| | |
|---|---|
| Fault: final temperature high | The maximum permissible final compression temperature (refer to 0) has been exceeded. |
| Fault: Line pressure high | The maximum permissible line pressure (refer to 0) has been exceeded. |
| Fault: System pressure conf. | The input of the accessories module that has been set to „System pressure switch“ has been opened. |
| Fault: I/O-Module (Addr.4) | The supplementary module on address 4 does not respond. This monitoring is only active if this module is selected (refer to 4.9.1 and at least one input of this module is programmed as Fault. |
| Fault: Accessories input 1 | Input 1 of the accessories module has been opened. |
| Fault: Accessories input 2 | Input 2 of the accessories module has been opened. |
| Fault: Accessories input 3 | Input 3 of the accessories module has been opened. |
| Fault: Accessories input 4 | Input 4 of the accessories module has been opened. |
| Fault: Accessories input 5 | Input 5 of the accessories module has been opened. |
| Fault: Accessories input 6 | Input 6 of the accessories module has been opened. |
| Fault: Accessories input 7 | Input 7 of the accessories module has been opened. |
| | |

If any of these faults appears, then it leads to the compressor switching off. The red LED stays on until the fault has been cleared. The fault can only be cleared with the **0** key if its cause has been rectified.

## 6.2 Warnings / Maintenance Messages

The warning triangle symbol flashes in the message window and the relevant text is displayed. The text Hotline also pops up. If there is more than one warning or servicing message, then the associated texts change every 3 seconds.

| **Störung** | **Beschreibung / Beseitigung** |
|---|---|
| Warning: Battery | The battery for the realtime clock and the data saving in RAM is low. The control unit must be exchanged. |
| Warning: Final temperature high | The maximum permissible final compression temperature (refer to item 0) of 5°C has been exceeded. |
| Warning: Line pressure high | The maximum permissible line pressure of 0.3 bar (refer to item 0) has been exceeded. |
| Warning: I/O-Module (Addr.5) | The supplementary module on address 5 does not respond.. This monitoring is only active if this module is selected (refer to item 4.9.1 ) and no input of this module is programmed as fault |
| Warning: I/O-Module (Addr.4) | The supplementary module on address does not respond. This monitoring is only active if this module is selected (refer to item 4.9.1 ) and no input of this module is programmed as fault |
| Warning: I/O-Module (Addr.3) | The supplementary module on address 3 does not respond. This monitoring is only active in LLC master mode if more than 4 slaves are selected |
| Warning: I/O-Module (Addr.2) | The supplementary module on address 2 does not respond. This monitoring is only active in converter mode |
| Warning: I/O-Module (Addr.1) | The supplementary module on address 1 does not respond. This monitoring is only active in LLC master mode |
| Warning: Speed reduction | |
| Warning: Temperature too low | |
| Warning: Extension module | An expansion module which is tasked with recording signals for viewing is faulty. |
| Fault: Dryer | An accessory module input which has been programmed to |

| | |
|---|---|
| | Dehumidifier Fault has been opened |
| Warning: Condensate drain | An accessory module input which has been programmed to Condensation discharge has been opened |
| Warning: Air filter | An accessory module input which has been programmed to Air Filter has been opened |
| Warning: Oil filter | An accessory module input which has been programmed to Oil Filter has been opened |
| Warning: Separator | An accessory module input which has been programmed to Oil Separator has been opened |
| Warning: Check oil level/heating | Check oil level of supplementary heating. |
| Warning: Lower pressure threshold reached | Line pressure has reached its lower limit. |
| Maintenance: Air filter | The remaining time before the air filter maintenance is due is less than 100 hours |
| Maintenance: Oil filter | The remaining time before the oil filter maintenance is due is less than 100 hours |
| Maintenance: Separator | The remaining time before the oil separator maintenance is due is less than 100 hours |
| Maintenance: Motor | The remaining time before the motor is due lubricating is less than 100 hours |
| Maintenance: Compressor | The remaining time before the compressor maintenance is due is less than 100 hours |
| Maintenance: *Universal* | The remaining time before the end of the *universal* maintenance interval is less than 100 hours |

The compressor is not switched off if a warning or maintenance message is displayed. The red light flashes until the reason for the warning is eliminated or until the relevant maintenance interval has been cleared.

## 6.3 Fault in the control unit programming memory

If a fault has been detected in the programme memory (Flash EPROM) after the power has been switched ON, then the following message appears in the display:

"Download V..."

At this point, the program must be reloaded into the control unit (refer to 3.3)!

# 7 Supplementary Modules

## 7.1 Analogue Output Module

The analogue output module (4 - 20 mA) is available both as an internal and an external module.

The internal module is plugged directly into the control unit. The socket for the module interface is used for this purpose. The Analogue Output Module menu in the Frequency Converter menu must be set to INTERNAL to activate this module.

If this module is used, you can no longer extend the system with external modules.

The external module is connected to the control unit's optional module interface. You must set this to address 1 using the Dip switch. It is activated likewise by setting the Analogue Output Module menu in the Frequency Converter menu to EXTERNAL.

## 7.2 Internal LLC modules

For the internal LLC function, up to two 8E4RA modules are required for each expansion stage. The first module, for compressors 2-5 is assigned address 2, the second, for compressors 6-9, address 3.

Modules are connected to the control unit's optional module interface. In order to activate the module set LLC in the Lead Lag Control Menu to YES. In the Priorities menu, now set the priority of at least one of compressors 6-9 to a number greater than 0 to activate the second module automatically.

Two inputs and one output are used on each compressor module for data exchange between the LLC and individual compressors.

- One output signals to the LLC that the compressor is on standby. If this input is not connected, then the LLC assumes that the compressor is permanently on standby.
- The second input is used merely to display the compressor status to distinguish between Standby and off-load. This input should therefore be connected with a message from the motor (Motor running). If this input stays open, then the Air Control 3 shows Standby status for this compressor when it is in fact at off-load.
- The output is used to show the load demand for the connected compressor.

When using external modules, never set the Analogue Output Module in the Frequency Converter menu to INTERNAL, as this is then neither polled nor selected.

**Pin assignment:**

Address 2 module:

Pin 1 Compressor 2 standby input
Pin 2 Compressor 2 motor running message input
Pin 3 Compressor 3 standby input
Pin 4 Compressor 3 motor running message input
Pin 5 Compressor 4 standby input
Pin 6 Compressor 4 motor running message input
Pin 7 Compressor 5 standby input
Pin 8 Compressor 5 motor running message input
Pin 9 24V DC input sensor voltage

Pins 12/13 Compressor 2 load demand output
Pins 14/16 Compressor 3 load demand output
Pins 18/19 Compressor 4 load demand output
Pins 20/22 Compressor 5 load demand output

Address 3 module:

Pin 1 Compressor 6 standby input
Pin 2 Compressor 6 motor running message input
Pin 3 Compressor 7 standby input
Pin 4 Compressor 7 motor running message input
Pin 5 Compressor 8 standby input
Pin 6 Compressor 8 motor running message input
Pin 7 Compressor 9 standby input
Pin 8 Compressor 9 motor running message input
Pin 9 24V DC input sensor voltage

Pins 12/13 Compressor 6 load demand output
Pins 14/16 Compressor 7 load demand output
Pins 18/19 Compressor 8 load demand output
Pins 20/22 Compressor 9 load demand output

## 7.3 Accessory Modules

You can connect up to two accessory modules with configurable input/output functions to the Air Control 3. The modules are assigned addresses 4 (first module) and 5 (second module).

Modules are connected to the control unit's optional module interface. Set the parameter Accessory Module Present in the Accessory Module menu to YES to activate the first module. In the Output Configuration menu, now set the function of at least one of outputs 5-8 to anything but FREE to activate the second module automatically.

Set the inputs of the first module as described in the Input Configuration menu. The inputs of the second module are not used.

Set the outputs of both the first module (1- 4) and the second module (5-8) in the Output Configuration menu. There are also four timer blocks, each with seven channels, available for the outputs of the first module; a block for each output.

If the relevant timer block is activated, then the associated timer channels are linked with the set function (AND gate). For example, if the relevant output is to be dependent only on the timer, then this is to be set to TIME/ON. The gating also works for output functions such as MAINTENANCE or MOTOR ON. If these functions are used, then the relevant timer block should be deactivated ("Timings Output X -> timer channels: OFF").

**Pin assignment:**

Address 4 module

Pin 1 Accessory input 1
Pin 2 Accessory input 2
Pin 3 Accessory input 3
Pin 4 Accessory input 4
Pin 5 Accessory input 5
Pin 6 Accessory input 6
Pin 7 Accessory input 7
Pin 8 Accessory input 8
Pin 9 24V DC input sensor voltage

Pins 12/13 Accessory output 1
Pins 14/16 Accessory output 2
Pins 18/19 Accessory output 3
Pins 20/22 Accessory output 4

Address 5 module

| | |
|---|---|
| Pins 12/13 | Accessory output 5 |
| Pins 14/16 | Accessory output 6 |
| Pins 18/19 | Accessory output 7 |
| Pins 20/22 | Accessory output 8 |

## 7.4 Extension modules (viewing)

You can connect up to 24 extension modules to the Air Control 3 for viewing. The modules are assigned addresses 8 (first module) to 31 (maximum of 24 units).

Modules are connected to the control unit's optional module interface. Set the parameter “Number of Extension Modules” in the Communication menu to the relevant amount (0-24) to activate the modules. 8E 4AE modules must be allocated addresses in ascending order. If a module fails/is absent, then the Air Control 3 outputs an Expansion Module Warning. The Air Control 3 does not provide any further evaluation of the module's data.

# 8 Annex

## 8.1 Codes

| Code | Funktion |
|---|---|
| 0000 | Access without code – for information purposes only. Changing of parameters is not possible. |
| 0001 | Customer code (parameter with **K** in the third column) |
| 5317 | Service code (parameter with **K** or **S** in the third column) |
| 1923 | Works code (parameter with **K, S** or **W** in the third col.) For initial use only. Usually this code will change subsequently.(*) |
| 9900 | Reset operation hours and set maintenance intervals (actual values) |
| 0088 | Reset maintenance intervals and set all menu parameters to default values |
| 0099 | Start diagnostics plug |
| 1964 | Reset monitoring of motor starts |

**(*)** The company-code will be generated on demand with a random number and it is valid for 24 hours after first use. The random number is displayed in the “type-plate” behind the software-version.
As long as no “installation date” is stored, the initial works-code is valid.

## 8.2 Software history

| Date | Version | Editor | Description |
|---|---|---|---|
| 12.09.01 | 0.53 | B. L. | Initial issue |
| 30.11.01 | 0.60 | B. L. | Major changes in the GLW, servicing clearance, and diagnostics areas as ordered on 14.11.01 incl. multi-lingual capability (10 languages), without changed accessories management. |
| 30.11.01 | 0.61 | B. L. | Minor corrections made to the GLW display and control system |
| 05.12.01 | 0.70 | B. L. | Expansion of the accessories management application to include some special functions |

| | | | |
|---|---|---|---|
| 17.12.01 | 0.80 | R. B. | Implementation of the MODBUS protocol |
| 17.12.01 | 0.81 | B. L. | Expansion for a sub-menu for settings related to a frequency converter |
| 19.12.01 | 0.82 | B. L. | - Upgrade with some language corrections<br>- Protocol expansion for additional settings |
| 25.04.02 | 0.90 | B. L. | - Expansion to integrate some data capture modules for viewing<br>- Additional calculation of the volumes of compressed air hitherto generated by the compressor<br>- Expansion to include a Russian language block |
| 23.05.02 | 0.91 | B. L. | Expansion of the interface protocol to record delivered volumes |
| 24.05.02 | 0.92 | B. L. | Regardless of network pressure, the converter remains on its lowest speed during the No Load phase |
| 11.06.02 | 0.93 | B. L. | Expansion of the timer function to cover time-dependent switching of the priorities for internal GLW |
| 17.06.02 | 0.94 | B. L. | - Production of a separate version with a special GLW control unit<br>- Optimisation to the PI controller, so that a pure P controller can also be set |
| 24.06.02 | 0.95 | B. L. | - The code levels for the controller settings have been set to the works code<br>- For the default setting via the code, the Recommended Percentages were reset from 100% to 50% |
| 26.06.02 | 0.96 | B. L. | A delay time of 3 minutes was introduced for oil separator monitoring |
| 02.07.02 | 0.97 | B. L. | - A setting for the minimum control range for correct recording of the delivered volume was introduced to the Frequency Converter menu |
| 03.09.02 | 1.00 | B. L. | - Introduction of a multimaster protocol for networking the internal GLW via RS485<br>- Expansion of the list of system types |
| 07.10.02 | 1.01 | B. L. | Expansion to include a Spanish language block |
| 23.10.02 | 1.02 | B. L. | - Fault repair with priority assignment via the timer with internal GLW<br>- Expansion to include a Czech language block |
| | 1.18 | B. L. | Special software for project Tractebel according to definitions sent by Hr. Klingler via email August 2004 |

| | | | |
|---|---|---|---|
| 13.07.07 | 2.00 | B. L. | Version ALUP and ALMIG<br>New hardware„AC3-Version 2007“ |
| 02.08.07 | 2.01 | B. L. | Improvement of the EEPROM driver |

## 8.3 Transferring a new program to the control unit

1. The control unit can be switched manually to programming mode.

2. Switch off the power supply to the control unit

3. Press the ▲ arrow and **O** keys simultaneously, and at the same time switch on the power supply to the control unit once again.

4. Download V... now appears in the display.

5. The relevant programme (hexadecimal file) can now be transferred to the control unit. The transfer programme must be transferred at a 19200 baud rate.

6. After the transfer, the power supply must be switched off and on again, so as to activate the transferred programme.