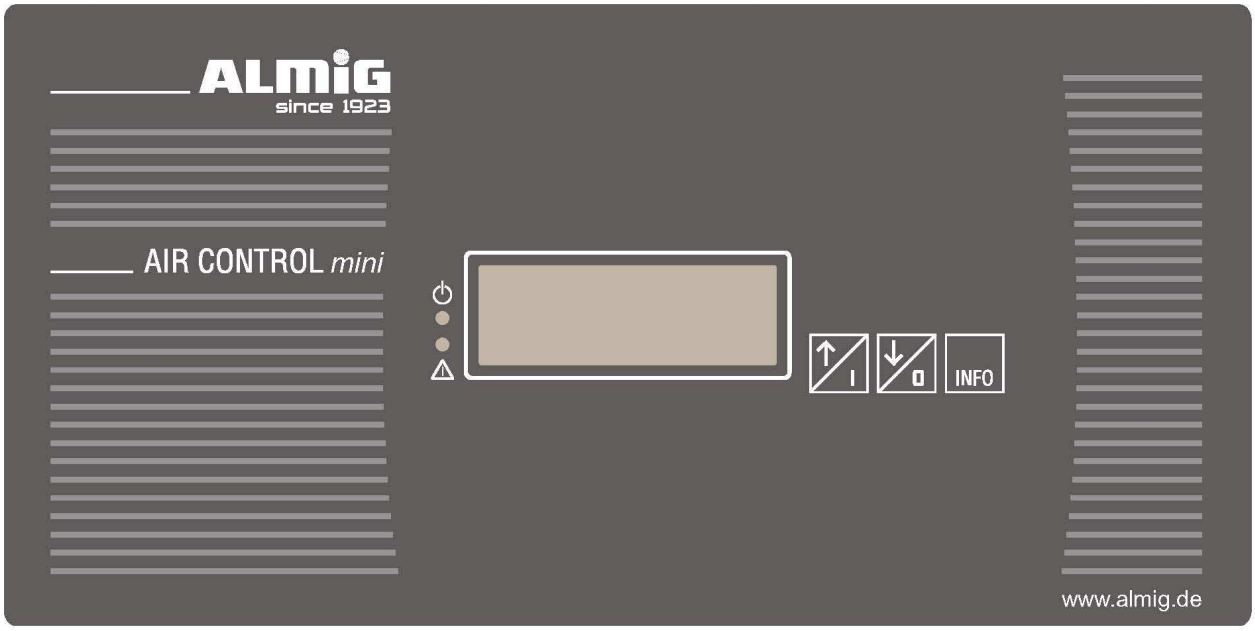
"AIR CONTROL *mini*" (V 0.72)



Manual

Contents

1. General information:

The control system comprises the following functional blocks:

a) Microprocessor logic (with EEPROM memory for data backup) for all control, monitoring and display functions;

b) Keypad with 3 keys for switching the compressor on and off and inputting set points and limit values;

c) Customer-specific LCD display to show the current actual / set points and the operating state, and faults/warnings;

d) Analog processing of network pressure, compressor and dew point temperatures;

e) Digital inputs/outputs for controlling a compressor;

2. Description of hardware:

2.1) Microprocessor logic:

16-bit micro controller with Watchdog

Powerfail identification (power failure > 40 ms),

64 kbyte Flash EPROM;

256 Byte EEPROM (for data backup),

4 kbyte RAM,

2.2) Keyboard:

3 keys

Customer-specific design;

2.3) Display :

Customer-specific LCD:

- 2x 3-digit 7-segment display
- Units via icons: ^{o}C, ^{o}F, K, bar, psi and MPa;
- Plus icons for: fault, warning, motor, solenoid valve, dryer, Remote (remote control), Restart, Automatic (mode)
- 2 LED (green and red)

2.4) Analog inputs:

Sensor voltage 18 VDC;

1 4-20mA input (corresponds to 0-16 bars), 10-bit resolution;

2 inputs for Pt1000 temperature sensors, 10-bit resolution;

2.5) digital inputs:

Sensor voltage 24 VDC;

4 digital inputs 24 VDC, 10mA;

1 input for PTC temperature sensor;

2.6) digital outputs:

5 Relay outputs, NO with shared connection, 250 VAC / 4 A (2 A inductive),

of which 2 outputs with varistor for connecting solenoid valve,

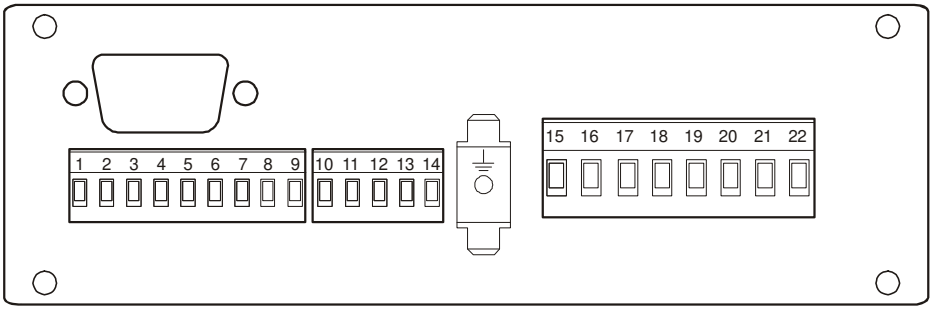
Capacity of shared connection: 250 VAC / 10A;

1 relay output, NO, 250 VAC / 16 A;

1 transistor output;

2.7 Terminal assignment:

Pin	Designation	Function	Connector / raster
1	0V AC	Control system supply (18V AC, +10% / -15%, 50/60 Hz, max. pre-fuse T 0.5 A)	Phoenix MINI-COMBICON raster 3.81 mm, 9-pin
2	18V AC		
3	24V DC for digital inputs		
4	Digital input 1	PTC (motor temperature)	
5	Digital input 2	Emergency OFF	
6	Digital input 3	Collective fault	
7	Digital input 4	Freely programmable	
8	Digital input 5	Freely programmable	
9	Transistor output 1	Freely programmable	
10	18V DC	18V DC for analog input 1	Phoenix MINI-COMBICON Raster 3,81 mm, 5-polig
11	Analog input 1	4-20 mA (network pressure)	
12	Analog input 2	PT1000	
13	Analog input 3	PT1000 (temp. refrigerant dryer)	
14	GND	GND for analog inputs 2 and 3	
15	Relay output 1 COM	Dryer isolated	Phoenix COMBICON MSTBA raster 5.0 mm 8-pin
16	Relay output 1 NO		
17	Relay output 2	Solenoid valve (with varistor)	
18	Relay output 3	Condensate valve (with varistor)	
19	Relay output 4	Mains contactor	
20	Relay output 5	Star contactor	
21	Relay output 6	Delta contactor	
22	Relay output 2-6 COM	Shared connection for relay outputs 2 to 6	



3. Software description:

Assignment of the keys:

If a key is assigned multiple functions, each time the key is pressed the next item is selected.

a) Default display:

I **:** Switch on compressor;

0 * Switch off compressor;

* Acknowledgement of a fault report;

* Key pressed for longer than 3 seconds:
  Initiate code input (only possible when plant is OFF);

INFO **:** Call INFO menu:

Display	Parameter	Range
[1. ##.#]	**Switch-on pressure**	**(3.5 – 15.0 bars)**
[2. ##.#]	**Switch-off pressure**	**(3.5 – 15.0 bars)**
[3. ##.#]	**Safety pressure**	**(display only)**
[4. ##.#]	**Minimum pressure/ BLCO**	**(0.0 – 15.0 bars)**
[5. 5.0**]**	**Min. vapor. temp.**	**(display only)**
[6. 110**]**	**Max. vapor. temp**	**(display only)**
[7.*#####*]	**Operating hours**	
[8.#####]	**Load hours**	
[9.#####]	**Balance time air filter**	**(display only)**
[A.#####]	**Balance time oil/oil filter**	**(display only)**
[b.#####]	**Balance time oil separator**	**(display only)**
[C.#####]	**Balance time lubrication**	**(display only)**
[d.#####]	**Balance time compressor**	**(display only)**
[E.#####]	**Balance time dryer**	**(display only)**
[F.#####]	**Oper. hours dryer:**	

Items “E” and “F” are hidden if “Dryer not available” has been programmed (c.f. 3.2.10) !

<LED green> : Operation display (lights up when the compressor is switched on / flashes when the compressor is expected to start any moment).

<LED red> : flashes during warning/maintenance, constant light when there is a fault;

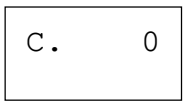
b) <u>Menu system:</u>

↑,↓ : For editing set points / limit values / code;

INFO : For adopting edited values, changing to next menu item;

3.1) Code input:

Press 0 key in default display for 3 seconds …

... the display shows 

((Customer code = 1)

The relevant code (customer, service, factory code) can now be input. The code is adopted by pressing the INFO key; the input is rejected by pressing ↑ + ↓.

3.2) Parameter inputs:

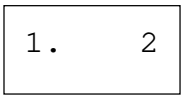
All of the setting parameters can be changed by selecting the relevant code level.

For this purpose, the correct code must first be input (refer to: item 3.1 / Code input). Thereafter the relevant code level can be selected via the keys; it can then be adopted using the INFO key. Only those code levels are displayed that can be changed by means of the code that has currently been input (customer, service, factory code).
By pressing both ↑ + ↓ keys (together) one can go back one level
(➔ select code level ➔ default display).

The values accessed in the default display via the “INFO” key can only be changed if code level “**11**” was selected beforehand; otherwise it is only possible to display these values!

3.2.1) Operating mode:

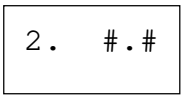
Code level 2 =>



1. Operating mode:
0 = AUTOMATIC
1 = LOAD / NO-LOAD
2 = AUTOMATIC OPT.

The following parameters are only displayed if the “AUTOMATIC OPT.” operating mode (2) was activated beforehand!

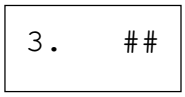
INFO =>



2. - max. drop in pressure:
Range: 0 – 9.9 bars

(max. drop in pressure after change in no load mode)

INFO =>



3. = max. number of switching operations:
Range: 1 - 55

(max permissible switching operations, compressor motor)

- If the “AUTOMATIC” or “AUTOMATIC OPT.” operating mode has been selected this is indicated by the **"Automatic"** icon.

3.2.2) Autom. restart following a power outage

(refer also to: item 3.5.10)

Code level 3 =>

1. #

0 = Restart OFF,
1 = Restart ON

If restart is activated, the **"Restart"** icon is displayed.

3.2.3) Local operation or remote control or feedback "LLC OK":

Code level 8 =>

1. #

0 = Local operation
ON/OFF via keyboard only
1 = Remote control
ON if "Remote on" input = closed
(flank) and keyed in locally;
OFF if "Remote on" input = open
or via **0** key;

2 = "LLC OK"
OK if "Remote on" input = closed;
Fault if "Remote on" input = open;

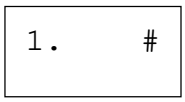
If a switch has been made to remote control and the plant has been keyed in, it is indicated by the flashing **"Remote"** icon.

If the plant is switched off by means of the = **0** key, the “Remote” icon in the LCD is deleted again!

The signal for "Remote on" can be activated via one of the 2 freely programmable digital inputs

3.2.4) Lead Lag Control mode (plant functions as LLC slave):

Code level 18 =>



0 = no LLC mode, i.e. base load / no-load via local pressure sensor

1 = LLC mode, load mode if the “Remote load” = closed; no-load mode if “Remote load” input = open;

ATTENTION:
If the “Remote on” input was defined as LLC feedback [LLC OK] via Code Level 0008, and the signal is missing, LLC mode is automatically switched off and the operation continues using the local pressure sensor.

If the LLC mode was activated, it is also displayed in the LCD by the “**Remote**” static icon.
The signal for “Remote load” can be enabled via one of the 2 freely programmable digital inputs.

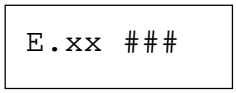
In LLC mode the local pressure sensor is only used for monitoring the safety pressure (P_ALLOWED)!

If the network pressure drops to below the “minimum pressure” threshold in LLC mode, a switch is made to the local pressure sensor and the corresponding warning appears. [E.39] (“Lower pressure threshold reached”). This warning must be acknowledged using the 0 key before switching back to the load requested by the LLC master.

3.2.5) Fault memory:

a) Display fault memory:

Select code level 30 => …

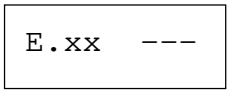


E.xx = item: 01 – 20,
= Number of the fault/warning
= Operating hours on occurrence

The individual items in the fault memory can be browsed through using the arrow keys. First the number of the fault/warning is displayed and then the operating hours when the fault/warning occurred!

If the [warning triangle] icon is shown, then this entry is for warning/maintenance. If the [tool] icon is shown, then this entry is a fault.

If the respective item is not assigned, the following is displayed:



The 20 items in the fault memory can be browsed through using the arrow keys. . Item 1 always contains the “most recent” fault!

The individual items of the fault memory are stored in the EEPROM memory and are therefore still available after a power failure.

b) Delete fault memory:

Activate code level 130 … The fault memory is deleted!

3.2.6) Editing the set points for the maintenance intervals:

a) Dryer:
Code level 40 =>

1. #####

Code level 40 is hidden if “Dryer not available” has been programmed (c.f. 3.2.10 / Dryer control).

b) Air filter
Code level 41 =>

1. #####

c) Oil/oil filter
Code level 42 =>

1. #####

d) Oil separator
Code level 43 =>

1. #####

e) Motor lubrication:
Code level 44 =>

1. #####

f) Compressor:
Code level 45 =>

1. #####

The arrow keys can be used to select the corresponding set point in stages of 500 and then to adopt them using the INFO key (Range: 0-20000 h).

If a set point is adopted using the INFO key, the corresponding interval (balance time) is restarted with that set point.

3.2.7) No-load time, downtime, delay star/delta (run-up):

Code level 51 => | 1. #### | 1. = No-load time Range: 10 - 1200s

INFO => | 2. ## | 2. = Downtime Range: 0 - 60s

INFO => | 3. ## | 3. = Run-up time Range: 3 - 30s

The arrow keys can be used to set the corresponding set point and it is then adopted by using the INFO key.

3.2.8) Set plant type, pressure range and delivery volume:

Code level 60 => | 1. ##### | 1. = Plant type „VAr“ / „VAr-t“

Depending on the plant type selected here, the “run-up time”, “maximum switching operations (ABO)”, “no-load time”, “downtime” parameters and the maintenance intervals are pre-allocated stored table values (“VAr-t” = with dryer).

INFO => | 2. ##.# | 2. = Pressure range Range: 7.0 15.0 – bars

The “switch-off pressure” the default value for the threshold is the value selected here and the “Switch-on pressure” has the default value “switch-off pressure – 2 bars”. The pressure range set here also serves as the upper limit when editing the “switch-on pressure”, “switch-off pressure” and “minimum pressure / LLC” parameters(c.f.: item 3.1 / INFO key).

INFO => | 3. #### | 3. = Max. delivery volume Range: 0 – 9999 m³/h

The maximum delivery volume of the compressor is specified here (in m³/h !).

3.2.9) Setting the pulse / no-current time for the condensate valve:

Code level 65 =>

1. ##

1. = pulse time
Range: 1 - 99 s

INFO =>

2. ###

2. = no-current time
Range: 1 – 999 s

3.2.10) Dryer control:

Code level 80 =>

1. #

1. = Dryer present
Range: 0/1 = No/Yes

The following menu items are only displayed if “Dryer present” !

INFO =>

2. ##

2. = Switch-off temp.
Range: 0 – 6°C

INFO =>

3. ##

3. = Temp. differential
Range: 2 – 10°C

INFO =>

4. ###

4. = Min. switch-off time
Range: 30 – 180s

INFO =>

5. ##

5. = Offset, dewp. temp.
Range: -10 – +10°C

The dryer is requested when the compressor motor is running and the dew point temperature rises above the “switch-off temp. + Temp. differential”.

The dryer is switched off again when the dew point temperature drops to or below the “switch-off temperature” threshold. After the dryer switches off, the “Min. switch-off time“ must expire before it is possible to switch it on again.
When the dryer is triggered, it is displayed by the ⊡ icon.

If the 🡅 and **INFO** keys are pressed simultaneously, the dryer can be switched on and off by hand. If the dryer is switched off in this way, the corresponding icon ⊡ flashes for as long as it takes.

The dew point temperature can be displayed if the 🡅 + 🡇 keys are pressed simultaneously in the default display (the **“T2”** icon is then shown additionally => 2nd temperature).

3.2.11) Default setting of system data:

Activate **code level 88:** All parameters that can be set are returned to their default values!

ATTENTION: All parameters previously set by hand are overwritten!

3.2.12) Reset unit for pressure gauge:

Code level 90 => | 1. # |

0 = Pressure gauge [bars]
1 = Pressure gauge [MPa]
2 = Pressure gauge [psi]

3.2.13) Reset unit for temperature gauge:

Code level 95 => | 1. # |

0 = Temperature gauge [°C]
1 = Temperature gauge [°F]
2 = Temperature gauge [K]

3.2.14) Correction value for pressure measurement:

Code level 105 => | 1 ##.# |

A value between -0.5 and +0.5 can now be input by means of the arrow keys.

If this value is exceeded the inclination of the characteristic pressure curve is adjusted in order to balance out slight deviations in the pressure sensors.
[current pressure value = measured value * P_MAX / (P_MAX - CORR.PRESSURE)]

Examples: P_MAX = 10.0 bars

a) CORR.PRESSURE = + 0-3 ..... P = P_meas * 10.0 /(10.0 - (+0.3)) = P_meas *1.03
b) CORR.PRESSURE = - 0.3 ..... P = P_meas * 10.0 /(10.0 - (-0.3)) = P_meas * 0.97

3.2.15) Configuration of freely programmable inputs:

Code level 150 =>

1. #	1. = Digital input 4 Range: 0 – 6
2. #	2. = Digital input 5 Range: 0 – 6

With the two freely programmable digital inputs in each case one of the following functions can be selected:

0 = not in use;	
1 = Remote on	(Signal "1" = Compressor on);
2 = Remote load	(Signal "1" = Load requirement);
3 = LLC OK	(Signal "1" = OK);
4 = Overcurrent fault	(Signal "0" = fault);
5 = Overpressure fault	(Signal "0" = fault);
6 = Direction of rotation fault	(Signal "0" = fault);

3.2.16) Configuration of freely programmable output:

Code level 155 =>

1. #	1. = Transistor output Range: 0 – 10

With the freely programmable digital output one of the following functions can be selected:

0 = not in use;	
1 = "Ready" message	(keyed in and no fault);
2 = "Operating" message	(compressor motor running);
3 = "Load operation" message	(compressor compressing);
4 = "No-load operation" message	(compressor running in no-load mode);
5 = "Warning" message	(at least 1 warning is active);
6 = "Maintenance request" message	(at least 1 maintenance request is active);
7 = "Warning or maintenance request" message	
8 = "Fault" message	(at least 1 fault is active);
9 = "Fault or warning" message	
10 = "Fault or warning or maintenance request" message	

3.2.17) Digital input/outputs test:

Code level 9980 =>

1. = Input 1
0 = Off / 1 = On

INFO =>

2. = Input 2
0 = Off / 1 = On

::

INFO =>

5. = Input 5
0 = Off / 1 = On

INFO =>

6. = Output 1
0=switch off/1=switch on

::

INFO =>

b. = Output 6
0=switch off/1=switch on

INFO =>

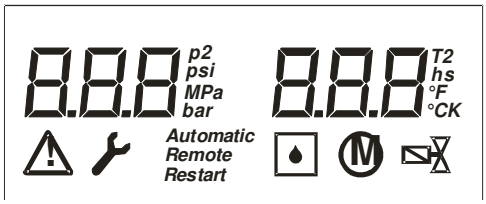
C. = Transistor output
0=switch off/1=switch on

With the output signals, the relevant output can be switched ON (↑ key) or OFF (↓ key) by means of the arrow keys.

The INFO key is used to switch to the next step (in this case the outputs are always disabled first).

ATTENTION: If individual outputs are activated in the test mode the compressor motor may start up ! ! !

3.3) Display on the LCD:



Top: - 2x 7-segment display (left: pressure / right: temperature);
- Icons for psi, MPa, bar;
- Icons for °C, °F, K, h, s;

Bottom: - Icons for fault and warning/maintenance;
- Icons for automatic, remote control and restart;
- Icons for dryer, motor and load valve;

3.3.1) Default display:

Top left: - Current network pressure
in case of fault/warning alternately, plus
- Number of the current fault (if tool is on);
- Number of the current warning/maintenance (if warning triangle is on);

Top right: - Current compressor temperature

- Using the ↑ + ↓ keys in the default display, the current temperature of the 2nd temp. sensor can be displayed (dew point temperature).

3.4) Processing of faults/warnings:

3.4.1) Fault: The “Tool” icon flashes and the relevant number is displayed, alternating with the current pressure !

[E. 1] “Wrong parameter” (Check pressure set points!)
[E. 2] "EEPROM ?"(Check all setting parameters)
[E. 3] "Undervoltage" (Only if activated / refer to: item 3.6)
[E. 4] “Voltage drop” (Only if not “Automatic restart"!)
[E. 5] “Calibration par.wrong“ (*Send in for repair/calibration!*)
[E. 6] “EMERGENCY-OFF enabled” (Contact open = fault)
[E. 7] “Rotational direction” (Contact open = fault) (*)
[E. 8] “Motor temperature” (PTC)

[E. 9] “Excess current” (Contact open = fault) (*)
[E.10] “Overpressure” (Contact open = fault) (*)
[E.11] “Dryer fault” (Contact open = fault)
[E.12] “Cable def. comp. temp.” (Monitoring: Comp. temp. Sensor)
[E.13] “Cable def. D-temp.” (Monitoring: Dryer temp. Sensor)
[E.14] “Cable def. pressure” (Monitoring: Pressure sensor)
[E.15] “Comp. temp too high” (Temperature > max. comp. temp.)
[E.16] “Netw. press. too high” (Pressure > safety pressure)

If one of these faults occurs, it causes the compressor to be switched off. The red LED remains lit until the fault is acknowledged. The fault can only be acknowledged using the **0** key if the cause of the fault has meanwhile been rectified!

Normally a fault is indicated immediately. However, if the operator has pressed the INFO key to input set points or limit values, the fault is not displayed until the operator switches back to the default display.

(*) These monitoring options can be enabled via the 2 freely programmable digital inputs.

3.4.2) Warning/maintenance: The "Warning triangle" icon flashes and the corresponding number is displayed, alternating with the current pressure !

[E.34] "Comp.temp.elevated"	(Temp. > max. com. temp - 5°C)
[E.35] "Network press.elevated"	(pressure > safety pressure – 0.3 bars)
[E.36] "Temp too low"	(Comp.temp. < +1°C)
[E.39] "Lower pressure threshold reached"	The plant is operating as a BLCO slave and the pressure has dropped below the "minimum pressure" threshold;
[E.42] "Dryer maintenance"	(Maintenance balance time < 100 hours)
[E.43] "Intake filter maintenance"	(Maintenance balance time < 100 hours)
[E.44] "Oil/oil filter maintenance"	(Maintenance balance time < 100 hours)
[E.45] "Oil separator maintenance"	(Maintenance balance time < 100 hours)
[E.46] "Lubrication maintenance"	(Maintenance balance time < 100 hours)
[E.47] "Compressor maintenance"	(Maintenance balance time < 100 hours)

The compressor is not switched of when a warning/maintenance occurs. The red LED flashes until the cause of the warning or the relevant maintenance interval has been acknowledged.

As long as a fault is pending, warning and maintenance messages are suspended.

A warning or maintenance is normally indicated immediately. However, if the operator has pressed the INFO key to input set points or limit values the warning or maintenance is not indicated until the operator has switched back to the default display.

3.5) Information on the program sequence:

3.5.1) Operating states:

a) The compressor is switched off:
- The green LED is off
- The “motor” and “solenoid valve” icons are disabled (LCD)

b) The compressor is switched on, but the current pressure is still above the switch-on pressure (start-up safeguard).
- The green LED is flashing
- The "motor" and "solenoid valve" icons are disabled

c) The compressor was switched on but the compressor temperature is (still) below +1°C.
- The green and red LED are flashing
- The “Temp. too low“ warning is displayed
- The "motor" and "solenoid valve" icons are disabled

d) The compressor is in operation and the load valve is disabled, i.e. the compressor is (still) not compressing (run-up or no-load/run-down).
- The green LED is on
- The “motor” icon is enabled (flashes during run-up)
- The “load valve” icon is disabled

If the compressor is in “Automatic” or “Automatic Opt.” mode
and the no-load time is running, it is indicated by the flashing “s” icon on the right behind the temperature gauge. In this case the 0 key can be used to show the remaining no-load time instead of the temperature.

e) The compressor is in operation and the load valve is enabled, i.e. the compressor is compressing. (Load operation)
- The green LED is on
- The “motor” icon is enabled
- The “load valve” icon is enabled

3.5.2) Operating modes: (refer also to: item 3.2.1)

a) AUTOMATIC mode :

After the switch-off pressure is reached the plant goes into the “No-load” (or run-down) mode for the duration of the “no-load time” (refer to: 3.2.7 / Param. “1.”).
When the no-load time ends, the compressor switches off.
After it has switched off the green LED flashes => Ready to start up again;
As soon as the pressure drops below the switch-on pressure, the plant restarts.

b) BASE LOAD / NO LOAD mode:

The compressor alternates between “Load” and “No-load” operation, i.e. there is no limit on run-down.

a) AUTOMATIC.OPT mode :

In this case, when the plant changes from load to no-load, the network pressure is stored after 10 and after 40 seconds in each case.
If the pressure drop determined in this manner is above the threshold (PRESS.DIFF.ABO), the plant remains in no-load mode for the “long” run-down time (item 3.2.7 / Param. “1.”), otherwise it switches off after a “short” run-down time (45 seconds).
When the no-load time ends, the compressor switches off.
After it has switched off the green LED flashes => Ready to start up again;
As soon as the pressure again drops below the switch-on pressure, the plant restarts.
Each time the compressor motor runs up an internal counter (number of switching operation) is raised by 1. As soon as this counter reaches the specified maximum; number of switching operations [MAX.SWITCH.OPER], the motor no longer switches off when the run-down time ends; instead it remains in no-load mode until the counter reading has again dropped below the relevant threshold [MAX.SWITCH:OPER.].
After the periodic lapse of a specific time ($\mathbf{t}_{SP}$ = 3600s / MAX.SWITCH:OPER.) the counter is reduced again by 1 each time.

The following applies for (a) "AUTOMATIC" and (c) "AUTOM.OPT.":

As an indication that the no-load time is enabled, the "s" icon on the right behind the temperature gauge flashes. In this case 0 key can be used to show the remaining no-load time instead of the temperature.

3.5.3) Switching-on procedure:

If the current network pressure is greater than the set switch-on pressure when the compressor is switched on, the green LED flashes (= ready to operate). Only when the network pressure drops below the switch-on pressure does the compressor go into operation and the operating signal (green LED) shines constantly.
If the compressor temperature is below +1°C when the compressor is switched on, the green LED also flashes. In addition to this the "E.36" warning is displayed.
If the temperature then rises to at least +1°C, the compressor starts.

3.5.4) Switching-off procedure:

If the compressor is switched off using the **0** key (or via Remote OFF), it first changes over to no-load mode. In the display the "s" icon behind the temperature gauge flashes.
The downtime is used here as the time (refer to item 3.2.7).
The plant does not switch off completely until this time lapses.

3.5.5) Condensate valve:

If the compressor is in "Load mode", the output for the condensate valve is actuated cyclically.

3.5.6) Downtime:

(refer to: item 3.5.9 / autom. restart)

3.5.7) Safety pressure: ("P_ALLOWED")

The safety pressure is the set “Pressure range” + 0.8 bars.
(“Pressure range” refer to item 3.2.8)

Example: "Pressure range" = 10 bars => "P_allowed" = 10.8 bars

If the pressure rises above the “P_ allowed – 0.3 bars” threshold, a warning is reported.
If the pressure rises above the “P_ allowed – 0.3 bars” threshold, the compressor is switched off and a fault reported.

3.5.8) Maintenance intervals:

(Actual values, refer to: *3.1* / set points, refer to: *3.2.6)*

a) Request for maintenance

The relevant intervals are counted backwards.
As soon as one of these intervals is less than 100 hours, the corresponding message appears and the red LED flashes (=> Maintenance!).To acknowledge this message, **code level 21** must first be enabled and then the **0** key pressed. This resets the relevant interval to the specified set point.

b) 1st maintenance for “Oil/oil filter”:

After the 1st maintenance the set point for the maintenance interval for “Oil/oil filter” is automatically changed from 500 h to 2000 h!

3.5.9) Procedure for “autom. restart”

If “automatic restart after power failure" is programmed, after the power returns, the time expires that was specified in the “downtime” parameter (refer to item 3.2.7). While this time lapses, the “Restart” icon flashes.
If the plant was in operation prior to the power failure, it starts again when this time has expired; otherwise it remains in STOP mode thereafter.
If “Restart” is enabled, when the power returns the fault “Power failure” is **not** reported!

3.6) Code levels available in the program:

0002 => selection:	AUTOMATIC, LOAD/NO-LOAD, AUTOM.OPT mode (+ additional parameters for AUTOM.OPT mode)
0003 => selection:	automatic restart (Y/N) + time
0008 => selection:	Local operation or remote control
0011 => Release:	Release for editing set points / limit values accessed via the INFO key.
0018 => selection:	LLC mode (0/1) [1 => plant is LLC slave]
0021 => Call:	Release acknowledgement of a “Maintenance request” (acknowledgement takes place thereafter using the **0** key !)
0030 => Call:	Display fault memory
0040 => Call:	Editing of the “dryer” maintenance interval
0041 => Call:	Editing of the “air filter” maintenance interval
0042 => Call:	Editing of the “oil/oil filter” maintenance interval
0043 => Call:	Editing of the “oil separator” maintenance interval
0044 => Call:	Editing of the “motor lubrication” maintenance interval
0045 => Call:	Editing of the “compressor” maintenance interval
0051 => Call*:*	Editing of no-load time, downtime, delay of star/delta switchover (run-up time)
0060 => Call:	Select plant type, pressure range and delivery volume
0062 => Call:	Select pressure range only
0069 => Call:	Specify delivery volume only
0065 => Call:	Pulse / no-current time for condensate valve;
0080 => Call:	Set parameters for controlling the dryer;
0088 => Call:	Default setting of system data (setting parameters)
0090 => Call:	Reset unit for pressure gauge

0095 => Call: Reset unit for temperature gauge

0105 => Call: Specify correction value for pressure measurement

0130 => Call: Delete fault memory

0150 => Call: Select function of the freely programmable digital inputs

0155 => Call: Select function of the freely programmable transistor output

9900 => Release: Initialisation (thereafter press 0 key!)
- Set operating/load hours to 0:
- Maintenance intervals => set points;
- Delete fault memory;
(ATTENTION: Only intended for 1st time of putting into service !)

9919 => Release: Edit operating hours / load hours
Call relevant parameter, **then** edit using the INFO key

9929 => Release: Edit operating hours / load hours …
Operating / load hours can be edited here in stages of 1000!

9970 => Call: Set action when voltage returns after “Undervoltage”

9980 => Call: Input / output test

9999 => Call: Display current version of program
+ display chance number for factory code (= 2nd menu item)

3.7) Fault in program memory of control system:

If a fault is identified in the program memory of the control system after power supply ON, the following message appears at top left in the display:

"FLA" => in this case the program must be reloaded onto the control system!

3.8) Loading a new program into the control system

a) Switch off power supply to the control system

b) Press “**Info**” and “**0**” keys simultaneously and at the same time switch on supply voltage to the control system again.

c) At the top on the left "FLA" is now to be seen in the display!

d) The relevant program (HEX file) can now be uploaded to the control system!

e) After the program has been successfully uploaded into the control system, the supply voltage must again be briefly switched on / off.

ATTENTION: In view of the fact that this control system has no RS485 interface, but just a simple programming interface, a special “ALMIG varioprog” transformer is required !