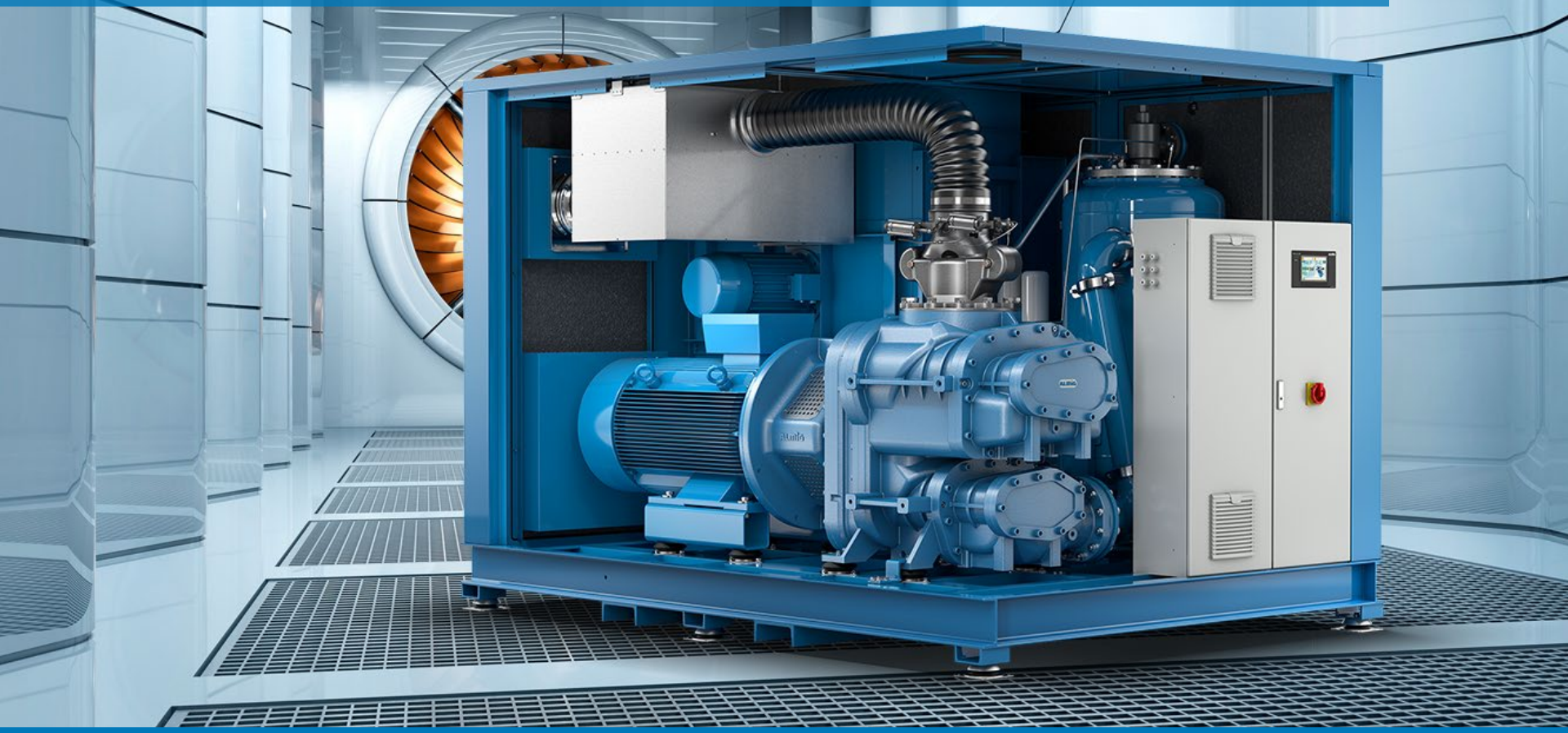
Compressor Systems
Made in Germany

ALMiG Control Systems



Content

- AIR CONTROL mini
- AIR CONTROL B
- AIR CONTROL P
- AIR CONTROL HE

Compressed air control systems

- Controls are used in the compressor stations in order to adapt the compressed air production to the demand for compressed air.
- Within the compressor stations the distinction is made between **internal** and **higher order** compressor controls.

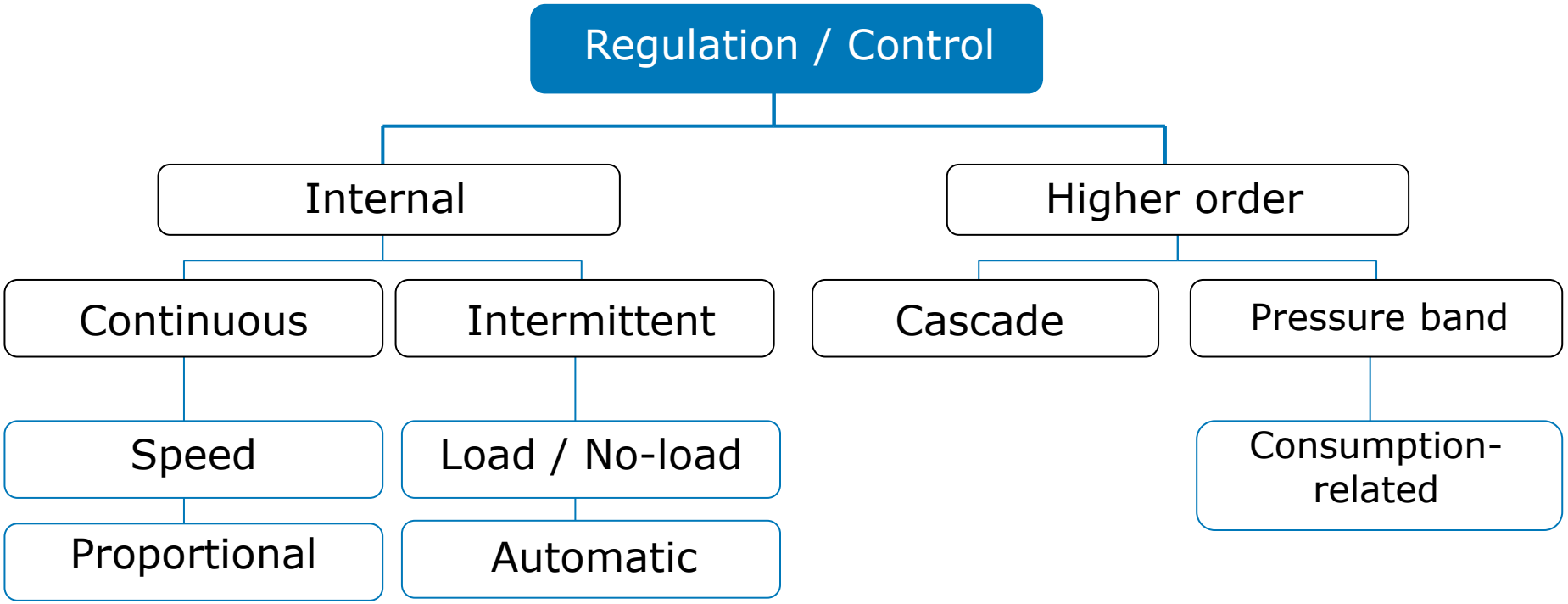
Internal controls

Internal controls (installed in the compressor) are responsible for adapting the relevant compressors to the required air consumptions, at the same time ensuring that the compressor functions reliably by optimally coordinating the internal control processes.

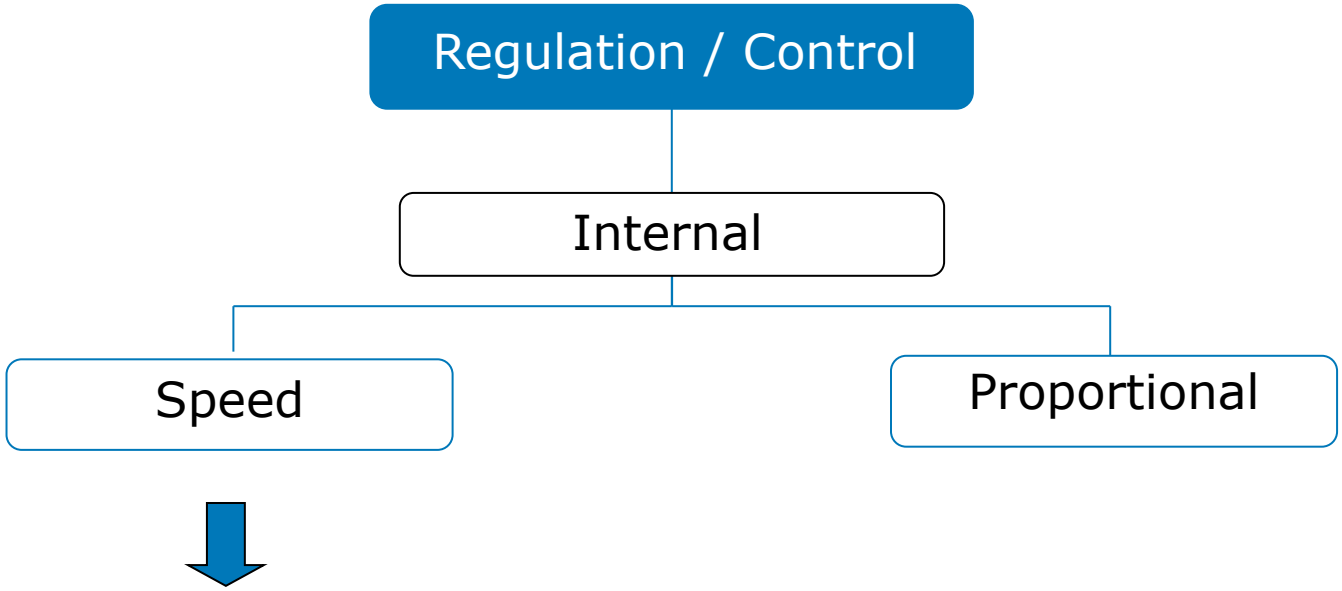
Higher order control system

In view of the fact that modern compressor stations frequently comprise multiple single compressors, the higher order control system is responsible for the optimal capacity utilisation of the individual compressors and for coordinating and monitoring their use in conformity with the actual air consumption.

Compressed air control systems



Compressed air control systems



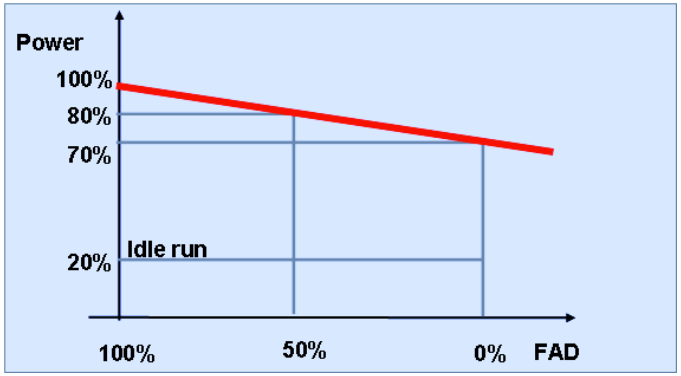
see Module 2
Technologies

Compressed air control systems

Regulation / Control

Internal

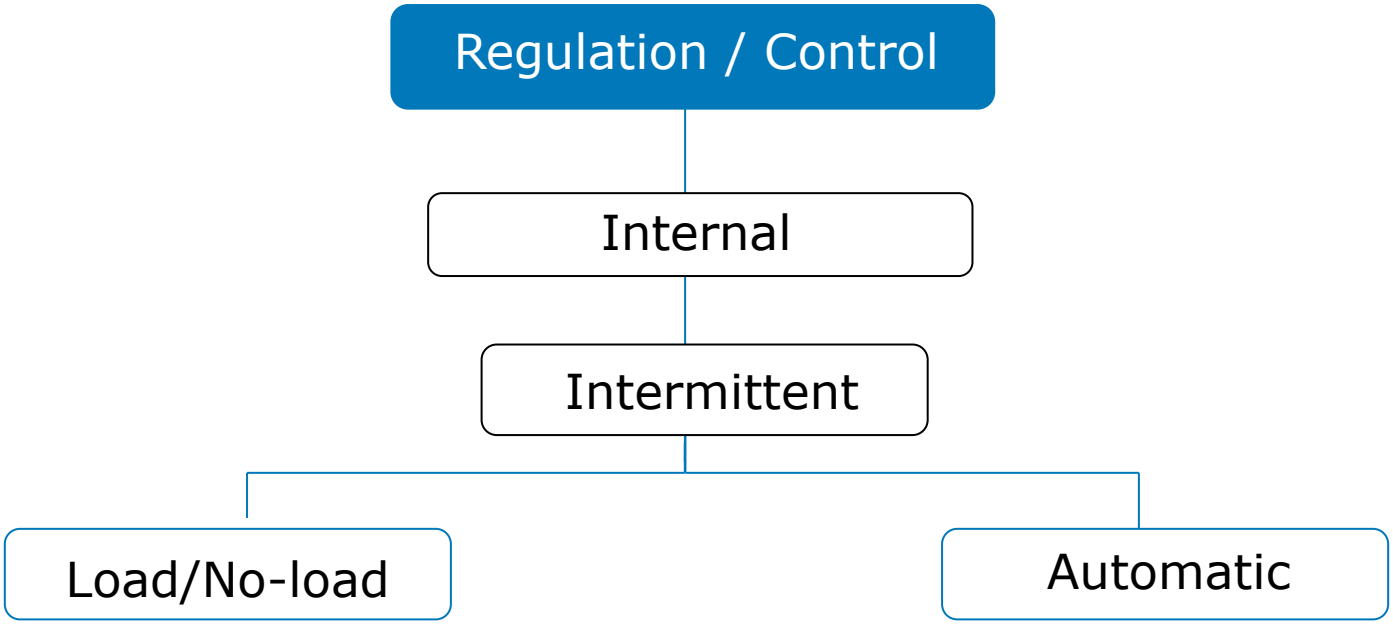
Proportional



In the case of proportional regulation a throttle valve in the intake regulator infinitely regulates the air throughput rate. Therefore it is possible to regulate the delivery volume at between 100% and ~0%.

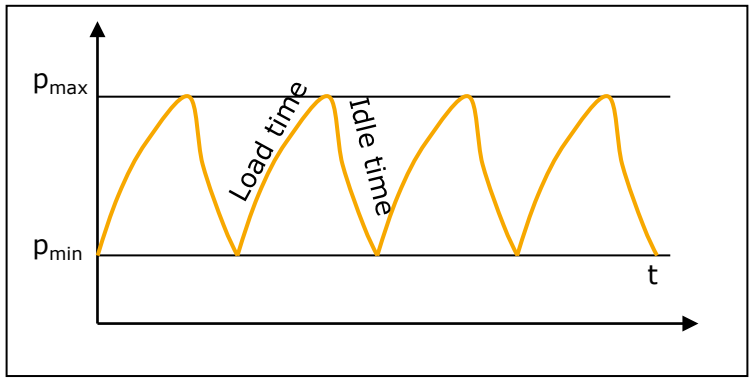
The disadvantage of the system lies in the fact that the reduction of the compressor's power consumption is not linear; indeed, even if the air inlet valve is almost closed (delivery volume close to zero), it is still approximately 70%.

Compressed air control systems



Compressed air control systems

Load / No-load



The compressor works between two configured pressure values p_{min} / p_{max}.

The compressor compresses air (load mode) as soon as the network pressure drops below switching-on pressure p_{min}.

The compressor switches into no-load mode (motor running, compressor is compressing no air) as soon as the network pressure reaches the switching-off pressure p_{max}

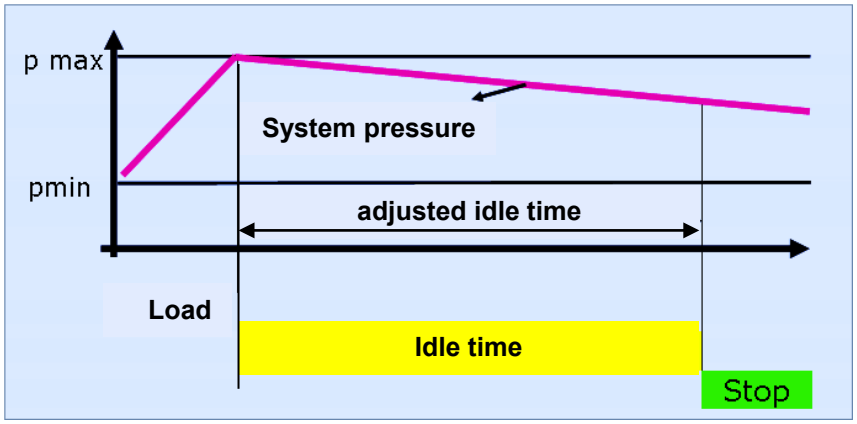
The compressed air consumption in the network causes the network pressure to drop again.

When the switching-on pressure is reached p_{min} the compressor recommences the load mode.

The motor never stops!

Compressed air control systems

Automatic



The compressor works between two pre-configured pressure values p_{min} / p_{max}.

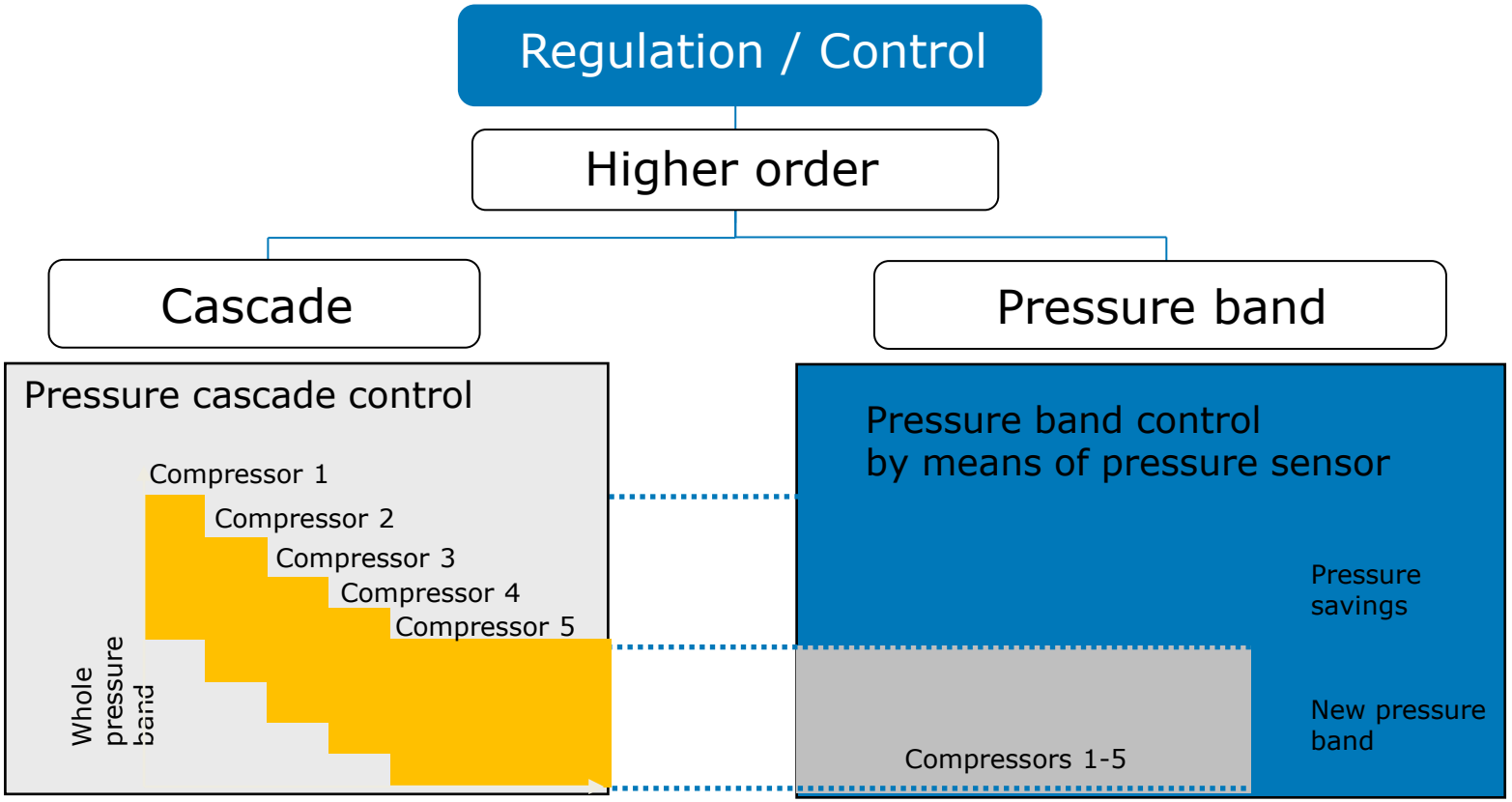
The compressor compresses air (load mode) as soon as the network pressure drops below the switch-on pressure p_{min}.

The compressor switches into no-load mode (motor running, compressor is compressing no air) as soon as the network pressure reaches the switching-off pressure p_{max}.

When it enters the no-load phase, the configured no-load time runs out.

After the configured no-load period the motor stops.

Compressed air control systems



Typical cascade regulation of multiple interconnected compressors:

The disadvantage of this arrangement is the summation of the pressure bands to form a joint wide pressure band.

Very disadvantageous from the point of view of economy

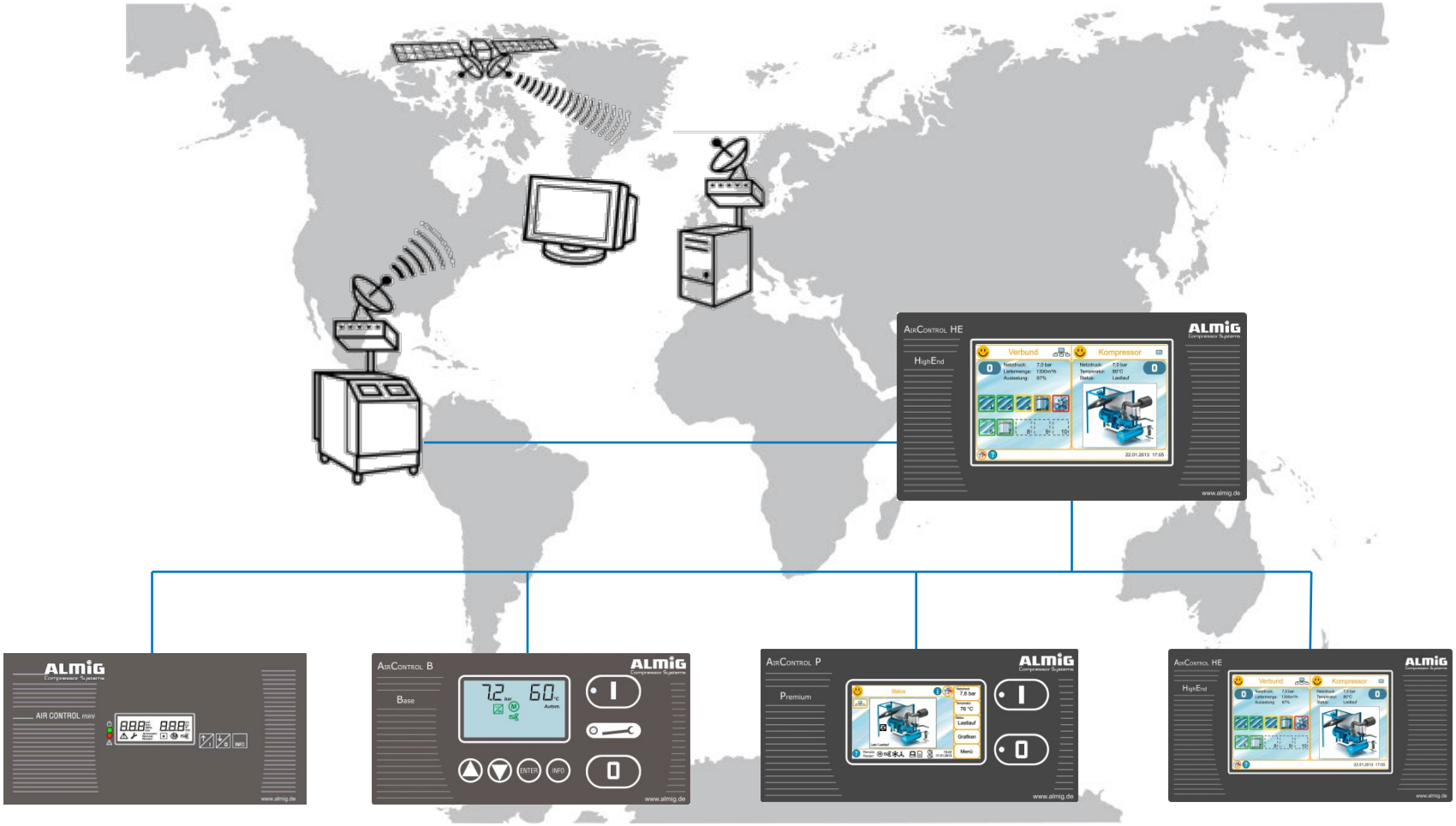
State-of-the-art variety of regulation for multiple interconnected compressors:

The advantage of this arrangement is that all compressors connected to it are controlled via a common higher-order pressure sensor within a very narrow pressure band. Pressure switch systems also enjoy the advantage of sensor regulation.

Very economical

ALMiG Control Systems

With the ALMiG Control Systems you can manage the entire compressed air station – worldwide



ALMiG Control Systems

Installed in the compressor

AIR CONTROL mini

AIR CONTROL B

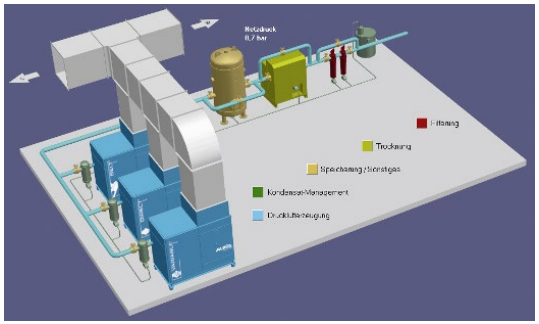
AIR CONTROL P

AIR CONTROL HE

Consumption-related multiple control system as the higher order control system

AIR CONTROL HE

Visualisation of the complete compressed air station



ALMiG Control Systems

Installed in the compressor

AIR CONTROL mini

COMBI 6 – 22

AIR CONTROL B

BELT 4 - 75

DIRECT 16 - 22

GEAR 30 - 75

VARIABLE 16 - 34

FLEX 3S – 30

Optional:

COMBI 6 – 22

AIR CONTROL P

BELT 76 - 250

DIRECT 37 - 315

GEAR 90 - 450

VARIABLE 35 - 355

Optional:

COMBI 6 – 22

BELT 4 - 75

DIRECT 16 - 22

GEAR 30 - 75

VARIABLE 16 - 34

FLEX 3S - 30

AIR CONTROL HE

- As installed control for all screw compressor series (except COMBI 3S-7S) with or without webserver
- As superior control with or without webserver

AIR CONTROL MINI

ALMiG
Compressor Systems

AIR CONTROL mini

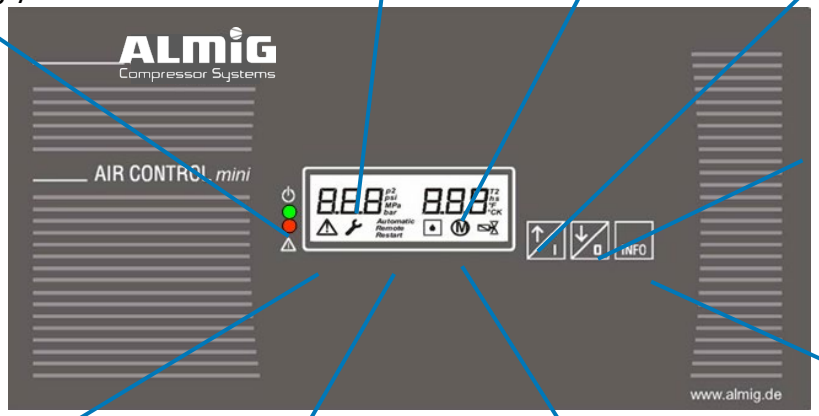
Information/Handling

Green LED
Flashes: Compressor not operating, but can start automatically at any time
Illuminated: Compressor operating

Red LED
Flashes: Warning / Maintenance
Illuminated: Error

Operating pressure display

Display:
- Compressor temperature
- Dew point



- Switch on compressor
- ↑ Move upwards in menu
- Switch of compressor
- Error acknowledgement
- Move down in menu

Access to INFO menu

Symbols:
- Error
- Maintenance

Display:
- Operating mode
- Automatic restart
- Remote control

Symbols:
- Dryer
- Motor
- Load valve

Key data

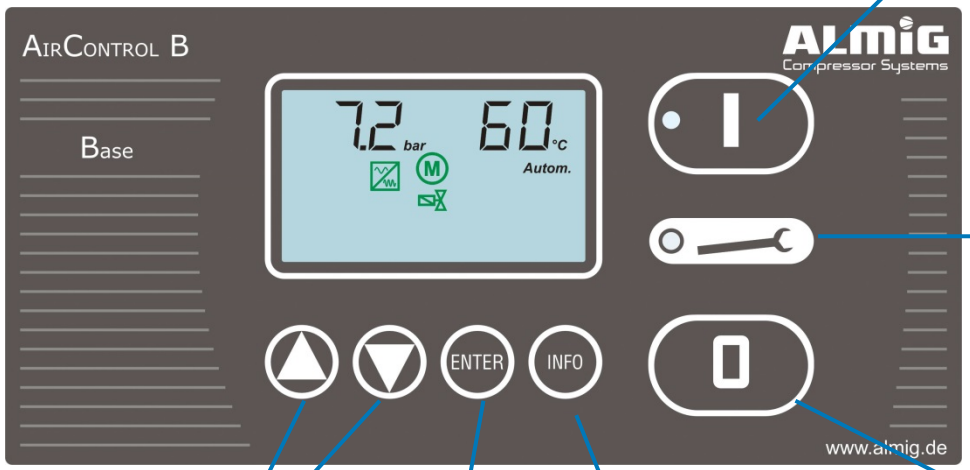
Optional modes:		Automatic
		Load/ No-load
Automatic restart programmable:		Yes
Local operation – remote On/Off:		Yes
Error memory (number of items):		20
Refrigerant dryer activation:		Yes
Freely programmable inputs (digital):		2
Freely programmable outputs (digital):		1
Master function (Base load changeover operation):		No
Slave connection to higher order control systems:		No
Display:	- Illuminated	No
	- Indication	Symbols

AIR CONTROL B (=„BASE“)

ALMiG
Compressor Systems

Air Control B

Information/Handling



Switch on compressor.

Integrated green LED

Flashes: Compressor not running, but may start up automatically at any time

Illuminated: Compressor running

- Queuing alert signalised
- Error via integrated red LED

- Switch off compressor
- Error acknowledgement

Change of parameter values

Display of additional operating data

Acknowledgement of parameter values

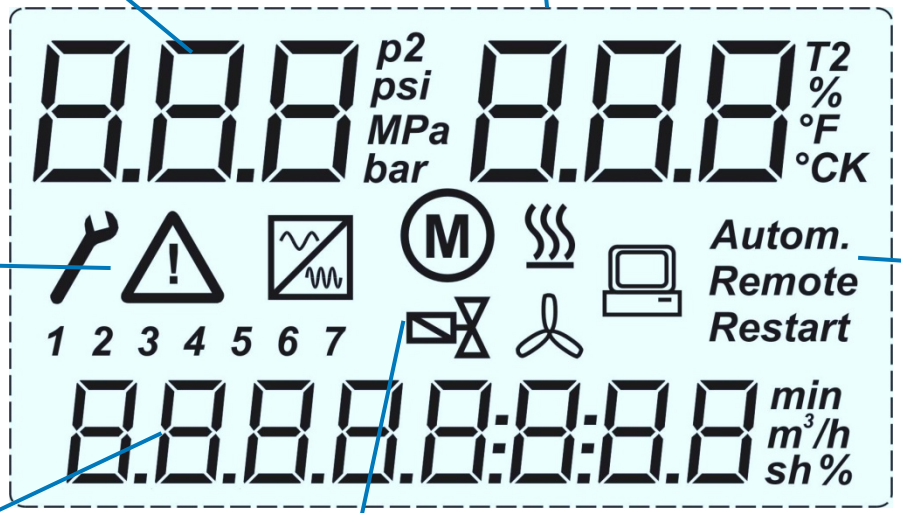
Air Control B

Information/Handling

- Final compression temp.
- Oil temperature
- Dew point temp.

Display

Network Pressure



Error display

Alert display

Display op. mode

- Remote control
- Autom. restart

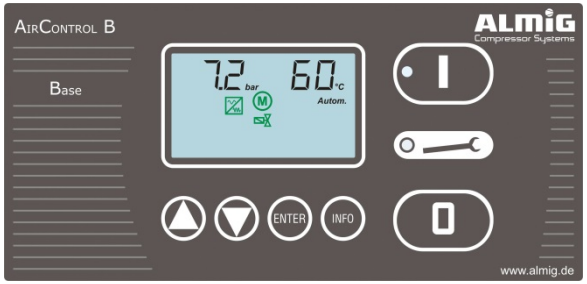
Alert / error no.

Symbols

- Motor
- Solenoid valve
- Heating
- Fan

Key data

Optional operating modes:	Automatic Load / no-load
Programmable automatic restart:	yes
Local operation – remote On/Off:	yes
Error memory (no. of items):	20
Control for refrig. dryer:	COMBI yes
Master function (Baseload changeover mode):	no
Slave connection to higher order control systems:	yes
Display:	illuminated colour indication: Symbols

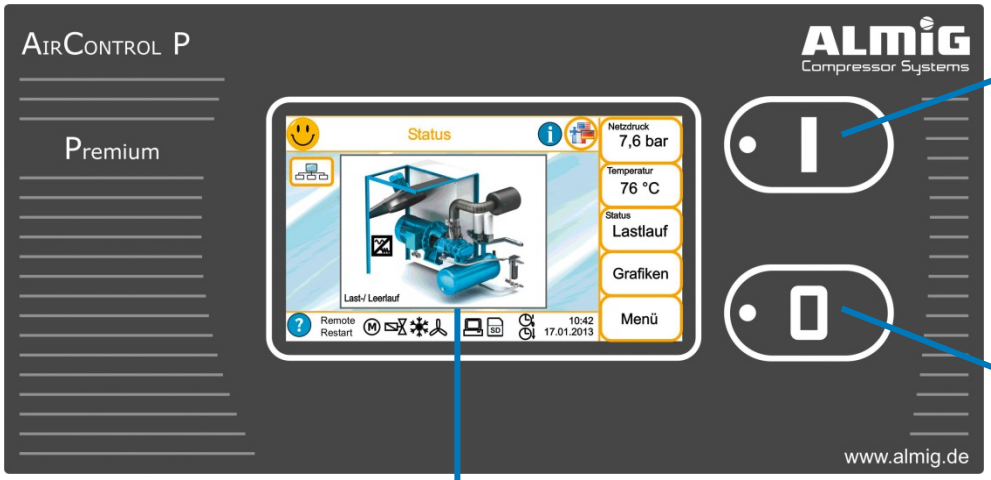


AIR CONTROL P (= „PREMIUM“)

ALMiG
Compressor Systems

Air Control P

Information/Handling



Switch on compressor
Integrated red LED
Flashes: Alert/maintenance
Illuminated: Error

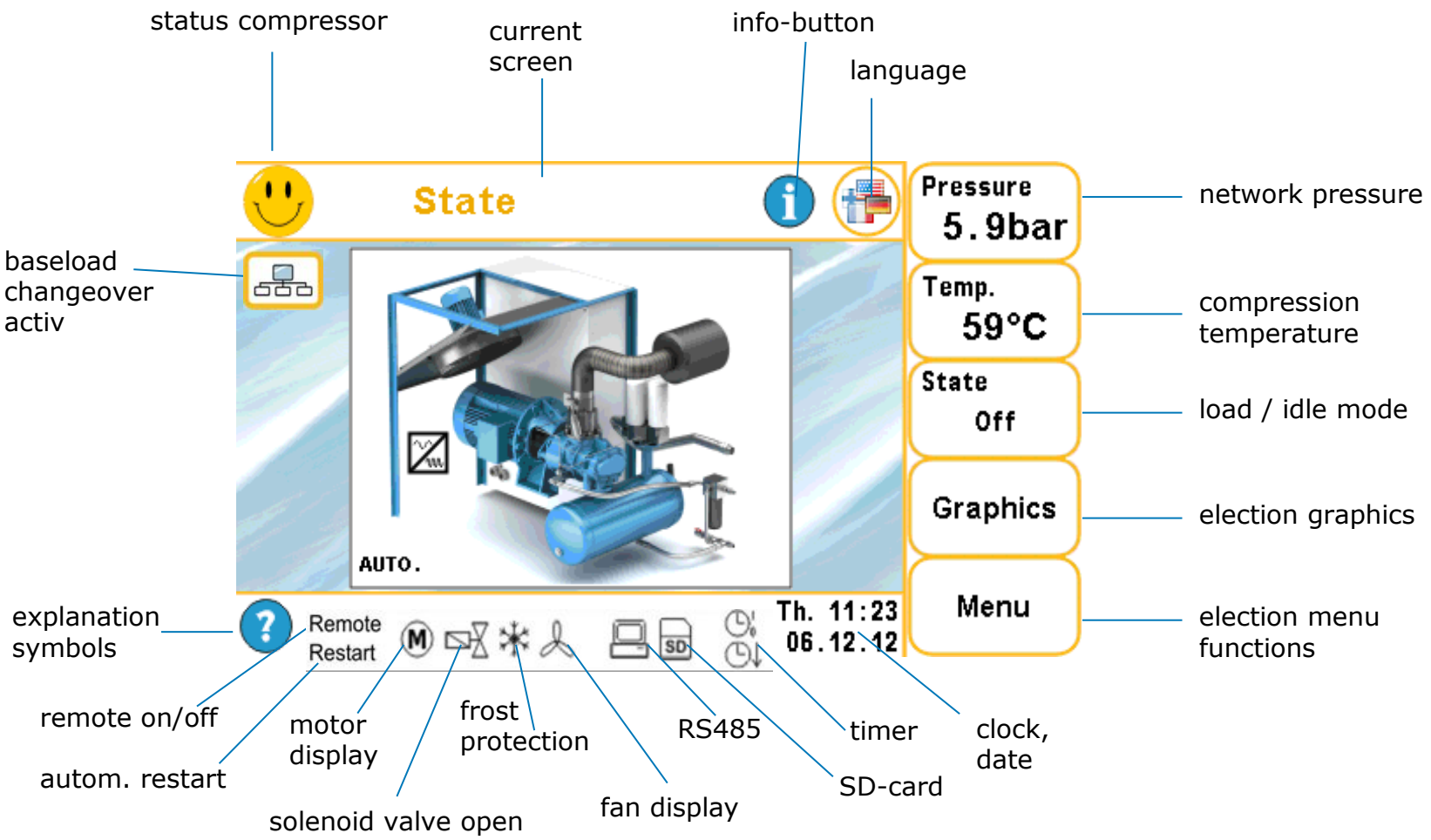
Switch off compressor

Colour-touchscreen

Input of parameter values
Mode for editing in sub-menus

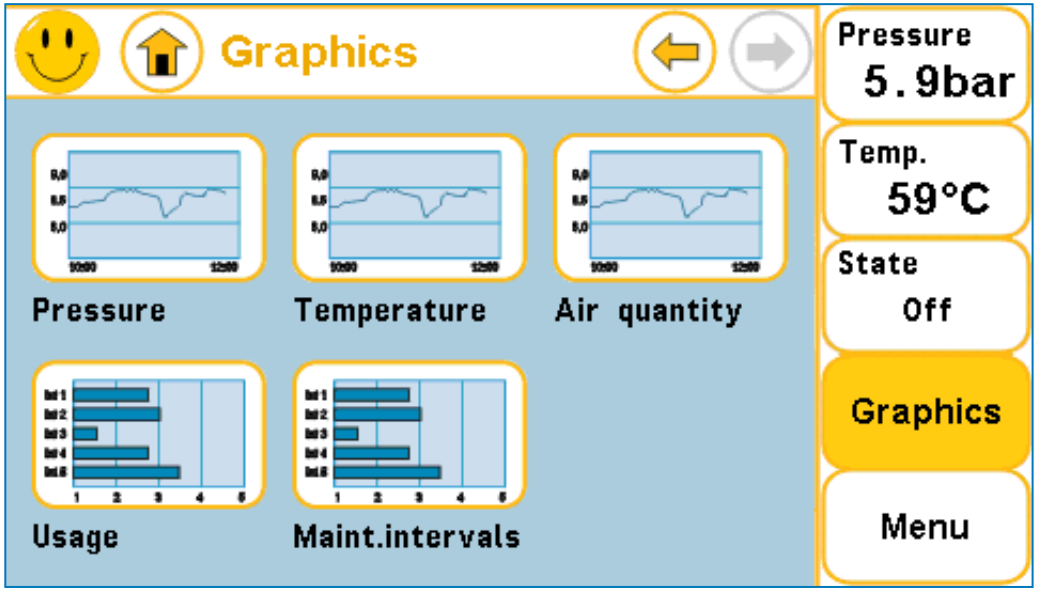
Air Control P

Information/Handling



Air Control P

Information/Handling



Graphic display of: Compressor capacity utilisation

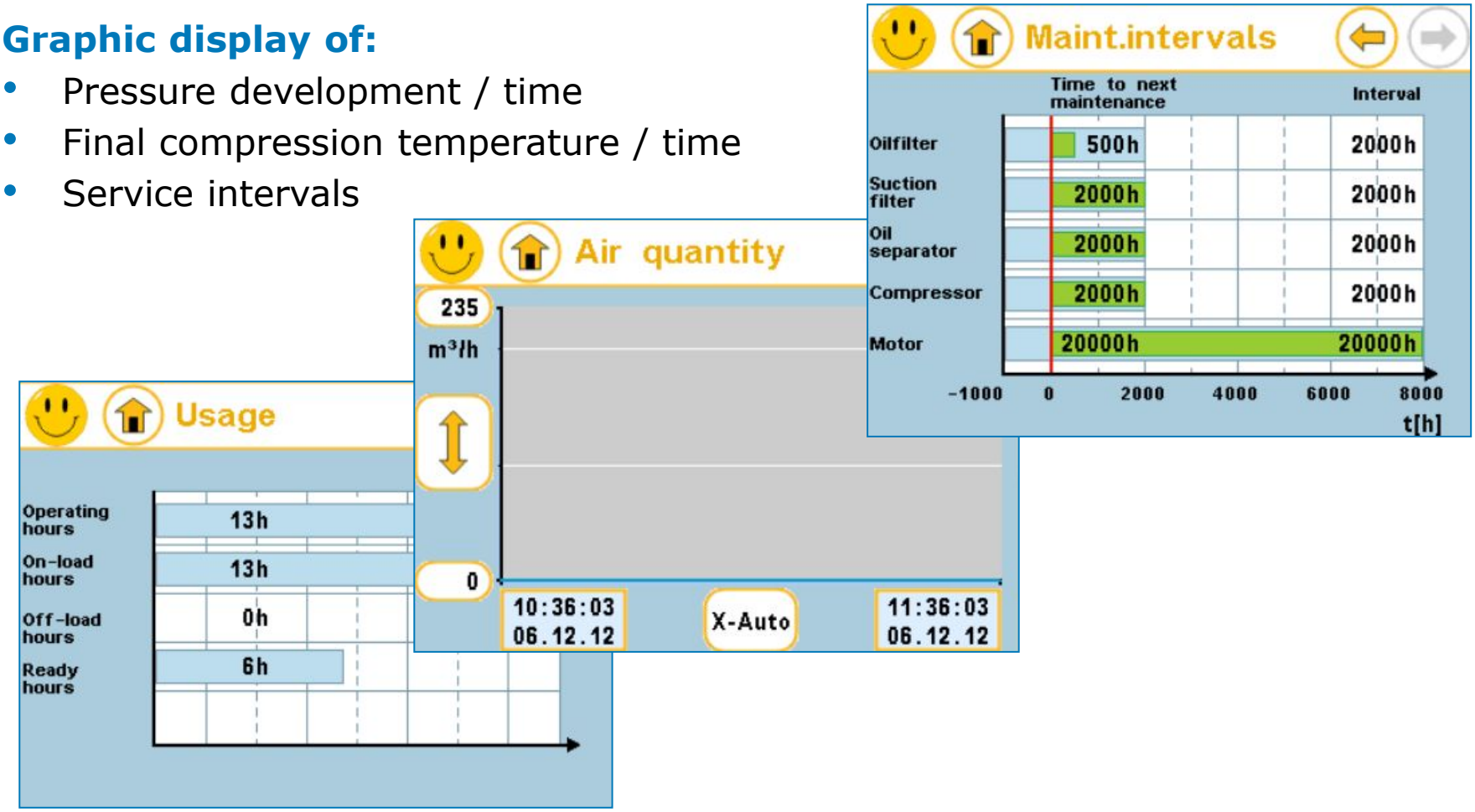
- Total operating hours
- Full load hours
- No-load hours
- Downtimes
- For speed-controlled compressors also the capacity utilisation as a percentage

Air Control P

Information/Handling

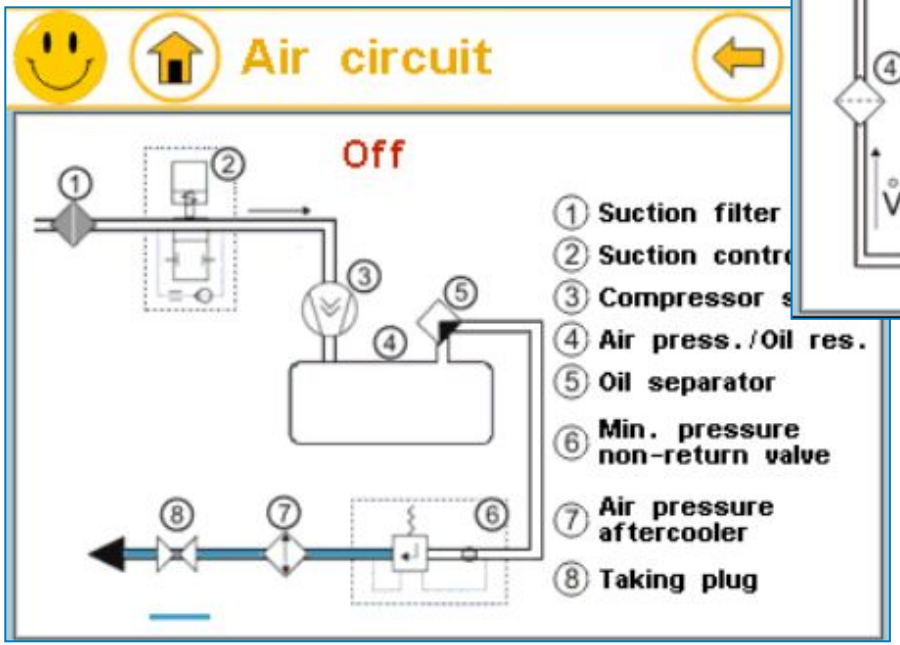
Graphic display of:

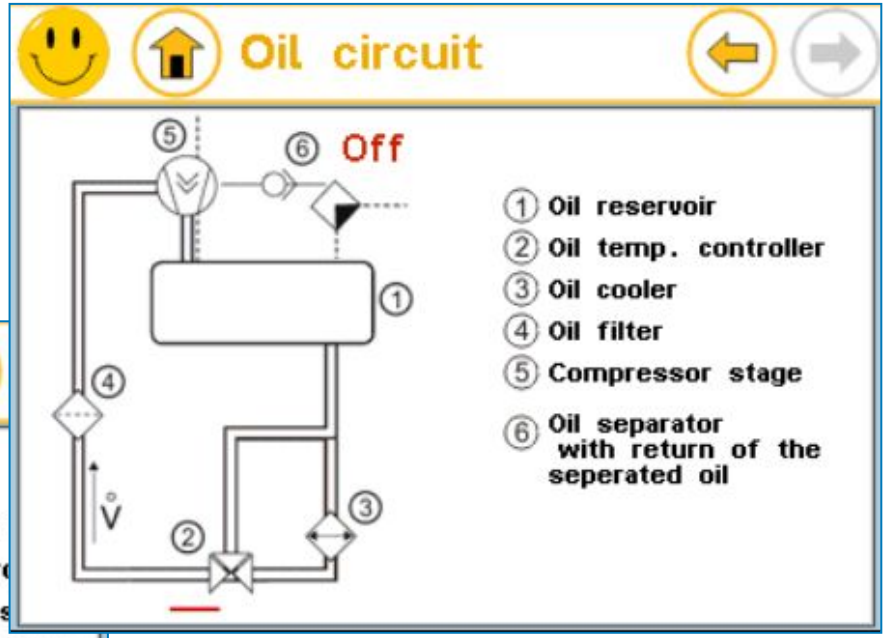
- Pressure development / time
- Final compression temperature / time
- Service intervals



Air Control P

Information/Handling



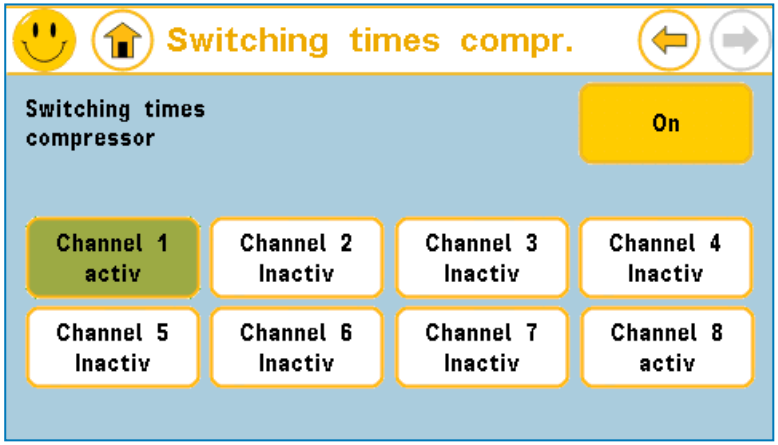


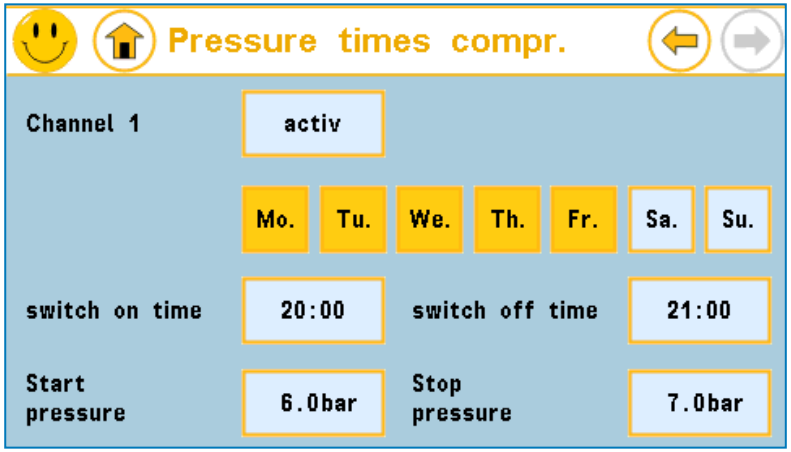
AIR CONTROL P

Key data

Optional operating modes:	- Automatic - Load / no-load
Programmable automatic restart:	Yes
Local operation – remote On/Off:	Yes
Error memory (no. of items):	20
Freely programmable outputs (digital):	1
Master function (Base load changeover mode):	Yes (4 additional compressors)
Slave connection to higher order control systems:	Yes
Timer function:	- Switch compressor On / Off 8 - Compressor compression times 8 - Base load changeover 8 - Pressure times base load changeover 8 - Assignment of priorities 8
Display:	- Illuminated: Yes - Indication: 4c-touchscreen, text & symbols - Graphics: Yes
Storage on SD-card:	- Total setup of the compressor - Data logging

Integrated timer

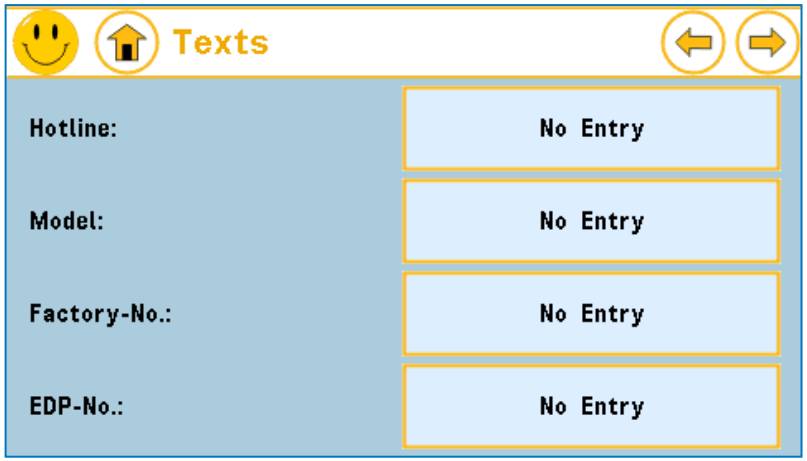




The integrated timer comprises:

- 8 channels for the switching On / Off time of
  the compressors
- 8 channels for pressure reduction
  - The compressor operating time can be adjusted optimally to the business needs
  - For example, different shifts, weekends are freely programmable
  - Energy savings thanks to adaptation of the optimal pressure level to the operational needs

Integrated plant pass

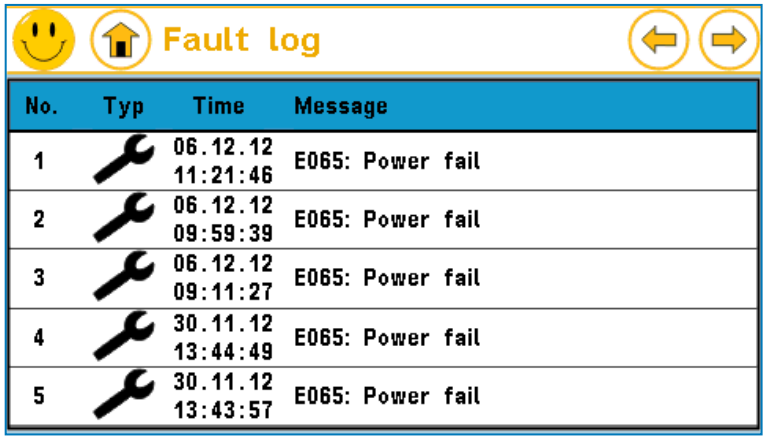


The compressor pass shows following information

- Clear information at all times for the customer / Service specialist about:
  - Model type: e.g.: BELT 76 WK
  - EDP no.
  - Commissions no.
  - Wiring plan no.
  - Software version
  - Date of commissioning at the customer‘s premises

If an error / alert occurs the customer can always give precise information about the compressor and thus prevent errors when spare parts are ordered or questions are asked of customer services.

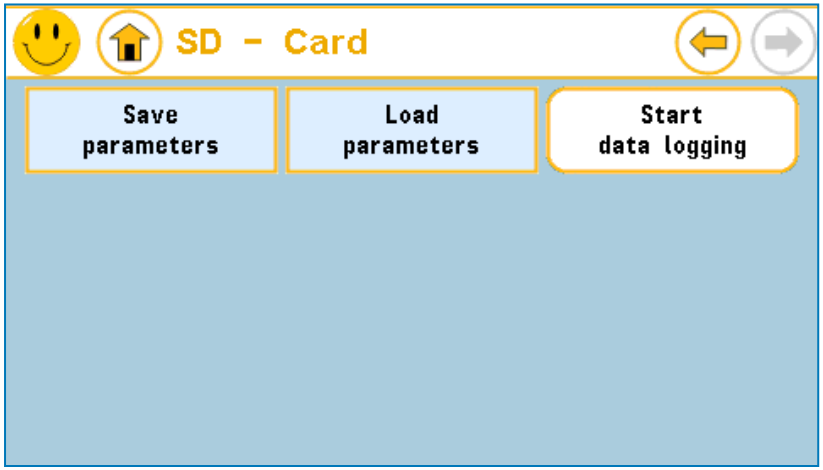
Integrated error memory



The integrated error memory gives exact information at any time about:

- Type of error / alert in the form of clear text
- Exact time at which error / alert arose
- The last 20 errors / alerts can be read directly off the monitor
- Clear information about the error history of the compressor at any time
- A service specialist can analyse and eliminate cause of error faster
- Downtimes are reduced to a minimum

Data logging

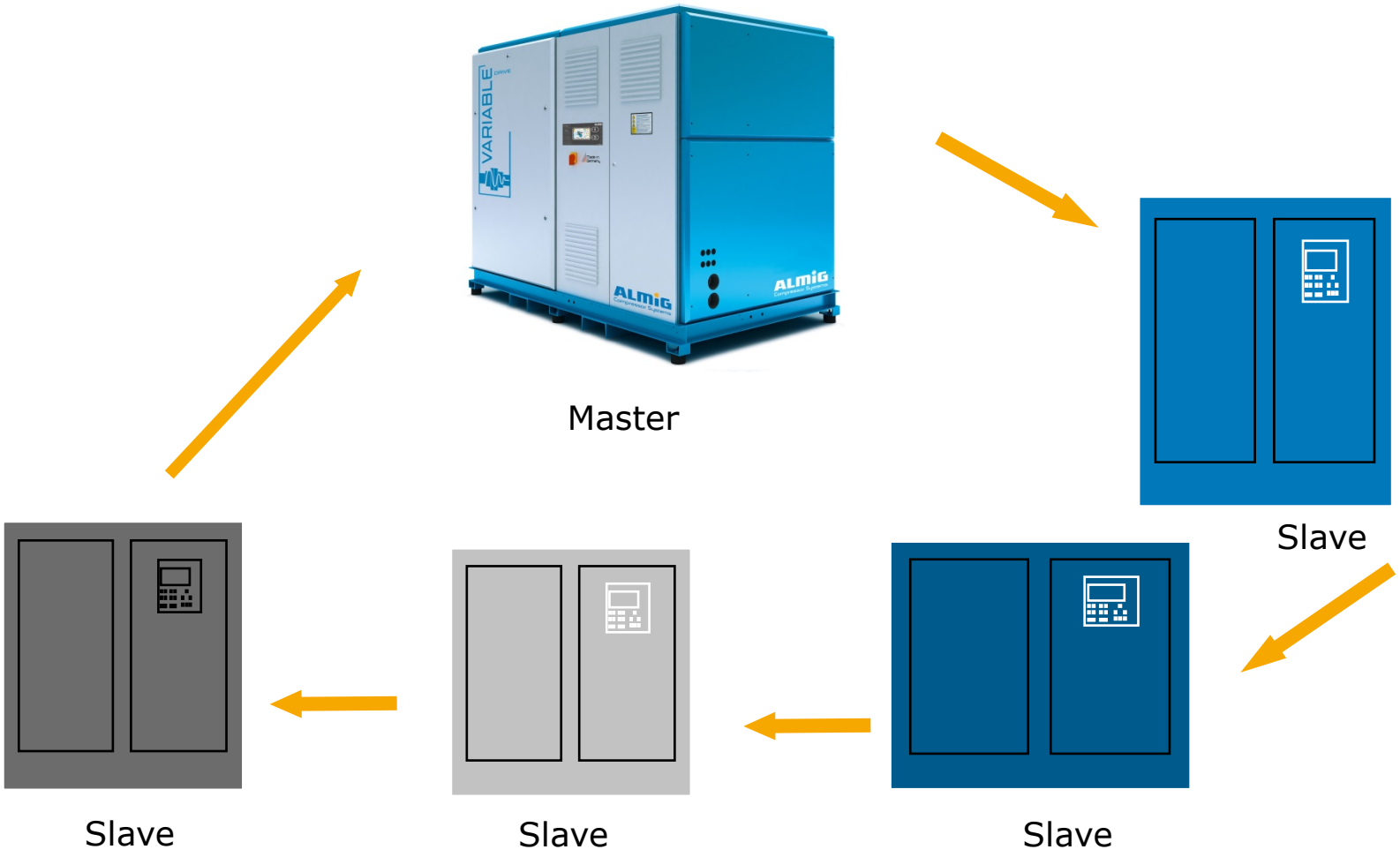


Following parameters can be stored permanently on SD card:

- Status of compressor
- System pressure
- Final compression temperature
- Oil temperature
- Volume flow
- Status of all connected compressors (at base load changeover)

- With one touch a lot of information and statistics is available
- The full setup of the compressor can be saved on SD card and can be rebooted again, which saves a lot of time, e.g. during maintenance.
- Best management of compressed air generation!

Base load changeover

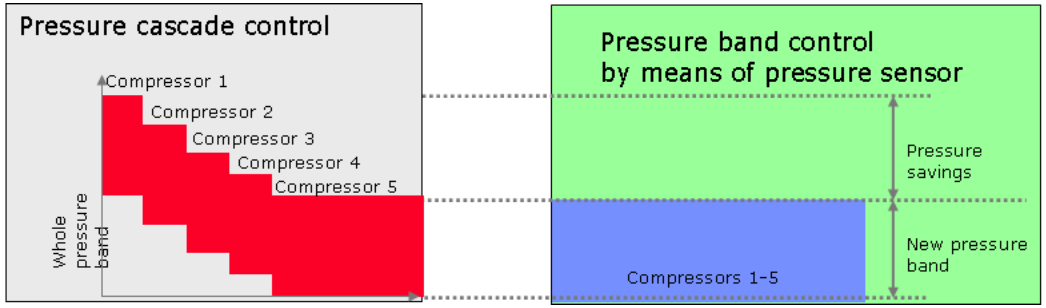


Base load changeover

Pressure band optimisation:

All compressors operate within a common pressure band

- The same switch-on and switch-off points for all compressors
- The pressure band can be reduced to a minimum (optimum 0.2 bars)
- High energy saving, because high pressure = high energy
- Older, uneconomical compressors / stations become more economical all at once



Pressure band prior to connection

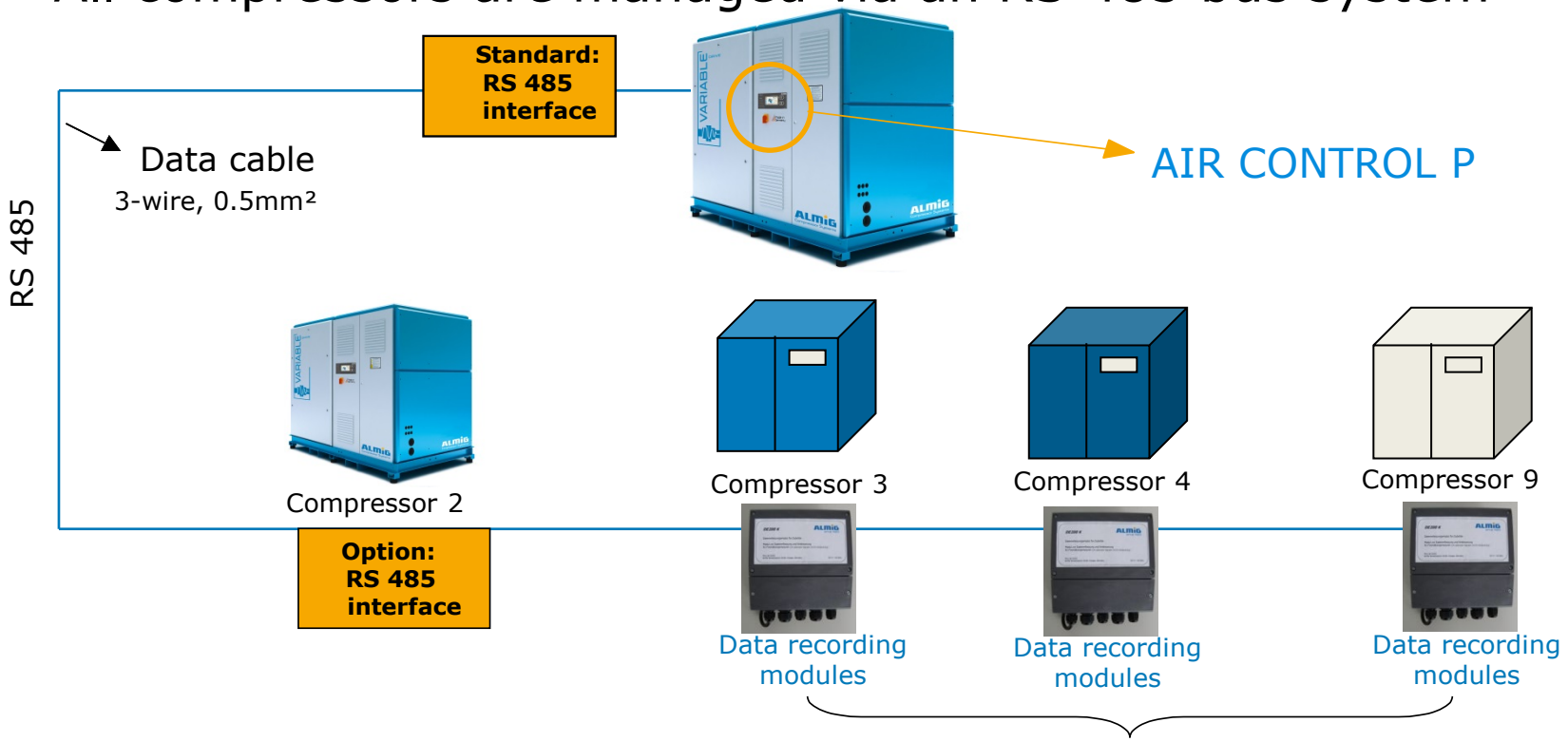
Pressure band after connection

1 bar higher pressure signifies 6 – 8 % more total power consumption per compressor !

AIR CONTROL P

Connection – Networking of base load changeover (up to 5 compressors)

All compressors are managed via an RS 485 bus system



Required signals

1. Motor On / Off
2. Load / No-load.
3. Error message
4. Base load changeover O.K.

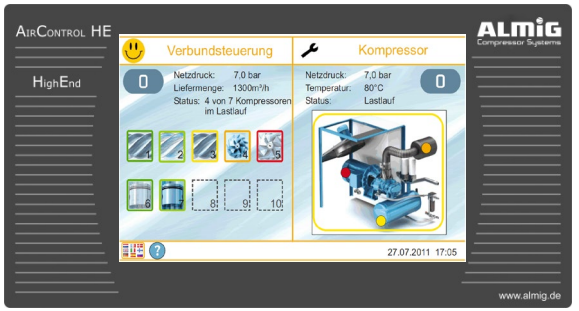
- **DE 200 F = Other make of compressor with fixed speed**
- **RS 485 = Standard scope of supply for AIR CONTROL P**

AIRCONTROL HE

ALMiG
Compressor Systems

AIR CONTROL HE

Key data



Consumption-related superior control:	up to 10 compressors
Applicable as:	control integrated into the compressor, external superior control
Programmable automatic restart:	yes
Local operation – remote On/Off:	yes
Error memory (no. of items):	20
Slave-connection to higher order control systems:	yes

The High-End-solution for highest demands to the control of the compressed air generation.

Timer functions:

- Switch compressor On/Off	8
- Compression times	8
- Base load changeover	8
- Pressure times BLC	8
- Assignment of priorities:	8

7“-Display:

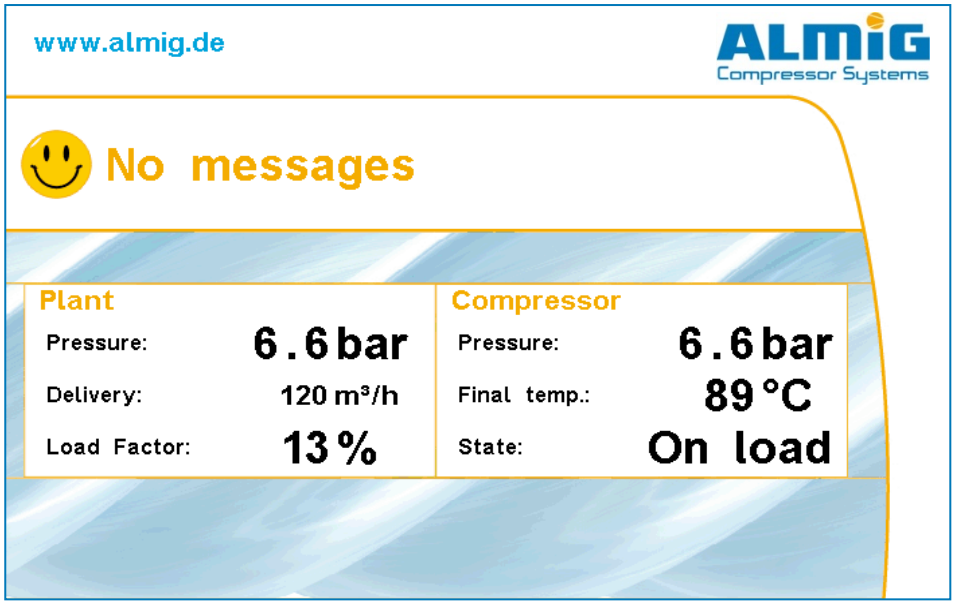
- 4 C, illuminated
- Touchscreen
- Indication : text & symbols

Storage on SD-card:

- Total setup of the compressor
- Data logging

Details

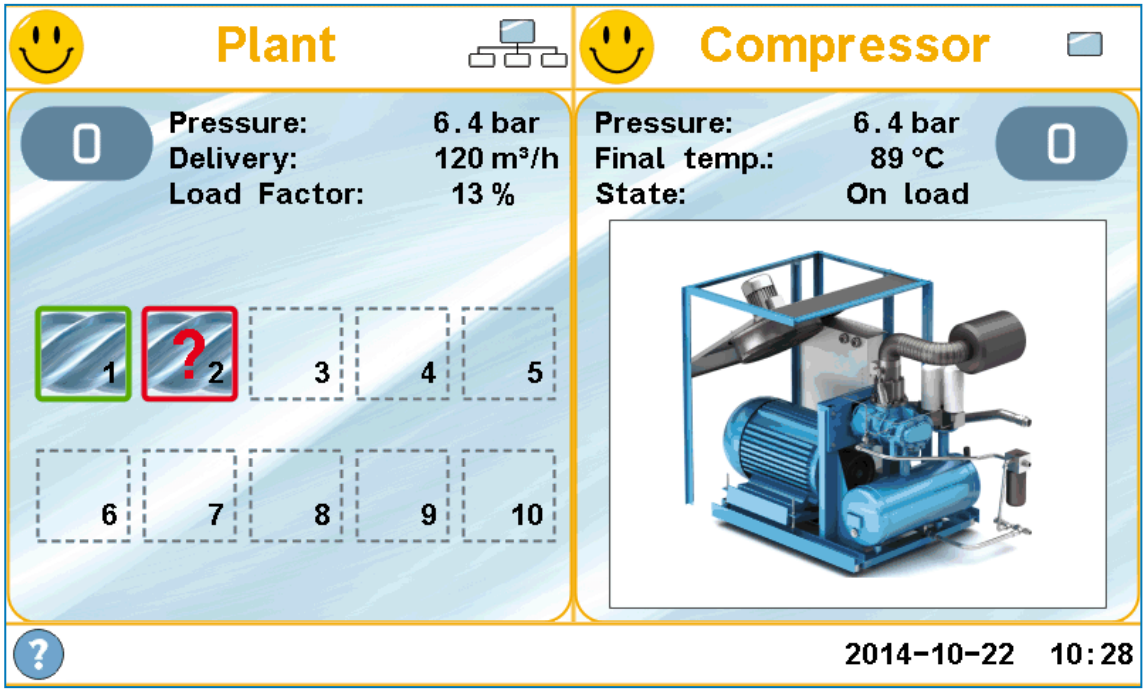
Screensaver mode (standard view)



- Dimmed light to protect the screen and to save energy
- Most important parameters of compressor and complete station are displayed permanently

Details

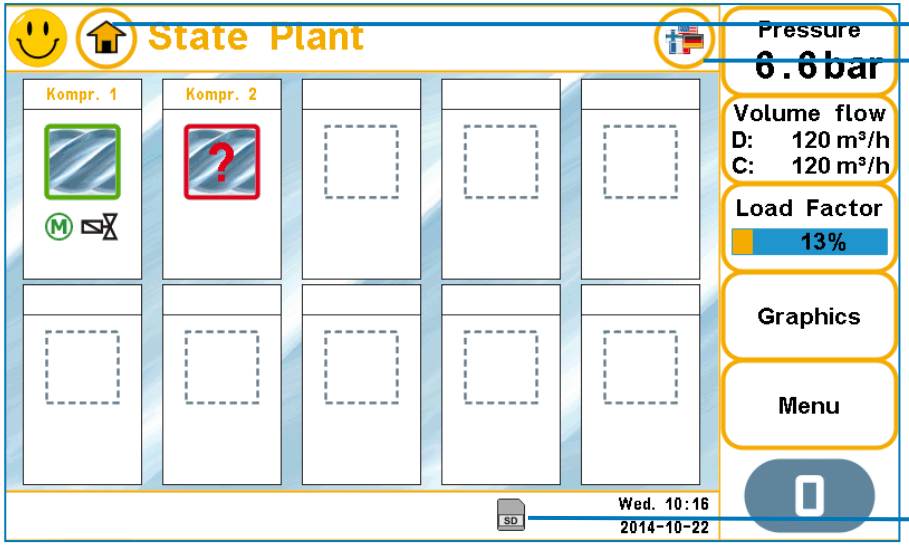
Immediate overview by split screen



Symbols give overview about types of compressors (ALMiG or competitor, screw reciprocating or centrifugal compressor) and their conditions (load, idle, off, failure, maintenance message)

Details

HE as superior control system



Back to start screen

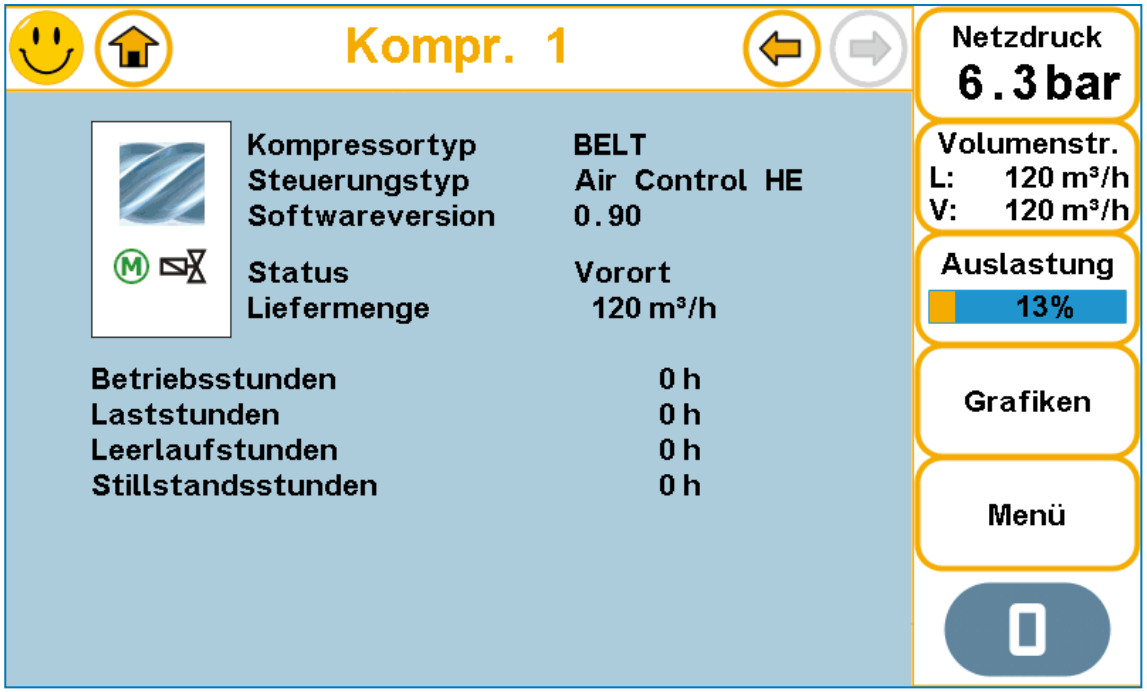
Choice for language

SD-card for data logging

Overview: Conditions of connected compressors, pressure, volume flow and load factor of the station

Details

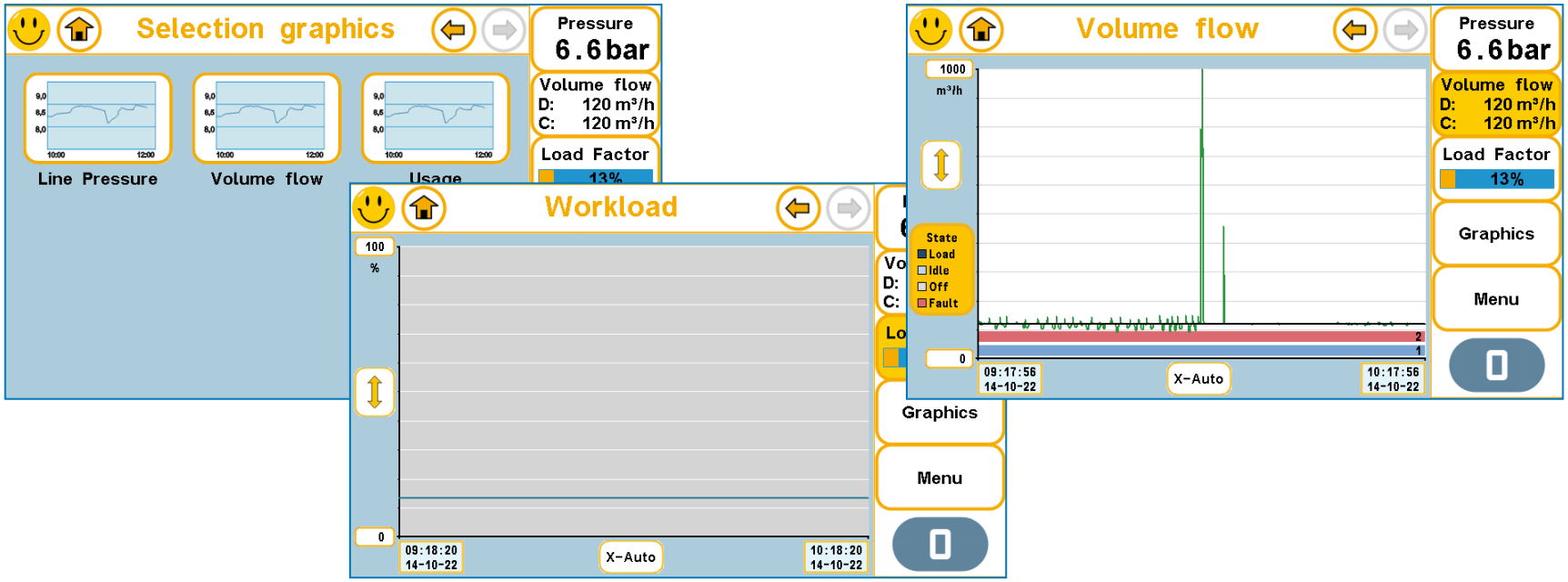
Details of each compressors



All technical details of the chosen compressor can be viewed

Details

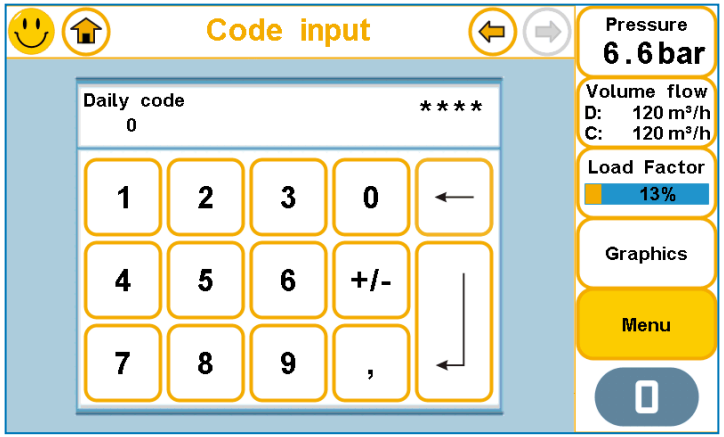
Graphics of compressor station

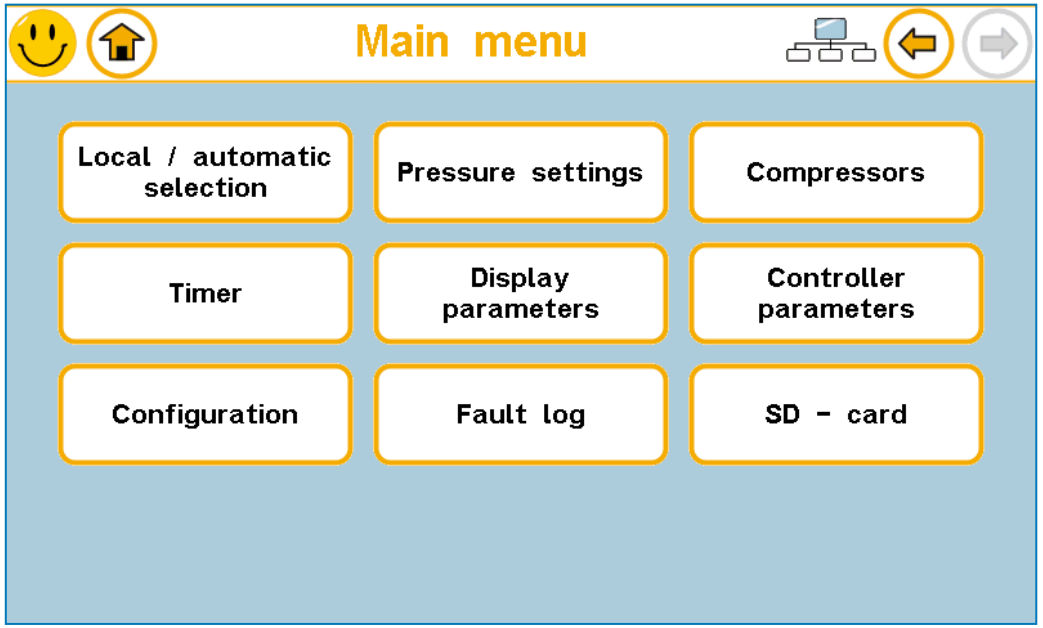


- Displayed as graphics: Overview, line pressure, volume flow, load factor
- Axes can be formatted manually or automatically

Details

Parameters for adjustment



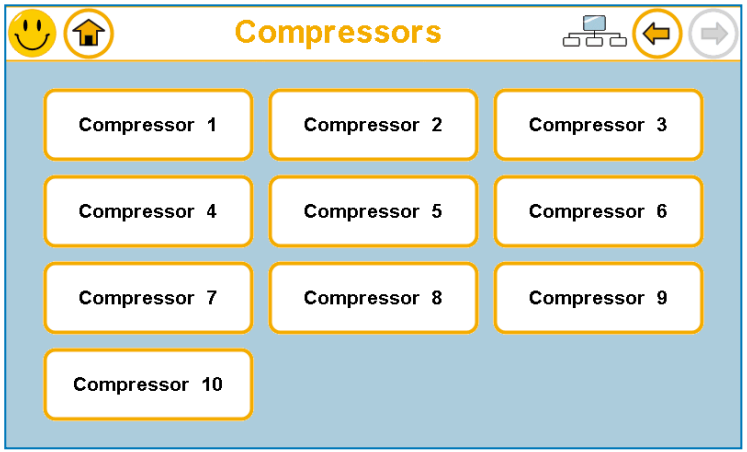


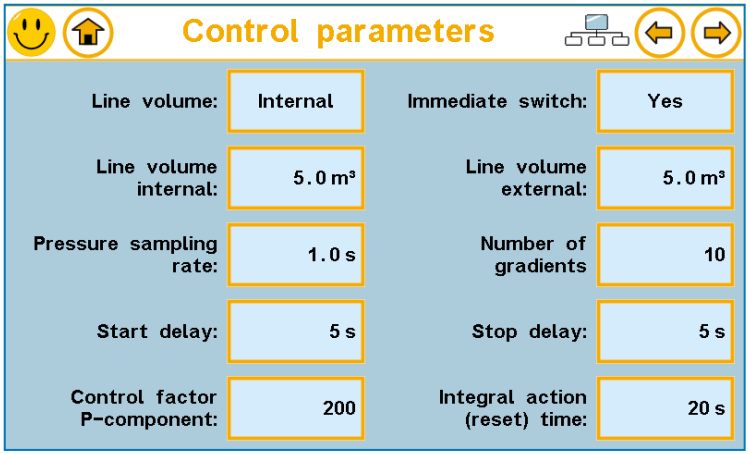
By using a code all parameters of the compressor network can be adjusted in the main menu

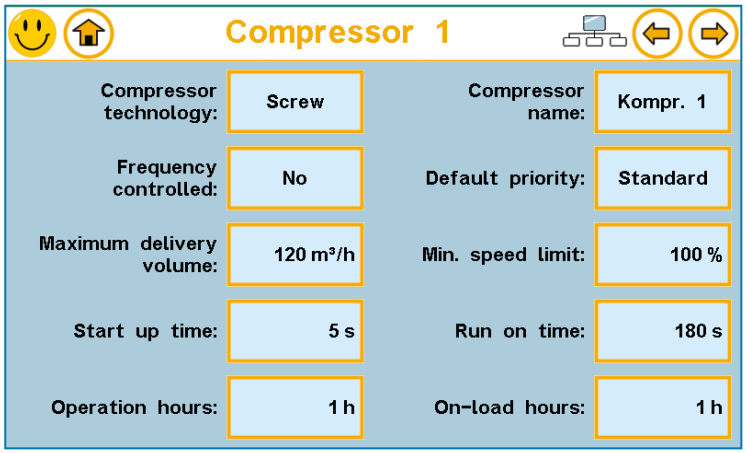
AIR CONTROL HE

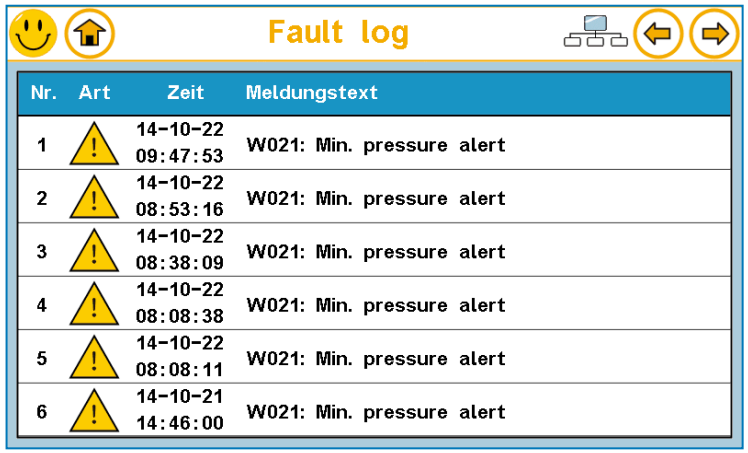
Details

Examples for subpoints of main menu







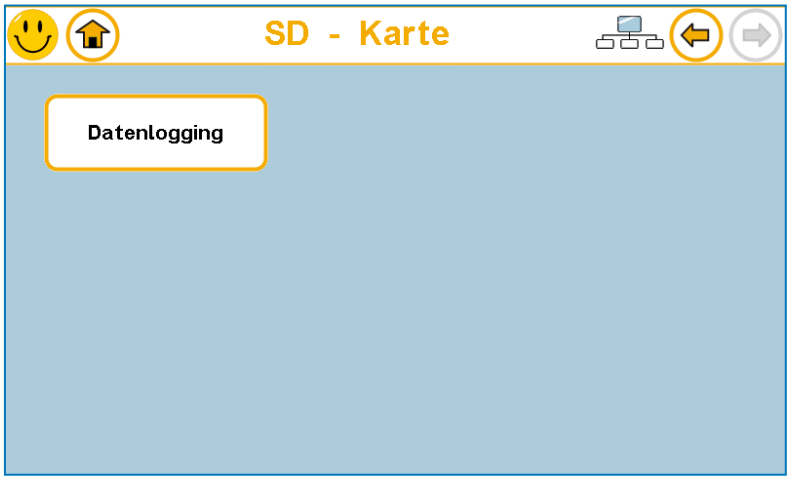


Details

Data logging on SD card

- Function is displayed by SD card symbol
- Following data can be saved on SD card:
  - Status of complete compressor station
  - Line pressure
  - Volume flow of compressor station
  - Conditions of connected compressors:
    - Final compression temperature
    - Pressure
    - Volume flow
    - Status (Load, Idle, Off)

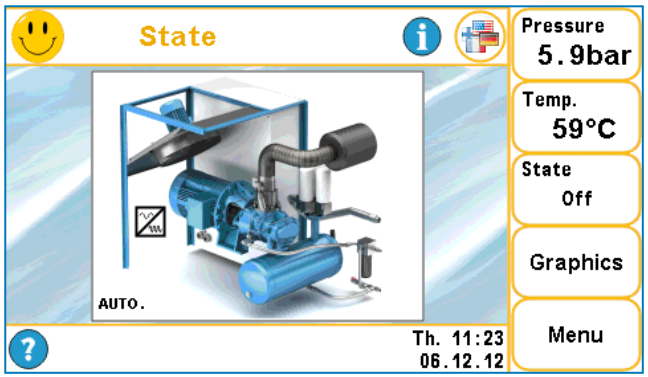
    All information reg. set-up of the station
- All information reg. set-up of the station

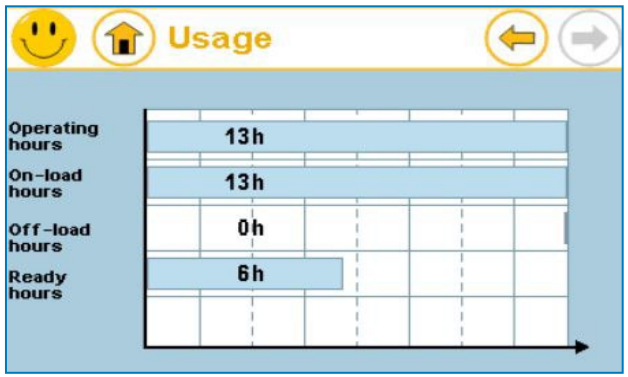


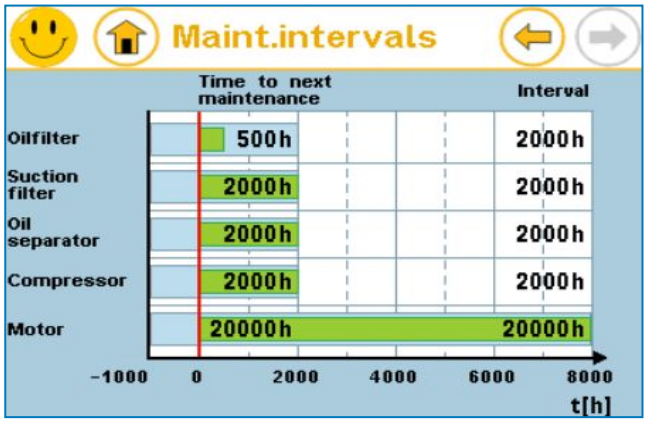
AIR CONTROL HE

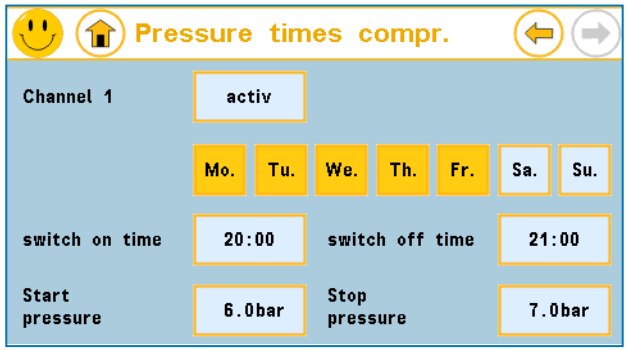
Details

The part with the compressor control functions is similar to AIR CONTROL P







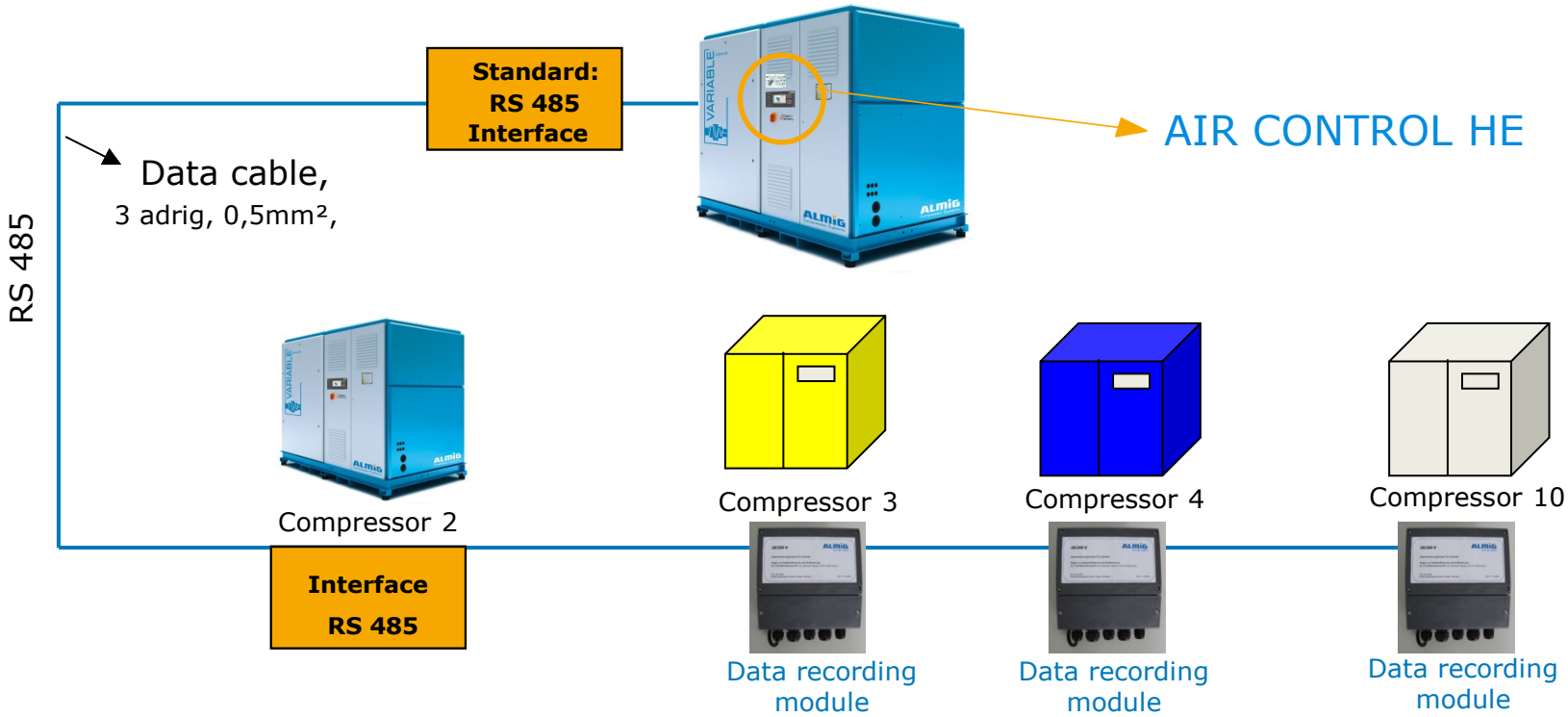


AIR CONTROL HE

Connection – Network

(up to 10 compressors)

All compressors are managed via an RS 485 bus system



- **DE 200 F = Competitor's compressor with fix speed**
- **DE 200 K = Competitor's compressor with VSD**
- **RS 485 = Standard of ALMiG**

Required signals

1. Motor On / Off
2. Load / No-load
3. Error message
4. Base load changeover O.K.

Advantages

- 2 in 1: Combination of a high-class compressor control with a consumption-related superior control system
- Energy savings by a controlled low pressure band
- Improving of production safety by permanent active control
- Connection to superior PPC systems via Modbus / Profibus possible
- Visualisation via webserver: Worldwide access to all relevant data (option)
- Parameters of compressors, data and fault messages can be safed on data storage devices e. g. for statistical approach
- Fast information and graphic illustrations for all important operating conditions
- Outstanding 7“ TFT-Colour touchscreen
- Easy handling because of clear structure of menus

Thank you!