User Manual

Rennertronic Plus Touch

Before starting the controller, read and follow the manual carefully!

RENNER GmbH Kompressoren
Emil-Weber Str. 32
D-74363 Güglingen
Tel: +49 (0)7135 931 93 0
Fax: +49 (0)7135 931 93 50
info@renner-kompressoren.de
www.renner-kompressoren.de

25282_EN_18239

EN

Contents

List of Tables

List of Figures

1. Safety

The person installing the controller should read the following manual and warranty information. Improper installation and handling of the controller voids the warranty.

Any connection and mounting work can be performed only when the supply voltage is disconnected.

The controller should be installed only by an authorized service or authorized personnel.

To comply with safety standards, the PE terminal of the controller should be connected to a protective conductor or dedicated grounding.

Using the controller without the enclosure is forbidden as it might result in an electric shock.

The device should not be exposed to water or excessive humidity which may cause damage.

Before switching on check the electrical connections according to the connection diagram in the operating manual.

Before starting the controller, make sure that the power supply meets the requirements in the operating manual.

Any repairs can be done only by the manufacturer’s service. A repair done by an unauthorized person voids the warranty.

2. User Interface

2.1. Buttons

The HMI provides two physical buttons: start and stop. Any function and device configuration is carried out using the touch screen interfaces.

2.2. Main View

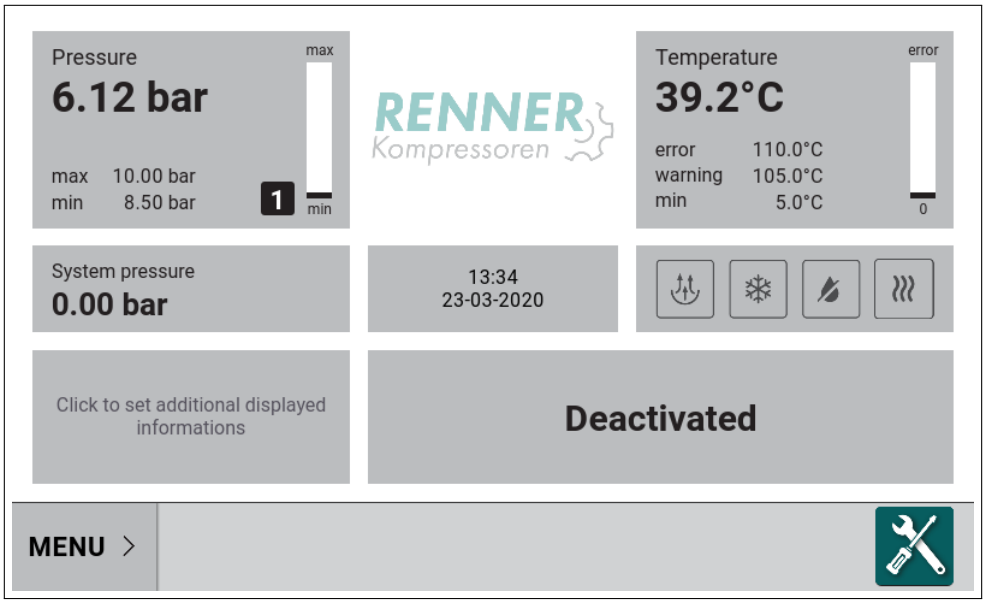

Figure 1: Rennertronic Plus Touch main screen view

Main display view is divided into tiles representing a specific function (as seen from left to right and from top to bottom):

1. Net pressure
2. Oil temperature
3. System pressure
4. Time and date
5. State of miscellaneous compressor functions
6. Compressor information additional fields
7. Compressor state
8. Slider menu

Most of the tiles can be tapped to reveal additional information. The functions and operation of the specific fields are described in the following subsections.

2.2.1. Net pressure tile

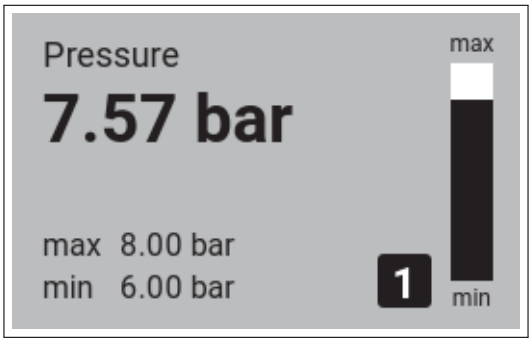

Figure 2: Net pressure tile

Pressure tile presents the following information:

1. Net pressure value
2. Pressure max (cut-out)
3. Pressure min (cut-in)
4. Pressure band indicator
5. Bar graph

Bar graph displays the pressure level between the active band's cut-in and cut-out pressures. If the current pressure is above the cut-out level the bar graph is black and if the pressure is below the cut-in level the bar graph is white.

The pressure shows the active pressure band that is currently active. The user can define four different pressure bands that can be selected using Modbus communication, digital input selector or with scheduler.

The default color of pressure tile is gray when the compressor is deactivated. During compressor operation pressure tile changes color to:

1. Green - the pressure is in the allowed region - between max and min pressure value (+/- 0.1).
2. Yellow - the pressure exceeded the minimum/maximum pressure value.
3. Red - the pressure exceeded minimum/maximum alert value.

When the tile is tapped, the net pressure diagram is displayed.

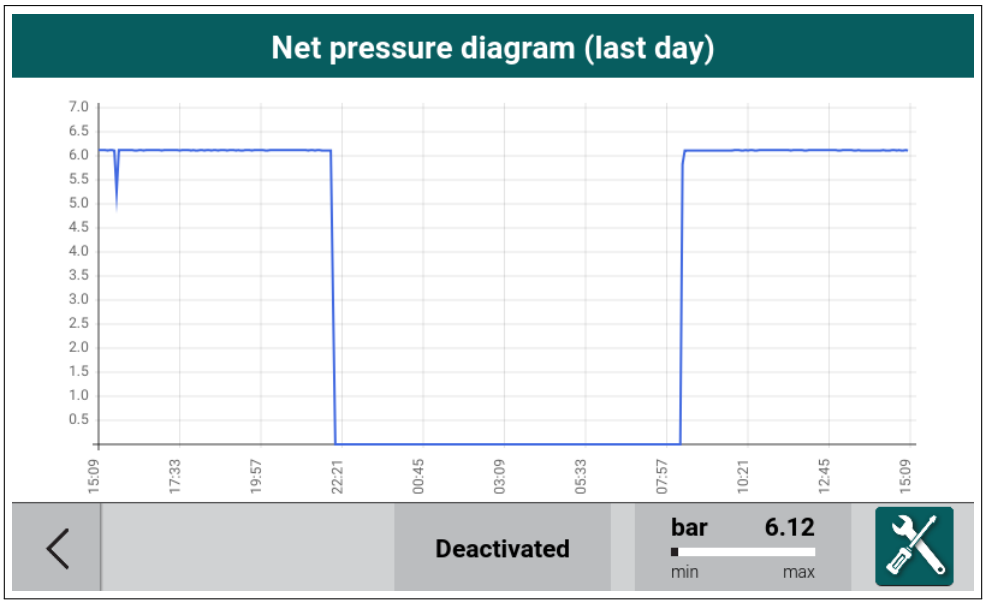

Figure 3: Net pressure diagram

2.2.2. System pressure tile + BLCO status

Figure 4: System pressure tile

System pressure tile displays current internal pressure value. On the right side of the panel the BLCO active icon is displayed if the BLCO is active.

The tile changes color to red if the sensor fails.

2.2.3. Time and date tile

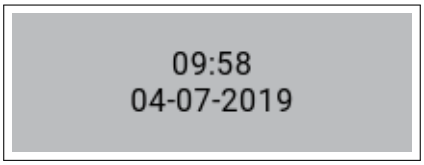

Figure 5: Time and date tile

The tile displays current date and time. All the relevant settings are described in the section 2.5.6.2.

Figure 6: Time and date tile with scheduler active

If at least one scheduler is active, the tile displays the scheduler icon. For more information and setting descriptions refer to section 5.3.. When the tile is tapped, the scheduler settings menu will be displayed.

2.2.4. State of miscellaneous compressor functions tile

Figure 7: Miscellaneous functions tile

The tile can display up to four miscellaneous compressor functions. The appropriate icons indicate the status of the selected functions. If the specific icon has a dark gray background, the function is currently active/in operation. If the icon is shown only as an outline, the function is inactive.

Table 1: Miscellaneous symbols descriptions

Description	Symbol	Description	symbol	Description	symbol
Fan		Dryer		Water injection	
Network operation		Drain		Heater	

2.2.5. Compressor information additional fields tile

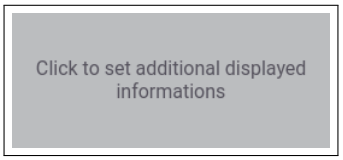

Figure 8: Compressor additional parameter fields

The tile can display up to three additional compressor information. To select the visible information tap the tile and choose the parameter from the menu.

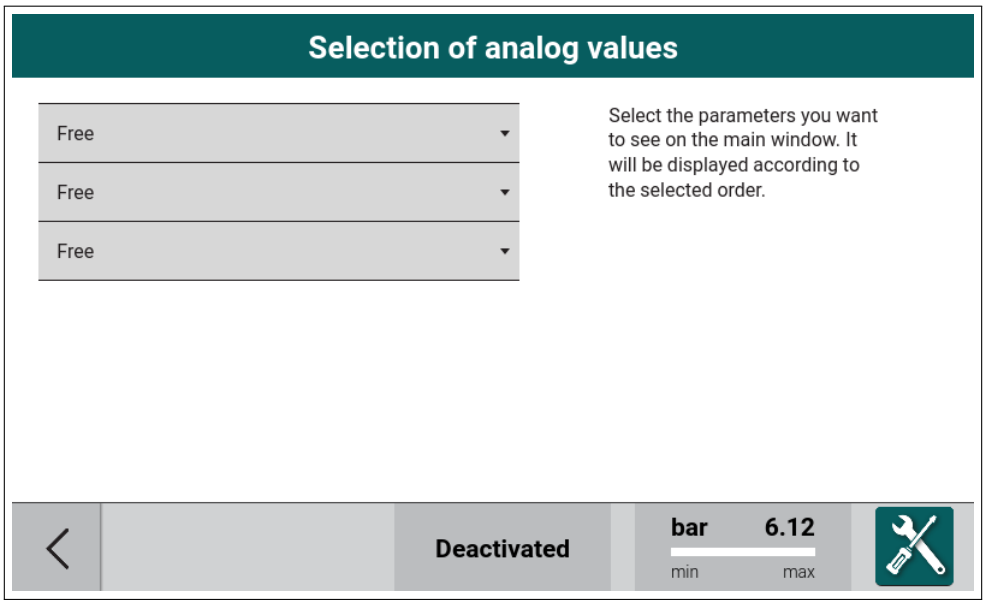

Figure 9: Compressor additional parameter menu

Main view with Free air delivery parameter on.

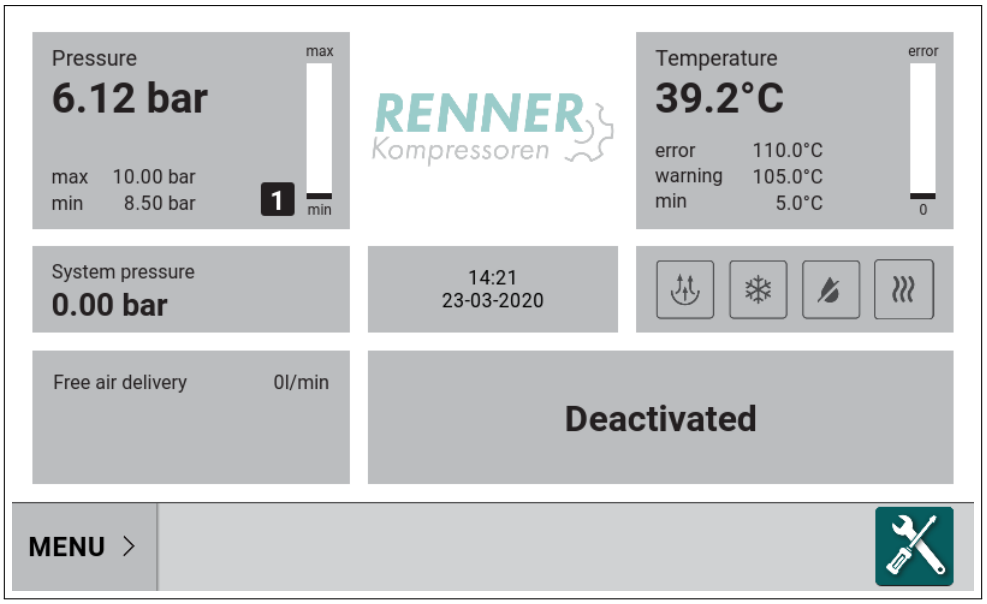

Figure 10: Main view

2.2.6. Compressor state tile

Figure 11: Compressor state tile

Tile displays current state of the compressor.

Table 2: Compressor state list

Compressor state name	Description
DEACTIVATED	The compressor is not allowed to start.
STARTING	The compressor is active and motor is starting.
COMPRESSION DELAY	The start procedure has been completed and compressor is waiting to load.
COMPRESSION	The compressor is on load.
IDLE	The pressure has reached pressure max level and the motor is idling until pressure drops below pressure min or idle time elapses.
DEACTIVATION STOPPING	Stopping procedure was activated by a stop command and a stop procedure will be ended when all conditions to stop have been met.
FAULT CONDITION	An fault has occurred, the compressor stops or has stopped and is waiting for the user to acknowledge the faults or the fault cause disappears.
READY TO START	The compressor is active and the pressure is above the pressure min. When pressure drops down below pressure min, compressor starts automatically.

Table 2: Compressor state list

Compressor state name	Description
STOP-START DELAY COUNTING	The stop-start delay is active. Compressor waits until the counter reaches the desired value. The desired start/stop delay can be modified in the ”operation parameters / control timings menu”.
NOT READY TO START	The compressor is not ready to start - at least one of the conditions preventing the compressor start is active.
SYSTEM PRESSURE TOO HIGH	System pressure is too high. When the pressure drops below ”maximum system pressure to start”, compressor starts automatically.
OIL TEMPERATURE TOO LOW	Oil temperature is too low. When oil temperature exceeds min oil temperature, compressor starts automatically.
MOTOR START COUNTER	The motor was started more times than allowed by the maximum starts per hour counter.
IDLE STOPPING	Stopping procedure was activated by a idle timer, but at least one of the conditions preventing the compressor stop is active.
DEACTIVATION (KEEP POWER)	There is a frequency converter fault active, the compressor is not allowed to start.
AUTO-RESTART	The compressor has activated auto restart procedure after power fail.

2.2.7. Status bar

Status bar is always visible, regardless of what is displayed in the user interface. When the main HMI view is displayed, the status bar contains elements:

1. MENU button
2. Service status icon

Figure 12: Status bar in the main view

When any other UI view is displayed, the status bar displays additional information - compressor status and the current pressure.

Figure 13: Status bar when a menu is active

In any moment, the status bar displays the service status of the compressor. The icon changes colour depending on the compressor status.

Table 3: Compressor service status

Description	Symbol
Normal operation	
Active warning	
Active warning and error	
Active error	

By pressing the icon in any menu, the user can request the display of a pop-up with a summary of the active messages, warnings and errors, together with the current counter statuses.

If an event or error occurred, the user can acknowledge the event by pressing the confirmation button. If the event is currently inactive, this will allow the compressor to resume normal operation.

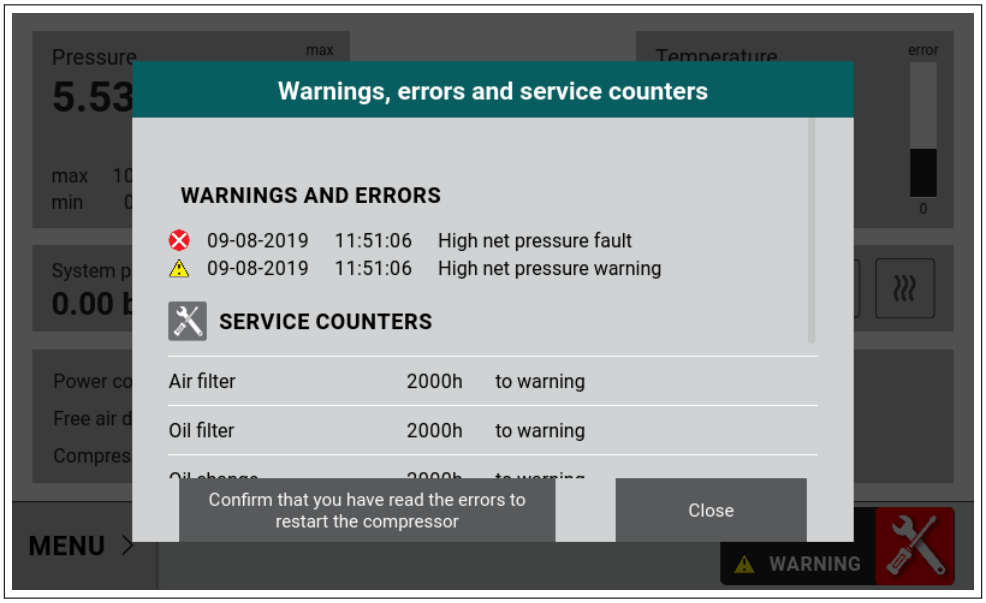

Figure 14: Compressor status pop-up

2.2.8. Sliding menu

When the MENU is pressed, the sliding menu opens, allowing the user to enter the specific menus.

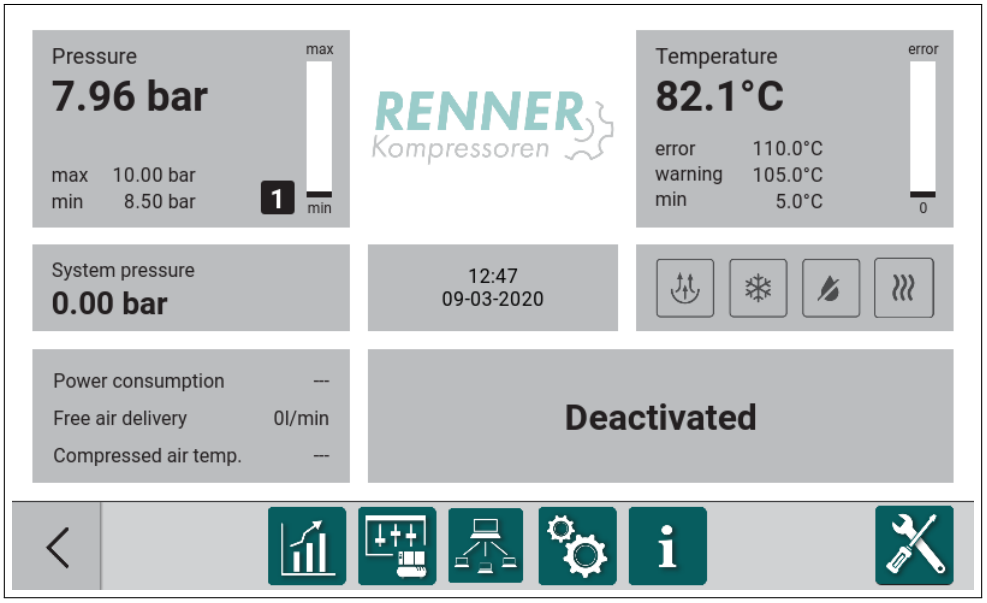

Figure 15: Sliding menu open

From the sliding menu the user has access to following menu entries:

- Statistics menu
- Sensors
- BLCO (Network operation menu) [If BLCO is active]
- Main settings menu
- Information about compressor and the software

2.3. Statistics

Statistics menu entry contains four submenus:

1. Events history
2. Utilisation
3. Error counter
4. Charts

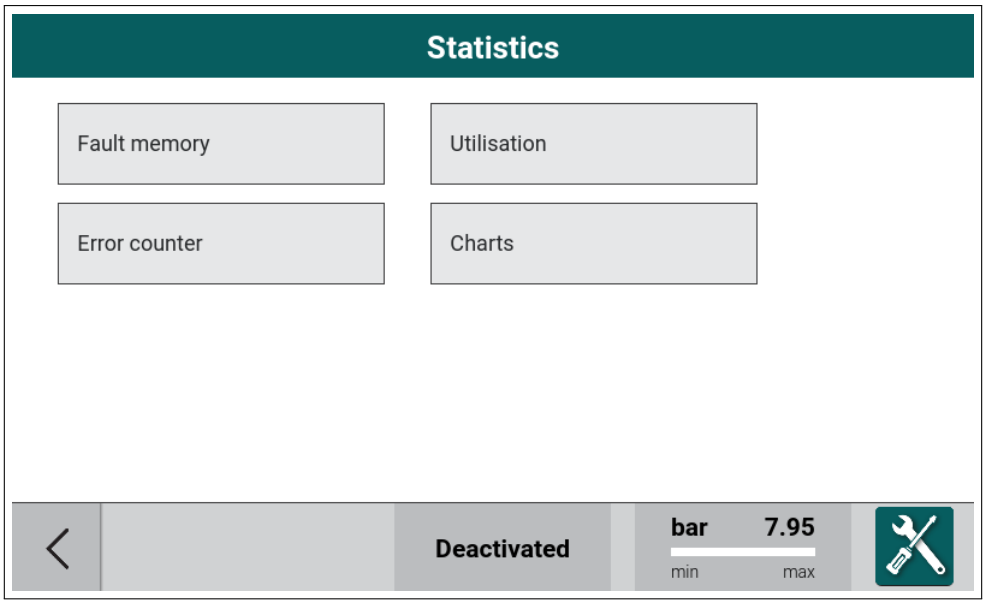

Figure 16: Statistics menu

2.3.1. Fault memory

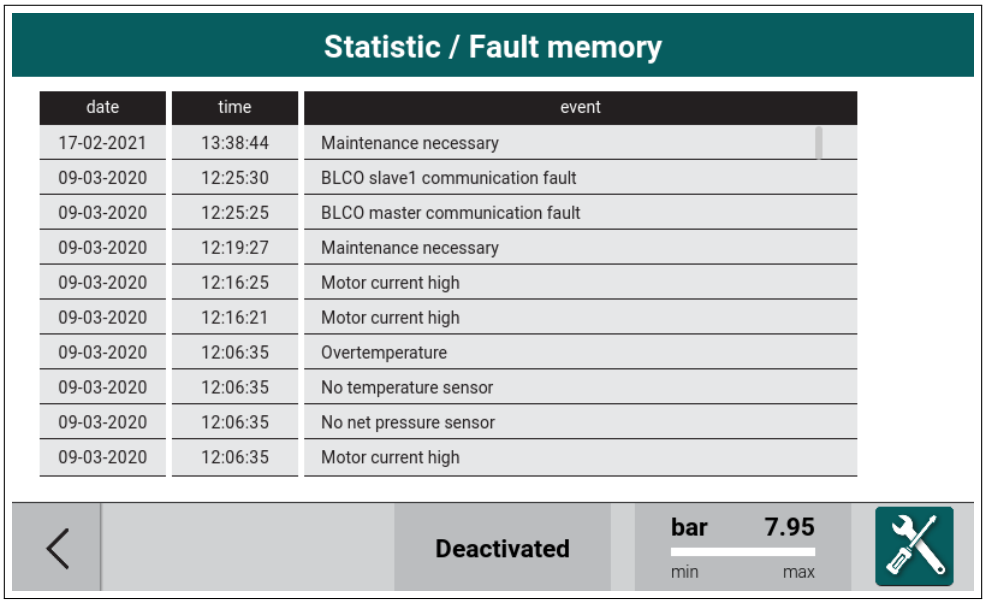

Figure 17: Fault memory menu

Event history menu stores all errors and warnings that have occurred during compressor operation. All the registered events are displayed

2.3.2. Utilisation

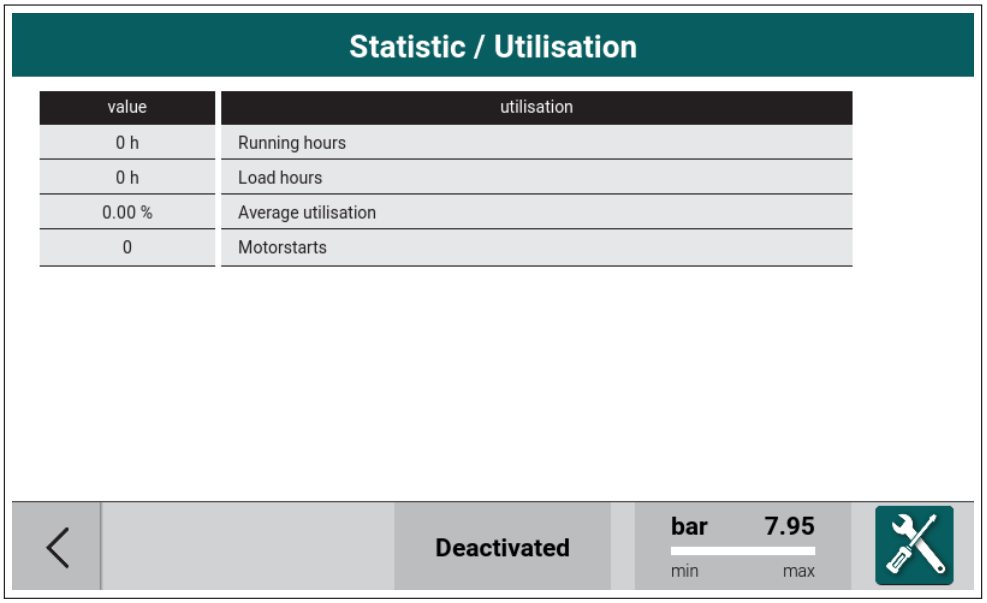

Figure 18: Utilisation menu

Utilisation menu displays counters related to aggregation of compressor operation time:

1. Working hours - counts total time of the motor being on.
2. Under load hours - counts total time of the compression time when the valve is on.
3. Average utilisation - this parameter shows ratio between ”working hours” and ”under load hours”.
4. Motor power cycles - counts total cycles of the motor being on.

2.3.3. Error counter

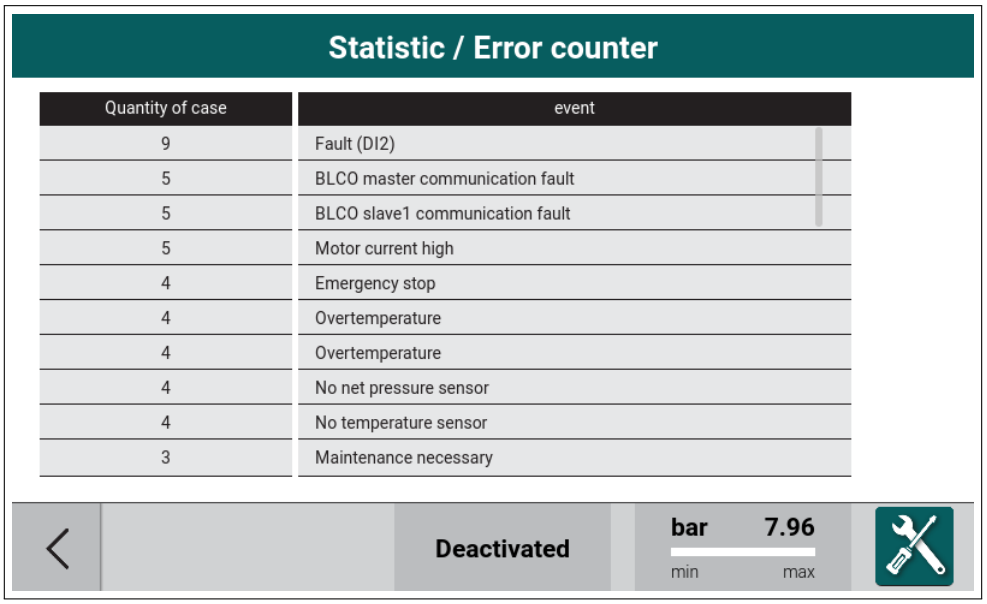

Figure 19: Error counter

2.3.4. Charts

The Charts show the values of selected parameters over time.

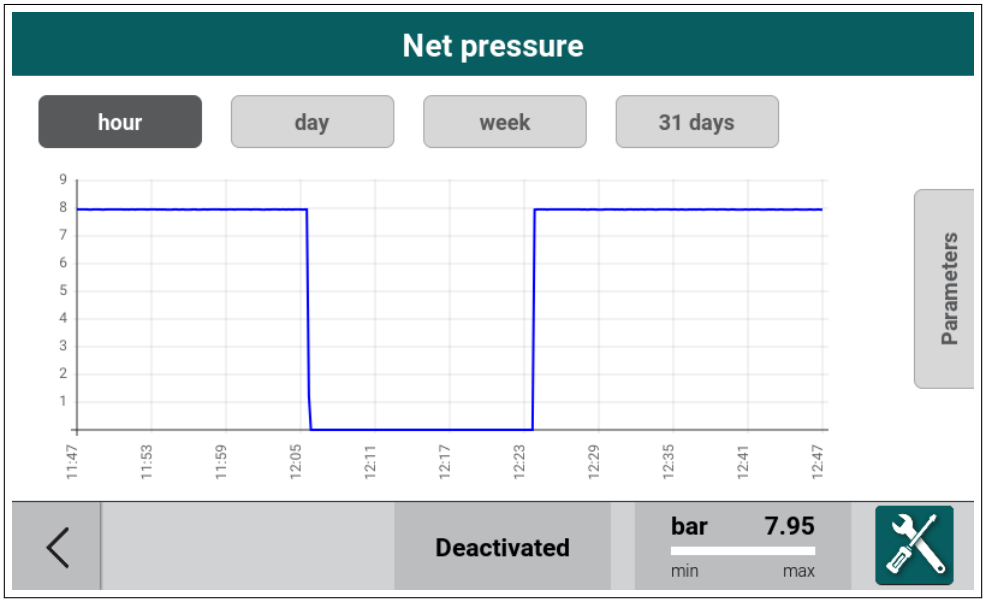

Figure 20: Charts

The time period can be set to:

1. hour,
2. day,
3. week,
4. 30 days.

The parameter can be selected between:

1. Net pressure,
2. System pressure,
3. Oil temperature,
4. Free air delivery.

2.3.5. Sensors

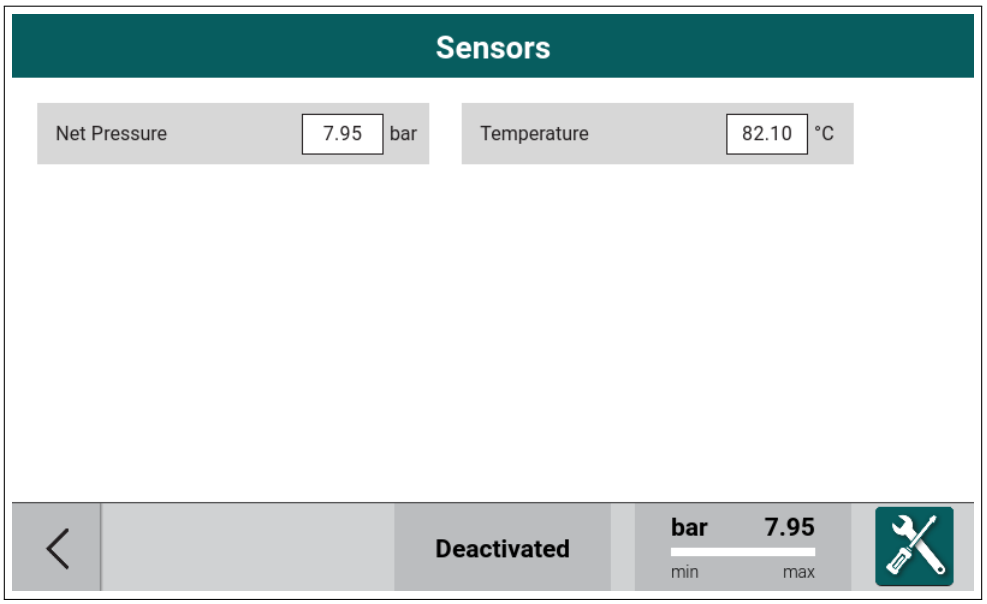

Figure 21: Sensors

2.4. BLCO (Network operation menu)

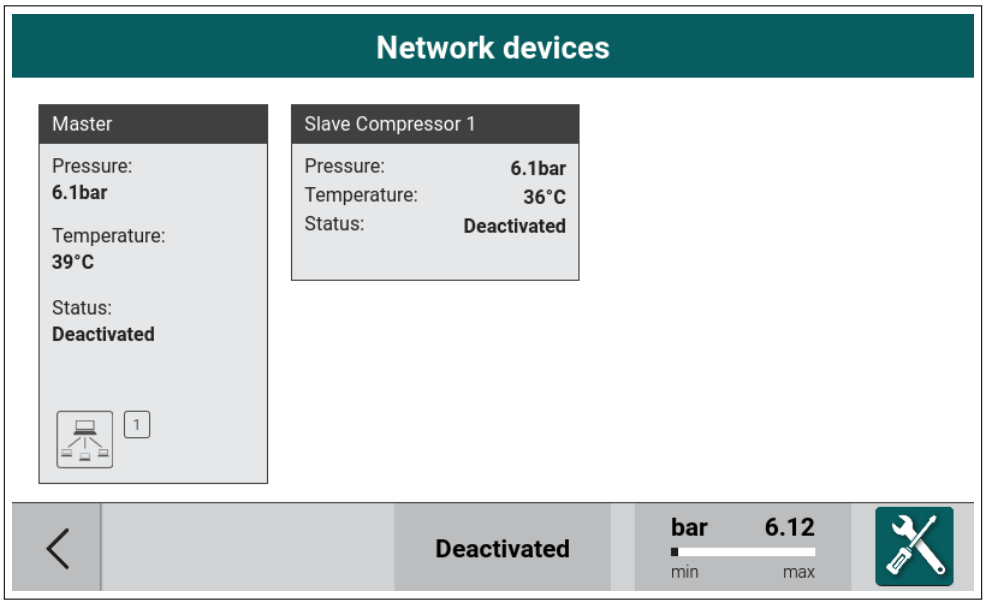

Figure 22: Network menu with example devices

2.5. Main settings menu

To access the main settings menu the user must provide a correct access password after pressing the Main Menu icon. Depending on the password entered, the user will be granted a different access. In lower access levels some parameters can be invisible or read only.

To get full access to compressor configuration, the user must obtain the unique access code, more information in section 4.2..

While entering the password, the user can preview the already entered characters by pressing the View icon.

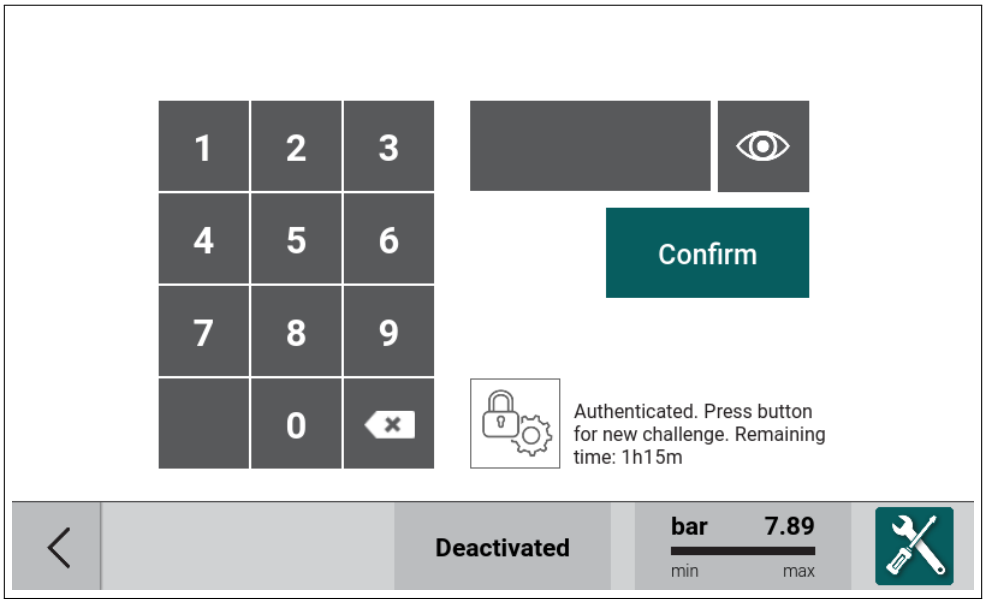

Figure 23: Password input dialog

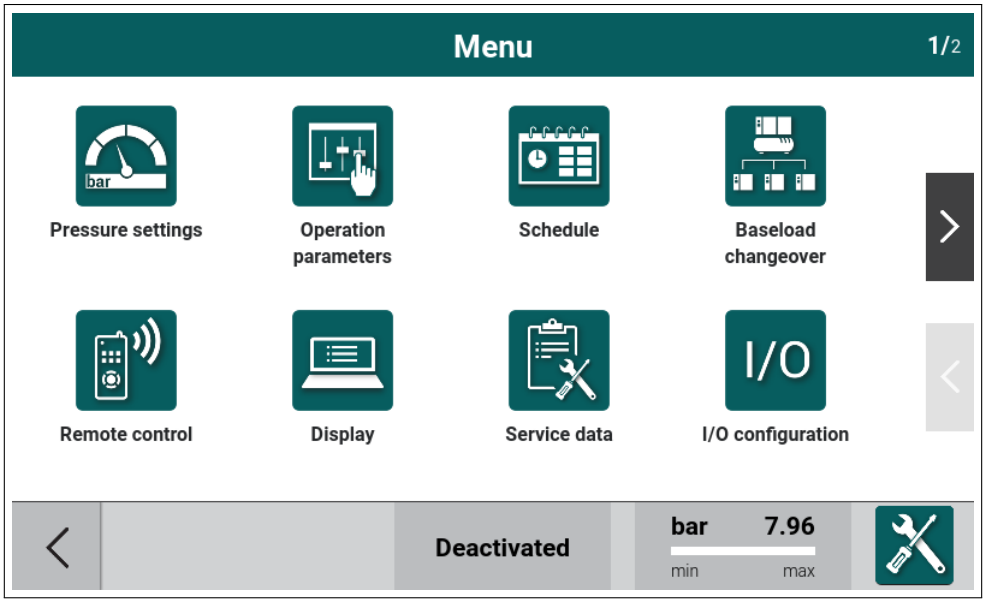

Figure 24: Main menu 1/2

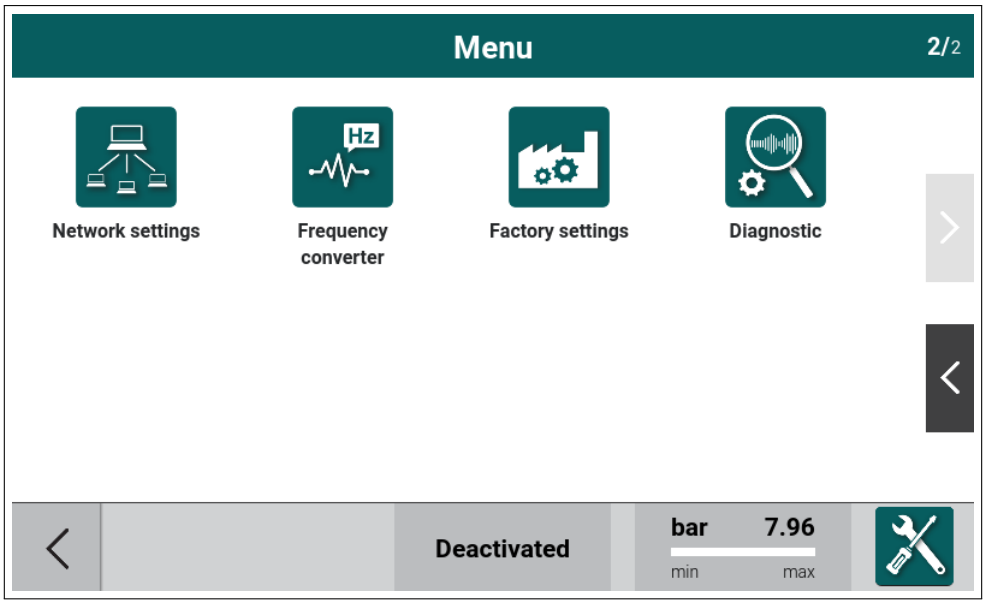

Figure 25: Main menu 2/2

Main settings menu is divided into following parameter lists:

1. Pressure settings - section 2.5.1.
2. Operation parameters - section 2.5.2.
3. Schedule - section 2.5.3.
4. BLCO - section 2.5.4.
5. Remote control - section 2.5.5.
6. Display - section 2.5.6.
7. Service data - section 2.5.7.
8. IO configuration - section 2.5.8.
9. Network settings - section 2.5.9.
10. Frequency converter - section 2.5.10.
11. Factory settings - section 2.5.11.
12. Diagnostics - section 2.5.12.

2.5.1. Pressure settings

Pressure settings allows the user to define four independent pressure bands.

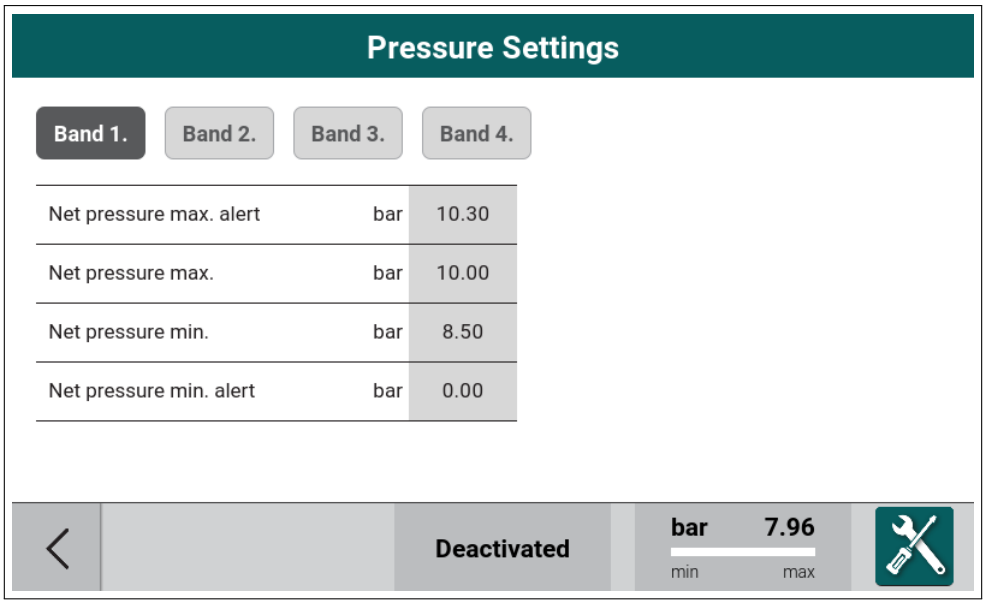

Figure 26: System pressure settings menu

Table 4: Pressure settings parameters

Parameter	Description	Access level
Net pressure max alert	If pressure rises above this level, high pressure warning occurs. Range [Net pressure max + 0.2 bar - Net pressure faul value - 0.2 bar]	Customer
Net pressure max	Upper switching point for pressure control. Range [Pressure setpoint + 0.2 bar - Net pressure max alert - 0.2 bar]	Customer
Net pressure min	Lower switching point for pressure control. Range [Net pressure min + 0.2 bar - Net pressure max - 0.2 bar]	Customer
Net pressure min alert	If pressure falls below this level, low pressure warning occurs. Range [Net pressure min alert + 0.2 bar - Pressure setpoint - 0.2 bar]	Customer

2.5.2. Operation parameters

Operation parameters menu contains subgroups related to compressor control algorithm and additional compressor functions.

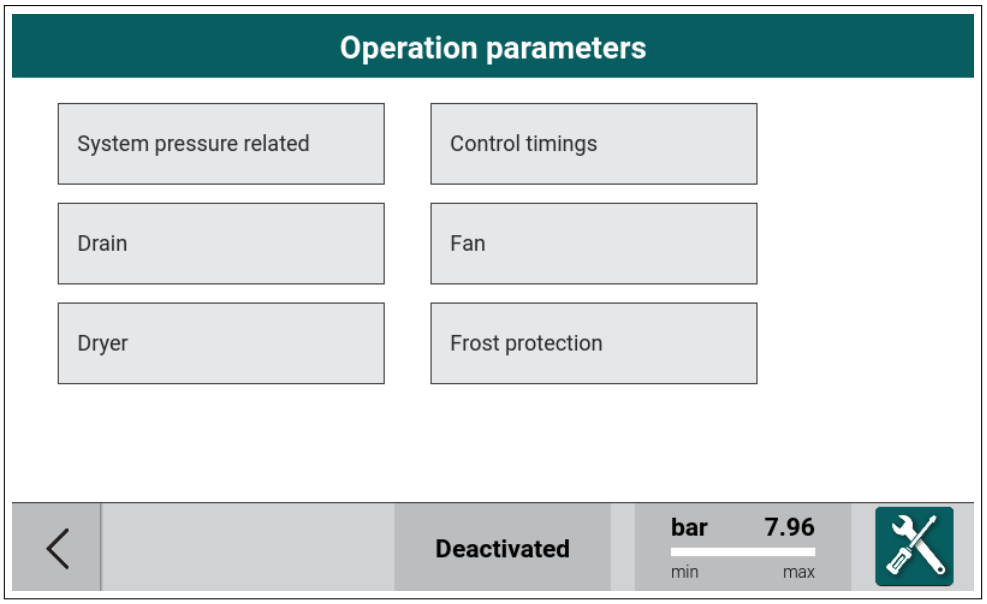

Figure 27: Operation parameters menu

2.5.2.1. System pressure related

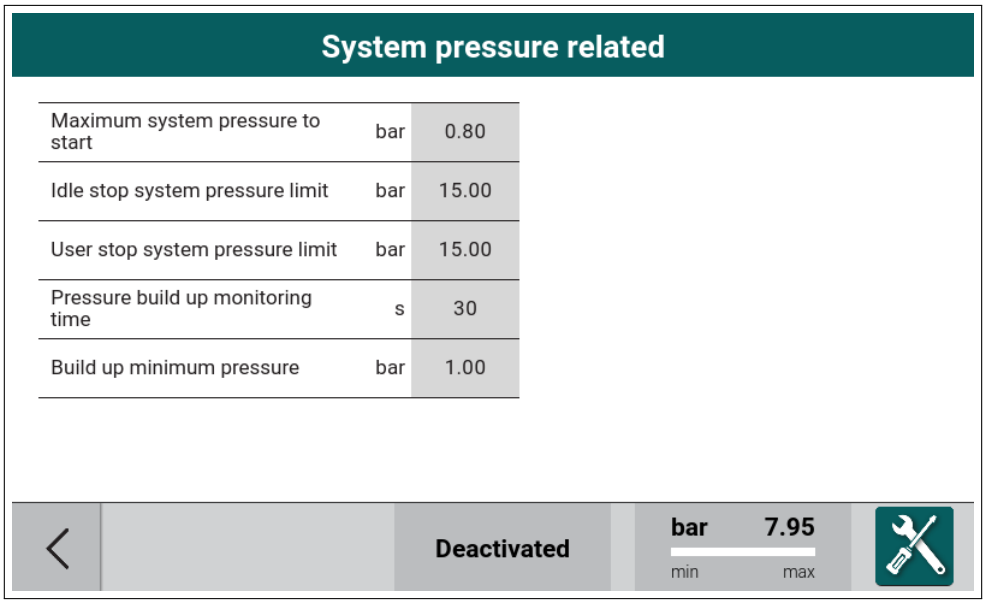

Figure 28: System pressure related settings

Table 5: System pressure related settings parameters

Parameter	Description	Access level
Maximum system pressure to start	If system pressure rises above this level, the motor start is prohibited.	Service
Idle stop system pressure limit	If system pressure is higher than this level, the motor stop is prohibited.	Service
User stop system pressure limit	If system pressure is higher than this level, user stop with a push button is prohibited.	Service

Table 5: System pressure related settings parameters

Parameter	Description	Access level
Pressure build up monitoring time	Time after which the system pressure is checked during compresson for the pressure build up.	Service
Build up minimum pressure	Level of system pressure that must be reached after build up delay.	Service

2.5.2.2. Control timings

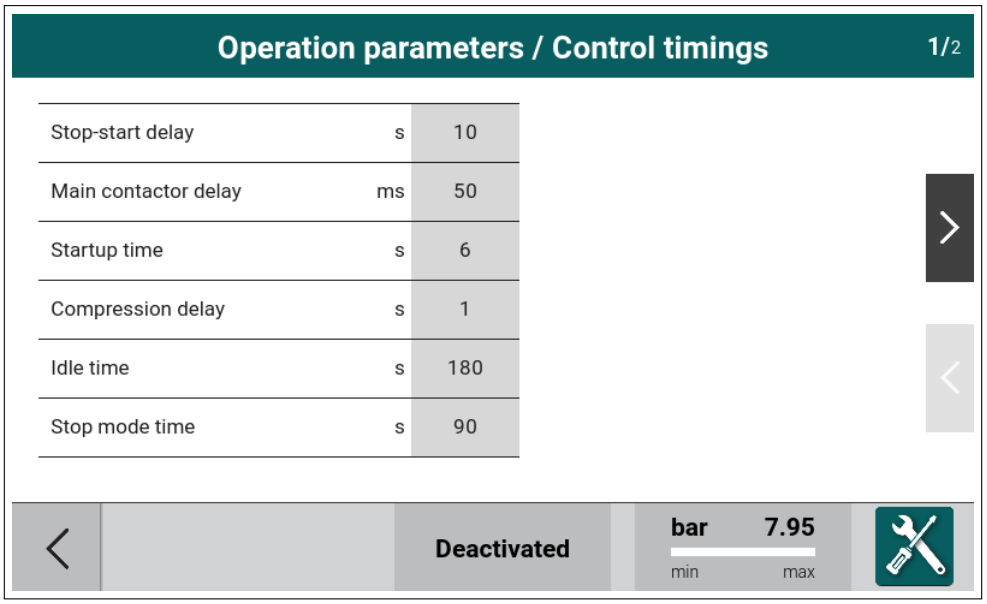

Figure 29: Control timings menu

Table 6: Control timings parameters

Parameter	Description	Access level
Stop-start delay	Time between consecutive stops and starts of the motor to allow the compressor to discharge.	Service
Main power delay	Delay between switching the main power relay on and the start relay on	Service
Startup time	Delay for motor start in star-delta mode.	Service
Compression delay	Delay to switch the valve on after start up time.	Service
Idling time	Delay between reaching pressure cut-off level and switching the motor off	Service
Soft stop delay	Delay between receiving stop command and stopping the motor	Service

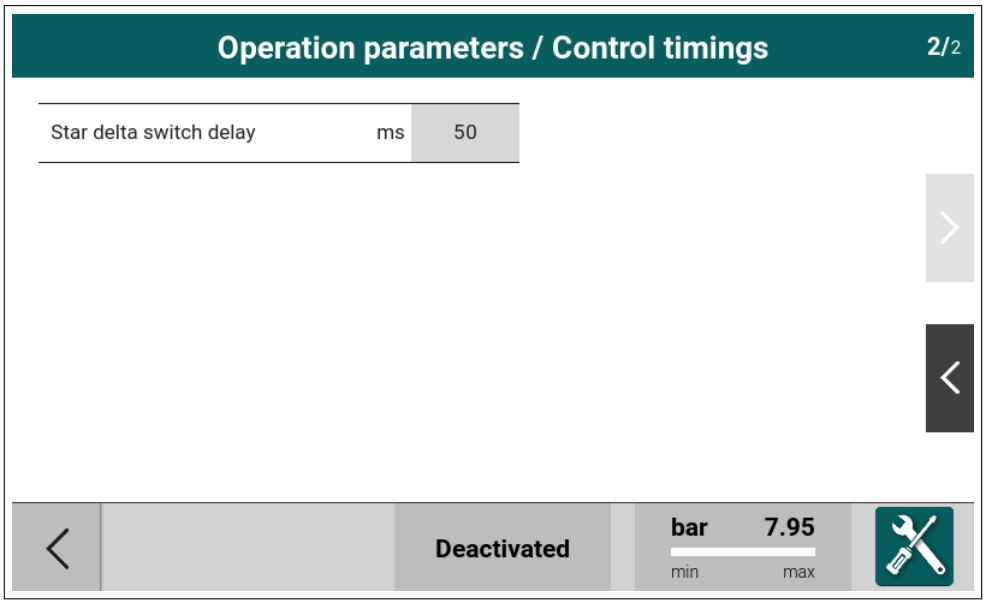

Figure 30: Control timings data input

Table 7: Control timings parameters

Parameter	Description	Access level
Stop mode time	Time between pressing the stop button and the motor stop.	Service
Star delta switch delay	Time between star relay disable and delta relay enable. Time count in ms.	Highest permission level

2.5.2.3. Drain configuration

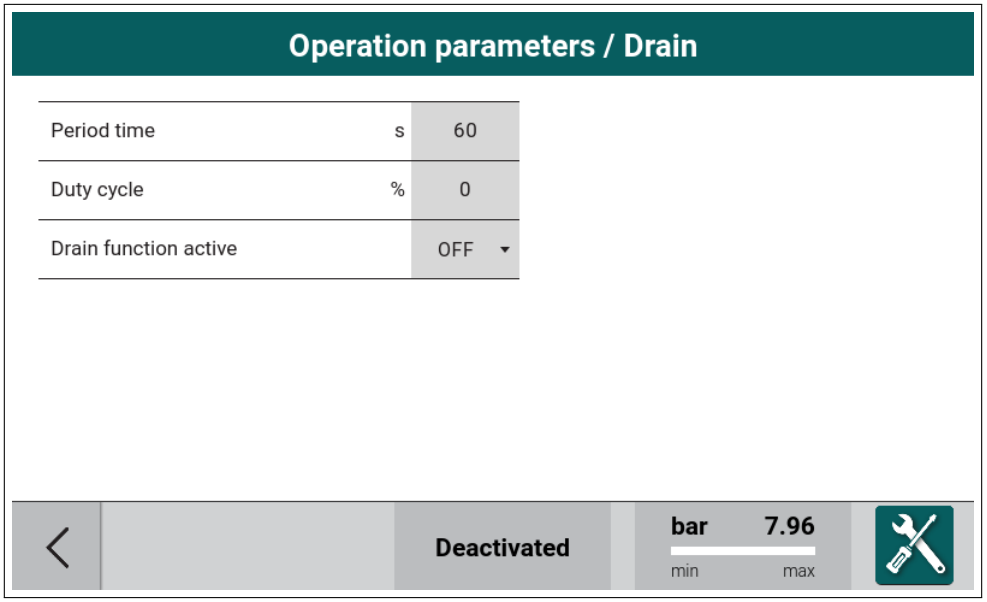

Figure 31: Drain configuration menu

Table 8: Drain configuration parameters

Parameter	Description	Access level
Period time	Length of the drain function operation period	Customer
Drain duty cycle	Time of active ouput during operation period.	Customer
Drain function active	Activation or deactivation of the drain function	Customer

2.5.2.4. Fan configuration

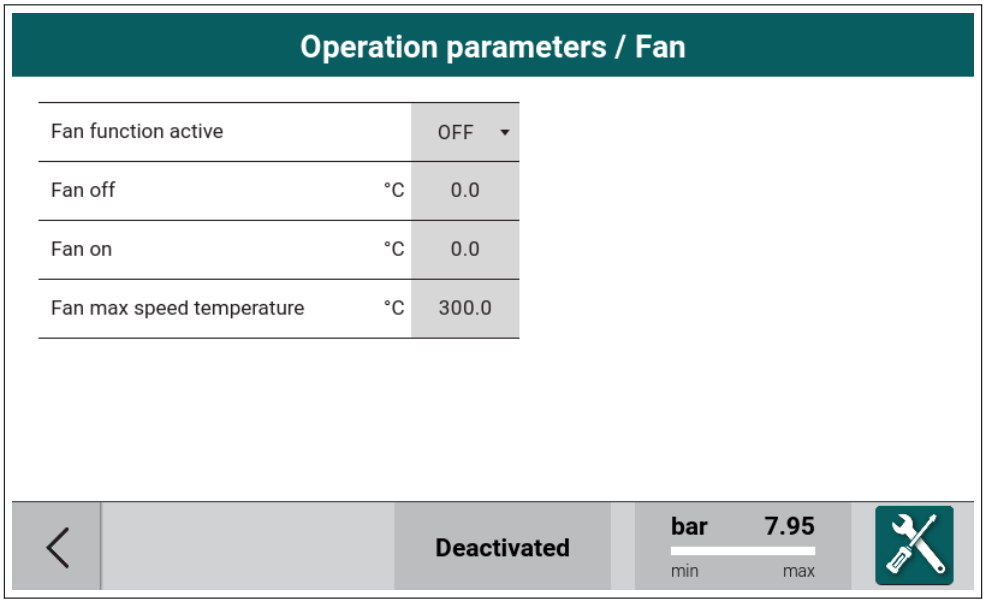

Figure 32: Fan configuration menu

Table 9: Fan configuration parameters

Parameter	Description	Access level
Fan function active	Activation or deactivation of the fan function	Service
Fan off	When the temperature drops below this level fan turns off.	Service
Fan on	When the temperature rises above this level fan turns on. Must be higher than fan off temperature.	Service
Fan max speed temperature	When the temperature reaches this level the analog fan control reaches max value. Must be higher than fan off temperature.	Service

2.5.2.5. Dryer configuration

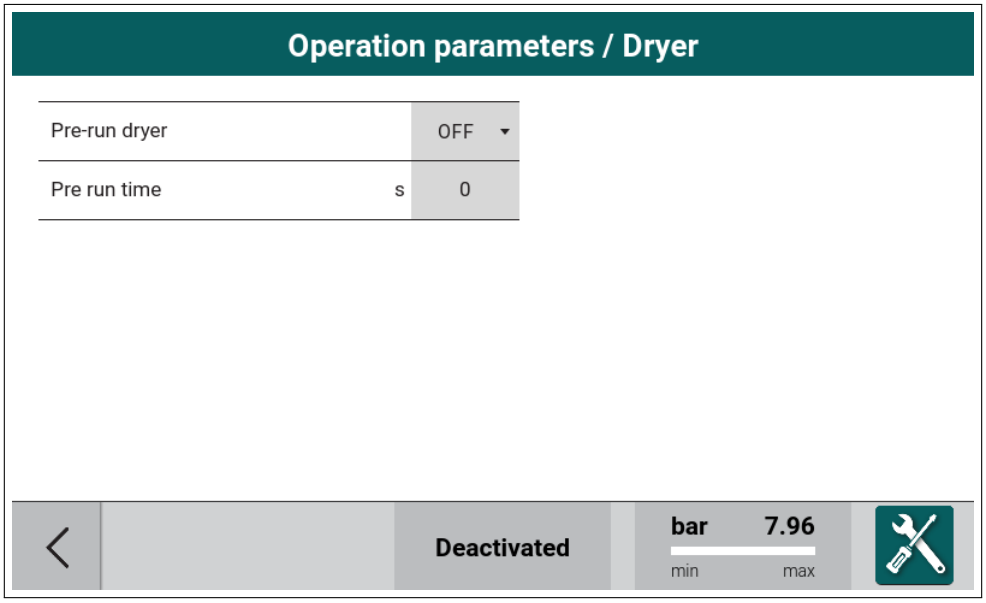

Figure 33: Dryer configuration menu

Table 10: Dryer configuration parameters

Parameter	Description	Access level
Pre-run dryer	Activation or deactivation of the dryer function	Service
Pre run time	Time that prohibits the start of the compressor if the dryer reaches the working condition	Service

2.5.2.6. Frost protection

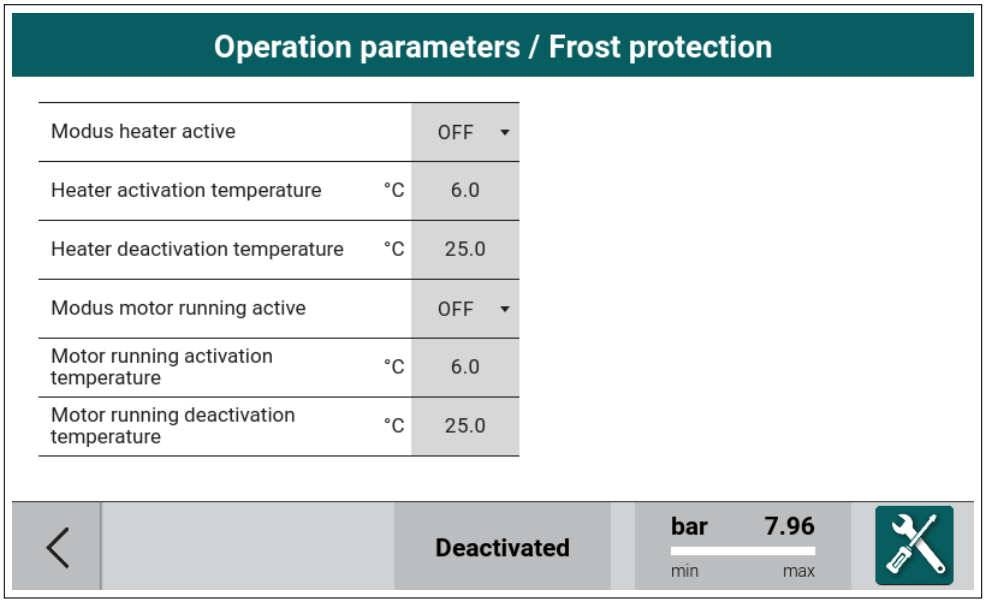

Figure 34: Frost protection configuration menu

Table 11: Frost protection configuration parameters

Parameter	Description	Access level
Modbus heater active	Activation or deactivation of the heater function	Service
Heater activation temperature	When the temperature drops below this level heater turns on.	Service
Heater deactivation temperature	When the temperature rise above this level heater turns off.	Service
Modbus motor heating active	Activation or deactivation of the motor heationg function	Service
Motor heating activation temperature	When the temperature drops below this level motor heating turns on.	Service
Motor heating deactivation temperature	When the temperature rise above this level motor heating turns off.	Service

2.5.3. Schedule

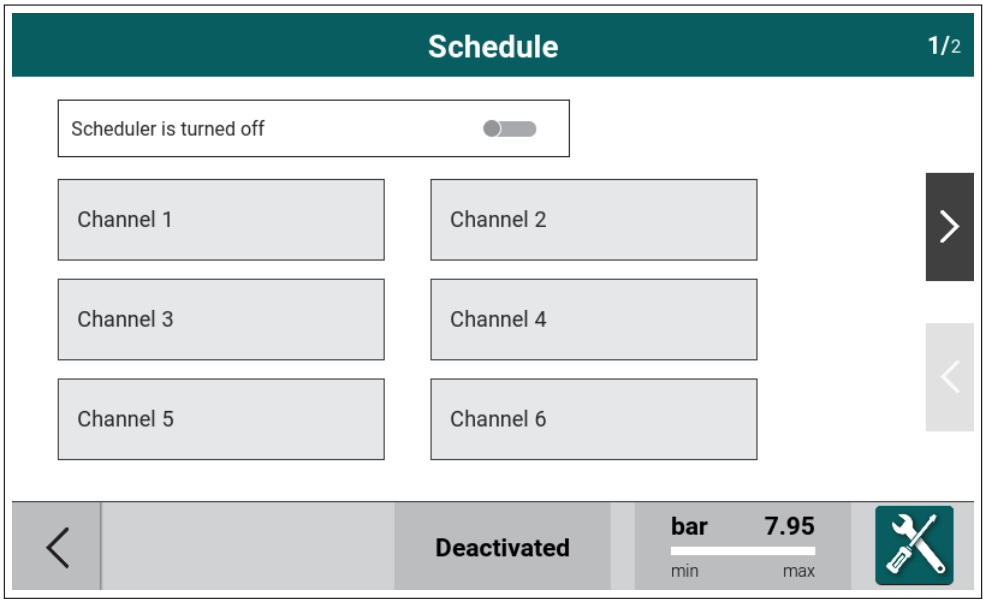

Figure 35: Schedule menu 1 / 2

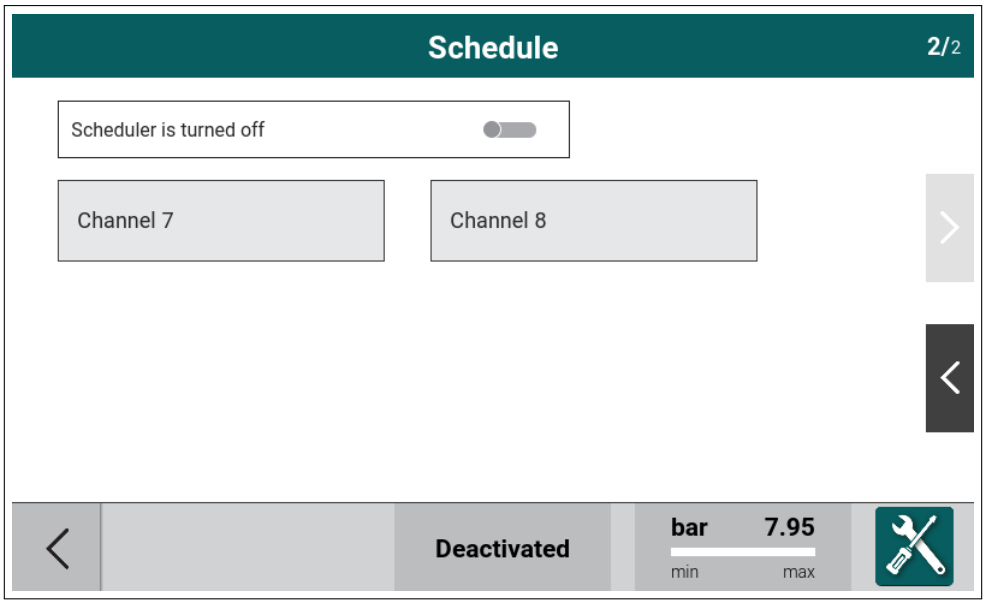

Figure 36: Schedule menu 2 / 2

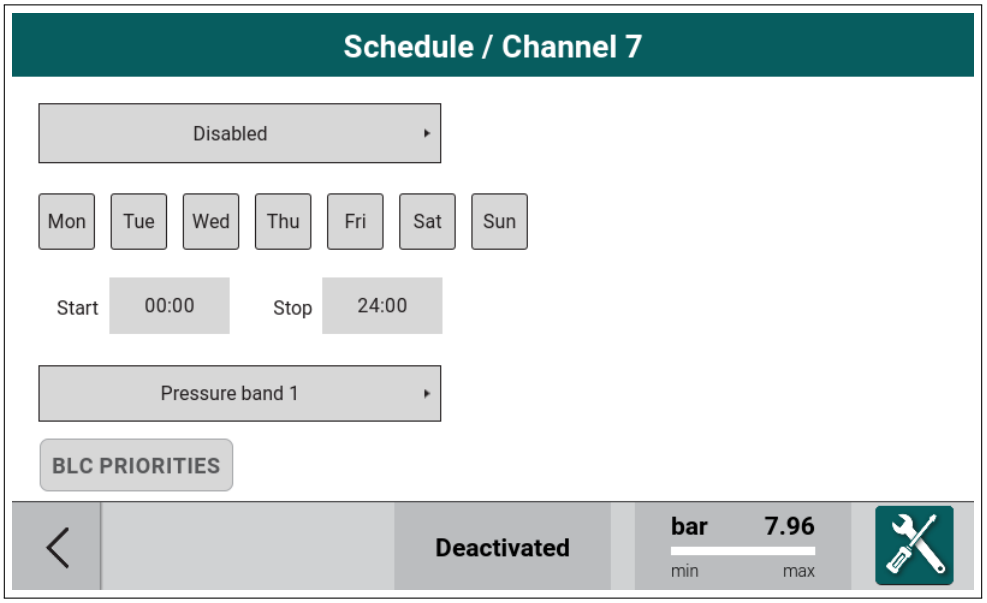

Figure 37: Schedule menu - setting for channel 7

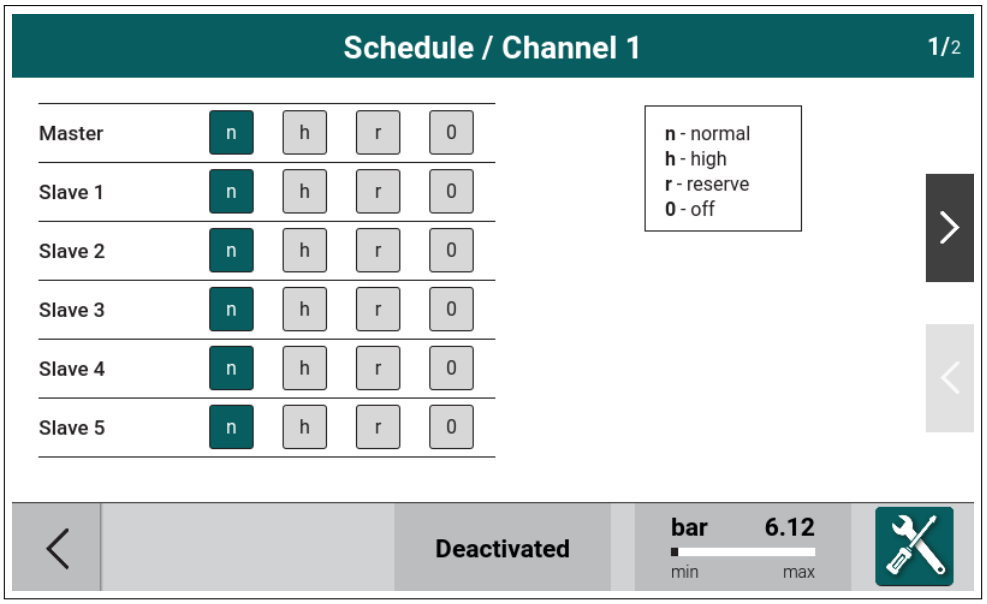

Figure 38: Schedule menu - priorities for channel 7

2.5.4. Baseload Changeover

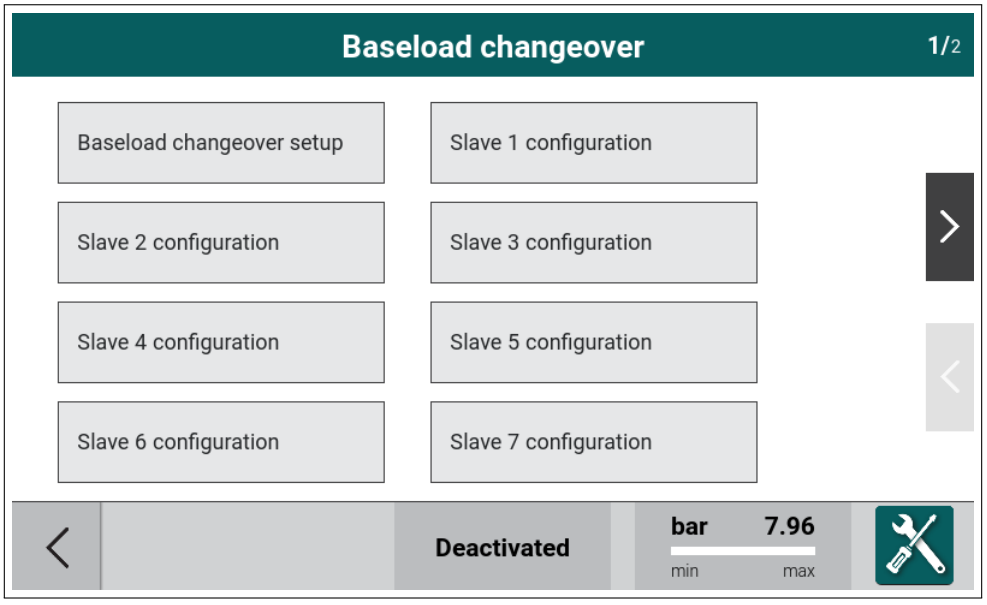

Figure 39: Baseload Changeover menu

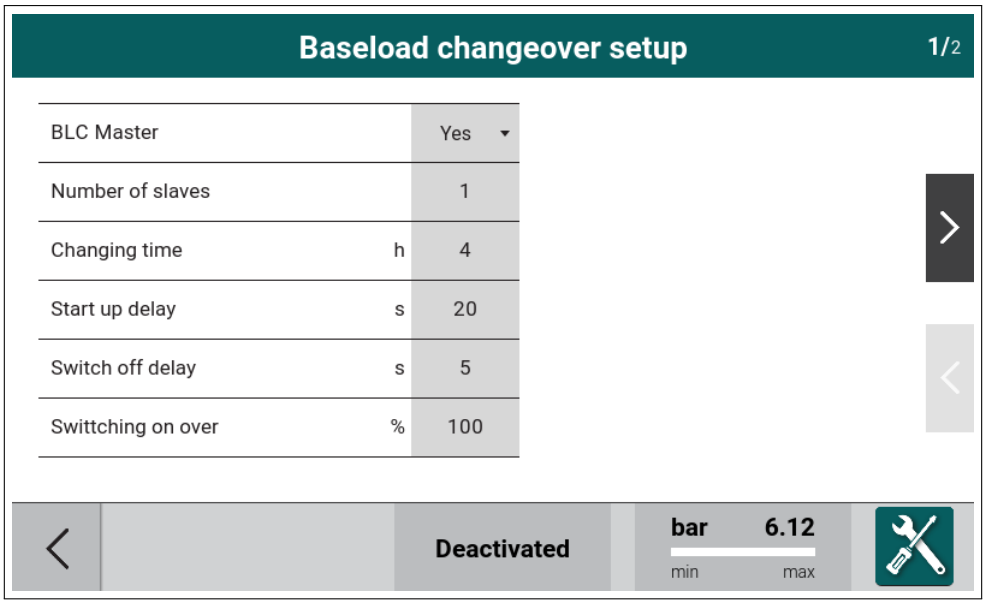

Figure 40: Baseload Changeover menu setup 1/2

Table 12: Baseload Changeover settings 1/3

Parameter	Description	Access level
BLC Master	If set to 'yes' compressor works as master, if set to 'no' compressor works as a slave	Service
Number of slaves	Number of connected slave devices	Service
Changing time	Time between consecutive base load and compressor switch order changes.	Service
Start up delay	Time of switching on additional compressors when the pressure remains below cut-in level. If the pressure rises above cut-in level during this time start of next compressor is prohibited.	Service
Switch off delay	Time of switching off additional compressors when the pressure remains above cut-in level. If the pressure falls below cut-in level during this time stop of the next compressor is prohibited.	Service
Switch on over	The value of motor speed in percent above which the next compressor is switched on.	Service

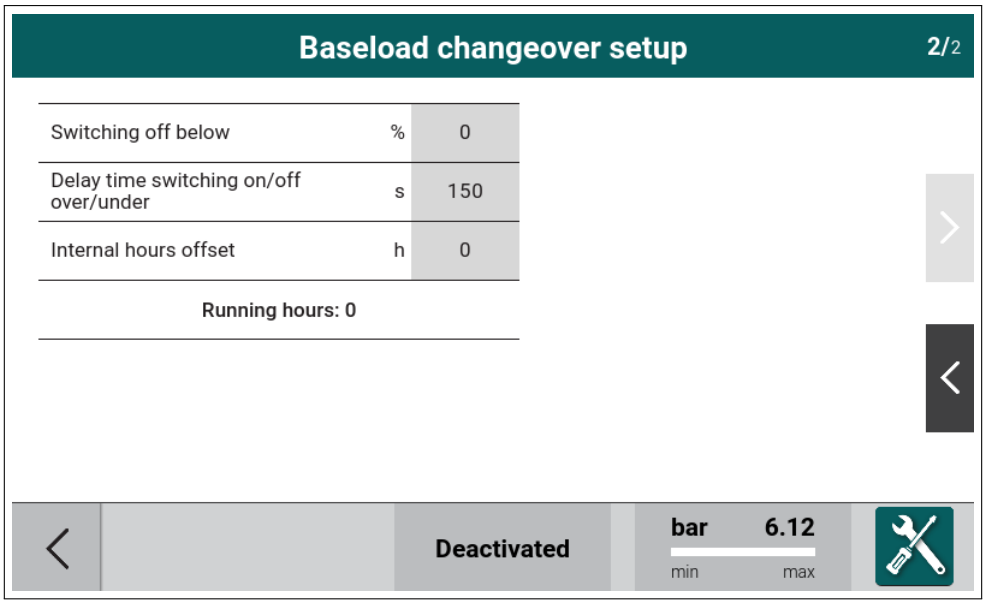

Figure 41: Baseload Changeover menu setup 2/2

Table 13: Baseload Changeover settings 2/3

Parameter	Description	Access level
Switch off below	The value of motor speed in percent below which one of the working compressors is switched off.	Service
Delay time switching on/off over/under	Time between consecutive starts and stops of a compressor with a VFD, related to VFD switch on setpoint and VFD switch off setpoint parameters.	Service
Internal hours offset	Number added to work counter to equalize work hours to rest of the slaves.	Service

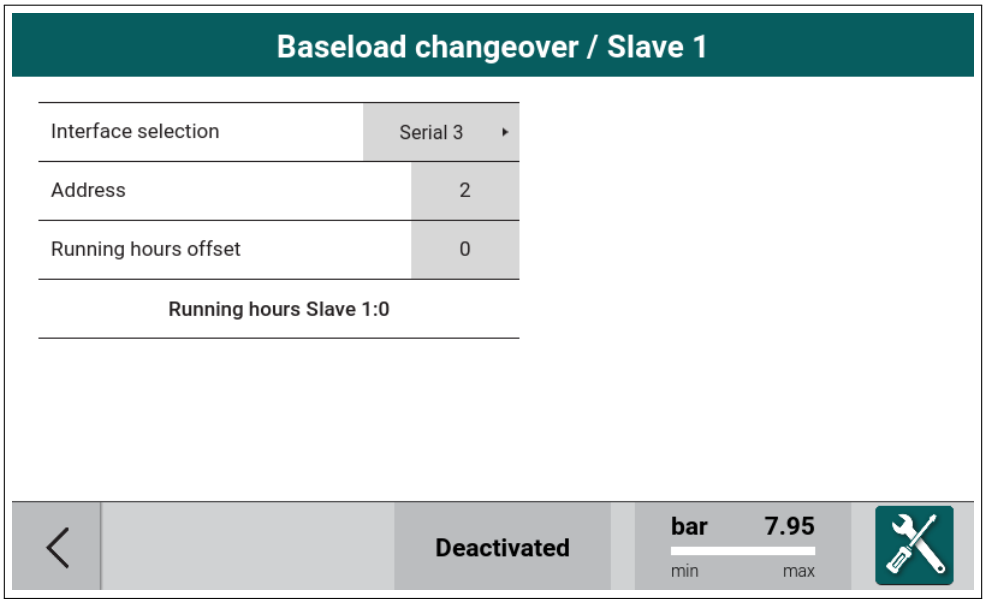

Figure 42: Baseload Changeover menu - setting for slave 1

Table 14: Baseload Changeover settings 3/3

Parameter	Description	Access level
Slave 1 master selector	Select the serial port to which the slave is connected.	Service
Slave 1 address	Select Modbus ID for this device.	Service
Slave 1 hours offset	Number added to work counter to equalize work hours to rest of the slaves.	Service

For other slaves the configuration process is similar and is carried out in next tabs.

2.5.5. Remote control

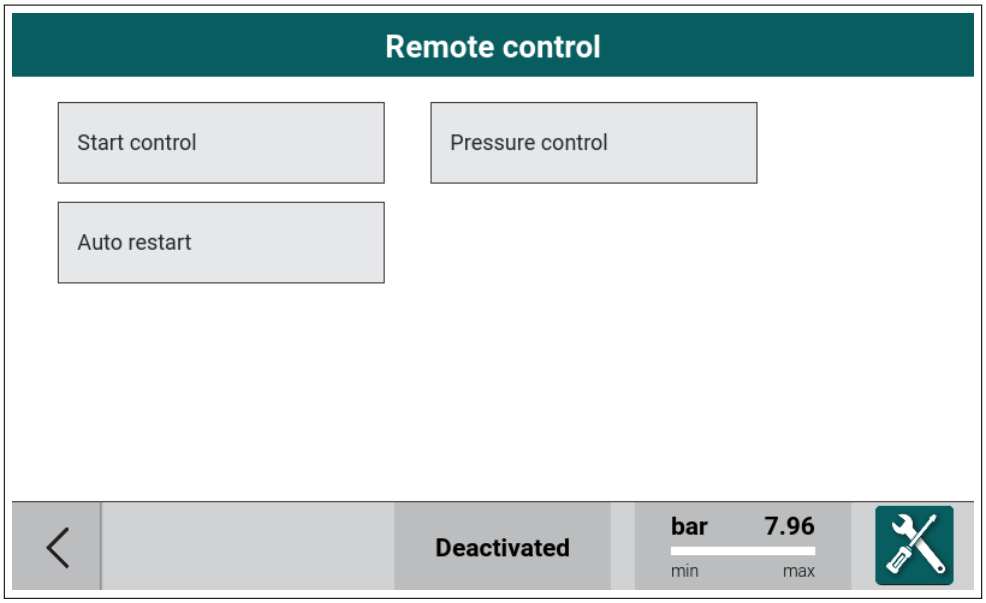

Figure 43: Remote control menu

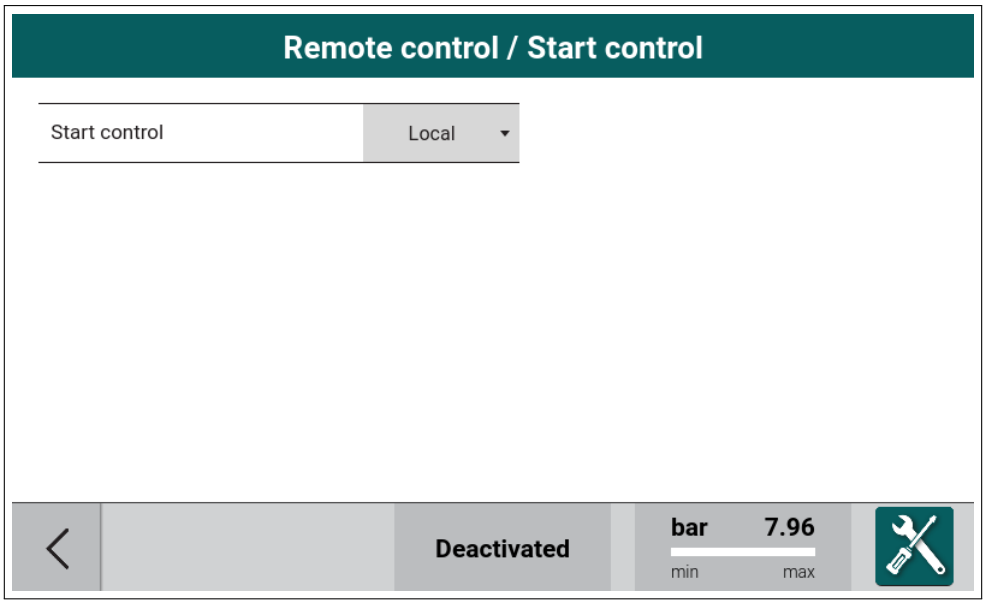

Figure 44: Remote control - Start control settings

Table 15: Remote control - start parameters

Parameter	Description	Access level
Start source	Local or external start source.	Service

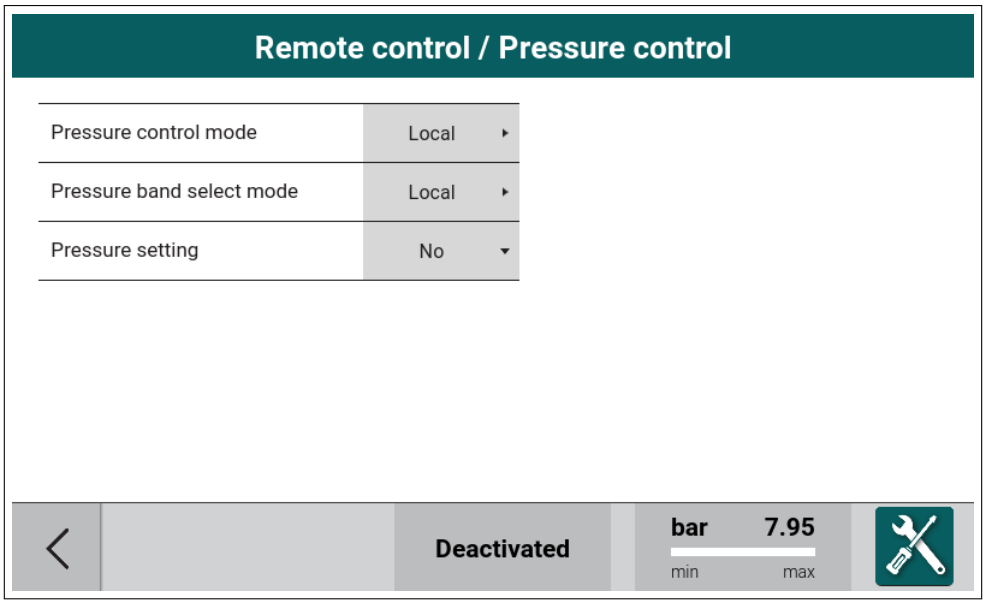

Figure 45: Remote control menu - Pressure control

Table 16: Remote control - Pressure control

Parameter	Description	Access level
Pressure control mode	Local - the controller utilizes load/unload signal derived from internal pressure sensor. BLCO - the controller utilizes load/unload signal from BLCO master. BLCO option is required for BLCO operation. External - the controller utilizes load/unload signal from digital input.	Service
Pressure band select mode	Local - Bands can be changed only by schedule. Digital input - Every pressure band has a digital input for activating a band.	Service
Pressure setting	No - Option is deactivated. Modbus - it is possible to change max/min pressure value by modbus registers.	Service

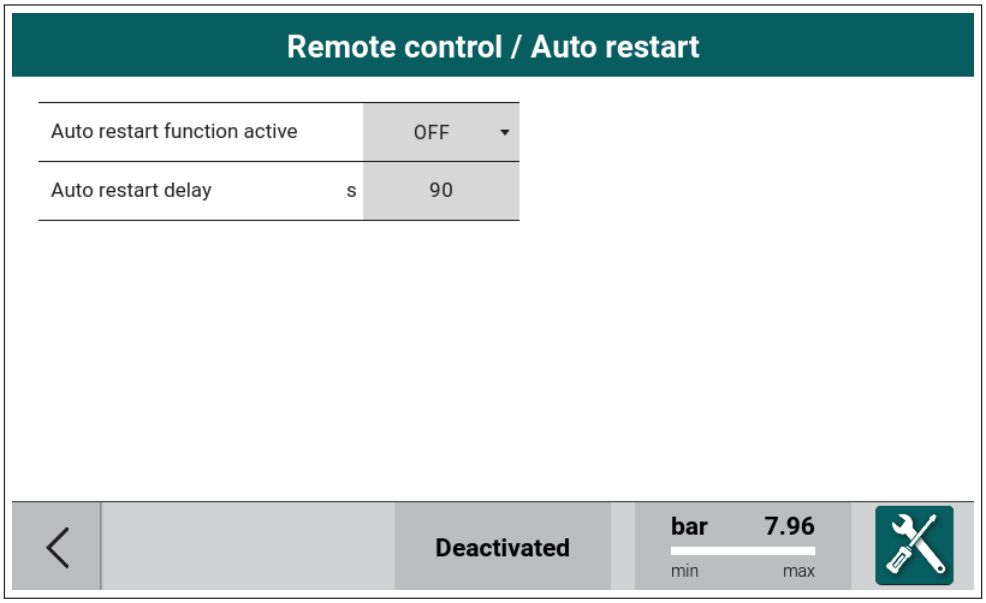

Figure 46: Remote control - Auto restart settings

Table 17: Remote control - auto restart parameters

Parameter	Description	Access level Service
Auto restart function active	Auto restart function active. / inactive.	Customer
Auto restart delay	Delay for the auto restart procedure.	Customer

2.5.6. Display

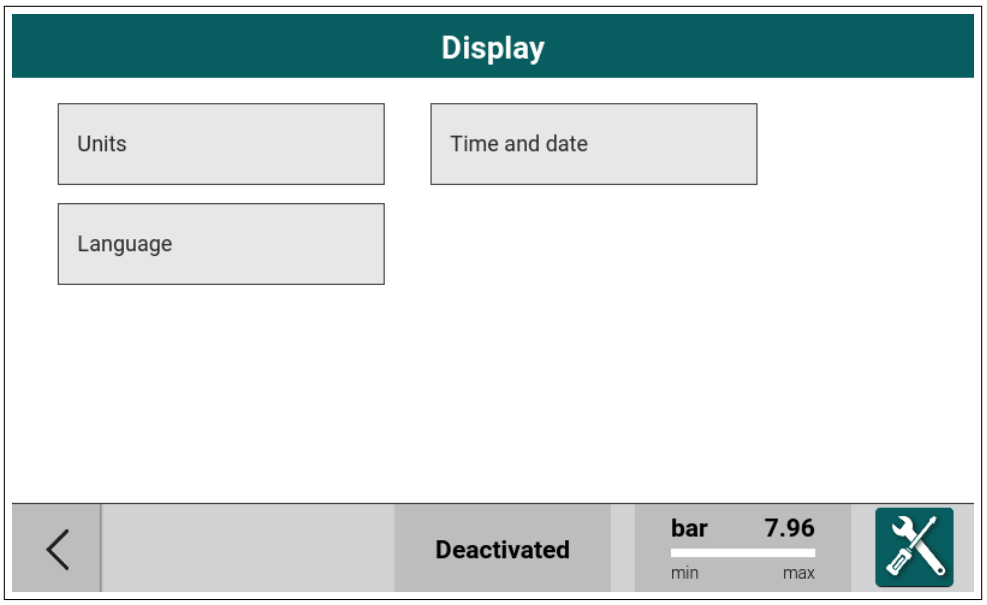

Figure 47: Display menu

Menu is a group of settings concerning the UI display.

2.5.6.1. Units

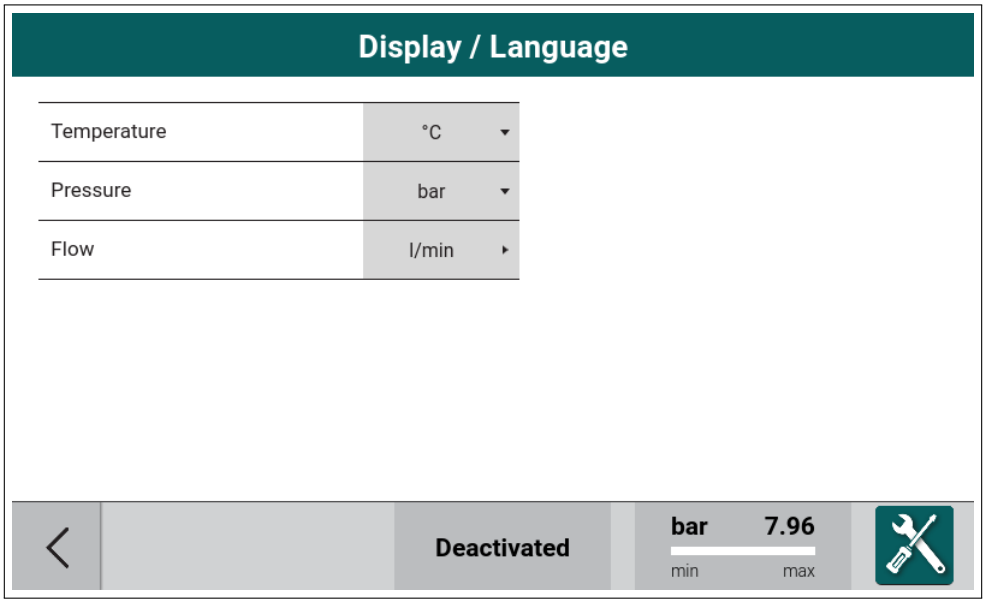

Figure 48: Units configuration menu

2.5.6.2. Time and Date

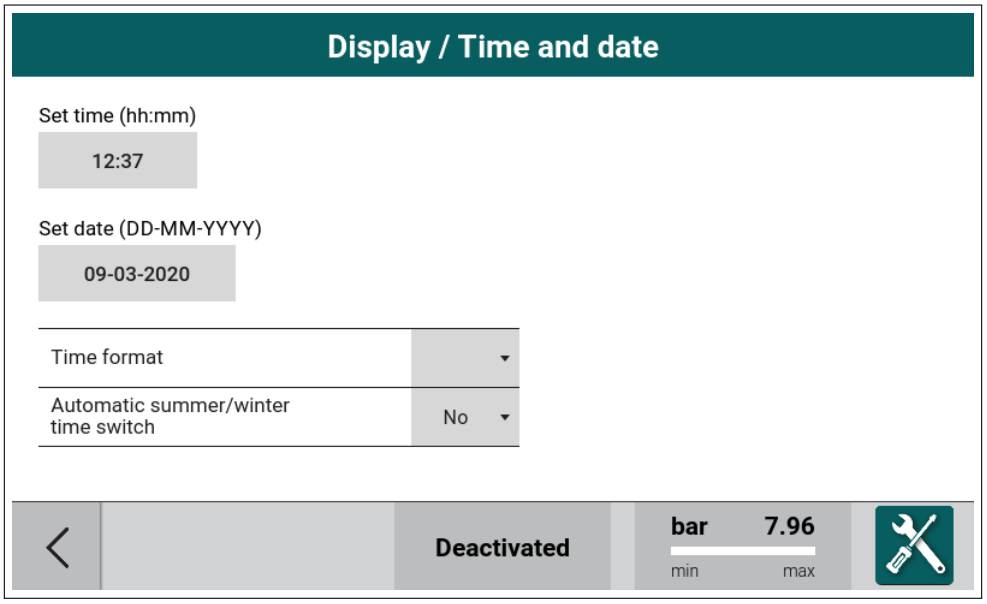

Figure 49: Date and time configuration menu

Table 18: Date and time parameters

Parameter	Description	Access level
Set time	Change current time	Customer
Set date	Change current date	Customer
Time format	Switch between 24h and 12h clock	Customer
Activate automatic summer/winter time switch	Select if the controller is to automatically change time based on Daylight Saving Time	Customer

2.5.6.3. Language

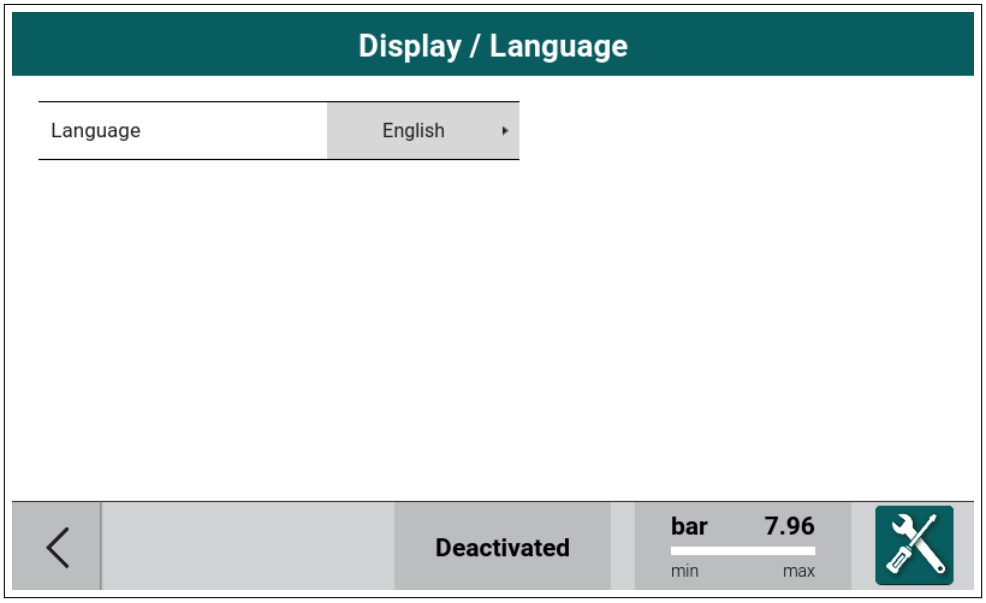

Figure 50: Language selector menu

The manu allows the user to change the display language.

2.5.7. Service data

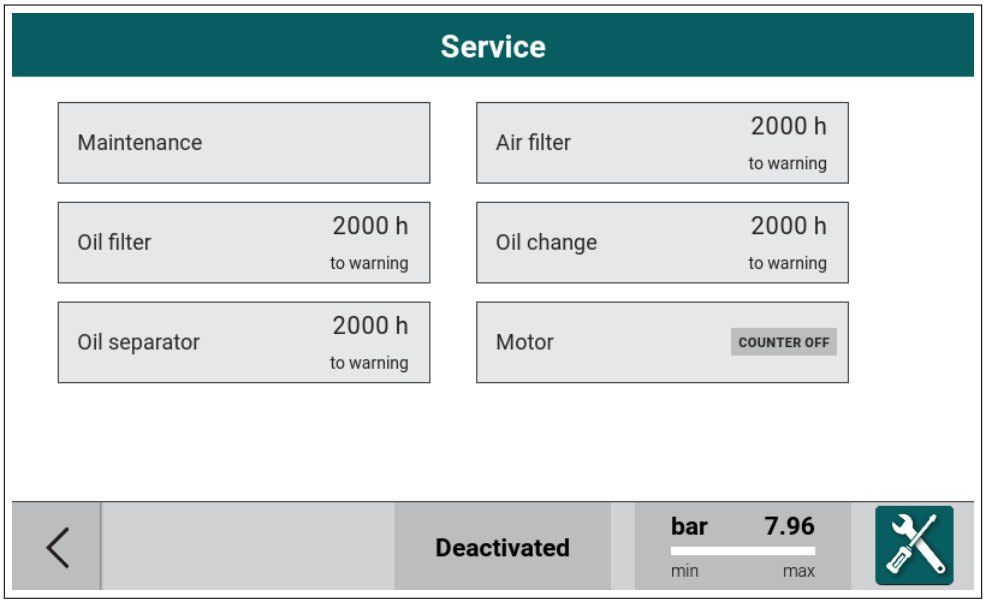

Figure 51: Service counter menu

The menu groups service counter subsystem settings and annual maintenance counter. Main view of the menu lists all the available counters.

Each counter is represented as a tile with the counter's name and status. Status indicates how many hours are left until the counter expires. If the counter reaches 0, the expiry is indicated with a warning symbol and

the status shows how many hours are left until error occurs (if error function is enabled - see 2.5.7.2.).

2.5.7.1. General Maintenance settings

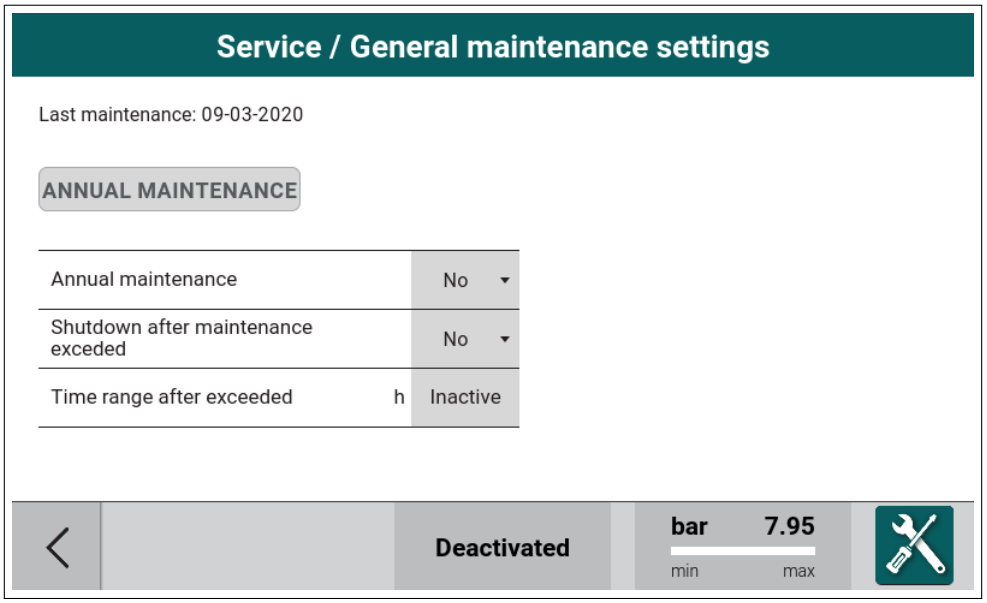

Figure 52: General maintenance menu

General maintenance function allows the user to set the date of the yearly general maintenance.

Table 19: General maintenance parameters

Parameter	Description	Access level
Annual maintenance	Confirm that the maintenance has just been performed and schedule the maintenance in one year.	Service
Shutdown after maintenance exceeded	Enable or disable the fault that occurs if minimum one of the service counters has reached fault level and the maintenance has not been performed after operating more than the number of hours defined in the parameter ”Time range after exceeded” after the counter expiry.	Service
Time range after exceeded	Number of hours of operation for service counters before the fault occurs if the maintenance was not performed in the designated time.	Service

2.5.7.2. Counter settings

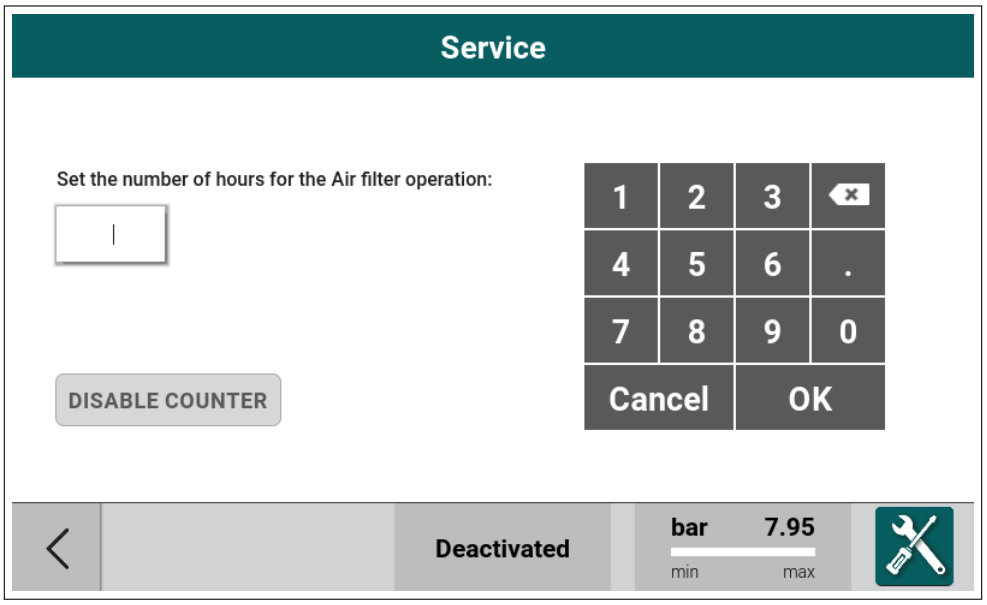

Figure 53: Counter setup

To enter the counter setup menu, press the tile with a corresponding counter name.

The menu allows the user to change the number of hours after which the counter elapses. All counters count to zero from that value. Entering the number of hours enables the counter. To disable the counter, press the ”DISABLE COUNTER” button.

2.5.8. I/O configuration

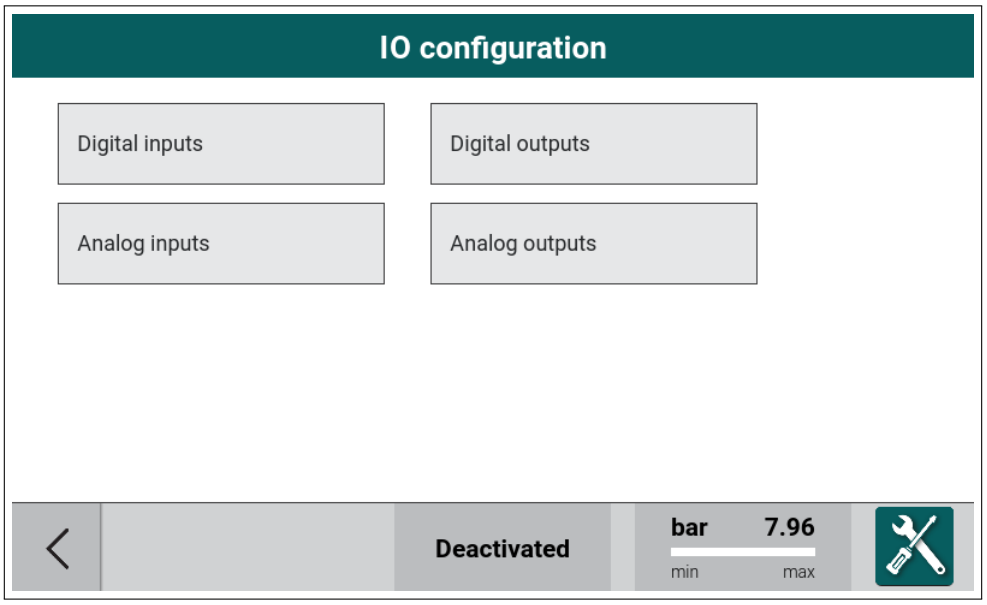

Figure 54: IO Configuration menu

I/O configuration menu groups the settings associated with the controller’s inputs and outputs.

2.5.8.1. Digital input configuration

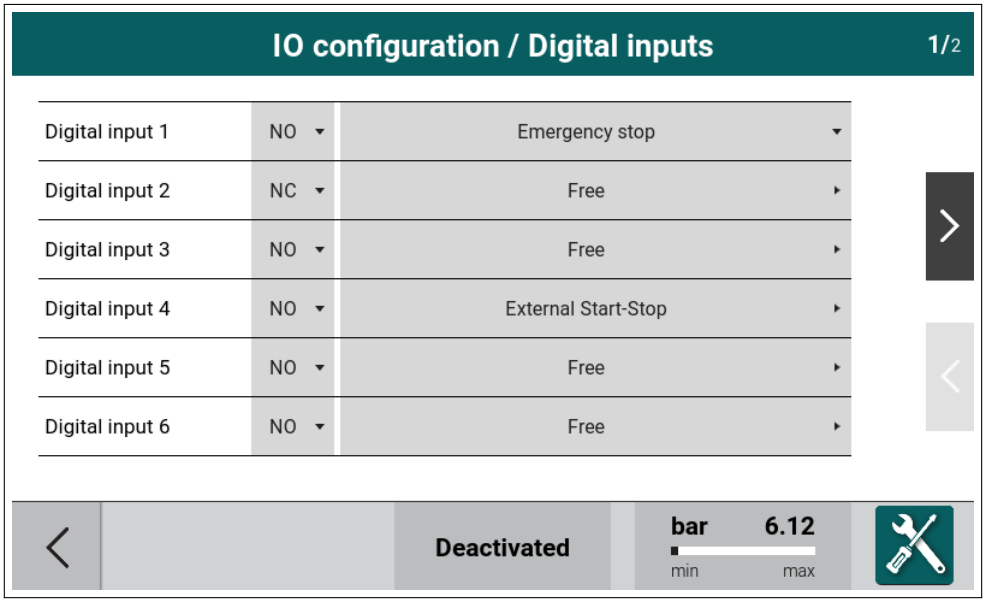

Figure 55: Digital inputs configuration menu

The menu allows the user to assign functions to digital inputs. The controller allows the user to define the function of each available input, both in the master Main Controller and the Main Controller defined as an I/O expander.

Table 20: Digital input configuration parameters

Parameter	Description	Access level
Free	No function assigned to the input	Factory
Motor Current High	Digital input. When active it triggers current overflow fault.	Factory
Fault frequency converter	It is digital input for FC fault	Factory
Fan fault	It is digital input for fan fault	Factory
Phase rotation fault	It is digital input for phase rotation fault	Factory
Fault	The function allows the input to trigger a fault. Can be assigned to all digital inputs.	Factory
Uncritical fault	The function allows the input to trigger uncritical fault. Can be assigned to all digital inputs.	Factory
Recoverable fault	The function allows the input to trigger recoverable fault. Can be assigned to all digital inputs.	Factory
Warning	The function allows the input to trigger a warning. Can be assigned to all digital inputs.	Factory
External Start-Stop	The function allows the compressor to be started from digital input. It can be assigned only to a single input.	Factory
External Load-Unload	External load-unload signal for the compressor.	Factory
100% setpoint	If set, the maximum speed for motor is selected even if pressure value is above the setpoint level.	Factory
Minimum speed 2	If set, the second minium speed for motor is selected.	Factory
Dryer ready	Digital input signal for dryer to indicate that dryer does not work properly. If this input is active the compressor turns off. Behaviour is similar to recoverable fault.	Factory
Band 2 Selector	Digital input to change active band to band 2.	Factory

Table 20: Digital input configuration parameters

Parameter	Description	Access level
Band 3 Selector	Digital input to change active band to band 3.	Factory
Band 4 Selector	Digital input to change active band to band 4.	Factory
Scheduler On-Off	Digital input for Scheduler on-off.	Factory

2.5.8.2. Digital output configuration

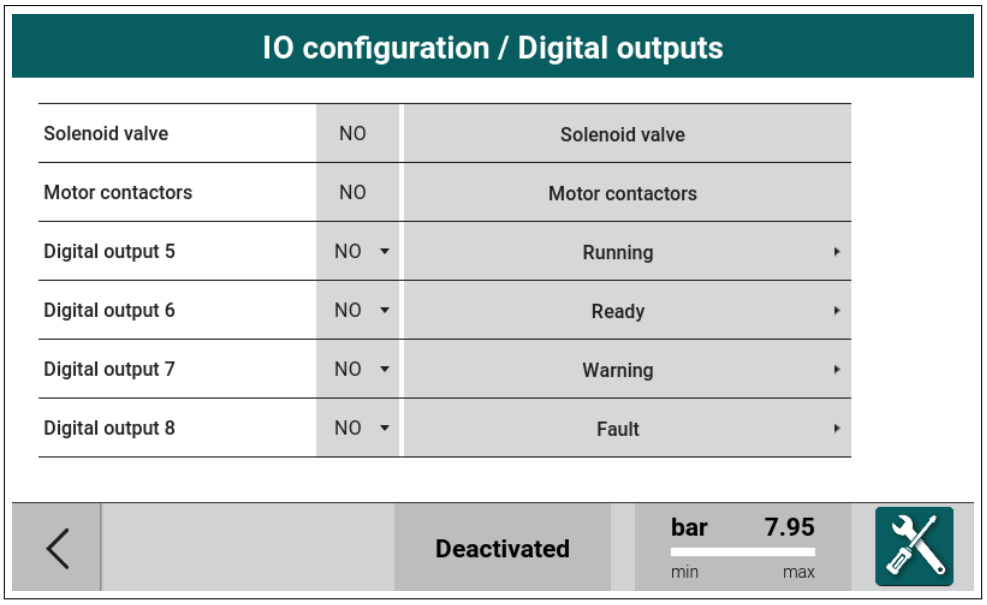

Figure 56: Digital output configuration menu

The menu allows the user to assign functions to digital outputs. The controller allows the user to define the function of four available outputs, both in the master Main Controller and the Main Controller defined as an I/O expander. First four digital outputs are reserved and used in solenoid control and star-delta control.

Table 21: Digital output configuration parameters

Parameter	Description	Access level
Free	No function assigned to the output	Factory
Drain	Control of the condensate drain	Factory
FC Enable	Start stop signal for frequency converter.	Factory
Fan	Control of the cooling fan.	Factory
Dryer	Control of the refrigerator dryer.	Factory
Heater	Control of the heater.	Factory
Warning	Digital output indicating that a warning has occurred.	Factory
Fault	Digital output indicating that a fault has occurred.	Factory
Ready	Digital output indicating that compressor is ready to start.	Factory
Running	Digital output indicating that motor is running.	Factory
On Load	Digital output indicating that compressor is on load.	Factory
Warning / Fault	Digital output indicating that warning or fault has occurred.	Factory
Scheduler channel 1	Digital output indicating that scheduler channel 1 is active.	Factory
Scheduler channel 2	Digital output indicating that scheduler channel 2 is active.	Factory
Scheduler channel 3	Digital output indicating that scheduler channel 3 is active.	Factory
Scheduler channel 4	Digital output indicating that scheduler channel 4 is active.	Factory

Table 21: Digital output configuration parameters

Parameter	Description	Access level
Scheduler channel 5	Digital output indicating that scheduler channel 5 is active.	Factory
Scheduler channel 6	Digital output indicating that scheduler channel 6 is active.	Factory
Scheduler channel 7	Digital output indicating that scheduler channel 7 is active.	Factory
Scheduler channel 8	Digital output indicating that scheduler channel 8 is active.	Factory
Any shceduler	Digital output indicating that any scheduler is active.	Factory
Maintenance	Digital output for control maintenance.	Factory
BLCO Ready	Digital output indicating that BLCO is ready.	Factory

2.5.8.3. Analog input configuration

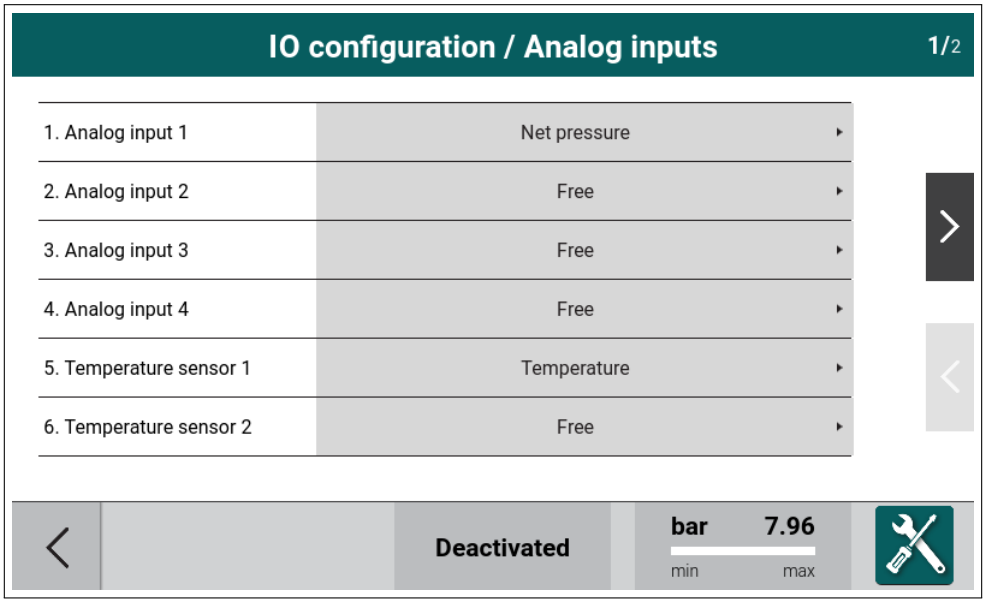

Figure 57: Analog input configuration menu

The menu allows the user to assign functions to analog inputs, both the 4-20mA inputs and the RTD inputs.

Table 22: Analog input 4-20mA configuration parameters

Parameter	Description	Access level
Free	No function assigned to the output	Factory
Net pressure sensor	Input for net pressure sensor	Factory
System pressure sensor	Input for system pressure sensor	Factory

Table 23: Analog input RTD configuration parameters

Parameter	Description	Access level
Free	No function assigned to the output	Factory
Temperature	Input for oil temperature sensor	Factory
Motor temperature	Input for motor temperature sensor	Factory

2.5.8.4. Analog output configuration

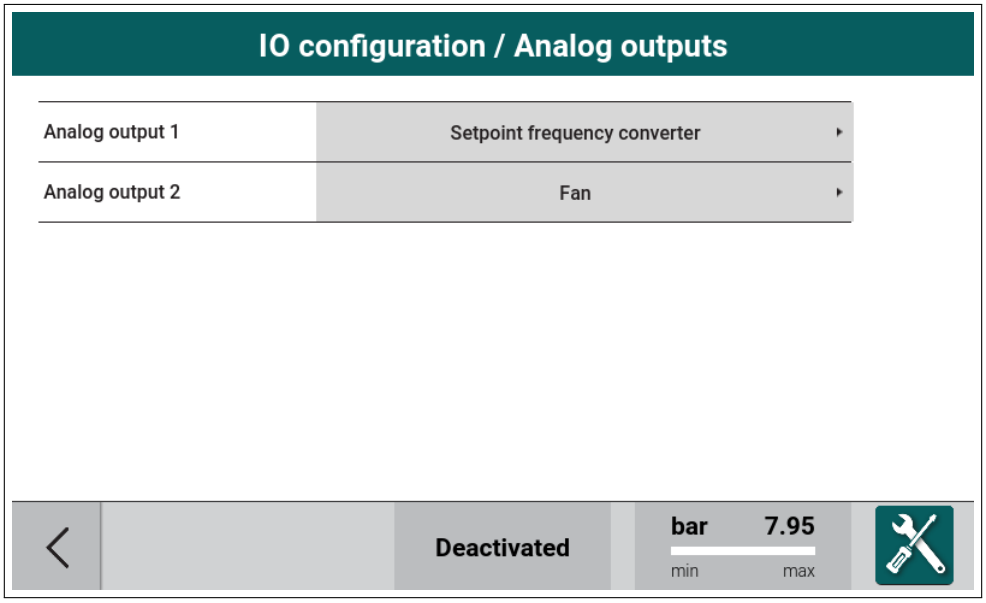

Figure 58: Analog output configuration menu

Table 24: Analog input RTD configuration parameters

Parameter	Description	Access level
Free	No function assigned to the output	Factory
Setpoint frequency converter	Speed setpoint for frequency converter	Factory
Fan	Speed setpoint for fan.	Factory

2.5.9. Network settings

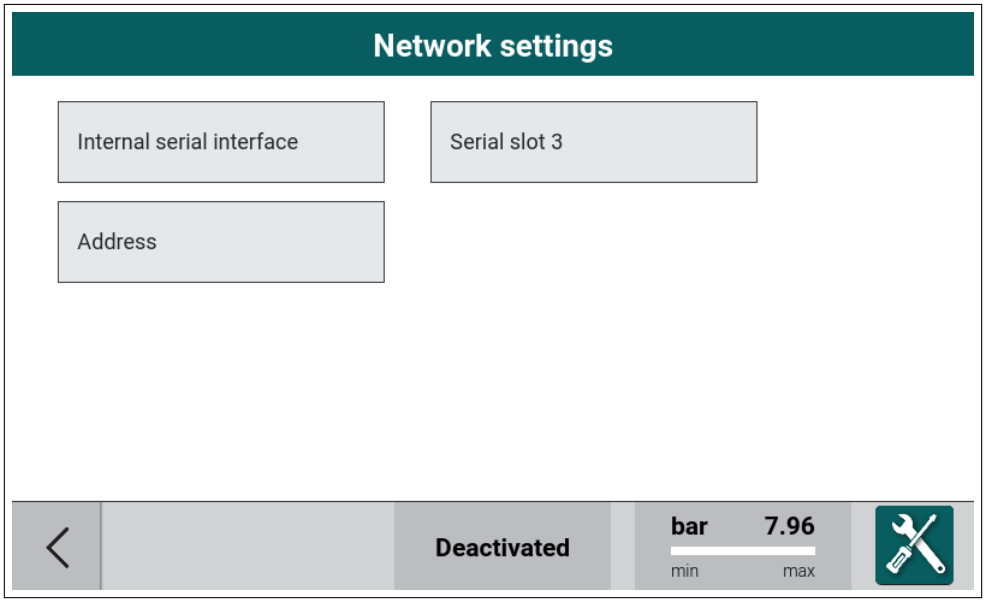

Figure 59: Network settings configuration menu

Tiles with ”Serial 1 configuration”, ”Serial 2 configuration” and ”Serial 3 configuration” are enabled only if external serial communication modules are installed correctly.

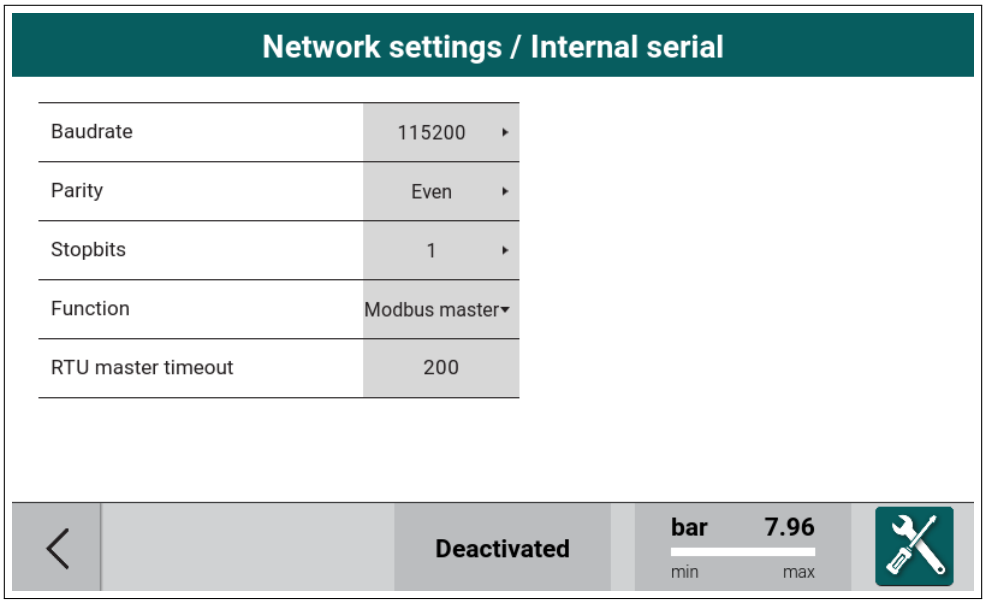

Figure 60: Network settings / serial parameters

Table 25: Internal serial configuration parameters

Parameter	Description	Access level
Baudrate	Buad rate of the internal RS-485 interface (Default: 19200)	Service
Parity	Parity bit for the communication on the internal RS-485 interface (Default: Even)	Service

Table 25: Internal serial configuration parameters

Parameter	Description	Access level
Stop bits	Stop bit for the communication on the internal RS-485 interface (Default: one)	Service
Function	Serial function of the internal interface. None - no function assigned to the internal serial, BLCO Slave - internal serial works as BLCO slave, Modbus Master - internal serial works as Modbus master	Service
RTU master timeout	Time of wait for the response for the communication on the internal RS-485 interface. (Default: 200)	Service

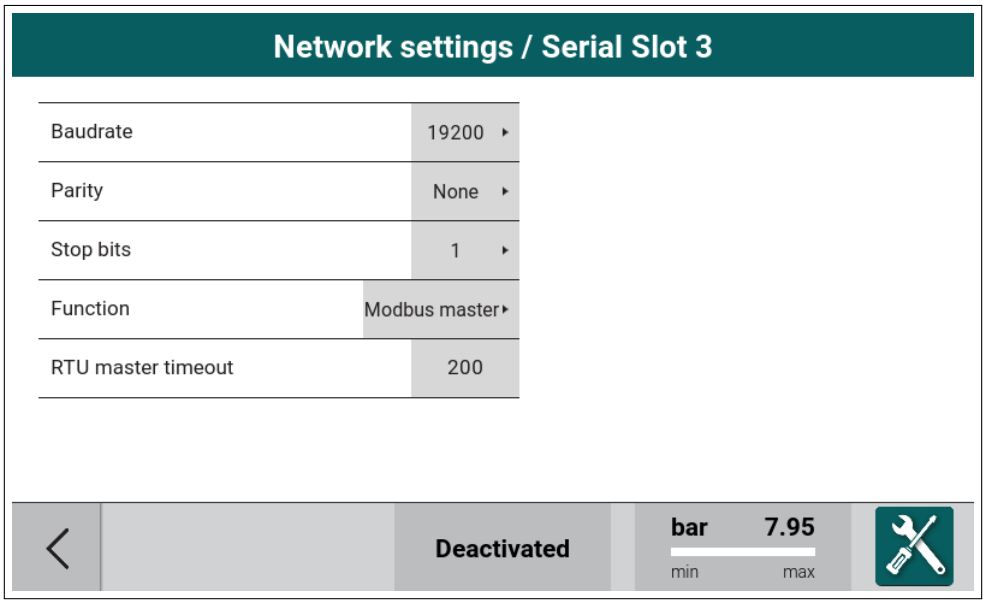

Figure 61: Network settings / serial parameters

Table 26: Serial 2 configuration parameters

Parameter	Description	Access level
Baudrate	Baud rate of the internal RS-485 interface (Default: 19200)	Service
Parity	Parity bit for the communication on the internal RS-485 interface (Default: Even)	Service
Stop bits	Stop bit for the communication on the internal RS-485 interface (Default: two)	Service
Function	Serial function of the internal interface. None - no function assigned to the Serial 2, BLCO Slave - Serial 2 works as BLCO slave, Modbus Master - Serial 2 works as Modbus master	Service
RTU master timeout	Time of wait for the response for the communication on the internal RS-485 interface. (Default: 200)	Service

For serials 1 and 3 there is the same configuration in the next tabs.

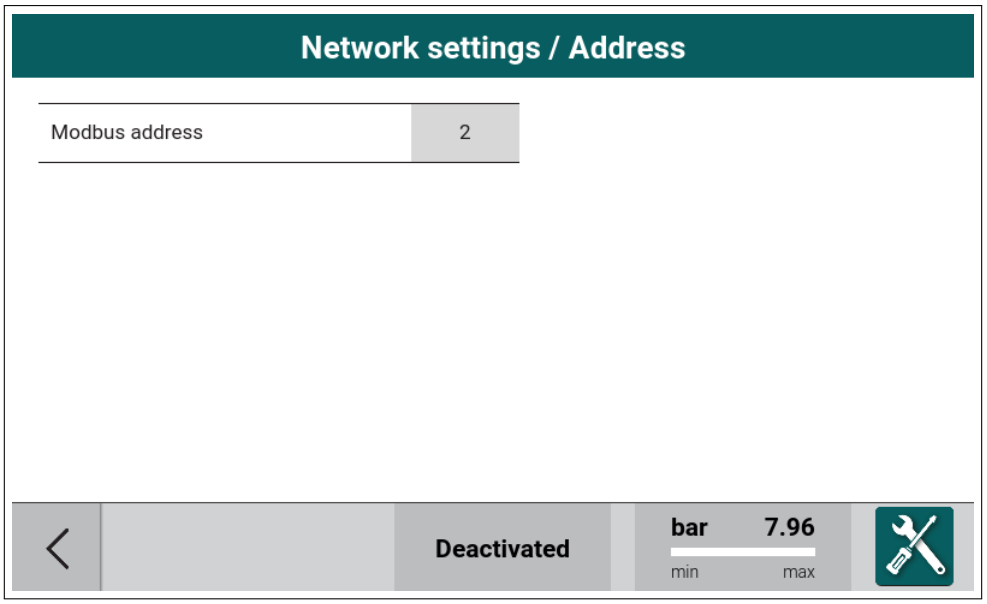

Figure 62: Network settings addres configuration

Table 27: Address configuration parameter

Parameter	Description	Access level
Modbus address	Modbus slave ID for the device. All Modbus serials use the assigned ID.	Customer

2.5.10. Frequency converter

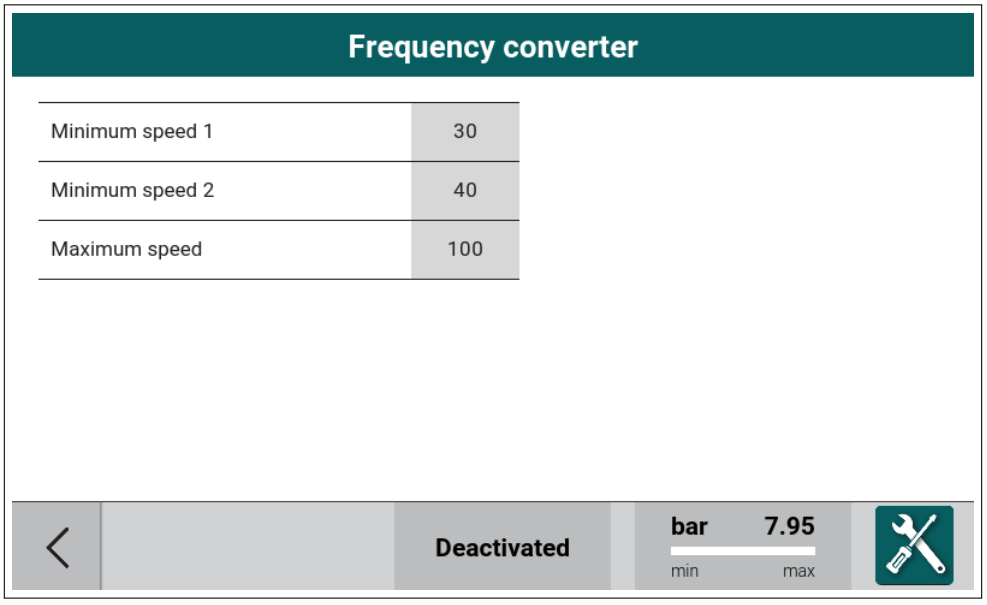

Figure 63: Frequency converter menu

Table 28: Frequency converter parameters

Parameter	Description	Access level
Minimum speed 1	Default lower motor speed limit	Service
Minimum speed 2	Lower motor speed limit	Service
Maximum speed	Highest motor speed limit	Service

2.5.11. Factory settings

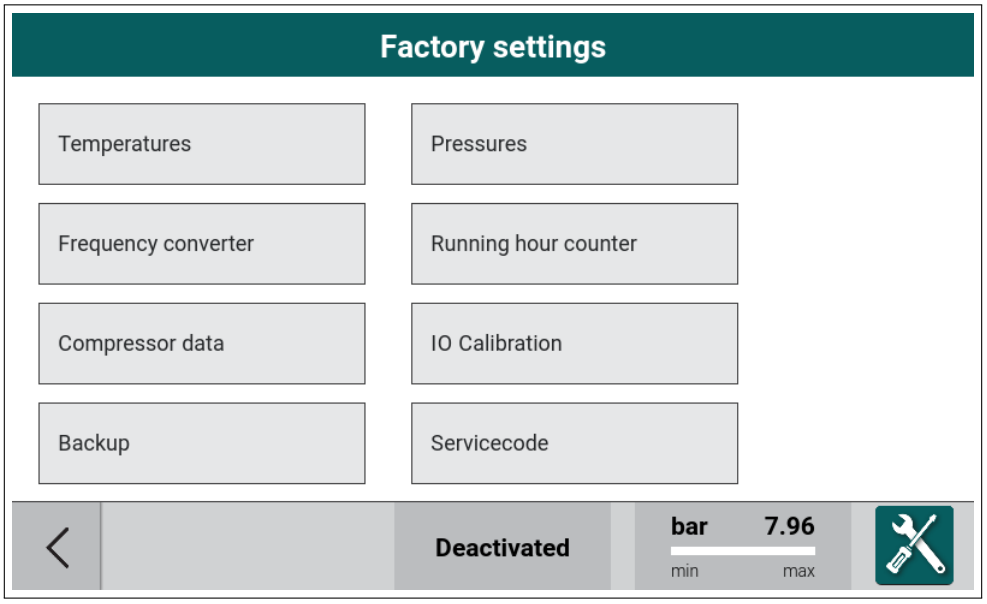

Figure 64: Factory settings menu

The menu groups the parameters that can only be changed by the manufacturer.

2.5.11.1. Temperatures

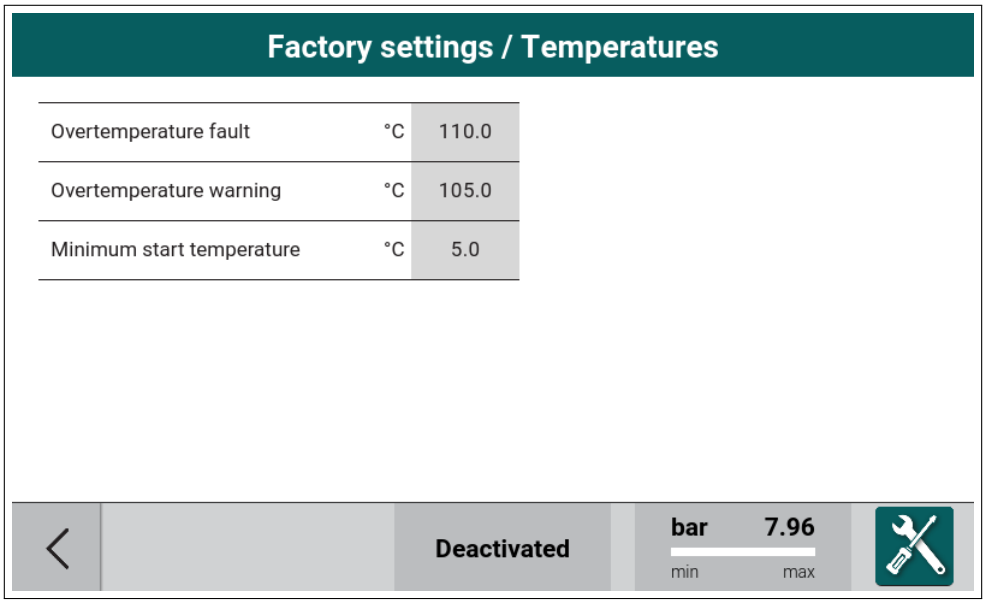

Figure 65: Factory settings temperature menu

Table 29: Factory settings temperature parameters

Parameter	Description	Access level
Overtemperature fault	Value of the oil temperature readout that stops the compressor and triggers fault if the temperature is above the value	Factory
Overtemperature warning	Value of the oil temperature readout that triggers warning if the temperature is above the value	Factory
Minimum start temperature	Value of the oil temperature readout that stops the compressor and triggers fault if the temperature is below the value	Factory

2.5.11.2. Pressure settings

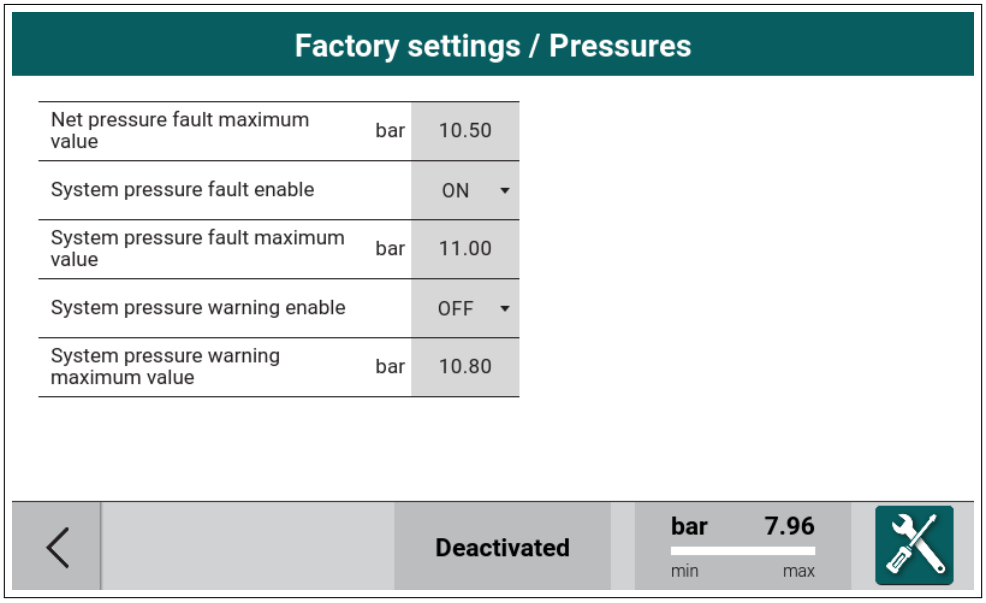

Figure 66: Factory settings pressure menu

Table 30: Factory settings pressure parameters

Parameter	Description	Access level
Net pressure fault maximum value	Value of the net pressure readout that stops the compressor and triggers fault if the pressure is above the value. Range [Net pressure max alert + 0.2 bar - 16 bar]	Factory
System pressure fault enable	Enable or disable of system pressure fault.	Factory
System pressure fault maximum value	Value of the system pressure readout that stops the compressor and triggers fault if the pressure is above the value.	Factory
System pressure warning enable	Enable or disable of system pressure warning.	Factory
System pressure warning maximum value	Value of the system pressure readout that triggers warning if the pressure is above the value.	Factory

2.5.11.3. Frequency converter

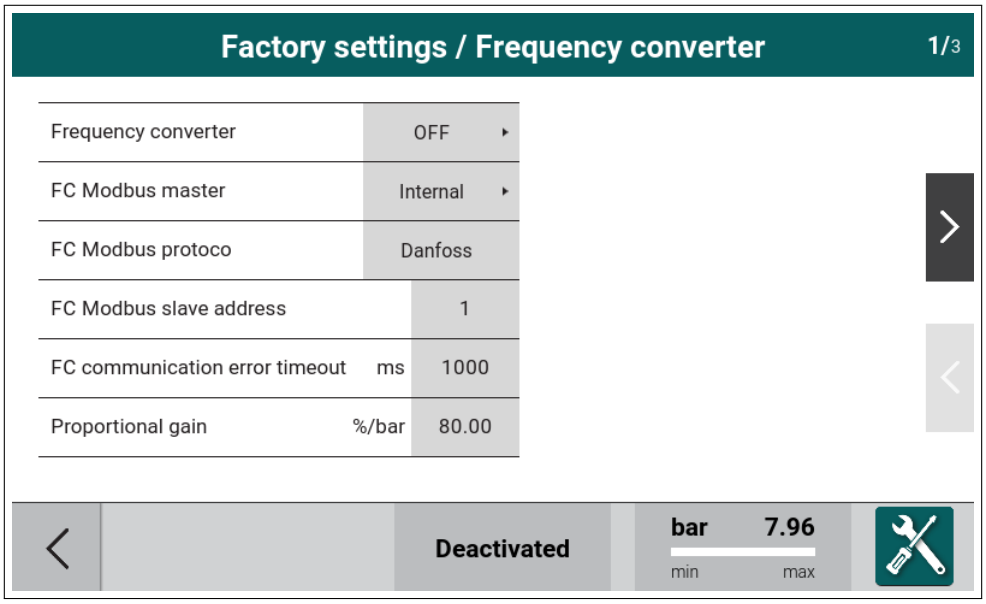

Figure 67: Factory settings frequency converter menu 1/3

The menu contains all the settings that are associated with the frequency converter control algorithm.

Table 31: Factory settings frequency converter parameters

Parameter	Description	Access level
Frequency converter	Select compressor operation mode. • OFF - compressor in star-delta configuration • Analog - compressor in frequency converter mode with I/O control	Factory
FC Modbus master	Select serial bus for frequency converter.	Factory
FC Modbus protocol	Set the type of Modbus device.	Factory
FC Modbus slave address	Set device Modbus ID for frequency converter.	Factory
FC communication error timeout	Timeout for fault communication.	Factory
Proportional gain	PI parameter which determines influence of proportional coefficient for regulation	Factory

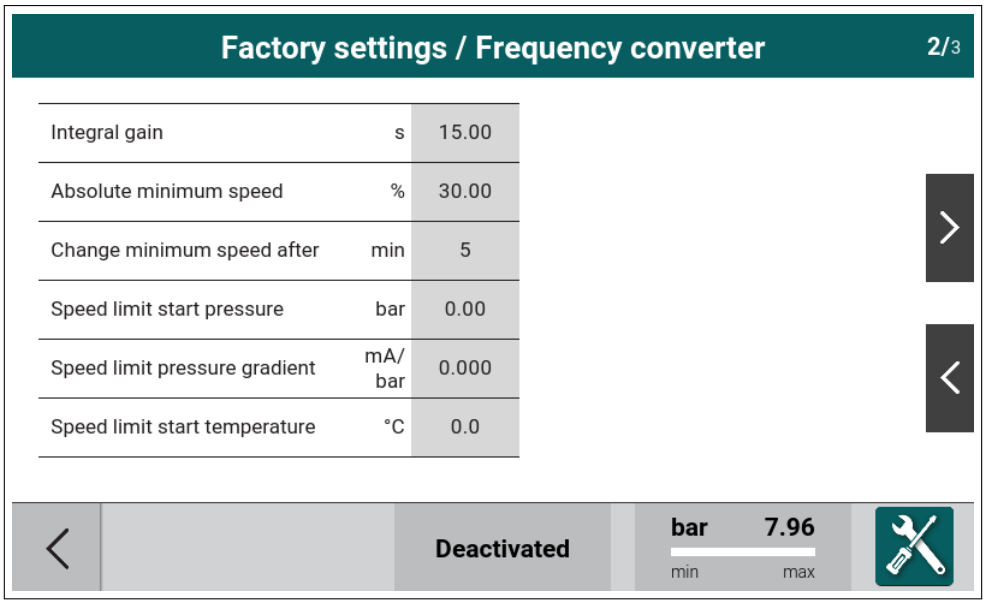

Figure 68: Factory settings frequency converter menu 2/3

Table 32: Factory settings frequency converter parameters

Parameter	Description	Access level
Integral gain	PI parameter which determines influence of Integral coefficient for regulation	Factory
Absolute minimum speed	Lowest motor speed limit	Factory
Change minimum speed after	Time after which the speed limit is changed from minimum 1 to speed limit minimum 2.	Factory
Speed limit start pressure	Pressure level on which speed reduction starts.	Factory
Speed limit pressure gradient	Dependency between presssure and speed setpoint reduction.	Factory
Speed limit start temperature	Temperature level on which speed reduction starts.	Factory

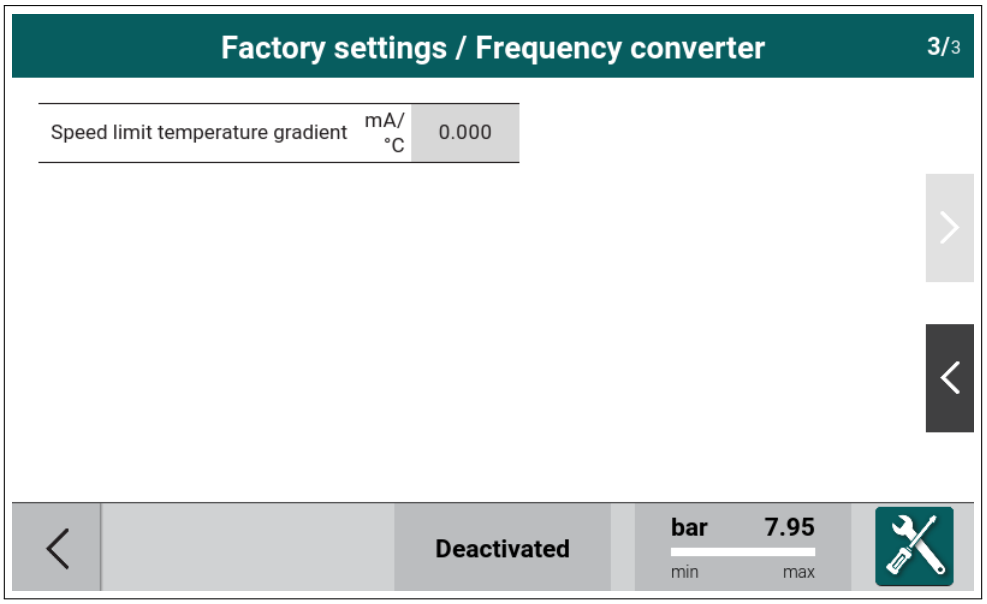

Figure 69: Factory settings frequency converter menu 3/3

Table 33: Factory settings frequency converter parameters

Parameter	Description	Access level
Speed limit temperature gradient	Dependency between temperature and speed setpoint reduction.	Factory

2.5.11.4. Running hour counter

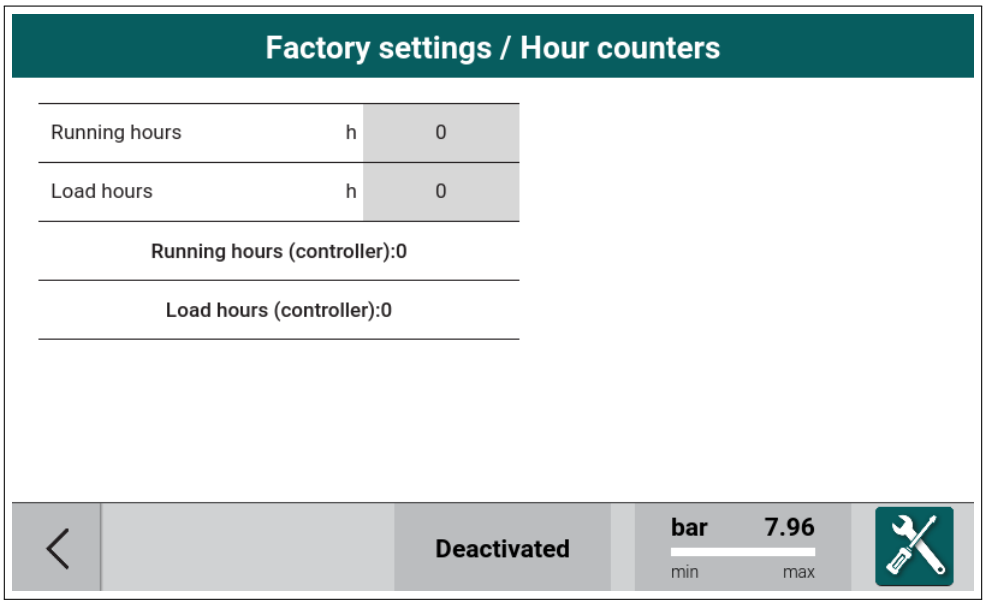

Figure 70: Factory settings - Work counters

Table 34: Factory settings hour counters parameters

Parameter	Description	Access level
Running hours	Work hours counter setup	Factory
Load hours	Compressor under load counter setup.	Factory

2.5.11.5. Compressor data

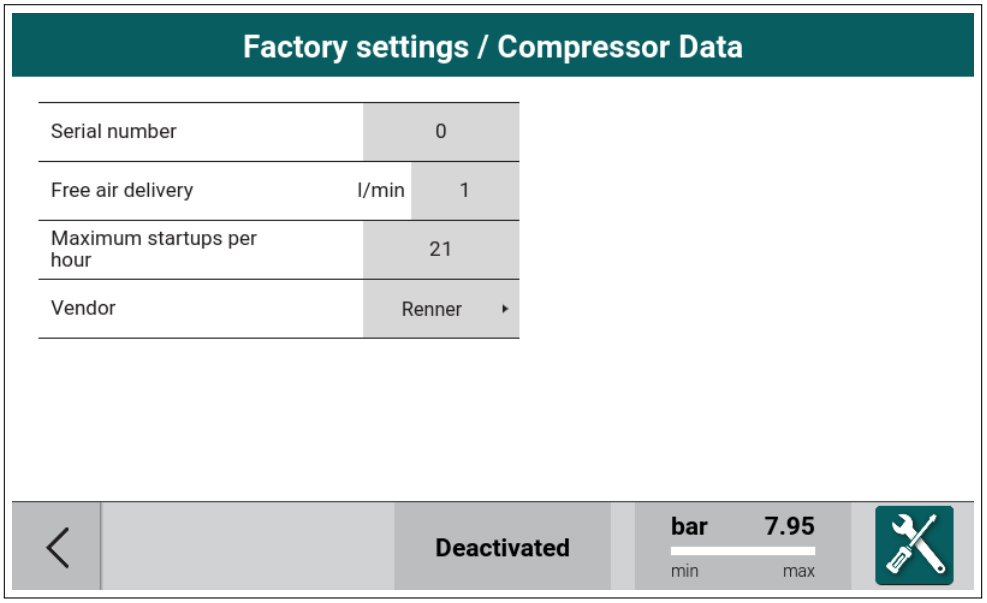

Figure 71: Factory settings - Compressor Data

Table 35: Factory settings compressor data parameters

Parameter	Description	Access level
Serial number	Unique number for the compressor, created by the manufacturer	Factory
Free air delivery	Nominal value of free air delivery.	Factory
Maximum startups per hour	If the number of compressor starts is equal with number declared in the parameter, compressor can't start.	Factory
Vendor	It's used to change the vendor logo on the main view.	Factory

2.5.11.6. IO Calibration

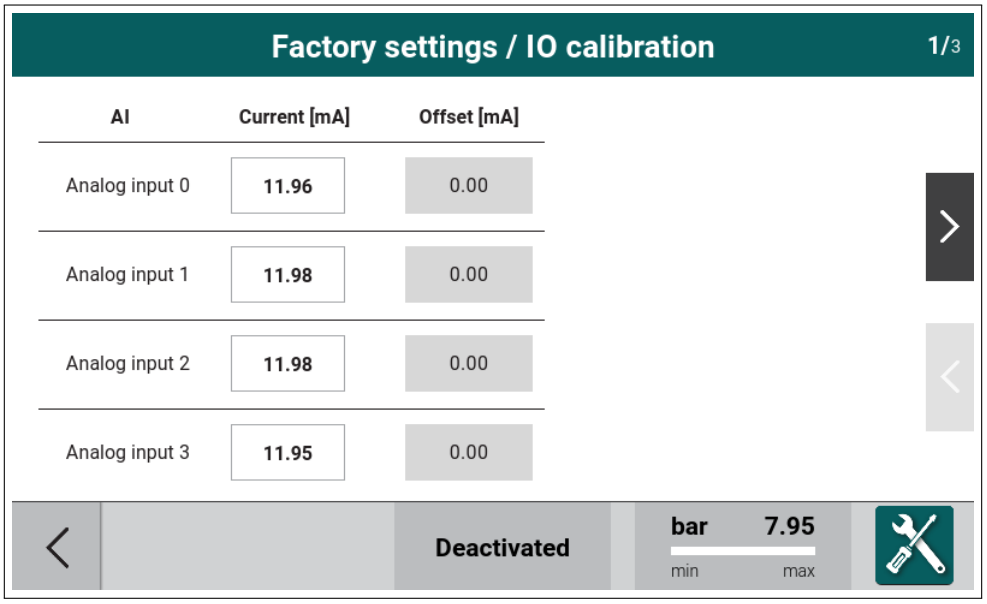

Figure 72: Factory settings - IO Calibration

2.5.11.7. Backup

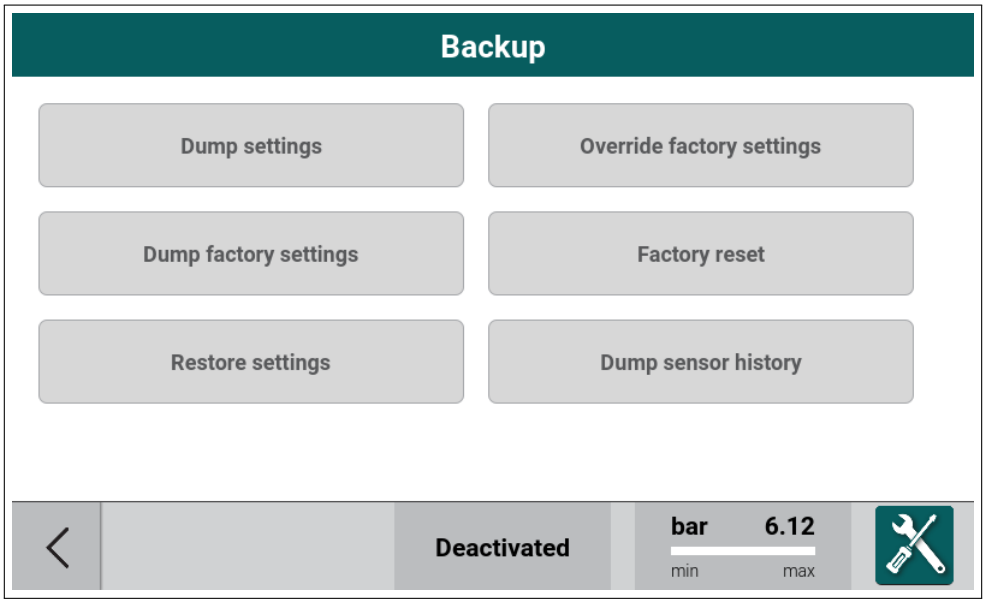

Figure 73: Backup menu

Table 36: Backup menu

Parameter	Description	Access level
Dump settings	Records encrypted settings to USB	Factory
Override factory settings	Remembers the current settings in the internal memory. The stored settings are then restored with factory reset.	Factory

Table 36: Backup menu

Parameter	Description	Access level
Dump factory settings	Records encrypted settings to USB and a public file to view stored settings	Factory
Factory reset	Restores the settings stored in the internal memory using override factory settings	Factory
Restore settings	Restore the settings from the flash drive. There must be an encrypted file on the USB, created with Dump settings or Dump factory settings.	Factory
Dump sensor history	Record to USB file with sensors measurement history	Factory

2.5.11.8. PIN codes

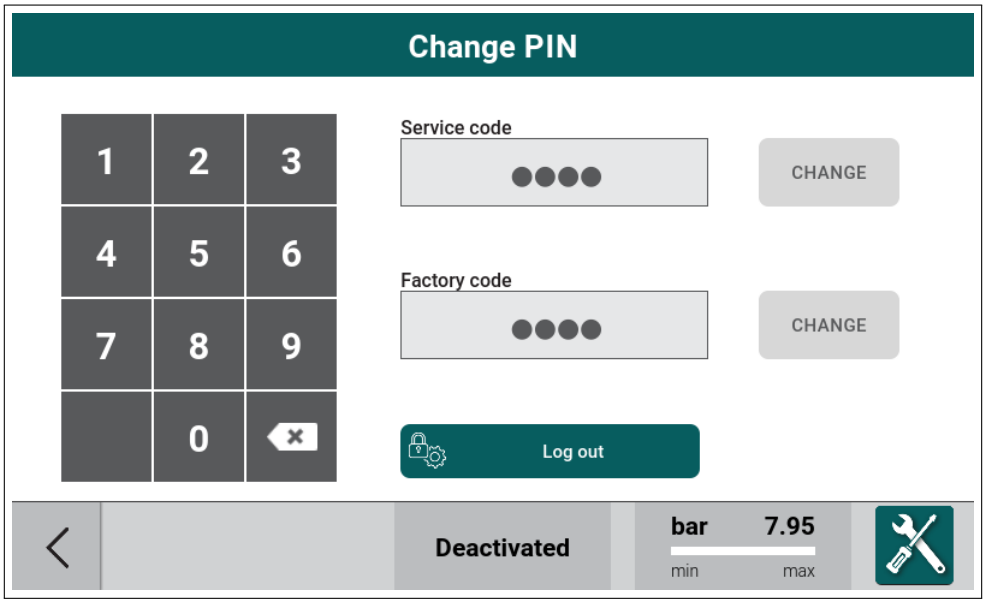

Figure 74: Factory settings - PIN codes

2.5.12. Diagnostics

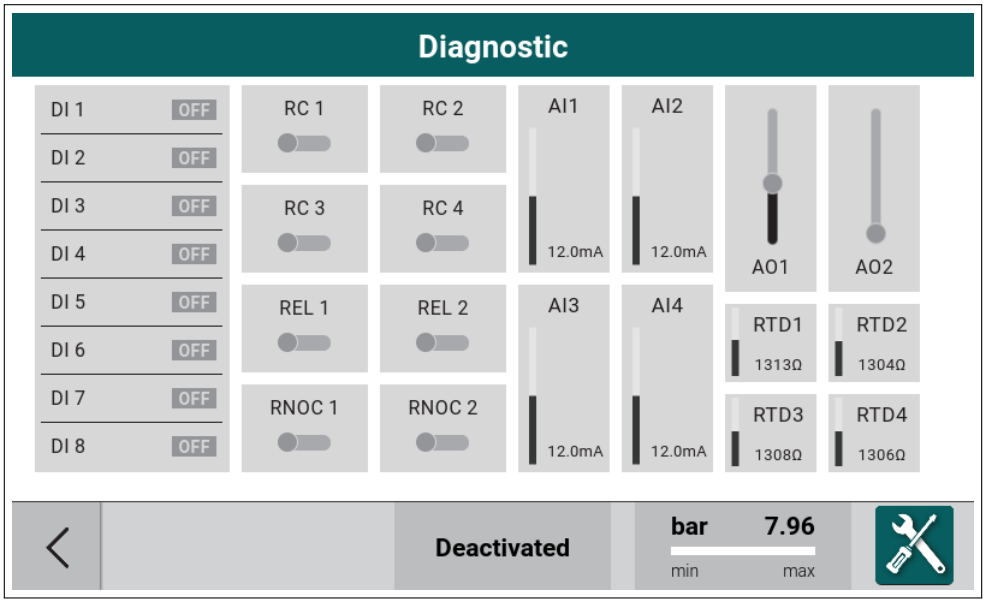

Figure 75: Diagnostics

2.6. Notifications

While the compressor is running, notifications may appear in the system. Notifications are shown as red pop up windows in the middle of the screen. Below is a example notification.

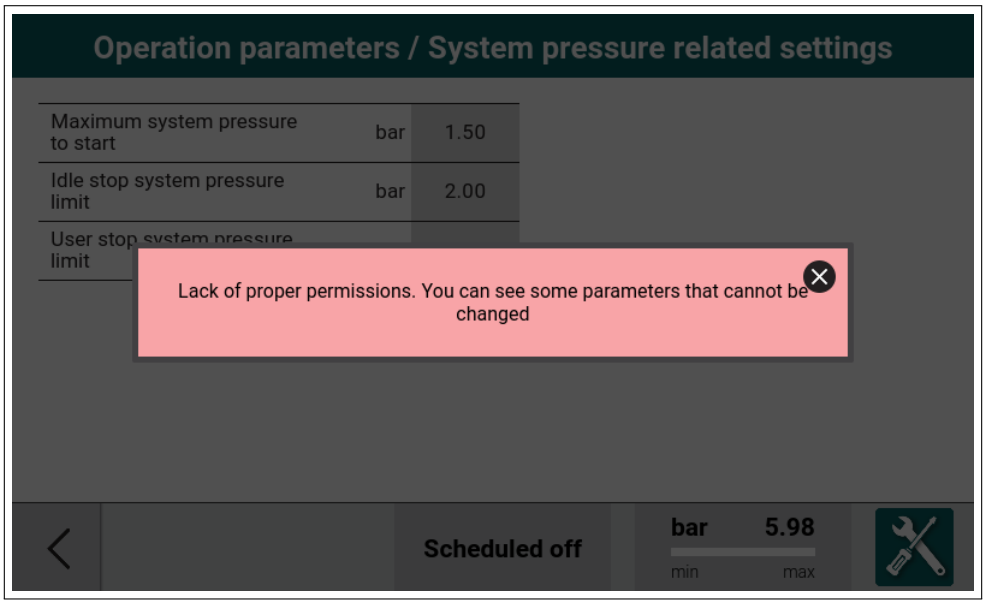

Figure 76: Example notification

List of messages:

- Connecting ...
- Main controller not detected ...
- Updating HMI. Do not turn off the power supply!

- UPDATE SUCCEED. REBOOTING...
- UPDATE FAILED!
- There was detected more than one updatable file on the data storage. Remove additional files and restart update.
- There is no file with the .update extension present on the data storage in the /update folder.
- Updating Main Controller: starting update
- Updating Main Controller: step 1 of 3
- Updating Main Controller: step 2 of 3
- Updating Main Controller: step 3 of 3
- No main controller for update available
- Performing enforced update of the main controller
- Reset DIP switch 1 to continue
- No data storage detected
- MAINTENANCE. DO NOT POWER OFF THE DEVICE. The display may flicker or temporarily switch off.
- Collecting data: step 1 of 5
- Collecting data: step 2 of 5
- Collecting data: step 3 of 5
- Collecting data: step 4 of 5
- Collecting data: step 5 of 5
- Saving data to storage failed
- Collecting settings
- Restoring settings
- Processing ...
- Disable the compressor to be able to change parameters
- Factory access not authenticated.
- Database clear
- Events and sensor history clear
- Factory access blocked.
- Wrong code. Retries: 3
- New code generated!
- Do you want to leave without resetting the annual maintenance counter?
- Lack of proper permissions. You can see some parameters that cannot be changed
- The password must be 4 digits, please try entering new password again.

3. Faults and warnings

Faults are divided into groups:

1. Critical faults - faults that stop the compressor immediately
2. Non-critical faults - faults that stop the compressor using a stop procedure
3. Recoverable faults - faults that stop the compressor using a stop procedure and resume the compressor operation after the fault cause ceases dissapears.

3.1. Critical faults

Table 37: List of critical faults

Critical fault	Description
No oil temperature sensor	Oil temperature sensor not attached or incorrect connection to the sensor.
Short circuit of oil temperature sensor	Oil temperature may be shorted, damaged or the wire may be shorted.
Overtemperature fault	Oil temperature above fault level. If the temperature rises above the fault level, the compressor stops. Can be changed in Factory settings / temperature menu. See 2.5.11.1.
Short circuit of net pressure sensor	Net pressure sensor may be shorted, damaged or the wire may be shorted.
High net pressure fault	Net pressure above the fault level. Can be changed in Factory settings / temperature menu. See 2.5.11.1.
No system pressure sensor	System pressure not attached or incorrect connection to the sensor.
Short circuit of system pressure sensor	System pressure sensor may be shorted, damaged or the wire may be shorted.
High system pressure fault	System pressure above the fault level. Can be changed in Factory settings / Pressure menu. See 2.5.11.2. *Not in UI*
Generic fault	Generic fault assigned to a digital input. See 2.5.8.1.
Emergency stop	Emergency stop button was pressed.

3.2. FC critical faults

Table 38: List of FC critical faults

FC critical Fault	Description
Frequency converter fault	
Frequency converter communication fault	Communication with frequency converter was lost.
Frequency converter trip fault	Trip faults can be reset using the automatic reset function in frequency converter.
Frequency converter trip lock fault	Alarms that are trip locked offer additional protection, meaning that the mains supply must be switched off before the alarm can be reset. After having been switched back on, the frequency converter is no longer blocked and can be reset as described in frequency converter manual.

3.3. Non-critical faults

Table 39: List of non-critical faults

Non-critical fault	Description
Air filter service counter fault	Air filter service counter has reached fault value.
Oil filter service counter fault	Oil filter service counter has reached fault value.
Oil change service counter fault	Oil change service counter has reached fault value.
Oil separator service counter fault	Oil separator service counter has reached fault value.
Belt change service counter fault	Belt change service counter has reached fault value.
Generic non-critical fault	Generic non-critical fault assigned to a digital input. See 2.5.8.1.
System pressure build up fault	System pressure does not rise after start up.
Motor temperature too high	Motor temperature above fault level. If the temperature rises above the fault level, the compressor stops.

3.4. Recoverable faults

Table 40: List of recoverable faults

Recoverable Fault	Description
Generic recoverable fault	Generic recoverable fault assigned to a digital input. See 2.5.8.1.
Low oil temperature fault	Oil temperature below fault level. Can be changed in Factory settings / temperature menu. See 2.5.11.1.
No net pressure sensor	Net pressure sensor not attached or incorrect connection to the sensor.
Power failure fault	Power supply was turned off.
Dryer not ready	Dryer does not work properly. If the fault occurs the compressor turns off, similar to recoverable fault.

3.5. Warnings

Table 41: List of warnings

Warning message	Description
High oil temperature	Oil temperature above the warning level. Warning level can be changed in the Factory settings / Temperatures menu
High net pressure warning	Net pressure above the warning level. Warning level can be changed in Pressure settings menu
Low net pressure warning	Net pressure below the warning level Warning level can be changed in Pressure settings menu
High system pressure warning	System pressure below the warning level Warning level can be changed in Pressure settings menu **Not in UI**
Maintenance counter warning	General maintenance was not performed in a required period.
Air filter service counter warning	Air filter service counter elapsed.
Oil filter service counter warning	Oil filter service counter elapsed.
Oil change service counter warning	Oil change service counter elapsed.
Oil separator service counter warning	Air filter service counter elapsed.
Belts change service counter	Belts change service counter elapsed.

Table 41: List of warnings

Warning message	Description
Counter warning	Warning after a counter has elapsed.
Generic warning	Generic warning assigned to one of the digital inputs. See 2.5.8.1.
Frequeny converter warning	There is a frequency converter fault active. Description of the warning provides information on warning type. For details see chapter 3.2.

4. Operation theory

4.1. Start prerequisites

This section describes the conditions that must be fulfilled to start / stop the compressor. Depending on the start / stop signal source, the prerequisites differ.

1. Start / stop source: automatic start / stop
   - System pressure must fall below ”Idle stop system pressure limit”. It can be changed in Operation parameters / System pressure related settings, this can prevent problem with next compressor start.
   - If pressure drops soon next start will be possible without violating ”Maximum startups per hour”. It can be changed in Factory settings / Compressor Data.
2. Start / stop source: user request
   - System pressure must fall below ”User stop system pressure limit”. It can be changed in Operation parameters / System pressure related settings, this can prevent this problem with next compressor start. This is usually set higher than ”Idle stop system pressure limit”.
3. Start / stop source: fault
   - When the compressor stops because a fault was detected, no conditions are checked.

If compressor can not start, it is necessary to check:

- System pressure level must be lower than level set in Operation parameters / System pressure related / Maximum system pressure to start.
- Oil temperature level must be higher than 5 degrees Celsius.
- Motor will not start soon after stop. It can be changed in Operation parameters / Control timings / Stop-start delay.
- Motor is not permitted to start more than number of times per hour as set in Factory settings / Compressor Data / Maximum startups per hour.
- If dryer is enabled it’s output must be enabled for some time before proceeding. It is set in Operation parameters / Dryer configuration.

4.2. Challenge response code authorization system

Challenge response code authorization system protects the compressor from changes made by not-authorized user. To get the full configuration access to the compressor controller, the authorization is carried out as follows:

1. Enter Main settings menu, press the icon with padlock symbol
2. When 9-digit code will appear, contact the compressor manufacturer and provide the generated code
3. The manufacturer will provide the user with a 9-digit response code
4. Enter the generated code in the authorization menu
5. - If the entered code is correct, the main system menu is open and full permissions will be granted for 24 hours.
   - If the entered code is incorrect, the system will generate a new challenge code and the code generation procedure is to be retried.

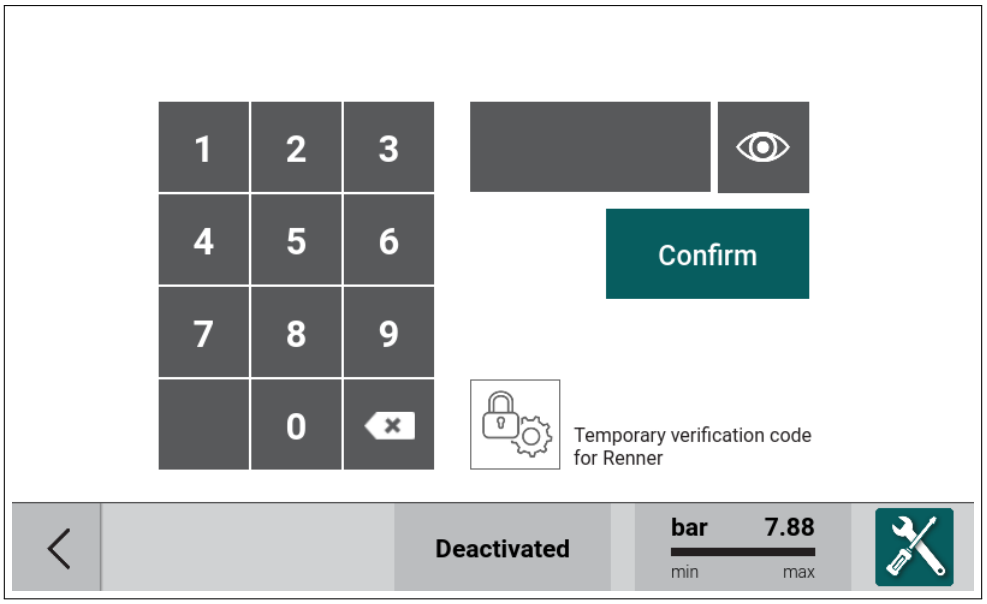

Figure 77: Challenge response with hidden code

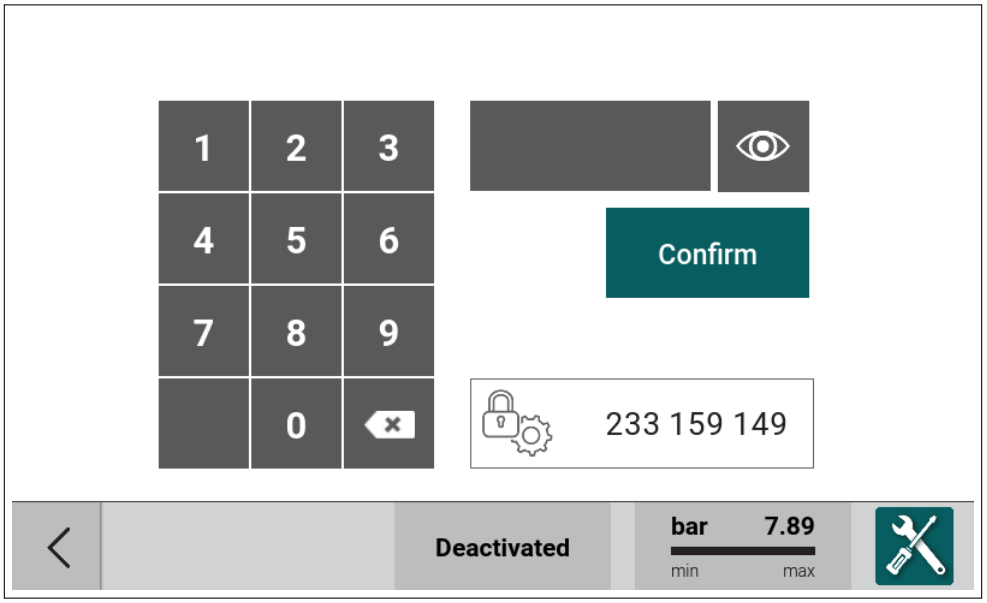

Figure 78: Challenge response with example code

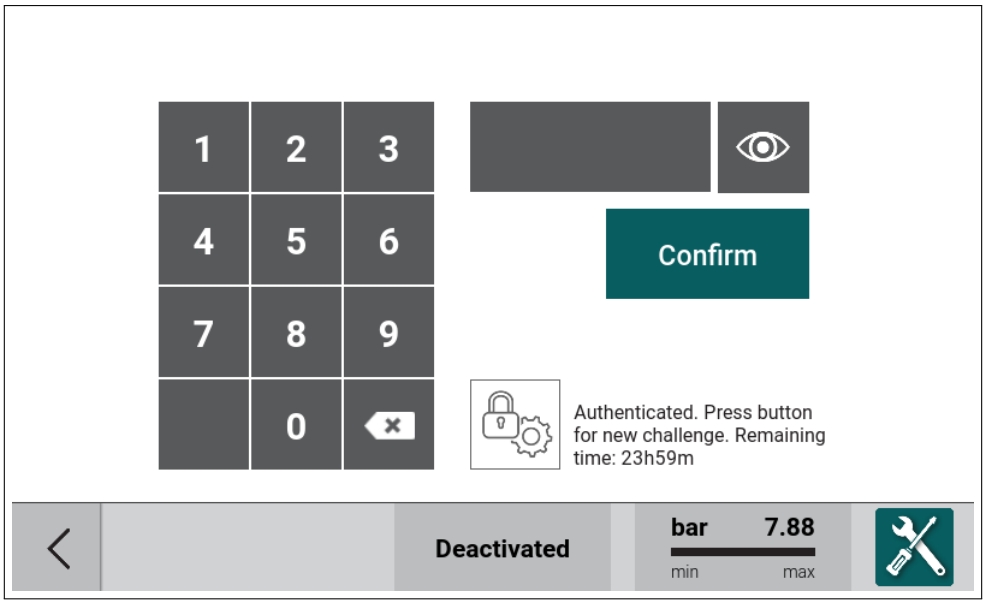

Figure 79: Challenge response with permmission granted

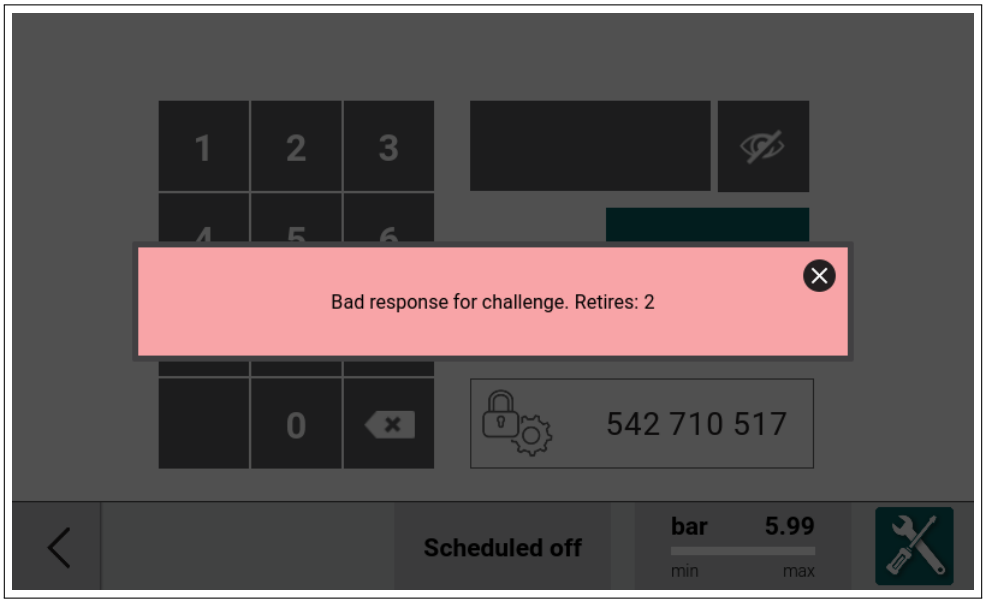

Figure 80: Challenge response with bad response

After the modifications requiring full access are finished, it is necessary to de-authorize. In main settings menu, enter Factory settings and PIN codes and press the ”Deauth” button. Full configuration access is revoked. To perform additional, changes, the challenge-response procedure is to be performed again.

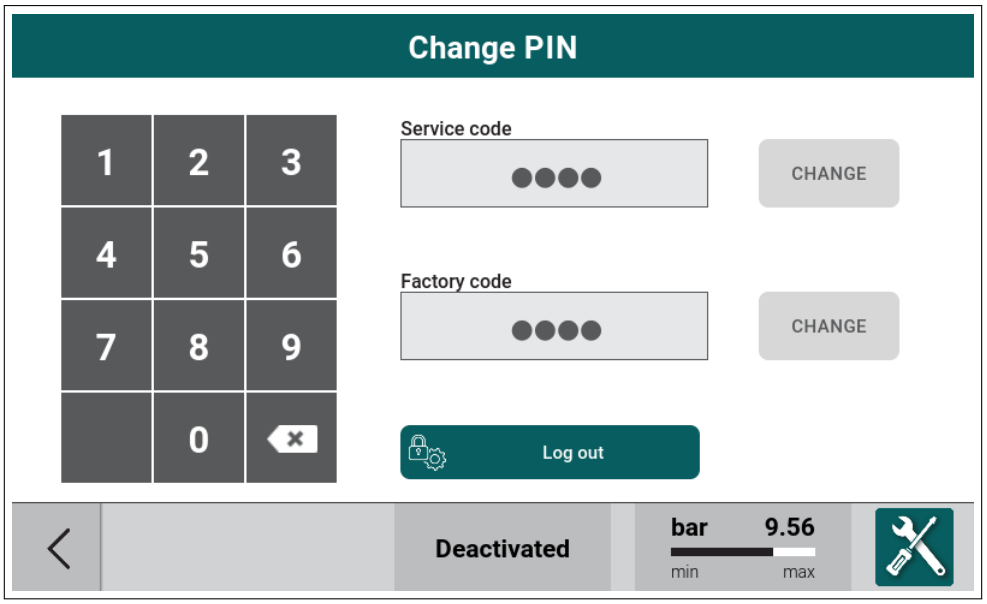

Figure 81: Factory settings - Deauthorization button

5. Function setup

This section describes how to enable and setup some of the controller functions.

5.1. Frequency converter

The controller supports two frequency converter control methods:

- Analog frequency converter, controlled using digital and analog input/outputs,
- Modbus frequency converter, controlled using serial port with Modbus RTU.

5.1.1. Analog frequency converter setup

To setup the analog frequency converter, the following parameters must be changed:

1. VFD type
2. IO assignment for VFD control signals
3. VFD operation parameters

5.1.1.1. Analog frequency converter configuration - setup VFD type

From settings menu, enter Factory settings / Frequency converter and set the converter type to ”Analog” in parameter ”Frequency converter”.

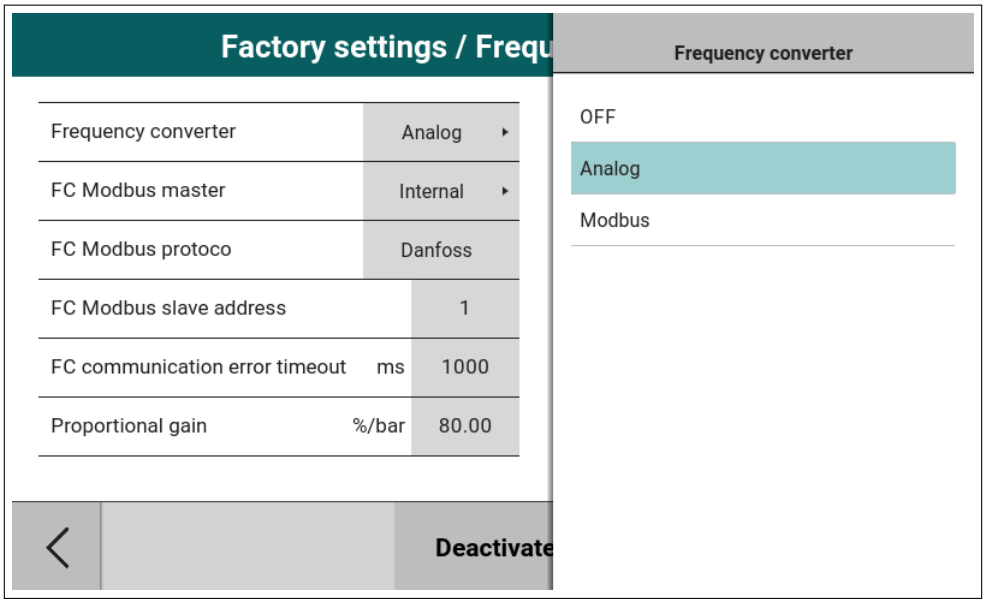

Figure 82: Analog frequency converter type setup

5.1.1.2. Analog frequency converter configuration - DI setup

From settings menu, enter IO configuration / Digital input menu and assign Fault frequency converter function to one of the digital inputs.

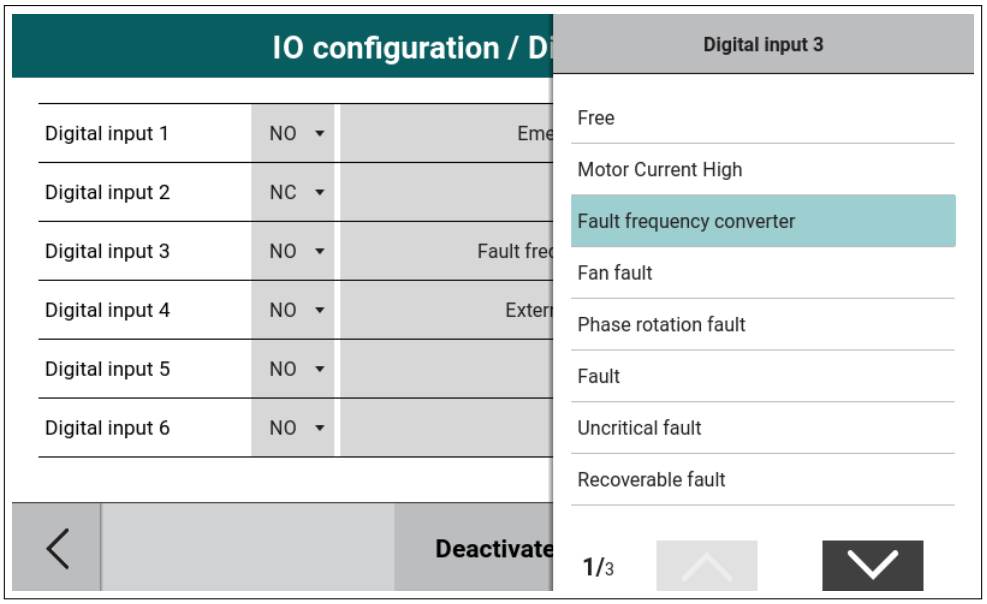

Figure 83: Analog frequency converter Digital Input menu

5.1.1.3. Analog frequency converter configuration - DO setup

From settings menu, enter IO configuration / Digital output menu and assign an FC enable function to one of the relay outputs.

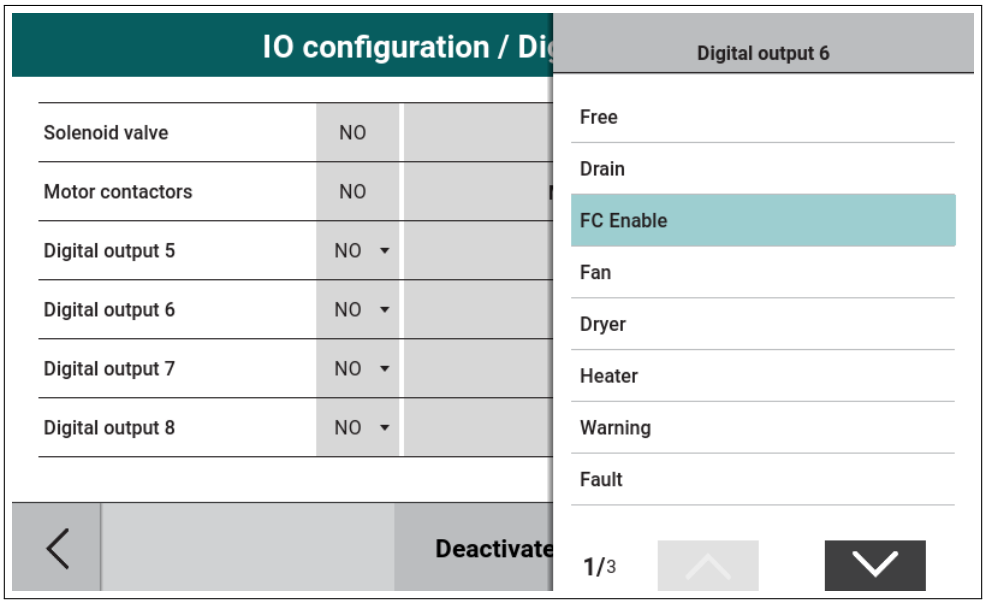

Figure 84: Analog frequency converter Digital Output menu

5.1.1.4. Analog frequency converter configuration - AO setup

From settings menu, enter IO configuration / Analog output menu and assign a Setpoint frequency converter to one of the analog outputs.

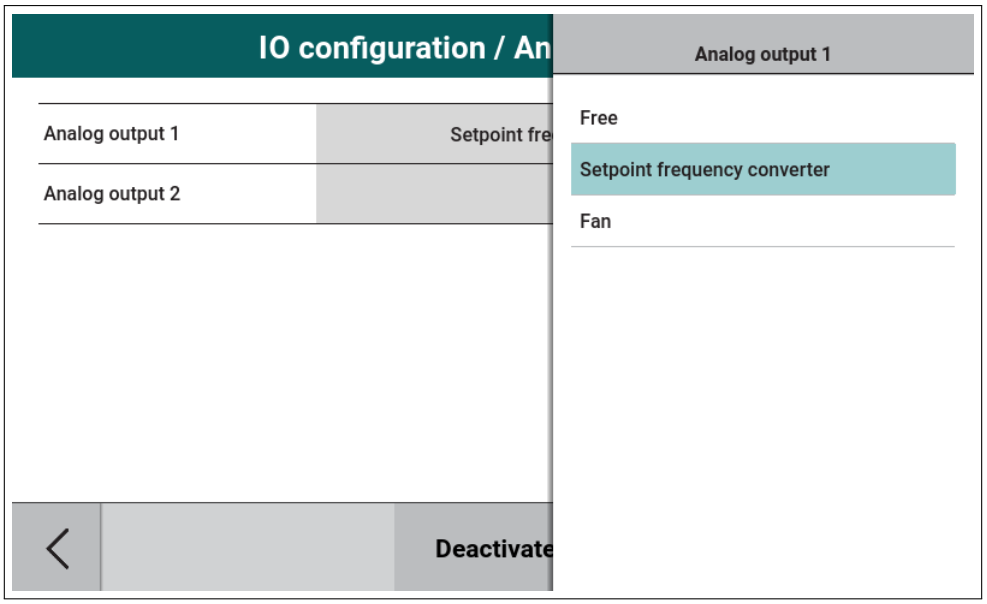

Figure 85: Analog frequency converter Analog Output menu

5.1.1.5. Analog frequency converter configuration - VFD parameter modification

If all the steps were done correctly, the Analog frequency converter should work properly. If required, enter Factory settings / Frequency converter menu and modify the converter parameters:

1. Minium FC speed
2. Maximum FC speed
3. PID parameters
4. Speed reduction functions

From settings menu, enter Frequency converter and if necessary modify speed limits.

5.1.2. Modbus frequency converter

To setup the Modbus-controlled frequency converter, the following parameters must be changed:

1. VFD type
2. Serial interface type for VFD control
3. VFD operation parameters

5.1.2.1. Modbus frequency converter - setup VFD type

From settings menu, enter Factory settings / Frequency converter and set the converter type to ”Modbus” in parameter ”Frequency converter”.

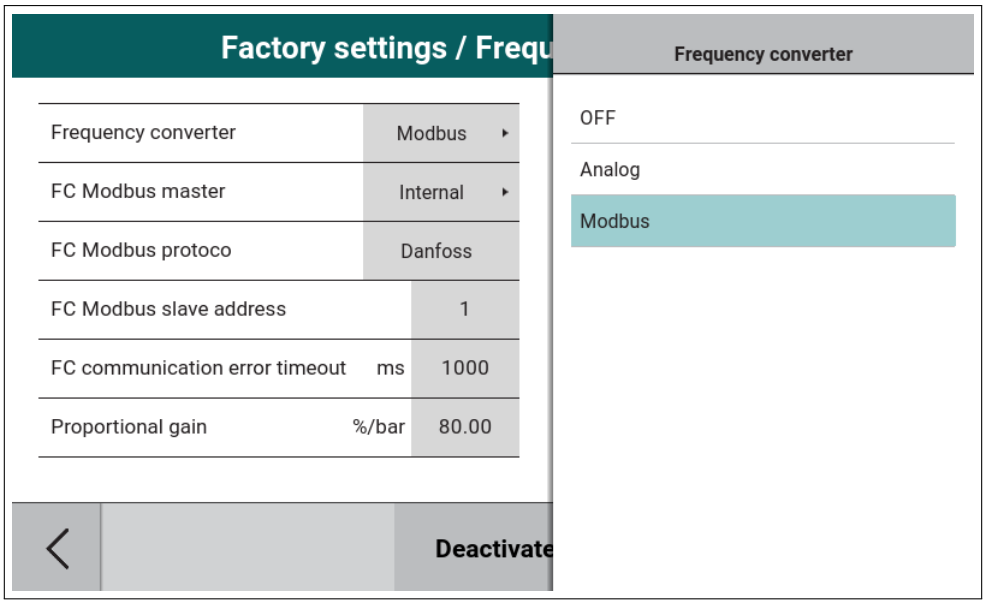

Figure 86: Modbus frequency converter type setup

Set the ”FC Modbus master” to the interface (serial port) to which the frequency converter is connected to.

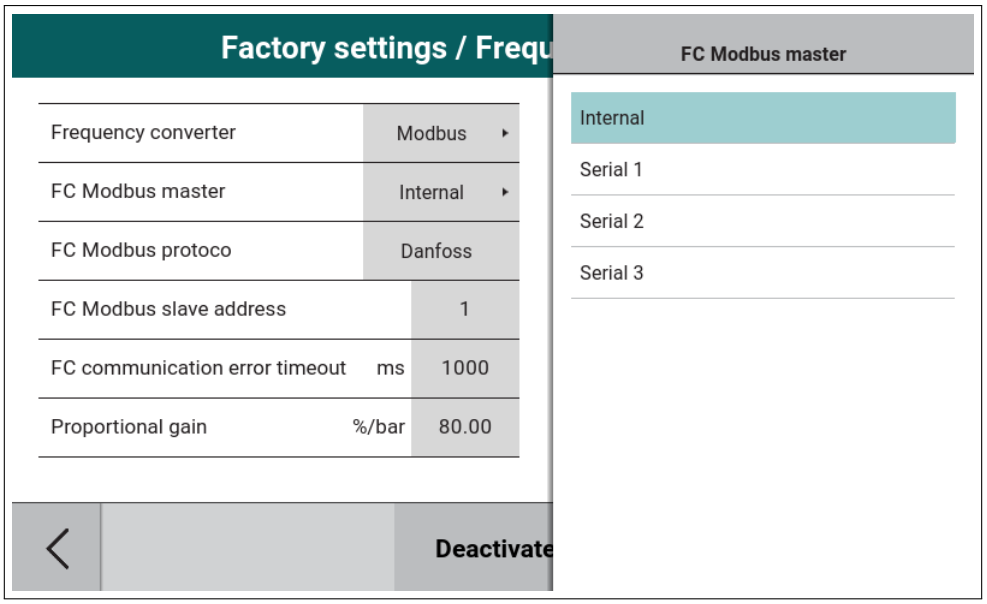

Figure 87: Modbus frequency converter serial port

Set the ”FC Modbus protocol” to the type of the FC.

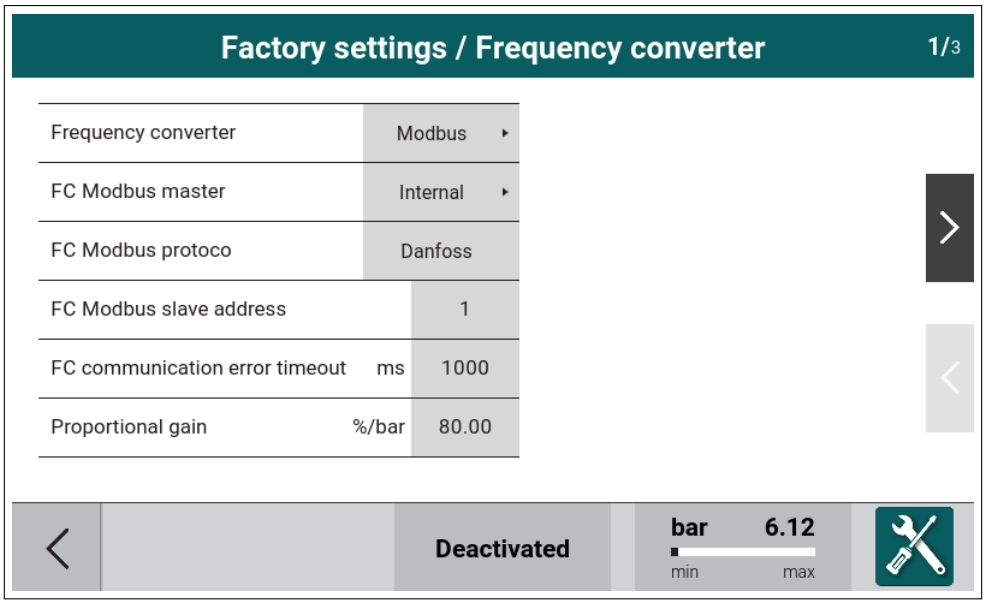

Figure 88: Modbus frequency converter model

Set the FC Modbus slave address.

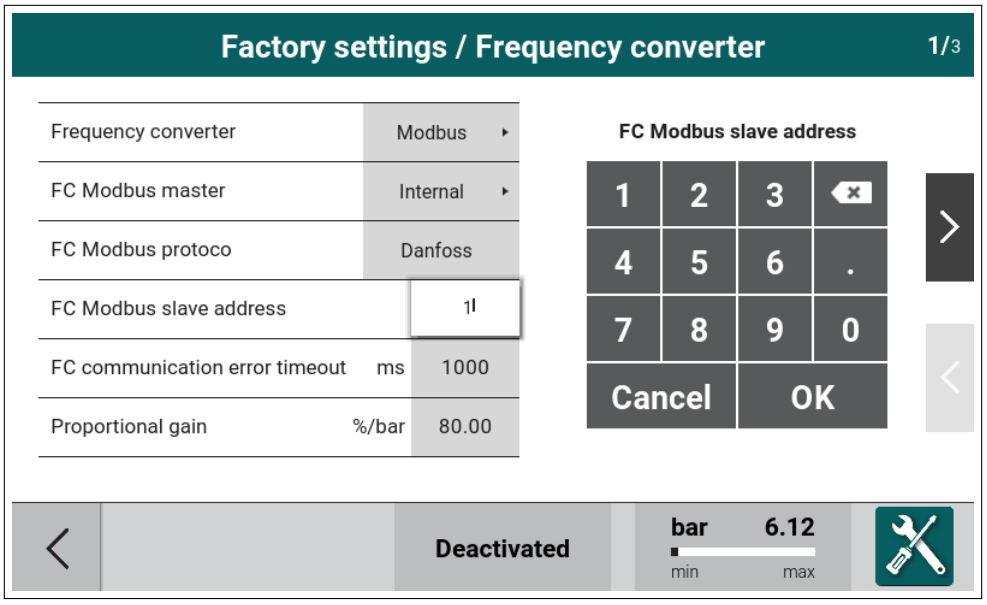

Figure 89: Modbus frequency converter ID

The parameter ”FC communication error timeout” can be adjusted if the controller reports communication errors too early.

5.1.2.2. Modbus frequency converter - serial configuration

From settings menu, enter Network settings and enter the configuration menu for the interface that the FC is connected to. Set all the communication parameters according to the VFD settings in ”Internal serial function”. The example below shows the configuration for the Danfoss VFD on the internal serial.

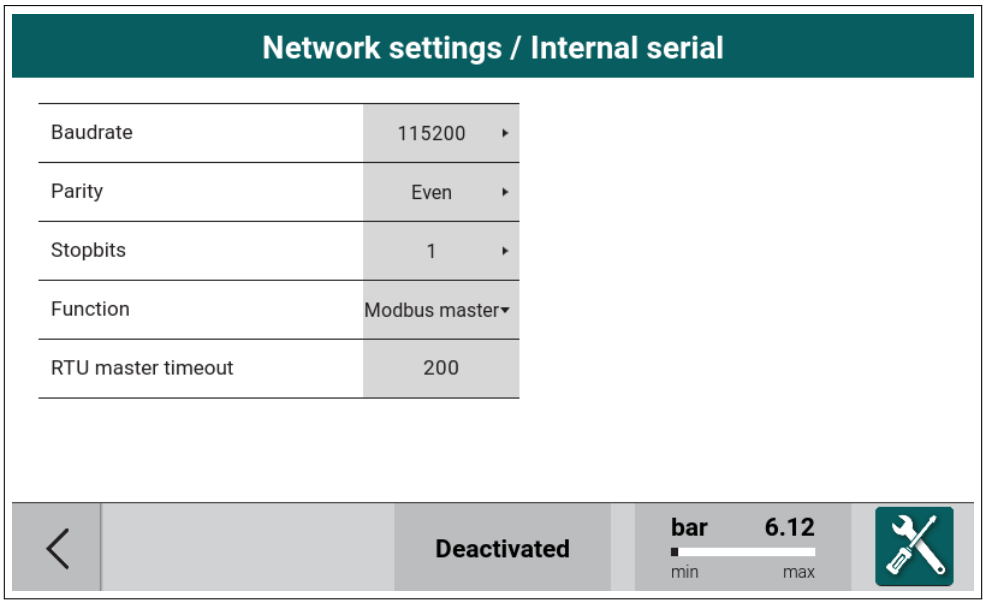

Figure 90: Modbus frequency converter on internal serial

From settings menu, enter Network settings and Address configuration. Choose the ”Modbus address” refers to the address of the master interface and not the VFD ID.

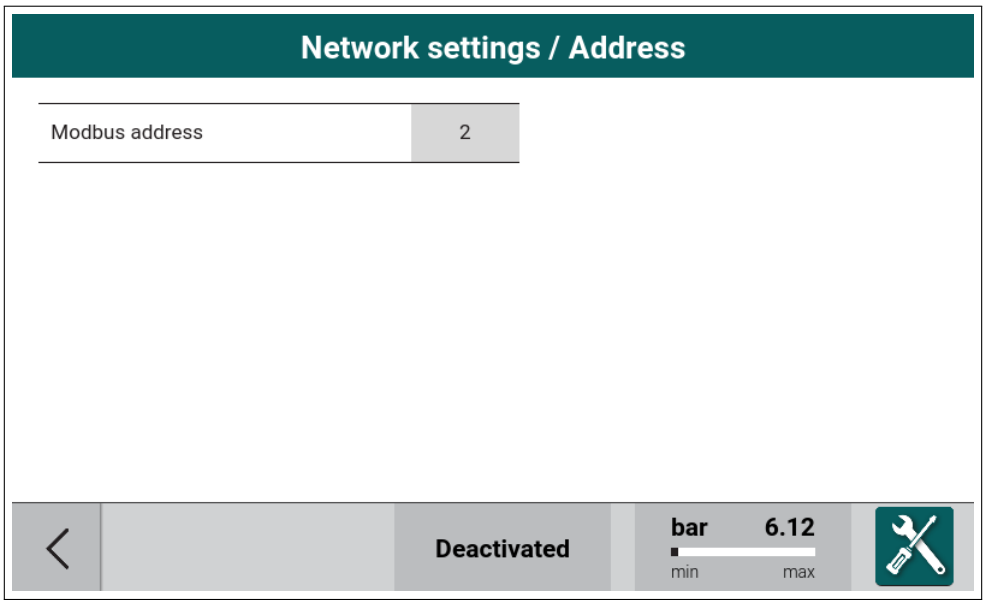

Figure 91: Device Modbus address

5.1.2.3. Analog frequency converter - setup VFD type

If all the steps were done correctly, the Modbus frequency converter should work properly. If required, enter Factory settings / Frequency converter menu and modify the converter parameters:

1. Minium FC speed
2. Maximum FC speed
3. PID parameters
4. speed reduction functions

From settings menu, enter Frequency converter and if necessary modify speed limits.

5.2. BLCO setup

5.2.1. BLCO Master configuration

To configure BLCO master, the following parameters must be changed on the master controller:

1. Serial port used for BLCO
2. Pressure control input
3. BLCO configuration
4. Individual slave configuration

5.2.1.1. BLCO Master serial port configuration

From settings menu, enter Network settings on the chosen serial port (Internal / Serial 1 / Serial 2 / Serial 3) which will be using for BLCO Network. Set the communication parameters to reflect the communication parameters that the BLCO net uses.

The following example is for Serial 3.

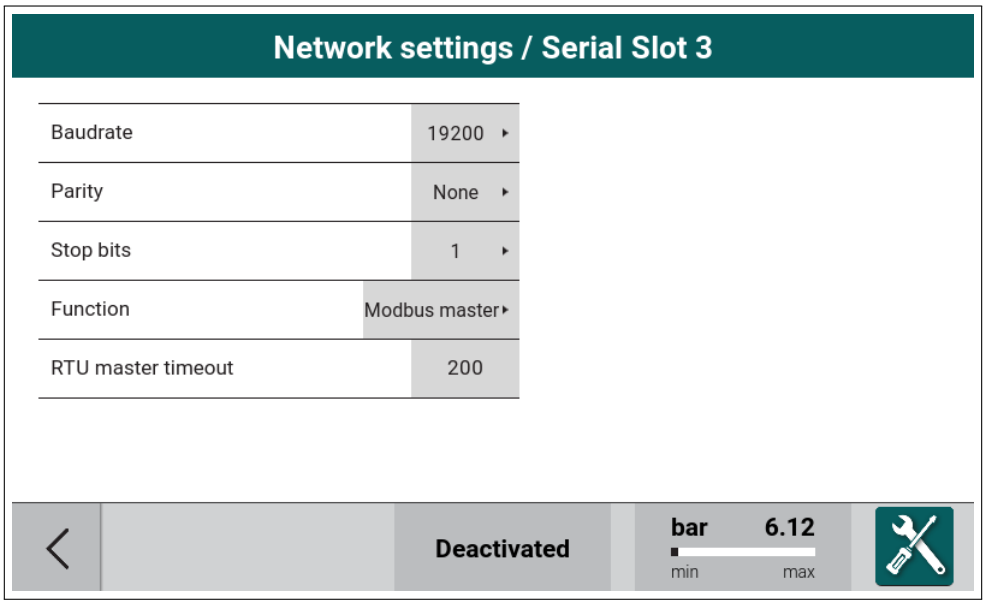

Figure 92: BLCO Master communication setup

Parameter ”Function” must be set to Modbus master, the rest of the parameters must be the same as on BLCO slave devices.

From settings menu, enter Network setting and Address configuration and set ”Modbus address” - this is the interface Modbus master ID.

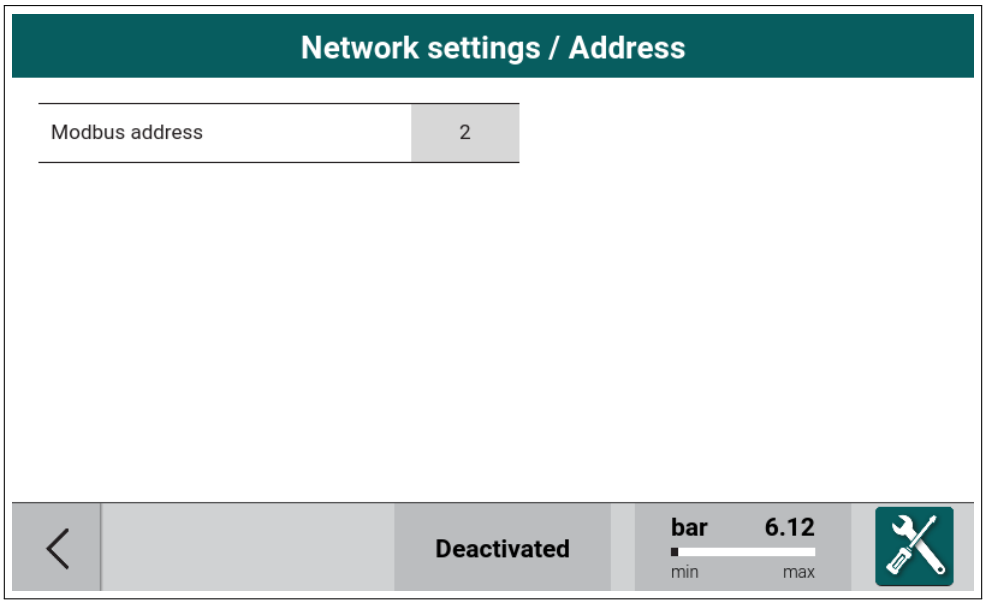

Figure 93: BLCO Device modbus address setup

5.2.1.2. BLCO Master pressure control input configuration

From settings menu, enter Remote control / Pressure control and set the pressure control mode to ”BLCO” if the master compressor is to be used and controlled by BLCO.

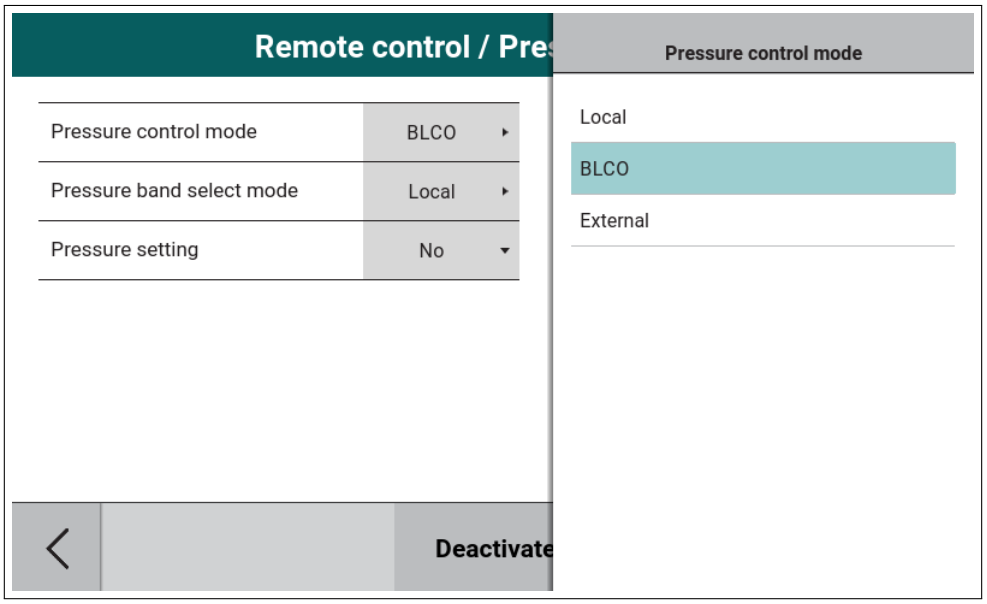

Figure 94: BLCO Master pressure source

5.2.1.3. BLCO Master BLCO net configuration

From settings menu, enter Baseload changeover / Baseload changeover setup

Parameters required to enable BLCO master:

1. ”Master enable” - set to yes

2. ”Slave count” - set to the number of slaves in the BLCO net. If this value is wrong, the network will be slower.
3. Rest of the parameters do not affect BLCO communication but influence the BLCO algorithm behaviour

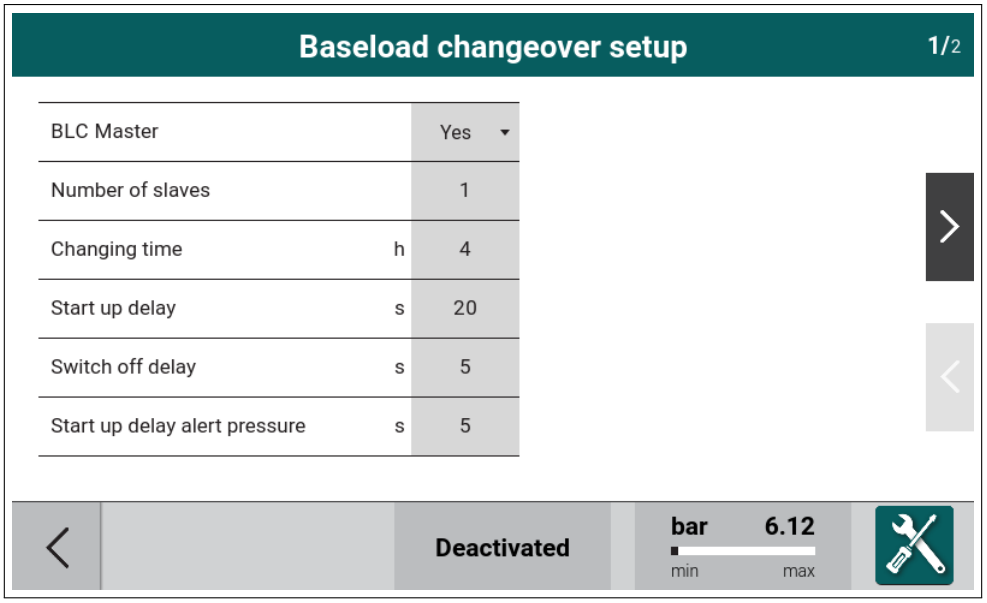

Figure 95: Baseload changeover setup 1 / 2

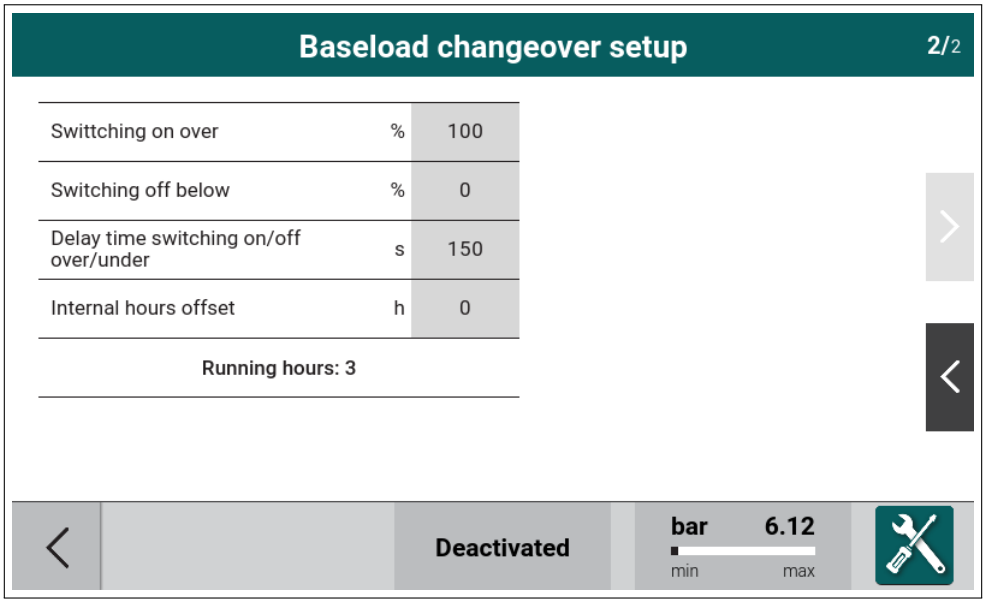

Figure 96: Baseload changeover setup 2 / 2

5.2.1.4. BLCO Master BLCO slave configuration

From settings menu, enter Baseload changeover. There the user can configure each of the slaves in their respective menu.

For each of the slaves, configure:

1. Slave serial port to which the slave is connected

2. Device address
3. Hours offset

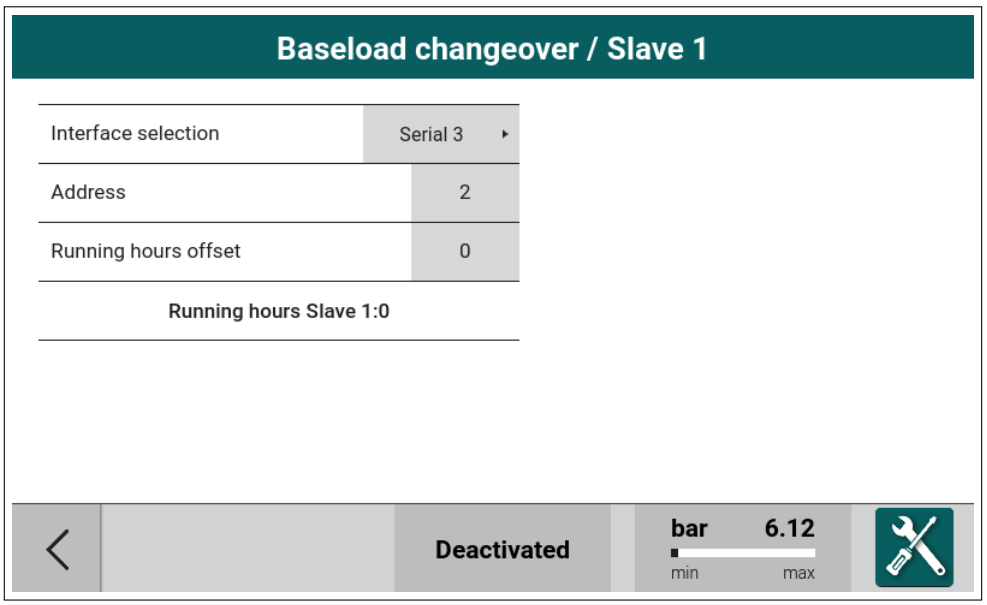

Figure 97: BLCO Master slave 1 configuration

5.2.2. BLCO Slave configuration

To configure BLCO slave, the following parameters must be changed on the slave controller:

1. Serial port used for BLCO
2. Pressure control input

5.2.2.1. BLCO Slave serial configuration

From settings menu, enter Network settings on the chosen serial port (Internal / Serial 1 / Serial 2 / Serial 3) which will be using for BLCO Network. Set the communication parameters to reflect the communication parameters that the BLCO net uses.

The following example is for Serial 3.

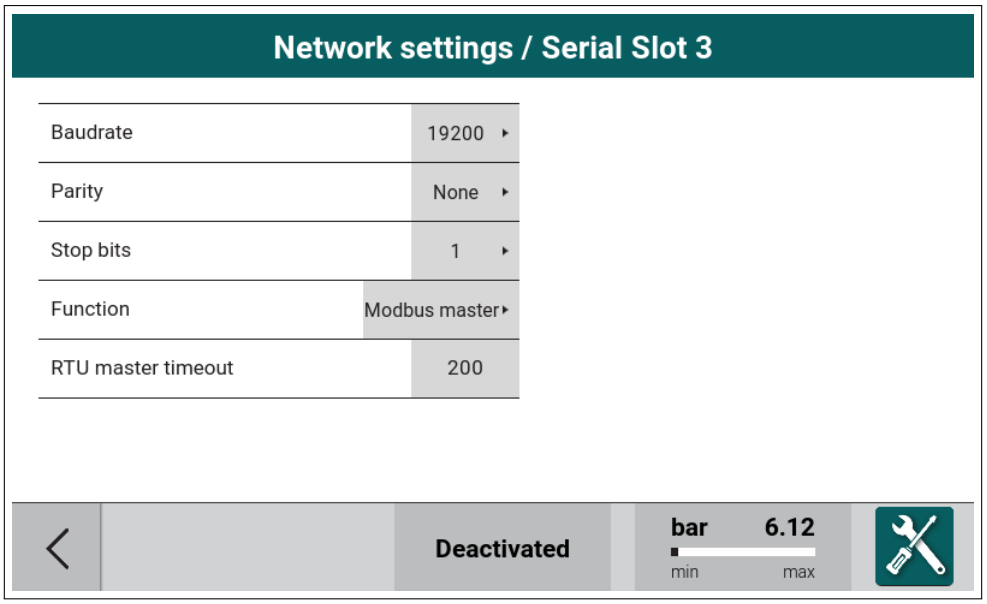

Figure 98: Network settings / Serial menu

Parameter ”Function” must be set to BLCO slave, the rest of the parameters must be the same as on BLCO master device.

From settings menu, enter Network setting and Address configuration and set ”Modbus address” - this is the interface Modbus master ID.

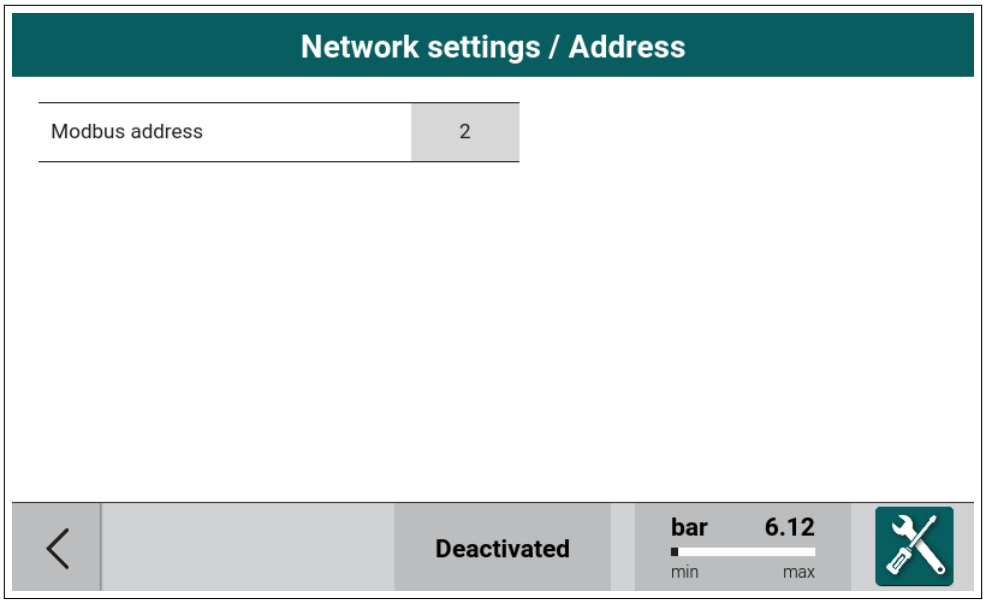

Figure 99: Network settings / Address configuration

5.2.2.2. BLCO Slave pressure control selection

From settings menu, enter Remote control / Pressure control and set the pressure control mode to ”BLCO” if the master compressor is to be used and controlled by BLCO.

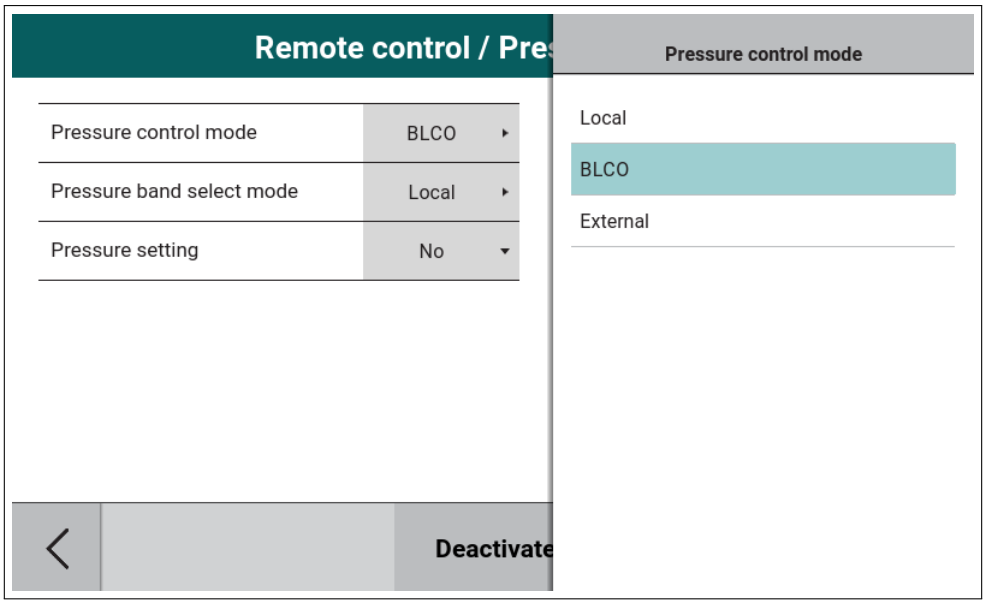

Figure 100: Remote control / Pressure control menu

5.3. Schedule

Scheduler allows to configure up to eight channels that can modify certain compressor operation parameters. From settings menu, enter Schedule and select the channel which settings are to be modified.

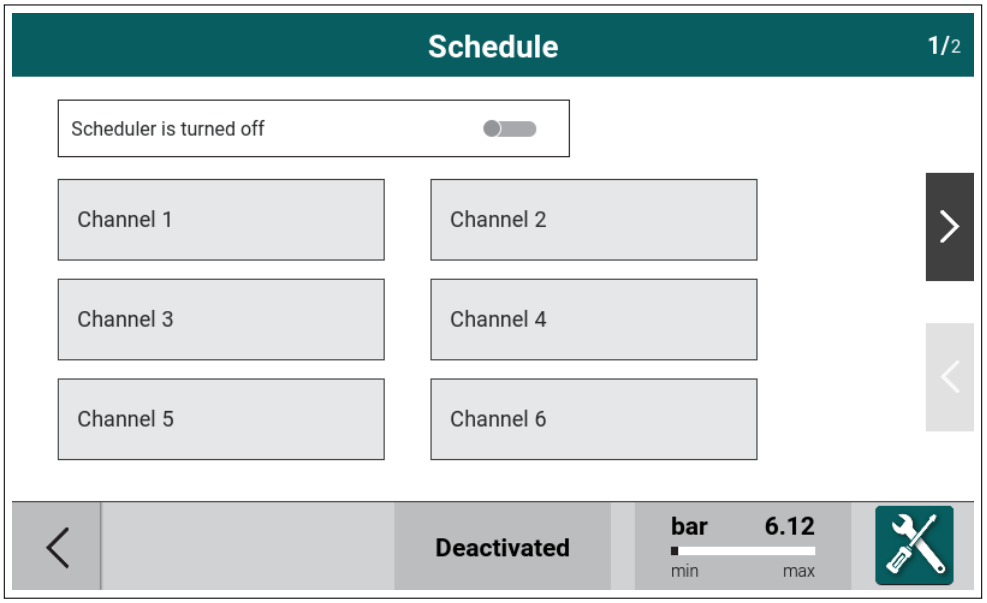

Figure 101: Schedule menu 1 / 2

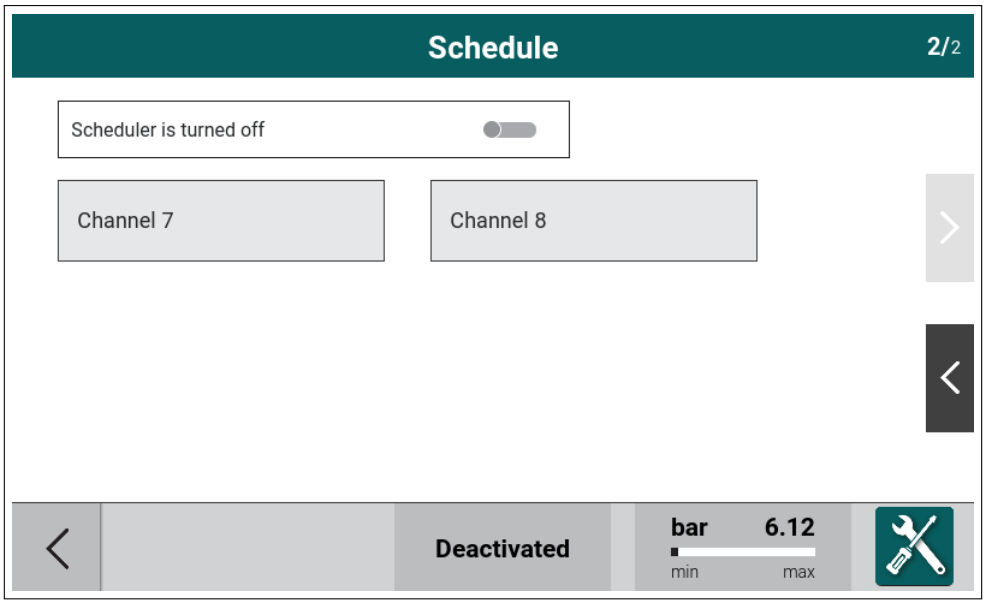

Figure 102: Schedule menu 2 / 2

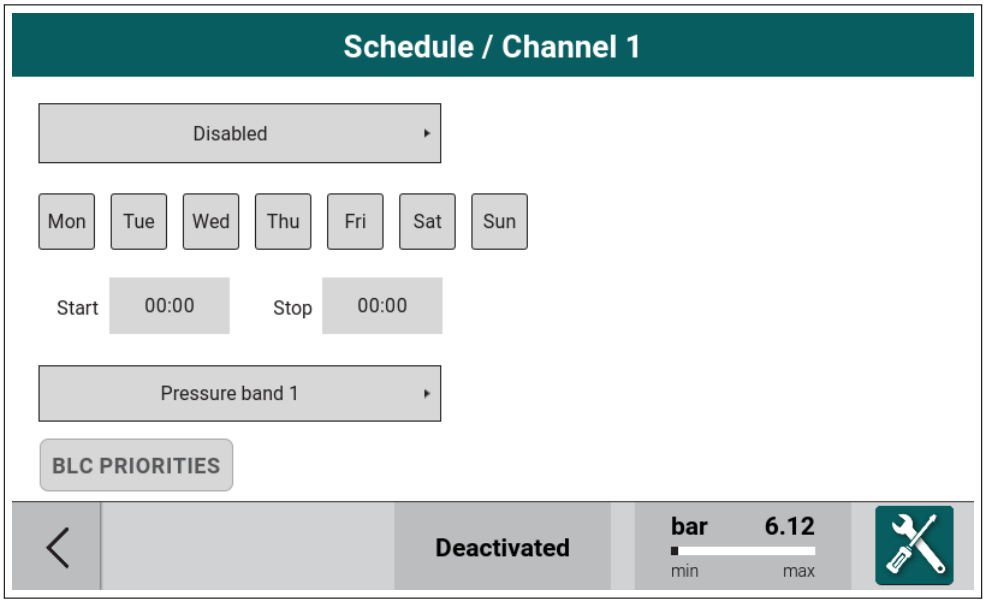

Figure 103: Schedule menu - settings for channel 1

Schedule configuration options for each of the channels:

1. Channel function: ”Compressor active” or ”Output active” or ”Compressor and output active”
2. Days on which the selected channel is active
3. Channel activation and deactivation times
4. Pressure band if the compressor is active during the active scheduler channel

If the scheduler is modified on the BLCO master device, slave device priorities can be adjusted.

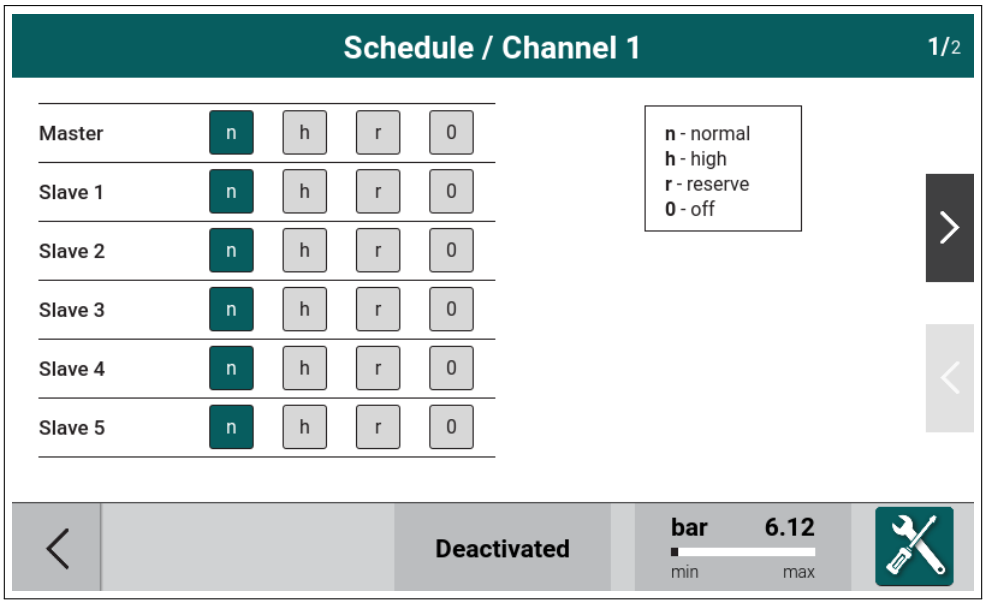

Figure 104: Schedule menu - BLCO priorities

To enable the scheduler, click on the ”Scheduler is turned off” tile. After successful activation, the text changes to ”Scheduler is active”.

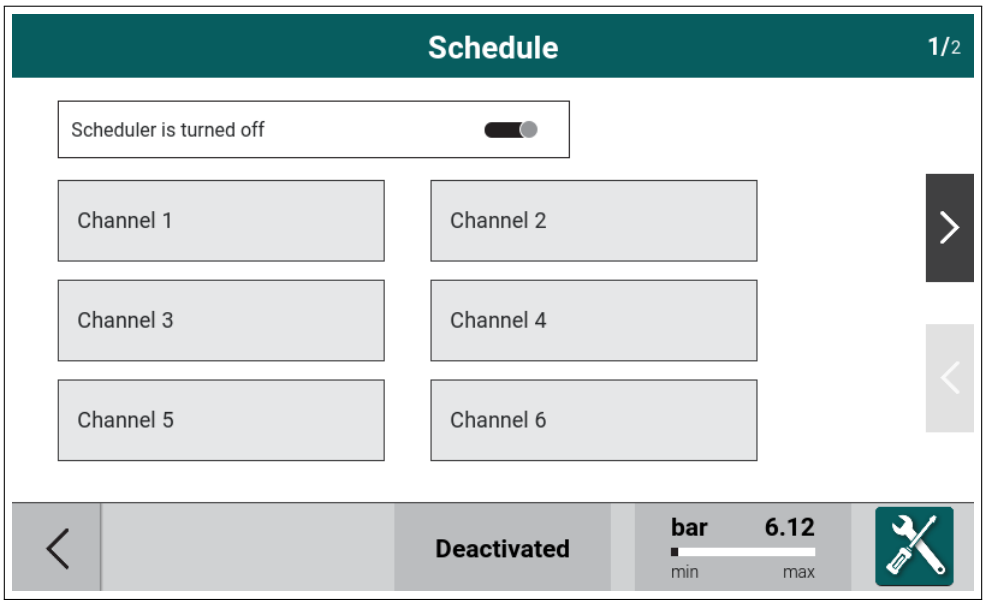

Figure 105: Schedule menu

In the main view, the scheduler can be enabled and disabled by pushing the time and date tile. The calendar icon indicates that the scheduler is active.

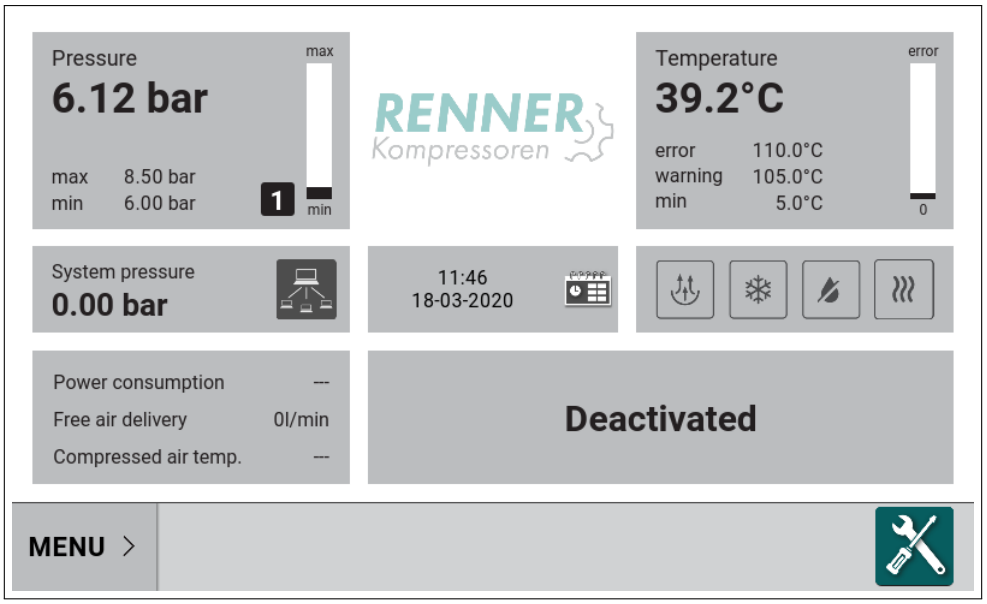

Figure 106: Main view with active sheduler

In order for the scheduler to be active, the compressor must be in enabled stage (the user must press the green start button).

5.4. Drain

From settings menu, enter Operation parameters / Drain configuration. To enable the function, set ”Drain function active” to ON.

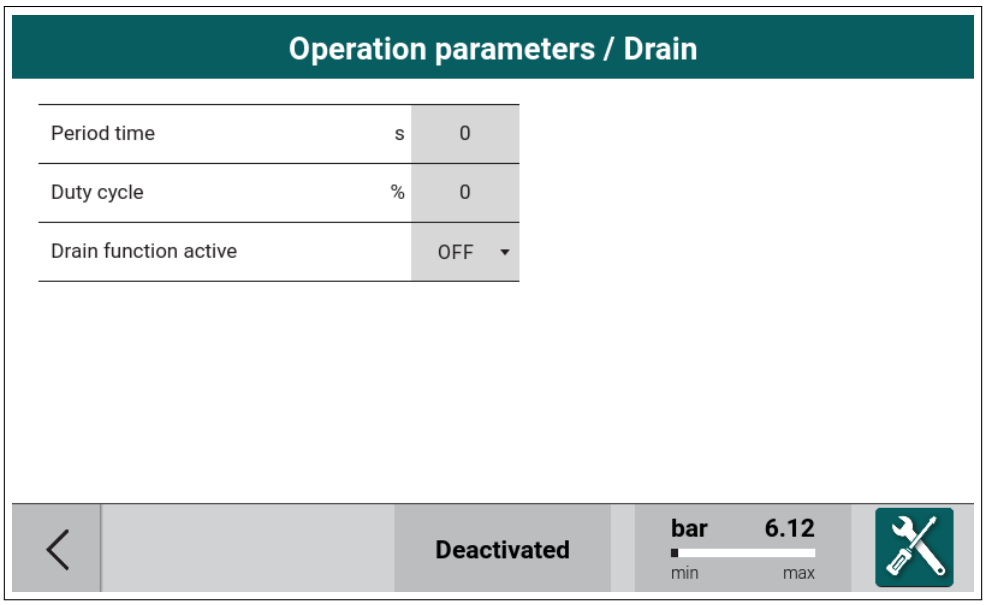

Figure 107: Drain configuration menu

Drain configuration options:

1. Drain period time - Length of the drain function operation period
2. Drain duty cycle - How long in the operation period the drain output is active

If drain is activated, it is necessary to set one of the digital outputs to drain function. In order to do this, from settings menu enter IO configration / Digital outputs configuration and set one of the outputs as a drain function.

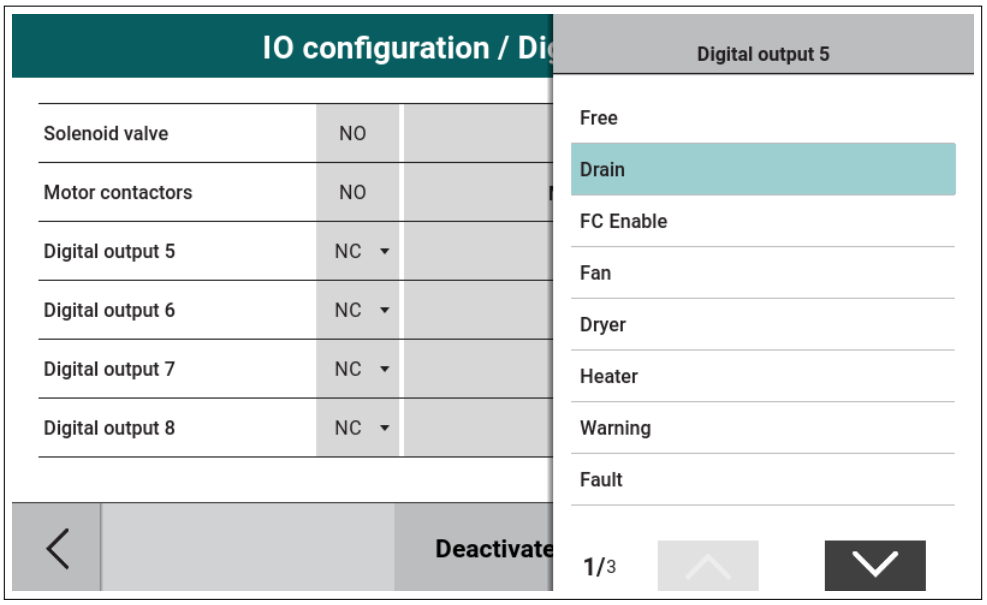

Figure 108: Drain digital output configuration

5.5. Fan

From Operation parameters, enter Fan configuration. To enable the function, set ”Fan function active” to ON.

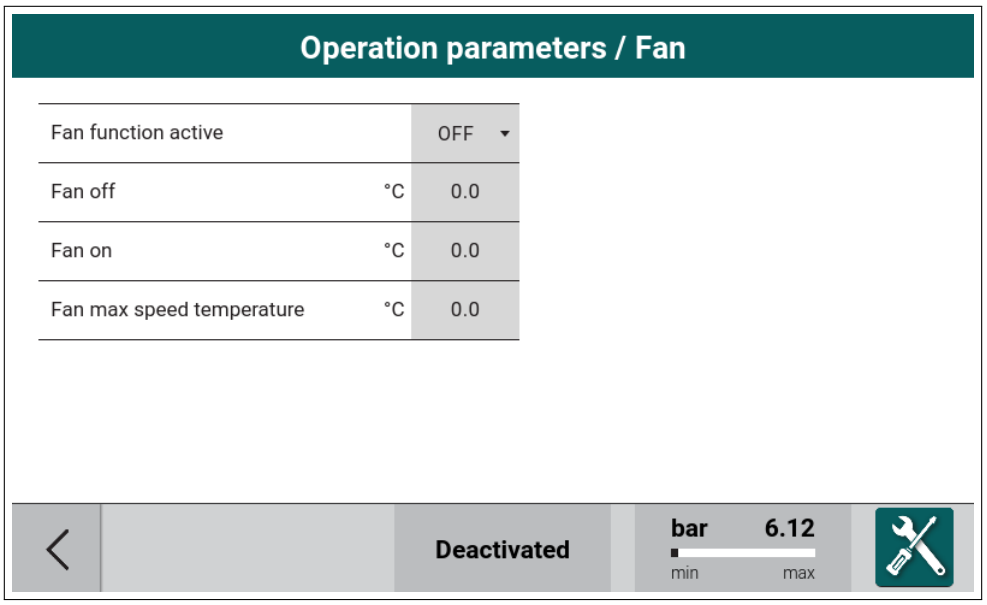

Figure 109: Fan configuration menu

Fan configuration options:

1. Fan off temperature - When the temperature drops below this level fan turns off.

2. Fan on temperature - When the temperature rises above this level fan turns on. Must be higher than fan off temperature.
3. Fan max speed temperature - When the temperature reaches this level the analog fan control reaches max value. Must be higher than fan off temperature.

If fan is activated, it is necessary to set one of the digital outputs to fan function. In order to do this, from settings menu enter IO configration / Digital outputs configuration and set one of the outputs as a fan function.

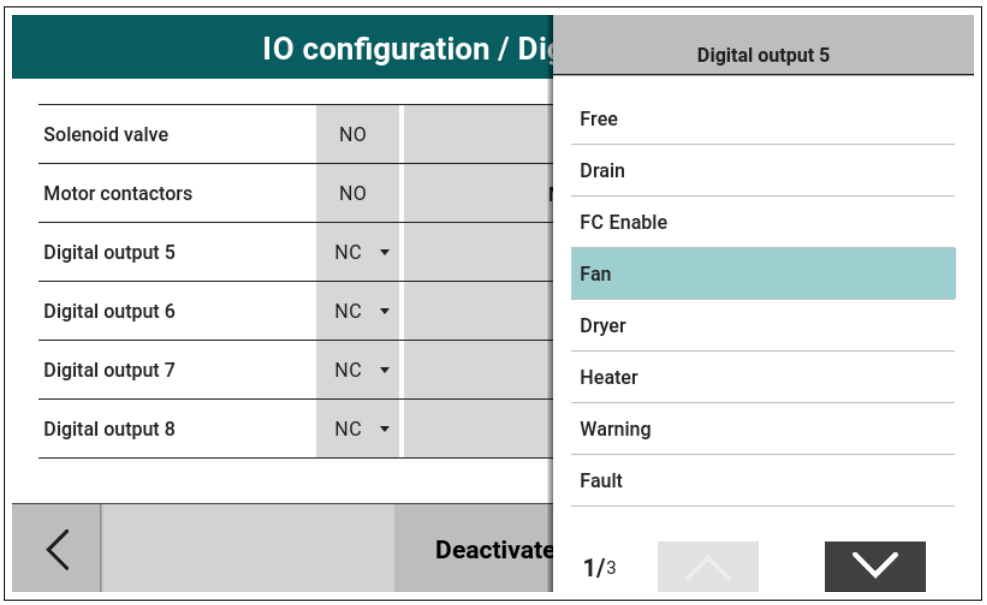

Figure 110: Fan digital output configuration

When a digital output is set, the next step is to setup the analog output. In order to do this, from settings menu enter IO configration / Analog outputs configuration and set one of the outputs as a fan function.

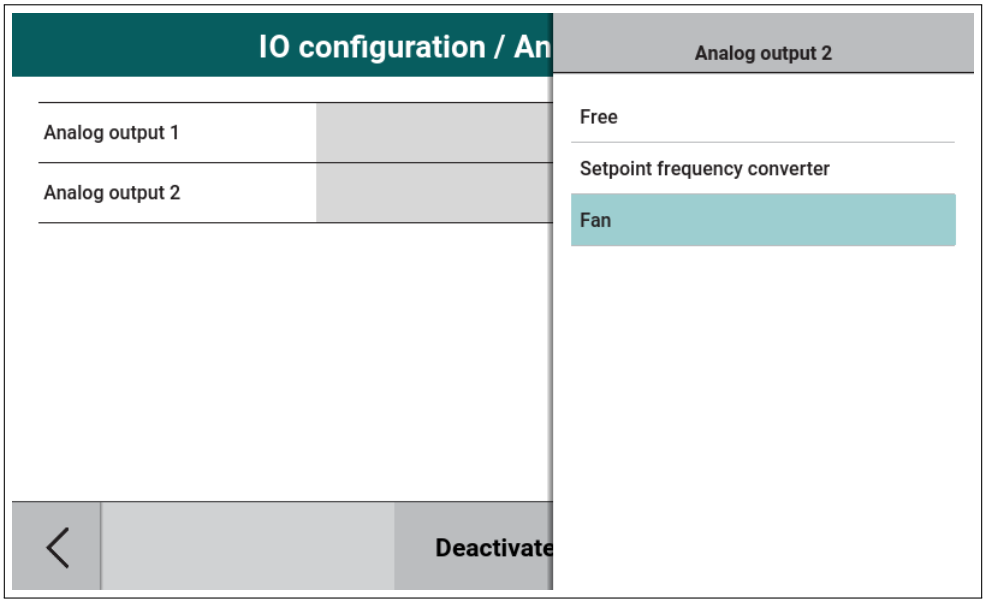

Figure 111: Fan analog output configuration

5.6. Dryer

From Operation parameters, enter Dryer configuration and set parameter ”Dryer function active” to ON.

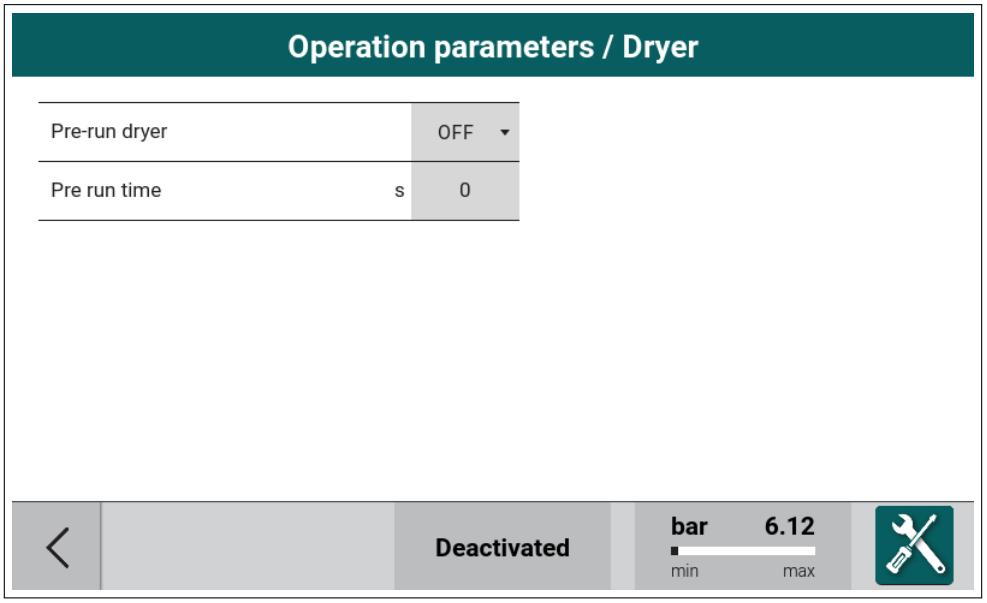

Figure 112: Dryer configuration menu

Dryer configuration options:

1. Pre run time - Time that prohibits the start of the compressor if the dryer reaches the working condition.

If dryer is activated, it is necessary to set one of digital output to dryer function. To do this, go to IO configuration enter digital output configuration choose output and set to dryer function.

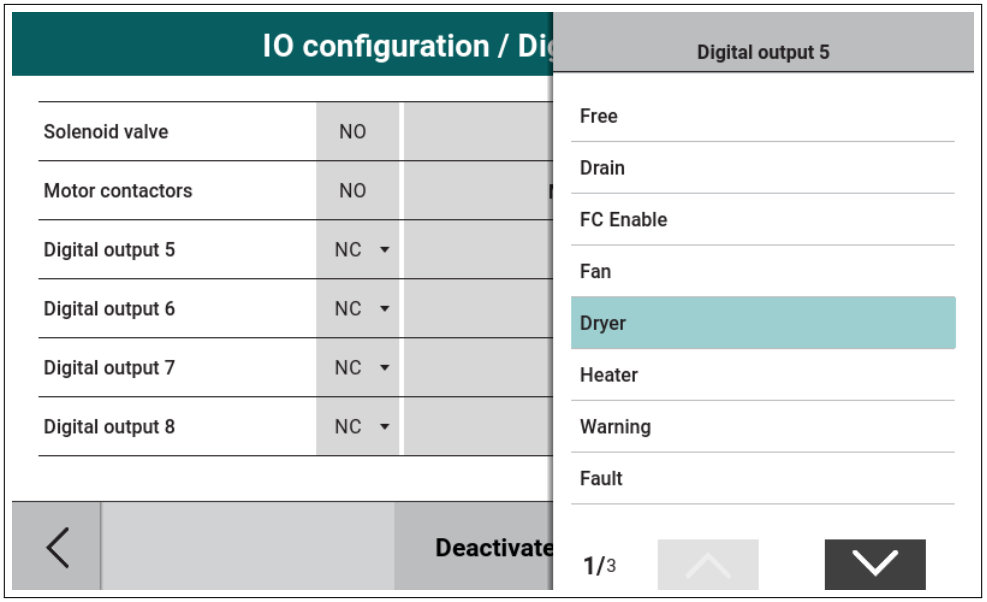

Figure 113: Drain digital output configuration

The user can optionally set the ”Dryer ready” input. This input is used to indicate that the dryer does not work correctly. If this input is active the compressor turns off.

To enable the signal, enter Settings menu / IO Configuration / Digital inputs and select the input to be used as a dryer ready input.

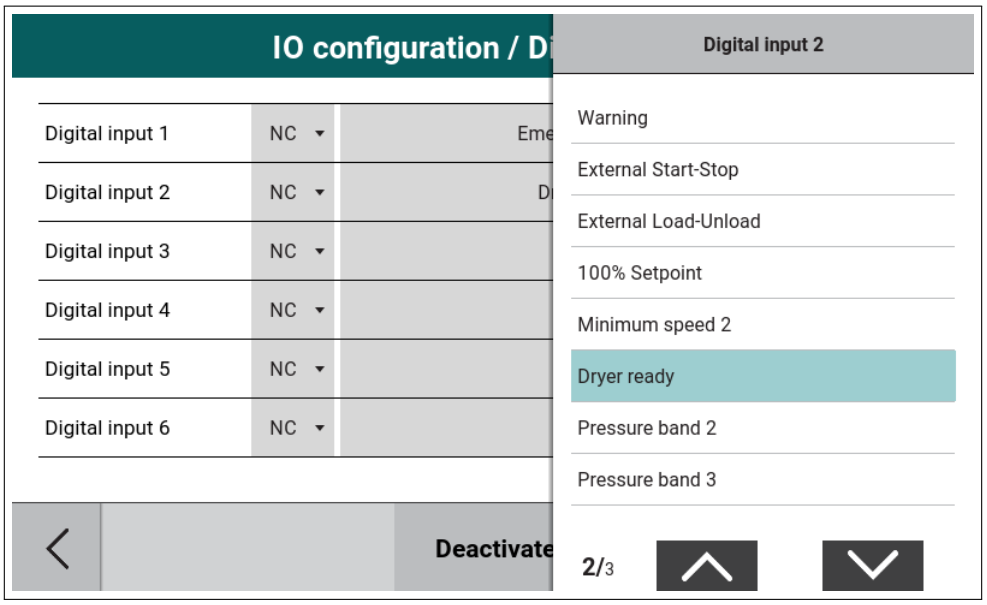

Figure 114: Drain digital input configuration

5.7. Frost protection

From Operation parameters, enter Frost protection configuration. To enable the function, set ”Heater active” to ON.

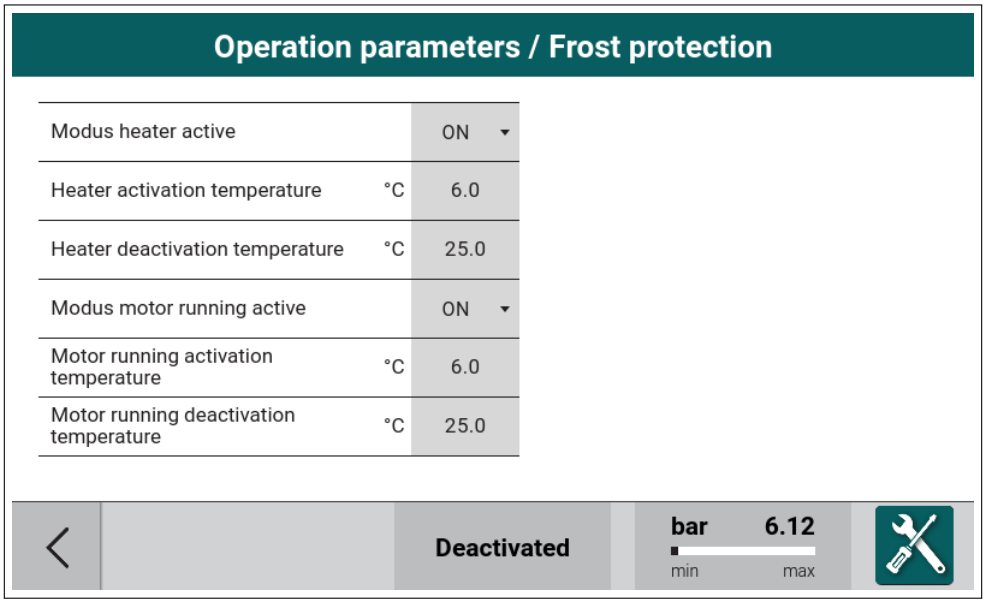

Figure 115: Frost protection configuration menu

Frost protection configuration options:

1. Heater active - Activation or deactivation of the heater function.

2. Heater activation temperature - When the temperature drops below this level heater turns on.
3. Heater deactivation temperature - When the temperature rise above this level heater turns off.
4. Motor heating active - Activation or deactivation of the motor heationg function.
5. Motor heating activation temperature - When the temperature drops below this level motor heating turns on.
6. Motor heating deactivation temperature - When the temperature rise above this level motor heating turns off.

If Frost protection is activated, it is necessary to set one of the digital outputs to heater function. In order to do this, from settings menu enter IO configration / Digital outputs configuration and set one of the outputs as a Heater function.

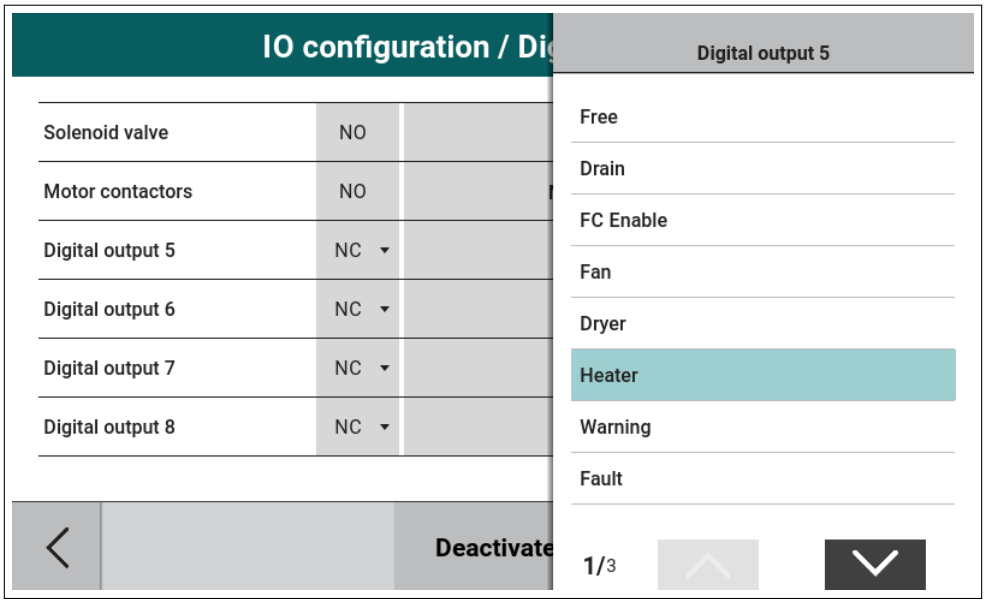

Figure 116: Heater digital output configuration

5.8. Build up monitor

From settings menu, enter Operation parameters / System pressure related and setup the parameters according to the requirements.

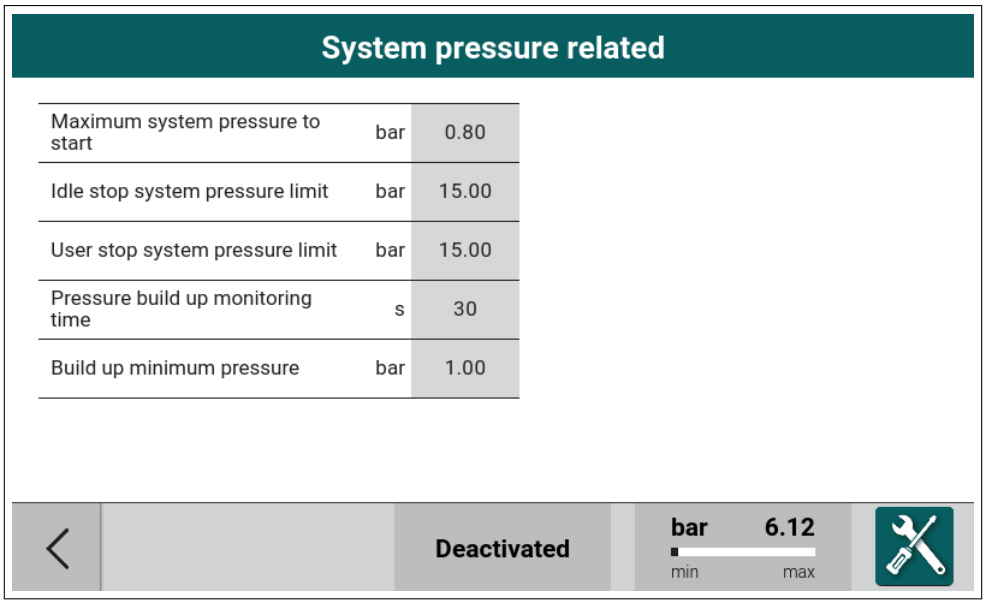

Figure 117: System pressure related menu

Build up monitor configuration options:

1. Pressure build up monitoring time - Time after which system pressure will be checked in compressing state for the pressure build up.
2. Build up minimum pressure - Level of system pressure that must be reached after build up delay.

If the compressor does not reached the ”build up minimum pressure” level after the ”build up delay”, the fault occurs and the compressor stops.

5.9. Software update

The update process consists of two steps:

1. HMI update - initiated by the user
2. Main controller update - performed automatically after the HMI update

5.9.1. HMI update

To begin the update process, plug the USB key with the update file located in the update/ directory to the USB port on the HMI. From the bottom sliding menu, enter Information menu and press the ”Update” button.

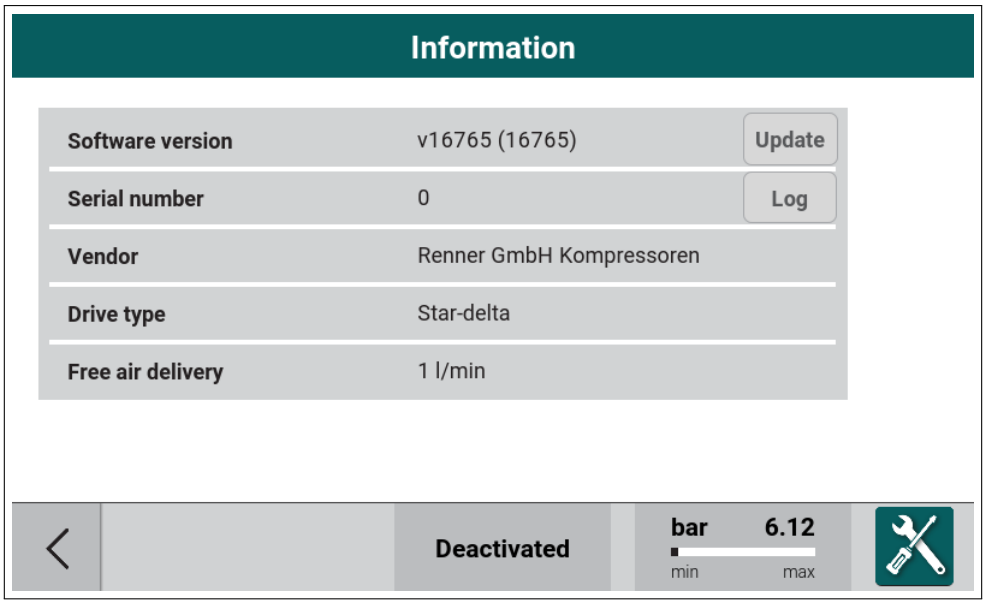

Figure 118: Information menu

The update procedure starts. Do not turn off the power supply during the update process.

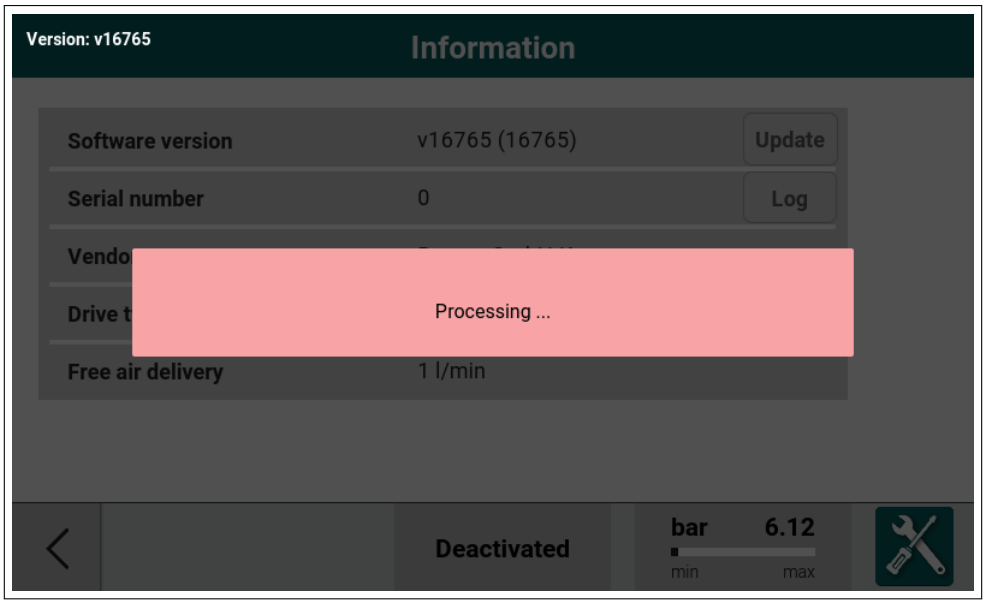

Figure 119: Update process

During the update process the diagnostic information will be displayed.

Table 42: HMI Update messages

Update message	Details / suggested action
Updating HMI. Do not turn off the power supply!	The update is in progress.
Update succeess. Rebooting	The HMI update was completed and the device is rebooting.

Table 42: HMI Update messages

Update message	Details / suggested action
There was detected more than one file with .update extension on the removable drive. Remove additional files and restart update.	On the USB key's update directory, there is more than one file with the update package. To fix the issue: 1. Disconnect the USB key from the HMI 2. Plug the USB key back to the HMI 3. Retry the update 4. If problem persists, connect to PC and verify if the update package was uploaded to the USB key properly
There is no file with .update extension present on the removable drive in the update foder.	On the USB key's update directory, there isno file with the update package. To fix the issue: 1. Disconnect the USB key from the HMI 2. Plug the USB key back to the HMI 3. Retry the update 4. If problem persists, connect to PC and verify if the update package was uploaded to the USB key properly 5. If the update package exists in the update directory, verify if it is a proper update file for a device 6. Disconnect the USB key from the PC and retry the update
UPDATE FAILED	Generic error. To fix the issue: 1. Retry the update 2. Disconnect the USB key from the HMI 3. Plug the USB key back to the HMI 4. Retry the update 5. If problem persists, connect to PC and verify if the update package was uploaded to the USB key properly 6. If the update package exists in the update directory, verify if it is a proper update file for a device 7. Disconnect the USB key from the PC and retry the update 8. If problem persists, try updating the HMI using the fallback update method.

5.9.1.1. Fallback HMI updater

If the HMI update fails or the user cannot enter the Information menu, there is a possibility to update the software system using the fallback updater.

To use a fallback updater:

1. Connect the USB key with a update package to the HMI USB port
2. Power off the HMI
3. Power on the HMI
4. When the splash screen is shown, press a *0* button several times and wait for the fallback updater to display the messages.

5.9.2. Main Controller update

In order for the Main Controller software to be updated, it needs to be connected to the HMI and powered on. After successful connection to the Main Controller, HMI detects if the software version on the Main Controller is the same as on the HMI and initiates the update if necessary. During the Main Controller update, the diagnostic information will be displayed.

Table 43: Main Controller Update messages

Update message	Details / suggested action
Updating Main Controller: starting update	The update has started
Updating Main Controller: step 1 of 3	The update is in progress
Updating Main Controller: step 2 of 3	The update is in progress
Updating Main Controller: step 3 of 3	The update is in progress
Updating Main Controller failed	The update has failed and will be retried

5.9.2.1. Fallback Main controller update

If updating the Main Controller fails it is possible to eneble the emergency updater and force the update.

In order to carry out the emergency update procedure, it is required to enable the switch position 1 on the main controller and restart the controller. The emergency update procedure starts and HMI will display the notification about updating the MC using the emergency updater. Possible notifications:

Table 44: Main Controller Update messages

Update message	Details / suggested action
Emergency updating Main Controller: starting update	The update has started
Emergency updating Main Controller: step 1 of 3	The update is in progress
Emergency updating Main Controller: step 2 of 3	The update is in progress
Emergency updating Main Controller: step 3 of 3	The update is in progress
Toggle a switch to proceed	Toggle the switch position 1 on the main controller to ”off” and wait for the procedure to end.