



SMARTPRESSUREGATE

FanControl & CapacityControl

Pressure control unit for refrigeration systems
with electronic pressure monitoring and digital display



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1. Intended use

With the **SmartPressureGate SPG 901**, the high and low pressures in refrigeration systems can be monitored and, with the aid of switching outputs, be regulated and output as alarms.

Via the RS485 interface, the SPG 901 can be read out and configured by means of Modbus RTU.

Compatible with the refrigerants R22, R134a, R404a, R407c, R407f, R410a, R507. Any other use is considered a non-intended use.

2. Safety



To ensure safe and reliable work, only use the device for the described application.



The device may only be installed and commissioned by refrigeration technicians from certified companies with electrotechnical training in the field of low voltage.
The device may only be operated by certified refrigeration technicians from certified companies.



DANGER

Electrical shock can result in burns and life-threatening injuries. The device must not be opened.
In the event of a defect, return the device to the manufacturer.



DANGER

Electrical shock can result in burns and life-threatening injuries. Before beginning installation and maintenance work, switch off mains voltage.



CAUTION

When using refrigerants that are not listed in chapter "Specifications", injuries may occur due to higher pressures or leaks.



DANGER

Fires may occur when using combustible refrigerants. It is therefore forbidden to operate the device with combustible refrigerants.



WARNING

This device is not a safety-related installation. It may only be used in the commercial sector. The system must absolutely be equipped with an approved safety valve. If not observed, there is a danger of injuries and environmental damage caused by the discharge of refrigerants in the event that the system limits are exceeded.



WARNING

The release of pressurized refrigerants could cause eye injuries. Wear protective goggles during installation and maintenance work.

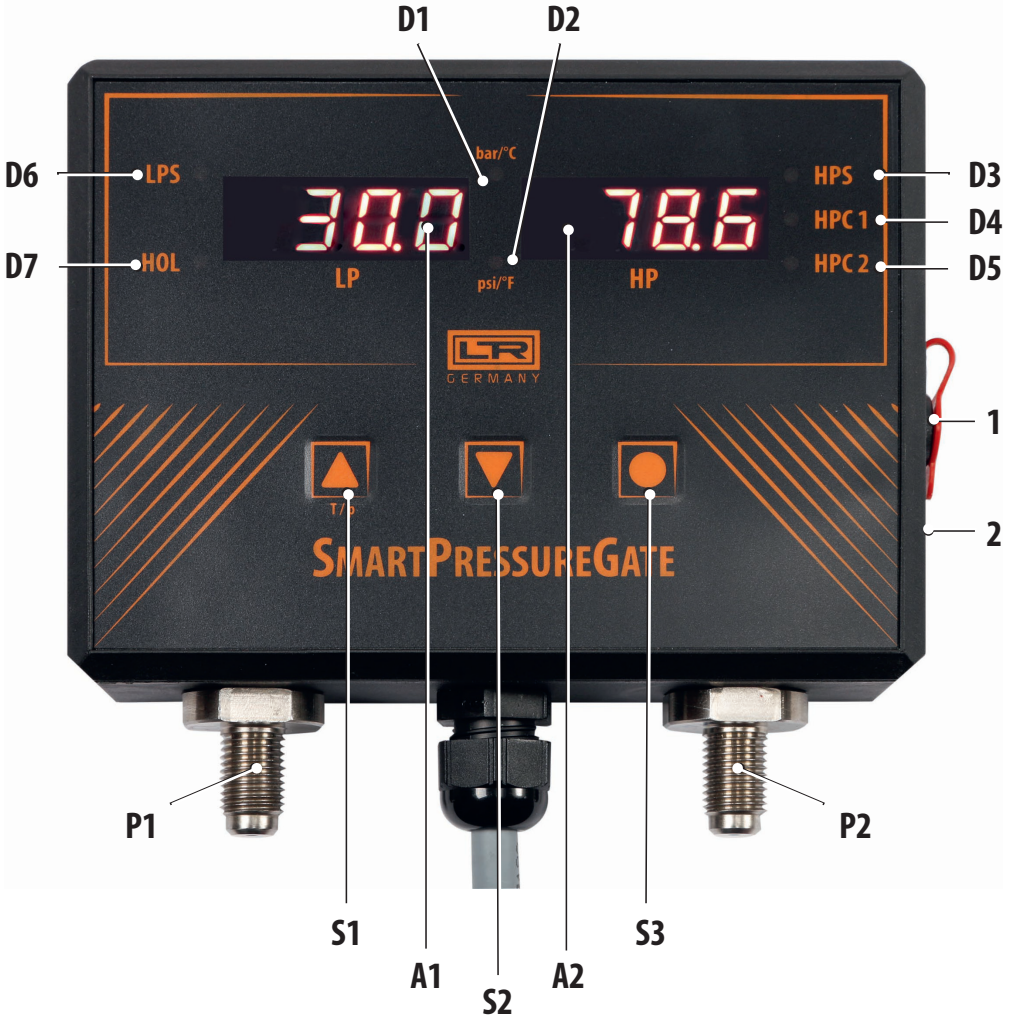
3. Specifications

Supply voltage:	100...240 VAC ~ @ 47...63 Hz 
Current consumption:	200 mA max.
Display:	4-digit LED display for LP (low pressure) 4-digit LED display for HP (high pressure)
Relay switching current:	5A @ 250 VAC, not fuse-protected. The specified switching currents must NOT be exceeded and adequate external fuse protection must additionally be provided!
Cable specification:	1.4 A @ 20 °C
LP analogue output:	4...20 mA / 0...10 VDC @ -1...19 bar or CapacityControl (see point 15)
HP analogue output:	4...20 mA / 0...10 VDC @ 0...50 bar or FanControl (see point 14)
Operating temperature:	-25°...+55 °C RH 60%
Protection class:	IP 65 in accordance with DIN EN 60529 / IEC 60529
Permitted degree of contamination of the environment:	I
Overvoltage category:	II
Altitude:	max. 2000 m
Pressure connections:	7/16" - 20 UNF / 1/4" SAE
Refrigerant:	R22, R134a, R404a, R407c, R407f, R410a, R507
Storage conditions:	Store the device in a clean and dry environment. Keep the device in a place inaccessible to unauthorized persons.

4. Pressure measurement ranges

	Low Pressure (LP) relative	High Pressure (HP) relative
Pressure range	-1...19 bar / -14...275 psi	0...50 bar / 0...725 psi
Precision	±0.5% full scale	
Overload warning	up to 2% overload ("OFL" flashes + acoustic warning)	
Overload	above 2% overload ("OFL" flashes + acoustic warning)	
Physical overload	40 bar / 580 psi	100 bar / 1450 psi
Bursting pressure	60 bar / 870 psi	140 bar / 2030 psi

5. Overview



S1	Button 1	D4	HPC1 LED
S2	Button 2	D5	HPC2 LED
S3	Button 3	D6	LPS LED
A1	LP display (low pressure)	D7	HOL LED
A2	HP display (high pressure)	P1	LP sensor connection
D1	bar/°C LED	P2	HP sensor connection
D2	psi/°F LED	1	Update connection / USB Type-C
D3	HPS LED	2	Update button (under the cover on the side)

6. Designations

HP (High Pressure):	High pressure downstream of the compressor.
LP (Low Pressure):	Low pressure upstream of the compressor (suction-side).
HPS (High Pressure Switch):	Adjustable HP value to switch off the compressor and to issue an alarm signal.
Hdt (High Pressure Delay Timer):	Adjustable delay for the HPS in order to avoid unstable system behaviour.
HPd (HP Switch Differential Pressure):	Adjustable differential pressure relative to the HP value in order to switch on the compressor again.
HC1 (High Pressure Control 1):	Adjustable HP value for controlling fan 1 on the condenser.
HF1 (HP Differential Pressure 1):	Adjustable differential pressure relative to HC1 for switching off fan 1 on the condenser.
HC2 (High Pressure Control 2):	Adjustable HP value for controlling fan 2 on the condenser.
HF2 (HP Differential Pressure 2):	Adjustable differential pressure relative to HC2 for switching off fan 2 on the condenser.
LPS (Low Pressure Switch):	For controlling the pressure at the suction side of the compressor, in combination with automatic resetting.
LIF (LP Differential Pressure):	Adjustable differential pressure relative to the LPS value.
Ldt (LP Delay Timer):	Adjustable delay for deactivation of the LPS in order to avoid unstable system behaviour.
FAN (FanControl):	Switch FanControl on or off via analogue output.
FHP (Fan High Pressure):	HP pressure at which the maximum analogue value is output (active with "FAN ON")
FLP (Fan Low Pressure):	HP pressure at which the minimum analogue value is output (active with "FAN ON")
FLL (Fan Low Level):	Minimum analogue value for the range at the output in %
CHP (CRI High Pressure)	LP pressure at which the maximum analogue value is output ("CRI ON" = active)
CLP (CRI Low Pressure)	LP pressure at which the minimum analogue value is output ("CRI ON" = active)
CLL (CRI Low Level)	Minimum analogue value for the range at the output in %
HHA (Manual Mode & Automatic Mode)	Resetting of the HPS when $HP < HPS - HPd$. A: HPS is reset again automatically. H: HPS is not reset until acknowledgement is given with button 3.
LHA (Manual Mode & Automatic Mode)	Resetting of the LPS when $LP > LPS$ A: LPS is reset again automatically. H: LPS is not reset until acknowledgement is given with button 3.
GAS	Selection of the refrigerant
Unt	For setting the displayed pressure unit.
C-F	For setting the displayed temperature unit.
ADD	Setting of the device address at the RS485 communication connection for use at the Modbus RTU.
RES	Resetting of all adjustable parameters to their default values.
End	Press arrow button to end.

7. Connection diagram

Colour	Connection	Schematic rep.	Group
Black	L1		Supply
Brown	N		
Yellow	LPS-A		LPS
White/yellow	LPS-B		
Yellow/brown	LPS-C		
Green	HPS-A		HPS
White/green	HPS-B		
Brown/green	HPS-C		
Red	HPC-A		HPC1
Red/blue	HPC-B		
Grey	HPC-C		HPC2
Grey/brown	HPC-D		
Purple	A		RS485
Blue	B		
White	LP analogue		LP output: (0 ... 10 V / 4 ... 20 mA)
White/grey	LP-GND		
Pink	HP analogue		HP output: (0 ... 10 V / 4 ... 20 mA)
Grey/pink	HP-GND		

8. Status LEDs

HPS:	Switching state of high pressure switch
LPS:	Switching state of low pressure switch
HPC1:	Switching state of high pressure control 1
HPC2:	Switching state of high pressure control 2
HOL:	off → Automatic mode active on → Manual mode active
bar/°C:	
Pressure indicator mode:	on → Pressure display in bar
Temperature indicator mode:	on → Temperature display in °C
psi/°F:	
Pressure indicator mode:	on → Pressure display in psi
Temperature indicator mode:	on → Temperature display in °F

9. Operation

Pressure indicator mode:

In this mode, the LP and HP pressures are displayed in the set unit.

Temperature indicator mode:

The  button is used to switch between pressure indicator mode and temperature indicator mode.

Upon releasing the  button, the mode automatically changes to the pressure indicator mode.

Setting mode:

Activate the Settings menu by pressing and holding down the  button. The  and  buttons are used to change the password and the parameters in the menu. Press the  button to advance to the next character of the password.

The parameters can only be changed if the password was entered correctly. If the password was not entered or if it was entered incorrectly, the parameters can only be displayed but not changed. The parameters are changed by pressing quickly in individual steps or by holding down to change at increased speed.

Briefly press the  button to navigate to the next item in the Settings menu. The order of the menu items corresponds to the order in the parameter list (see point 10)

Setting mode is ended automatically and the pressure display is shown again if 20 seconds pass without a button being pressed. Press and hold down the  button to exit the Settings menu at any time; the display switches to the pressure display. Exiting the Settings menu is also signalled by a brief acoustic signal.

To reset all parameters to the factory settings, the  button in the "RES" menu item of the Settings menu must be pressed for 2 seconds.

10. Parameters

Label	Name	Limit values	Default values
HPS	High Pressure Switch	0.0...50 bar / 0...725 psi	30 bar / 435 psi
Hdt	Delay timer for HPS value	0...200 s	0 s
HPd	Differential pressure value for HPS value	0.0...50.0 bar / 0...725 psi	15.0 bar / 217 psi
HC1	High Pressure Control 1	0.0...50.0 bar / 0...725 psi	20.0 bar / 290 psi
HF1	Differential pressure value for HC1 data	0.0...50.0 bar / 0...725 psi	5.0 bar / 72 psi
HC2	High Pressure Control 2	0.0...50.0 bar / 0...725 psi	20.0 bar / 290 psi
HF2	Differential pressure value for HC2 data	0.0...50.0 bar / 0...725 psi	5.0 bar / 72 psi
LPS	Low Pressure Switch	-1...+19 bar / -14...+275 psi	7.0 bar / 101 psi
LIF	Differential pressure value for LPS data	0...20 bar / 0...290 psi	2.0 bar / 29 psi
Ldt	Delay timer for LPS value	0...200 s	0 s
FAN	FanControl	ON/OFF	OFF
FHP	FanControl High Pressure (HP)	0.0...50.0 bar / 0...725 psi	20.0 bar / 290 psi
FLP	FanControl Low Pressure (LP)	0.0...50.0 bar / 0...725 psi	5.0 bar / 72 psi
FLL	FanControl Low Level	0...100 %	15 %
CRI	CapacityControl	ON/OFF	OFF
CHP	CapacityControl High Pressure	0.25...3.00 bar / 3.6...43.5 psi	0.25 bar / 3.6 psi
CLP	CapacityControl Low Pressure	0.2...7.0 bar / 3...101 psi	1.0 bar 14 psi
CLL	CapacityControl Low Level	0...50 %	10 %
HHA	Selection of automatic or manual mode	A: automatic / H: manual	A
LHA	Selection of automatic or manual mode	A: automatic / H: manual	A
GAS	Select the gas type	R22, R134a, R404a, R407c, R407f, R410a, R507	R22
Unt	Select the pressure unit	bar, psi	bar
C-F	Selection of temperature unit	°C, °F	°C
Add	RS-485 address for Modbus communication	0...255	2
RES	Resetting of all parameters to default values	---	---
End	Press arrow button to end	---	---

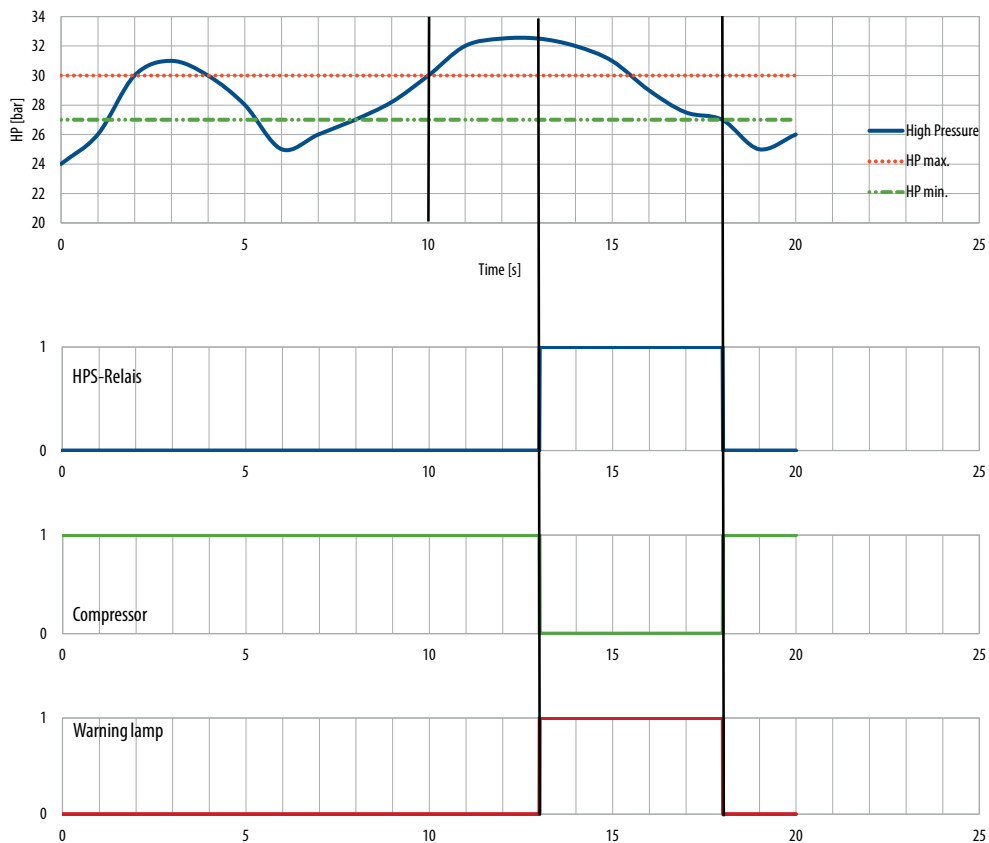
11. Switching behaviour – HPS

HPS with the following set parameters:

HPS: 30 bar

Hdt: 3 seconds

HPd: 3 bar



12. Switching behaviour – HPC

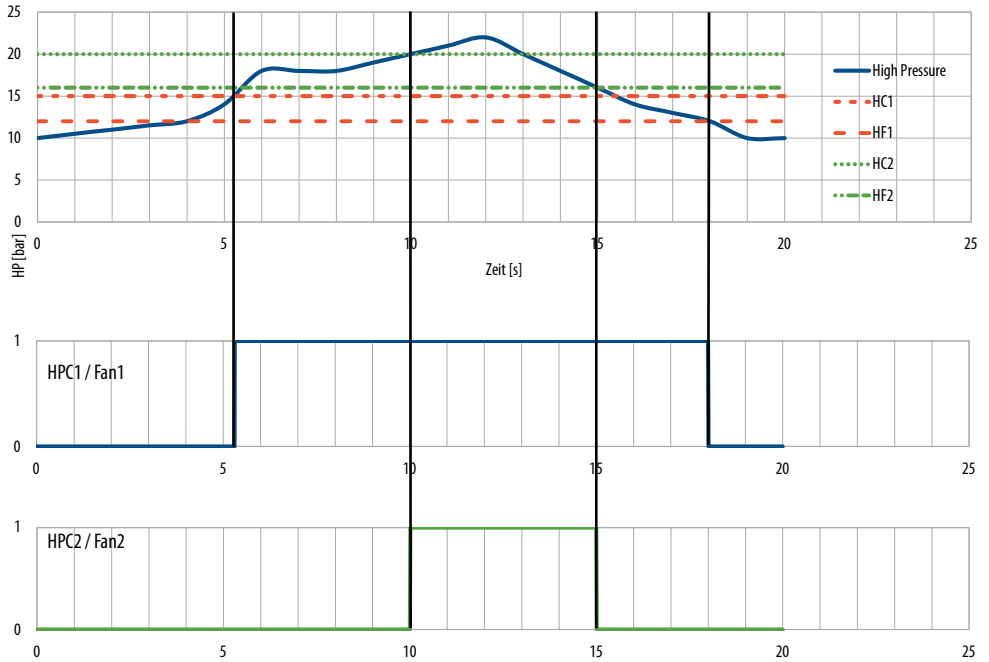
HPC with the following set parameters:

HC1: 15 bar

HF1: 3 bar

HC2: 20 bar

HF2: 5 bar



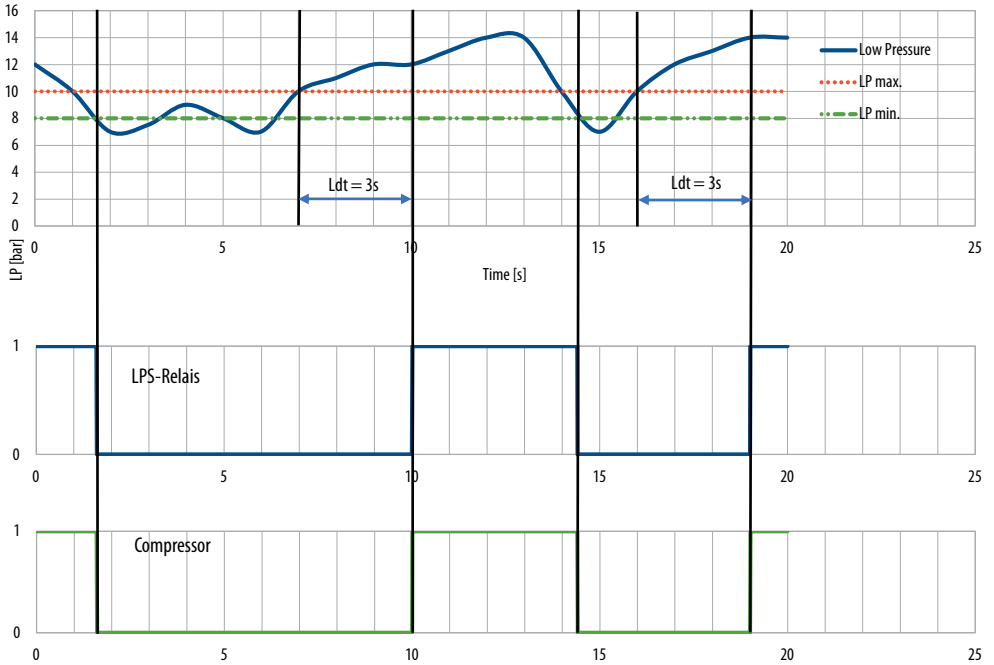
13. Switching behaviour – LPS

LPS with the following set parameters:

LPS: 10 bar

Ldt: 3 seconds

LIF: 2 bar



14. FanControl

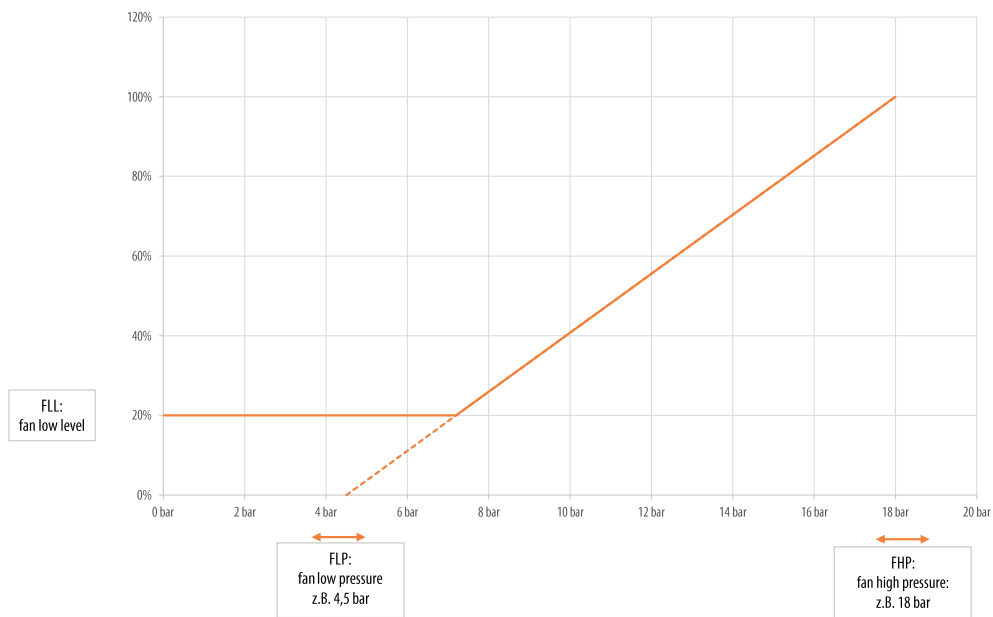
Analogue output FanControl with the following set parameters:

FHP: 18 bar

FLP: 4,25 bar

FLL: 20 %

FanControl



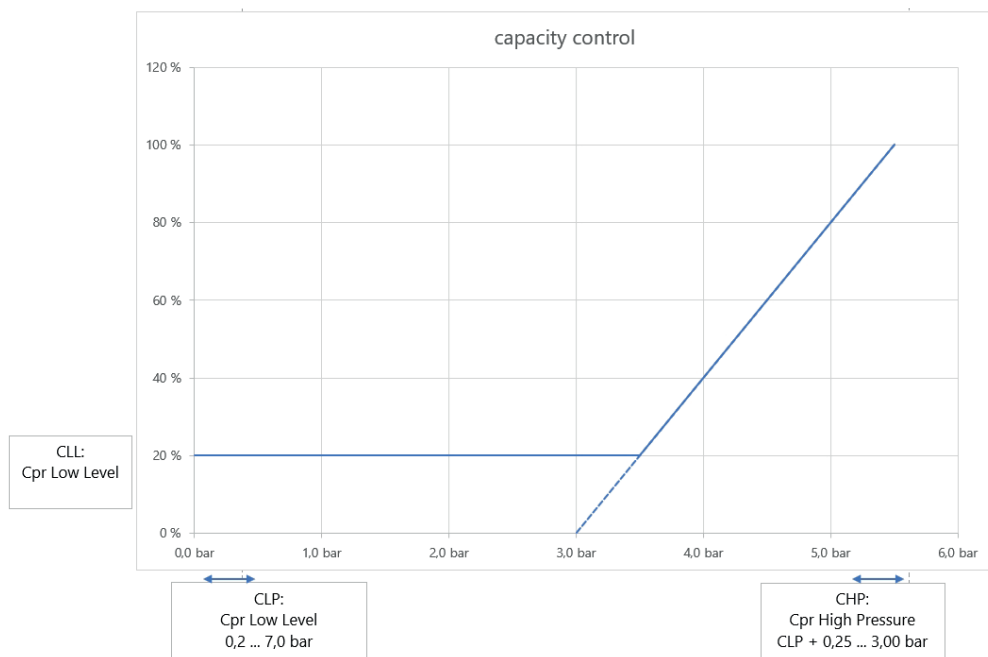
15. CapacityControl

Analogue output CRI with the following set parameters

CHP: 3,00 bar

CLP: 3,0 bar

CLL: 20 %



16. RS-485 (Modbus RTU)

Communication: RS485, start/stop-synchronized serial interface
Baud rate: 115200
Data length: 8-bit data length
Stop bit: 1 stop bit
Parity: no parity

For detailed specifications of the transmission protocol, please contact the manufacturer. Contact data is given on the last page.

17. Disposal



Recycling according to WEEE (EU Directive 2012/19/EU) and ElektroG (German Electrical and Electronic Equipment Act)

You can optionally return the device to us for disposal. The user is responsible for deleting personal data from the old device. The device or its components must not be disposed of as household waste.



Subject to technical alterations.

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