Operating and Installation Instructions

R-IMC BUS
Filter control system

RM-300 C
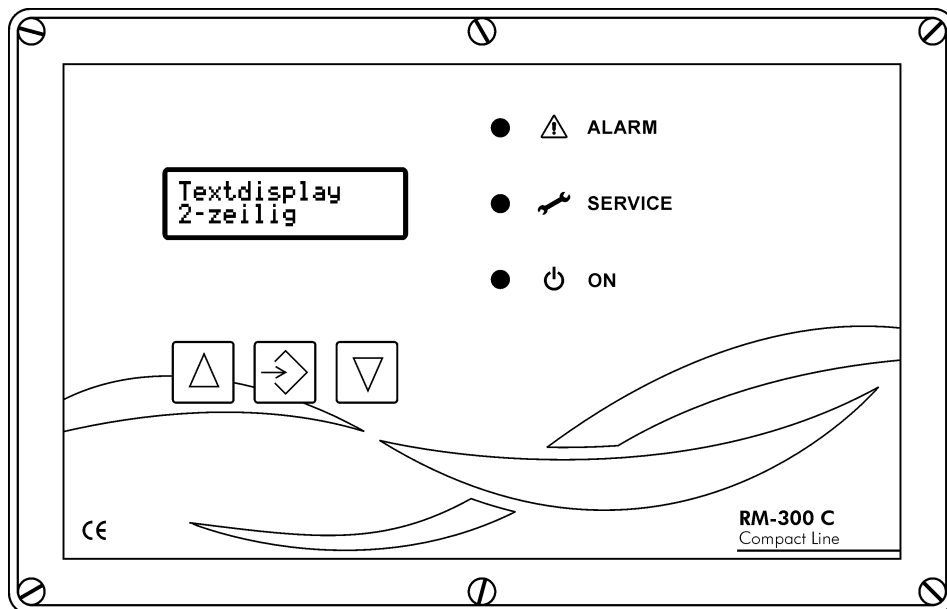# CompactLine

Textdisplay
2-zeilig

⚠ ALARM

🔧 SERVICE

⏻ ON

△ ⇥ ▽

CE

RM-300 C
Compact Line

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Regulations

2014/30/EU   EN 60.204 Part 1

2014/35/EU

Legend

Important note

Important warning

A brief summary of the most important points

1 Safety instructions

Device failure, serious or even fatal injuries may occur as a result of improper installation of the *RM-300C Compact Line* filter control or connected equipment. Therefore, in addition to the general safety regulations for equipment in industrial electrical installations, carefully observe the points set out below:

- Installation of the device may be carried out only by qualified experts, in accordance with the provisions of IEC 364, DIN VDE 0105 for electrical equipment.

- Regarding the installation site, all applicable laws, rules and regulations governing the installation of electrical equipment must be observed.

- Devices with protection degree IP00 without covers may only be adjusted by authorised experts, when disconnected, and whilst observing the local safety and accident prevention regulations.

The *RM-300C Compact Line* may only be operated in the permitted operating area.

Switch off the mains supply before replacing the filter control or any components connected to it. Failure to do so could damage the device.

2 Equipment specification

The R-IMC bus system is a complex control and display system for machine and plant engineering. The bus system is adjusted, visualised and controlled by the RM-300C CompactLine controller. Intelligent I/O modules carry out their measurement and control functions in decentralised form. The R-IMC bus is based on the RECO Inter Module Communication Protocol which was developed specially for use in industrial environments.

The following diagram (see Figure 1) shows the general layout of an R-IMC bus controller environment for use as a pulse filter.
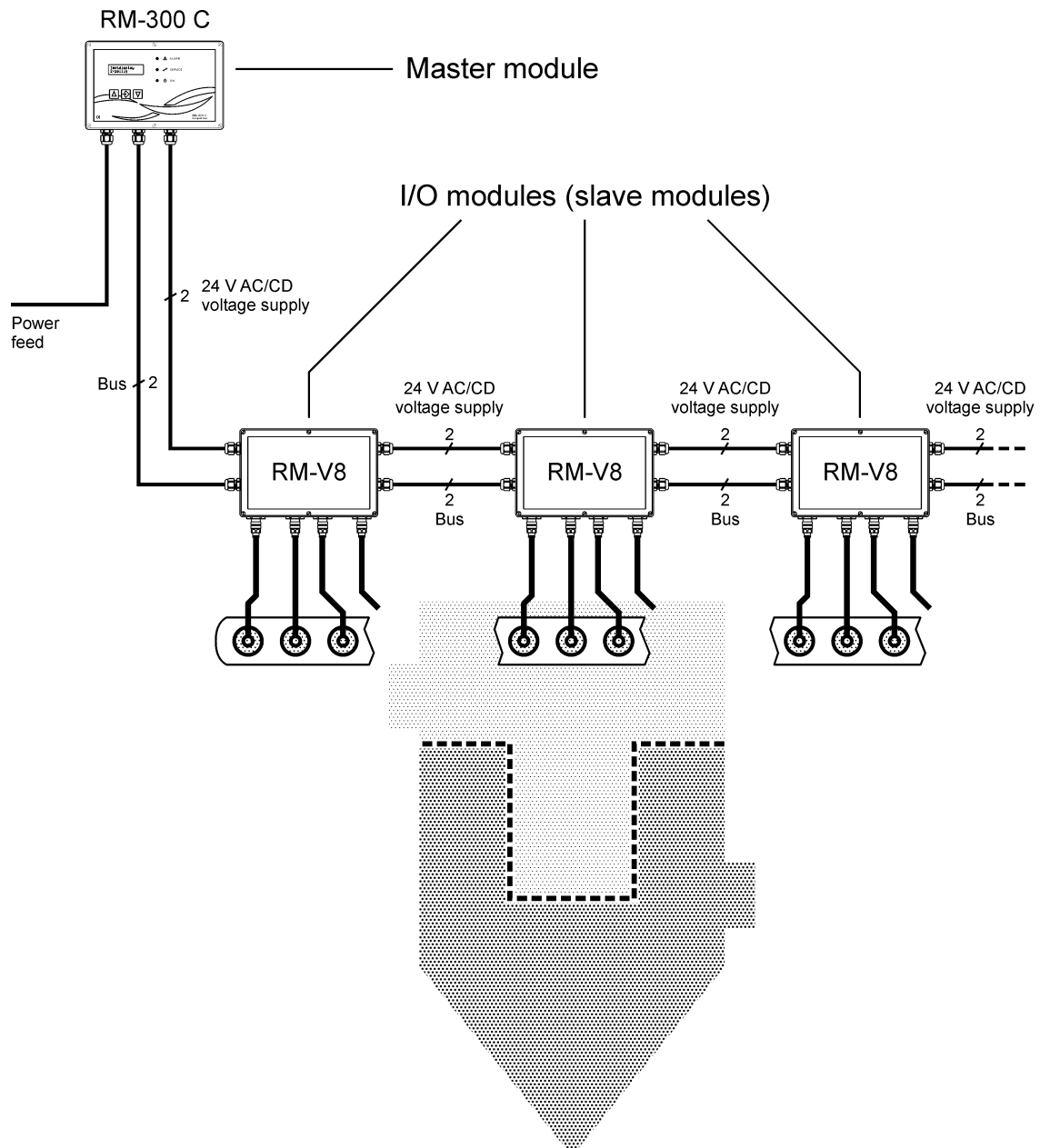
Figure 1: Filter control system with *RM-300 C* and *RM-V8*

3 Assembly

The *RM-300C Compact Line* is built into a plastic casing with minimum degree of protection IP-66. The casing can be attached to the filter using four M4 screws (see Figure 2).
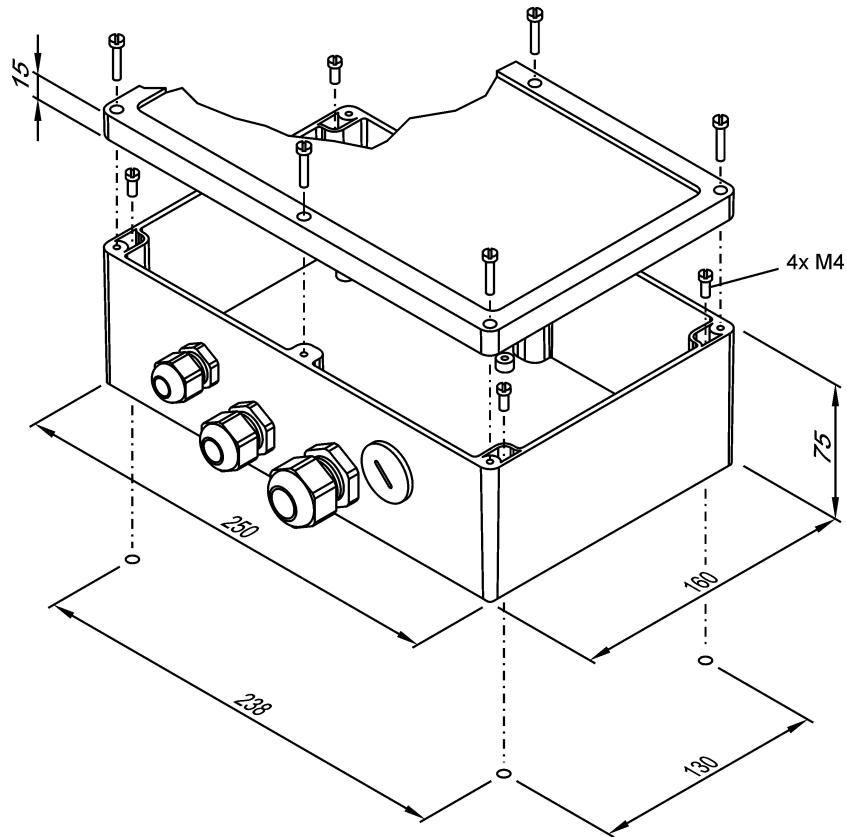
Figure 2: Affixing the *RM-300C Compact Line* casing

4 Installation

4.1 Electrical Connections

Figure 3 shows an overview of the connection terminals of the *RM-300C CompactLine* with example connections. The details of the connections are described on the following pages.

Figure 3: Terminal assignment of the *RM-300C Compact Line* filter control with example connections

Code in Figure 3

Description

(1) Voltage supply

- 230 V AC for the 230 V AC version of the device (terminal label: PE. N. L)

- 24 V DC for the 24 V DC version of the device (terminal label: PE. -. +)

(2) Optocoupler inputs

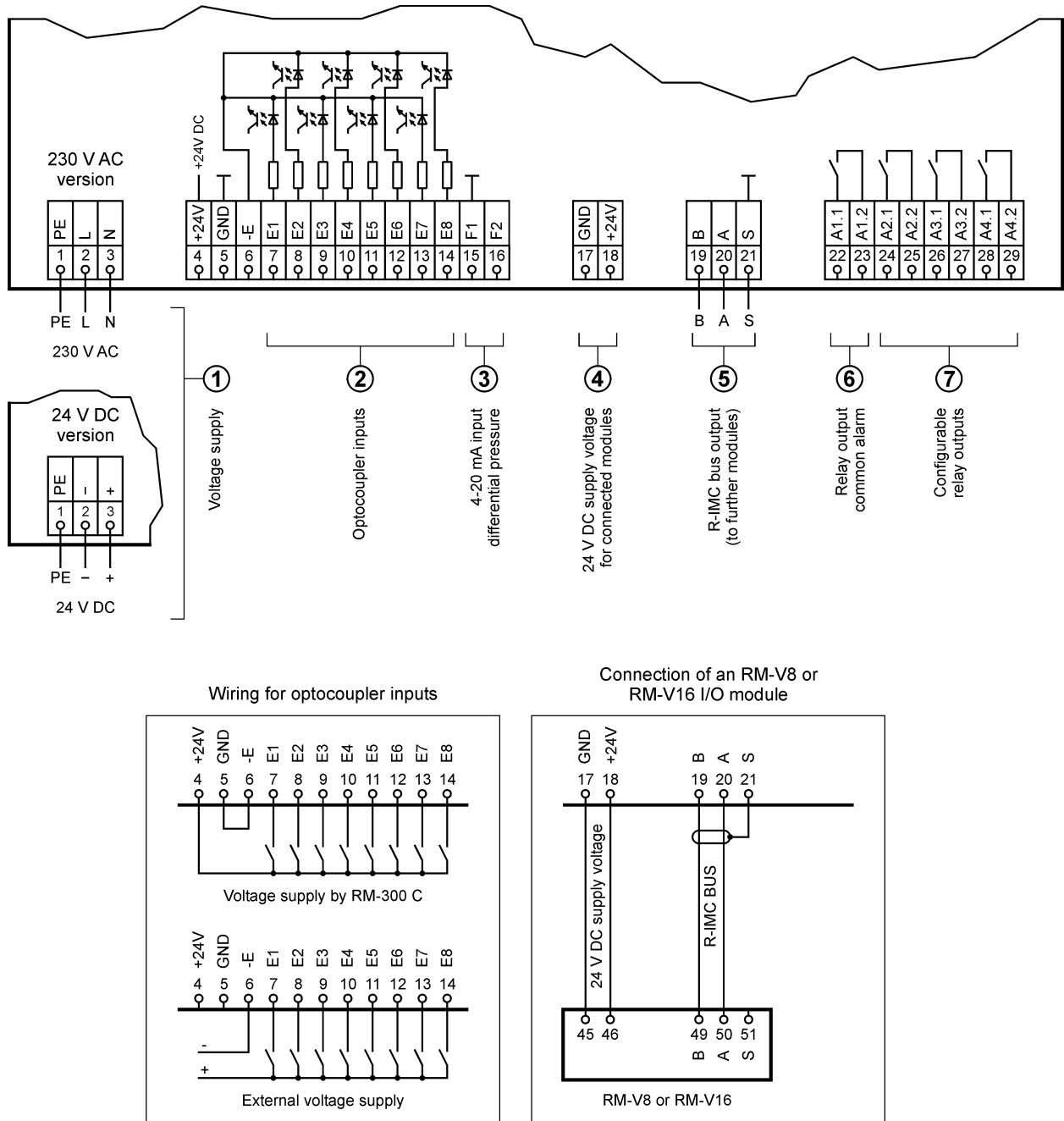Figure 3 shows the wiring of the optocoupler inputs of the *RM-300C Compact Line*. Both the internal device voltage and an external voltage source can be used to supply the voltage to the control contacts. The functions of the inputs are as follows:

Input	Function
I1	General enable. Set using parameters P16 and P19.
I2	The function is set using parameter P16.
I3	General alarm reset
I4	Cleaning on. Cleaning is switched on when I4 = 1.
I5	Cleaning off. Cleaning is switched off when I5 = 1.
I6	Cleaning release (on request from P17 / P18 / P19 = 10)

i Input I5 has the highest priority. It has precedence over all other inputs.

(3) 4-20mA input differential pressure

Input F1 / F2 is used for connecting a differential pressure transmitter with a 4-20 mA output signal.

(4) 24 V DC supply voltage for connected modules

I/O modules connected to the *RM-300C Compact Line* are supplied with voltage through terminals 17 (GND) and 18 (+24 V). (see connection example Figure 3).

(5) *R-IMC BUS* output

The BUS cable is connected to the *R-IMC BUS* output, terminals 19 (B), 20 (A) and 21 (shield).

(6) "Common alarm" relay output

The relay output A1.1 / A1.2 is used to report a common alarm. As soon as there is a voltage supply to the *RM-300C Compact Line*, the relay contact closes. It opens for every alarm that occurs.

Code in Figure 3

Description

(7) **Configurable relay outputs**

Relay outputs O2.1 / O2.2, O3.1 / O3.2 and O4.1 / O4.2 are for signal exchange. The function of the outputs is selected using the parameter settings as follows:

Output	Function
O2.1 / O2.2	The function is set using parameter P17.
O3.1 / O3.2	The function is set using parameter P18.
O4.1 / O4.2	The function is set using parameter P19.

4.2 Checklist after completed installation

- Before switching on, check that the mains voltage agrees with the rated supply voltage for the device. (230 V AC or 24 V DC)
- Check valve and device functions by running in test mode.
- The run-on cleaning function can be tested by briefly closing and opening the contact on input I1, I2, providing it has been set using parameter P06.

i When using cable conduits, do not lay sensitive signal cables in the same conduits as motor cables. If signal cables intersect with power cables, this should occur at an angle of 90°.

5   Operation

5.1   Display and control elements

When the *RM-300C Compact Line* is switched on, the device is in operation mode. The current differential pressure of the filter is output in plain text on the display. The control parameters cannot be accessed.
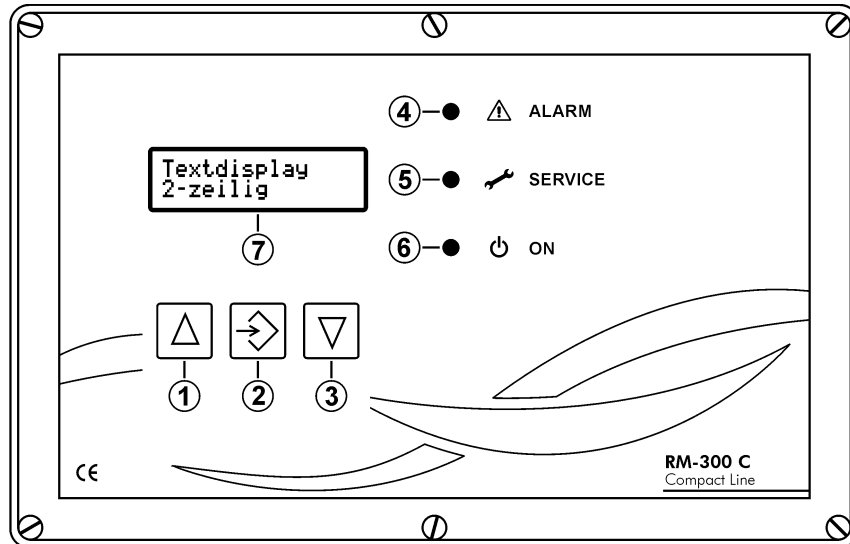
(1) △ key to select parameter or value (in upward direction)

(2) ENTER key to enter selected value

(3) ▽ key to select parameter or value (in downward direction)

(4) "ALARM" LED lights up when there is an alarm message (alarm relay pressed)

(5) "SERVICE" LED lights up when the service hours configured for parameter P26 have been reached

(6) "ON" LED   **lights up** when the unit is working
        does not light up when the unit is in parameter selection mode
        flashes when the unit is in parameter settings mode

(7) Text display, 2 lines

Figure 4: Display and control elements on the front of the unit

5.2 Setting parameters

In order to select a parameter to set or check, you need to switch from operating mode to parameter selection mode. To do this, press the Δ key at the same time as the ∇ key and hold them down for at least 3 seconds. The parameters can then be called up in sequence by pressing the Δ key again. You can return to parameters you have already displayed by pressing the ∇ key.

Switching to parameter selection mode:

Press the ∇ key at the same time as the Δ key and hold them down for at least 3 seconds.

To change the value of the parameter selected, you need to switch to parameter setting mode. To do this, hold the ENTER key down for at least one second. The parameter value displayed can then be gradually increased by pressing the Δ key or decreased by pressing the ∇ key.

Switching to parameter setting mode:

Hold the ENTER key down for at least 1 second.

Changing a selected parameter value:

Δ- key   Selects the next higher value
∇ key   Selects the next lower value.

When attempting to change a parameter, if the message "`Param.`☐`locked`☐☐☐" appears on the display set parameter P000 to code 111 to lift the lock on all parameters.

Pressing the ENTER key again and holding it down for at least 3 seconds saves the new value, exits settings mode and returns to parameter selection mode.

Saving the amended parameter value and switching to parameter selection mode:

Hold the ENTER key down for at least 3 seconds.

To return to operating mode from parameter selection mode (from any parameter), press the Δ key at the same time as the Δ key and hold them down for at least 3 seconds. If you are still in parameter settings mode, you need to switch to parameter selection mode as described above. In the parameter modes (parameter selection mode and parameter settings mode), if no key is pressed within 4 minutes the device automatically reverts to operating mode with the last values saved.

Returning to operating mode from parameter selection mode:

Press the ∇ key at the same time as the Δ key and hold them down for at least 3 seconds.

To switch to parameter selection mode:

❶ Press the ▲ -button at the same time as the ▼ -button and hold for at least 3 seconds.

To select a parameter:

❷ Press the ▲ -button to scroll up
Press the ▼ -button to scroll down

To switch to parameter setting mode:

❸ Hold the ENTER key down for at least 1 second

To change a selected parameter value:

❹ ▲ -button to select the next higher value
▼ -button to select the next lower value

To save the changed parameter value:

❺ Hold the ENTER key down for at least 3 seconds

To return to operating mode:

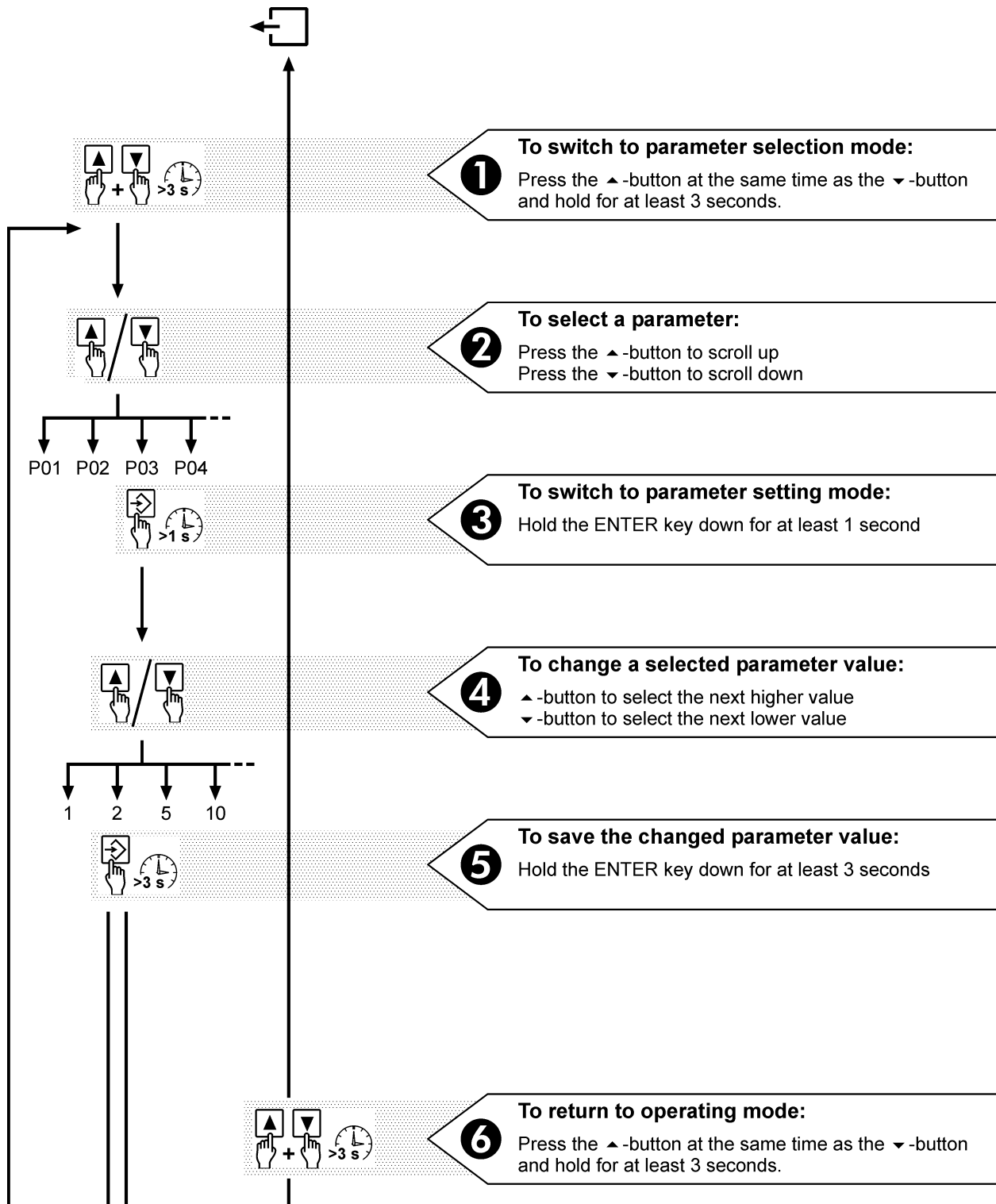❻ Press the ▲ -button at the same time as the ▼ -button and hold for at least 3 seconds.

Figure 5: Brief introduction to checking and adjusting parameter values

5.3 Parameter list – Controller type 1 (standard functions)

Para-meter no.	Brief description	Display line 1	Release	Unit	Min value	Max value	Base value
P00	Parameter release (111)	P00□Rel.□param□□	on	000 no.	0	250	0
P01	Test programs	P01□Test□mode□□□	on	000 no.	0	15	0
P02	DP start	P02□DP□start□□□□	on	00.0 hPa	1.0	50.0	10.0
P03	DP hysteresis	P03□DP□hyster.□□	off	00.0 hPa	0.3	40.0	0.3
P04	DP min alarm	P04□DP□min□alarm	off	00.0 hPa	0.0	20.0	0.0
P05	DP max alarm	P05□DP□max□alarm	off	00.0 hPa	5.0	50.0	20.0
P06	run-on cycles	P06□run-on□cyc□□	on	000 cyc.	0	16	0
P07	Reserve	P07□Reserve□□□□□	off	–	–	–	–
P08	Forced cleaning time	P08□Forced□clean	on	Text	0	15	0
P09	Interval 1	P09□Interval□1□□	on	000 s	1	600	10
P10	Interval 2	P10□Interval□2□□	on	000 s	1	252	6
P11	Reserve	P11□Reserve□□□□□	off	–	–	–	–
P12	Cleaning valve pulse time	P12□Pulse□clean□	off	000 ms	30	2500	80
P13	Display language	P13□Display□lang	on	Text	0	1	0
P14	Display selection	P14□Disp.□select	on	Text	0	7	0
P15	Reserve	P15□Reserve□□□□□	off	–	–	–	–
P16	Input I2 function	P16□Inp.□mode□I2	off	Text	0	6	0
P17	Output O2 function	P17□Outp.mode□O2	off	Text	1	26	6
P18	Output O3 function	P18□Outp.mode□O3	off	Text	1	26	4
P19	Output O4 function	P19□Outp.mode□O4	off	Text	1	26	5
P20	Controller type	P20□Control□type	off	Text	0	1	0
P21	DP cleaning mode	P21□Clean.□mode□	off	Text	0	3	1
P22	Sensor type	P22□Sensor□type□	off	Text	0	11	2
P23	Sensor alarm	P23□Sensor□alarm	off	Text	0	3	0
P24	Number of I/O module	P24□RM-VXX□no.□□	off	000 unit	1	15	1
P25	Number of valves	P25□Valve□no.□□□	off	000 unit	1	240	8
P26	Service hours alarm	P26□Service□al.□	off (128)	00000 h	0	25000	0

5.4 Extended parameter list – Controller type 2

Para-meter no.	Brief description	Display line 1	Release	Unit	Min value	Max value	Base value
P27	DP window P controller	P27□DP□P□control	off	00.0 hPa	0.5	5.0	1.3
P28	Value table P controller	P28□Tb□P□control	off	Text	0	45	0
P29	Measurement time P controller	P29□PP□meas.time	off	000 pulses	1	250	5
P30	P controller program	P30□Program□PP□□	off	Text	0	15	0
P31	Interval 3	P31□Interval□3□□	on	000 s	1	250	1
P32	Min interval (0 = controller off)	P32□Min□interval	on	000 s	0	100	0
P33	DP min interval	P33□DP□min□inter	on	00.0 hPa	10.0	50.0	35.0
P34	Max interval	P34□Max□interval	on	000 s	3	600	210
P35	DP max interval	P35□DP□max□inter	on	00.0 hPa	0	25.0	5.0
P36	Monitoring	P36□IP□monitor□□	off	Text	0	3	1
P37	Reserve 3	P37□Reserve□□□□	off	0	0	0	0
P38	Skip range	P38□Skip□range□□	off	000 unit	0	16	1
P39	Program table	P39□Prog□table□□	off	0	0	1	1

5.5 Parameter description

P00 Release parameters

Certain parameters first need to be released using switch P00. If this parameter is set and saved to the value **111**, the parameters listed as **"off"** in the Release column are released.

P01 Test program

During set-up, the following functions can be called up. In this mode, all alarms are suppressed.

Activation of valves connected to the I/O modules

Parameter value	Text on display	What the program does
P01 = 0	`P01☐Test☐mode☐☐☐` `000☐Off☐☐☐☐☐☐☐☐☐`	Test program off
P01 = 1	`P01☐Test☐mode☐☐☐` `☐RM-VXX☐01☐☐☐Y☐☐`	Once the value has been saved, all the valves are activated in sequence via I/O module 1 (*RM-V8* or *RM-V16*). The interval is 1 second. The number of the currently activated valve is displayed in text line 2. Y = valve number
P01 = 2	see right	As with setting P01 = 1, but I/O module 2 (*RM-V8* or *RM-V16*) is activated.
P01 = 3 and so on to	see right	As with setting P01 = 1, but I/O module 3 (*RM-V8* or *RM-V16*) is activated.
P01 = 15	see right	As with setting P01 = 1, but I/O module 15 (*RM-V8* or *RM-V16*) is activated.
P01 = 16	`P01☐Test☐mode☐☐☐` `000☐Reserve☐☐☐☐☐`	Optional for output module

i To exit test mode, set P01 to "off".

P02 DP start

When the controller is enabled, if differential pressure increases to above the **DP start** value the connected I/O modules (interface modules) begin cleaning.

P03 DP hysteresis

Once cleaning has started, if the differential pressure drops below the value **DP start minus DP hysteresis**, cleaning stops.

P04 DP min alarm

One minute after the controller is enabled, if the differential pressure is less than the value of **DP alarm min**, a DP alarm min is set and saved.

P05 DP max alarm

When the system is switched on, if the differential pressure rises above the **DP max alarm** value, a DP max alarm is set and saved.

P06 Run-on cycles

Once the enable is removed, the down-time cycles set here are activated with interval 2 (see parameter P10). If the setting is "0", run-on is switched off.

P07 Reserve

P08 Forced cleaning time

When the controller is enabled, as soon as cleaning stops because of falling differential pressure, forced cleaning time begins. Once this time is up, a run-on cycle is activated. The forced cleaning time counter is set to zero when cleaning starts based on differential pressure.

Parameter value	Text on display	What the program does
P08 = 0	`P08□Forced□clean` `□Off□□□□□□□□□□□□`	deactivated
P08 = 1	`P08□Forced□clean` `□12□minutes□□□□□`	Forced cleaning time is 12 minutes.
P08 = 2	`P08□Forced□clean` `□24□minutes□□□□□`	Forced cleaning time is 24 minutes.
P08 = 3	`P08□Forced□clean` `□36□minutes□□□□□`	Forced cleaning time is 36 minutes.
P08 = 4	`P08□Forced□clean` `□48□minutes□□□□□`	Forced cleaning time is 48 minutes.

Parameter value	Text on display	What the program does
P08 = 5	P08□Forced□clean □60□minutes□□□□□	Forced cleaning time is 60 minutes.
P08 = 6	P08□Forced□clean □72□minutes□□□□□	Forced cleaning time is 72 minutes.
P08 = 7	P08□Forced□clean □90□minutes□□□□□	Forced cleaning time is 90 minutes.
P08 = 8	P08□Forced□clean □2□hours□□□□□□□□	Forced cleaning time is 2 hours.
P08 = 9	P08□Forced□clean □3□hours□□□□□□□□	Forced cleaning time is 3 hours.
P08 = 10	P08□Forced□clean □5□hours□□□□□□□□	Forced cleaning time is 5 hours.
P08 = 11	P08□Forced□clean □7□hours□□□□□□□□	Forced cleaning time is 7 hours.
P08 = 12	P08□Forced□clean □10□hours□□□□□□□	Forced cleaning time is 10 hours.
P08 = 13	P08□Forced□clean □13□hours□□□□□□□	Forced cleaning time is 13 hours.
P08 = 14	P08□Forced□clean □16□hours□□□□□□□	Forced cleaning time is 16 hours.
P08 = 15	P08□Forced□clean □20□hours□□□□□□□	Forced cleaning time is 20 hours.

P09 Interval 1

Interval 1 is the time between cleaning pulses when cleaning has started. It is activated in conjunction with various input functions.

P10 Interval 2

Interval 2 is the time between cleaning pulses when cleaning has started. It is activated in conjunction with various input functions (see parameter P16 and P32).

i Interval 2 is always set during run-on.

P11 Reserve

P12 "Cleaning valve" pulse time

The pulse time for the cleaning valves is set to 80 milliseconds, and can be adjusted.

P13 Display language

The display texts can be output in 7 different languages. The language required is set using parameter P13.

Parameter value	Text on display	What the program does
P13 = 0	`P13␣Display␣lang` `0␣␣D␣␣␣Deutsch␣␣␣␣`	The display texts are output in German.
P13 = 1	`P13␣Display␣lang` `1␣GB␣␣English␣␣␣␣`	The display texts are output in English.
P13 = 2	`P13␣Display␣lang` `2␣␣F␣␣Francais␣␣␣␣`	The display texts are output in French.
P13 = 3	`P13␣Display␣lang` `3␣ES␣␣Espanol␣␣␣␣`	The display texts are output in Spanish.
P13 = 4	`P13␣Display␣lang` `4␣␣I␣␣Italiano␣␣␣␣`	The display texts are output in Italian.
P13 = 5	`P13␣Display␣lang` `5␣␣P␣␣Polski␣␣␣␣␣␣`	The display texts are output in Polish.
P13 = 6	`P13␣Display␣lang` `6␣NL␣Nederlands␣`	The display texts are output in Dutch.
P13 = 7	`P13␣Display␣lang` `7␣␣␣␣Free␣␣␣␣␣␣␣`	Not used.

P14 Display selection

On exiting the settings mode, the configuration is displayed in the second line of text.

Parameter value	Text on display	What the program does
P14 = 0	`P14␣Disp.␣select` `Differe.pressure`	Differential pressure is recorded by the configured P21 sensor type and displayed in hPa.
P14 = 1	`P14␣Disp.␣select` `Valve␣output␣␣␣␣`	The valve number set is displayed.
P14 = 2	`P14␣Disp.␣select` `Ser.operation␣h␣`	Display of service hours in 1-hour increments[1].
P14 = 3	`P14␣Disp.␣select` `Operation␣hours␣`	Display of operating service hours in 1-hour increments[1].
P14 = 4	`P14␣Disp.␣select` `Inputstate␣I1-4␣`	This parameter is used for checking input statuses I1-I4 and for service purposes.
P14 = 5	`P14␣Disp.␣select` `Inputstate␣I5-8␣`	This parameter is used for checking input statuses I5-I8 and for service purposes.
P14 = 6	`P14␣Disp.␣select` `Outputstate␣O1-4`	This parameter is used for checking output statuses O1-O4 and for service purposes.
P14 = 7	`P14␣Disp.␣select` `Cleaningpressure`	Displays the target pre-pressure value in bar when the pre-pressure controller is activated.

)[1] If the system is switched on and the differential pressure is greater than 2 hPa, an internal operating hours counter is activated. If cleaning is switched on, the counter is also activated. The counter value is stored in EEPROM memory every half hour. This guarantees that the counter retains its value if mains voltage fails.

)[2] If the voltage is live, an internal operating hours counter is activated. The counter value is stored in EEPROM memory every half hour. This guarantees that the counter retains its value if mains voltage fails.

P15 Reserve

P16 Function of input I2

The filter control *RM-300C Compact Line* is generally released using input I1. Depending on the setting of the parameter P16, input I2 can also affect the release.

Parameter value	Text on display	What the program does
P16 = 0	`P16□Inp.□mode□I2` `000□No□function□`	Input I2 has no function.
P16 = 1	`P16□Inp.□mode□I2` `001□Rel.□I1&I2□□`	For release there must be a 1 signal on inputs I1 and I2 at the same time (AND connection).
P16 = 2	`P16□Inp.□mode□I2` `000□Rel.□I1/I2□□`	For release, there must be a 1 signal on either input I1 or I2 (OR connection).
P16 = 3	`P16□Inp.□mode□I2` `003□Run-on□end□□`	If input I2 = 1, run-on is released. If input I2 = 2, run-on is immediately stopped and blocked.
P16 = 4	`P16□Inp.□mode□I2` `004□RO□release□□`	If input I2 = 0, run-on is interrupted until the input is reset to 1.
P16 = 5	`P16□Inp.□mode□I2` `005□Ext□clean□I1`	If input I2 = 1, cleaning is activated with interval 1.
P16 = 6	`P16□Inp.□mode□I2` `006□Ext□clean□I2`	If input I2 = 1, cleaning is activated with interval 2.

P17 Function of output O2

The function of the relay output O2 can be programmed using parameter P17.

Parameter value	Text on display	What the program does
P17 = 1	`P17□Outp.mode□O2` `01□Ctrl.□release`	The relay contact of output O2 closes if the control is released.
P17 = 2	`P17□Outp.mode□O2` `02□Rel.□no□alarm`	The relay contact of output O2 closes if the control is released and there is no alarm.
P17 = 3	`P17□Outp.mode□O2` `03□DP□alarm□□□□`	The relay contact of output O2 closes if a differential pressure alarm is active.
P17 = 4	`P17□Outp.mode□O2` `04□DP□min□alarm□`	The relay contact of output O2 closes if a minimum differential pressure alarm is active.
P17 = 5	`P17□Outp.mode□O2` `05□DP□max□alarm□`	The relay contact of output O2 closes if there is a maximum differential pressure alarm active.
P17 = 6	`P17□Outp.mode□O2` `06□Cleaning□on□□`	The relay contact of output O2 closes if cleaning is activated.

Parameter value	Text on display	What the program does
P17 = 7	`P17□Outp.mode□O2` `07□RO□on□no□int□`	The relay contact of output O2 closes if run-on is activated. It reopens when run-on is interrupted or ends.
P17 = 8	`P17□Outp.mode□O2` `08□RO□on□int□□□□`	The relay contact of output O2 closes if run-on is activated.
P17 = 9	`P17□Outp.mode□O2` `09□Rel.□RO□act.□`	The relay contact of output O2 closes if release occurs or run-on is active.
P17 = 10	`P17□Outp.mode□O2` `10□□□I□alarm□1□□`	The relay contact of output O2 closes if a valve current alarm is active.
P17 = 11	`P17□Outp.mode□O2` `11□Clean□req.□□□`	If cleaning is requested in general: The relay contact of output O2 closes if the differential pressure exceeds the DP start value (P02). It opens when the differential pressure falls below the value DP start (P02) minus DP hysteresis (P03).
P17 = 12	`P17□Outp.mode□O2` `12□Clean□alarm□□`	The relay contact of output O2 closes if a cleaning alarm is active.
P17 = 13	`P17□Outp.mode□O2` `13□□Reserve□1□□□`	Reserve parameter
P17 = 14	`P17□Outp.mode□O2` `14□□Reserve□2□□□`	Reserve parameter
P17 = 15	`P17□Outp.mode□O2` `15□Ctrl.□rel.□/□`	The relay contact of output O2 opens if the control is released.
P17 = 16	`P17□Outp.mode□O2` `16□Rel.□no□al□/□`	The relay contact of output O2 opens if the control is released and there is no alarm.
P17 = 17	`P17□Outp.mode□O2` `17□DP□alarm□/□□□`	The relay contact of output O2 opens if a differential pressure alarm is active.
P17 = 18	`P17□Outp.mode□O2` `18□DP□min□alarm/`	The relay contact of output O2 opens if a minimum differential pressure alarm is active.
P17 = 19	`P17□Outp.mode□O2` `19□DP□max□alarm/`	The relay contact of output O2 opens if a maximum differential pressure alarm is active.
P17 = 20	`P17□Outp.mode□O2` `20□Cleaning□on□/`	The relay contact of output O2 opens if cleaning is activated.
P17 = 21	`P17□Outp.mode□O2` `21□RO□on□no□int/`	The relay contact of output O2 opens when run-on is activated. It closes again when run-on is interrupted or ends.
P17 = 22	`P17□Outp.mode□O2` `22□RO□on□int□/□□`	The relay contact of output O2 opens when run-on is activated.
P17 = 23	`P17□Outp.mode□O2` `23□Rel.□RO□act./`	The relay contact of output O2 opens in case of release or if run-on is active.
P17 = 24	`P17□Outp.mode□O2` `24□□I□alarm□1□/□`	The relay contact of output O2 opens if a valve current alarm is active.
P17 = 25	`P17□Outp.mode□O2` `25□Clean□req.□/□`	If cleaning is requested in general: The relay contact of output O2 opens if the differential pressure exceeds the DP start value (P02). It closes when the differential pressure falls below the value DP start (P02) minus DP hysteresis (P03).
P17 = 26	`P17□Outp.mode□O2` `26□Clean□alarm□/`	The relay contact of output O2 opens if a cleaning alarm is active.

P18 Function of output O3

The function of the relay output O3 can be programmed using parameter P18.

Parameter value	Text on display	What the program does
P18 = 1	`P18 Outp.mode O3` `01 Ctrl. release`	The relay contact of output O3 closes if the control is released.
P18 = 2	`P18 Outp.mode O3` `02 Rel. no alarm`	The relay contact of output O3 closes if the control is released and there is no alarm.
P18 = 3	`P18 Outp.mode O3` `03 DP alarm     `	The relay contact of output O3 closes if a differential pressure alarm is active.
P18 = 4	`P18 Outp.mode O3` `04 DP min alarm `	The relay contact of output O3 closes if a minimum differential pressure alarm is active.
P18 = 5	`P18 Outp.mode O3` `05 DP max alarm `	The relay contact of output O3 closes if a maximum differential pressure alarm is active.
P18 = 6	`P18 Outp.mode O3` `06 Cleaning on  `	The relay contact of output O3 closes if cleaning is activated.
P18 = 7	`P18 Outp.mode O3` `07 RO on no int `	The relay contact of output O3 closes if run-on is activated. It reopens when run-on is interrupted or ends.
P18 = 8	`P18 Outp.mode O3` `08 RO on int    `	The relay contact of output O3 closes when run-on is activated.
P18 = 9	`P18 Outp.mode O3` `09 Rel. RO act. `	The relay contact of output O3 closes in case of release occurs or if run-on is active.
P18 = 10	`P18 Outp.mode O3` `10    I alarm 1  `	The relay contact of output O3 closes if a valve current alarm is active.
P18 = 11	`P18 Outp.mode O3` `11 Clean req.   `	If cleaning is requested in general: The relay contact of output A3 closes if the differential pressure exceeds the DP start value (P02). It opens when the differential pressure falls below the value DP start (P02) minus DP hysteresis (P03).
P18 = 12	`P18 Outp.mode O3` `12 Clean alarm  `	The relay contact of output O3 closes if a cleaning alarm is active.
P18 = 13	`P18 Outp.mode O3` `13  Reserve 1   `	Reserve parameter
P18 = 14	`P18 Outp.mode O3` `14  Reserve 2   `	Reserve parameter
P18 = 15	`P18 Outp.mode O3` `15 Ctrl. rel. / `	The relay contact of output O3 opens if the control is released.
P18 = 16	`P18 Outp.mode O3` `16 Rel. no al / `	The relay contact of output O3 opens if the control is released and there is no alarm.
P18 = 17	`P18 Outp.mode O3` `17 DP alarm /   `	The relay contact of output O3 opens if a differential pressure alarm is active.
P18 = 18	`P18 Outp.mode O3` `18 DP min alarm/`	The relay contact of output A3 opens if a minimum differential pressure alarm is active.
P18 = 19	`P18 Outp.mode O3` `19 DP max alarm/`	The relay contact of output A3 opens if a maximum differential pressure alarm is active.

Parameter value	Text on display	What the program does
P18 = 20	P18□Outp.mode□O3 20□Cleaning□on□/	The relay contact of output O3 opens if cleaning is activated.
P18 = 21	P18□Outp.mode□O3 21□RO□on□no□int/	The relay contact of output O3 opens if run-on is activated. It reopens when run-on is interrupted or ends.
P18 = 22	P18□Outp.mode□O3 22□RO□on□int□/□□	The relay contact of output O3 opens if run-on is activated.
P18 = 23	P18□Outp.mode□O3 23□Rel.□RO□act./	The relay contact of output O3 opens if release occurs or run-on is active.
P18 = 24	P18□Outp.mode□O3 24□□I□alarm□1□/□	The relay contact of output O3 opens if a valve current alarm is active.
P18 = 25	P18□Outp.mode□O3 25□Clean□req.□/□	If cleaning is requested in general: The relay contact of output O3 opens if the differential pressure exceeds the DP start value (P02). It closes when the differential pressure falls below the value DP start (P02) minus DP hysteresis (P03).
P18 = 26	P18□Outp.mode□O3 26□Clean□alarm□/	The relay contact of output O3 opens if a cleaning alarm is active.

P19 Function of output O4

The function of the relay output O4 can be programmed using parameter P19.

Parameter value	Text on display	What the program does
P19 = 1	P19□Outp.mode□O4 01□Ctrl.□release	The relay contact of output O4 closes if the control is released.
P19 = 2	P19□Outp.mode□O4 02□Rel.□no□alarm	The relay contact of output O4 closes if the control is released and there is no alarm.
P19 = 3	P19□Outp.mode□O4 03□DP□alarm□□□□□	The relay contact of output O4 closes if a differential pressure alarm is active.
P19 = 4	P19□Outp.mode□O4 04□DP□min□alarm□	The relay contact of output O4 closes if a minimum differential pressure alarm is active.
P19 = 5	P19□Outp.mode□O4 05□DP□max□alarm□	The relay contact of output O4 closes if a maximum differential pressure alarm is active.
P19 = 6	P19□Outp.mode□O4 06□Cleaning□on□□	The relay contact of output O4 closes if cleaning is activated.
P19 = 7	P19□Outp.mode□O4 07□RO□on□no□int□	The relay contact of output O4 closes if run-on is activated. It reopens when run-on is interrupted or ends.
P19 = 8	P19□Outp.mode□O4 08□RO□on□int□□□□	The relay contact of output O4 closes if run-on is activated.
P19 = 9	P19□Outp.mode□O4 09□Rel.□RO□act.□	The relay contact of output O4 closes if release occurs or run-on is active.

Parameter value	Text on display	What the program does
P19 = 10	P19□Outp.mode□O4 10□□□I□alarm□1□□	The relay contact of output O4 closes if a valve current alarm is active.
P19 = 11	P19□Outp.mode□O4 11□Clean□req.□□□	If cleaning is requested in general: The relay contact of output A3 closes if the differential pressure exceeds the DP start value (P02). It opens when the differential pressure falls below the value DP start (P02) minus DP hysteresis (P03).
P19 = 12	P19□Outp.mode□O4 12□Clean□alarm□□	The relay contact of output O4 closes if a cleaning alarm is active.
P19 = 13	P19□Outp.mode□O4 13□□Reserve□1□□□	Reserve parameter
P19 = 14	P19□Outp.mode□O4 14□□Reserve□2□□□	Reserve parameter
P19 = 15	P19□Outp.mode□O4 15□Ctrl.□rel.□/□	The relay contact of output O4 opens if the control is released.
P19 = 16	P19□Outp.mode□O4 16□Rel.□no□al□/□	The relay contact of output O4 opens if the control is released and there is no alarm.
P19 = 17	P19□Outp.mode□O4 17□DP□alarm□/□□□	The relay contact of output O4 opens if a differential pressure alarm is active.
P19 = 18	P19□Outp.mode□O4 18□DP□min□alarm/	The relay contact of output O4 opens if a minimum differential pressure alarm is active.
P19 = 19	P19□Outp.mode□O4 19□DP□max□alarm/	The relay contact of output O4 opens if a maximum differential pressure alarm is active.
P19 = 20	P19□Outp.mode□O4 20□Cleaning□on□/	The relay contact of output O4 opens if cleaning is activated.
P19 = 21	P19□Outp.mode□O4 21□RO□on□no□int/	The relay contact of output O4 opens if run-on is activated. It reopens when run-on is interrupted or ends.
P19 = 22	P19□Outp.mode□O4 22□RO□on□int□/□□	The relay contact of output O4 opens if run-on is activated.
P19 = 23	P19□Outp.mode□O4 23□Rel.□RO□act./	The relay contact of output O4 opens if release occurs or run-on is active.
P19 = 24	P19□Outp.mode□O4 24□□I□alarm□1□/□	The relay contact of output O4 opens if a valve current alarm is active.
P19 = 25	P19□Outp.mode□O4 25□Clean□req.□/□	If cleaning is requested in general: The relay contact of output A4 opens if the differential pressure exceeds the DP start value (P02). It closes when the differential pressure falls below the value DP start (P02) minus DP hysteresis (P03).
P19 = 26	P19□Outp.mode□O4 26□Clean□alarm□/	The relay contact of output O4 opens if a cleaning alarm is active.

P20 Controller type

Parameter value	Text on display	What the program does
P20 = 0	`P20□Control□type` `□Contr.Type□1□□□`	Control type 1 Parameters P00 to P26 are enabled.
P20 = 1	`P20□Control□type` `□Contr.Type□2□□□`	Control type 2 Parameters P00 to P39 are enabled.

P21 DP cleaning mode

Parameter value	Text on display	What the program does
P21 = 0	`P21□Clean.□mode□` `000□w/o□DP□meas.`	The differential pressure controller is deactivated. Cleaning is no longer influenced by the differential pressure.
P21 = 1	`P21□Clean.□mode□` `001□DP□cl.□stop□`	Differential pressure measurement is activated. Cleaning is carried out based on the differential pressure. On a stop command, the valve number of the last valve activated is stored. On the next start command, cleaning begins with the valve with the next higher valve number.
P21 = 2	`P21□Clean.□mode□` `002□DP□cl□st□end`	Differential pressure measurement is activated. Cleaning is carried out based on the differential pressure. On a stop command, the valve number of the last valve activated is stored. Cleaning remains active until a full cycle is complete. On the next start command, the cleaning begins with the valve following the one saved.
P21 = 3	`P21□Clean.□mode□` `003□DP□meas□only`	Only differential pressure measurement and differential pressure monitoring are activated. All cleaning control functions are deactivated.

P22 Sensor type

Parameter value	Text on display	What the program does
P22 = 0	`P22□Sensor□type□` `int.4-20□mA=20.0`	The differential pressure is recorded through the internal 4-20 mA input on the control unit. Measuring range: 4-20 mA corresponding to 0-20.0 hPa
P22 = 1	`P22□Sensor□type□` `int.□s.mod.=20.0`	The differential pressure is measured using the internal sensor module of the *RM-300C* control unit. Measuring range: 0-20.0 hPa
P22 = 2	`P22□Sensor□type□` `int.4-20□mA=50.0`	The differential pressure is recorded through the internal 4-20 mA input on the control unit. Measuring range: 4-20 mA corresponding to 0-50.0 hPa
P22 = 3	`P22□Sensor□type□` `int.□s.mod.=50.0`	The differential pressure is measured using the internal sensor module of the *RM-300C* control unit. Measuring range: 0-50.0 hPa
P22 = 4	`P22□Sensor□type□` `int.4-20□mA=350□`	The differential pressure is recorded through the internal 4-20 mA input on the control unit. Measuring range: 4-20 mA corresponding to 0-350 hPa
P22 = 5	`P22□Sensor□type□` `int.□s.mod.=350□`	The differential pressure is measured using the internal sensor module of the *RM-300C* control unit. Measuring range: 0-350 hPa
P22 = 6	`P22□Sensor□type□` `ext.4-20□mA=20.0`	The differential pressure is measured using the 4-20 mA input 1 of the *RM-V16* I/O module with control address 1. Measuring range: 4-20 mA corresponding to 0-20.0 hPa
P22 = 7	`P22□Sensor□type□` `ext.□s.mod.=20.0`	The differential pressure is measured using the sensor module of the *RM-V16* I/O module with control address 1. Measuring range: 0-20.0 hPa
P22 = 8	`P22□Sensor□type□` `ext.4-20□mA=50.0`	The differential pressure is measured using the 4-20 mA input 1 of the *RM-V16* I/O module with control address 1. Measuring range: 4-20 mA corresponding to 0-50.0 hPa
P22 = 9	`P22□Sensor□type□` `ext.□s.mod.=50.0`	The differential pressure is measured using the sensor module of the *RM-V16* I/O module with control address 1. Measuring range: 0-50.0 hPa
P22 = 10	`P22□Sensor□type□` `ext.4-20□mA=350□`	The differential pressure is measured using the 4-20 mA input 1 of the *RM-V16* I/O module with control address 1. Measuring range: 4-20 mA corresponding to 0-350 hPa
P22 = 11	`P22□Sensor□type□` `ext.□s.mod.=350□`	The differential pressure is measured using the sensor module of the *RM-V16* I/O module with control address 1. Measuring range: 0-350 hPa

P23 Sensor alarm

Parameter value	Text on display	What the program does
P23 = 0	P23□Sensor□alarm 000□not□active□□	The function of the sensor is not monitored.
P23 = 1	P23□Sensor□alarm 001□□□<□1□mA□□□□	The input signal is monitored. If the current is less than 1 mA, a sensor alarm is activated.
P23 = 2	P23□Sensor□alarm 002□□□<□3.5□mA□□	The input signal is monitored. If the current is less than 3.5 mA, a sensor alarm is activated.
P23 = 3	P23□Sensor□alarm 003□<□-2.0□hPa□□	The differential pressure is monitored. If the differential pressure is greater than -2 hPa, a sensor alarm is activated. (Possible cause: differential pressure hoses mixed up or sensors faulty.)

P24 Number of I/O modules

Configuration of the number of I/O modules (interface modules) connected. When the controller starts, all I/O modules are addressed and checked. If an I/O module has failed, it is skipped and a communication alarm is output.

Parameter value	Text on display	What the program does
P24 = 1 to 15	P24□RM-Vxx no.□□ □□□□xxx□pcs.□□□	see above

P25 Number of valves

Parameter value	Text on display	What the program does
P25 = 1 to 240	P25□Valve no.□□□ □□□□xxx□pcs.□□□	Configuration of the number of valves connected.

P26 Service operating hours alarm

If the internal service operating hours counter reaches the value set in P26, the service LED lights up. This parameter can only be altered by entering a service number for parameter P00.

i With the setting P26 = 0, the service operating hours counter is deactivated.

Parameter value	Text on display	What the program does
P26 = 0 to 25000	P26□Service□al.□ □□□□xxx00□h□□.□	see above

P27 DP window P controller

The preliminary pressure of the filter system is controlled using the values of "DP start" (P02) and "DP window P controller" (P27) (see Figure 6). The preliminary pressure remains constant in the differential pressure range between "DP start" and "DP start" plus "DP window P controller". If the differential pressure rises above the value "DP start" plus "DP window P controller", the preliminary pressure is initially increased by 0.5 bar. When next measured (the number of cleaning pulses between two measurements is set using parameter P29), if the differential pressure is still above the value "DP start" plus "DP window P controller", the preliminary pressure is increased by another 0.5 bar. This continues until the maximum preliminary pressure PP MAX is reached. As soon as the differential pressure reaches or goes below the value "DP start" plus "DP window P controller", the preliminary pressure set remains constant. In the same way, the preliminary pressure is reduced in increments of 0.5 bar if the differential pressure falls below the DP start value. The minimum preliminary pressure is reached at the value PP MIN.
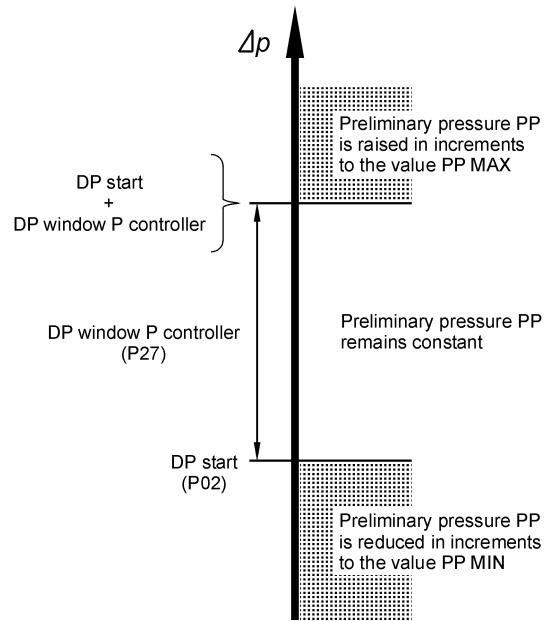
$Δp$

DP start
+
DP window P controller

Preliminary pressure PP is raised in increments to the value PP MAX

DP window P controller (P27)

Preliminary pressure PP remains constant

DP start (P02)

Preliminary pressure PP is reduced in increments to the value PP MIN

Figure 6: Controlling the preliminary pressure as a function of differential pressure $Δp$

P28 P controller value table

Parameter P28 is used to set the values for PP MIN, PP max and the preliminary pressure switching hysteresis for the preliminary pressure control described under parameter P29. 45 value combinations can be selected using parameter values 1 to 45 (see table below). If P28 = 0, preliminary pressure control is switched off.

Parameter value	Text on display	What the program does
P28 = 0	`P28␣Tb␣P␣control` `PreP␣ctrl.␣off␣␣`	Preliminary pressure control is switched off.
P28 = 1	`P28␣Tb␣P␣control` `2.0␣-␣4.0␣/␣0.15`	Preliminary pressure control is working with the values: PP MIN = 2.0 bar; PP MAX = 4.0 bar; hyster. = 0.15 bar
P28 = 2	`P28␣Tb␣P␣control` `2.0␣-␣4.5␣/␣0.15`	Preliminary pressure control is working with the values: PP MIN = 2.0 bar; PP MAX = 4.5 bar; hyster. = 0.15 bar
P28 = 3	(Line 1 as before) `2.0␣-␣5.0␣/␣0.15`	Preliminary pressure control is working with the values: PP MIN = 2.0 bar; PP MAX = 5.0 bar; hyster. = 0.15 bar
P28 = 4	`2.0␣-␣5.5␣/␣0.15`	PP MIN = 2.0 bar; PP MAX = 5.5 bar; hyster. = 0.15 bar
P28 = 5	`2.0␣-␣6.0␣/␣0.15`	PP MIN = 2.0 bar; PP MAX = 6.0 bar; hyster. = 0.15 bar
P28 = 6	`2.5␣-␣4.5␣/␣0.15`	PP MIN = 2.5 bar; PP MAX = 4.5 bar; hyster. = 0.15 bar
P28 = 7	`2.5␣-␣5.0␣/␣0.15`	PP MIN = 2.5 bar; PP MAX = 5.0 bar; hyster. = 0.15 bar
P28 = 8	`2.5␣-␣5.5␣/␣0.15`	PP MIN = 2.5 bar; PP MAX = 5.5 bar; hyster. = 0.15 bar
P28 = 9	`2.5␣-␣6.0␣/␣0.15`	PP MIN = 2.5 bar; PP MAX = 6.0 bar; hyster. = 0.15 bar
P28 = 10	`3.0␣-␣5.0␣/␣0.15`	PP MIN = 3.0 bar; PP MAX = 5.0 bar; hyster. = 0.15 bar

Parameter value	Text on display	What the program does
P28 = 11	3.0□-□5.5□/□0.15	PP MIN = 3.0 bar; PP MAX = 5.5 bar; hyster. = 0.15 bar
P28 = 12	3.0□-□6.0□/□0.15	PP MIN = 3.0 bar; PP MAX = 6.0 bar; hyster. = 0.15 bar
P28 = 13	3.5□-□5.5□/□0.15	PP MIN = 3.5 bar; PP MAX = 5.5 bar; hyster. = 0.15 bar
P28 = 14	3.5□-□6.0□/□0.15	PP MIN = 3.5 bar; PP MAX = 6.0 bar; hyster. = 0.15 bar
P28 = 15	4.0□-□6.0□/□0.15	PP MIN = 4.0 bar; PP MAX = 6.0 bar; hyster. = 0.15 bar
P28 = 16	2.0□-□4.0□/□0.3□	PP MIN = 2.0 bar; PP MAX = 4.0 bar; hyster. = 0.3 bar
P28 = 17	2.0□-□4.5□/□0.3□	PP MIN = 2.0 bar; PP MAX = 4.5 bar; hyster. = 0.3 bar
P28 = 18	2.0□-□5.0□/□0.3□	PP MIN = 2.0 bar; PP MAX = 5.0 bar; hyster. = 0.3 bar
P28 = 19	2.0□-□5.5□/□0.3□	PP MIN = 2.0 bar; PP MAX = 5.5 bar; hyster. = 0.3 bar
P28 = 20	2.0□-□6.0□/□0.3□	PP MIN = 2.0 bar; PP MAX = 6.0 bar; hyster. = 0.3 bar
P28 = 21	2.5□-□4.5□/□0.3□	PP MIN = 2.5 bar; PP MAX = 4.5 bar; hyster. = 0.3 bar
P28 = 22	2.5□-□5.0□/□0.3□	PP MIN = 2.5 bar; PP MAX = 5.0 bar; hyster. = 0.3 bar
P28 = 23	2.5□-□5.5□/□0.3□	PP MIN = 2.5 bar; PP MAX = 5.5 bar; hyster. = 0.3 bar
P28 = 24	2.5□-□6.0□/□0.3□	PP MIN = 2.5 bar; PP MAX = 6.0 bar; hyster. = 0.3 bar
P28 = 25	3.0□-□5.0□/□0.3□	PP MIN = 3.0 bar; PP MAX = 5.0 bar; hyster. = 0.3 bar
P28 = 26	3.0□-□5.5□/□0.3□	PP MIN = 3.0 bar; PP MAX = 5.5 bar; hyster. = 0.3 bar
P28 = 27	3.0□-□6.0□/□0.3□	PP MIN = 3.0 bar; PP MAX = 6.0 bar; hyster. = 0.3 bar
P28 = 28	3.5□-□5.5□/□0.3□	PP MIN = 3.5 bar; PP MAX = 5.5 bar; hyster. = 0.3 bar
P28 = 29	3.5□-□6.0□/□0.3□	PP MIN = 3.5 bar; PP MAX = 6.0 bar; hyster. = 0.3 bar
P28 = 30	4.0□-□6.0□/□0.3□	PP MIN = 4.0 bar; PP MAX = 6.0 bar; hyster. = 0.3 bar
P28 = 31	2.0□-□4.0□/□0.5□	PP MIN = 2.0 bar; PP MAX = 4.0 bar; hyster. = 0.5 bar
P28 = 32	2.0□-□4.5□/□0.5□	PP MIN = 2.0 bar; PP MAX = 4.5 bar; hyster. = 0.5 bar
P28 = 33	2.0□-□5.0□/□0.5□	PP MIN = 2.0 bar; PP MAX = 5.0 bar; hyster. = 0.5 bar
P28 = 34	2.0□-□5.5□/□0.5□	PP MIN = 2.0 bar; PP MAX = 5.5 bar; hyster. = 0.5 bar
P28 = 35	2.0□-□6.0□/□0.5□	PP MIN = 2.0 bar; PP MAX = 6.0 bar; hyster. = 0.5 bar
P28 = 36	2.5□-□4.5□/□0.5□	PP MIN = 2.5 bar; PP MAX = 4.5 bar; hyster. = 0.5 bar
P28 = 37	2.5□-□5.0□/□0.5□	PP MIN = 2.5 bar; PP MAX = 5.0 bar; hyster. = 0.5 bar
P28 = 38	2.5□-□5.5□/□0.5□	PP MIN = 2.5 bar; PP MAX = 5.5 bar; hyster. = 0.5 bar
P28 = 39	2.5□-□6.0□/□0.5□	PP MIN = 2.5 bar; PP MAX = 6.0 bar; hyster. = 0.5 bar
P28 = 40	3.0□-□5.0□/□0.5□	PP MIN = 3.0 bar; PP MAX = 5.0 bar; hyster. = 0.5 bar
P28 = 41	3.0□-□5.5□/□0.5□	PP MIN = 3.0 bar; PP MAX = 5.5 bar; hyster. = 0.5 bar
P28 = 42	3.0□-□6.0□/□0.5□	PP MIN = 3.0 bar; PP MAX = 6.0 bar; hyster. = 0.5 bar
P28 = 43	3.5□-□5.5□/□0.5□	PP MIN = 3.5 bar; PP MAX = 5.5 bar; hyster. = 0.5 bar
P28 = 44	3.5□-□6.0□/□0.5□	PP MIN = 3.5 bar; PP MAX = 6.0 bar; hyster. = 0.5 bar
P28 = 45	4.0□-□6.0□/□0.5□	PP MIN = 4.0 bar; PP MAX = 6.0 bar; hyster. = 0.5 bar

P29 Measurement time P controller

For the preliminary pressure control, the differential pressure is measured at regular intervals. The number of cleaning pulses between each measurement is set using parameter P29.

Parameter value	Text on display	What the program does
P29 = 1 to 250	`P29□PP□meas.time` `□□□□xxx□s□□□□□□`	see above

P30 P controller program

Preliminary pressure control modes which differ from normal mode can be set for run-on cleaning and forced cleaning. This is done using parameter P30. If P30 = 0, the preliminary pressure control mode described in P27 is valid for all operating modes. Line 2 of the text display shows the preliminary pressure control mode for run-on cleaning, then the preliminary pressure control mode for forced cleaning. The following abbreviations are used.

`Auto`   Preliminary pressure control mode as described in parameter P27.

`100%`   The preliminary pressure valve is switched on all the time.

`PP-`   The preliminary pressure is set to the value PP MIN.

`PP+`   The preliminary pressure is set to the value PP MAX.

Parameter value	Text on display	What the program does
P30 = 0	`P30□Program□PP□□` `000□□□Auto/Auto□`	No differing modes for preliminary pressure control for run-on cleaning and forced cleaning.
P30 = 1	`P30□Program□PP□□` `001□□□Auto/PP-□□`	Run-on cleaning: preliminary pressure control mode Auto Forced cleaning: preliminary pressure control mode PP-
P30 = 2	`P30□Program□PP□□` `002□□□Auto/PP+□□`	Run-on cleaning: preliminary pressure control mode Auto Forced cleaning: preliminary pressure control mode PP+
P30 = 3	`P30□Program□PP□□` `000□□□Auto/100%□`	Run-on cleaning: preliminary pressure control mode Auto Forced cleaning: preliminary pressure control mode 100 %
P30 = 4	`P30□Program□PP□□` `004□□□100%/Auto□`	Run-on cleaning: preliminary pressure control mode 100 % Forced cleaning: preliminary pressure control mode Auto
P30 = 5	`P30□Program□PP□□` `005□□□100%/PP-□□`	Run-on cleaning: preliminary pressure control mode 100 % Forced cleaning: preliminary pressure control mode PP-
P30 = 6	`P30□Program□PP□□` `006□□□100%/PP+□□`	Run-on cleaning: preliminary pressure control mode 100 % Forced cleaning: preliminary pressure control mode PP+
P30 = 7	`P30□Program□PP□□` `007□□□100%/100%□`	Run-on cleaning: preliminary pressure control mode 100 % Forced cleaning: preliminary pressure control mode 100 %
P30 = 8	`P30□Program□PP□□` `002□□□PP-/Auto□□`	Run-on cleaning: preliminary pressure control mode PP- Forced cleaning: preliminary pressure control mode Auto
P30 = 9	`P30□Program□PP□□` `009□□□PP-/PP-□□□`	Run-on cleaning: preliminary pressure control mode PP- Forced cleaning: preliminary pressure control mode PP-

Parameter value	Text on display	What the program does
P30 = 10	`P30`□`Program`□`PP`□□ `010`□□□`PP-/PP+`□□□	Run-on cleaning: preliminary pressure control mode PP- Forced cleaning: preliminary pressure control mode PP+
P30 = 11	`P30`□`Program`□`PP`□□ `011`□□□`PP-/100%`□□	Run-on cleaning: preliminary pressure control mode PP- Forced cleaning: preliminary pressure control mode 100 %
P30 = 12	`P30`□`Program`□`PP`□□ `012`□□□`PP+/Auto`□□	Run-on cleaning: preliminary pressure control mode PP+ Forced cleaning: preliminary pressure control mode Auto
P30 = 13	`P30`□`Program`□`PP`□□ `013`□□□`PP+/PP-`□□□	Run-on cleaning: preliminary pressure control mode PP+ Forced cleaning: preliminary pressure control mode PP-
P30 = 14	`P30`□`Program`□`PP`□□ `014`□□□`PP+/PP+`□□□	Run-on cleaning: preliminary pressure control mode PP+ Forced cleaning: preliminary pressure control mode PP+
P30 = 15	`P30`□`Program`□`PP`□□ `015`□□□`PP+/100%`□□	Run-on cleaning: preliminary pressure control mode PP+ Forced cleaning: preliminary pressure control mode 100 %

Interval controller P31, P32, P33, P34 and P35

In addition to the standard intervals "Interval 1" (P09) and "Interval 2" (P10), there are three further intervals "Interval 3" (P31), "Min interval" (P32) and "Max interval" (P34), which can be activated dependent on differential pressure to make the filter control particularly effective. Figure 7 shows when the individual intervals are active. Beside the parameters "DP start" (P02), "DP max alarm" (P04) and the differential pressure value Δ*p* stop (= P02 minus P03), parameters P33 "DP min interval" and P35 "DP max interval" represent two further switching points for the interval controller.
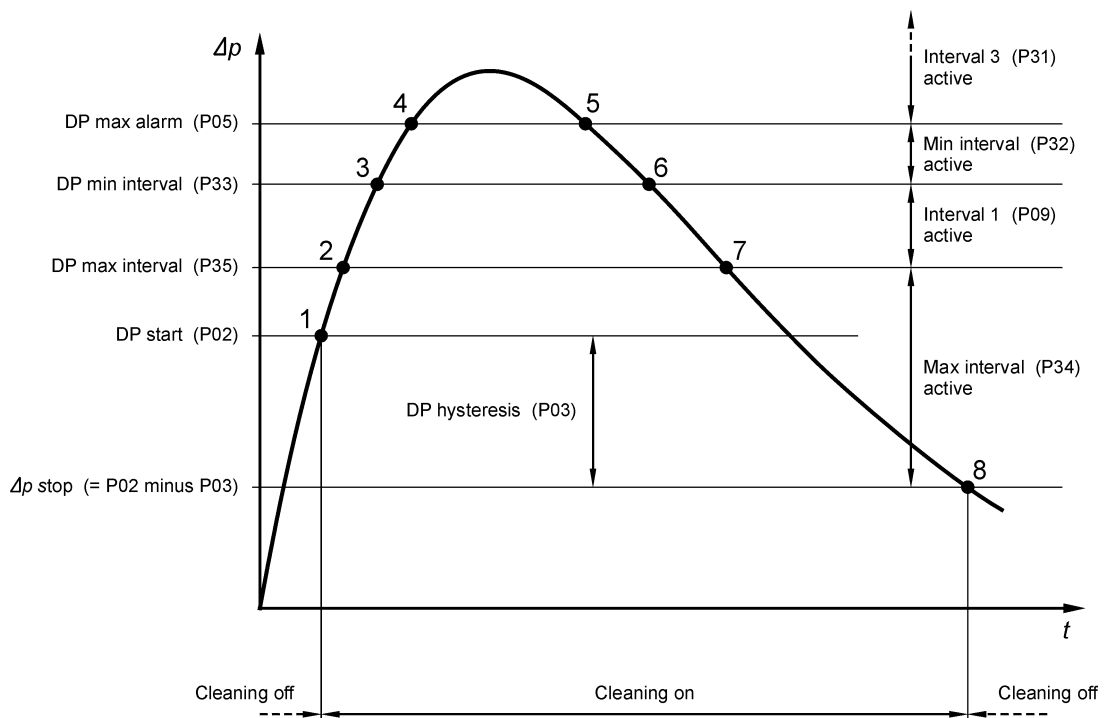

Figure 7: Switching points for interval controller

Switching point in Figure 7	Description
1	The differential pressure Δp exceeds the value "DP start" (P02). Cleaning starts with the "Max interval" (P34).
2	The differential pressure Δp exceeds the value "DP max interval" (P35). Cleaning continues with the "Interval 1" (P09).
3	The differential pressure Δp exceeds the value "DP min interval" (P33). Cleaning continues with the "Min interval" (P32).
4	The differential pressure Δp exceeds the value "DP max alarm" (P05). Cleaning continues with the "Interval 3" (P31).
5	The differential pressure Δp is below the value "DP max alarm" (P05). Cleaning continues with the "Min interval" (P32).
6	The differential pressure Δp is below the value "DP min interval" (P33). Cleaning continues with the "Interval 1" (P09).
7	The differential pressure Δp is below the value "DP max interval" (P34). Cleaning continues with the "Max interval" (P34).
8	The differential pressure Δp is below the value Δp stop (= P02 - P03). Cleaning is stopped.

P36 IP Monitoring (optional)

Cleaning monitoring can be activated using parameter P36. It is possible to record the power consumption of each solenoid valve or monitor the cleaning pressure in the pressure accumulator during cleaning. Both monitoring systems can also be activated at the same time. If an error occurs, an alarm message appears on the text display (see Section 6.3). If multiple errors occur simultaneously, the following priority applies to the error messages:

1. Message for a valve current alarm

2. "No pressure" message (The cleaning pressure is no longer reaching its target value. The pressure switch no longer closes.)

3. "No cleaning" message (The cleaning pressure does not drop following a cleaning pulse. The pressure switch does not open.)

i The pressure switch for pressure monitoring is connected on I / O module *RM-V8* or *RM-V16* with control address 1 on input P1, +.

If an AD-P regulator *RM-X5.05* is used to control the cleaning pre-pressure, parameter P36 should be set to value 3.

Parameter value	Text on display	What the program does
P36 = 0	`P36␣IP␣monitor␣␣` `000␣Off␣␣␣␣␣␣␣␣␣`	Cleaning monitoring is switched off.
P36 = 1	`P36␣IP␣monitor␣␣` `001␣Power␣␣␣␣␣␣␣`	Only the power consumption of the solenoid valves is monitored.
P36 = 2	`P36␣IP␣monitor␣␣` `002␣Press&Power␣`	The cleaning pressure in the pressure accumulator and the power consumption of the solenoid valves are monitored via I / O module *RM-V8* or *RM-V16*.
P36 = 3	`P36␣IP␣monitor␣␣` `003␣Analog␣P-I␣␣`	The cleaning pressure in the pressure accumulator is monitored via the AD-P regulator *RM-X5.05*. The power consumption of the solenoid valves is monitored via I / O module *RM-V8* or *RM-V16*.

P37 Reserve

P38 Cleaning skip range

The activation sequence of the solenoid valves can be set using parameter P38.

Skip range	Solenoid valve activation sequence
1	1 2 3 4 5 6 7 8 9 1 2 3 4 5 6 7 8 9 etc.
2	1 3 5 7 9 2 4 6 8 1 3 5 7 9 2 4 6 8 etc.
etc.	

P39 Program table

Program functions

0	=	Interval range 3 … 750 s, can be adjusted in 3 second increments.
1	=	Interval range 1 … 250 s, can be adjusted in 1 second increments.

6 Operational and alarm messages

6.1 LEDs on the front of the device

ON LED   **lights up** when the mains voltage is switched on.

does not light up when the device is in parameter selection mode.

flashes when the device is in parameter settings mode.

Service LED   **lights up** when the service operating hours alarm (P26) is reached.

Alarm LED   **lights up** every time an alarm message is received (common error message).

6.2 Operating messages on the text display

Condition	Text on display	
After about one second, the following text appears	`    Stand-by    ` `    00.0hPa     `	
If cleaning is stopped based on differential pressure	`Cleaning off    ` `    00.0hPa     `	
If cleaning is started based on differential pressure	`Cleaning on     ` `    00.0hPa     `	
If cleaning is stopped externally	`Ext.clean off P1` `    00.0hPa     `	or P2
If cleaning is started externally	`Ext.clean on P1 ` `    00.0hPa     `	or P2
On cleaning request	`Cleaning request` `    00.0hPa     `	
On "Cleaning on" from input I4	`Cleaning on I4  ` `    00.0hPa     `	
On "Cleaning off" from input I5	`Cleaning off I5 ` `    00.0hPa     `	
If forced cleaning is activated	`Forced cleaning ` `    00.0hPa     `	
If run-on is activated	`Run-on on       ` `    000cycles   `	
If run-on is interrupted	`Run-on interrupt` `    000cycles   `	

Depending on the display selection configured, the following messages are displayed.

Condition	Text on display
P14 = 1	`Clean□valve□no.□` `□□□□□□1□□□□□□□□□`
P14 = 2	`Service□hours□□□` `□□□□000000□h□□□□`
P14 = 3	`Operating□hours□` `□□□□000000□h□□□□`

P14 = 4	`Input□statuses□□`
	`No□input□□□□□□□□`
	
	or in the 2nd line of text:
	
	`□□I1□--□--□--□□□`
	`□□--□I2□--□--□□□`
	`□□I1□I2□--□--□□□`
	`□□--□--□I3□--□□□`
	`□□I1□--□I3□--□□□`
	`□□--□I2□I3□--□□□`
	`□□I1□I2□I3□--□□□`
	`□□--□--□--□I4□□□`
	`□□I1□--□--□I4□□□`
	`□□--□I2□--□I4□□□`
	`□□I1□I2□--□I4□□□`
	`□□--□--□I3□I4□□□`
	`□□I1□--□I3□I4□□□`
	`□□--□I2□I3□I4□□□`
	`□□I1□I2□I3□I4□□□`

P14 = 5	`Input□statuses□□`
	`No□input□□□□□□□□`
	
	or in the 2nd line of text:
	
	`□□I5□--□--□--□□□`
	`□□--□I6□--□--□□□`
	`□□I5□I6□--□--□□□`
	`□□--□--□I7□--□□□`
	`□□I5□--□I7□--□□□`
	`□□--□I6□I7□--□□□`
	`□□I5□I6□I7□--□□□`
	`□□--□--□--□I8□□□`
	`□□I5□--□--□I8□□□`
	`□□--□I6□--□I8□□□`
	`□□I5□I6□--□I8□□□`
	`□□--□--□I7□I8□□□`
	`□□I5□--□I7□I8□□□`
	`□□--□I6□I7□I8□□□`
	`□□I5□I6□I7□I8□□□`

Condition	Text on display

P14 = 6	`Output□statuses□`
	`No□output□□□□□□`
	 or in the 2nd line of text:
	`□□O1□--□--□--□□□`
	`□□--□O2□--□--□□□`
	`□□O1□O2□--□--□□□`
	`□□--□--□O3□--□□□`
	`□□O1□--□O3□--□□□`
	`□□--□O2□O3□--□□□`
	`□□O1□O2□O3□--□□□`
	`□□--□--□--□O4□□□`
	`□□O1□--□--□O4□□□`
	`□□--□O2□--□O4□□□`
	`□□O1□O2□--□O4□□□`
	`□□--□--□O3□O4□□□`
	`□□O1□--□O3□O4□□□`
	`□□--□O2□O3□O4□□□`
	`□□O1□O2□O3□O4□□□`

P14 = 7 if preliminary pressure controller is deactivated	`Prepress□display` `Not□active□□□□□□`
if preliminary pressure controller is activated	`Prepress□display` `□□□□□2.0□bar□□□□`

6.3 Alarm messages on the text display

Condition	Text on display
On Min DP alarm	`DP□min□alarm□□□□` `□□□□00.0□hPa□□□□`
On Max DP alarm	`DP□max□alarm□□□□` `□□□□00.0□hPa□□□□`
On sensor alarm	`Sensor□alarm□□□□` `□□□□00.0□hPa□□□□`
On data alarm	`Data□alarm□□□□□□` `□□□□□000□no.□□□□`
For an error detected by the cleaning monitoring (the controller and valve number and the alarm no. are displayed alternately) For example: I / O module *RM-V8* or *RM-V16* no.1, no current on output 8.	`RMV-no./no□curr.` `□□1-□□8□□valve□□`
For example: I / O module *RM-V8* or *RM-V16* no.1, no cleaning pressure (continuous cleaning) on output 8.	`RMV-no./no□press` `□□1-□□8□□valve□□`
For example: I / O module *RM-V8* or *RM-V16* no.1, no cleaning pressure drop has been generated on output 8 (no cleaning).	`RMV-no./□no□cle.` `□□1-□□8□□valve□□`
Then the alarm no. is displayed.	`□RMV-XX□Alarm□□□` `no.Axxx□□□□□□□□□`

**i** All alarms received remain stored even when the system is switched off.

They are displayed at intervals of approx. 3 seconds one after another on the first line of text until they are reset (deleted) by pressing the ∇ key and the Δ key at the same time.

Pressing the Δ key and the ∇ key at the same time deletes all current alarm messages. Activating input I3 also deletes all stored alarms.

7   I/O modules *RM-V8* and *RM*-V16

A complete filter control requires I/O modules (interface modules) of type *RM-V8* (up to 8 valves) or *RM-V16* (up to 16 valves). A maximum of 15 I/O modules can be connected to the main *RM-300C Compact Line* device. This means that 240 valves are available if using the *RM-V16* type module. The *RM-V8* and *RM-V16* modules each come with their own documentation.

RM-V8 I/O module
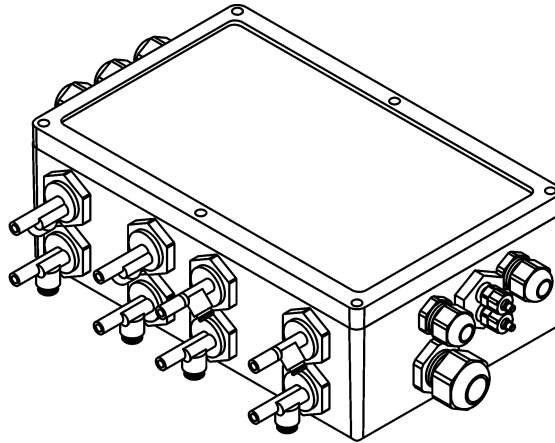
RM-V16 I/O module
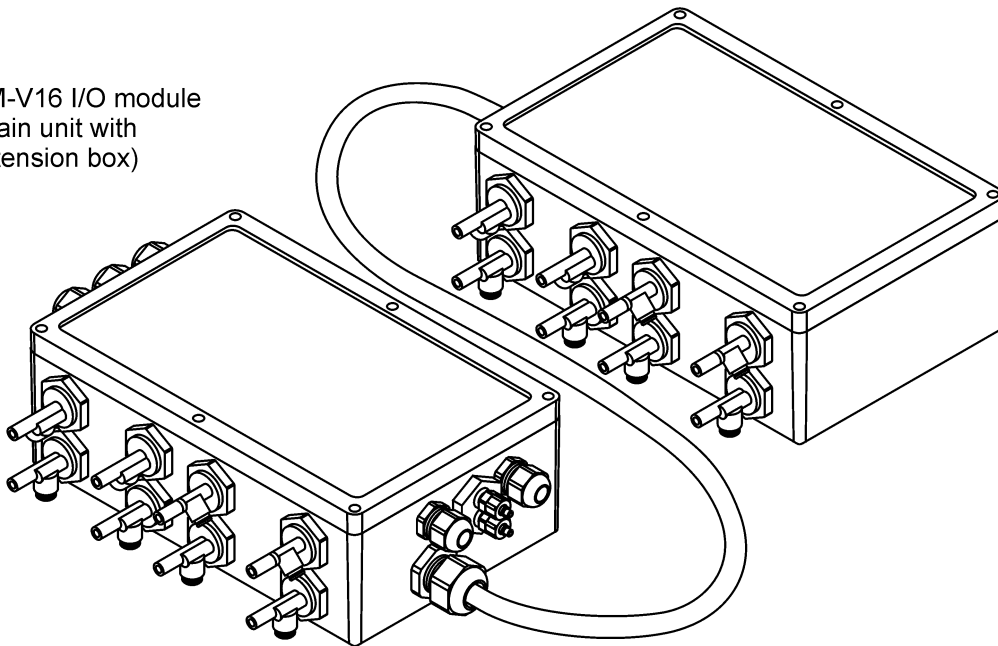(Main unit with
extension box)

Figure 8: I/O modules *RM-V8* and *RM-V16* with maximum valve allocation

8 Technical data

Application	Data	Terminals
Supply voltages	**230 V AC version :** 230 V AC -10% / +10%	 1, 2, 3
	24 V DC version : 24 V DC -0% / +10%	 1, 2, 3
Bus	RS-485 interface with 9600 baud half duplex	19, 20, 21
Signal inputs	Optocoupler inputs Power supply can be either through the controller's own 24 V DC supply or through an external 24 V DC supply (see also Figure 3).	6 (COM) 7 (I1) 8 (I2) 9 (I3) 10 (I4) 11 (I5) 12 (I6) 13 (I7) 14 (I8)
Signal outputs	Relay outputs, potential-free max. 2 A, 250 V or 1 A, 30 V DC	22 ... 29
Fuse	**230 V AC version :** T 0.4 A, 250 V, 5 x 20 mm	
	24 V DC version : T 2.5 A, 250 V, 5 x 20 mm	
Temperature range	- 20°C to +60°C	
Degree of protection	Casing IP 66 / NEMA 4	
Dimensions	Width x Height x Depth approx. 250 x 160 x 90 mm	
Weight	approx. 0.8 kg	
Installation height	max. 3000 m above M.S.L.	