Operating and installation instructions

R-IMC-BUS
Filter control systems

RM-310 C
RM-310 CT
RM-310 C Plug and Play
RM-310 CT Plug and Play

Contents

Regulations

      2014/30/EU

      2014/35/EU

1 Safety instructions

The filter controls RM-310 C / RM-310 CT or RM-310 C Plug and Play / RM-310 CT Plug and Play carry hazardous electrical voltage when connected to the mains. Improper installation of the connected electrical equipment may cause device failure, serious or even fatal injuries. In addition to general safety rules for equipment in industrial electrical installations, pay particular attention to the following points:

The equipment must only be installed by qualified persons according to the provisions of the standards IEC 364 and DIN VDE 0105 for electrical equipment.

All applicable laws, conditions, rules and regulations governing the installation of electrical equipment must be observed.

Equipment with protection rating IP00 without covers must only be configured by authorised expert staff when disconnected and whilst observing the local safety and accident prevention rules.

The filter controls RM-310 C / RM-310 CT or RM-310 C Plug and Play / RM-310 CT Plug and Play must only be operated within the permitted application range.

Switch off the supply voltage before replacing the filter controllers or components connected to them. Failure to do so may cause equipment damage.

Symbol explanation

Warning of physical and health hazards or damages to the product and other properties.
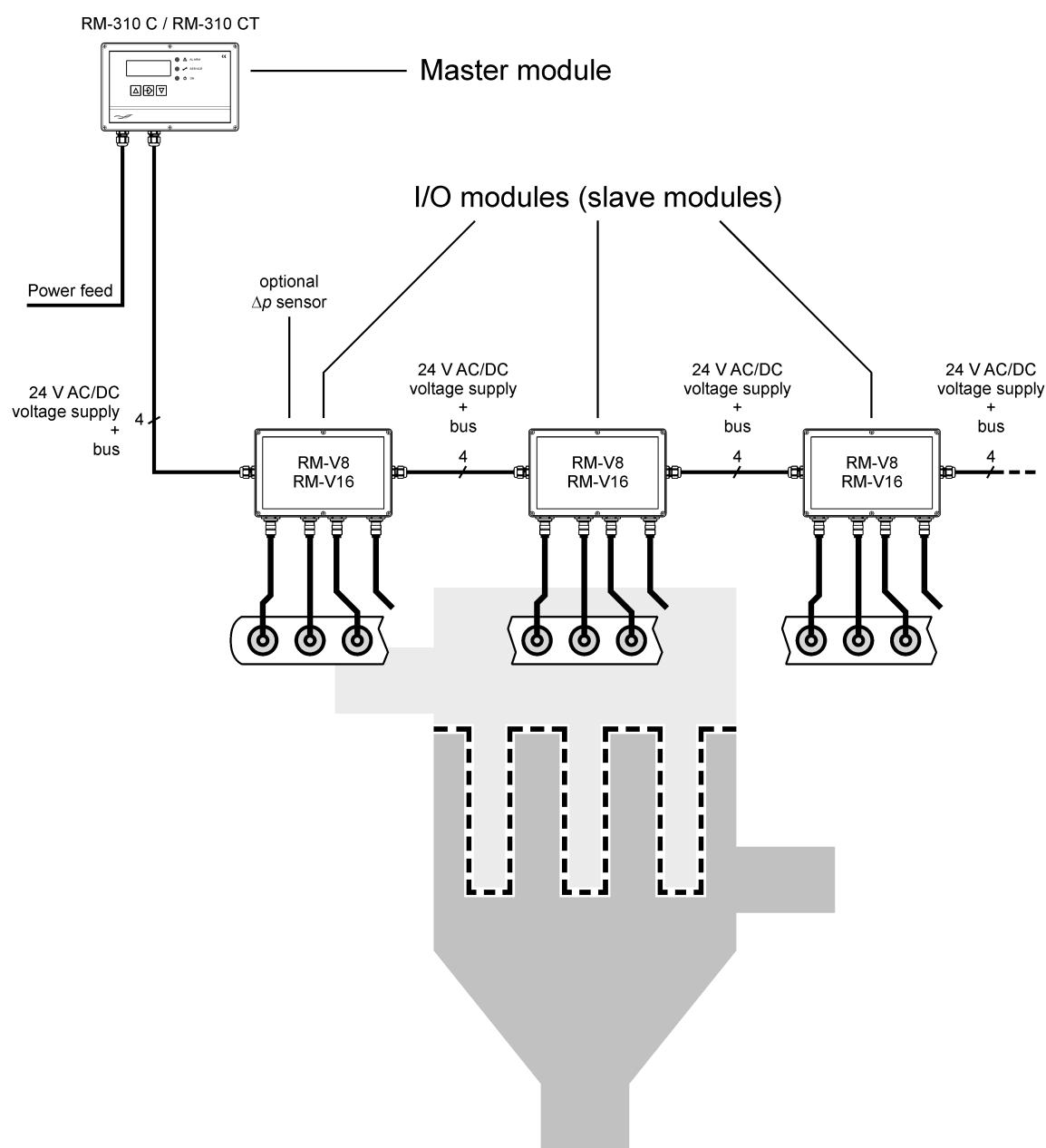
Important note

2 Device descriptions

RM-310 C / RM-310 CT
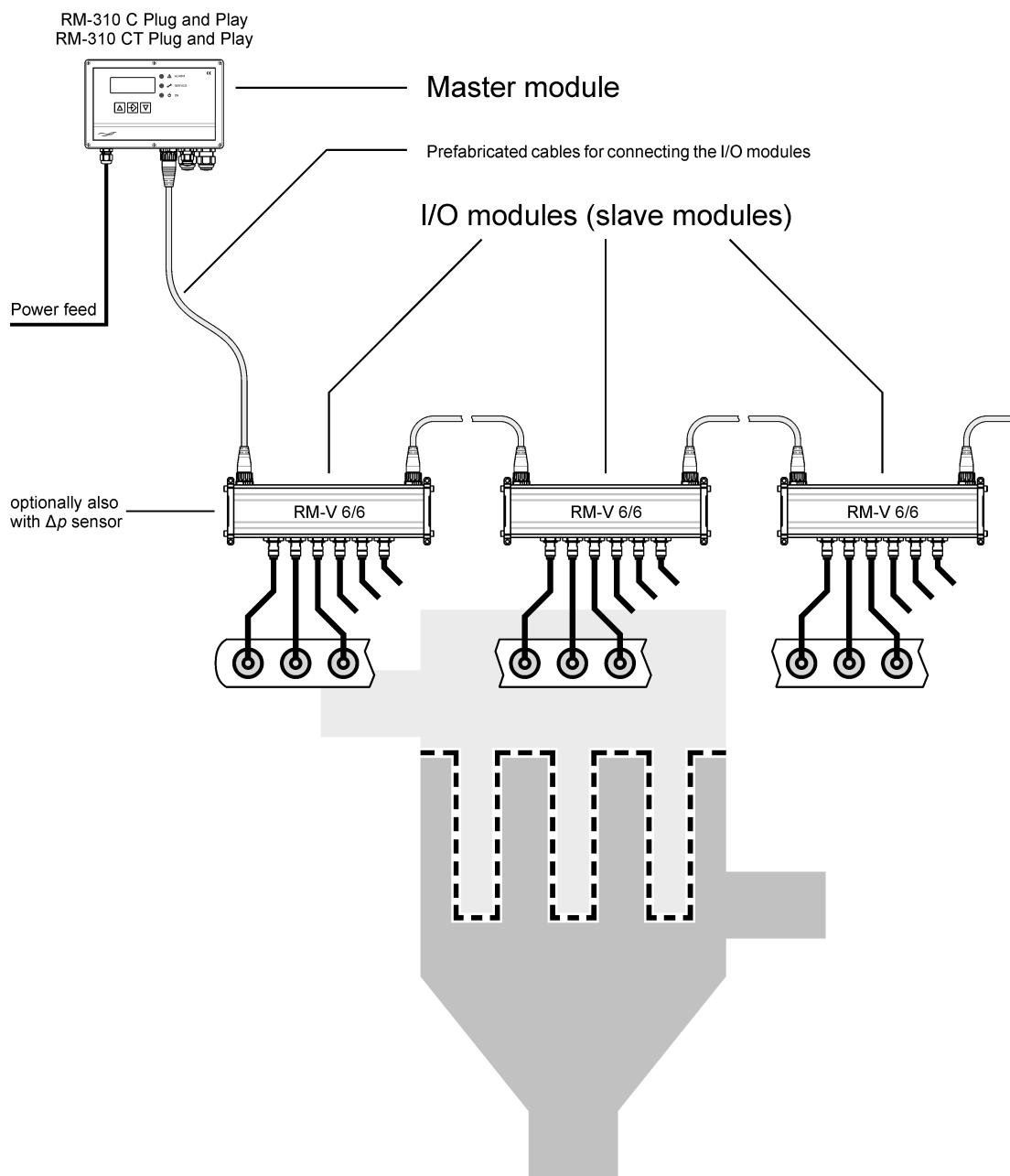
The RM-310 C / RM-310 CT controller is the master control of the modular filter control system for filtering separators with compressed air pulse cleaning. The front of the device with text display, membrane key-pad and status LEDs is used to display operating and alarm messages and to set parameters. The intelligent I/O modules handle decentral measuring and control tasks. The R-IMC-Bus (RECO – Inter Module Communication) employed for data transfer between the individual control components was developed specifically for use in industrial environments. Once the supply voltage and the intelligent I/O modules have been connected the RM-310 C / RM-310 CT filter control works fully automated without further handling.

The following diagram shows the general layout of an R-IMC bus controller environment with the controller RM-310 C / RM-310 CT and the I/O modules RM-V 8 and RM-V 16 provided for this controller type for use as a pulse filter.

RM-310 C Plug and Play / RM-310 CT Plug and Play

The controller types RM-310 C Plug and Play / RM-310 CT Plug and Play differ from the types RM-310 C / RM-310 CT in that the prefabricated cables from RECO are used to connect the I/O modules. This means that the time required for electrical installation is considerably less. The RM-V 6 I/O modules intended for this plug-and-play system are available with 6 (RM-V 6/6), 5 (RM-V 6/5), 4 (RM-V 6/4) or 3 (RM-V 6/3) valves.

RM-310 C Plug and Play
RM-310 CT Plug and Play

Master module

Prefabricated cables for connecting the I/O modules

I/O modules (slave modules)

Power feed

optionally also
with Δp sensor

RM-V 6/6   RM-V 6/6   RM-V 6/6

i Since the controller types RM-310 C / RM-310 CT and RM-310 C Plug and Play / RM-310 CT Plug and Play do not otherwise differ, for the sake of simplicity only the types RM-310 C / RM-310 CT are mentioned in the further descriptions of this manual. The complete type designations only appear where there are differences.

Comparison of controller types
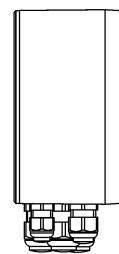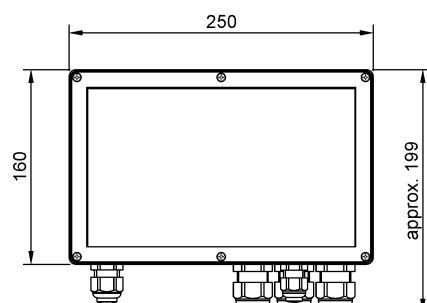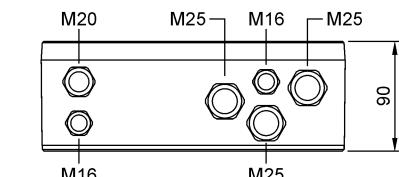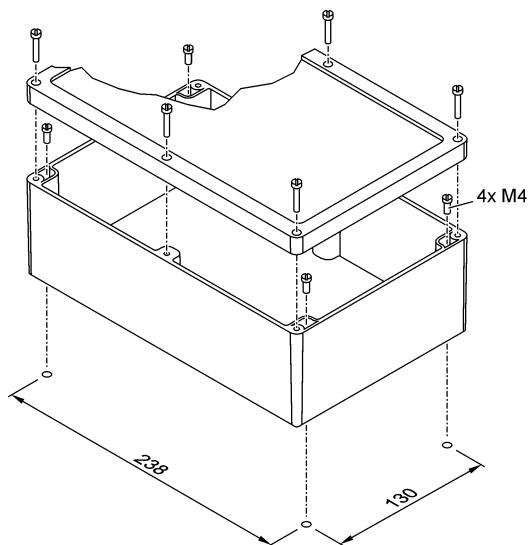
Controller type	Plug-and-play system*	I/O module types	With a Δp sensor on the controller board
RM-310 C	–	RM-V 8 RM-V 16	–
RM-310 CT	–	RM-V 8 RM-V 16	●
RM-310 C Plug and Play	●	RM-V 6/3 RM-V 6/4 RM-V 6/5 RM-V 6/6	–
RM-310 CT Plug and Play	●	RM-V 6/3 RM-V 6/4 RM-V 6/5 RM-V 6/6	●

* The I/O modules are connected to the controller and with each other via prefabricated cables.

3 Assembly
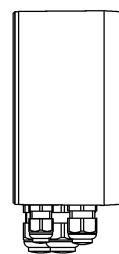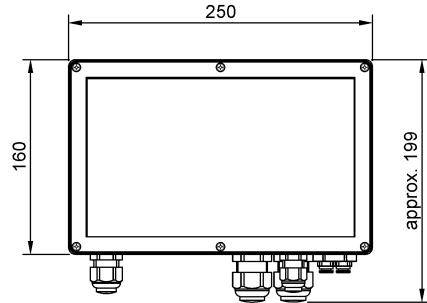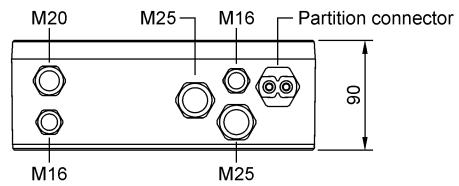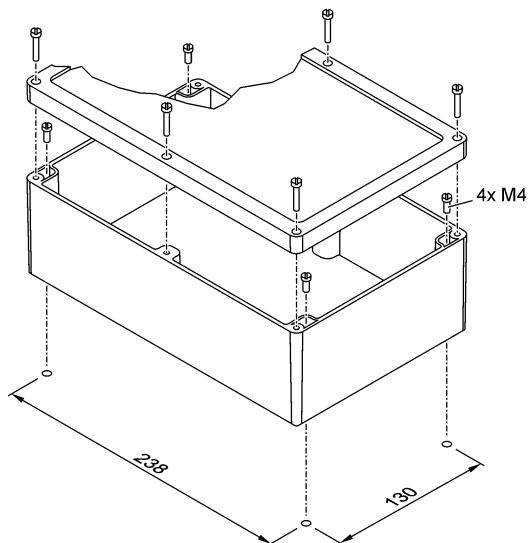
RM-310 C

Casing assembly
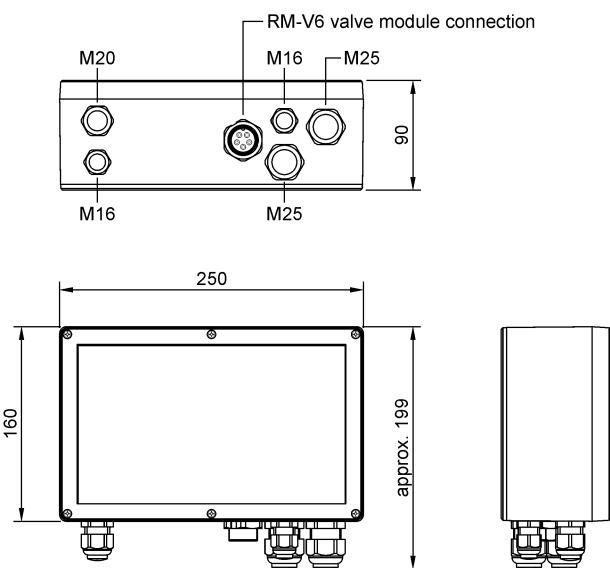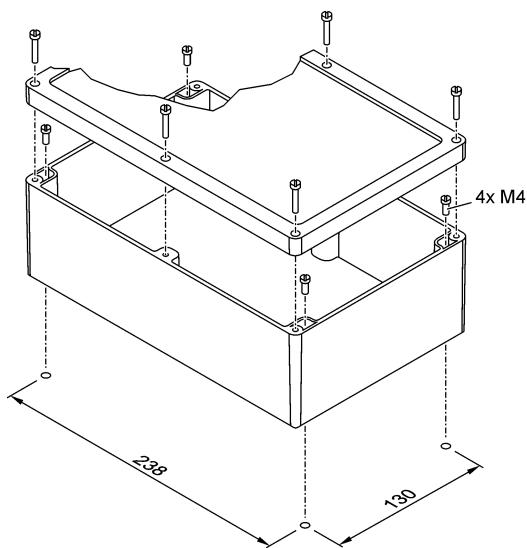
RM-310 CT

Casing assembly
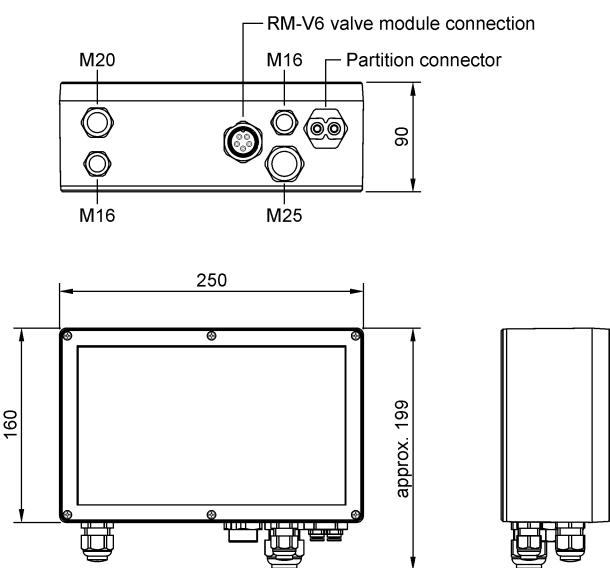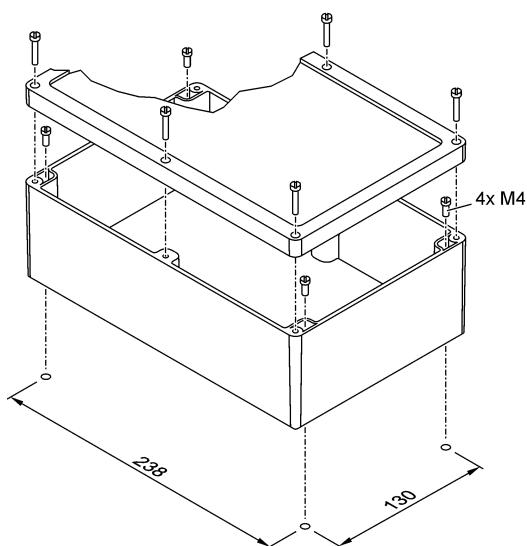
RM-310 C Plug and Play

Casing assembly
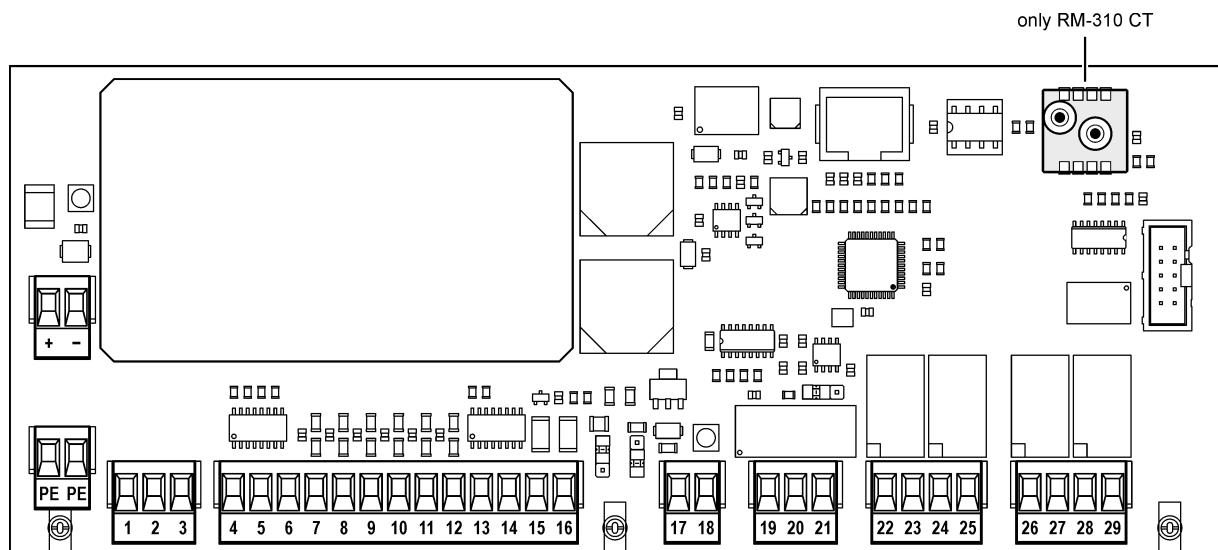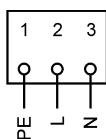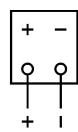
RM-310 CT Plug and Play

Casing assembly

4 Installation ❶-❻

only RM-310 CT

❶ **Power supply**

1 2 3
PE L N

100 V ... 240 V AC

+ –
+ –
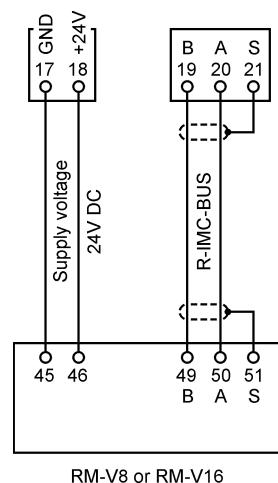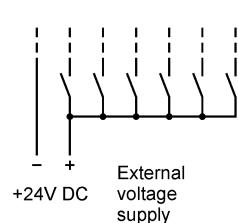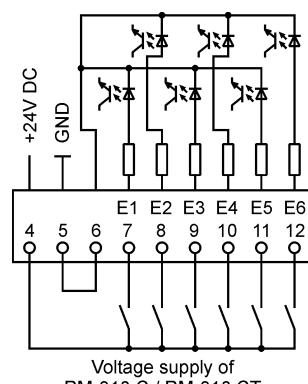
24 V DC

❷ **Connection of the I/O modules RM-V8 / RM-V16 to the controller types RM-310 C / RM-310 CT**

ⓘ The prefabricated cables from RECO are used to connect the RM-V6/X I / O modules to the controller types RM 310 C Plug and Play / RM 310 CT Plug and Play.

GND +24V
17 18

B A S
19 20 21

Supply voltage 24V DC

R-IMC-BUS

45 46   49 50 51
             B A S

RM-V8 or RM-V16

❸ **Digital inputs E1 ... E6, 24 V DC**

+24V DC   GND

E1 E2 E3 E4 E5 E6
4 5 6 7 8 9 10 11 12

Voltage supply of
RM-310 C / RM-310 CT

– +
+24V DC

External
voltage
supply

Input	Factory-set function
E1	Release of the control when 1-signal is present
E2	The function is set with the parameter F2
E3	Acknowledge alarm
E4	Continuous cleaning with Interval 1
E5	Cleaning off (priority over Cleaning on)
E6	Cleaning release
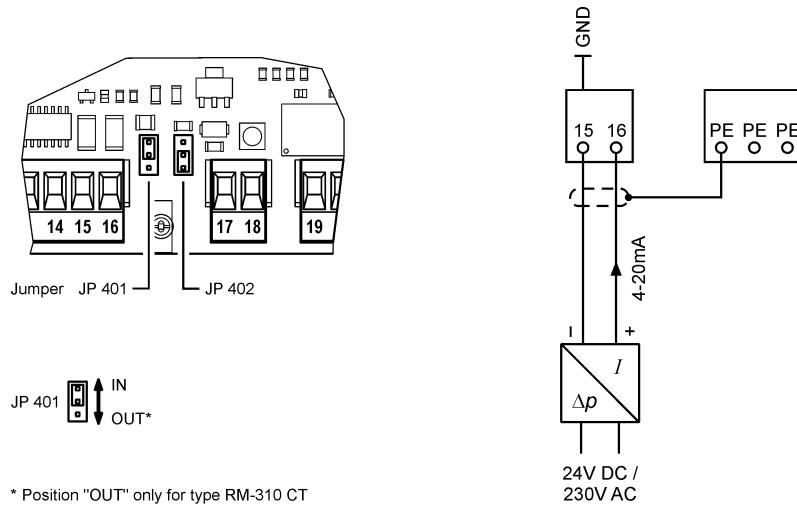
ⓘ The function of the inputs can be individually set via parameter group F0-F6. See appendix 7 "Input and output signal parametrisation, special parameter".
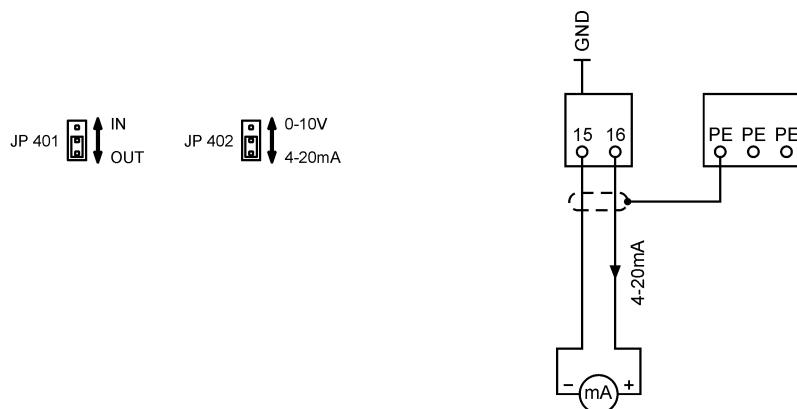
❹ **4-20mA input / 4-20mA output / 0-10V output**

The function depends on the position of the jumpers JP 401 and JP 402
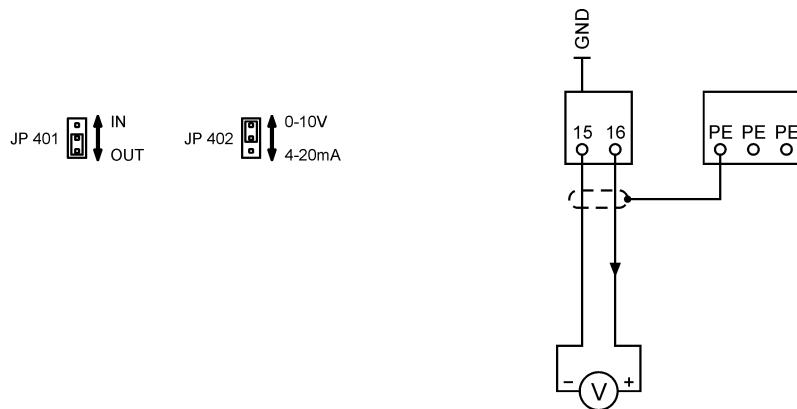
- Differential pressure transmitter with a 4-20 mA output signal
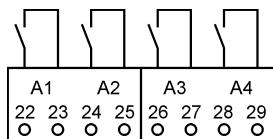
Jumper JP 401 ──┐ └── JP 402

JP 401 — IN / OUT*

* Position "OUT" only for type RM-310 CT

- 4-20mA remote display (RM-310 CT or RM-310 C with I/O module and Δp sensor)

JP 401 — IN / OUT   JP 402 — 0-10V / 4-20mA

- 0-10V remote display (RM-310 CT or RM-310 C with I/O module and Δp sensor)

JP 401 — IN / OUT   JP 402 — 0-10V / 4-20mA

❺ **Relay outputs A1 ... A4 connection, potential-free**

Output	Factory-set function
A1	The relay contact closes as soon as the supply voltage is applied to RM-310 C / RM-310 CT. It opens any time an alarm is present (Group Alarm).
A2	Contact closes when cleaning and downtime are active.
A3	Contact closes at Δp-Min. Alarm
A4	Contact closes at Δp-Max. Alarm

ℹ The function of the outputs can be individually set via parameter group G0-G8. See appendix 7 "Input and output signal parametrisation, special parameter".
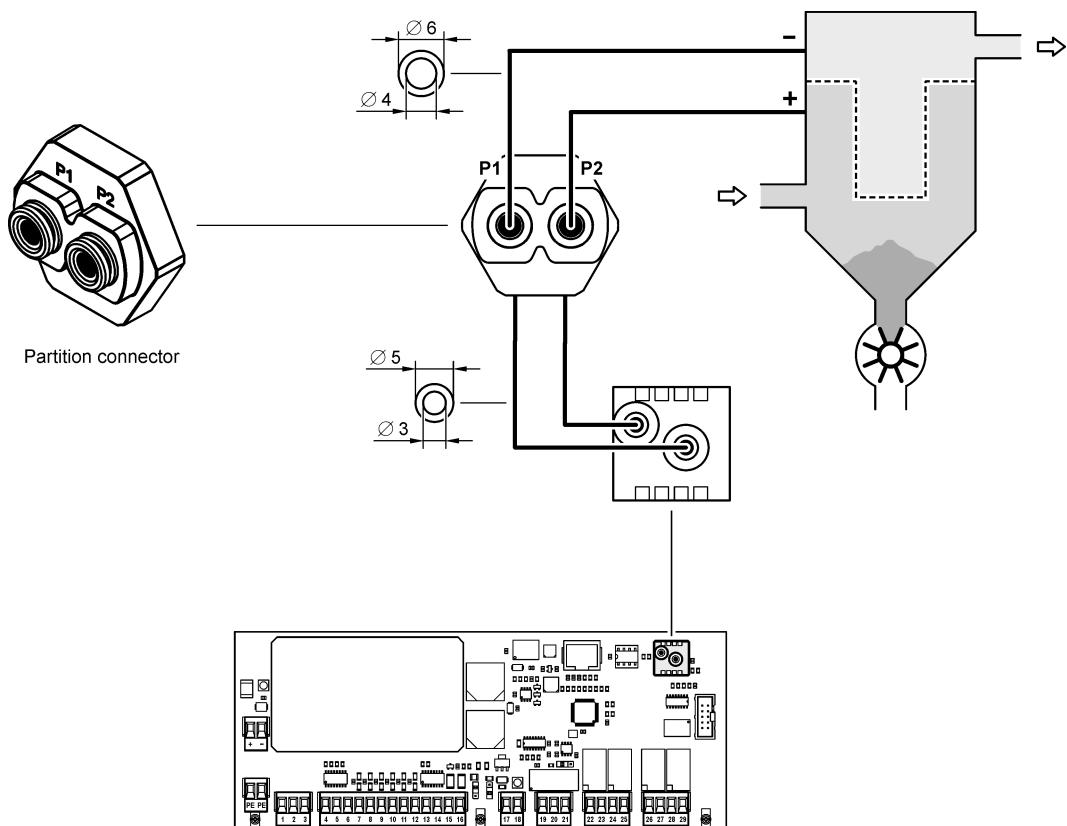
ℹ Shielded cables must be used for all bus and analogue signal lines! The shielding is to be applied one-sided and as short as possible.

Signal cables are not allowed to be installed parallel to power cables.

All cable glands must be firmly tightened to make sure the cables are solidly enclosed and no water can enter.

Unused cable glands must be closed and replaced with blind plugs.

**❻ Differential pressure measurement cables
(only types RM-310 CT and RM-310 CT Plug and Play)**

Partition connector

5 Setting procedure

5.1 Function in "as delivered" condition

The following parameters must be set before operating the RM-310 C / RM-310 CT:
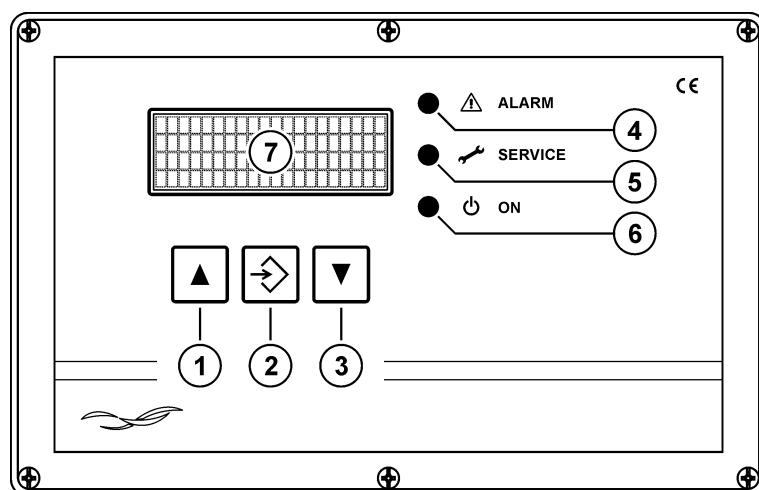
E0   Cleaning control functions
EA   Number of valves
EB   Number of I/O modules

The RM-310 C / RM-310 CT operates automatically once the cleaning control functions, number of valves and number of I/O modules have been set.

Cleaning starts when the filter's differential pressure Δp has reached the "DP-Start" value (factory setting: 1200 Pa). The solenoid valves are controlled sequentially. By cleaning the differential pressure drops after a certain period of time. Once the differential pressure has reached the value "DP-Start" minus "DP-Hyster." (factory setting: 300 Pa), i.e. the differential pressure is 1200 Pa - 300 Pa = 900 Pa, cleaning stops.

If a different function is desired or additional functions shall be activated, the parameter setting of the RM-310 C / RM-310 CT must be changed. See sections 5.3 "Parameter selection level" to 5.9 "Parameter list" on this.

5.2 Operating and display elements

(1)	△- key	■ In parameterisation mode* to select parameters or values (in up-arrow direction) ■ In operating mode to call text messages not shown (in up-arrow direction)
(2)	ENTER key	■ In parameterisation mode* to confirm parameters ■ If a service or alarm message is present, to acknowledge the message
(3)	▽- key	■ In parameterisation mode* to select parameters and values (in down-arrow direction) ■ In operating mode to call text messages not shown (in down-arrow direction)

* the RM-310 C / RM-310 CT is on the parameter selection or parameter setting level.

(4)	"ALARM" LED	Lights when an alarm is present
(5)	"SERVICE" LED	Lights when the filter requires maintenance.
(6)	"ON" LED	Lights when the device is in operation Does not light when the device is on the parameter selection level Flashes when the device is on the parameter selection level
(7)	Display	To display text messages (4 x 20 characters)

5.3 Parameter selection level

To view the parameters and their values the user must switch from the operating level to the parameter selection level. The △ and ▽ keys must be pressed simultaneously until the green "ON" LED goes off (approx. 3 seconds).

All parameters with their set values can now be viewed in sequence by repeatedly pressing the △ or ▽ key. Inactive or hidden parameters are automatically skipped (see section "Activated and deactivated parameters / faded in and faded out parameters" on this page).

Parameter blocks

To ensure an uncluttered view of the device's parametrisation parameters referring to the same function are grouped into blocks (C0, D0, E0, etc.). For example, the block D0 "Δp-controls" includes all parameters (D1, D2, D3, etc.) referring to the differential pressure-dependent cleaning control (short: Δp-controls).

Activated and deactivated parameters / faded in and faded out parameters

Two different types of parameter blocks are available: those that can be activated and deactivated and those that can be faded in and faded out. A deactivated block is inactive. All parameters assigned to it are without function and are not shown. With faded out parameter blocks the associated parameters are active, that is, functioning. They are just not shown.

i To activate a disabled parameter group or to fade in a faded out parameter group switching to the parameter setting level is required (see section 5.4 "Parameter setting level" on page 17 on this).

Parameter display examples

Parameter block C0, deactivated

Display	Meaning
| ```
 C0 Ser.ope.hours

  0 inactive
Parameter code    5
``` | Parameter block C0 "Service operating hours"<br><br>The block is inactive (deactivated)<br>The block is protected by Code 5 |

Parameter block C0, activated

Display	Meaning
| ```
C0 Ser.ope.hours

1 act.w/o mess.
Parameter code    5
``` | Parameter block C0 "Service operating hours"<br><br>The group is active (activated without message)<br>The block is protected by Code 5 |

Parameter C1 of parameter block C0

| ```
C0 Ser.ope.hours
C1 Counter mode
3 DP / Clean on
``` | Parameter block C0 "Service operating hours"<br>Parameter C1 "Counter mode"<br>Set value of the parameter C1 |

Parameter block D0, faded out

| ```
D0 DP-controls

0 faded out
Parameter code    3
``` | Parameter group D0 "$\Delta p$-control"<br><br>The block is faded out (parameter not visible)<br>The block is protected by Code 3 |

Parameter block D0, faded in

| ```
D0 DP-control

1 faded in
Parameter code    3
``` | Parameter group D0 "$\Delta p$-control"<br><br>The block is faded in (parameters are visible)<br>The block is protected by Code 3 |

Parameter D1 of parameter block D0

| ```
D0 DP-controls
D1 Cleaning mode
1 DP cont.clean.
Parameter code    3
``` | Parameter block D0 "$\Delta p$-controls"<br>Parameter D1 "$\Delta p$ Cleaning mode"<br>Set value of the parameter D1<br>Parameter D1 is protected by Code 3 |

Parameter block B0

| ```
B0 Disp.language

0  D - Deutsch
``` | Parameter block B0 "Display language"<br>The block consists only of parameter B0<br>Set value of the parameter B0<br>The block is not protected by a code |

5.4   Parameter setting level

To change the value of a selected parameter or to activate and deactivate or fade in or fade out a parameter block the user must switch from the parameter selection level to the parameter setting level. To do so, the ENTER key must be pressed until the text display switches over (for parameters locked by a code) or the green LED "ON" begins to flash (with unblocked or previously unblocked parameters).

i For parameters blocked by a code, the entry of a 4-digit code is required to release the parameter (refer to section 5.5 "Code input to clear locked parameters" on this).

Subsequently, the parameter value can be changed or the parameter block activated or deactivated or faded in and faded out by pressing the △ or ▽ key.

To save the set value or the status of the parameter block (activated / deactivated or faded in / faded out) and return to the parameter selection level the ENTER key must be pressed until the green LED "ON" goes out (approx. 1 second).

5.5   Code input to clear locked parameters

There are 3 different codes that are used to allow access to certain parameters to authorised persons only. In the parameter selection mode, the row 4 of the display shows what code has to be entered to release the displayed parameter (parameter code 3, 4 or 5). If nothing is displayed in the row 4, the relevant parameter can be accessed without code. The required codes can be found in section 5.9 "Parameter list" on page 23.

The 4-digit code must be entered as follows:

1.   The code digit is selected by briefly pressing the ENTER key.
2.   The digit value is set by briefly pressing the ▽ or △ key.
3.   The set code is confirmed by prolonged pressing of the ENTER key.

If the code entered is wrong the message "`!Invalid input!`" appears for 2 seconds. The code input must be repeated.

If the code entered is correct the message "`!!!!   OK   !!!!`" appears for 2 seconds.

All parameters that were blocked by the same code are now released for setting. The parameters are blocked again if no key of the device is pressed for 20 minutes.

5.6   Return to the operating level

To get to the operating level the ▽ and △ keys must be pressed simultaneously until the green LED lights (approx. 3 seconds).

5.7 Short guide for parameter setting

❶ Getting to the parameter selection level:
Simultaneously press the ▲ key and the ▼ key longer than 3 seconds.

❷ Select a parameter:
Press the ▲ key = scrolling up
Press the ▼ key = scrolling down

B0   C0   C1   C2

❸ Getting to the parameter setting level:
Press the ENTER-key longer than 1 second.

❹ Changing a selected parameter value:
▲ key = selects the next higher value
▼ key = selects the next lower value

0   1   2   3

❺ Saving the changed parameter value:
Press the ENTER-key longer than 3 seconds.

❻ Returning to the operating level:
Simultaneously press the ▲ key and the ▼ key longer than 3 seconds.

i The ON LED indicates the current level of the device.

LED **lights**	Operating level
LED **off**	Parameter selection level
LED **flashing**	Parameter setting level

If no key has been pressed for 3 minutes the RM-310 C / RM-310 CT automatically returns from the parameter selection or the parameter setting level with the last values stored to the operating level.

5.8 Overview of menu navigation

Parameter selection level   Parameter setting level

B0
```
B0 Disp.language
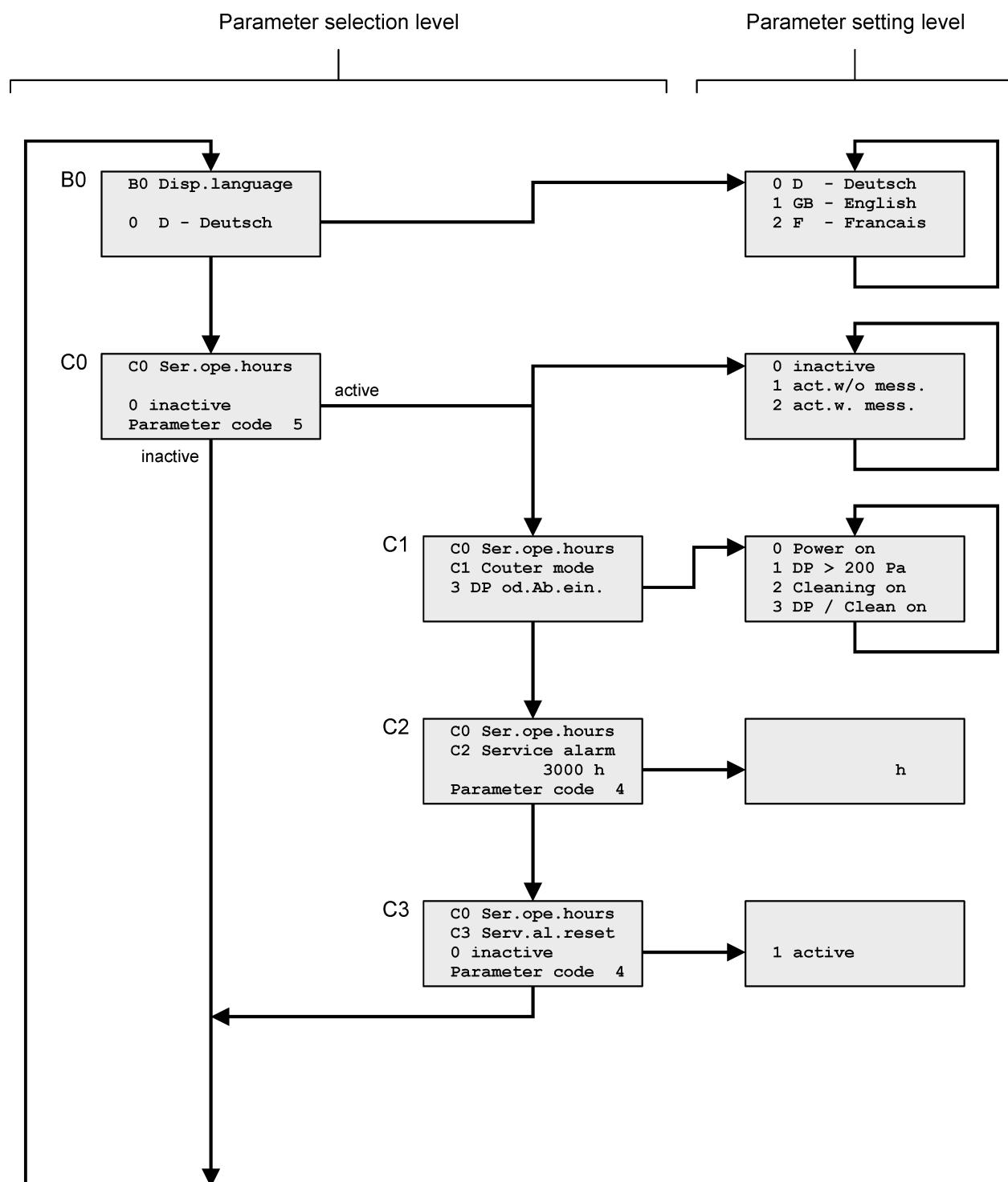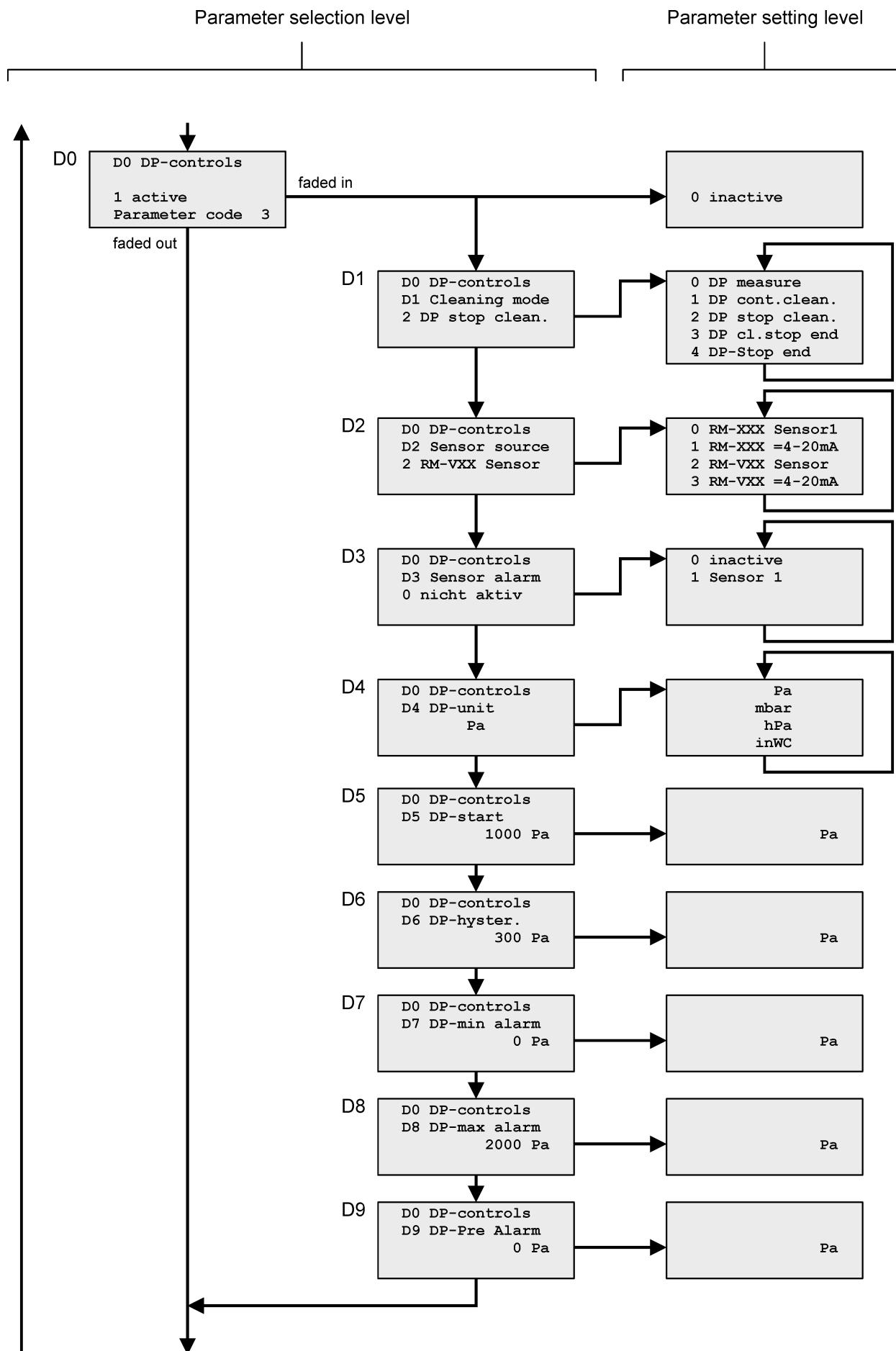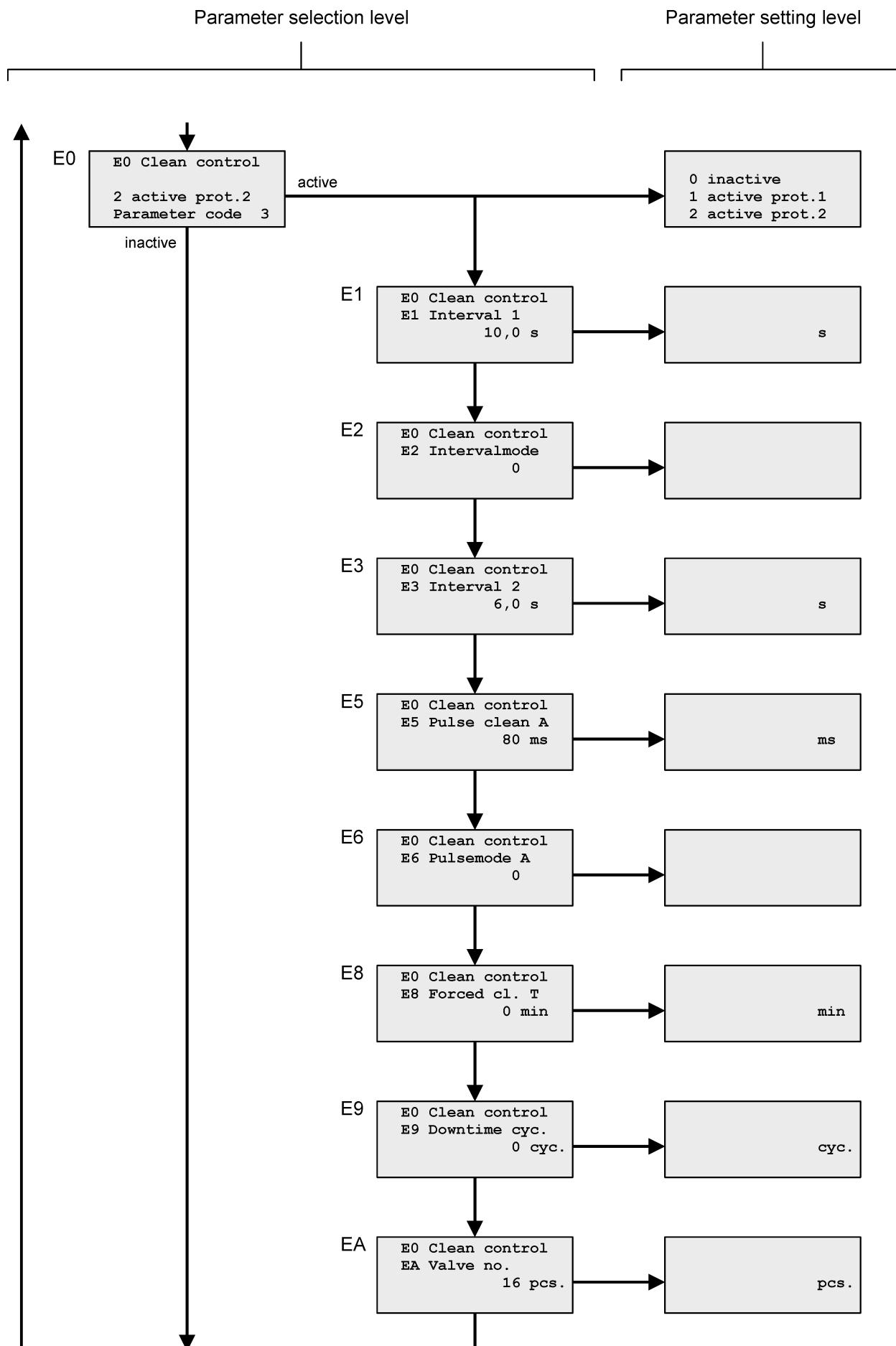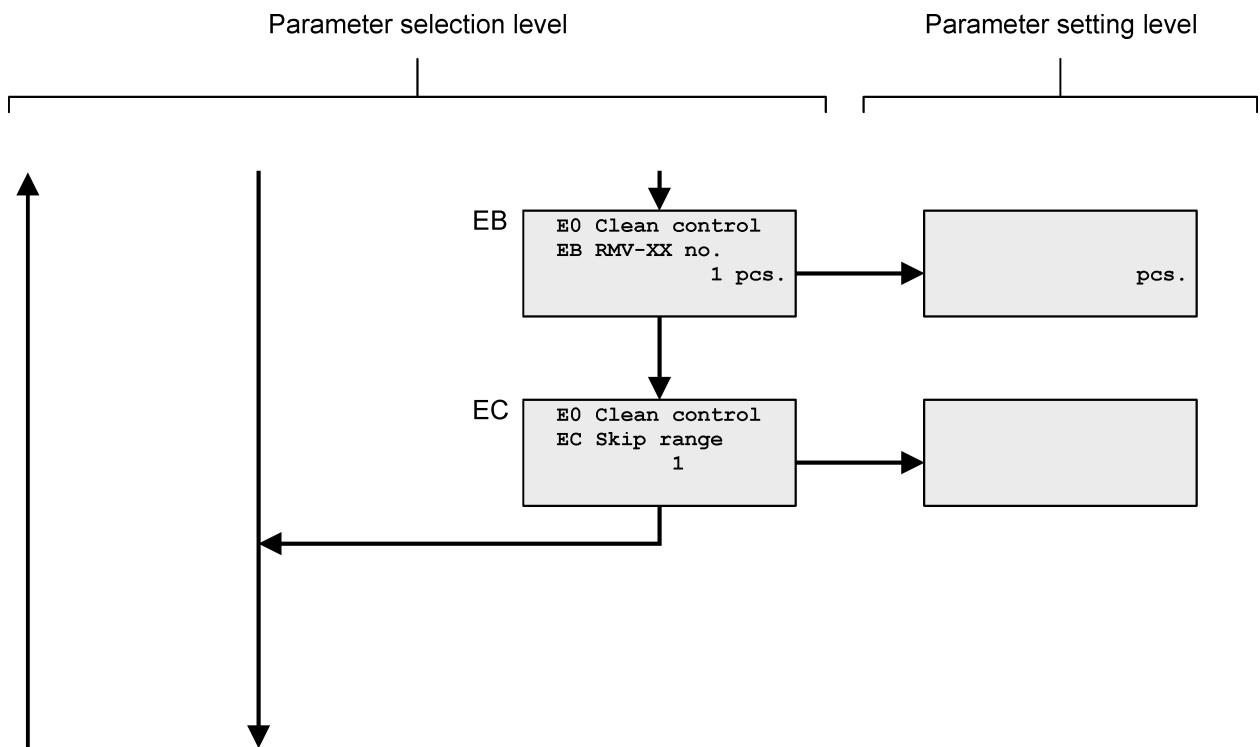
0  D - Deutsch
```
```
0 D  - Deutsch
1 GB - English
2 F  - Francais
```

C0
```
C0 Ser.ope.hours

0 inactive
Parameter code  5
```
active
```
0 inactive
1 act.w/o mess.
2 act.w. mess.
```
inactive

C1
```
C0 Ser.ope.hours
C1 Couter mode
3 DP od.Ab.ein.
```
```
0 Power on
1 DP > 200 Pa
2 Cleaning on
3 DP / Clean on
```

C2
```
C0 Ser.ope.hours
C2 Service alarm
          3000 h
Parameter code  4
```
```
          h
```

C3
```
C0 Ser.ope.hours
C3 Serv.al.reset
0 inactive
Parameter code  4
```
```
1 active
```

Parameter selection level Parameter setting level

D0
```
D0 DP-controls

1 active
Parameter code  3
```
faded in → `0 inactive`

faded out

D1
```
D0 DP-controls
D1 Cleaning mode
2 DP stop clean.
```
```
0 DP measure
1 DP cont.clean.
2 DP stop clean.
3 DP cl.stop end
4 DP-Stop end
```

D2
```
D0 DP-controls
D2 Sensor source
2 RM-VXX Sensor
```
```
0 RM-XXX Sensor1
1 RM-XXX =4-20mA
2 RM-VXX Sensor
3 RM-VXX =4-20mA
```

D3
```
D0 DP-controls
D3 Sensor alarm
0 nicht aktiv
```
```
0 inactive
1 Sensor 1
```

D4
```
D0 DP-controls
D4 DP-unit
        Pa
```
```
    Pa
  mbar
   hPa
 inWC
```

D5
```
D0 DP-controls
D5 DP-start
      1000 Pa
```
```
        Pa
```

D6
```
D0 DP-controls
D6 DP-hyster.
       300 Pa
```
```
        Pa
```

D7
```
D0 DP-controls
D7 DP-min alarm
         0 Pa
```
```
        Pa
```

D8
```
D0 DP-controls
D8 DP-max alarm
      2000 Pa
```
```
        Pa
```

D9
```
D0 DP-controls
D9 DP-Pre Alarm
         0 Pa
```
```
        Pa
```

Parameter selection level   Parameter setting level

E0
```
E0 Clean control

2 active prot.2
Parameter code  3
```
active

inactive

```
0 inactive
1 active prot.1
2 active prot.2
```

E1
```
E0 Clean control
E1 Interval 1
         10,0 s
```
```
         s
```

E2
```
E0 Clean control
E2 Intervalmode
         0
```

E3
```
E0 Clean control
E3 Interval 2
         6,0 s
```
```
         s
```

E5
```
E0 Clean control
E5 Pulse clean A
         80 ms
```
```
         ms
```

E6
```
E0 Clean control
E6 Pulsemode A
         0
```

E8
```
E0 Clean control
E8 Forced cl. T
         0 min
```
```
         min
```

E9
```
E0 Clean control
E9 Downtime cyc.
         0 cyc.
```
```
         cyc.
```

EA
```
E0 Clean control
EA Valve no.
         16 pcs.
```
```
         pcs.
```

Parameter selection level

Parameter setting level

EB

```
E0 Clean control
EB RMV-XX no.
          1 pcs.
```

```
          pcs.
```

EC

```
E0 Clean control
EC Skip range
       1
```

5.9 Parameter list

Parameter	Code 🔒	Text in display, line 1	Meaning	Factory setting	Setting range	See page
B0	–	B0 Disp.language	Language of the display text	0	0 … 2	25

Parameter block C0-C3 "Service operating hours counter"

Parameter	Code 🔒	Text in display, line 1	Meaning	Factory setting	Setting range	See page
C0	5	C0 Ser.ope.hours	Service operating hours counter	0^1	0^1 … 2	25
C1	–	C1 Counter mode	Operating hours counter mode	3	0 … 3	25
C2	4	C2 Service alarm	Service alarm	3000 h	0^1 … 25.500 h	25
C3	4	C3 Serv.al.reset	Service alarm reset	–	–	25

Parameter block D0-D8 "Δp-controls"

Parameter	Code 🔒	Text in display, line 1	Meaning	Factory setting	Setting range	See page
D0	3	D0 DP-controls	Δp controls	1	0^1, 1	26
D1	–	D1 Cleaning mode	Δp cleaning mode	2	0 … 4	26
D2	–	D2 Sensor source	Sensor source	2	0 … 3	26
D3	–	D3 Sensor alarm	Sensor alarm	0	0 … 1	26
D4	–	D4 DP-unit	Δp unit in display	Pa	Pa, mbar, hPa, inch/Wc	27
D5	–	D5 DP-start	Δp start	$1000\ Pa^2$	$100 … 4800\ Pa^3$	27
D6	–	D6 DP-hyster.	Δp hysteresis	$300\ Pa^4$	$100 … 4700\ Pa^5$	27
D7	–	D7 DP-min alarm	Δp min. alarm	$0^1\ Pa$	$0^1 … 4600\ Pa^6$	27
D8	–	D8 DP-max alarm	Δp max. alarm	$2000\ Pa^7$	$0^1 … 5000\ Pa^8$	27
D9	–	D9 DP pre-alarm	Δp-pre-Alarm max.	$0^1\ Pa$	$0^1 … 5000\ Pa^8$	27

[1] 0 = Function inactive

[2] The value 1000 Pa applies to the default setting of parameter T1 = 0 … 5000 Pa. If another Δp range is selected, the Δp starting value is 20% of the full scale value.

[3] The setting range 100 Pa … 4800 Pa applies to the default setting of parameter T1 = 0 … 5000 Pa. If another Δp range is selected, the setting range is 2% ... 96% of the full scale value.

[4] The value 300 Pa applies to the default setting of parameter T1 = 0 … 5000 Pa. If another Δp range is selected, the Δp hysteresis value is 6% of the full scale value.

[5] The setting range 100 Pa … 4700 Pa applies to the default setting of parameter T1 = 0 … 5000 Pa. If another Δp range is selected, the setting range is 2% ... 94% of the full scale value.

[6] The setting range 0 … 4600 Pa applies to the default setting of parameter T1 = 0 … 5000 Pa. If another Δp range is selected, the setting range is 0 ... 92% of the full scale value.

[7] The value 2000 Pa applies to the default setting of parameter T1 = 0 … 5000 Pa. If another Δp range is selected, the Δp max. alarm value is 40% of the full scale value.

[8] The setting range 0 … 5000 Pa applies to the default setting of parameter T1 = 0 … 5000 Pa. If another Δp range is selected, the setting range is 0 ... 100% of the full scale value.

i 🔒 Parameter code 3 = 4711
Parameter code 4 = known only to the manufacturer of the filter system
Parameter code 5 = known only to the manufacturer of the filter system

Parameter	Code ⚙	Text in display, line 1	Meaning	Factory setting	Setting range	See page
Parameter block E0-EC "Cleaning control functions"
E0	3	E0 Clean control	Cleaning control functions	1	0^1 … 2	28
E1	–	E1 Interval 1	Interval 1	10 s	0.5 … 250 s	28
E2	–	E2 Interval Mode	Interval mode[9]	0^1	0^1 … 1	28
E3	–	E3 Interval 2	Interval 2	6 s	0.5 … 250 s	28
E5	–	E5 pulse clean A	Pulse time "Cleaning valve"	80 ms	40 … 990 ms	28
E6	–	E6 Pulsemode A	Pulse mode "Cleaning valve"	0^1	0^1 … 1	28
E8	–	E8 Forced cl. T	Compulsory cleaning time	0^1	0^1 … 2500 min	28
E9	–	E9 Downtime cyc.	Downtime cycles	0^1	0^1 … 64	28
▶ EA	3	EA Valve no.	Number of valves at parameter setting E0 = 1	16	1 … 240	28
▶ EB	3	EB Number RM-VXX	Number of I/O modules RM-V 6/X[10], RM-V 8[11] or RM-V 16[11] with parameter setting E0 = 1	1	1 … 15	28
EC	3	EC Skip range	Cleaning skip range	1	1 … EA/2[12]	28

[1] 0 = Function inactive

[9] is not active with active impulse controller

[10] only types RM-310 C Plug and Play and RM-310 CT Plug and Play

[11] only types RM-310 C and RM-310 CT

[12] EA/2 = Set value of the EA parameter divided by 2

ℹ ▶ Parameters must definitely be set before commissioning.

 ⚙ Parameter code 3 = 4711

5.10 Parameter description and explanation of function

Parameter B0 "Display language"

The display texts can be shown in different national languages. The text output is in German when the system is delivered.

B0 =	Text in display, line 3	Meaning
0	`0 D – Deutsch`	Text output German
1	`1 GB – English`	Text output English
2	`2 F – Francais`	Text output French

Parameter block C0-C4 "Service operating hours counter"

Parameter C0 "Service operating hours counter"

The service operating hours counter can be activated or deactivated with parameter C0. The parameter value is factory-set to 0 (= inactive).

C0 =	Text in display, line 3	Meaning
0	`0 inactive`	The operating hours counter is deactivated. The parameters C1 through C3 are not displayed.
1	`1 act.w/o mess.`	The operating hours counter is activated but without external messages.
2	`2 act.w. mess.`	The operating hours counter is activated, with external service or alarm messages.

Parameter C1 "Operating hours counter mode"

The operating hours counter mode can be set with parameter C1.

C1 =	Text in display, line 3	Meaning
0	`0 Power on`	The counter counts when mains voltage is present.
1	`1 DP > 200 Pa`	The counter counts when the differential pressure is > 200 Pa.
2	`2 Cleaning on`	The counter counts when cleaning is activated.
3	`3 DP /Clean on`	The counter counts when the differential pressure is > 200 Pa or cleaning is activated.

Parameter C2 "Service alarm"

The service alarm switch point can be set with parameter C2. It is factory-set to 3000 hours. Once the counter reaches the set value the yellow LED is activated and signals a present warning to the operator. On the display, the service alarm message „Operating hours" appears.

Parameter C3 "Service alarm reset"

A maintenance technician can reset the operating hours counter for the service alarm to 0 with parameter C3. The present service alarm message is cleared and the yellow service LED switched off.

Parameter block D0-D8 "Δ*p*-controls"

Parameter D0 "Δ*p*-controls"

Parameters D1-D8 can be faded in or out with parameter D0. Parameter D0 is factory-set to 1. The "Δp control" is also active. It Δ*p* control is not active, cleaning is set to the "continuous" mode.

D0 =	Text in display, line 3	Meaning
0	`0 inactive`	Parameters D1-D8 are faded out (invisible)
1	`1 active`	Parameters D1-D8 are faded in (visible)

Parameter D1 "Δ*p* Cleaning mode"

The operating mode of the differential pressure-dependent cleaning can be set with parameter D1.

D1 =	Text in display, line 3	Meaning
0	`0 DP measure`	The control only serves as differential pressure measuring device with all Δ*p* alarm switch points.
1	`1 DP cont.clean.`	Cleaning works continuously independent from the differential pressure, with the parametrised control times (see parameters E1, E3, E5 and E9). The Δ*p* alarm switch points set are active.
2	`2 DP stop clean.`	The dedusting works in start-stop mode. If the differential pressure reaches the start value set with parameter D5 cleaning is activated until the differential pressure falls below the value D5 - D6 (Δ*p* start value minus Δp hysteresis value). The valve number selected last is stored to enable cleaning to continue with the subsequent valve when starting again.
3	`3 DP cl.stop end`	The dedusting works in the start-stop mode with circulation ending. If the differential pressure reaches the start value set with parameter D5, the valve number is stored and cleaning is activated until the differential pressure falls below the value D5 - D6 (Δ*p* start value minus Δp hysteresis value) and the stored valve number is reached. (At least 1 complete circulation is always carried out.)
4	`4 DP-Stop end`	Cleaning works in stop-end mode. If the differential pressure reaches the Δ*p* start value set by parameter D5 cleaning remains active until the differential pressure drops below the D5 - D6 (Δ*p* start value minus Δ*p* hysteresis value) and the last valve has been operated.

Parameter D2 "Sensor source"

The source of the differential pressure measurement is set with parameter D2.

D2 =	Text in display, line 3	Meaning
0	`0 RM-XXX Sensor1`	Δ*p* measurement via sensor 1 of the RM-310 CT
1	`1 RM-XXX =4-20mA`	Δ*p* measurement via the current input I1 of the RM-310 C
2	`2 RM-VXX Sensor`	Δ*p* measurement via the sensor of the I/O module RM-V6/X[1] or RM-V8[2] / RM-V16[2] with the address No.1
3	`3 RM-VXX =4-20mA`	Δ*p* measurement via the current input of the I/O module RM-V8[2] or RM-V16[2] with the address No.1

[1] only types RM-310 C Plug and Play and RM-310 CT Plug and Play

[2] only types RM-310 C and RM-310 CT

Parameter D3 "Sensor alarm"

The RM-310 CT indicates a sensor alarm when the sensor 1 is faulty or the measuring hoses on the sensor 1 are connected incorrectly. The sensor monitoring can be enabled or disabled with the parameter D3.

D3 =	Text in display, line 3	Meaning
0	`0 inactive`	Sensor monitoring deactivated
1	`1 Sensor 1`	Monitoring of sensor 1 enabled

Parameter D4 "Δp Unit"

The display unit of the differential pressure is set with parameter D4. It is factory-set to the unit Pascal (Pa).

Text in display, line 3	Meaning
`Pa`	Differential pressure display in Pa
`mbar`	Differential pressure display in mbar
`hPa`	Differential pressure display in hPa
`inWC`	Differential pressure display in inch/WC

Parameter D5 "Δp Start"
The Δp start value of the differential pressure-dependent cleaning is set with parameter D5.

Parameter D6 "Δp Hysteresis"
The Δp hysteresis value of the differential pressure-dependent cleaning is set with parameter D6.

Parameter D7 "Δp min. alarm"
The Δp min. alarm value is set with parameter D7.

Parameter D8 "Δp max. alarm"
The Δp max. alarm value is set with parameter D8.

Parameter D9 "Δp pre-alarm max."
Parameter D9 is used to set the Δp pre-alarm max. value.

Parameter block E0-E8 "Cleaning control functions"

Parameter E0 "Cleaning control functions"

Cleaning control functions can be activated or deactivated with parameter E0. The parameter value is factory-set to 0 (= active).

E0 =	Text in display, line 3	Meaning
0	0	The cleaning control functions are inactive
1	1	The cleaning control functions are active via RMV-XX control (I/O module RM-V 8[2] or RM-V 16[2]).
2	2	The cleaning control functions are active via RMV-XX-SMD control (I/O module RM-V 6/X[1] or RM-V 8.10[2] / RM-V 16.10[2]).

[1] only types RM-310 C Plug and Play and RM-310 CT Plug and Play

[2] only types RM-310 C and RM-310 CT

Parameter E1 "Interval 1"
The period between two successive cleaning pulses can be set in 0.1-second increments via parameter E1.

Parameter E2 "Interval mode"
The parameter is factory-set to 0 and is therefore not active. With parameter setting E2 = 1 all intervals are multiplied with factor 10, **except** with active interval controller.

Parameter E3 "Interval 2"
The period between two successive cleaning pulses can be set in 0.1-second increments via parameter E3 during downtime and forced cleaning.

Parameter E5 "Pulse time A" (cleaning valve)
Valve pulse time A can be set in 10-millisecond increments via parameter E5.

Parameter E6 "Pulse time mode A"
The parameter is factory-set to 0 and is therefore not active. With the parameter setting E6 =1 the pulse time of the cleaning valves is multiplied with factor 10.

Parameter E8 "Forced cleaning time"
The parameter is factory-set to 0 and is therefore not active. The forced cleaning time is set via parameter E8. If cleaning is in the stopped state, a complete cycle is always cleaned after the set forced cleaning time has elapsed.

Parameter E9 "Downtime cycles"
The last run cycles can be set with parameter E9. Interval 2 is always active during downtime.

Parameter EA "Number of valves"
The number of dedusting valves connected to the filter system can be set with parameter EA.

Parameter EB "Number of I/O modules"
The number of I/O modules (RM-V 8 or RM-V 16) connected to the filter system can be set with parameter EB.

i A communication alarm is triggered if the number of the I/O modules detected at the controller start differs from the settings.

Parameter EC "Cleaning skip range"

In the delivery state the valves are selected in direct succession (1, 2, 3, 4 .../ skip range = 1). Depending on the filter arrangement cleaning in a different order may be useful (for example: 1, 4, 7, 10 … / skip range = 3). The product discharge can be regulated this way. A cleaning skip range from 1 to 120 can be set with parameter EC. However, the value cannot be chosen greater than half the value of the number of valves set (parameter EA).

i

Parameter group J0-J5
see appendix 1 "Cleaning monitoring"

Parameter groups F0-F8, G0-G8, T0-T6 and U0-U1
see appendix 7 "Input and output signal parametrisation, special parameters"

For the funktions

cleaning pressure control and
cleaning pressure-related interval control

the filter controller type RM-350 C is necessary.

6 Operating modes

6.1 Time-controlled cleaning (parameter E1, E5, D1)

Cleaning takes place continuously with the control times E1, E5 set.

Interval 2 (E3) becomes active only in the event of downtime.

6.2 Forced cleaning (parameter E8)

If cleaning is in the stopped state, a complete cycle with interval 2 is always cleaned after the set forced cleaning time has elapsed. Forced cleaning is deactivated when the control is in stand-by or via an external signal.

6.3 Differential pressure-controlled cleaning (parameter D5, D6, D1)

Cleaning starts when the filter's differential pressure Δp has reached the "DP-Start" value. The solenoid valves are controlled sequentially. By cleaning the differential pressure drops after a certain period of time. Cleaning stops when the differential pressure has reached the value "DP-Start" minus "DP-Hyster.".

Interval 2 (E3) becomes active only in the event of downtime.

6.4 Downtime (parameter E9)

Downtime cleaning is started by the closing of contact connected to input E1. Downtime cleaning stops when the contact opens.

Set the number of downtime cycles with parameter E9. Interval 2 is always valid during downtime.

6.5 Cleaning skip range (parameter EC)

See section "Parameter EC, cleaning skip range on page 28 on this.

6.6 Valve test mode

In the valve test mode, you can select an individual valve and operate it with the set control times (pulse and interval time 1). If the interval time 1 is set to a value smaller than 5 s, the test program works with a interval time of 5 s.

To activate the valve test mode select the parameter E0 and enter the code ABVT. The display shows a window for valve 1 of the controller (I/O module RM-V6/X or RM-V8 / RM-V16) with address 1.

Display		Meaning
``` V Test program ----- bar Ctrl. 1 Valve no. 1 (+) End (+) ```	Row 1 Row 2 Row 3 Row 4	Current pressure drop* Control number 1 / valve number Function assignment for the keys
		* Only displayed with active pressure monitoring.

After expiration of interval time 1, the displayed valve is operated. Momentarily press the ▽ key to select different valves of the control 1 in succession. With each operation of the ▽ key, the displayed valve is immediately activated. Momentarily press the △ key to select the remaining controls (I/O modules) in succession. You can stop the valve test mode by pressing the ENTER key.

7 Troubleshooting

Fault	Possible causes	Recommended action
The "ON" LED does not light	No mains voltage	Check the power supply
	Fuse in device defective	Replace fuse
	System EMERGENCY-STOP actuated	Check EMERGENCY-STOP
No valve activity	Wiring to valves interrupted	Check cables and electrical connections
	Solenoid defective	Replace coil
	Cycle interrupted	- Check hose connections - Check parameter groups D and E
No downtime cleaning	Parameter E9 = 0 (downtime cycles)	Check parameter E9 "Downtime cycles"
	Contact on input E1 does not open	Check contact on input E1
Cleaning not effective	Interval too long	Set parameter E1 "Interval 1" to lower value
	Pressure too low	- Increase pressure - Set parameter E1 "Interval 1" to higher value
	Valve defective	Check / replace valves
	Pulse time too short	Set parameter E5 "Pulse time" to higher value
	Cycle frequently interrupted	Check differential pressure transmitter and hose connections
Differential pressure display error	Hose connection error	- Drain hoses. Clean hose connection points on the filter housing with compressed air (only in direction of filter, never in direction of sensor) - Install hoses without kinks - Check hose connections in the device for water, kinks, etc.
The display shows the message „RM-VXX Comm.Alarm" (communication alarm).	The number of connected I/O modules RM-V6/X or RM-V8 / RM-V16 does not agree with the parameter setting.	- Check the EB parameter setting and correct if necessary - Check bus connection for polarity and electrical connection. - Check address setting of the I/A modules.

Fault	Possible causes	Recommended action
On the display, the message „RM-VXX alarm setting" appears.	The valve setting of the I/O modules RM-V6/X or RM-V8 / RM-V16 does not agree with the setting of the RM-310 C / RM-310 CT.	Check the EA parameter setting and correct if necessary
On the display, the message „Sensor alarm" appears.	Δp sensor DP-1 defective	Check the Δp sensors and replace if necessary
	Δp measuring lead connected incorrectly or defective	- Check connections of the Δp measuring leads and replace if necessary - Check Δp measuring leads and replace if necessary
On the display, the message „Input lx alarm" appears.	The input current of the analogue input is too low.	Check analogue line for polarity and electrical connection.

8 Text messages on the display

In the operating mode of the filter control RM-310 C / RM-310 CT the following operating messages are either displayed directly or they can be retrieved in sequence by pressing the $\triangle$ key or the $\triangledown$ key. Non-active functions are not displayed.

i   If no key is pressed during a duration of 3 minutes the display automatically returns to operating message 1.

8.1 Program start

Display	Meaning
| ```
Program
RM-310C
Version no.   x
Date:  xx.xx.20xx
``` | The name of the program, the version number and the date of the program release are displayed for approx. 4 seconds after switching on the supply voltage. The device powers up during this time and conducts a self-test. |

8.2 Operating message 1

Display		Meaning
`Stand-By`	Row 1	The control is <u>not</u> released.
| ```
Only DP measurement
DP-contr. deactive
DP filter  #### Pa
``` | Row 1<br>Row 2<br>Row 2 | Parameter D1 is set to 0.<br>Parameter D0 is set to the value 0.<br>#### currently measured differential pressure of filter |
| ```
Clean.contr.inactive
DP-contr. deactive
DP filter  #### Pa
``` | Row 1<br>Row 2<br>Row 2 | Parameter E0 is set to the value 0.<br>Parameter D0 is set to the value 0.<br>#### currently measured differential pressure of filter |
| `Ext.cleaning off` | Row 1 | The input "Cleaning off" carries 1-signal at factory setting.

* The function of the inputs can be individually set via parameter group F0-F8. See appendix 7 "Input and output signal parametrisation, special parameters" on this. |
| `Downtime active` | Row 1 | The downtime is active.

Downtime is not externally released when the indicator flashes. |

Display		Meaning
`Ext.cleaning on`	Row 1	The input "Cleaning on" carries 1-signal at factory setting. * The function of the inputs can be individually set via parameter group F0-F8. See appendix 7 "Input and output signal parametrisation, special parameters" on this.
`Cont. cleaning on`	Row 1	Control released and continuous cleaning on.
`F-clean.in     5 min`	Row 1	Start of active forced cleaning in 5 minutes
`Forced cleaning on`	Row 1	Cleaning is activated after the forced cleaning time has elapsed.
`Cleaning on`	Row 1	Cleaning has been activated because the rising differential pressure of the filter has reached the value „DP Start".
`Cleaning off`	Row 1	Cleaning has been deactivated because the dropping differential pressure of the filter has reached the value „DP Start" minus „DP Hyster.". With the indicator flashing when the release of cleaning has been requested but not granted (see parameter Fn = 10/30 or Gn = 6/38).
		The following is displayed in rows 3 and 4 in all operating modes except in downtime:
`Filter  valv.no.###` `Ctrl.## Valv.no.###`	Row 3 Row 4	The cleaning valve with the filter number ### is active. Location: Control number ## / Control valve number ###
`DP-Filter ####  Pa` `DP-contr. deactive`	Row 2 Row 2	#### effective measured differential pressure of the filter or parameter D0 is set to the value 0.
`                 2`	Row 2	The controller is in the 2nd downtime cycle.

8.3 Operating messages 2 to 4

Operating messages 2 to 4 are the currently valid parameter values. The effective differential pressure is displayed only when parameter D0 "$\triangle p$ control" is set to value 1 (active).

Display		Meaning

``DP-Min Al. #### Pa``
``DP-Max Al. #### Pa``
``DP Pre-Al. #### Pa``
``DP filter  #### Pa``
	Row 2
	Row 3
	Row 3
	Row 4
		Operating message 2
		#### set value Δp-Min Alarm
		#### set value Δp-Max Alarm
		#### set value Δp-pre-alarm*
		#### currently measured differential pressure of filter
		
		* The operating message is displayed only when the parameter D9 Δp pre-alarm is set to a value greater than 0 (alternating at 3-second cycle with the value set for Δp Max. alarm).

``DP-Start   1200 Pa``
``DP-Stop    900 Pa``
``DP-Filter #### Pa``
	Row 2
	Row 3
	Row 4
		Operating message 3
		Parameter "Starting cleaning"
		Parameter "Stopping cleaning"
		#### currently measured differential pressure of filter

``Interv.t.  ##,# s``
``Pulse t.    ### ms``
``Downtime     ## cyc.``
``DP-Filter #### Pa``
	Row 2
	Row 3
	Row 4
	Row 4
		Operating message 4
		##,# effective value of interval
		### effective value of pulse time
		## effective value of downtime cycles*
		#### currently measured differential pressure of filter
		
		* The operating message is displayed only when downtime is active. If downtime is not active, the currently measured differential pressure of the filter is displayed instead.

8.4 Operating message 5 – only with active service operating hours counter

Display		Meaning
``Next service`` ``*        #### h``	Row 1 Row 2	Next service #### Time to next service The asterisk symbol at the beginning of the row flashes when the service operating hours counter is active.
``Operating hours`` ``      ###### h``	Row 3 Row 4	Elapsed general operating hours (mains on) ######

8.5 Service and alarm messages

The service and alarm messages are shown in the first row. If several messages are present, the other messages can be retrieved in sequence by pressing the △ key or the ▽. The two lower rows also indicate the current operating message and the alarm condition.

The alarm messages are acknowledged by pressing the ENTER key or via the external acknowledgement input.

i   The service message can only be acknowledged via parameter C3 "Service alarm reset".

Display		Meaning
		Service message
		(the yellow "SERVICE" LED is lit at the same time)
`Rem. oper. hours`	Row 1	The set service operating hours have been reached
		Alarm messages
		(the red "ALARM" LED is lit at the same time)
`DP-Min Alarm`	Row 1	Δp-Min Alarm
`DP-Filter  #### Pa`	Row 2	#### currently measured differential pressure of filter
`DP-Min Al. #### Pa`	Row 3	#### set value Δp-Min Alarm
		The differential pressure of the filter has dropped below the set value Δp min. alarm.
`DP-Max Alarm`	Row 1	Δp-Max-Alarm
`DP-Filter  #### Pa`	Row 2	#### currently measured differential pressure of filter
`DP-Max-Al. #### Pa`	Row 3	#### set value Δp-Max Alarm
		The differential pressure of the filter has dropped below the set value Δp max. alarm.
`DP pre-alarm`	Row 1	Δp-pre-Alarm
`DP-Filter  #### Pa`	Row 2	#### currently measured differential pressure of filter
`DP-pre-Al. #### Pa`	Row 3	#### set value Δp-pre-alarm*
		The differential pressure of the filter has dropped below the set value Δp pre alarm.

Display		Meaning
`Cleaning Alarm`	Row 1	Cleaning Alarm
`Valve current`	Row 2	No valve current present or
`No pressure`	Row 2	cleaning pressure too low or
`No drop in pressure`	Row 2	no pressure drop after a cleaning pulse
`Filter  valv.no. ###`	Row 3	on the valve with the filter number ###
`Ctrl.## Valv.no. ###`	Row 4	Location: I/O module RM-V6/X / RM-V8 / RM-V16 with the control number/address ## and the control valve No. ### (valve connection faulty or valve defective).
`RM-VXX comm.alarm`	Row 1	RM-V6/X / RM-V8 / RM-V16 Communication alarm
	Row 2	Empty row
`RM-VXX No. ##`	Row 3	I/O module RM-V6/X / RM-V8 / RM-V16 with the address #
`No reply`	Row 4	sends no response
`RM-VXX alarm setting`	Row 1	RM-V6/X / RM-V8 / RM-V16 Setting alarm
`RM-VXX`	Row 2	The valve setting of the I/O modules RM-V6/X / RM-V8 / RM-V16 does not agree with the setting of the RM-310 C / RM-310 CT.
`Valve setting`	Row 3	
`incorrect`	Row 4	
`Sensor alarm #`	Row 1	Sensor Alarm #
`DP-Sens.defect or`	Row 2	Δp-Sensor # defective or
`Check P-connection`	Row 3	Δp-Connections faulty (check!)
	Row 4	
`Input Ix alarm`	Row 1	Input current monitoring
`I < #,# mA or`	Row 2	Input current Ix < #,# mA
	Row 3	x = input 1, 2 or 3
`not connected`	Row 4	#,# = 1.00 or 3.50 mA

9 Glossary

Term	Meaning
Acknowledge alarm	Clearing a stored alarm message.
Cleaning	Cleaning the filter elements with compressed air pulses
Cleaning Alarm	Alarm triggered in case of faulty cleaning.
Cleaning valve	Solenoid valve controlling the cleaning of the filter elements.
Communication alarm	Alarm which signals that the communication between the controller and a module or several modules via the bus system is faulty.
Compressed air pulse cleaning	Cleaning of the filter elements through compressed air pulses
Control parameters	The internal parameters of the RM-310 C / RM-310 CT filter control.
Differential pressure	Difference of the pressure Δp on the clean and raw gas side of the filter.
Differential pressure transmitter	Differential pressure sensor (Δp sensor) or transducer
Display language	Language in which the text messages are shown in the display.
Downtime cleaning (short: Downtime)	Cleaning of the filter elements after a shutdown of the system for a set duration or number of cycles.
Downtime cycles	The number of cleaning cycles carried out during downtime cleaning.
DP cleaning mode	Manner of functioning of differential pressure-dependent cleaning
DP hysteresis	If during cleaning the differential pressure drops below the value "DP Start minus DP Hysteresis" cleaning stops when Δp cleaning mode 2 or 3 has been selected.
DP max. alarm	Differential pressure where an alarm is triggered when exceeded.
DP min. alarm	Differential pressure where an alarm is triggered when fallen below.
DP start	If the rising filter differential pressure (Δp filter) reaches the set value "DP-Start" cleaning is started when Δp cleaning mode 2 or 3 has been selected.
DP stop	If the dropping filter differential pressure (Δp filter) reaches the value "DP Stop = DP Start minus DP Hysteresis" the running cleaning process is stopped when the Δp cleaning mode 2 or 3 has been selected.
I/O module	Module for the input and output of control signals
Interval (also interval time)	Time between two consecutive control pulses of the valve outputs during ongoing cleaning.
Operating level	Condition of the RM-310 C / RM-310 CT in which the device is operational.
Parameter block	Grouping of parameters relating to the same function.
Parameter code	Code that must be entered on the device to clear locked parameters.
Parameter selection level	State of the RM-310 C / RM-310 CT in which the operator of the device can select a parameter.
Parameter setting level	State of the RM-310 C / RM-310 CT in which the operator of the device can set a parameter.

Term	Meaning
Parameterisation mode	State of the RM-310 C / RM-310 CT in which the operator can parametrise the device (the RM-310 C / RM-310 CT is at the parameter selection or parameter setting level).
Pulse time	Duration of a control pulse of the valve outputs
R-IMC-BUS	Data bus system of RECO with special BUS protocol (RECO Inter Module Communication Protocol)
Sensor alarm	Alarm triggered when a faulty sensor signal is present.
Service alarm	Alarm triggered when the operating hours (parameter C2) set for the service interval have been reached.
Service operating hours counter	Depending on the mode set (parameter C1) the internal service operating hours counter is activated. The service alarm is triggered when the set operating hours (parameter C2) have been reached.
Solenoid valve	(also pilot valve) electromagnetically operated valve for the pneumatic selection of the diaphragm valves of the filter. The diaphragm valves, in turn, release the compressed air pulses for filter cleaning.

10 Technical specifications

Item	Data
Supply voltages	**Device version 100 V … 240 V AC:** 100 V … 240 V AC 50/60 Hz
	Device version 24 V DC: without I/O modules: 24 V … 28 V DC / 1.8 A with I/O modules RM-V 6/X[1] / RM-V 8[2] / RM-V 16[2]: 26 V … 28 V DC / 1.8 A
Connected load	**Device version 100 V … 240 V AC:** max. 60 VA
	Device version 24 V DC: max. 40 W
Fuse	**Device version 100 V … 240 V AC:** Power supply fused internally
	Device version 24 V DC: PTC fuse 1.85 A
Signal inputs, digital	8 optocoupler inputs, 24 V DC, to be served potential-free High >15 V Low < 5 V ⓘ The circuitry can either involve the internal control's 24 V DC or the external voltage of 24 V DC (see chapter 4 at ❸ "Digital inputs E1 … E8, 24 V DC")
Signal outputs, digital	4 relay outputs, potential-free max. 2 A, 250 V AC 50/60 Hz or max. 1 A, 30 V DC
Outputs for R-IMC Bus	max. number of I/O modules: 14 modules RM-V 6/X[1] / RM-V 8[2] / RM-V 16[2] Cable cross section 1.5 mm², shielded cable Cable length max. 50 m from the filter control to the last module
Measuring sensor Δp measurement[3]	Pressure range 0 … 5000 Pa (standard range) alternative 0 … 500 Pa / 0 … 1000 Pa / 0 … 2000 Pa / 0 … 10.000 Pa / 0 … 35.000 Pa piezoresistive, overpressure-proof up to 120 kPa Total error band ± 1.5% FSO Operating temperature range -25°C up to 85°C: Long-term stability < 0.5% FSO/a

[1] only types RM-310 C Plug and Play and RM-310 CT Plug and Play

[2] only types RM-310 C and RM-310 CT

[3] only types RM-310 CT and RM-310 CT Plug and Play

Item	Data
Signal inputs, analog	1 input 4-20 mA, 4-20 mA 0 ... X^4 Pa, burden 250 Ω
Electrical connections	Screw terminals
	Conductor cross sections AWG: min 24 / max 12
	Conductor cross sections without ferrule solid: min 0.2 mm² / max 2.5 mm² stranded: min 0.2 mm² / max 2.5 mm²
	Conductor cross sections flexible, with ferrule without plastic sleeve min 0.25 mm² / max 2.5 mm²
	Conductor cross sections flexible, with ferrule with plastic sleeve min 0.2 mm² / max 1 mm²
	2 conductors with same cross section solid: min 0.2 mm² / max 1 mm² stranded: min 0.2 mm² / max 1 mm²
	2 conductors with same cross section, stranded, TWIN ferrules with plastic sleeve min 0.5 mm² / max 1.5 mm²
Display	LCD 4x 20 characters
Temperature range / humidity	Operation: -20°C to +60°C Transport: -20°C to +60°C Storage: -20°C to +60°C 75% relative humidity, no condensation
Protection class	Housing IP-66 / NEMA 4 Cable gands IP-67 Δp-connection (only type RM-310 CT) IP-66
Air gaps and creepage distances EN 61010	Pollution degree 2, overvoltage category II
Dimensions / weight	Width x Height x Depth 250 x 199 x 90 mm / approx. 0.8 kg
Altitude	Max. 3000 m above sea level

[4]   depending on the set value of parameter T1
(Setting range: 0 … 500 Pa / 0 … 1000 Pa / 0 … 2000 Pa / 0 … 5000 Pa / 0 … 10.000 Pa / 0 … 35.000 Pa)

Disclaimer

The contents of this documentation have been verified for correctness and completeness. Nevertheless, errors can not be excluded so that we cannot guarantee the correctness of this information. Subject to alterations at any time.