

# Ultima RD2.1

## Magnetic filter for heating and cooling systems

Ultima RD2.1 is a highly effective magnetic filter designed to protect heating and cooling systems (mainly circulating pumps, heat exchanger, 3-way valves, etc.) against all magnetic and non-magnetic debris. Magnetic debris are captured by powerful built-in neodymium magnet 12,000 Gauss, non-magnetic debris by stainless steel filtration cartridge. All filter parts are produced from stainless steel material with upper protection level to chemicals and mechanical impurities.

| ULTIMA RD2.1 specification                         |  |
|--|--|
| Material   | Stainless steel  |
| Magnet power                                       | 12,000 Gauss   |
| Magnet material                                    | Neodymium  |
| Cartridge specification                            | stainless steel, 100 microns (µm)  |
| Maximum working temperature                        | 85°C (110°C *, 140°C *)  |
| Maximum working pressure                           | 10 (16 *) bar  |
| Maximum flow rate                                  | 796 m <sup>3</sup> /hod  |
| Connection   | Standart stock items<br>DN 50: 2" M thread<br>DN 65 – DN 150 Flange connection |
|  | Order based production<br>DN 200, DN 250, DN 300 – Flange connection           |
| Flange   | PN 10/16   |
| Operating fluid                                    | Water, water with glycol   |
| <b>Produced in line with EU standard EN 14 868</b> |  |



\* Custom made production with extended lead time



**WARNING!**

The filter includes a magnet that creates a large magnetic field. The generated magnetic field can be hazardous to electronic devices near the magnet.



## Product codes overview - filter

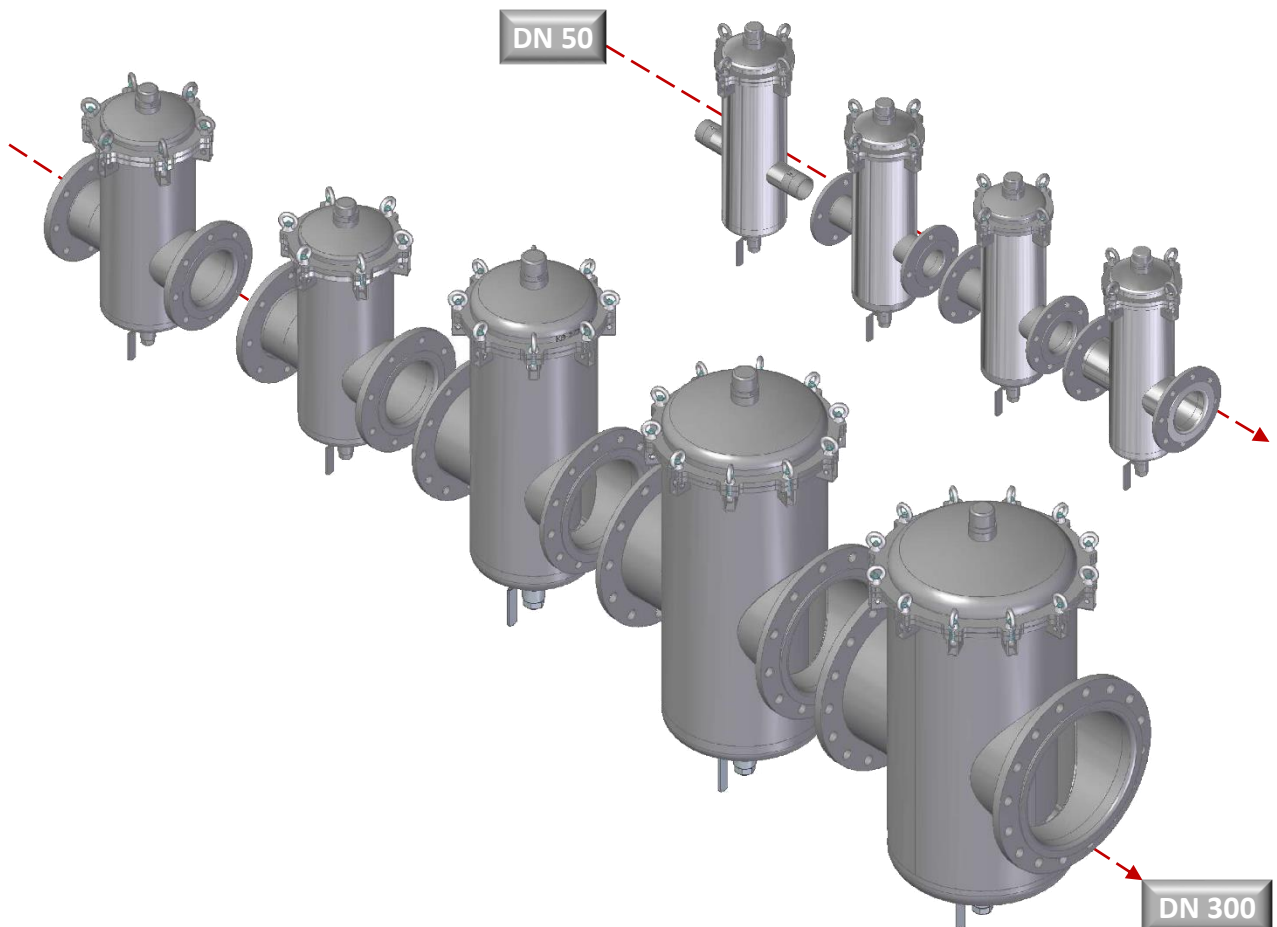
### ULTIMA RD2.1 – no manometre screw-thread

| Order code    | Filter connection specification | Maximum working temperature | Maximum working pressure | Availability           |
|---------------|---------------------------------|-----------------------------|--------------------------|------------------------|
| RD2.1-50/85   | DN 50 – outer thread            | 85 °C                       | 10 bar                   | on stock               |
| RD2.1-65/85   | DN 65 – flange                  |                             |                          |                        |
| RD2.1-80/85   | DN 80 – flange                  |                             |                          |                        |
| RD2.1-100/85  | DN 100 – flange                 |                             |                          |                        |
| RD2.1-125/85  | DN 125 – flange                 |                             |                          |                        |
| RD2.1-150/85  | DN 150 – flange                 |                             |                          |                        |
| RD2.1-200/85  | DN 200 – flange                 | 85 °C                       | 10 bar                   | order based production |
| RD2.1-250/85  | DN 250 – flange                 |                             |                          |                        |
| RD2.1-300/85  | DN 300 – flange                 |                             |                          |                        |
| RD2.1-50/110  | DN 50 – outer thread            | 110 °C                      | 10 bar                   | order based production |
| RD2.1-65/110  | DN 65 – flange                  |                             |                          |                        |
| RD2.1-80/110  | DN 80 – flange                  |                             |                          |                        |
| RD2.1-100/110 | DN 100 – flange                 |                             |                          |                        |
| RD2.1-125/110 | DN 125 – flange                 |                             |                          |                        |
| RD2.1-150/110 | DN 150 – flange                 |                             |                          |                        |
| RD2.1-200/110 | DN 200 – flange                 |                             |                          |                        |
| RD2.1-250/110 | DN 250 – flange                 |                             |                          |                        |
| RD2.1-300/110 | DN 300 – flange                 |                             |                          |                        |
| RD2.1-50/140  | DN 50 – outer thread            | 140 °C                      | 16 bar                   | order based production |
| RD2.1-65/140  | DN 65 – flange                  |                             |                          |                        |
| RD2.1-80/140  | DN 80 – flange                  |                             |                          |                        |
| RD2.1-100/140 | DN 100 – flange                 |                             |                          |                        |
| RD2.1-125/140 | DN 125 – flange                 |                             |                          |                        |
| RD2.1-150/140 | DN 150 – flange                 |                             |                          |                        |
| RD2.1-200/140 | DN 200 – flange                 |                             |                          |                        |
| RD2.1-250/140 | DN 250 – flange                 |                             |                          |                        |
| RD2.1-300/140 | DN 300 – flange                 |                             |                          |                        |



## Product codes overview - filter

| ULTIMA RD2.1 Plus – with no manometre screw-thread |                                 |                             |                          |                        |
|--|---------------------------------|-----------------------------|--------------------------|------------------------|
| Order code   | Filter connection specification | Maximum working temperature | Maximum working pressure | Availability           |
| RD2.1-50P/85                                       | DN 50 – outer thread            | 85 °C                       | 10 bar                   | order based production |
| RD2.1-65P/85                                       | DN 65 - flange                  |                             |                          |                        |
| RD2.1-80P/85                                       | DN 80 - flange                  |                             |                          |                        |
| RD2.1-100P/85                                      | DN 100 - flange                 |                             |                          |                        |
| RD2.1-125P/85                                      | DN 125 - flange                 |                             |                          |                        |
| RD2.1-150P/85                                      | DN 150 - flange                 |                             |                          |                        |
| RD2.1-200P/85                                      | DN 200 - flange                 |                             |                          |                        |
| RD2.1-250P/85                                      | DN 250 - flange                 |                             |                          |                        |
| RD2.1-300P/85                                      | DN 300 - flange                 |                             |                          |                        |



## Product codes overview - accessories and spare parts

| Manometers |  |                |
|------------|--|----------------|
| Order code | Description  | Flow direction |
| M-GL       | Standard glycerin  | -              |
| M-DIF-L    | Differential without switch contacts (mounting kit included) - for manually controlled operation | Left           |
| M-DIF-P    |  | Right          |
| M-DIF-L/SK | Differential with switch contacts (mounting kit included) – for automatic operation              | Left           |
| M-DIF-P/SK |  | Right          |

| Spare parts |            |                             |   |
|-------------|------------|-----------------------------|---|
| Order code  | DN         | Maximum working temperature | Description   |
| TES1/RD2.1  | DN 50-100  | 85 °C                       | Gasket set (1 pc - 38 x 4 mm - NBR 70 Sh, 1 pc - 158 x 7 mm - NBR 70 Sh)  |
| TES2/RD2.1  |            | 85 °C                       | Gasket set incl. Manometer tank gasket (1 pc - 38 x 4 mm - NBR 70 Sh, 1 pc - 158 x 7 mm - NBR 70 Sh, 2 pcs - 21 x 25 x 2 mm - REINZ AFM 39) |
| TES3/RD2.1  |            | 110 °C                      | Gasket set (1 pc - 38 x 4 mm - EPDM 70 Sh, 1 pc - 158 x 7 mm - EPDM 70 Sh)  |
| TES4/RD2.1  |            | 140 °C                      | Gasket set (1 pc - 38 x 4 mm - SIL 70 Sh, 1 pc - 158 x 7 mm - SIL 70 Sh)  |
| TES5/RD2.1  | DN 125-150 | 85 °C                       | Gasket set (1 pc - 38 x 4 mm - NBR 70 Sh, 1 pc - 209 x 7 mm - NBR 70 Sh)  |
| TES6/RD2.1  |            | 85 °C                       | Gasket set incl. manometer tank seal (1 pc - 38 x 4 mm - NBR 70 Sh, 1 pc - 209 x 7 mm - NBR 70 Sh, 2 pcs - 21 x 25 x 2 mm - REINZ AFM 39)   |
| TES7/RD2.1  |            | 110 °C                      | Gasket set (1 pc - 38 x 4 mm - EPDM 70 Sh, 1 pc - 209 x 7 mm - EPDM 70 Sh)  |
| TES8/RD2.1  |            | 140 °C                      | Gasket set (1 pc - 38 x 4 mm - SIL 70 Sh, 1 pc - 209 x 7 mm - SIL 70 Sh)  |
| TES9/RD2.1  | DN 200     | 85 °C                       | Gasket set (1 pc - 42 x 6 mm - NBR 70 Sh, 1 pc - 280 x 8 mm - NBR 70 Sh)  |
| TES10/RD2.1 |            | 85 °C                       | Gasket set incl. manometer tank seal (1 pc - 42 x 6 mm - NBR 70 Sh, 1 pc - 280 x 8 mm - NBR 70 Sh, 2 pcs - 21 x 25 x 2 mm - REINZ AFM 39)   |
| TES11/RD2.1 |            | 110 °C                      | Gasket set (1 pc - 42 x 6 mm - EPDM 70 Sh, 1 pc - 280 x 8 mm - EPDM 70 Sh)  |
| TES12/RD2.1 |            | 140 °C                      | Gasket set (1 pc - 42 x 6 mm - SIL 70 Sh, 1 pc - 280 x 8 mm - SIL 70 Sh)  |

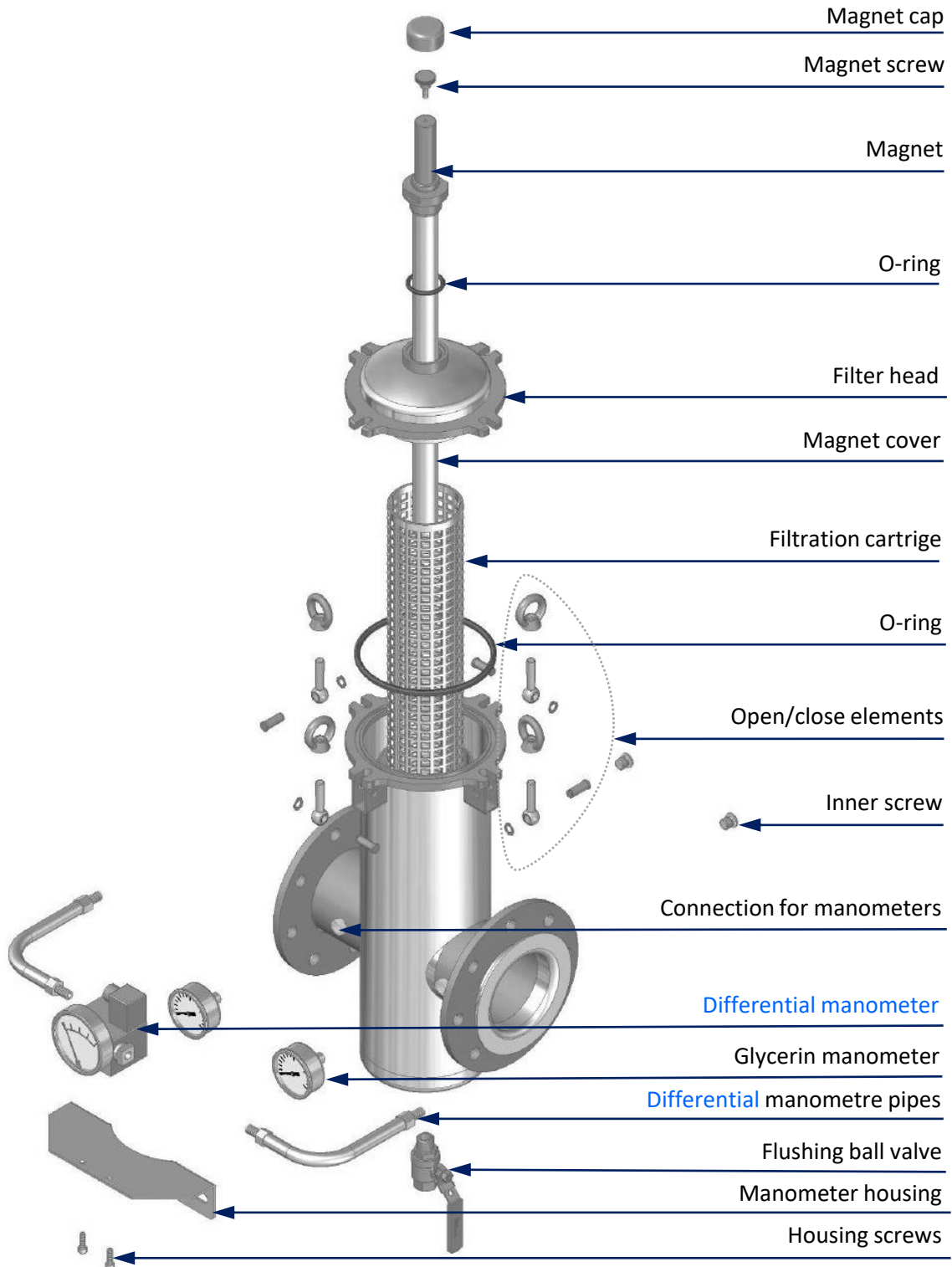


## Product codes overview - accessories and spare parts

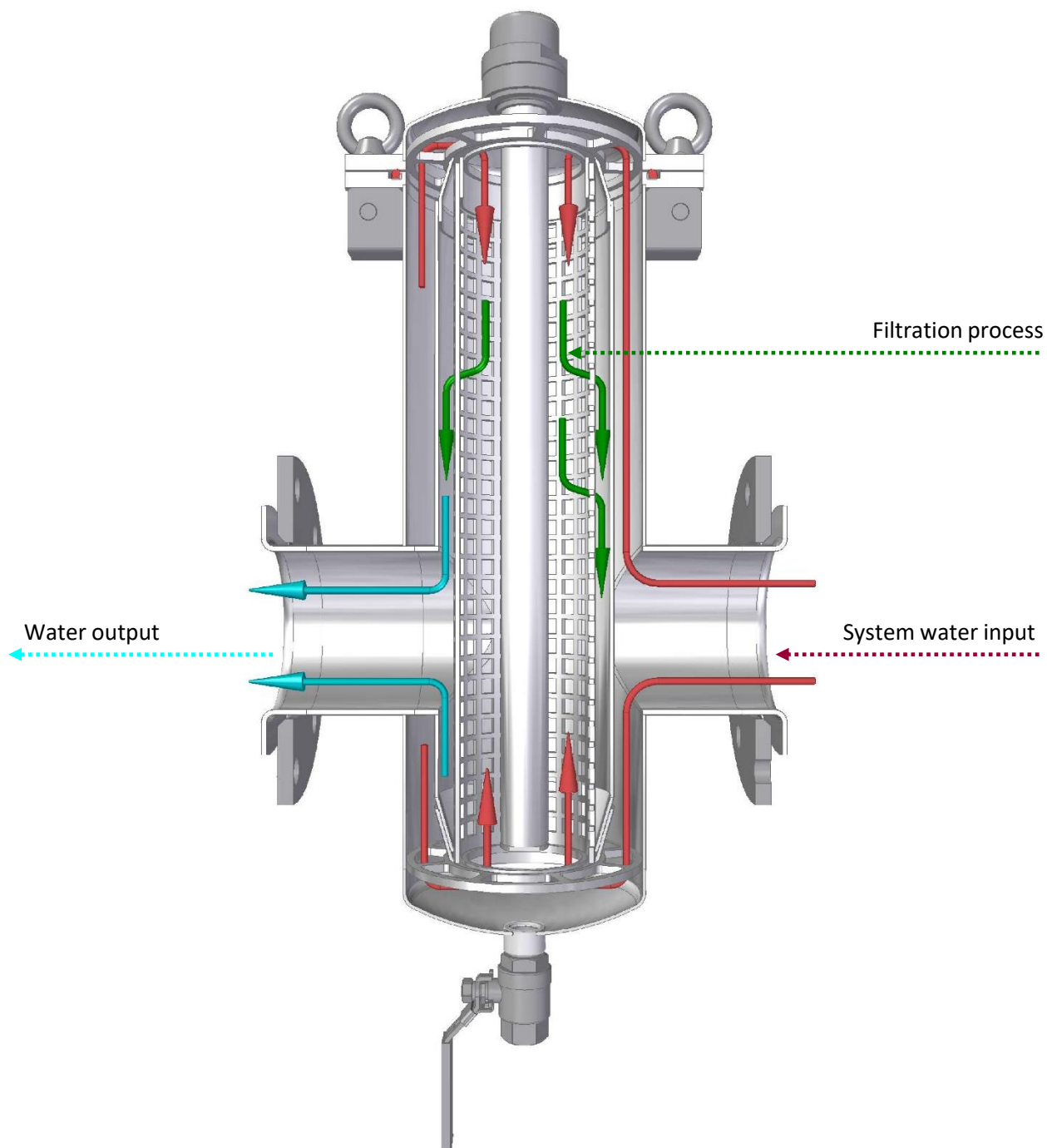
| Spare parts |            |                             |  |
|-------------|------------|-----------------------------|--|
| Order code  | DN         | Maximum working temperature | Description  |
| TES13/RD2.1 | DN 250     | 85 °C                       | <b>Gasket set</b> (1 pc - 42 x 6 mm - NBR 70 Sh, 1 pc - 360 x 8 mm - NBR 70 Sh)  |
| TES14/RD2.1 |            | 85 °C                       | <b>Gasket set</b> incl. manometer tank seal (1 pc - 42 x 6 mm - NBR 70 Sh, 1 pc - 360 x 8 mm - NBR 70 Sh, 2 pcs - 21 x 25 x 2 mm - REINZ AFM 39) |
| TES15/RD2.1 |            | 110 °C                      | <b>Gasket set</b> (1 pc - 42 x 6 mm - EPDM 70 Sh, 1 pc - 360 x 8 mm - EPDM 70 Sh)  |
| TES16/RD2.1 |            | 140 °C                      | <b>Gasket set</b> (1 pc - 42 x 6 mm - SIL 70 Sh, 1 pc - 360 x 8 mm - SIL 70 Sh)  |
| TES17/RD2.1 | DN 300     | 85 °C                       | <b>Gasket set</b> (1 pc - 42 x 6 mm - NBR 70 Sh, 1 pc - 430 x 9 mm - NBR 70 Sh)  |
| TES18/RD2.1 |            | 85 °C                       | <b>Gasket set</b> incl. manometer tank seal (1 pc - 42 x 6 mm - NBR 70 Sh, 1 pc - 430 x 9 mm - NBR 70 Sh, 2 pcs - 21 x 25 x 2 mm - REINZ AFM 39) |
| TES19/RD2.1 |            | 110 °C                      | <b>Gasket set</b> (1 pc - 42 x 6 mm - EPDM 70 Sh, 1 pc - 430 x 9 mm - EPDM 70 Sh)  |
| TES20/RD2.1 |            | 140 °C                      | <b>Gasket set</b> (1 pc - 42 x 6 mm - SIL 70 Sh, 1 pc - 430 x 9 mm - SIL 70 Sh)  |
| MAG1/RD2.1  | DN 50-150  | 85 °C                       | <b>Magnet</b> – 25 x 500 mm  |
| MAG2/RD2.1  |            | 110 °C                      |  |
| MAG3/RD2.1  |            | 140 °C                      |  |
| MAG4/RD2.1  | DN 200-300 | 85 °C                       | <b>Magnet</b> – 30 x 700 mm  |
| MAG5/RD2.1  |            | 110 °C                      |  |
| MAG6/RD2.1  |            | 140 °C                      |  |
| RD2.1/FV1   | DN 50-100  |                             | <b>Cartridge</b> – 100 microns - 110 x 450 mm  |
| RD2.1/FV2   | DN 125-150 |                             | <b>Cartridge</b> – 100 microns - 110 x 450 mm  |
| RD2.1/FV3   | DN 200     |                             | <b>Cartridge</b> – 100 microns - 150 x 600 mm  |
| RD2.1/FV4   | DN 250     |                             | <b>Cartridge</b> – 100 microns - 200 x 700 mm  |
| RD2.1/FV5   | DN 300     |                             | <b>Cartridge</b> – 100 microns - 210 x 700 mm  |
| AV/F.27     | DN 50-150  |                             | <b>Flushing ball valve</b> – ½“  |
| AV/F.28     | DN 200-300 |                             | <b>Flushing vall valve</b> – 1“  |



## ULTIMA RD2.1. - Exploded product view



## ULTIMA RD2.1. Working principle



**ULTIMA**



**ANTARKTIS**



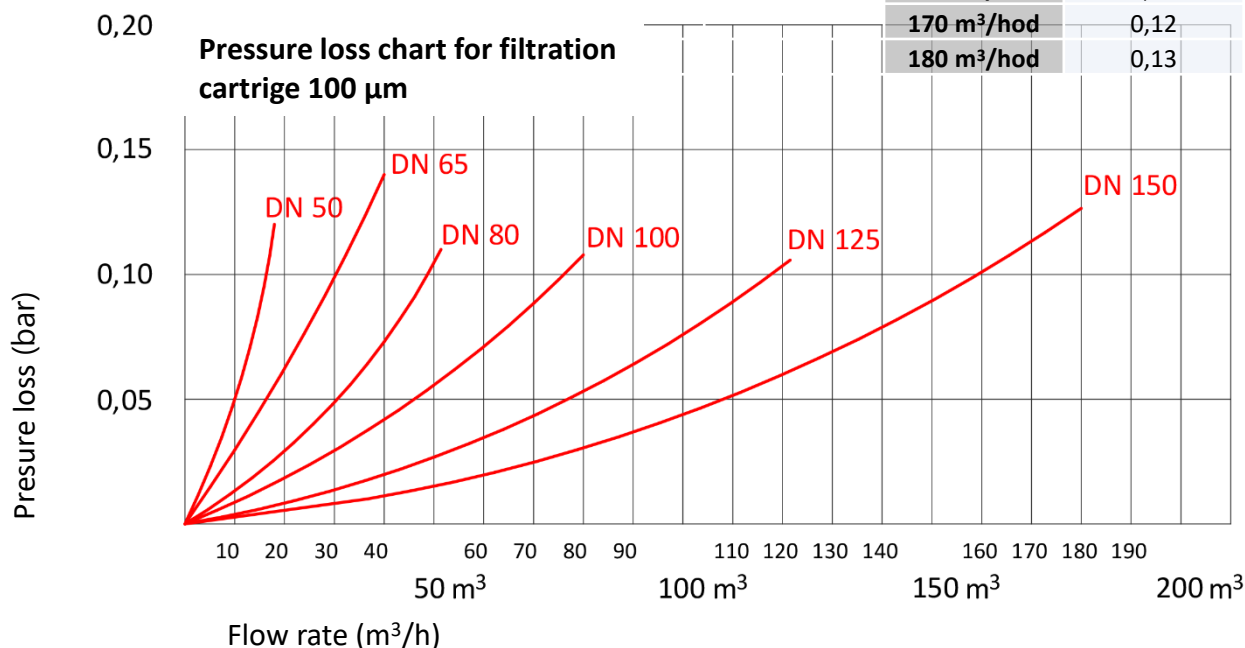
**RAINDROPS**



**NATURALIS**

## ULTIMA RD2.1 - Pressure losses data (bar) – valid for filtration cartridge 100 µm

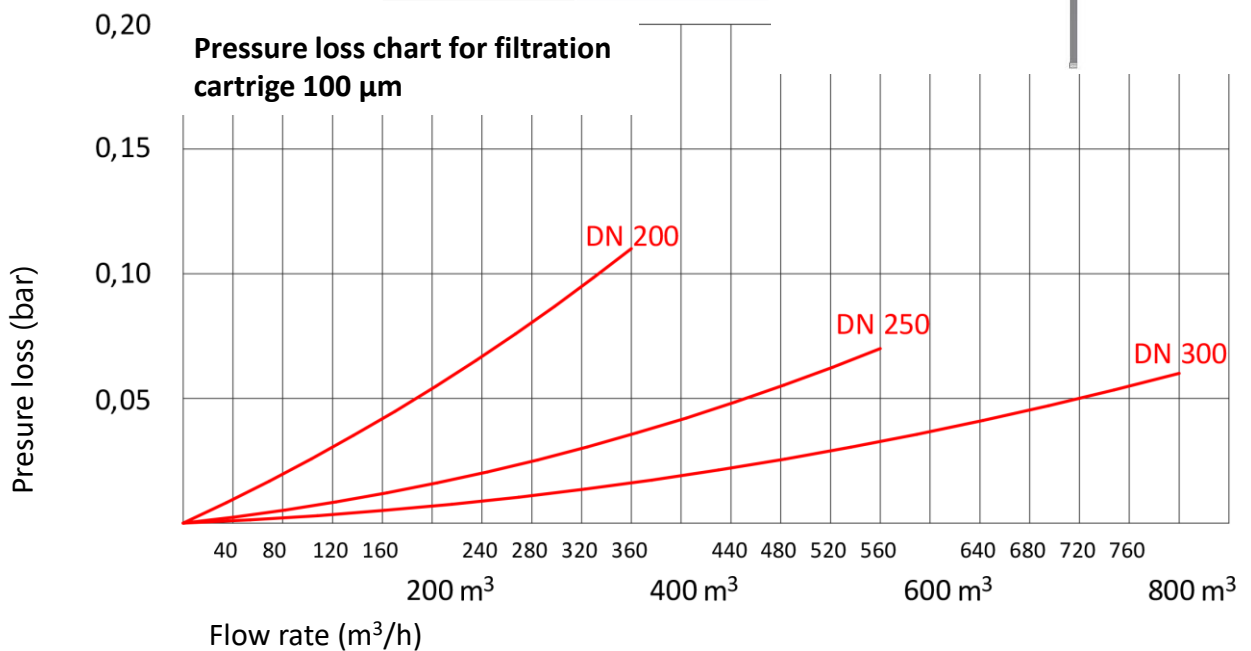
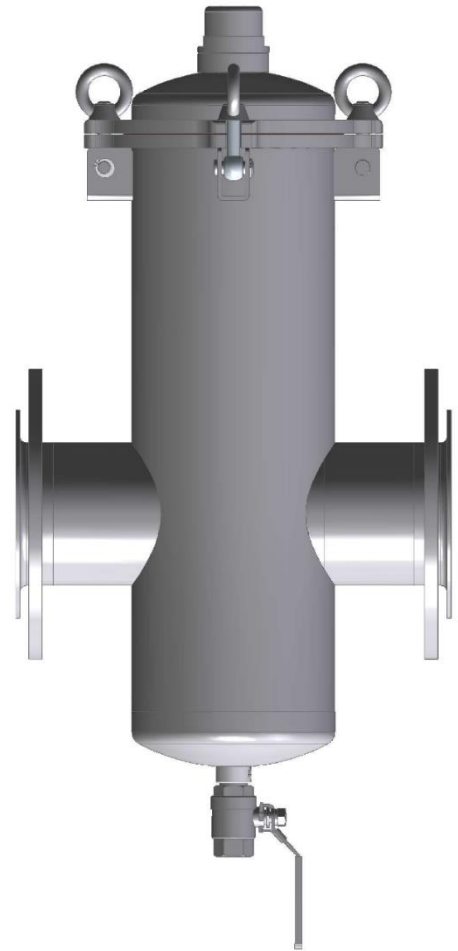
| Volume flow             | DN 50 | DN 65 | DN 80 | DN 100 | DN 125 | DN 150 |
|-------------------------|-------|-------|-------|--------|--------|--------|
| 5 m <sup>3</sup> /hod   | 0,02  | 0,01  | 0,01  | 0,01   | 0,01   | 0,01   |
| 10 m <sup>3</sup> /hod  | 0,05  | 0,02  | 0,01  | 0,01   | 0,01   | 0,01   |
| 15 m <sup>3</sup> /hod  | 0,08  | 0,03  | 0,01  | 0,01   | 0,01   | 0,01   |
| 20 m <sup>3</sup> /hod  | 0,12  | 0,05  | 0,02  | 0,01   | 0,01   | 0,01   |
| 25 m <sup>3</sup> /hod  |       | 0,07  | 0,03  | 0,01   | 0,01   | 0,01   |
| 30 m <sup>3</sup> /hod  |       | 0,10  | 0,04  | 0,02   | 0,01   | 0,01   |
| 35 m <sup>3</sup> /hod  |       | 0,13  | 0,05  | 0,02   | 0,02   | 0,01   |
| 40 m <sup>3</sup> /hod  |       | 0,14  | 0,06  | 0,04   | 0,02   | 0,01   |
| 45 m <sup>3</sup> /hod  |       |       | 0,08  | 0,05   | 0,03   | 0,01   |
| 50 m <sup>3</sup> /hod  |       |       | 0,11  | 0,06   | 0,03   | 0,01   |
| 55 m <sup>3</sup> /hod  |       |       | 0,12  | 0,07   | 0,04   | 0,02   |
| 60 m <sup>3</sup> /hod  |       |       |       | 0,08   | 0,04   | 0,02   |
| 65 m <sup>3</sup> /hod  |       |       |       | 0,09   | 0,05   | 0,02   |
| 70 m <sup>3</sup> /hod  |       |       |       | 0,10   | 0,06   | 0,02   |
| 75 m <sup>3</sup> /hod  |       |       |       | 0,11   | 0,06   | 0,03   |
| 80 m <sup>3</sup> /hod  |       |       |       | 0,12   | 0,07   | 0,03   |
| 85 m <sup>3</sup> /hod  |       |       |       |        | 0,07   | 0,04   |
| 90 m <sup>3</sup> /hod  |       |       |       |        | 0,08   | 0,04   |
| 100 m <sup>3</sup> /hod |       |       |       |        | 0,09   | 0,04   |
| 110 m <sup>3</sup> /hod |       |       |       |        | 0,10   | 0,05   |
| 120 m <sup>3</sup> /hod |       |       |       |        | 0,11   | 0,06   |
| 130 m <sup>3</sup> /hod |       |       |       |        | 0,12   | 0,07   |
| 140 m <sup>3</sup> /hod |       |       |       |        |        | 0,08   |
| 150 m <sup>3</sup> /hod |       |       |       |        |        | 0,09   |
| 160 m <sup>3</sup> /hod |       |       |       |        |        | 0,10   |
| 170 m <sup>3</sup> /hod |       |       |       |        |        | 0,12   |
| 180 m <sup>3</sup> /hod |       |       |       |        |        | 0,13   |





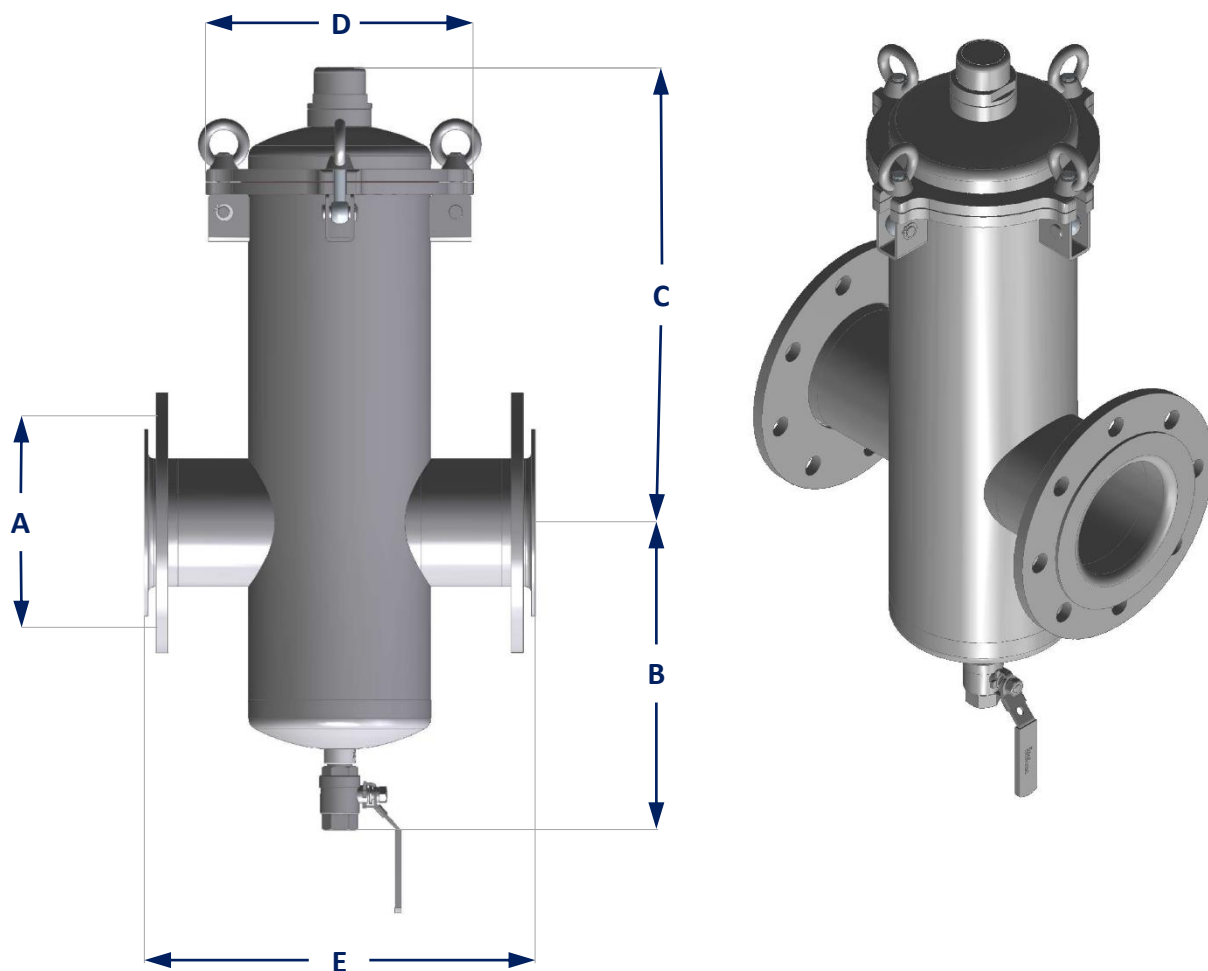
## ULTIMA RD2.1 filter pressure losses (bar)

| Volume flow             | DN 200 | DN 250 | DN 300 |
|-------------------------|--------|--------|--------|
| 40 m <sup>3</sup> /hod  | 0,01   | 0,01   | 0,01   |
| 80 m <sup>3</sup> /hod  | 0,01   | 0,01   | 0,01   |
| 120 m <sup>3</sup> /hod | 0,02   | 0,01   | 0,01   |
| 160 m <sup>3</sup> /hod | 0,03   | 0,01   | 0,01   |
| 200 m <sup>3</sup> /hod | 0,05   | 0,02   | 0,02   |
| 240 m <sup>3</sup> /hod | 0,08   | 0,02   | 0,02   |
| 280 m <sup>3</sup> /hod | 0,10   | 0,03   | 0,02   |
| 320 m <sup>3</sup> /hod | 0,11   | 0,04   | 0,02   |
| 360 m <sup>3</sup> /hod | 0,12   | 0,04   | 0,02   |
| 400 m <sup>3</sup> /hod |        | 0,02   | 0,02   |
| 440 m <sup>3</sup> /hod |        | 0,05   | 0,02   |
| 480 m <sup>3</sup> /hod |        | 0,06   | 0,03   |
| 520 m <sup>3</sup> /hod |        | 0,06   | 0,03   |
| 560 m <sup>3</sup> /hod |        | 0,07   | 0,03   |
| 600 m <sup>3</sup> /hod |        |        | 0,04   |
| 640 m <sup>3</sup> /hod |        |        | 0,04   |
| 680 m <sup>3</sup> /hod |        |        | 0,04   |
| 720 m <sup>3</sup> /hod |        |        | 0,05   |
| 760 m <sup>3</sup> /hod |        |        | 0,05   |
| 800 m <sup>3</sup> /hod |        |        | 0,06   |



## ULTIMA RD2.1 – technical data

| A             | B   | C   | D   | E   | Connection type | Flow rate (m <sup>3</sup> /hod) | Weight (kg) |
|---------------|-----|-----|-----|-----|-----------------|---------------------------------|-------------|
| <b>DN 50</b>  | 262 | 384 | 245 | 300 | thread          | 18                              | 15,6        |
| <b>DN 65</b>  | 262 | 384 | 245 | 330 | flange          | 39                              | 19,1        |
| <b>DN 80</b>  | 262 | 384 | 245 | 330 | flange          | 52                              | 19,6        |
| <b>DN 100</b> | 262 | 384 | 245 | 330 | flange          | 79                              | 20,2        |
| <b>DN 125</b> | 270 | 400 | 300 | 400 | flange          | 124                             | 31,3        |
| <b>DN 150</b> | 270 | 400 | 300 | 400 | flange          | 177                             | 33,8        |
| <b>DN 200</b> | 372 | 545 | 370 | 440 | flange          | 359                             | 53,6        |
| <b>DN 250</b> | 485 | 559 | 450 | 540 | flange          | 560                             | 87,6        |
| <b>DN 300</b> | 472 | 572 | 500 | 600 | flange          | 796                             | 115,4       |

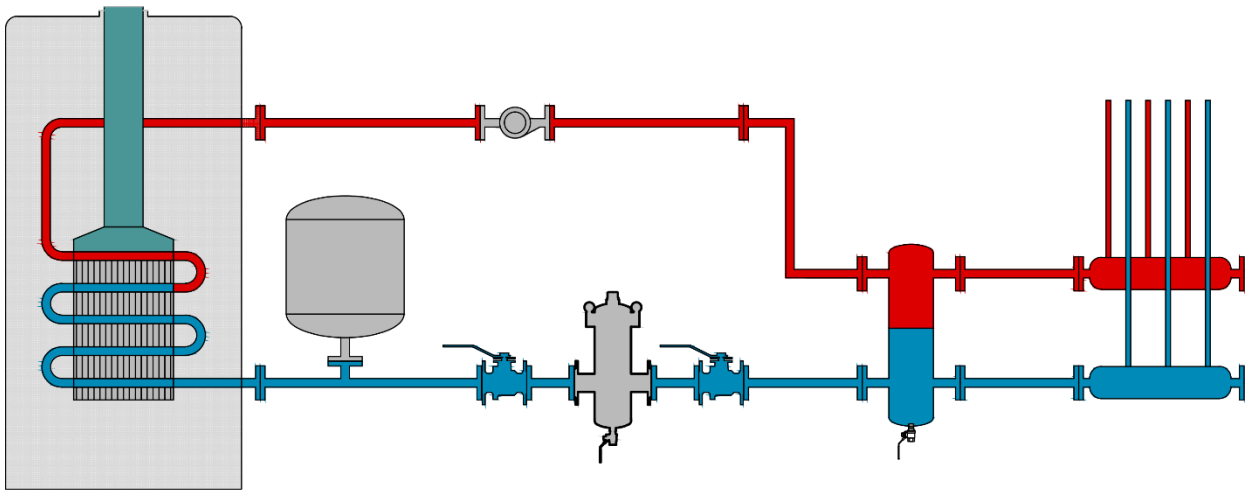


## ULTIMA RD2.1 - Installation schema

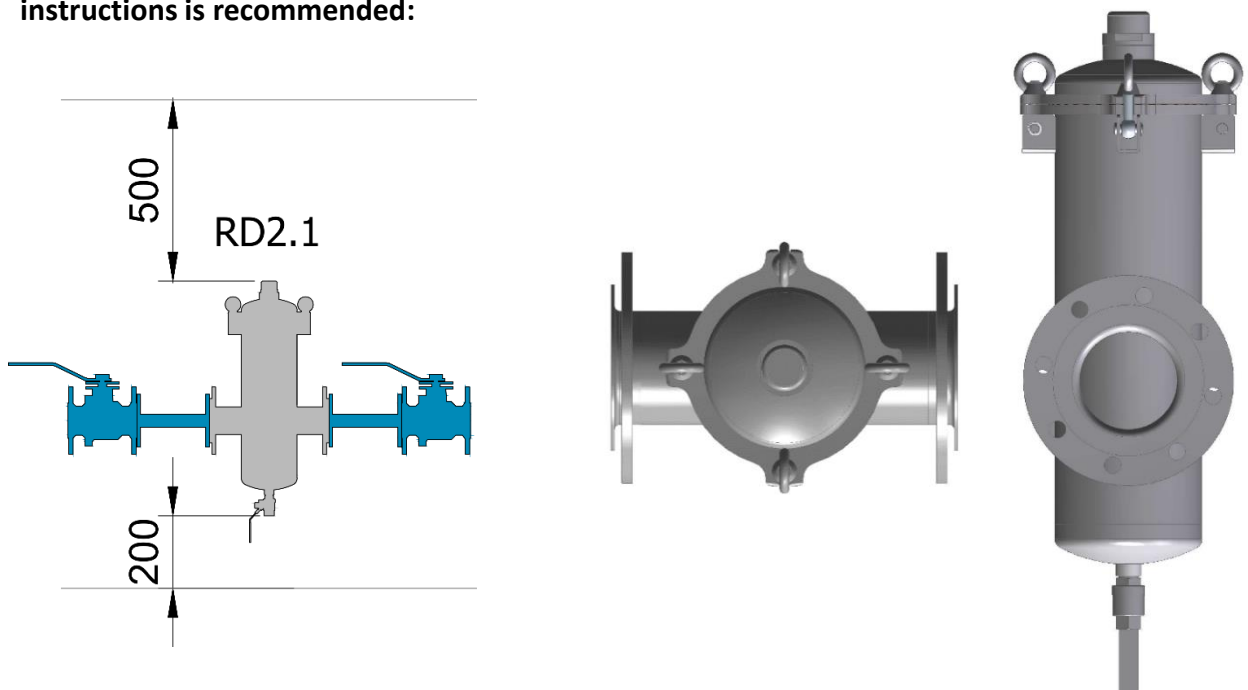
### Possible installation variants:

1. on the return pipe as close as possible to boiler/heat exchanger
2. To adequate position in to systém to protect sensitive systém components (3-way valves, circulating pumps, etc.)

Note: DWG format is available on request.

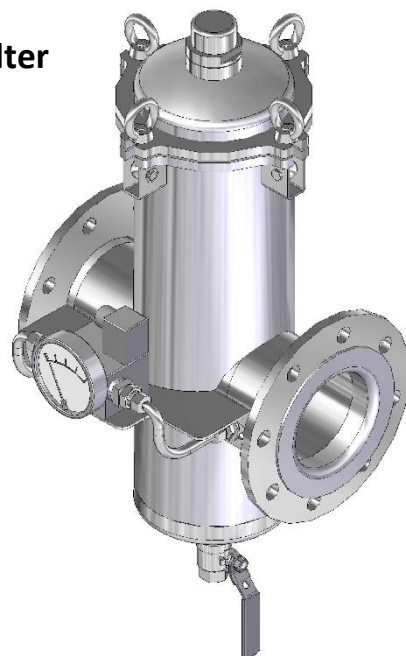


For smooth service and maintenance following to keep following instructions is recommended:



## Optional differential manometers for the RD2.1 filter

Differential manometers with a **magnetic piston** are designed to measure the pressure difference between two static pressures. Service / maintenance is required if value exceed defined limit – limit value for filter RD2.1 is 0.3 bar = 30 kPa. Differential manometres are supplied with the mounting kit.



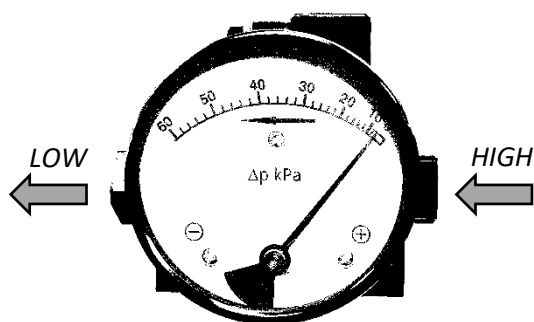
### Basic variants of differential manometers:

- Differential manometer without switching contacts – for manually controlled operation
- Differential manometer with switching contacts – for automatic operation

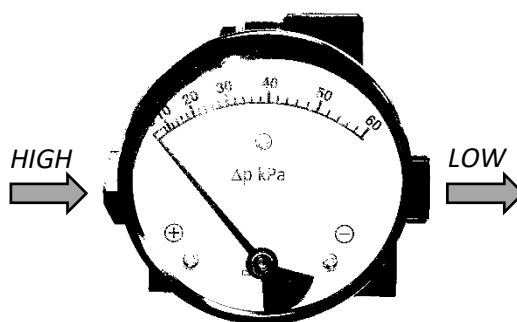
### Types of differential manometers based on inlet pressure:

Differential manometer with right side inlet

Differential manometer with left side inlet



Order code: RD2.1/DIFMA1-4/L/WO  
Order code: RD2.1/DIFMA1-4/L/W



Order code: RD2.1/DIFMA1-4/R/WO  
Order code: RD2.1/DIFMA1-4/R/W

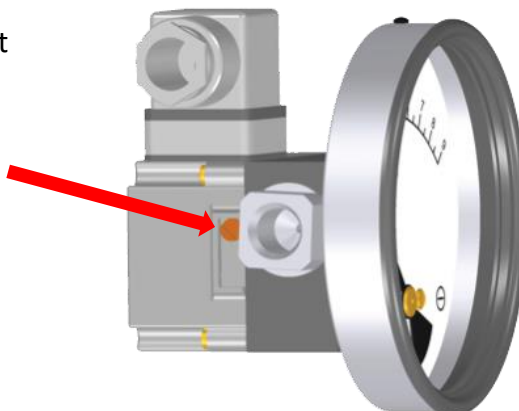
### Switch setting and adjustment

The switches are normally factory set to save time at customer's end.

In case of adjustments required:

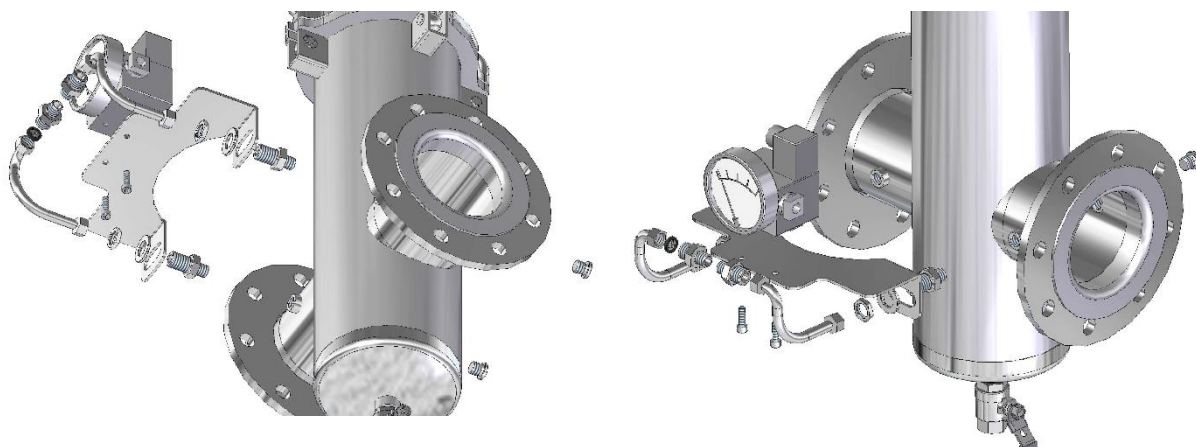
Rotate the screw anti-clockwise to increase the set point and clockwise to decrease the set point. One or two trials may be necessary to attain the exact set point.

Above procedure to be followed by putting the instrument on test bed or while in actual service



## Installation schema

Note: The schema shows the installation of the differential manometer with switching contacts. The installation of the manometer without switching contacts is identical.



## Switch connection schema

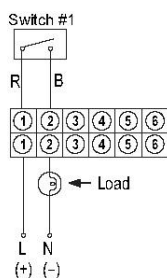
**SPST switch** – single-pole, single-throw, single break

**SPDT switch** – single-pole, double-throw, single-break

Switches are available according to the equipment of the customer. Switch specifications can be found on the pressure gauge label.

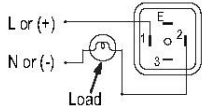
### One SPST switch

Reed switches & terminal block connection



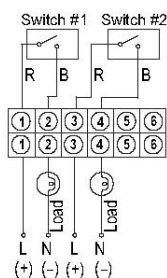
View of the power outlet for power supply connection

View of the power outlet for power supply connection



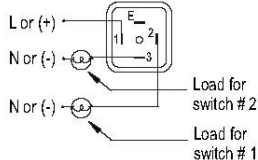
### Two SPST switches

Reed switches & terminal block connection



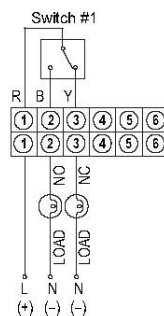
View of the power outlet for power supply connection

Reed switches & terminal block connection



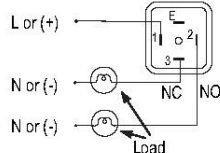
### One SPDT switch

Reed switches & terminal block connection



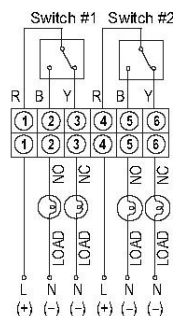
View of the power outlet for power supply connection

Reed switches & terminal block connection



### Two SPDT switches

Reed switches & terminal block connection



## ULTIMA RD2.1 - Service and maintenance

1. Recommendation: Filters need to be cleaned in case of pressure difference measured by manometre is equal or higher than 0,3.
2. Before start cleaning the filter, switch off the circulation pump.
3. To stop water flow through filter close ball valve/flap installed before/after filter.
4. Unscrew magnet cap, remove magnet from filter. Place the magnet carefully on a clean surface (no magnetic debris).
5. Unscrew open/close components between filter head and filter body.
6. Dry filter by opening flushing valve. Warning – water can be very hot !
7. Remove filter head
8. Clean magnet cover by water
9. Remove filtration cartridge from filter, clean cartridge by water
10. Clean filter body by water, if necessary
11. Check filter head seal. Replace it, if necessary
12. Place back filtration cartridge to filter.
13. Return filter head back to original position.
14. Screw close components to fix filter body and filter head.
15. Return magnet back to filter, close magnet by cap.
16. Close flushing ball valve.
17. Carefully open valve / flaps to fill filters by water.
18. Check leakage. If necessary, check and replace damaged leaking seals by new.
19. Open the inlet and outlet ball valve / flap.
20. Switch on the circulation pump.

### WARNING!



- The filter includes a strong magnet which creates a powerful magnetic field.



- The generated magnetic field can be hazardous to electronic devices around the magnet.
- Attention! Before starting service and maintenance close the inlet and outlet ball valves to stop water flow through filters. By opening flushing valve release the pressure from the filter.
- Attention! System water and filter components can be hot. Use appropriate protection equipment, follow safety instructions and local rules.



## ULTIMA RD2.1 filter operation book

|  |                            |            |                         |            |            |            |
|--|----------------------------|------------|-------------------------|------------|------------|------------|
| <b>Object:</b>                           |                            |            |                         |            |            |            |
| <b>Object address:</b>                   |                            |            |                         |            |            |            |
| <b>Installation date:</b>                |                            |            |                         |            |            |            |
| <b>RD2.1 filter type:</b>                | Size of DN connection:     |            |                         |            |            |            |
|  | Working temperature up to: | °C         | Working pressure up to: | bar        |            |            |
| <b>Recommended service frequency:</b>    | Optimally 1x per year      |            |                         |            |            |            |
| <b>Service performed by:</b>             |                            |            |                         |            |            |            |
| <b>Service operation date:</b>           |                            |            |                         |            |            |            |
| <b>Recommended service operations</b>    | <b>Y/N</b>                 | <b>Y/N</b> | <b>Y/N</b>              | <b>Y/N</b> | <b>Y/N</b> | <b>Y/N</b> |
| Clean the filter insert (cartridge)      |                            |            |                         |            |            |            |
| Replace the filter insert (cartridge)    |                            |            |                         |            |            |            |
| Check the cock drainage tightness        |                            |            |                         |            |            |            |
| Replace the drain cock seal              |                            |            |                         |            |            |            |
| Check the seal under the opening head    |                            |            |                         |            |            |            |
| Replace the seals under the opening head |                            |            |                         |            |            |            |
| Check the magnet housing seal            |                            |            |                         |            |            |            |
| Replace the magnet housing seal          |                            |            |                         |            |            |            |
| Check the thread seals for manometers    |                            |            |                         |            |            |            |
| Replace the thread seals for manometers  |                            |            |                         |            |            |            |

