

Flowmeter

COVOL



OVERVIEW

Operation

- Oscillating piston

Application

- Consumption measuring
- Dosing and mixing
- Filling of tanks and other containers
- Petrochemical industry

Features

- Universal orientation
- Bi-directional flow measurement
- High accuracy
- Easy cleaning
- Used for viscosities up to 120000 mPas (cP)
- EX-version according to ATEX directive available
- Flange connection in accordance with EN 1092-1
- Optional thread connecting

Options:

- Analog transmitter with display
- Totalizer with display
- Frequency divider
- Electrical converter with display

Installation information

- The operating instructions for COVOL must be observed!
- **Download: www.meister-flow.com**

■ OPERATING DATA

| | |
|----------------------------|---------------------------------|
| Operating pressure, | PN 10 (Plastic version) |
| max. | PN 16 (Stainless steel version) |
| Pressure drop | see diagram on page 6 |
| Media temperature | |
| PVC version | 0 °C - 45 °C |
| PP version | -10 °C - 80 °C |
| PTFE version | -20 °C - 130 °C |
| Stainless steel version | -40 °C - 150 °C |
| Viscosity | ≤ 120000 mPas (cP) |
| Measuring accuracy | ±0,8 % of measured value |
| Repeatability | ±0,3 % of measured value |

Changed operating data apply for EX-version in accordance with ATEX-Directives!

The Operating Instructions for COVOL and the applicable Declarations of Conformity must be observed.

Download: www.meister-flow.com

■ MEASURING RANGES

| Type | Flow | | Temporary | Pulse rate |
|------------------------|------|--------------|-------------|------------|
| | DN | l/h | max. l/h | Pulses/l |
| COVOL-H ⁽¹⁾ | 10 | 25 – 250 | 500 | 100 |
| COVOL | 10 | 40 – 350 | 800 | 100 |
| COVOL | 15 | 150 – 1500 | 2700 | 20 |
| COVOL | 25 | 500 – 4500 | 9000 | 10 |
| COVOL | 40 | 800 – 8500 | 15500 | 4 |
| COVOL | 50 | 1500 – 16000 | 28000 | 2 |
| COVOL | 80 | 3000 – 28000 | 50000 | 1 |
| COVOL | 100 | 5000 – 60000 | 104000 | 0,2 |

⁽¹⁾ DN 10 / 1/4", horizontal installation only

The flowmeters are calibrated with water (density 1.00 kg/dm³, viscosity 1 mPas). The pulse rate (pulse per liter) is then established and recorded on the device.

Using this value, the transmitter can then calculate the flow rate and / or volume per time interval.

The maximum measurement accuracy is achieved in the middle of the respective measuring range (refer to table on page 6).

An altered viscosity can lead to changes in the pulse rate. Changes in density, compared to the calibration medium, generally affects only the beginning of the specified measuring range. With a higher density, the signal output starts at a lower flow rate; and with lower density it begins at a higher flow rate. In both cases, the measurement range changes maximally by 5% relative to the measured reference medium value.

At viscosities of more than 1000 mPas, the measuring range may change significantly.

■ MATERIALS

see table on page 3

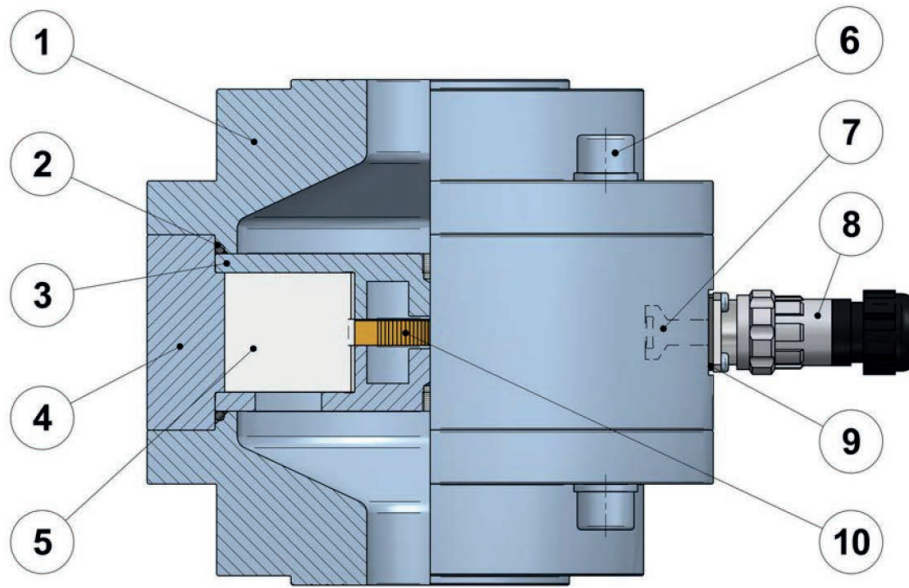
■ OPTIONS

See pages 8 to 11

| | |
|--------------------|---|
| CP 420 | Analog transmitter, 4 - 20 mA, with display and counter |
| CIP, CIP II | Battery powered counter with display |
| ADF60V | Explosion-proof housing for CP 420L, CIP or CIP II |

Further accessories on request

■ ASSEMBLY DRAWING

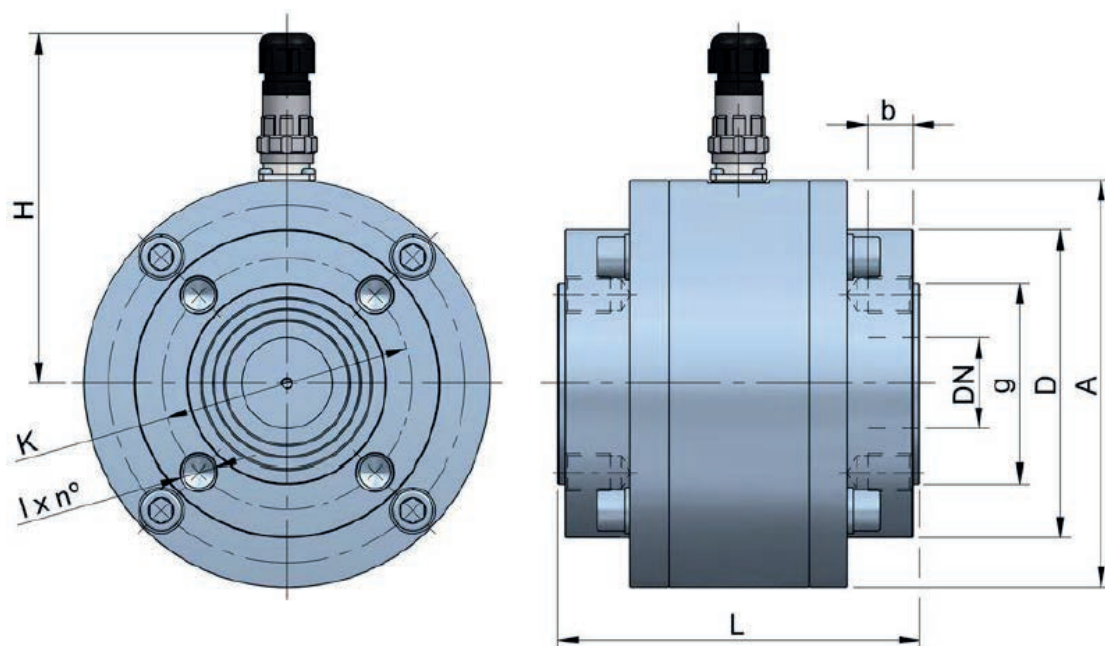


■ MATERIALS / PARTS DESCRIPTION

Version

| Item | Description | Material | |
|------|--------------------------------------|-------------------------------------|-------------------------------------|
| | | Stainless steel version | PTFE, PVC and PP version |
| 1 | Inlet / outlet chamber + connection: | EN 1.4404 (AISI 316L) | PTFE / PVC / PP |
| 2 | O-ring: | NBR / PTFE / EPDM / FKM | NBR / PTFE / EPDM / FKM |
| 3 | Guide disk: | EN 1.4404 (AISI 316L) | PTFE / PVC / PP |
| 4 | Measuring chamber: | EN 1.4404 (AISI 316L) | PTFE / PVC / PP |
| 5 | Separator: | EN 1.4404 (AISI 316L) | PTFE / PVC / PP |
| 6 | Screws: | EN 1.4401 (AISI 316) | EN 1.4401 (AISI 316) |
| 7 | Reed contact: | | |
| 8 | Connector: | Aluminum alloy + Polyamide | Aluminum alloy + Polyamide |
| 9 | Gasket: | NBR | NBR |
| 10 | Piston: | PTFE + Graphite / Bronze / Aluminum | PTFE + Graphite / Bronze / Aluminum |

TECHNICAL DRAWING



SUMMARY OF TYPES

Flange connection in accordance to EN 1092-1, Stainless steel version

| Type | Overall dimensions [mm] | | | | | | | |
|-------|-------------------------|-----|-----|-----|----------------|-----|-----|-----|
| | DN | D | g | K | (I x n°) x b | L | A | H |
| COVOL | 10 | 77 | 40 | 60 | (M12 x 4) x 15 | 90 | 100 | 110 |
| COVOL | 15 | 84 | 45 | 65 | (M12 x 4) x 15 | 110 | 110 | 115 |
| COVOL | 25 | 107 | 68 | 85 | (M12 x 4) x 15 | 120 | 140 | 135 |
| COVOL | 40 | 135 | 88 | 110 | (M16 x 4) x 20 | 150 | 180 | 155 |
| COVOL | 50 | 154 | 102 | 125 | (M16 x 4) x 20 | 180 | 200 | 165 |
| COVOL | 80 | 200 | 138 | 160 | (M16 x 8) x 20 | 200 | 250 | 190 |

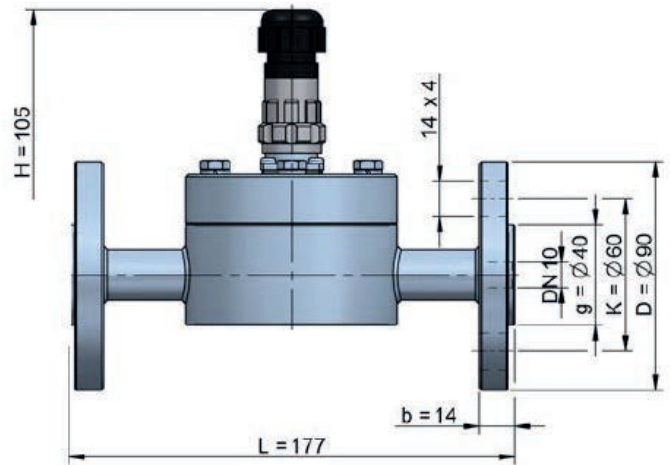
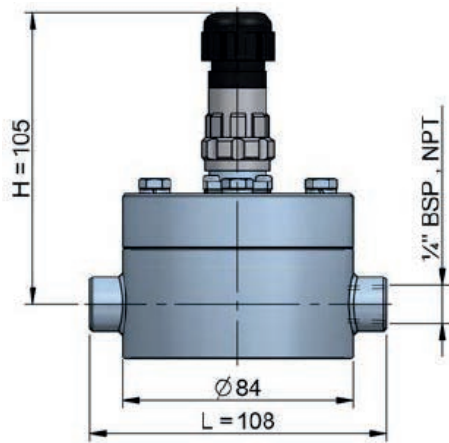
DN 100 on request (special version)

Flange connection in accordance to EN 1092-1, PTFE-, PVC- and PP version

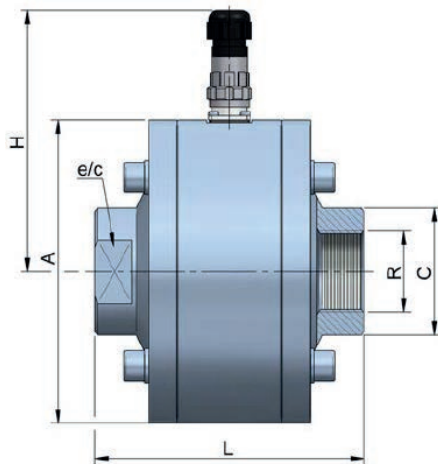
| Type | Overall dimensions [mm] | | | | | | | |
|-------|-------------------------|-----|-----|-----|----------------|-----|-----|-----|
| | DN | D | g | K | (I x n°) x b | L | A | H |
| COVOL | 10 | 90 | 40 | 60 | (M12 x 4) x 18 | 100 | 115 | 120 |
| COVOL | 15 | 95 | 45 | 65 | (M12 x 4) x 20 | 125 | 125 | 130 |
| COVOL | 25 | 115 | 68 | 85 | (M12 x 4) x 25 | 140 | 150 | 140 |
| COVOL | 40 | 145 | 88 | 110 | (M16 x 4) x 25 | 160 | 180 | 155 |
| COVOL | 50 | 160 | 102 | 125 | (M16 x 4) x 25 | 195 | 200 | 165 |
| COVOL | 80 | 200 | 138 | 160 | (M16 x 8) x 25 | 235 | 250 | 190 |

TECHNICAL DRAWING

Type COVOL-H / DN 10 / 1/4", Flange- or threaded connection, horizontal installation



THREAD CONNECTION BSP / NPT



| Type | Overall dimensions [mm] | | | | | | |
|-------|-------------------------|------------------|-----|-----|-----|-----|-----|
| | DN | R ⁽²⁾ | C | e/c | L | A | H |
| COVOL | 10 | 1/4" | 36 | 32 | 90 | 100 | 110 |
| COVOL | 15 | 1/2" | 42 | 36 | 110 | 110 | 115 |
| COVOL | 25 | 1" | 60 | 55 | 120 | 140 | 135 |
| COVOL | 40 | 1 1/2" | 75 | 65 | 150 | 180 | 155 |
| COVOL | 50 | 2" | 90 | 80 | 180 | 200 | 165 |
| COVOL | 80 | 3" | 125 | 115 | 200 | 250 | 190 |

⁽²⁾ Other sizes on request

Hygienic process connections on request!

DIAGRAMS

Diagram 1: Pressure drop for water is dependant on the flow

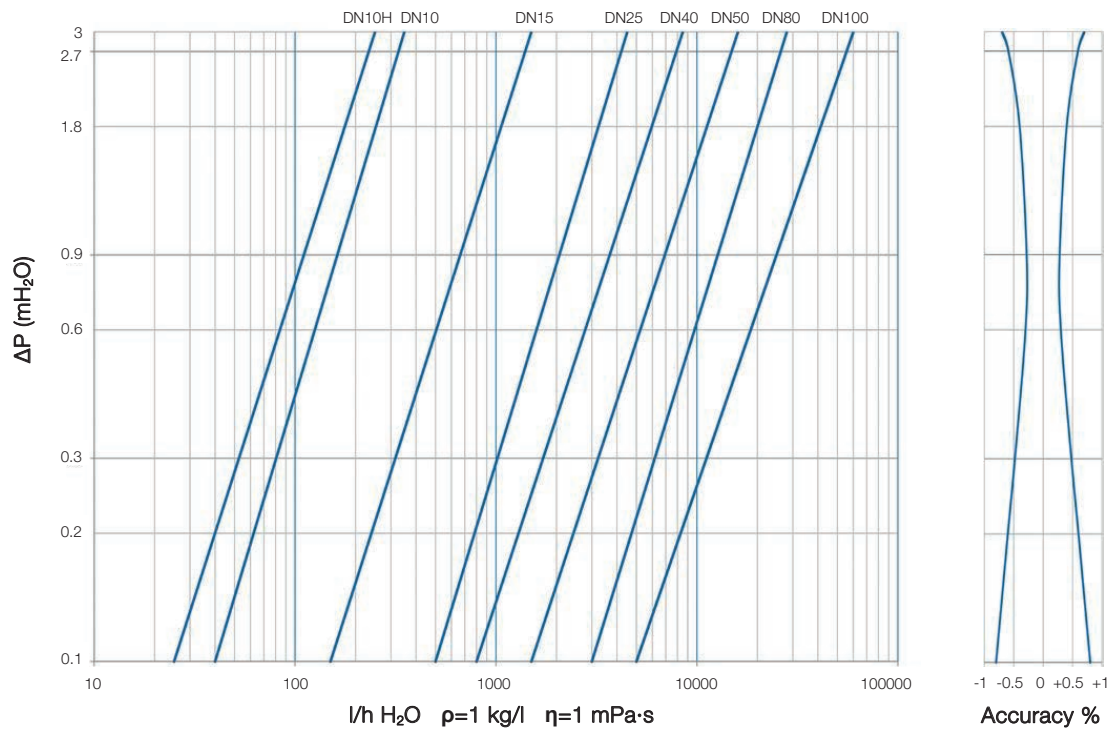
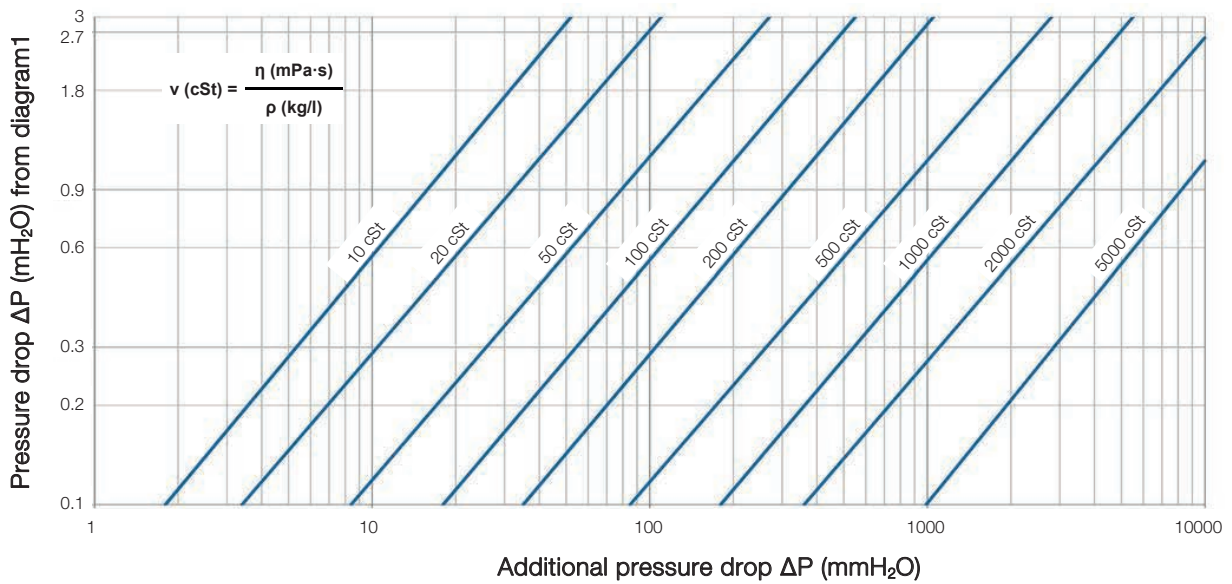
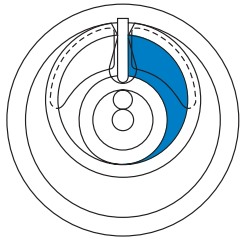


Diagram 2: Additional pressure drop (mmH₂O) is dependent on the kinematic viscosity (cSt)

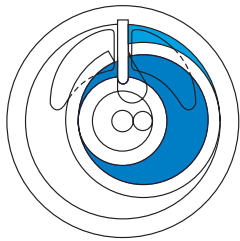


FUNCTIONAL PRINCIPLE



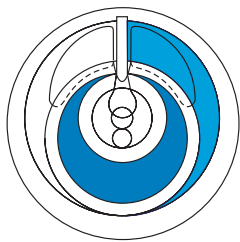
Position 1

The liquid flows into the inside of the ring piston and starts the rotation.



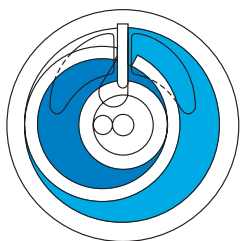
Position 2

The liquid starts to fill the cavity between metering chamber and the outside of the piston and continues to fill the inside of the piston.



Position 3

The piston is completely filled. The liquid continues to fill the outside cavity and keeps the piston in motion.



Position 4

During further filling of the cavity, the inside of the piston will be discharged through the outlet. A new cycle begins as the liquid flows into the inside of the ring piston.

■ OPTIONS, ELECTRONIC

■ CP420

Analog transmitter with display and counter

2-wire system (loop powered)

3 housing versions

Housing versions

| | |
|----------------------------|---|
| CP420L | Compact design aluminum base with UV-resistant polycarbonate cover IP 65 |
| CP420R | Separate version for installation on DIN rail IP 30 |
| CP420P | Separate version for panel mounting, front IP 50, rear IP 30 |
| Power supply | 8...36 V DC |
| Power consumption | ≤ 20 mA |
| Output | 4 - 20 mA |
| Totalizer (volume) | 7 digit display, height 8 mm, reset via keyboard, several measuring units selectable |
| Flow rate display | 5 digit, height 5 mm, programmable measuring range limits several measuring units selectable |
| Pulse rate | programmable correction factor (pulses per liter) |
| Ambient temperature | 0 °C - 60 °C |

CP420L



CP420R



CP420P



CIP, CIP II

Battery powered totalizer with display

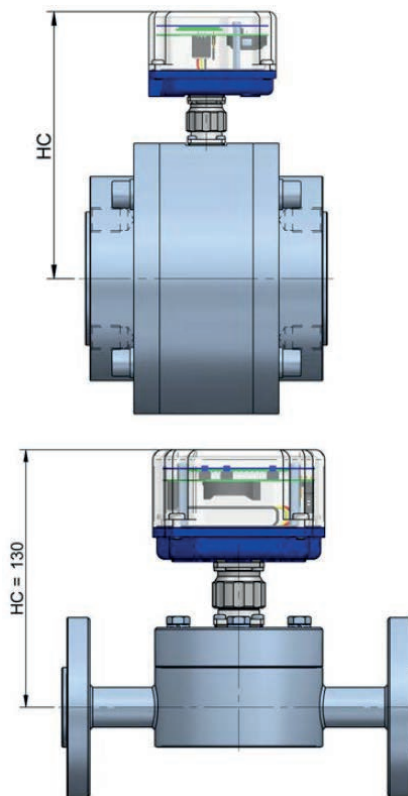
| | |
|-----------------------------------|--|
| CIP | Resettable totalizer (total volume) |
| CIP II | Non-resettable totalizer (total volume) + resettable partial volume totalizer |
| Housing | Aluminum base with UV-resistant polycarbonate cover IP 65 Compact design |
| Power supply | 3 V DC |
| Battery | CR-2450, 3 V, 560 mAh Button cell battery 24,5 x 5,0 mm |
| Power consumption | 8 µA |
| Battery life | approx. 5 years |
| Totalizer (total volume) | 7 digit display, height 8 mm, reset (not with CIP II) via push-button or external magnet |
| Totalizer (partial volume) | only with CIP II, 5 digit, height 5 mm reset via push-button or external magnet |
| Pulse rate | programmable correction factor (pulses per liter) |
| Ambient temperature | 0 °C - 60 °C |

CIP II with COVOL



TECHNICAL DRAWING

COVOL + CIP / CIP II / CP420L



| Type | Overall dimensions [mm] | | |
|---------|-------------------------|-------------------|-------------------|
| | DN | HC ⁽³⁾ | HC ⁽⁴⁾ |
| COVOL-H | 10 | 130 | 130 |
| COVOL | 10 | 135 | 145 |
| COVOL | 15 | 140 | 155 |
| COVOL | 25 | 160 | 165 |
| COVOL | 40 | 180 | 180 |
| COVOL | 50 | 190 | 190 |
| COVOL | 80 | 215 | 215 |

⁽³⁾ Devices in Stainless steel version

⁽⁴⁾ Devices in PTFE-, PVC- and PP-version

■ ATEX VERSION

The COVOL flowmeter is suitable for installation in hazardous areas according to ATEX Directive, i.e. in areas where an explosive atmosphere can be created. There are two types of protection available:

Exi (intrinsic safe)
Exd (pressure proof encapsulation)

Ignition protection type Exia

The Reed contact is considered as "simple equipment" under EN 60079-11, Section 5.7, since it contains no separate ignition source.

Technical data for the Reed-contact:

- Vmax.: 30 V ; Imax.: 20 mA
- Max. Contact rating: 0.6 VA
- Max. ambient temperature: 40 °C

According to this data, the flowmeter can be installed in hazardous areas if a suitable Zener barrier is installed between the hazardous and safe area. The electronic converters must always be installed in the safe area.

Ignition protection type Exd

These devices comply with Directive 94/9 / EC (Equipment and protective systems intended for use in potentially explosive atmospheres), as indicated in the certificate LOM 14ATEX and in the associated identification marking and labeling.

The device belongs to Group II and is therefore intended for use in areas where the risk of formation of an explosive atmosphere exists, except in mining.

As device in category 2GD, it can be employed in areas where it can be expected that an explosive atmosphere of gases, vapors, mists or air / dust mixtures may occasionally occur.

- Type ADF60V: Housing with sight glass, employment with CIP, CIP II and CP420L

Technical data for Exd version:

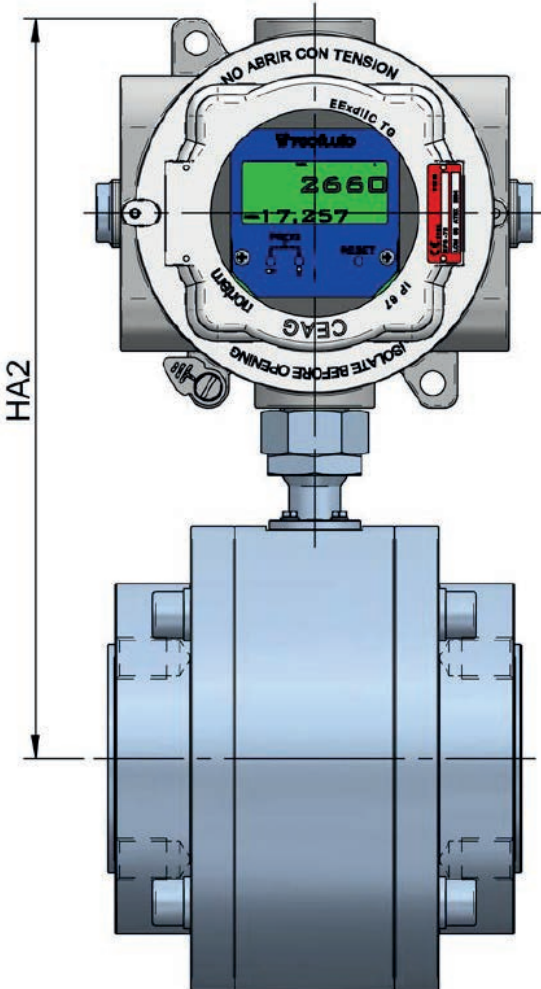
- Ambient temperature: -20 °C - 60 °C
- Electrical wiring inside the Exd housing
- On request ATEX cable glands for standard cable and shielded cable
- Associated electronics for the series:
 - CIP / CIP II: Battery-operated volumetric meter
 - CP420: Transmitter 2-wire system, with flow display, totalizer and 4 - 20 mA output
- ATEX Certificate Ex d IIC T6 Gb / Ex tb IIIC T85°C Db

Exd-housing ADF60V with CIP II



TECHNICAL DRAWING

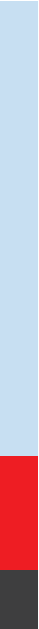
Exd-housing, Type ADF60V



| Type | Overall dimensions [mm] | |
|-------|-------------------------|-------------------------|
| | DN | HA-2 Stainless steel |
| COVOL | 15 | 250 |
| COVOL | 25 | 270 |
| COVOL | 40 | 290 |
| COVOL | 60 | 300 |
| COVOL | 80 | 325 |

Exd-housing not available for DN 10

DN 100 on request



MASTERPIECES MADE IN GERMANY

COVOL 12 0001 12-15 E M

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