

D184S072U02 Rev. 01 / 07.2009



Fig. 1

The COPA-XL is an electromagnetic flowmeter. The flow of liquids whose electrical conductivity is at least $20 \mu\text{S}/\text{cm}$ can be measured with the COPA-XL. The converter is mounted directly on the flowmeter primary. Together they comprise a single, compact entity.

The features which distinguish the COPA-XL are:

- Very small dimensions.
 - Light weight.
 - Quick installation and removal.
 - Supply power and signal outputs are connected using plugs.
 - Meter sizes DN10 - 300 / 3/8" - 12"
 - Process connections: Flanges per DIN, EN and ASME.
- Upgradeable
 - Display for reading the flowrate and flow totals.
 - Straight forward, clear text operator controlled configuration.
 - Shipped ready for operation.

Overview, Design Versions



| | |
|-----------------------------------|---|
| Accuracy | 0.5 % of rate |
| Model Number | DL43F |
| Flowmeter Primary | |
| Meter sizes | DN 10 to DN 300 [3/8" to 12"] |
| Process connections | Flanges per DIN, EN and ASME |
| Liners | PTFE or Hard Rubber |
| Conductivity | Min. 20 μ S/cm |
| Electrodes | Hast. C or SS 1.4571[316Ti] |
| Protection Class | IP 65 |
| Max. allow. fluid temperatures | 80 °C for DN 10 – DN 250 [3/8" – 10"]; 60 °C for DN 300 [12"] |
| Converter | |
| Supply power | 24 V AC/DC |
| Current output | 0/4 - 20 mA |
| Signal output passive optocoupler | Function: pulse or contact output |

Operating Principle and System Design

Operating Principle

The operation of the electromagnetic flowmeter is based on Faraday's Laws of Induction. A voltage is generated in a conductor as it moves through a magnetic field.

This principle is applied in this flowmeter to a conductive fluid as it moves through a magnetic field generated perpendicular to the flow direction. The voltage induced in the fluid is measured at two electrodes installed opposite to each other. The signal voltage U_E is proportional to the magnetic induction B , the electrode spacing D and the average flow velocity v . Recognizing that the magnetic induction B and the electrode spacing D are constant values indicates that the signal voltage U_E is directly proportional to the average flow velocity v . The equation for calculating the volume flowrate shows that the signal voltage U_E is linearly proportional to the volume flowrate q_v .

The induced signal voltage is processed in the converter into scaled, analog and digital signals.

Input

Any flowrate within the following flow ranges, listed by flowmeter size, can be selected.

| Meter Size | | Std. Pres. Rating | Min. Flow Range | Max. Flow Range |
|------------|-------|-------------------|----------------------------|-----------------------------|
| DN | Inch | PN | Flow Velocity | Flow Velocity |
| | | 0 to 0.5 m/s | | 0 to 10 m/s |
| 10 | 3/8 | 40 | 0 to 2.25 l/min | 0 to 45 l/min |
| 15 | 1/2 | 40 | 0 to 5.0 l/min | 0 to 100 l/min |
| 20 | 3/4 | 40 | 0 to 7.5 l/min | 0 to 150 l/min |
| 25 | 1 | 40 | 0 to 10 l/min | 0 to 200 l/min |
| 32 | 1-1/4 | 40 | 0 to 20 l/min | 0 to 400 l/min |
| 40 | 1-3/8 | 40 | 0 to 30 l/min | 0 to 600 l/min |
| 50 | 2 | 40 | 0 to 3 m ³ /h | 0 to 60 m ³ /h |
| 65 | 2-3/8 | 40 | 0 to 6 m ³ /h | 0 to 120 m ³ /h |
| 80 | 3 | 40 | 0 to 9 m ³ /h | 0 to 180 m ³ /h |
| 100 | 4 | 16 | 0 to 12 m ³ /h | 0 to 240 m ³ /h |
| 125 | 5 | 16 | 0 to 21 m ³ /h | 0 to 420 m ³ /h |
| 150 | 6 | 16 | 0 to 30 m ³ /h | 0 to 600 m ³ /h |
| 200 | 8 | 10/16 | 0 to 54 m ³ /h | 0 to 1080 m ³ /h |
| 250 | 10 | 10/16 | 0 to 90 m ³ /h | 0 to 1800 m ³ /h |
| 300 | 12 | 10/16 | 0 to 120 m ³ /h | 0 to 2400 m ³ /h |

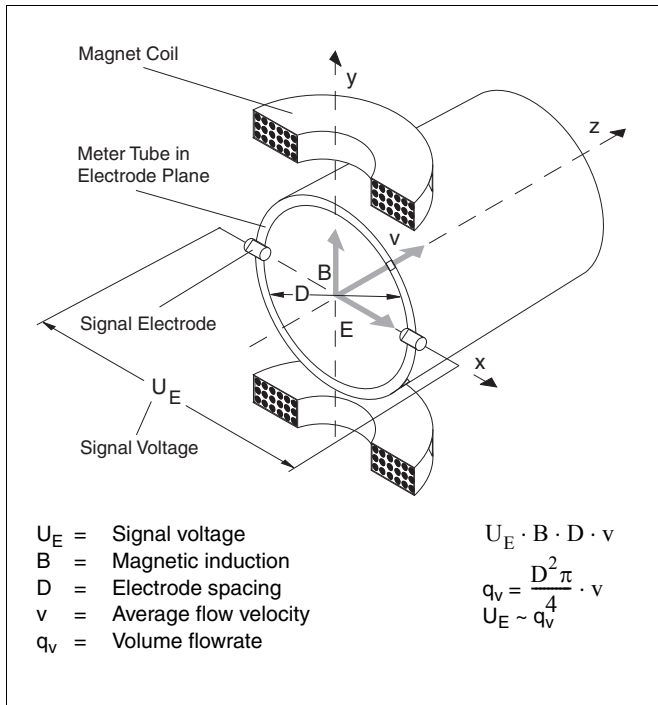


Fig. 2 Electromagnetic Flowmeter Schematic

System Design

The converter in the COPA-XL is mounted directly on the flowmeter primary.

Flowrate Nomograph

Flowrate Nomograph

The volume flowrate is a function of both the flow velocity and the flowmeter size. The Flowrate Nomograph indicates the flow range applicable to each flowmeter size as well as the flowmeter sizes suitable for a specific flowrate.

Example:

Flowrate = 7 m³/h (maximum value = flow range end value). Suitable are flowmeter sizes DN 20 to DN 65 [1" to 2-1/2"] for a flow velocity from 0.5 to 10 m/s.

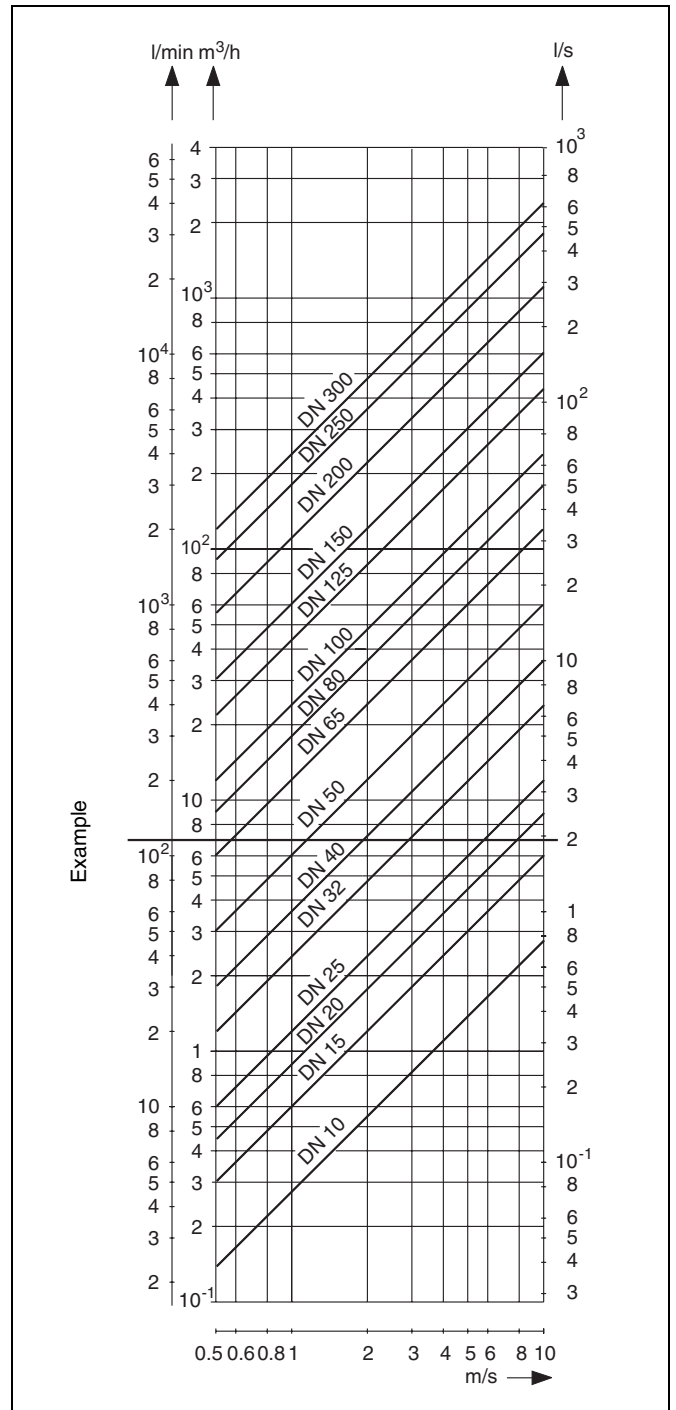


Fig. 3 Flowrate Nomograph

Specifications: Outputs, Characteristic Values and Installation Requirements

Outputs

Optocoupler as

a) Pulse Output, passive

(Optocoupler specifications):
 $16\text{ V} \leq U_{CEH} \leq 30\text{ V}$; $0\text{ V} \leq U_{CEL} \leq 2\text{ V}$;
 $0\text{ mA} \leq I_{CEH} \leq 0.2\text{ mA}$; $2\text{ mA} \leq I_{CEL} \leq 220\text{ mA}$
 $f_{max} = 20\text{ pulses/sec.}$;
 Pulse width min. 20 ms; max. 2550 ms

or

b) Contact Output, passive

The function of the output can be assigned as fwd/rev flow signal, min./max. contact, system alarm
 Optocoupler specifications: see Pulse Output

Either of the optocoupler output functions, "Pulse Output" or "Contact Output", can be defined at the site.

Current Output

Selectable 0/4 to 20 mA; load $\leq 600\text{ Ohm}$

Failure Mode Alarm

The contact output (optocoupler) can be configured as a system alarm.

Optocoupler specifications: see Pulse Output

Load

Max. load for the current output: $\leq 600\text{ Ohm}$

Low Flow Cutoff

The low flow cutoff value is selectable.
 Factory default setting: 1%

Characteristic Values

Accuracy at Reference Conditions

(Pulse Output)

Installation Requirements

The flowmeter should not be installed in close proximity to strong electromagnetic fields. The orientation is arbitrary! However it is essential that the flowmeter be completely filled with fluid at all times. Partially full conditions will result in erroneous measurements.

Valves or other shut off devices should be installed downstream from the flowmeter. A slight slope of approx. 3 % in the pipeline is helpful in removing gas accumulations from the measurement section. The imaginary line connection the two electrodes should be horizontal when the flowmeter is installed in a horizontal pipeline to prevent air or gas bubbles from interfering with the signal voltage measured at the electrodes.

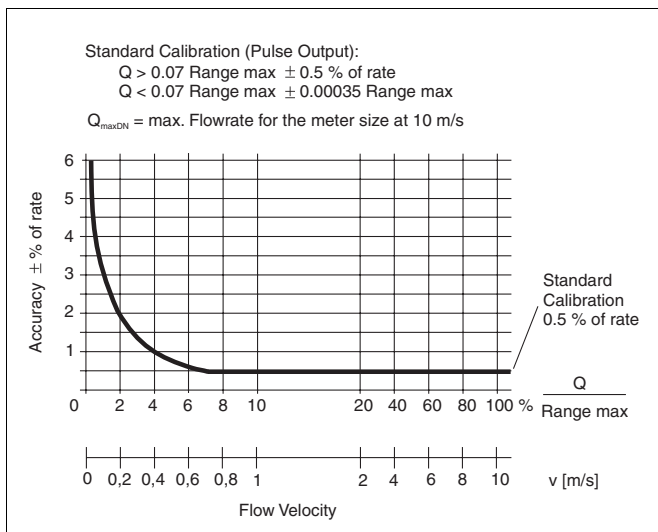


Fig. 4 Accuracies of the Measurement System

Reproducibility

$\leq 0.2\%$ of rate

Response Time

For a step change 0-99 % (corresp. 5τ) $\geq 5\text{ s}$
 Excitation frequency : 6 1/4 Hz

Specifications

In- and Outlet Conditioning Sections

A straight section with a length of 3 x D should be installed upstream of the flowmeter and a straight section 2 x D long downstream.

Pressure Drop

There are no parts which protrude into the flow stream in the COPA-XL. The pressure drop is negligible.

Ambient Conditions

Ambient Temperature

-25 °C to 50 °C

Protection Class

IP 65 (per EN 60529)

Electromagnetic Compatibility

The flowmeter complies with the NAMUR-Recommendations NE21. Electromagnetic Compatibility for Equipment in Process and Laboratory Systems 5/93 and EMC Guideline 89/336/EWG (EN50081-1, EN 50082-2).

Warning:

When the housing cover is removed the EMC-Protection is reduced.

Process Conditions

Process Temperature

Allowable fluid temperatures
 DN 10-250 [3/8"-12"] with hard rubber or PTFE liners:
 -25 °C to +80 °C
 DN 300 [12"] with hard rubber liners.: -25 °C to +60 °C

Conductivity

Min. 20 µS/cm

Air Inclusions

The flowmeter must always be completely filled with fluid. A partial filling results in additional errors as do air bubbles carried along with the fluid.

Min. and Max. Allowable Pressure as a Function of the Fluid Temperature

| Liner | Meter Size | | P _{Operate} bar | P _{Operate} at T _{Operate} | |
|-----------------------------|------------|--------|-----------------------------|--|---------|
| | DN | Inch | | mbar | abs. °C |
| Hard rubber KTW approved | 100-250 | 4-10 | 40 | 0 | < 80 |
| | 300 | 12 | 25 | 0 | < 60 |
| PTFE | 10-250 | 3/8-10 | 40 | 270 | < 20 |
| | | | 25 | 500 | < 80 |

Temperature Diagram, Flanged Design

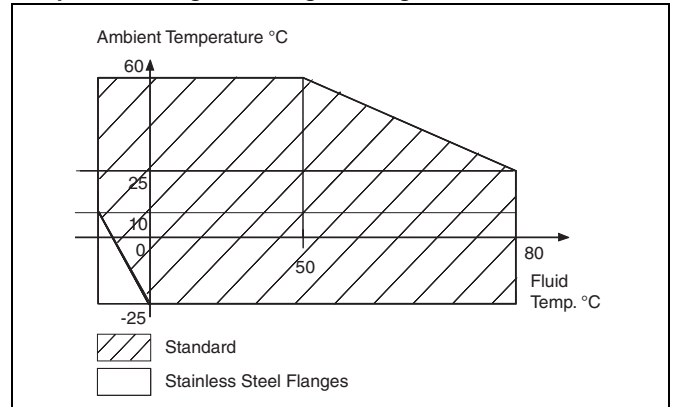


Fig. 5 Fluid Temperatures as a Function of the Ambient Temperature COPA-XL

Materials: Fluid Wetted Parts

| Part | Standard |
|------------------------------------|-----------------------|
| Liner | PTFE, Hard Rubber |
| Signal Electrode for - Hard rubber | SS No.: 1.4571[316Ti] |
| Signal Electrode for - PTFE | Hast.-C4 |

Non-Fluid Wetted Parts

| Part | Standard |
|---|--|
| Housing DN 10 - DN 300 [3/8" - 12:] | Two piece housing Alum. casting, painted, Paint coat: 60 µm thick RAL 9002 |
| Flanges DN 10 - DN 15 [3/8" - 3/8"] DN 20 - DN 300 [3/4" - 12"] | SS No.: 1.4571[316Ti] Steel (Zinc plated) |
| Converter housing | Alum alloy, painted, Paint coat: 60 µm thick Frame: dark gray, RAL 7012 Cover: light gray, RAL 9002 |
| Meter tube | SS No.: 1.4301 [304] |

Pipeline Vibration

Maximum allowable: 15 m/s² (10 - 150 Hz)

Designs

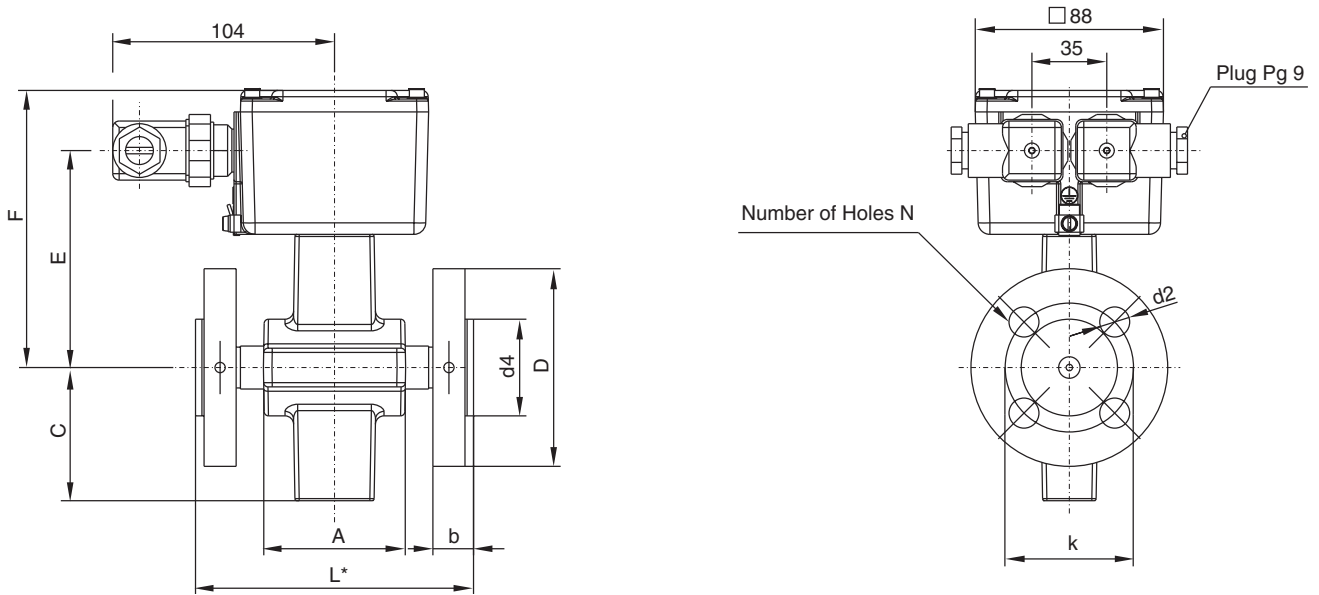
DN 10 to DN 300 [3/8" to 10"]

Two piece housing: Alum casting, painted

Lay Length Flanged (Short Design)

Flowmeter sizes DN 15 to DN 300 [3/8" to 12"] correspond to the lengths defined in the Flange Designs VDE/VDI 2641 and in the DVGW Working Paper W420 (Water Totalizers, Design WP ISO 4064 Short as well as ISO 13359).

Dimensions: Flowmeter Primary DN 10 - DN 100 [3/8" - 4"], Flanges per DIN, EN and ASME, Model DL43F



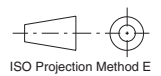
Tolerance: L* + 0 /-3 mm

DIN 2501 / EN 1092-1¹⁾ / ASME B16.5

| Meter Size | | Connection Dimensions | | | | | | | | | | | | Weight appr. kg |
|------------|--------|-----------------------|-----|-------|------|-------|-------|-------|---|------|-----|-----|-----|-----------------|
| DN | Inch | PN | L | D | b | k | d2 | d4 | N | A | C | E | F | |
| 10 | 3/8" | 10-40 | 200 | 90 | 18 | 60 | 14 | 40 | 4 | 66.5 | 62 | 101 | 129 | 3 |
| 15 | 1/2" | 10-40 | 200 | 95 | 18 | 65 | 14 | 45 | 4 | 66.5 | 62 | 101 | 129 | 3 |
| 20 | 3/4" | 10-40 | 200 | 105 | 20 | 75 | 14 | 58 | 4 | 87 | 73 | 112 | 140 | 3.5 |
| 25 | 1" | 10-40 | 200 | 115 | 20 | 85 | 14 | 68 | 4 | 87 | 73 | 112 | 140 | 4 |
| | | CL 150 | 200 | 108 | 16 | 79.2 | 15.7 | 50.8 | | | | | | |
| 32 | 1-1/4" | 10-40 | 200 | 140 | 20 | 100 | 18 | 78 | 4 | 95 | 78 | 117 | 145 | 5 |
| 40 | 1-3/8" | 10-40 | 200 | 150 | 20 | 110 | 18 | 88 | 4 | 100 | 82 | 121 | 149 | 6 |
| | | CL 150 | 200 | 127 | 19.5 | 98.6 | 15.37 | 73.2 | | | | | | |
| 50 | 2" | 10-40 | 200 | 165 | 21 | 125 | 18 | 102 | 4 | 116 | 90 | 129 | 157 | 8 |
| | | CL 150 | 200 | 152.4 | 21 | 120.6 | 19.1 | 92.2 | | | | | | |
| 65 | 2-3/8" | 25-40 | 200 | 185 | 25 | 145 | 18 | 122 | 8 | 100 | 104 | 153 | 171 | 12 |
| 80 | 3" | 10-40 | 200 | 200 | 27 | 160 | 18 | 138 | 8 | 100 | 110 | 159 | 177 | 16 |
| | | CL 150 | 200 | 190.5 | 26 | 152.4 | 19.1 | 127 | | | | | | |
| 100 | 4" | 10-40 | 250 | 220 | 23 | 180 | 18 | 158 | 8 | 130 | 130 | 179 | 197 | 15 |
| | | CL 150 | 250 | 229 | 26 | 190.5 | 19.1 | 157.2 | | | | | | |

¹⁾ Flange dimensions according to EN 1092-1

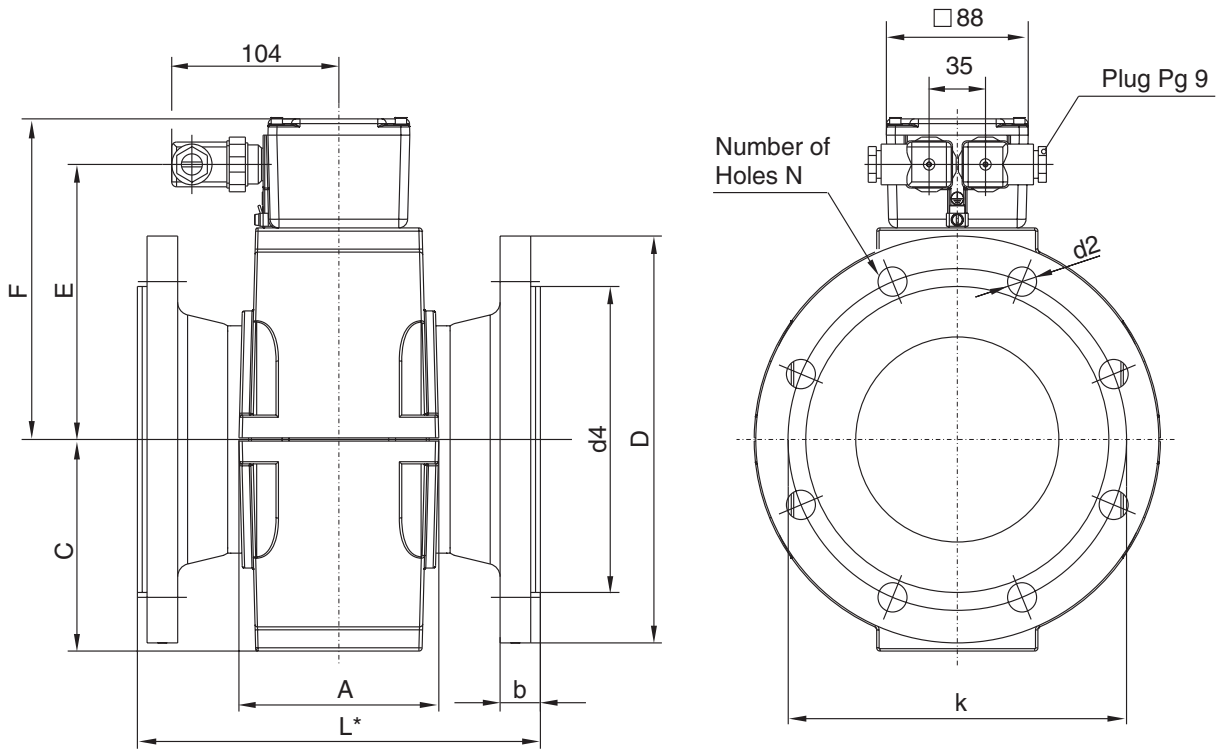
Dimen's in mm



ISO Projection Method E

Fig. 6

Dimensions: Flowmeter Primary DN 125 - DN 300 [5" - 12"], Flanges per DIN, EN and ASME, Model DL43F



Tolerance: L* DN 125...DN 200 +0 /-3 mm; DN 250...DN 300 +0 /-5 mm

DIN 2501 / EN 1092-1¹⁾ / ASME B16.5

| Meter Size | | Connection Dimensions | | | | | | | | | | | | |
|------------|-------|-----------------------|-----|-------|------|-------|------|-------|----|-----|-----|-----|-----|-----------------|
| DN | Inch | PN | L | D | b | k | d2 | d4 | N | A | C | E | F | Weight appr. kg |
| 125 | (5") | 10-16 | 250 | 250 | 25 | 210 | 18 | 188 | 8 | 124 | 127 | 173 | 199 | 27 |
| 150 | (6") | 10-16 | 300 | 285 | 25 | 240 | 22 | 212 | 8 | 170 | 148 | 194 | 220 | 29 |
| | | CL 150 | 300 | 279.4 | 29.4 | 241.3 | 22.2 | 215.9 | 8 | 170 | 148 | 194 | 220 | 38 |
| 200 | (8") | 10 | 350 | 340 | 28 | 295 | 22 | 268 | 8 | 195 | 179 | 225 | 251 | 53 |
| | | 16 | 350 | 340 | 28 | 295 | 22 | 268 | 12 | | | | | 53 |
| | | CL 150 | 300 | 342.9 | 33.6 | 298.4 | 22.2 | 269.9 | 8 | | | | | 66 |
| 250 | (10") | 10 | 450 | 395 | 30 | 350 | 22 | 320 | 12 | 250 | 207 | 253 | 279 | 79 |
| | | 16 | 450 | 405 | 30 | 355 | 26 | 320 | 12 | | | | | 79 |
| | | CL 150 | 450 | 406.4 | 35.2 | 361.9 | 25.4 | 323.8 | 12 | | | | | 98 |
| 300 | (12") | 10 | 500 | 445 | 31 | 400 | 22 | 370 | 12 | 250 | 250 | 296 | 322 | 86 |
| | | 16 | 500 | 460 | 33 | 410 | 26 | 378 | 12 | | | | | 86 |

¹⁾ Flange dimensions according to EN 1092-1

Dimen's in mm

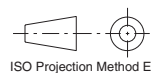
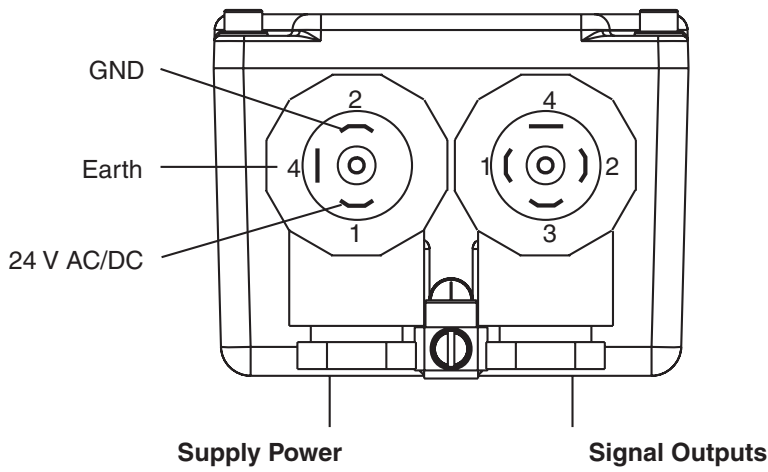


Fig. 7

Electrical Interconnections, Examples for Peripherals



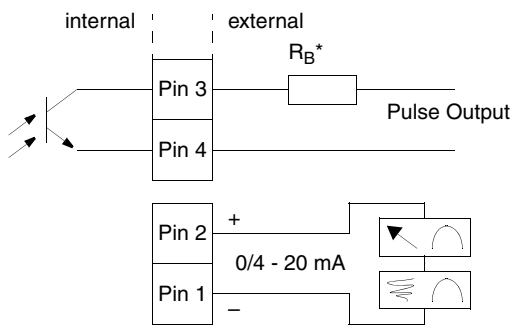
The Pin designations are summarized in the following table.

| | |
|-------------------------------------|-----------------|
| Output signal, passive, optocoupler | + Pin 3 - Pin 4 |
| Current output 0/4 -20 mA | + Pin 2 - Pin 1 |

Cable connector: PG 9

Fig. 8 Interconnection Diagram

Pulse Output passive, optocoupler and Current Output 0/4 - 20 mA or Contact Output passive, optocoupler and Current Output 0/4 - 20 mA)



Supply Power
(24 V AC/DC)

| | |
|-------|------------|
| Pin 1 | 24 V AC/DC |
| Pin 2 | GND |
| Pin 4 | Earth |

Specifications, Signal Outputs

Pulse Output, passive

(Optocoupler specifications:)

$16\text{ V} \leq U_{CEH} \leq 30\text{ V}; 0\text{ V} \leq U_{CEL} \leq 2\text{ V};$

$0\text{ mA} \leq I_{CEH} \leq 0.2\text{ mA}; 2\text{ mA} \leq I_{CEL} \leq 220\text{ mA}$

$f_{max} = 20\text{ pulses/sec.};$ pulse width min. 20 ms; max. 2550 ms

Output Signal, passive, optocoupler

The functions for the output signal, Pulse Output or Contact Output, can be defined in the software.

The following status conditions can be signalled using the function "Contact Output": Forward/reverse flow direction, min./max. contact, system alarm.

Current Output

Selectable 0/4 to 20 mA; load $\leq 600\text{ Ohm}$

Supply Power

16.8 V AC - 26.4 V AC or 16.8 V DC - 31.2 V DC

Ripple: 5 %

Power: < 5 W

Fig. 9 Interconnection Examples for Peripherals, Output Signal Specifications

Grounds

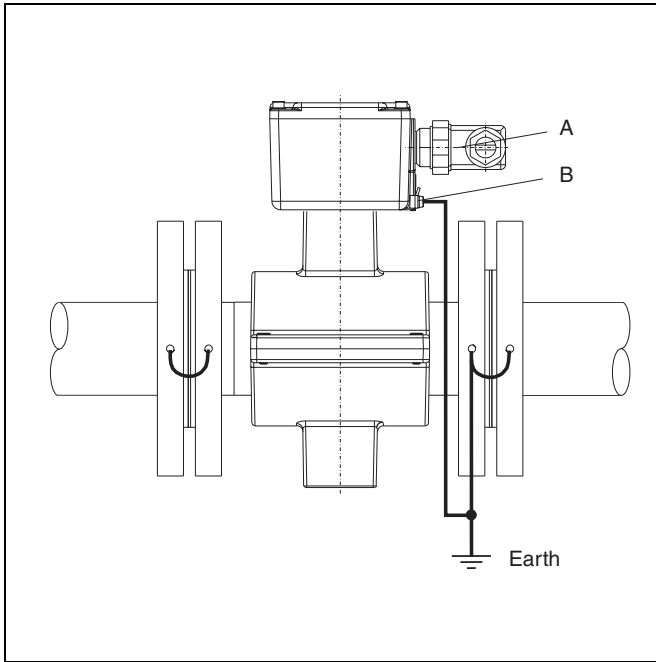


Fig. 10 Grounding the Flowmeter Primary

Potential equalization should be established during installation in accordance with the figure above.

Warning:

If the supply power earth is connected to the plug (point A) (left plug), the lead, which is connected to point B, must be at the same potential as point A.

If this cannot be assured, then a connection should only be made at one point - either to the plug (point A) or externally to the housing (point B).

We recommend that the earth be connected at point B.

Display and Operator Level

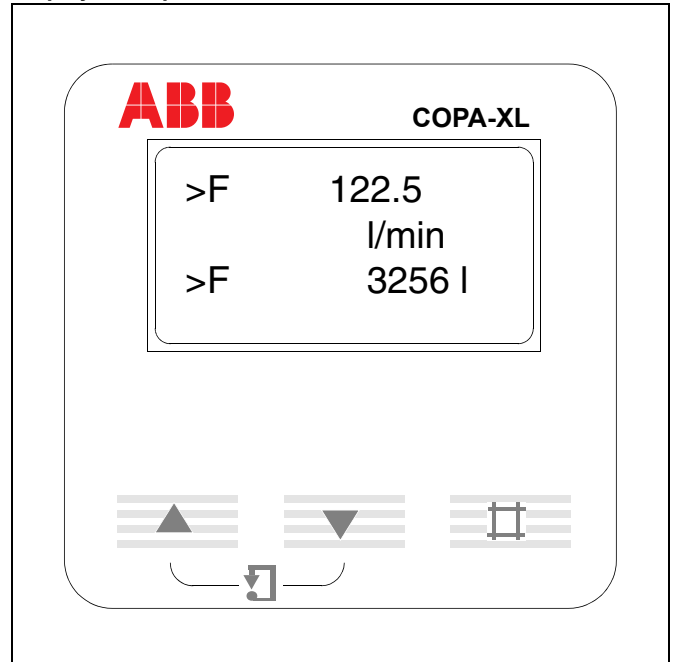


Fig. 11

The converter is configured in clear text by the operator. Entries are made using the foil keypad.

The internal flow totalization is recorded on separate counters, one for each flow direction.

The process display indicates the value of instantaneous flowrate in the first line and its units in the second line. In the bottom line the totalizer value and the present flow direction are displayed. During an alarm or error condition the display changes to indicate a clear text error message.

Ordering Information

| Ordering Number | | | | | | | DL43F | | | | | | | | | | | | |
|--|--------------|------------------|--------|-----------------------|--------|--|-------|--|--|--|--|--|--|--|--|--|--|---|----|
| Liner | Meter Size | Electrodes | PN | Flanges | | | | | | | | | | | | | | | |
| PTFE | DN 10 3/8" | Hast. C-4 | PN 40 | Flanges 1.4571[316Ti] | T10HF3 | | | | | | | | | | | | | | |
| PTFE | DN 15 3/8" | Hast. C-4 | PN 40 | Flanges 1.4571[316Ti] | T15HF3 | | | | | | | | | | | | | | |
| PTFE | DN 20 3/4" | Hast. C-4 | PN 40 | Steel flanges | T20HF1 | | | | | | | | | | | | | | |
| PTFE | DN 25 1" | Hast. C-4 | PN 40 | Steel flanges | T25HF1 | | | | | | | | | | | | | | |
| PTFE | DN 25 1" | Hast. C-4 | CL 150 | Steel flanges | T25HR1 | | | | | | | | | | | | | | |
| PTFE | DN 32 1-1/4" | Hast. C-4 | PN 40 | Steel flanges | T32HF1 | | | | | | | | | | | | | | |
| PTFE | DN 40 1-3/8" | Hast. C-4 | PN 40 | Steel flanges | T40HF1 | | | | | | | | | | | | | | |
| PTFE | DN 40 1-3/8" | Hast. C-4 | CL 150 | Steel flanges | T40HR1 | | | | | | | | | | | | | | |
| PTFE | DN 50 2" | Hast. C-4 | PN 40 | Steel flanges | T50HF1 | | | | | | | | | | | | | | |
| PTFE | DN 50 2" | Hast. C-4 | CL 150 | Steel flanges | T50HR1 | | | | | | | | | | | | | | |
| PTFE | DN 65 2-3/8" | Hast. C-4 | PN 40 | Steel flanges | T65HF1 | | | | | | | | | | | | | | |
| PTFE | DN 80 3" | Hast. C-4 | CL 150 | Steel flanges | T80HR1 | | | | | | | | | | | | | | |
| PTFE | DN 80 3" | Hast. C-4 | PN 40 | Steel flanges | T80HF1 | | | | | | | | | | | | | | |
| PTFE | DN 100 4" | Hast. C-4 | PN 16 | Steel flanges | T1HHD1 | | | | | | | | | | | | | | |
| PTFE | DN 100 4" | Hast. C-4 | CL 150 | Steel flanges | T1HHR1 | | | | | | | | | | | | | | |
| Hard rubber | DN 100 4" | SS 1.4571[316Ti] | PN 16 | Steel flanges | H1HSD1 | | | | | | | | | | | | | | |
| PTFE | DN 125 5" | Hast. C-4 | PN 16 | Steel flanges | T1QHD1 | | | | | | | | | | | | | | |
| Hard rubber | DN 125 5" | SS 1.4571[316Ti] | PN 16 | Steel flanges | H1QSD1 | | | | | | | | | | | | | | |
| PTFE | DN 150 6" | Hast. C-4 | PN 16 | Steel flanges | T1FHD1 | | | | | | | | | | | | | | |
| PTFE | DN 150 6" | Hast. C-4 | CL 150 | Steel flanges | T1FHR1 | | | | | | | | | | | | | | |
| Hard rubber | DN 150 6" | SS 1.4571[316Ti] | PN 16 | Steel flanges | H1FSD1 | | | | | | | | | | | | | | |
| PTFE | DN 200 8" | Hast. C-4 | PN 10 | Steel flanges | T2HHC1 | | | | | | | | | | | | | | |
| PTFE | DN 200 8" | Hast. C-4 | PN 16 | Steel flanges | T2HHD1 | | | | | | | | | | | | | | |
| Hard rubber | DN 200 8" | SS 1.4571[316Ti] | PN 10 | Steel flanges | H2HSC1 | | | | | | | | | | | | | | |
| Hard rubber | DN 200 8" | SS 1.4571[316Ti] | PN 16 | Steel flanges | H2HSD1 | | | | | | | | | | | | | | |
| Hard rubber | DN 200 8" | SS 1.4571[316Ti] | CL 150 | Steel flanges | H2HSR1 | | | | | | | | | | | | | | |
| PTFE | DN 250 10" | Hast. C-4 | PN 10 | Steel flanges | T2FHC1 | | | | | | | | | | | | | | |
| PTFE | DN 250 10" | Hast. C-4 | PN 16 | Steel flanges | T2FHD1 | | | | | | | | | | | | | | |
| Hard rubber | DN 250 10" | SS 1.4571[316Ti] | PN 10 | Steel flanges | H2FSC1 | | | | | | | | | | | | | | |
| Hard rubber | DN 250 10" | SS 1.4571[316Ti] | PN 16 | Steel flanges | H2FSD1 | | | | | | | | | | | | | | |
| Hard rubber | DN 250 10" | SS 1.4571[316Ti] | CL 150 | Steel flanges | H2FSR1 | | | | | | | | | | | | | | |
| Hard rubber | DN 300 12" | SS 1.4571[316Ti] | PN 10 | Steel flanges | H3HSC1 | | | | | | | | | | | | | | |
| Hard rubber | DN 300 12" | SS 1.4571[316Ti] | PN 16 | Steel flanges | H3HSD1 | | | | | | | | | | | | | | |
| Accessories | | | | | | | | | | | | | | | | | | | |
| None | | | | | | | | | | | | | | | | | | A | |
| Temperature Range | | | | | | | | | | | | | | | | | | | |
| DN 10 - 250 [3/8" - 10"] max. 80 °C; DN 300 [12"] max. 60 °C | | | | | | | | | | | | | | | | | | | S |
| Certifications | | | | | | | | | | | | | | | | | | | |
| None | | | | | | | | | | | | | | | | | | A | |
| Calibration Certifications | | | | | | | | | | | | | | | | | | | |
| Standard | | | | | | | | | | | | | | | | | | A | |
| Supply Power | | | | | | | | | | | | | | | | | | | |
| Low voltage 16.8 - 26.4 V AC / 16.8 - 31.2 V DC | | | | | | | | | | | | | | | | | | | K |
| Display / Signal Outputs | | | | | | | | | | | | | | | | | | | |
| Included / Pulse Output Opto + 20 mA Signal | | | | | | | | | | | | | | | | | | | 04 |
| Design Level | | | | | | | | | | | | | | | | | | | |
| Standard | | | | | | | | | | | | | | | | | | | A |
| Electrode Design | | | | | | | | | | | | | | | | | | | |
| Standard | | | | | | | | | | | | | | | | | | | 1 |
| Excitation Frequency | | | | | | | | | | | | | | | | | | | |
| 6 1/4 Hz (DN 10 - 300 [3/8"-12"]) | | | | | | | | | | | | | | | | | | | 1 |

A conductive element is integrated in the hard/soft rubber lined flowmeter sizes DN 125 - 300 [5" - 12"] eliminating the requirement for grounding electrodes.
 If the flowmeter is installed in a plastic pipeline a grounding ring is required and should be ordered!

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