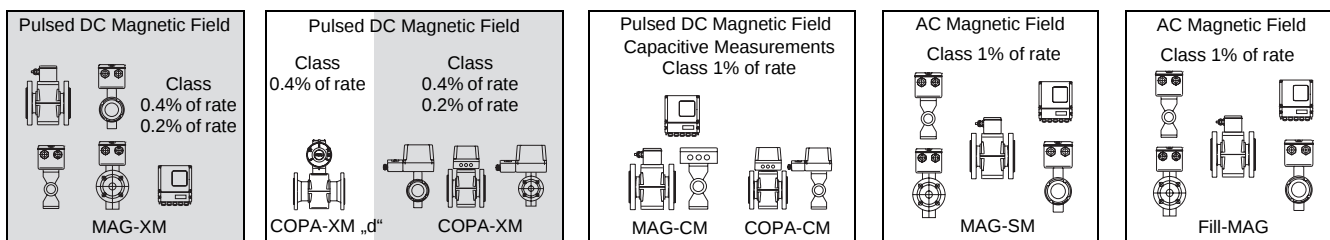


# Electromagnetic Flowmeter with Pulsed DC Field Excitation in a Compact or Remote Mounted Design



**Process Connections: Flanged, 1/8"-Pipe thread, Wafer Design, Tri-Clamp, Food Industry Fittings DIN 11851, Aseptic Connections DIN 11846-1, Weld Stubs, Male Threads, Female Threads, PVC-Cement Sleeve and Hose Connectors**



The electromagnetic flowmeter can be used to accurately measure the flowrate of liquids, pulps, slurries and sludges which have an electrical conductivity greater than 5  $\mu\text{S}/\text{cm}$ . The COPA-XM metering system consists of a flowmeter primary and the appropriate  $\mu\text{P}$ -Converter in a Compact Design. The MAG-XM consists of a flowmeter primary and a separate  $\mu\text{P}$ -Converter.

The Operating Principles may be found on Page 4.

The electromagnetic metering system is characterized by the following important design features:

- Flowmeter with a variety of process connections:
 

|                                 |                          |
|---------------------------------|--------------------------|
| Flanges                         | DN 3 - DN 2000 1/10"-78" |
| 1/8"-Pipe thread                | DN 1 - DN 2 1/25"-3/32"  |
| Wafer design                    | DN 3 - DN 100 1/10"-4"   |
| Tri-Clamp DIN 32676             | DN 3 - DN 100 1/10"-4"   |
| Food industry fitting DIN 11851 | DN 3 - DN 100 1/10"-4"   |
| Aseptic connection DIN11864-1   | DN 3 - DN 100 1/10"-4"   |
| Weld stubs                      | DN 3 - DN 100 1/10"-4"   |
| Male threads                    | DN 3 - DN 25 1/10"-1"    |
| Female threads                  | DN 3 - DN 25 1/10"-1"    |
| PVC-Cement sleeve               | DN 3 - DN 25 1/10"-1"    |
| Hose connector                  | DN 3 - DN 15 1/10"-1/2"  |
- Fluid temperature, standard -40 °C to 130 °C,  
High temperature design 180 °C (356 °F)  
Ambient temperature -25 °C to 60 °C
- Easy straight forward cleaning and sterilization – even in automatic CIP/SIP-systems – as a result of the smooth, unobstructed metering tube in the flowmeter primary.
- Wide application spectrum satisfied by a multitude of liner and electrode materials and connection types.
- Linear and accurate flowrate metering independent of flow profile using weighting factor matched magnetic fields.
- Long term stable accuracy through digital signal processing with pulsed DC magnetic field excitation and a stable zero.
- Automatic recognition of an empty pipe condition.
- Integrated preset totalizer.
- Difference totalization or individual forward and reverse flow totals.
- 2 flow ranges with automatic or external switch over.
- Easy menu controlled operating structure. Parameter settings directly from the converter or externally through use of a magnetic stick with a closed housing.
- EEPROM-Module for easy converter exchange.

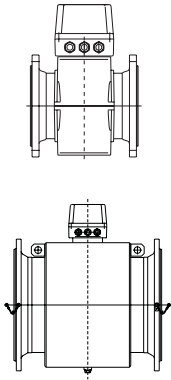
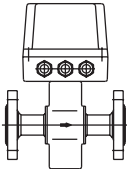
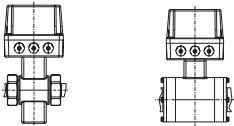


Fig.1 Flow Metering System in a Compact or Remote Mounted Design

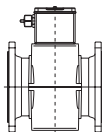
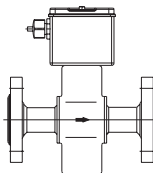
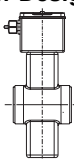
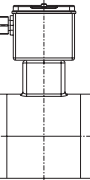
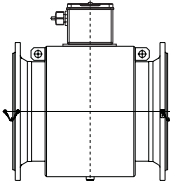
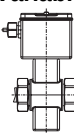
- Certified design for Cold-/Waste Water or Liquids other than Water.
- Max. measurement deviation 0.4 % of rate.
- Optionally 0.2 % of rate.

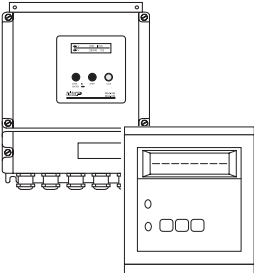
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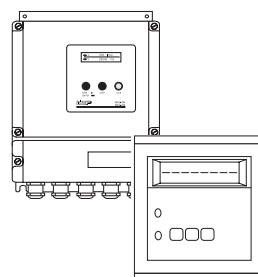
**COPA-XM / MAG-XM****Overview, Flowmeter Primary and Converter, COPA-XM**

|                                 |                                                                                                                      |                                                                                                                      |                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| COPA-XM                         | <div>Fixed Flange</div> <div></div> | <div>Fixed Flange</div> <div></div> | <div>Wafer Design</div> <div></div> <div>DN 3 - DN 40 : 1/8" - 1-1/2"</div> <div>DN 50- DN 100 / 2" - 4"</div> | <div>Variable Connections</div> <div></div> <div>DN3-DN40: 1/8"-1-1/2" DN50-DN100: 2"-4"</div> <div><br/>Weld stubs</div> <div><br/>Hose connections</div> <div><br/>Sanitary connections</div> <div><br/>Male threads</div> <div><br/>Tri-Clamp</div> <div><br/>Female threads</div> <div><br/>Flange</div> <div><br/>PVC-cement weld coupling</div> <div>Others upon request</div> |
| Accuracy                        | 0.4 % of rate, optionally 0.2 % or rate                                                                              |                                                                                                                      |                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Flowmeter Primary               |                                                                                                                      |                                                                                                                      |                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Model Number                    | 10DX3311                                                                                                             | DM23F                                                                                                                | DM23W                                                                                                                                                                                            | DM23L, -A,-R,-S,-T,-E,-I,-G,-H                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Housing materials               | Aluminum                                                                                                             | Stainless Steel                                                                                                      |                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                                 | DN:Inch    Press.rtg                                                                                                 | DN:Inch    Press.rtg                                                                                                 | DN:Inch    Press.rtg                                                                                                                                                                             | DN:Inch    Press.rtg                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Wafer Design                    | —                                                                                                                    | —                                                                                                                    | 3-100:1/10"-4"    10-40                                                                                                                                                                          | —                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Flanges DIN 2501                | 3-2000    10-40                                                                                                      | 3-100    10-40                                                                                                       | —                                                                                                                                                                                                | —                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Flanges ANSI B16.5              | 1/10"-78"    CL150/300                                                                                               | 1/10"-4"    CL 150/300                                                                                               | —                                                                                                                                                                                                | —                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Flanges FAB1B DIN 11864-2       | —                                                                                                                    | —                                                                                                                    | —                                                                                                                                                                                                | 3-100    1/10"-4"    10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Aseptic connection DIN 11864    | —                                                                                                                    | —                                                                                                                    | —                                                                                                                                                                                                | 3-100    1/10"-4"    16                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Food ind. fitting DIN 11851     | —                                                                                                                    | —                                                                                                                    | —                                                                                                                                                                                                | 3-100    1/10"-4"    10-40                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Weld stubs                      | —                                                                                                                    | —                                                                                                                    | —                                                                                                                                                                                                | 3-100    1/10"-4"    10-40                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Tri-Clamp DIN 32676             | —                                                                                                                    | —                                                                                                                    | —                                                                                                                                                                                                | 3-100    1/10"-4"    10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Male threads ISO 228            | —                                                                                                                    | —                                                                                                                    | —                                                                                                                                                                                                | 3- 25    1/10"-1"    10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Female threads ISO 228          | —                                                                                                                    | —                                                                                                                    | —                                                                                                                                                                                                | 3- 25    1/10"-1"    10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| PVC-cement sleeve               | —                                                                                                                    | —                                                                                                                    | —                                                                                                                                                                                                | 3- 25    1/10"-1"    10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Hose connector                  | —                                                                                                                    | —                                                                                                                    | —                                                                                                                                                                                                | 3- 15    1/10"-1/2"    10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 1/8" Pipe thread                | —                                                                                                                    | —                                                                                                                    | —                                                                                                                                                                                                | 1-2    1/25"-1/12"    10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Liner                           | Hard/soft rubber,<br>PTFE, PFA                                                                                       | PFA                                                                                                                  | PFA<br>Ceramic upon request                                                                                                                                                                      | PEEK, Torlon (<DN 3:1/10")<br>PFA (>DN 2: 1/12")                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Conductivity                    | ≥ 5 μ S/cm                                                                                                           |                                                                                                                      |                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Electrode material              | SST No.1.4571 [316Ti], 1.4539, Hastelloy B2/C4, Platinum-Iridium, Tantalum, Titanium                                 |                                                                                                                      |                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Process connection material     | Steel, 1.4541[321],<br>1.4571[316Ti]                                                                                 | 1.4571[316Ti]                                                                                                        | —                                                                                                                                                                                                | 1.4301[304], 1.4404[316L],<br>1.4571[316Ti], PVC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Protection Class                | IP 67                                                                                                                | IP 67                                                                                                                | IP 67                                                                                                                                                                                            | IP 67                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Fluid temperature               | -25 to +130 °C                                                                                                       | -40 to +130 °C (-40 to +266 °F)                                                                                      |                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Approvals                       |                                                                                                                      |                                                                                                                      |                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Hygienic & sterile requirements | CIP-capable                                                                                                          | CIP/SIP-capable FML, 3A, (EHEDG in preparation)                                                                      |                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| EEx-Design                      | Zone 2, Zone 1 see<br>Spec.10DX3711                                                                                  | Zone 2, Zone 1 in preparation                                                                                        |                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Certifications for              | Water/Waste Water, Beer, Wort, Milk, Beverage Concentrates, Brine                                                    |                                                                                                                      |                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Converter                       |                                                                                                                      |                                                                                                                      |                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Supply power                    | 24 V, 48 V, 110 V, 230 V AC, 24/48 V DC others upon request                                                          |                                                                                                                      |                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Current output configurable     | 0/2-10 mA, 0-5 mA, 0/4-20 mA, 0/4-10/12-20 mA                                                                        |                                                                                                                      |                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Pulse output, 1 channel std.    | active, 24 V, optocoupler                                                                                            |                                                                                                                      |                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Pulse output, 2 channel option  | active 24 V, optocoupler , relay                                                                                     |                                                                                                                      |                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Ext. zero return                | yes                                                                                                                  |                                                                                                                      |                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Ext. totalizer reset            | yes                                                                                                                  |                                                                                                                      |                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Forward-/reverse metering       | yes                                                                                                                  |                                                                                                                      |                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Data link option                | RS232C, RS485, Profibus DP                                                                                           |                                                                                                                      |                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| HART-Protocol® option           | yes                                                                                                                  |                                                                                                                      |                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Fluid monitoring                | yes, DN 10: 3/8" and up                                                                                              |                                                                                                                      |                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Self monitoring                 | yes                                                                                                                  |                                                                                                                      |                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Local indication/totalization   | yes                                                                                                                  |                                                                                                                      |                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 2 Flow ranges                   | yes, automatic or external switching                                                                                 |                                                                                                                      |                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Preset counter                  | yes, START/STOP over contact input, ending over contact output                                                       |                                                                                                                      |                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Autom. density correction       | yes, factor manual entry                                                                                             |                                                                                                                      |                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

**COPA-XM / MAG-XM****Overview, Flowmeter Primary and Converter, MAG-XM**

|                                 |                                                                                      |            |                                                                                   |            |                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |       |
|---------------------------------|--------------------------------------------------------------------------------------|------------|-----------------------------------------------------------------------------------|------------|---------------------------------------------------------------------------------------------------------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------|
| <b>MAG-XM</b>                   | <b>Fixed Flange</b>                                                                  |            | <b>Fixed Flange</b>                                                               |            | <b>Wafer Design</b>                                                                                                 |           | <b>Variable Connections</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |       |
|                                 |     |            |  |            | <br>DN 3 - DN 40 : 1/8" - 1-1/2" |           | <br>DN 50 - DN 100 / 2" - 4"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |       |
|                                 |     |            |                                                                                   |            |                                                                                                                     |           | <br>DN3-DN40: 1/8"-1-1/2" DN50-DN100: 2"-4"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |             |       |
|                                 |                                                                                      |            |                                                                                   |            |                                                                                                                     |           | <br>Weld stubs<br><br>Hose connections<br><br>Sanitary connections<br><br>Male threads<br><br>Tri-Clamp<br><br>Female threads<br><br>Flange<br><br>PVC-cement weld coupling<br>Others upon request |             |       |
| Accuracy                        | 0.4 % of rate, optionally 0.2 % of rate                                              |            |                                                                                   |            |                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |       |
| <b>Flowmeter Primary</b>        |                                                                                      |            |                                                                                   |            |                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |       |
| Model Number                    | 10DX3111                                                                             |            | DM21F                                                                             |            | DM21W                                                                                                               |           | DM21L, -A,-R,-S,-T,-E,-I,-G,-H                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |             |       |
| Housing materials               | Aluminum                                                                             |            | Stainless Steel                                                                   |            |                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |       |
|                                 | DN:Inch                                                                              | Press.rtg  | DN:Inch                                                                           | Press.rtg  | DN:Inch                                                                                                             | Press.rtg | DN:Inch                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Press.rtg   |       |
| Wafer Design                    | —                                                                                    |            | —                                                                                 |            | 3-100:1/10"-4" 10-40                                                                                                |           | —                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |             |       |
| Flanges DIN 2501                | 3-2000                                                                               | 10-40      | 3-100                                                                             | 10-40      | —                                                                                                                   |           | —                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |             |       |
| Flanges ANSI B16.5              | 1/10"-78"                                                                            | CL 150/300 | 1/10"-4"                                                                          | CL 150/300 | —                                                                                                                   |           | —                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |             |       |
| Flanges FAB1B DIN 11864-2       | —                                                                                    |            | —                                                                                 |            | —                                                                                                                   |           | 3-100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1/10"-4"    | 10    |
| Aseptic connection DIN 11864-1  | —                                                                                    |            | —                                                                                 |            | —                                                                                                                   |           | 3-100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1/10"-4"    | 16    |
| Food ind. fitting DIN 11851     | —                                                                                    |            | —                                                                                 |            | —                                                                                                                   |           | 3-100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1/10"-4"    | 10-40 |
| Weld stubs                      | —                                                                                    |            | —                                                                                 |            | —                                                                                                                   |           | 3-100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1/10"-4"    | 10-40 |
| Tri-Clamp DIN 32676             | —                                                                                    |            | —                                                                                 |            | —                                                                                                                   |           | 3-100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1/10"-4"    | 10    |
| Male threads ISO 228            | —                                                                                    |            | —                                                                                 |            | —                                                                                                                   |           | 3- 25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1/10"-1"    | 10    |
| Female threads ISO 228          | —                                                                                    |            | —                                                                                 |            | —                                                                                                                   |           | 3- 25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1/10"-1"    | 10    |
| PVC-cement sleeve               | —                                                                                    |            | —                                                                                 |            | —                                                                                                                   |           | 3- 25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1/10"-1"    | 10    |
| Hose connector                  | —                                                                                    |            | —                                                                                 |            | —                                                                                                                   |           | 3- 15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1/10"-1/2"  | 10    |
| 1/8" Pipe thread                | —                                                                                    |            | —                                                                                 |            | —                                                                                                                   |           | 1-2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1/25"-1/12" | 10    |
| Liner                           | Hard/soft rubber.,<br>PTFE, PFA                                                      |            | PFA                                                                               |            | PFA<br>Ceramic upon request                                                                                         |           | PEEK, Torlon (<DN 3: 1/10")<br>PFA (>DN 2: 1/12")                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |             |       |
| Conductivity                    | ≥ 5 μ S/cm                                                                           |            |                                                                                   |            |                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |       |
| Electrode materials             | SST No. 1.4571[316Ti], 1.4539, Hastelloy B2/C4, Platinum-Iridium, Tantalum, Titanium |            |                                                                                   |            |                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |       |
| Process connection materials    | Steel, 1.4541[321],<br>1.4571[316Ti]                                                 |            | 1.4571[316Ti]                                                                     |            | —                                                                                                                   |           | 1.4301[304], 1.4404[316L],<br>1.4571[316Ti], PVC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |       |
| Protection Class                | IP 67/IP 68                                                                          |            | IP 67/IP 68                                                                       |            | IP 67/IP 68                                                                                                         |           | IP 67/IP 68                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |       |
| Fluid temperature               | -25 to +130 °C/180 °C                                                                |            | -40 to +130 °C (-40 to +266 °F)                                                   |            |                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |       |
| <b>Approvals</b>                |                                                                                      |            |                                                                                   |            |                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |       |
| Hygienic & sterile requirements | CIP-capable                                                                          |            | CIP/SIP-capable FML, 3A, (EHEDG in preparation)                                   |            |                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |       |
| EEx-Design                      | Zone 1                                                                               |            | Zone 2, Zone 1 in preparation                                                     |            |                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |       |
| Certifications for              | Water/Waste Water, Beer, Wort, Milk, Beverage Concentrates, Brine                    |            |                                                                                   |            |                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |       |
| <b>Converter</b>                |                                                                                      |            |                                                                                   |            |                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |       |
| Model Number                    | 50XM2000                                                                             |            |                                                                                   |            |                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |       |
| Supply power                    | 24 V, 48 V, 110 V, 230 V AC, 24/48 V DC others upon request                          |            |                                                                                   |            |                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |       |
| Current output configurable     | 0/2-10 mA, 0-5 mA, 0/4-20 mA, 0/4-10/12-20 mA                                        |            |                                                                                   |            |                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |       |
| Pulse output, 1 channel, std.   | active, 24 V, optocoupler                                                            |            |                                                                                   |            |                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |       |
| Pulse output, 2 channel, option | active 24 V, optocoupler , relay                                                     |            |                                                                                   |            |                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |       |
| Ext. zero return                | yes                                                                                  |            |                                                                                   |            |                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |       |
| Ext. totalizer reset            | yes                                                                                  |            |                                                                                   |            |                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |       |
| Forward/reverse metering        | yes                                                                                  |            |                                                                                   |            |                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |       |
| Data link option                | RS232C, RS485, Profibus DP                                                           |            |                                                                                   |            |                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |       |
| HART-Protocol® option           | yes                                                                                  |            |                                                                                   |            |                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |       |
| Fluid monitoring                | yes, DN 10: 3/8" and up to max. 50 m signal cable length                             |            |                                                                                   |            |                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |       |
| Self monitoring                 | yes                                                                                  |            |                                                                                   |            |                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |       |
| Local indication/totalization   | yes                                                                                  |            |                                                                                   |            |                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |       |
| 2 Flow ranges                   | yes, automatic or external switching                                                 |            |                                                                                   |            |                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |       |
| Preset counter                  | yes, START/STOP over contact input ,<br>Ending over contact output                   |            |                                                                                   |            |                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |       |
| Autom. density correction       | yes, factor manual entry                                                             |            |                                                                                   |            |                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |       |
| Housing                         | Field mount housing or 19"-plug-in                                                   |            |                                                                                   |            |                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |       |





## COPA-XM / MAG-XM

### Accuracy, Reference Conditions and Operating Principles

#### Reference Conditions per EN 29104:

##### Fluid Temperature

20 °C ±2K

##### Ambient Temperature

20 °C ±2K

##### Supply Power

Nominal voltage per Instrument Tag  $U_N \pm 1\%$

##### Installation Conditions Straight Pipe Sections

Upstream >10 x DN

Downstream >5 x DN

DN = Meter size of flowmeter primary

##### Warm-Up Time

30 min

##### Analog Output Influence

Same as pulse output plus.  $\pm 0.1\%$  of rate

#### Operating Principles

The Faraday Laws of Induction provide the basis for the electromagnetic flowmeter measurements. A voltage is generated in a conductor when it moves through a magnetic field.

This measurement principle is applied to a conductive fluid which flows in a pipe in which a magnetic field is generated perpendicular to the flow direction (see Schematic).

The voltage which is induced in the fluid is measured at two electrodes located diametrically opposite to each other. This signal voltage  $U_E$  is proportional to the magnetic induction  $B$ , the electrode spacing  $D$  and the average fluid velocity  $v$ .

Noting that the magnetic induction  $B$  and the electrode spacing  $D$  are constant values indicates the proportionality between the signal voltage  $U_E$  and the average flow velocity  $v$ . The equation for calculating the volumetric flowrate shows that the signal voltage  $U_E$  is linear and proportional to the volumetric flowrate.

The induced signal voltage is converted into scaled analog and digital output signals in the converter.

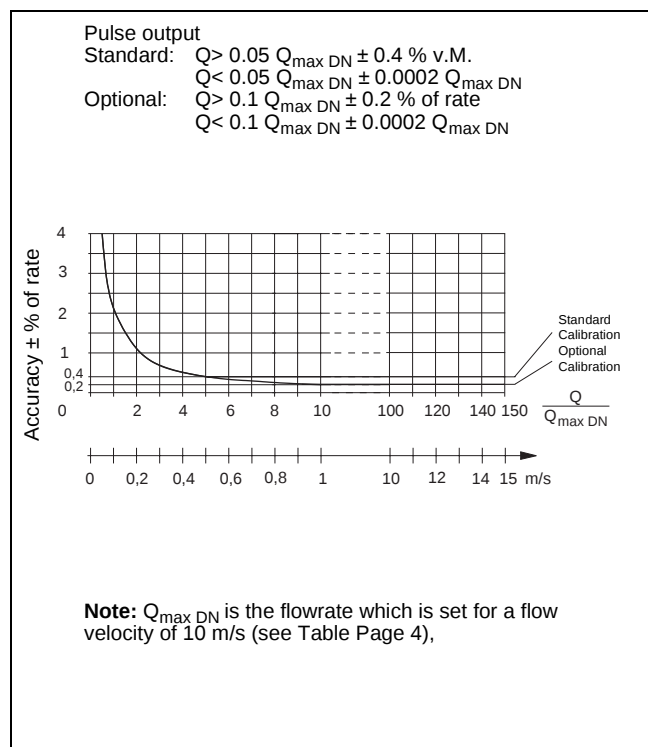


Fig.2 Accuracy

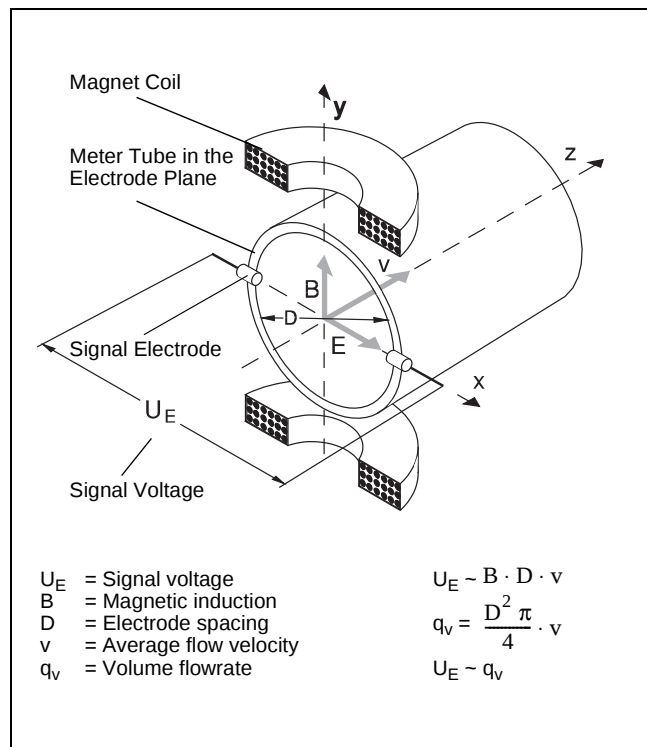


Fig.3 Electromagnetic Flowmeter Schematic

## Specifications

### Flowmeter Primary

#### Flow Ranges, Meter Sizes and Pressure Ratings

| Meter Size |       | Std. Press. Rating PN | Min. Flow Range Flow Velocity 0 to 0.5 m/s | Max. Flow Range Flow Velocity 0 to 10 m/s | Max. Flow Range Flow Velocity 0 to 15 m/s |
|------------|-------|-----------------------|--------------------------------------------|-------------------------------------------|-------------------------------------------|
| DN         | Inch  |                       |                                            |                                           |                                           |
| 1          | 1/25  | 10                    | 0 to 0.03 l/min                            | 0 to 0.6 l/min                            | 0 to 0.9 l/min                            |
| 1.5        | 1/17  | 10                    | 0 to 0.06 l/min                            | 0 to 1.2 l/min                            | 0 to 1.8 l/min                            |
| 2          | 1/12  | 10                    | 0 to 0.1 l/min                             | 0 to 2 l/min                              | 0 to 3 l/min                              |
| 3          | 1/10  | 40                    | 0 to 0.2 l/min                             | 0 to 4 l/min                              | 0 to 6 l/min                              |
| 4          | 5/32  | 40                    | 0 to 0.4 l/min                             | 0 to 8 l/min                              | 0 to 12 l/min                             |
| 6          | 1/4   | 40                    | 0 to 1 l/min                               | 0 to 20 l/min                             | 0 to 30 l/min                             |
| 8          | 5/16  | 40                    | 0 to 1.5 l/min                             | 0 to 30 l/min                             | 0 to 45 l/min                             |
| 10         | 3/8   | 40                    | 0 to 2.25 l/min                            | 0 to 45 l/min                             | 0 to 67.5 l/min                           |
| 15         | 1/2   | 40                    | 0 to 5 l/min                               | 0 to 100 l/min                            | 0 to 150 l/min                            |
| 20         | 3/4   | 40                    | 0 to 7.5 l/min                             | 0 to 150 l/min                            | 0 to 225 l/min                            |
| 25         | 1     | 40                    | 0 to 10 l/min                              | 0 to 200 l/min                            | 0 to 300 l/min                            |
| 32         | 1-1/4 | 40                    | 0 to 20 l/min                              | 0 to 400 l/min                            | 0 to 600 l/min                            |
| 40         | 1-1/2 | 40                    | 0 to 30 l/min                              | 0 to 600 l/min                            | 0 to 900 l/min                            |
| 50         | 2     | 40                    | 0 to 3 m <sup>3</sup> /h                   | 0 to 60 m <sup>3</sup> /h                 | 0 to 90 m <sup>3</sup> /h                 |
| 65         | 2-1/2 | 40                    | 0 to 6 m <sup>3</sup> /h                   | 0 to 120 m <sup>3</sup> /h                | 0 to 180 m <sup>3</sup> /h                |
| 80         | 3     | 40                    | 0 to 9 m <sup>3</sup> /h                   | 0 to 180 m <sup>3</sup> /h                | 0 to 270 m <sup>3</sup> /h                |
| 100        | 4     | 16                    | 0 to 12 m <sup>3</sup> /h                  | 0 to 240 m <sup>3</sup> /h                | 0 to 360 m <sup>3</sup> /h                |
| 125        | 5     | 16                    | 0 to 21 m <sup>3</sup> /h                  | 0 to 420 m <sup>3</sup> /h                | 0 to 630 m <sup>3</sup> /h                |
| 150        | 6     | 16                    | 0 to 30 m <sup>3</sup> /h                  | 0 to 600 m <sup>3</sup> /h                | 0 to 900 m <sup>3</sup> /h                |
| 200        | 8     | 10/16                 | 0 to 54 m <sup>3</sup> /h                  | 0 to 1080 m <sup>3</sup> /h               | 0 to 1620 m <sup>3</sup> /h               |
| 250        | 10    | 10/16                 | 0 to 90 m <sup>3</sup> /h                  | 0 to 1800 m <sup>3</sup> /h               | 0 to 2700 m <sup>3</sup> /h               |
| 300        | 12    | 10/16                 | 0 to 120 m <sup>3</sup> /h                 | 0 to 2400 m <sup>3</sup> /h               | 0 to 3600 m <sup>3</sup> /h               |
| 350        | 14    | 10/16                 | 0 to 165 m <sup>3</sup> /h                 | 0 to 3300 m <sup>3</sup> /h               | 0 to 4950 m <sup>3</sup> /h               |
| 400        | 16    | 10/16                 | 0 to 225 m <sup>3</sup> /h                 | 0 to 4500 m <sup>3</sup> /h               | 0 to 6750 m <sup>3</sup> /h               |
| 500        | 20    | 10                    | 0 to 330 m <sup>3</sup> /h                 | 0 to 6600 m <sup>3</sup> /h               | 0 to 9900 m <sup>3</sup> /h               |
| 600        | 24    | 10                    | 0 to 480 m <sup>3</sup> /h                 | 0 to 9600 m <sup>3</sup> /h               | 0 to 14400 m <sup>3</sup> /h              |
| 700        | 28    | 10                    | 0 to 660 m <sup>3</sup> /h                 | 0 to 13200 m <sup>3</sup> /h              | 0 to 19800 m <sup>3</sup> /h              |
| 800        | 32    | 10                    | 0 to 900 m <sup>3</sup> /h                 | 0 to 18000 m <sup>3</sup> /h              | 0 to 27000 m <sup>3</sup> /h              |
| 900        | 36    | 10                    | 0 to 1200 m <sup>3</sup> /h                | 0 to 24000 m <sup>3</sup> /h              | 0 to 36000 m <sup>3</sup> /h              |
| 1000       | 40    | 10                    | 0 to 1350 m <sup>3</sup> /h                | 0 to 27000 m <sup>3</sup> /h              | 0 to 40500 m <sup>3</sup> /h              |
| 1200       | 48    | 6                     | 0 to 2100 m <sup>3</sup> /h                | 0 to 42000 m <sup>3</sup> /h              | 0 to 63000 m <sup>3</sup> /h              |
| 1400       | 54    | 6                     | 0 to 2700 m <sup>3</sup> /h                | 0 to 54000 m <sup>3</sup> /h              | 0 to 81000 m <sup>3</sup> /h              |
| 1600       | 64    | 6                     | 0 to 3600 m <sup>3</sup> /h                | 0 to 72000 m <sup>3</sup> /h              | 0 to 108000 m <sup>3</sup> /h             |
| 1800       | 72    | 6                     | 0 to 4500 m <sup>3</sup> /h                | 0 to 90000 m <sup>3</sup> /h              | 0 to 135000 m <sup>3</sup> /h             |
| 2000       | 78    | 6                     | 0 to 5700 m <sup>3</sup> /h                | 0 to 114000 m <sup>3</sup> /h             | 0 to 171000 m <sup>3</sup> /h             |

#### Note:

The flow range end value can be set from 0.5 to 15 m/s, whereas the Nomographs which are shown on Page 7 are based on 0.5 to 10 m/s. (for range end values, see Table "Flow Ranges").

#### Max. Allowable Fluid Temperature and Pressure

| Liner                 | Meter Size DN | Inch     | P <sub>operate</sub> bar | P <sub>operate</sub> mbar abs | T <sub>operate</sub> °C |
|-----------------------|---------------|----------|--------------------------|-------------------------------|-------------------------|
| Hard rubber KTW app'd | 15 - 250      | 1/2 - 10 | 40                       | 0                             | < 90                    |
|                       | 300 - 1000    | 12 - 40  | 25                       | 0                             | < 90                    |
|                       | 1200 - 2000   | 48 - 78  | 16                       | 0                             | < 90                    |
| Soft rubber KTW app'd | 50 - 250      | 2 - 10   | 16                       | 0                             | < 90                    |
|                       | 300 - 1000    | 12 - 40  | 16                       | 0                             | < 90                    |
|                       | 1200 - 2000   | 48 - 78  | 16                       | 0                             | < 90                    |
| PTFE                  | 10 - 800      | 3/8 - 32 | 40                       | 270                           | < 20                    |
|                       |               |          | 25                       | 550                           | < 130/180               |
| PFA                   | 3 - 100       | 1/10 - 4 | 40                       | 270                           | < 20                    |
|                       |               |          | 25                       | 550                           | < 130/180               |

Other meter sizes, pressure ratings and temperature classes upon request.

#### Temperature Diagram, Flanged Design

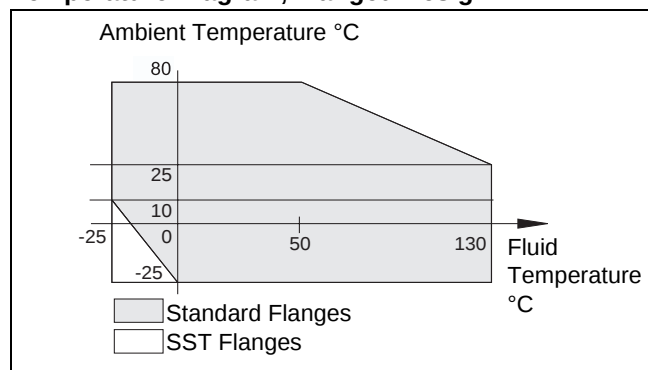


Fig.4 Fluid Temperature as a Function of the Ambient Temperature **COPA-XM**

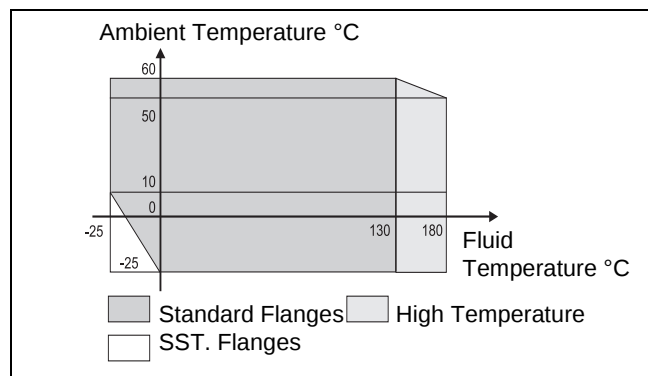


Fig.5 Fluid Temperature as a Function of the Ambient Temperature **MAG-XM**

#### Max. Allowable Cleaning Temperature

| CIP-Cleaning    | Liner Flowmeter Primary          | T <sub>max</sub> °C | t <sub>max</sub> Minutes | T <sub>Amb.</sub> °C |
|-----------------|----------------------------------|---------------------|--------------------------|----------------------|
| Steam Cleaning  | PTFE, PFA, Ceramic, PEEK         | 150                 | 60                       | 25                   |
| Liquid Cleaning | PTFE, PFA, Ceramic, PEEK, Torlon | 140                 | 60                       | 25                   |

If the ambient temperature >25 °C, the max. cleaning temperature is to be reduced by the difference, T<sub>max</sub> - Δ °C where Δ °C = (T<sub>Amb.</sub> - 25 °C).

## COPA-XM / MAG-XM

# Specifications Flowmeter Primary

### Protection Class per EN 60529

IP 67 Standard

IP 68 (only available for MAG-XM)

### Pipeline Vibration

Maximum allow. 15 m/s<sup>2</sup> (10 – 150 Hz)

### Designs

#### Metering Tube

Stainless steel SST No. 1.4301[304]

#### DN 3 to DN 300: 1/10" to 12"

Two piece clam shell housing: Cast Alum, painted<sup>1)</sup>

#### Flanges

Steel, standard

Stainless steel 1.4541[321]/1.4571[316Ti]

#### DN 350 to DN 2000: 14" to 78"

Welded steel construction, painted<sup>1)</sup>

#### Flanges

Zinc plated steel, standard

Stainless steel 1.4541[321]/1.4571[316Ti]

1) Paint coat 60 µm thick, RAL 9006

### Connection Box

Cast alum, painted

Paint coat 60 µm thick

Frame: blue, RAL 5012

Cover: gray, RAL 9006

### Electrical Connections

Screw terminals / screwless spring terminals

Cable connectors Pg 13.5 standar

NPT thread

### Weight

See Dimensions

### Installation Length, Flanged (Short Design)

Meter sizes DN 15 – DN 400: 1/2" - 16" correspond to DIN Flange Design VDE/VDI 2641 and the installation lengths defined in DVGW Working Paper W420 (Water Totalizer, Design WP ISO 4064 short and ISO 13359).

### Installation Length, Series 1000 (only for replacement)

DIN flange design same as Model 10D1465.

### ANSI CL 150/CL 300

#### Installation Length Series 1000

Protection flanges can be specified for Series 1000 L + 20 mm ≤ DN 80: 3"; L + 25 mm DN 100: 4" and above.

### Ex-Protection Zone 1

See Page 10

### Ex-Protection Zone 2

See Page 10

## Specifications

### Flowmeter Primary

Flowrate Nomograph

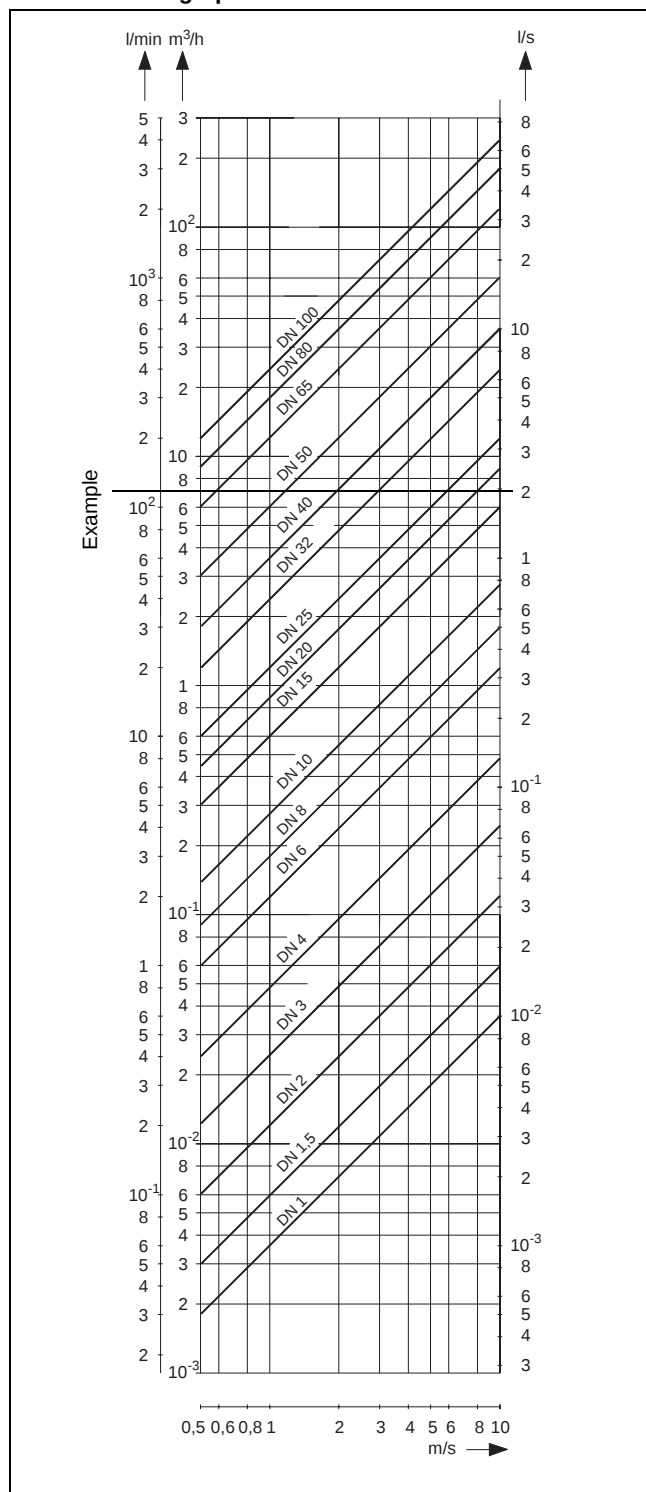


Fig.6 Flowrate Nomograph DN 1 to DN 100: 1/25" to 4"

#### Flowrate Nomograph

The volumetric flowrate is a function of the flow velocity and the flowmeter size. The Flowrate Nomographs (Figs. 6 & 7) show the flowrate range which can be metered with a specific flowmeter size and the flowmeter sizes which are suitable for a specific flowrate.

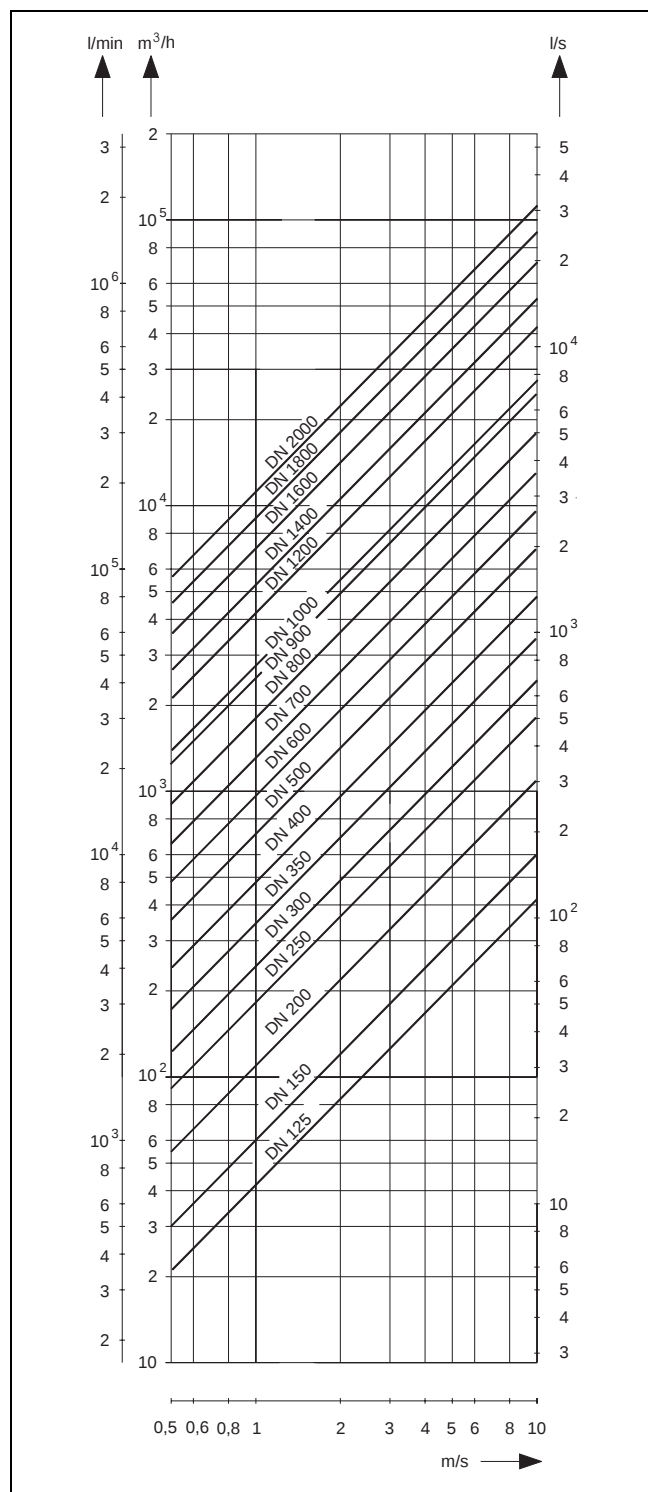


Fig.7 Flowrate Nomograph DN 125 to DN 2000: 5" to 78"

#### Example:

Flowrate = 7 m³/h (maximum value = flow range end value). Suitable are flowmeter primary meter sizes DN 20 to DN 65: 3/4" to 2-1/2" for a flow velocity between 0.5 and 10 m/s

## COPA-XM / MAG-XM

# Installation Requirements and Grounding Flowmeter Primary

### In- and Outlet Sections

The metering principle is independent of the flow profile as long as standing eddies do not extend into the metering section, such as may exist after double elbows, tangential inflow or partially open gate valves directly upstream of the flowmeter. It is recommended that measures be taken to normalize the flow profile. Flow control devices should be installed downstream from the meter primary.

### Note:

- For the agency certified EMF (Volume Flowrate Integrator) the installation requirements defined in the approval are to be maintained (see "Agency Certified EMF", Page 9).

### Grounding

The grounding of the flowmeter primary is not only essential for safety reasons but also of importance to assure trouble free operation of the electromagnetic flowmeter. The ground screws on the meter primary are to be connected to the operating ground potential in accordance with VDE 0100, Section 540 (for Ex-Designs, to the potential equalization). For technical reasons this should be identical to the potential of the metering fluid if possible.

For plastic or insulated lined pipelines the fluid is grounded by utilizing a grounding ring or grounding electrodes (see Footnote in Dimensions and in Ordering Information). When there are stray potentials present in the pipeline a grounding ring is recommended at both ends of the meter primary.

### Electrode Axis

When installing the flowmeter in horizontal pipelines assure that neither of the two electrodes is at the highest point. Gas bubbles which may be present in the fluid could interrupt the electrical connection between the electrodes and the fluid. An ideal installation is shown in Fig. 8. It is essential that the metering tube always be filled with fluid. Meter designs with removable electrodes for cleaning are available upon request.

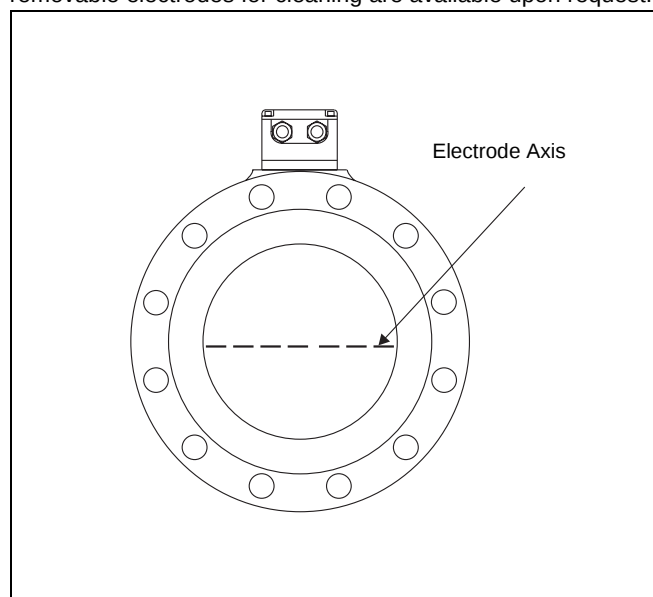


Fig.8 Electrode Axis

### Installation in Larger Size Pipelines

The flowmeter primary can readily be installed in larger pipeline sizes by utilizing reducers (e.g. flanged reducers DIN 28545). The pressure drop which results from the reduction can be determined from the Nomograph Fig. 9. The pressure drop is determined in the following manner:

1. Calculate the diameter ratio  $d/D$ .
2. Determine the flow velocity as a function of the flowmeter size and the instantaneous flowrate.  

$$v = \frac{Q \text{ (Instantaneous Flowrate)}}{\text{Flowmeter Primary Constant}}$$

The flow velocity can also be determined from the Flowrate Nomographs Figs. 6 and 7.
3. Read the pressure drop on the Y-Axis in Fig. 9 at the intersection of the "Diameter Ratio  $d/D$ " x-axis value and the flow velocity line.

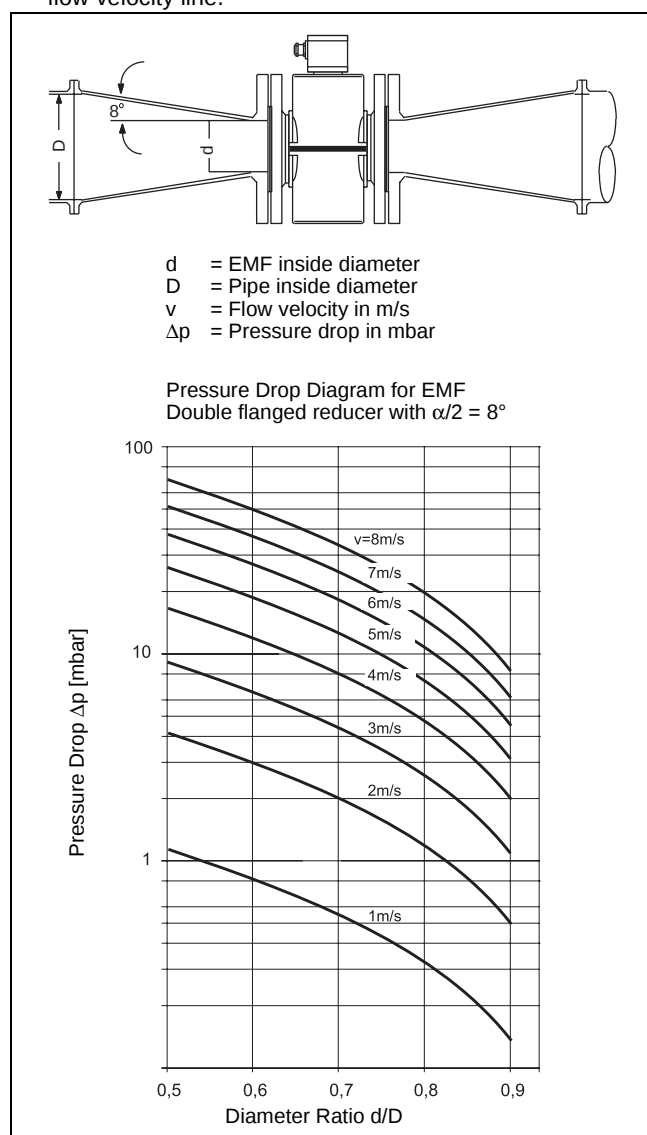


Fig.9 Nomograph for Pressure Drop Determinations

## Agency Certified EMF

### Approvals

The design of the metering instrument "Electromagnetic Volume Flow Integrator with Electrical Counter" has been approved by the National Institute of Science and Technology [PTB] in Braunschweig, Germany for domestic certifications. The following approvals have been granted for the Volume Flow Integrator consisting of a flowmeter primary and a converter:

|       |                                                                               |
|-------|-------------------------------------------------------------------------------|
| 6.221 | Electromagnetic Volume Flowrate Integrator                                    |
| 87.12 | with Electrical Counter in Class "B" for<br><b>Cold Water and Waste Water</b> |

|       |                                                                |
|-------|----------------------------------------------------------------|
| 5.721 | Electromagnetic Volume Flowrate Integrator                     |
| 87.05 | with Electrical Counter for<br><b>Liquids Other than Water</b> |

For the Electromagnetic Volume Flowrate Totalizers with Electrical Counters Appendix (EO 6) and Appendix 5 (EO 5) of the Certification Regulation of 1988 apply.

### Certification

The certification of the Electromagnetic Volume Flowrate Integrator is made on the calibration stands at BFP in Göttingen, Germany which have been approved for certification calibrations. After the certification, the parameters which affect the certification, can only be changed in the presence of a certifying agency official.

### Approved Flowmeter Sizes for "Cold Water and Waste Water"

| Meter Size<br>DN Inch | Min. Allow. Range End<br>Value (ca. 2 m/s) | Max. Allow. Range End<br>Value (ca. 10 m/s) |
|-----------------------|--------------------------------------------|---------------------------------------------|
| 25 1                  | 0 to 2.4 m <sup>3</sup> /h                 | 0 to 12 m <sup>3</sup> /h                   |
| 32 1-1/4              | 0 to 5 m <sup>3</sup> /h                   | 0 to 25 m <sup>3</sup> /h                   |
| 40 1-1/2              | 0 to 9 m <sup>3</sup> /h                   | 0 to 45 m <sup>3</sup> /h                   |
| 50 2                  | 0 to 14 m <sup>3</sup> /h                  | 0 to 70 m <sup>3</sup> /h                   |
| 65 2-1/2              | 0 to 24 m <sup>3</sup> /h                  | 0 to 120 m <sup>3</sup> /h                  |
| 80 3                  | 0 to 36 m <sup>3</sup> /h                  | 0 to 180 m <sup>3</sup> /h                  |
| 100 4                 | 0 to 56 m <sup>3</sup> /h                  | 0 to 280 m <sup>3</sup> /h                  |
| 125 5                 | 0 to 84 m <sup>3</sup> /h                  | 0 to 420 m <sup>3</sup> /h                  |
| 150 6                 | 0 to 128 m <sup>3</sup> /h                 | 0 to 640 m <sup>3</sup> /h                  |
| 200 8                 | 0 to 220 m <sup>3</sup> /h                 | 0 to 1100 m <sup>3</sup> /h                 |
| 250 10                | 0 to 360 m <sup>3</sup> /h                 | 0 to 1800 m <sup>3</sup> /h                 |
| 300 12                | 0 to 500 m <sup>3</sup> /h                 | 0 to 2500 m <sup>3</sup> /h                 |
| 350 14                | 0 to 700 m <sup>3</sup> /h                 | 0 to 3500 m <sup>3</sup> /h                 |
| 400 16                | 0 to 900 m <sup>3</sup> /h                 | 0 to 4500 m <sup>3</sup> /h                 |
| 500 20                | 0 to 1420 m <sup>3</sup> /h                | 0 to 7100 m <sup>3</sup> /h                 |
| 600 24                | 0 to 2000 m <sup>3</sup> /h                | 0 to 10000 m <sup>3</sup> /h                |
| 700 28                | 0 to 2800 m <sup>3</sup> /h                | 0 to 14000 m <sup>3</sup> /h                |
| 800 32                | 0 to 3600 m <sup>3</sup> /h                | 0 to 18000 m <sup>3</sup> /h                |
| 900 36                | 0 to 4600 m <sup>3</sup> /h                | 0 to 23000 m <sup>3</sup> /h                |
| 1000 40               | 0 to 5600 m <sup>3</sup> /h                | 0 to 28000 m <sup>3</sup> /h                |
| 1100 42               | 0 to 6200 m <sup>3</sup> /h                | 0 to 31000 m <sup>3</sup> /h                |
| 1200 48               | 0 to 8200 m <sup>3</sup> /h                | 0 to 41000 m <sup>3</sup> /h                |
| 1400 54               | 0 to 11000 m <sup>3</sup> /h               | 0 to 55000 m <sup>3</sup> /h                |
| 1600 64               | 0 to 14400 m <sup>3</sup> /h               | 0 to 72000 m <sup>3</sup> /h                |
| 1800 72               | 0 to 18400 m <sup>3</sup> /h               | 0 to 92000 m <sup>3</sup> /h                |
| 2000 78               | 0 to 22000 m <sup>3</sup> /h               | 0 to 110000 m <sup>3</sup> /h               |

### Approved Flowmeter Sizes for "Liquids Other than Water"

| Flowmeter Sizes and Max. Allowable Flowrates |       |                            |         |       |             |     |
|----------------------------------------------|-------|----------------------------|---------|-------|-------------|-----|
| DN                                           | Inch  | Q <sub>max</sub> Liter/min |         |       |             |     |
| 25                                           | 1     | selectable                 | 60 to   | 200   | in steps of | 10  |
| 32                                           | 1-1/4 | selectable                 | 100 to  | 400   | in steps of | 10  |
| 40                                           | 1-1/2 | selectable                 | 150 to  | 750   | in steps of | 50  |
| 50                                           | 2     | selectable                 | 250 to  | 1000  | in steps of | 50  |
| 65                                           | 2-1/2 | selectable                 | 400 to  | 2000  | in steps of | 100 |
| 80                                           | 3     | selectable                 | 700 to  | 3000  | in steps of | 100 |
| 100                                          | 4     | selectable                 | 900 to  | 4500  | in steps of | 100 |
| 150                                          | 6     | selectable                 | 2000 to | 10000 | in steps of | 500 |

| Minimum Flowrate and Fluid |       |                     |                   |
|----------------------------|-------|---------------------|-------------------|
| DN                         | Inch  | Min. Flowrate l/min | Fluid             |
| 25                         | 1     | 8                   | Beer, Milk, Syrup |
| 32                         | 1-1/4 | 5                   | Beer, Milk, Syrup |
| 40                         | 1-1/2 | 20                  | Beer, Milk        |
| 50                         | 2     | 200                 | Beer, Wort        |
| 65                         | 2-1/2 | 500                 | Milk, Wort, Beer  |
| 80                         | 3     | 500                 | Milk, Wort, Beer  |
| 100                        | 4     | 2000                | Brine, Wort       |
| 150                        | 6     | 2000                | Brine             |

Min. flow range approx. 2.5 m/s.

Max. flow range approx. 10 m/s.

The flow ranges are prescribed as listed in the tables. Subsequent flow range changes necessitate a new certification on an agency certified calibration stand.

### Installation Requirements for Volume Flowrate Integrators

The following installation requirements are to be observed: For Cold Water and Waste Water a straight pipeline section with a length of at least 5 times the flowmeter size is required upstream of the flowmeter primary and at least twice the flowmeter size downstream. For Liquids Other than Water (Milk, Beer, Wort, Brine) the values shown in brackets in Fig. 10 apply.

For flow metering in both flow directions (forward and reverse) straight pipeline sections with a length of at least 5 times the flowmeter primary size are required both up- and downstream by the "Cold Water and Waste Water" approval and a length of at least 10 times the flowmeter primary size by the "Liquids Other than Water" approval. The piping system must always be completely filled with fluid. The signal cable length may not exceed 100 m.

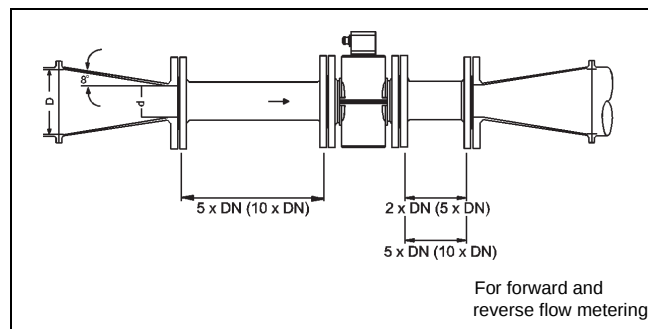


Fig.10 Pipeline Installation, Reductions as Required

**COPA-XM / MAG-XM****Specifications, Flowmeter Primary MAG-XM  
Flanged Design, Ex-Protection****Ex-Temperature Classes, Meter Sizes, Liners**

| Meter Size |             | Liner Material | Standard Temperature Class |       |        | High Temperature Class |        |
|------------|-------------|----------------|----------------------------|-------|--------|------------------------|--------|
| DN         | Inch        |                | T6                         | T5    | T4     | T3                     | Option |
| 3 – 10     | 1/8 - 3/8   | PTFE/PFA       | –                          | –     | 110 °C | 180 °C                 | X      |
| 15 – 40    | 1/2 - 1-1/2 | PTFE/PFA       | –                          | –     | 110 °C | 180 °C                 | X      |
| 15 – 40    | 1/2 - 1-1/2 | Hard rubber    | –                          | –     | 90 °C  | –                      | –      |
| 50         | 2           | PTFE/PFA       | 70 °C                      | 95 °C | 130 °C | 180 °C                 | X      |
| 50         | 2           | Hard rubber    | 70 °C                      | 95 °C | –      | –                      | –      |
| 65         | 2-1/2       | PTFE/PFA       | 70 °C                      | 95 °C | 130 °C | 180 °C                 | X      |
| 65         | 2-1/2       | Hard rubber    | 70 °C                      | 90 °C | –      | –                      | –      |
| 65         | 2-1/2       | Soft rubber    | 50 °C                      | –     | –      | –                      | –      |
| 80         | 3           | PTFE/PFA       | 70 °C                      | 95 °C | 130 °C | 180 °C                 | X      |
| 80         | 3           | Hard rubber    | 70 °C                      | 90 °C | –      | –                      | –      |
| 80         | 3           | Soft rubber    | 50 °C                      | –     | –      | –                      | –      |
| 100        | 4           | PTFE/PFA       | 60 °C                      | 85 °C | 130 °C | 180 °C                 | X      |
| 100        | 4           | Hard rubber    | 60 °C                      | 85 °C | 90 °C  | –                      | –      |
| 100        | 4           | Soft rubber    | 50 °C                      | –     | –      | –                      | –      |
| 125        | 5           | PTFE/PFA       | 50 °C                      | 80 °C | 130 °C | 180 °C                 | X      |
| 125        | 5           | Hard rubber    | 50 °C                      | 80 °C | 130 °C | –                      | –      |
| 125        | 5           | Soft rubber    | 50 °C                      | –     | –      | –                      | –      |
| 150        | 6           | PTFE/PFA       | 60 °C                      | 80 °C | 130 °C | 180 °C                 | X      |
| 150        | 6           | Hard rubber    | 60 °C                      | 80 °C | –      | –                      | –      |
| 150        | 6           | Soft rubber    | 50 °C                      | –     | –      | –                      | –      |
| 200        | 8           | PTFE/PFA       | 60 °C                      | 80 °C | 130 °C | 180 °C                 | X      |
| 200        | 8           | Hard rubber    | 60 °C                      | 80 °C | –      | –                      | –      |
| 200        | 8           | Soft rubber    | 50 °C                      | –     | –      | –                      | –      |
| 250        | 10          | PTFE/PFA       | 50 °C                      | 80 °C | 125 °C | 180 °C                 | X      |
| 250        | 10          | Hard rubber    | 50 °C                      | 80 °C | –      | –                      | –      |
| 250        | 10          | Soft rubber    | 50 °C                      | –     | –      | –                      | –      |
| 300 – 600  | 12 - 24     | PTFE/PFA       | 60 °C                      | 80 °C | 120 °C | 180 °C                 | X      |
| 300 – 600  | 12 - 24     | Hard rubber    | 60 °C                      | 80 °C | –      | –                      | –      |
| 300 – 600  | 12 - 24     | Soft rubber    | 50 °C                      | –     | –      | –                      | –      |
| 700 – 2000 | 28 - 78     | Hard rubber    | 60 °C                      | 80 °C | 90 °C  | –                      | –      |
| 700 – 2000 | 28 - 78     | Soft rubber    | 50 °C                      | –     | –      | –                      | –      |

1) – = not available

2) X = Optional, High Temperature Design

Please specify Temperature Class when ordering.

**Ambient Temperature****Standard**

-20 °C to + 40 °C (-4 °F to 104 °F)

**High Temperature Design**

-20 °C to + 60 °C (-4 °F to 140 °F)

Removable electrodes DN 300 to DN 2000: 12" to 78" may not be used for fluid temperatures exceeding + 60 °C or for pressures exceeding 25 bar. Option upon request.

**Ex-Protection Zone 1****MAG-XM**

Symbol: EEx em [ib] IIC T3, T4, T5 or T6

Approval: PTB No. Ex-92.C.2187

Model: 10DX3111

**Ex-Protection Zone 1****COPA-XM"d"**

See Specification Sheet Part No. D184S010U01

**Ex-Protection Zone 2**

Factory certification per DIN VDE 0165 can be provided for the standard design.

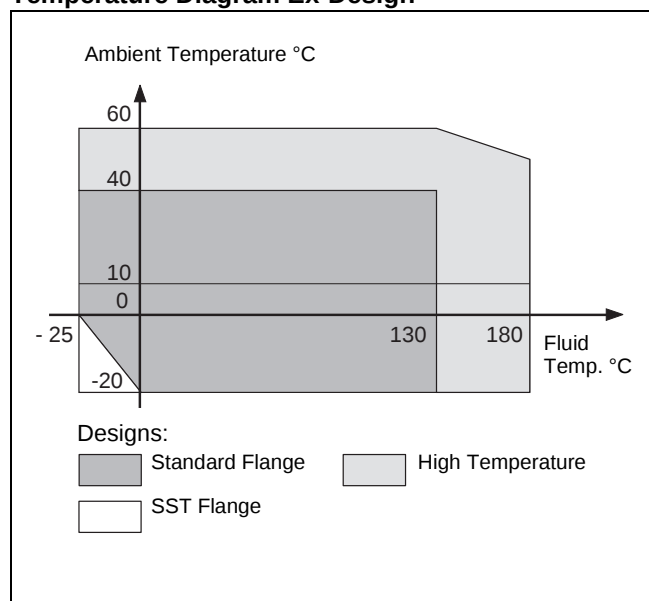
**Temperature Diagram Ex-Design**

Fig.11 Fluid Temperature as a Function of the Ambient Temperature

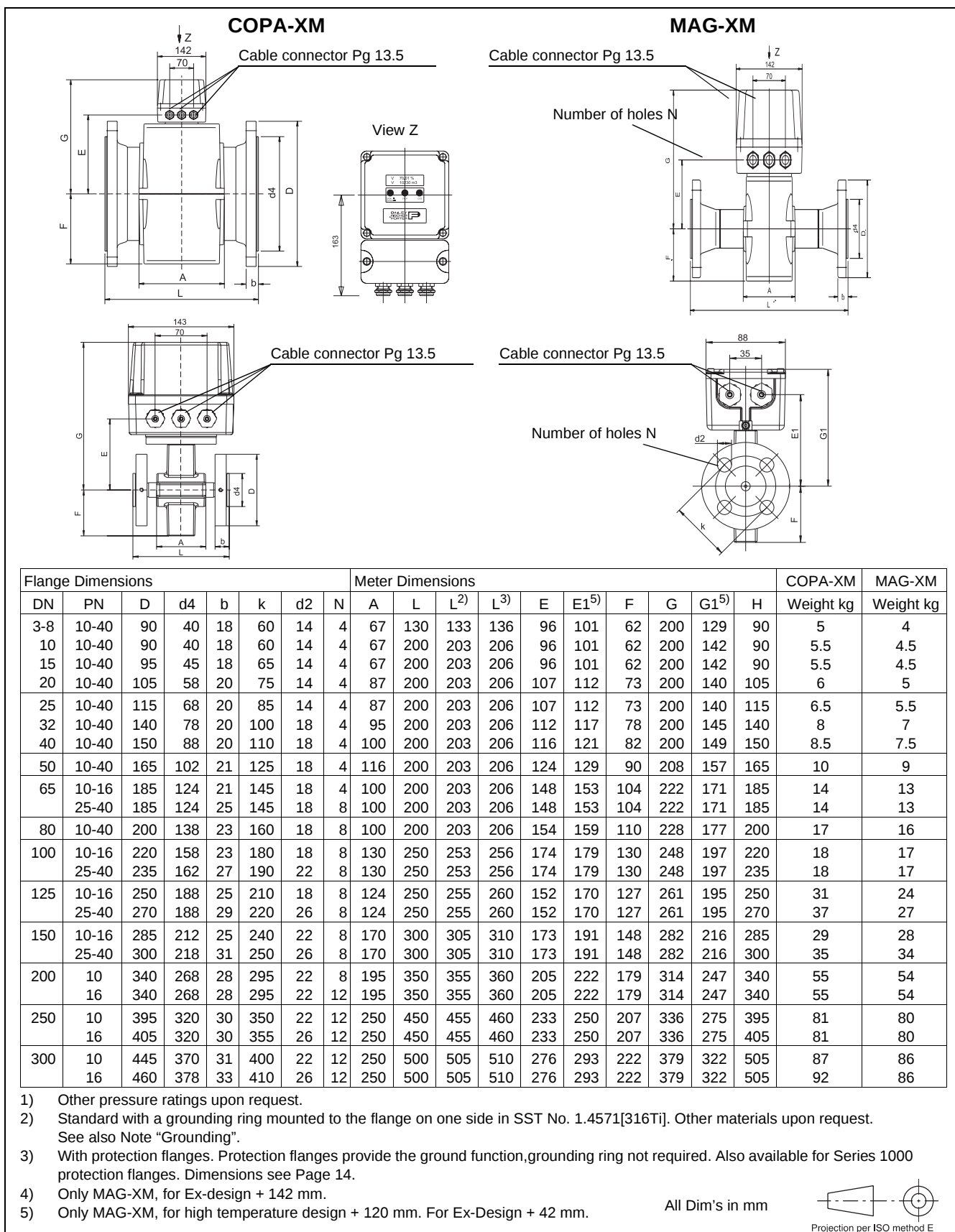
**COPA-XM / MAG-XM****Dimensions, Flowmeters  
DN 3 to DN 300, DIN Flanges**

Fig.12 Flowmeter DN 3 to DN 300, DIN Flanges

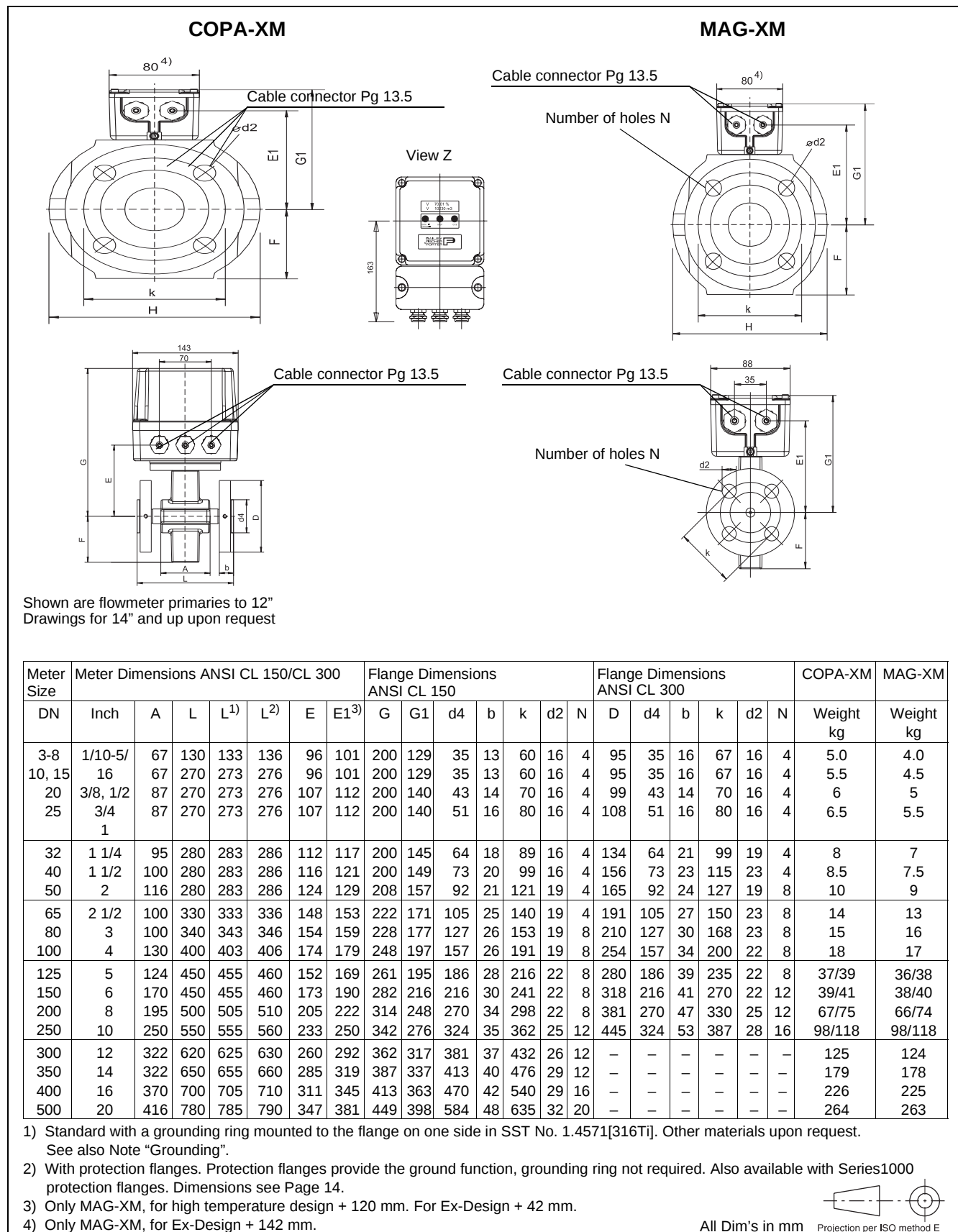
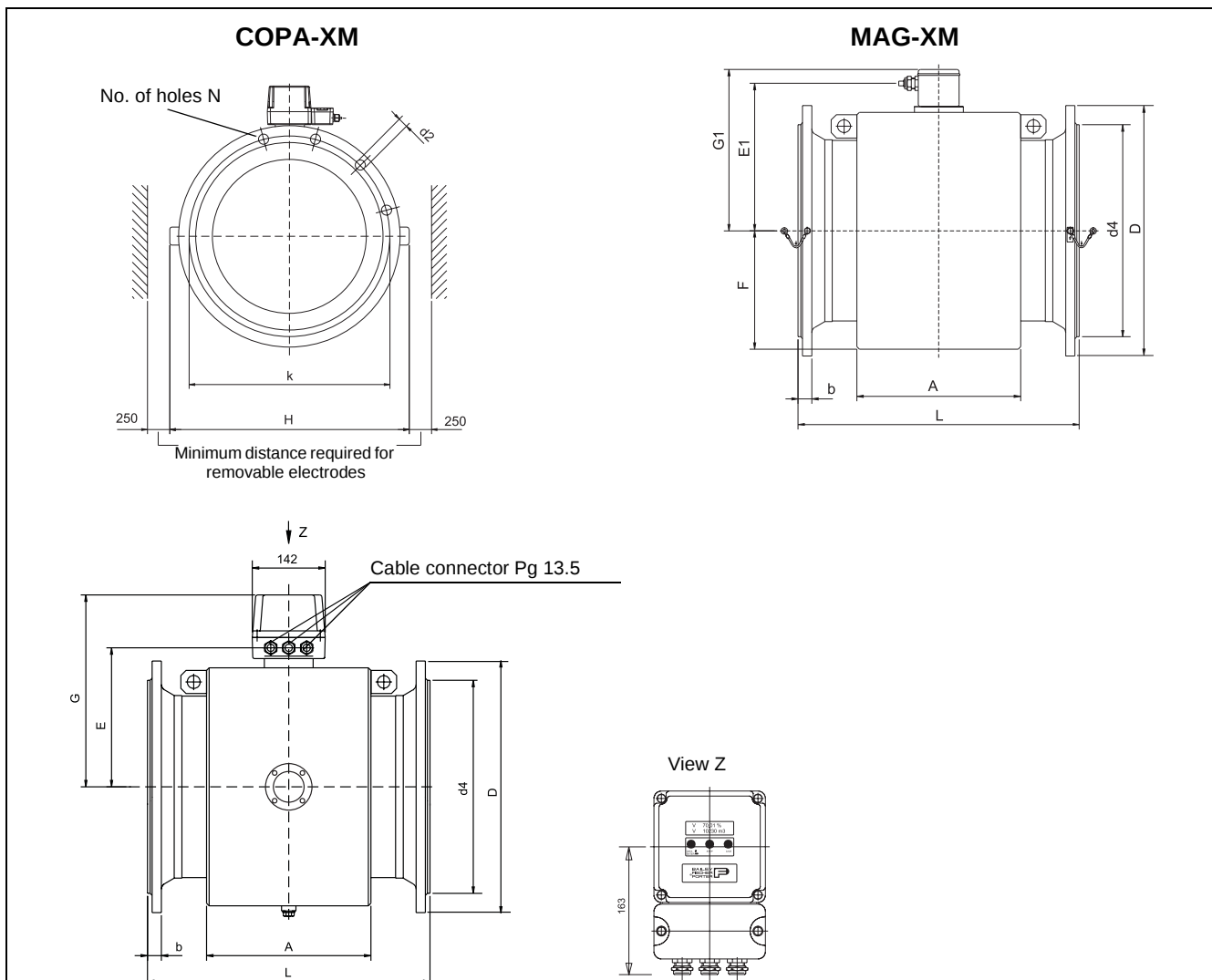
**COPA-XM / MAG-XM****Dimensions Flowmeters  
1/8" to 20", ANSI Flanges**

Fig.13 Flowmeter 1/10" to 20", ANSI Flanges

## Dimensions Flowmeters

### DN 350 to DN 2000, DIN Flanges DIN



Flanges per DIN 2501

| Flange Dimensions |                  |      |      |    |      |    |    | Meter Dimensions |                                                           |      |     |     |     |     |      | COPA-XM | MAG-XM |
|-------------------|------------------|------|------|----|------|----|----|------------------|-----------------------------------------------------------|------|-----|-----|-----|-----|------|---------|--------|
|                   |                  |      |      |    |      |    |    | A                | Prot. Flanges<br>without <sup>3)</sup> with <sup>4)</sup> |      | E   | E1  | G   | G1  | H    |         |        |
| DN <sup>1)</sup>  | PN <sup>2)</sup> | D    | d4   | b  | k    | d2 | N  |                  | L                                                         | L    |     |     |     |     |      |         |        |
| 350               | 10               | 505  | 430  | 31 | 460  | 22 | 16 | 322              | 550                                                       | 560  | 285 | 319 | 381 | 346 | 620  | 142     | 140    |
| 400               | 10               | 565  | 482  | 31 | 515  | 26 | 16 | 370              | 600                                                       | 610  | 311 | 319 | 407 | 346 | 671  | 164     | 148    |
| 350               | 16               | 520  | 438  | 35 | 470  | 26 | 16 | 322              | 550                                                       | 560  | 285 | 345 | 381 | 372 | 620  | 142     | 182    |
| 400               | 16               | 580  | 490  | 37 | 525  | 30 | 16 | 370              | 600                                                       | 610  | 311 | 345 | 407 | 372 | 671  | 171     | 192    |
| 500               | 10               | 670  | 585  | 33 | 620  | 26 | 20 | 416              | 650                                                       | 660  | 347 | 381 | 449 | 408 | 743  | 210     | 216    |
| 600               | 10               | 780  | 685  | 33 | 725  | 30 | 20 | 480              | 780                                                       | 790  | 398 | 431 | 507 | 457 | 844  | 281     | 281    |
| 700               | 10               | 895  | 800  | 35 | 840  | 30 | 24 | 540              | 910                                                       | 920  | 441 | 475 | 550 | 501 | 932  | 392     | 392    |
| 800               | 10               | 1015 | 905  | 37 | 950  | 33 | 24 | 586              | 1040                                                      | 1050 | 491 | 525 | 600 | 552 | 1032 | 439     | 439    |
| 900               | 10               | 1115 | 1005 | 39 | 1050 | 33 | 28 | 630              | 1170                                                      | —    | 541 | 575 | 650 | 602 | 1132 | 755     | 755    |
| 1000              | 10               | 1230 | 1110 | 39 | 1160 | 36 | 28 | 670              | 1300                                                      | —    | 591 | 625 | 700 | 652 | 1232 | 959     | 958    |

- >DN 1000 with/without protection flanges upon request.
  - Standard pressure ratings. Others upon request
  - Grounding ring to DN 800, L + 5 mm. See also Note "Grounding".
  - Protection flanges provide the ground function, ground ring not required.
- Protection flanges also available for Series 1000-Design, Dimensions see Page 14.

All Dim's in mm

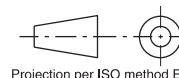


Fig.14 Flowmeter DN 350 to DN 2000, DIN Flanges

**COPA-XM / MAG-XM****Ordering Information  
Flanged Flowmeters**

In addition to the Ordering Number please supply the following information: fluid, fluid temperature, operating pressure, flow range, type of pipeline (grounding ring, grounding electrodes)<sup>1)</sup>

| COPA-XM                                                                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  | MAG-XM   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------------------------------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|----------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Ordering Number                                                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 10DX3111 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Conductivity ≥ 5 μS/cm                                                  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Design Level (specified by BFP)                                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  | *        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Installation Length                                                     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Series 3000 (short design) standard                                     |  |  |  |  |  |  |  |  |  |  |  |  |  |  | A        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Series 1000 (only for exchange) DN10-DN 250:3/8"-10"                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  | C        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Liner material                                                          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Hard rubber (DN 15 to DN 2000; 1/2" - 78")                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  | A        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Soft rubber (DN 50 to DN 2000; 2" - 78")                                |  |  |  |  |  |  |  |  |  |  |  |  |  |  | B        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| PTFE (DN 3 to DN 800: 1/8" - 32")                                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  | E        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| PFA (DN 3 to DN 250: 1/8" - 10")                                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  | K        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Others                                                                  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Z        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Meter Size                                                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 3 1/10"                                                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 01       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 4 5/32"                                                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 02       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 6 1/4"                                                               |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 04       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 8 5/16"                                                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 05       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 10 3/8"                                                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 06       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 15 1/2"                                                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 07       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 20 3/4"                                                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 08       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 25 1"                                                                |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 09       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 32 1-1/4"                                                            |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 10       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 40 1-1/2"                                                            |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 11       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 50 2"                                                                |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 12       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 65 2-1/2"                                                            |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 13       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 80 3"                                                                |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 14       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 100 4"                                                               |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 15       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 125 5"                                                               |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 16       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 150 6"                                                               |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 17       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 200 8"                                                               |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 18       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 250 10"                                                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 19       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 300 12"                                                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 20       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 350 14"                                                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 21       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 400 16"                                                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 22       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 500 20"                                                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 23       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 600 24"                                                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 24       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 700 28"                                                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 25       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 800 32"                                                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 26       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 900 36"                                                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 27       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 1000 40"                                                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 28       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 1200 48"                                                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 30       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 1400 54"                                                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 31       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 1600 64"                                                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 32       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 1800 72"                                                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 33       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 2000 78"                                                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 34       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Pressure Rating                                                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DIN PN 2.5                                                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  | A        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DIN PN 6                                                                |  |  |  |  |  |  |  |  |  |  |  |  |  |  | B        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DIN PN 10                                                               |  |  |  |  |  |  |  |  |  |  |  |  |  |  | C        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DIN PN 16                                                               |  |  |  |  |  |  |  |  |  |  |  |  |  |  | D        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DIN PN 25                                                               |  |  |  |  |  |  |  |  |  |  |  |  |  |  | E        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DIN PN 40                                                               |  |  |  |  |  |  |  |  |  |  |  |  |  |  | F        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| JIS K10 ≤ DN 1400                                                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  | F        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ANSI CL 150 (Installation Length Series 1000)                           |  |  |  |  |  |  |  |  |  |  |  |  |  |  | P        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ANSI CL 300 (Installation Length Series 1000)                           |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Q        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Flange Material                                                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Steel                                                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 1        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SST No. 1.4541[321] (>DN 125: 5")                                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 2        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SST No. 1.4571[316Ti]                                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 3        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Others upon request                                                     |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 9        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Flange Accessories                                                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| None                                                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  | A        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Prot. flanges SST No. 1.4571[316Ti] (mounted on both ends)              |  |  |  |  |  |  |  |  |  |  |  |  |  |  | B        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Grounding ring SST No. 1.4571[316Ti] <sup>2)</sup>                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  | C        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Prot. Flanges SS No. 1.4571[316Ti] (mounted on both ends) <sup>3)</sup> |  |  |  |  |  |  |  |  |  |  |  |  |  |  | D        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |



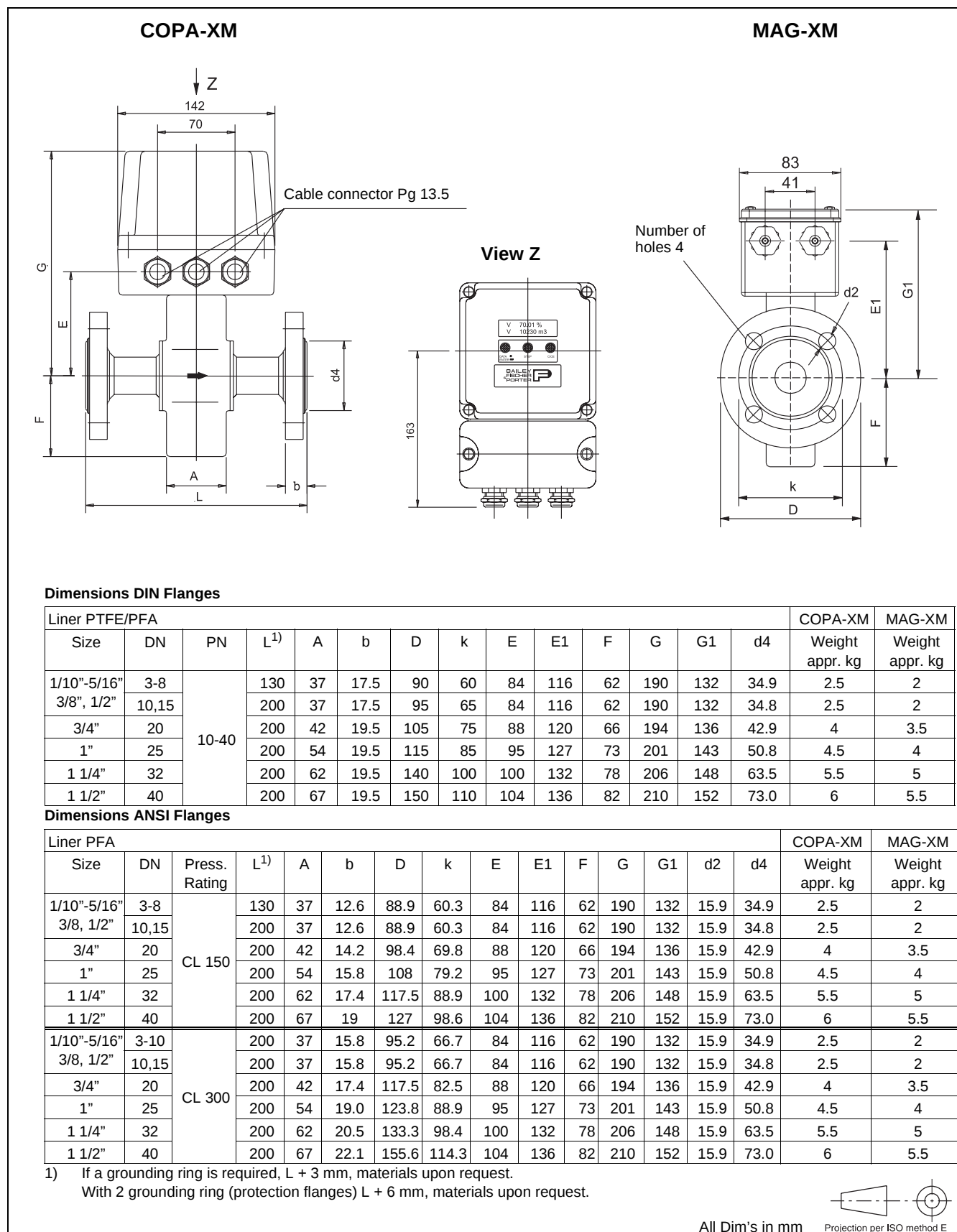
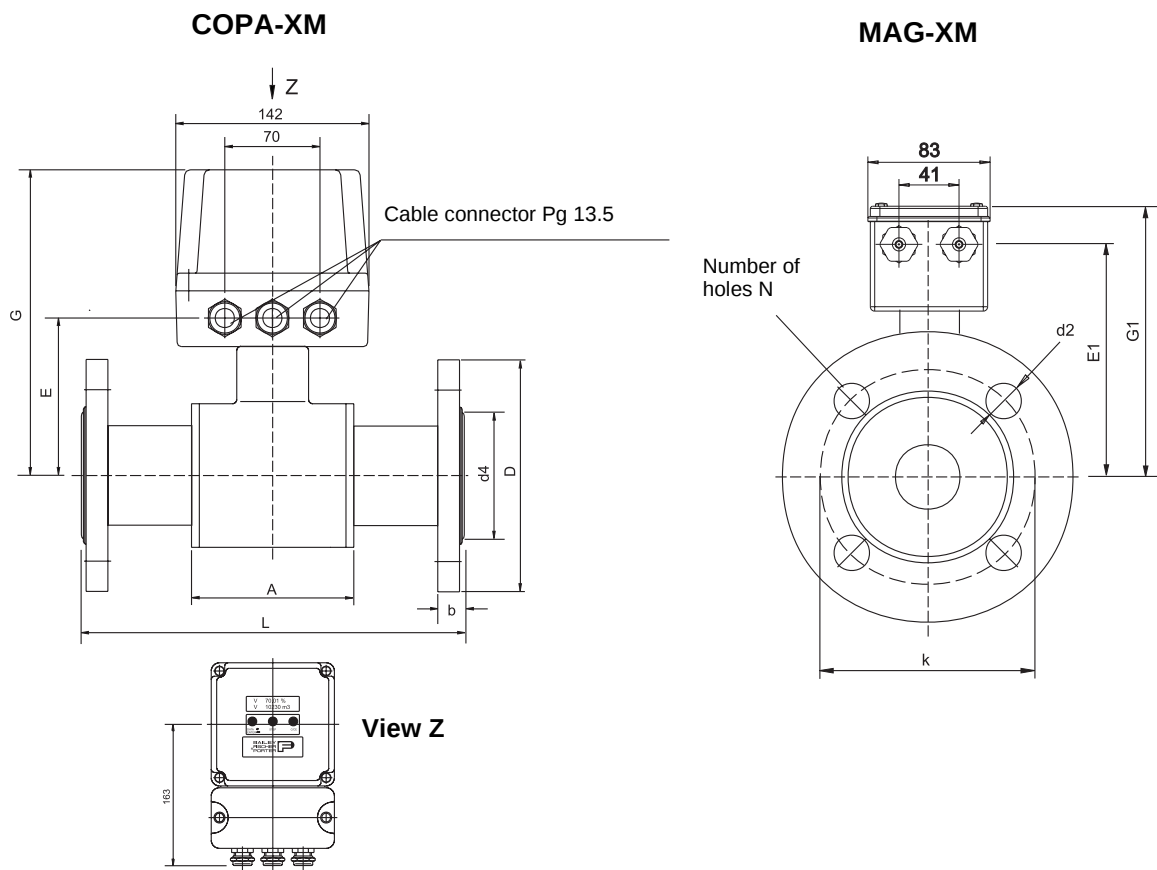
**COPA-XM / MAG-XM****Dimensions, Stainless Steel Flowmeters****Models DM23F and DM21F, DN 3 to DN 40: 1/8" to 1-1/4", Flanged**

Fig.15 Flowmeter DN 3 to DN 40: 1/8" to 1-1/4"

**COPA-XM / MAG-XM**

# Dimensions, Stainless Steel Flowmeters

## Models DM23F and DM21F, DN 50 to DN 100: 2" to 4", Flanged

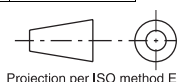
**Dimensions DIN Flanges**

| Liner PFA |       |                 |     |    |     |     |     |     |     |     |    |     |   | COPA-XM            | MAG-XM             |
|-----------|-------|-----------------|-----|----|-----|-----|-----|-----|-----|-----|----|-----|---|--------------------|--------------------|
| DN        | PN    | L <sup>1)</sup> | A   | b  | D   | k   | E   | E1  | G   | G1  | d2 | d4  | N | Weight<br>appr. kg | Weight<br>appr. kg |
| 50        | 10-40 | 200             | 100 | 24 | 165 | 125 | 117 | 135 | 214 | 161 | 18 | 104 | 4 | 10                 | 8                  |
| 65        | 10-16 | 200             | 107 | 26 | 185 | 145 | 131 | 149 | 228 | 175 | 18 | 124 | 4 | 12                 | 10                 |
|           | 25-40 | 200             | 107 | 26 | 185 | 145 | 131 | 149 | 228 | 175 | 18 | 124 | 8 | 12                 | 10                 |
| 80        | 10-40 | 200             | 107 | 28 | 200 | 160 | 137 | 155 | 234 | 181 | 18 | 139 | 8 | 14                 | 12                 |
| 100       | 10-16 | 250             | 159 | 24 | 220 | 180 | 157 | 175 | 254 | 201 | 18 | 161 | 8 | 20                 | 18                 |
|           | 25-40 | 250             | 159 | 24 | 235 | 190 | 157 | 175 | 254 | 201 | 22 | 167 | 8 | 20                 | 18                 |

**Dimensions ANSI Flanges**

| Liner PFA |     |                  |                 |     |    |     |     |     |     |     |     |    |     |   | COPA-XM            | MAG-XM             |
|-----------|-----|------------------|-----------------|-----|----|-----|-----|-----|-----|-----|-----|----|-----|---|--------------------|--------------------|
| Size      | DN  | Press.<br>Rating | L <sup>1)</sup> | A   | b  | D   | k   | E   | E1  | G   | G1  | d2 | d4  | N | Weight<br>appr. kg | Weight<br>appr. kg |
| 2"        | 50  | CL 150           | 200             | 100 | 23 | 152 | 121 | 117 | 135 | 214 | 161 | 19 | 99  | 4 | 10                 | 8                  |
| 2 1/2"    | 65  |                  | 200             | 107 | 26 | 178 | 140 | 131 | 149 | 228 | 175 | 19 | 118 | 4 | 12                 | 10                 |
| 3"        | 80  |                  | 200             | 107 | 28 | 191 | 152 | 137 | 155 | 234 | 181 | 19 | 131 | 8 | 14                 | 12                 |
| 4"        | 100 |                  | 250             | 159 | 28 | 229 | 190 | 157 | 175 | 254 | 201 | 19 | 171 | 8 | 20                 | 18                 |
| 2"        | 50  | CL 300           | 200             | 100 | 26 | 165 | 127 | 117 | 135 | 214 | 161 | 19 | 102 | 8 | 10                 | 8                  |
| 2 1/2"    | 65  |                  | 200             | 107 | 27 | 191 | 149 | 131 | 149 | 228 | 175 | 22 | 124 | 8 | 12                 | 10                 |
| 3"        | 80  |                  | 200             | 107 | 32 | 210 | 168 | 137 | 155 | 234 | 181 | 22 | 143 | 8 | 14                 | 12                 |
| 4"        | 100 |                  | 250             | 159 | 36 | 254 | 200 | 157 | 175 | 254 | 201 | 22 | 177 | 8 | 20                 | 18                 |

- 1) If a grounding ring is required, L + 3 mm, materials upon request.  
With 2 grounding rings (protection flanges) L + 6 mm, materials upon request.



All Dim's in mm

Projection per ISO method E

Fig.16 Flowmeter DN 50 to DN 100: 2" to 4"

**COPA-XM / MAG-XM****Ordering Information, Stainless Steel Flowmeters  
Flanged DN 3 to DN 100; 1/8" to 4"**

In addition to the Ordering Number please supply the following information: fluid, fluid temperature, operating pressure, flow range, type of pipeline (grounding ring)<sup>1)</sup>

| COPA-XM                                                    |                                     |    |  |  |  |  |  |  |  | MAG-XM                                                     |                                     |    |  |  |  |  |  |  |  |
|------------------------------------------------------------|-------------------------------------|----|--|--|--|--|--|--|--|------------------------------------------------------------|-------------------------------------|----|--|--|--|--|--|--|--|
| Ordering Number                                            |                                     |    |  |  |  |  |  |  |  | Ordering Number                                            |                                     |    |  |  |  |  |  |  |  |
| DM23F                                                      |                                     |    |  |  |  |  |  |  |  | DM21F                                                      |                                     |    |  |  |  |  |  |  |  |
| Conductivity $\geq 5 \mu\text{S/cm}$                       |                                     |    |  |  |  |  |  |  |  | Conductivity $\geq 5 \mu\text{S/cm}$                       |                                     |    |  |  |  |  |  |  |  |
| Liner material: PFA                                        |                                     |    |  |  |  |  |  |  |  | Liner material: PFA                                        |                                     |    |  |  |  |  |  |  |  |
| P                                                          |                                     |    |  |  |  |  |  |  |  | P                                                          |                                     |    |  |  |  |  |  |  |  |
| Meter Size                                                 |                                     |    |  |  |  |  |  |  |  | Meter Size                                                 |                                     |    |  |  |  |  |  |  |  |
| DN 3                                                       | 1/10"                               | 03 |  |  |  |  |  |  |  | DN 3                                                       | 1/10"                               | 03 |  |  |  |  |  |  |  |
| DN 4                                                       | 5/32"                               | 04 |  |  |  |  |  |  |  | DN 4                                                       | 5/32"                               | 04 |  |  |  |  |  |  |  |
| DN 6                                                       | 1/4"                                | 06 |  |  |  |  |  |  |  | DN 6                                                       | 1/4"                                | 06 |  |  |  |  |  |  |  |
| DN 8                                                       | 5/16"                               | 08 |  |  |  |  |  |  |  | DN 8                                                       | 5/16"                               | 08 |  |  |  |  |  |  |  |
| DN 10                                                      | 3/8"                                | 10 |  |  |  |  |  |  |  | DN 10                                                      | 3/8"                                | 10 |  |  |  |  |  |  |  |
| DN 15                                                      | 1/2"                                | 15 |  |  |  |  |  |  |  | DN 15                                                      | 1/2"                                | 15 |  |  |  |  |  |  |  |
| DN 20                                                      | 3/4"                                | 20 |  |  |  |  |  |  |  | DN 20                                                      | 3/4"                                | 20 |  |  |  |  |  |  |  |
| DN 25                                                      | 1"                                  | 25 |  |  |  |  |  |  |  | DN 25                                                      | 1"                                  | 25 |  |  |  |  |  |  |  |
| DN 32                                                      | 1-1/4"                              | 32 |  |  |  |  |  |  |  | DN 32                                                      | 1-1/4"                              | 32 |  |  |  |  |  |  |  |
| DN 40                                                      | 1-1/2"                              | 40 |  |  |  |  |  |  |  | DN 40                                                      | 1-1/2"                              | 40 |  |  |  |  |  |  |  |
| DN 50                                                      | 2"                                  | 50 |  |  |  |  |  |  |  | DN 50                                                      | 2"                                  | 50 |  |  |  |  |  |  |  |
| DN 65                                                      | 2-1/2"                              | 65 |  |  |  |  |  |  |  | DN 65                                                      | 2-1/2"                              | 65 |  |  |  |  |  |  |  |
| DN 80                                                      | 3"                                  | 80 |  |  |  |  |  |  |  | DN 80                                                      | 3"                                  | 80 |  |  |  |  |  |  |  |
| DN 100                                                     | 4"                                  | 1H |  |  |  |  |  |  |  | DN 100                                                     | 4"                                  | 1H |  |  |  |  |  |  |  |
| Measuring Electrode Material/ Grounding Electrode Material |                                     |    |  |  |  |  |  |  |  | Measuring Electrode Material/ Grounding Electrode Material |                                     |    |  |  |  |  |  |  |  |
| SST No. 1.4571[316Ti]                                      | / without                           | S  |  |  |  |  |  |  |  | SST No. 1.4571[316Ti]                                      | / without                           | S  |  |  |  |  |  |  |  |
| Hastelloy B-2                                              | / without                           | B  |  |  |  |  |  |  |  | Hastelloy B-2                                              | / without                           | B  |  |  |  |  |  |  |  |
| Hastelloy C-4                                              | / without                           | H  |  |  |  |  |  |  |  | Hastelloy C-4                                              | / without                           | H  |  |  |  |  |  |  |  |
| Titanium                                                   | / without                           | M  |  |  |  |  |  |  |  | Titanium                                                   | / without                           | M  |  |  |  |  |  |  |  |
| Tantalum                                                   | / without                           | T  |  |  |  |  |  |  |  | Tantalum                                                   | / without                           | T  |  |  |  |  |  |  |  |
| SST No. 1.4539                                             | / without (Food Ind. applications.) | F  |  |  |  |  |  |  |  | SST No. 1.4539                                             | / without (Food Ind. applications.) | F  |  |  |  |  |  |  |  |
| Platinum-Iridium                                           | / without                           | P  |  |  |  |  |  |  |  | Platinum-Iridium                                           | / without                           | P  |  |  |  |  |  |  |  |
| SST No. 1.4571[316Ti]                                      | / with                              | E  |  |  |  |  |  |  |  | SST No. 1.4571[316Ti]                                      | / with                              | E  |  |  |  |  |  |  |  |
| Hastelloy B-2                                              | / with                              | N  |  |  |  |  |  |  |  | Hastelloy B-2                                              | / with                              | N  |  |  |  |  |  |  |  |
| Hastelloy C-4                                              | / with                              | O  |  |  |  |  |  |  |  | Hastelloy C-4                                              | / with                              | O  |  |  |  |  |  |  |  |
| Titanium                                                   | / with                              | I  |  |  |  |  |  |  |  | Titanium                                                   | / with                              | I  |  |  |  |  |  |  |  |
| Tantalum                                                   | / with                              | Q  |  |  |  |  |  |  |  | Tantalum                                                   | / with                              | Q  |  |  |  |  |  |  |  |
| SST No. 1.4539                                             | / with (Food Ind. applications.)    | R  |  |  |  |  |  |  |  | SST No. 1.4539                                             | / with (Food Ind. applications.)    | R  |  |  |  |  |  |  |  |
| Platinum-Iridium                                           | / with                              | G  |  |  |  |  |  |  |  | Platinum-Iridium                                           | / with                              | G  |  |  |  |  |  |  |  |
| Pressure Rating                                            |                                     |    |  |  |  |  |  |  |  | Pressure Rating                                            |                                     |    |  |  |  |  |  |  |  |
| PN 10                                                      |                                     | C  |  |  |  |  |  |  |  | PN 10                                                      |                                     | C  |  |  |  |  |  |  |  |
| PN 16                                                      | standard DN 100: 4'                 | D  |  |  |  |  |  |  |  | PN 16                                                      | standard DN 100: 4'                 | D  |  |  |  |  |  |  |  |
| PN 25                                                      |                                     | E  |  |  |  |  |  |  |  | PN 25                                                      |                                     | E  |  |  |  |  |  |  |  |
| PN 40                                                      | standard DN 10 - 80: 3/8" - 3"      | F  |  |  |  |  |  |  |  | PN 40                                                      | standard DN 10 - 80: 3/8" - 3"      | F  |  |  |  |  |  |  |  |
| JIS K10                                                    |                                     | K  |  |  |  |  |  |  |  | JIS K10                                                    |                                     | K  |  |  |  |  |  |  |  |
| ANSI CL 150                                                |                                     | P  |  |  |  |  |  |  |  | ANSI CL 150                                                |                                     | P  |  |  |  |  |  |  |  |
| ANSI CL 300                                                |                                     | Q  |  |  |  |  |  |  |  | ANSI CL 300                                                |                                     | Q  |  |  |  |  |  |  |  |
| Process Connection Material                                |                                     |    |  |  |  |  |  |  |  | Process Connection Material                                |                                     |    |  |  |  |  |  |  |  |
| SST No. 1.4571[316Ti]                                      |                                     | 3  |  |  |  |  |  |  |  | SST No. 1.4571[316Ti]                                      |                                     | 3  |  |  |  |  |  |  |  |
| Others                                                     |                                     | 9  |  |  |  |  |  |  |  | Others                                                     |                                     | 9  |  |  |  |  |  |  |  |
| Accessories                                                |                                     |    |  |  |  |  |  |  |  | Accessories                                                |                                     |    |  |  |  |  |  |  |  |
| None                                                       |                                     | A  |  |  |  |  |  |  |  | None                                                       |                                     | A  |  |  |  |  |  |  |  |
| With magnetic stick operation                              |                                     | B  |  |  |  |  |  |  |  | With magnetic stick operation                              |                                     | B  |  |  |  |  |  |  |  |
| Protection flanges <sup>1)</sup>                           |                                     | C  |  |  |  |  |  |  |  | Protection flanges <sup>1)</sup>                           |                                     | C  |  |  |  |  |  |  |  |
| Magnetic stick operation, protection flanges <sup>1)</sup> |                                     | D  |  |  |  |  |  |  |  | Magnetic stick operation, protection flanges <sup>1)</sup> |                                     | D  |  |  |  |  |  |  |  |
| Grounding plate <sup>1)</sup>                              |                                     | E  |  |  |  |  |  |  |  | Grounding plate <sup>1)</sup>                              |                                     | E  |  |  |  |  |  |  |  |
| Magnetic stick operation, grounding ring <sup>1)</sup>     |                                     | F  |  |  |  |  |  |  |  | Magnetic stick operation, grounding ring <sup>1)</sup>     |                                     | F  |  |  |  |  |  |  |  |
| Temperature Range                                          |                                     |    |  |  |  |  |  |  |  | Temperature Range                                          |                                     |    |  |  |  |  |  |  |  |
| Standard design $\leq 130^\circ\text{C}$                   |                                     | S  |  |  |  |  |  |  |  | Standard design $\leq 130^\circ\text{C}$                   |                                     | S  |  |  |  |  |  |  |  |

Continued on next page

1) Protection flanges (2 grounding rings) mounted on both flanges or 1 grounding ring mounted on one flange, Material SST No. 1.4571[316Ti]. Others upon request.

**COPA-XM / MAG-XM**

## Ordering Information, Stainless Steel Flowmeters

### Flanged DN 3 to DN 100: 1/8" to 4"

| COPA-XM                                                   |  |  |  |  |  |  |  |  |  |  |  |  | MAG-XM |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--------|--|--|--|--|--|--|--|--|--|--|--|--|
| Ordering Number                                           |  |  |  |  |  |  |  |  |  |  |  |  | DM21F  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>Approvals</b>                                          |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |
| None                                                      |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |
| Agency certified for Cold Water & Waste Water ≥ DN 25: 1" |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |
| Agency certified for Liquids Other than Water ≥ DN 25: 1" |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |
| Inspection certificate 3.1B per EN 10204                  |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>Protection Class</b>                                   |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |
| IP 67                                                     |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |
| IP 68 (only MAG-XM)                                       |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>Power Supply</b>                                       |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |
| 230 V; 50/60 Hz                                           |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |
| 115/120 V; 50/60 Hz                                       |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |
| 110 V; 50/60 Hz                                           |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |
| 48 V; 50/60 Hz                                            |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |
| 24 V; 50/60 Hz                                            |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |
| 24 V DC                                                   |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>Display</b>                                            |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |
| With                                                      |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>Contact Input</b>                                      |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>/Contact Output</b>                                    |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |
| Opto coupler /Opto, General alarm                         |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |
| Opto coupler /Relay, General alarm                        |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |
| Opto coupler /Opto, Function configurable                 |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |
| Opto coupler /Relay, Function configurable                |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>Pulse output</b>                                       |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>/Communication</b>                                     |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |
| 1-channel active 24 V DC /None                            |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |
| 1-channel passive /None                                   |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |
| 1-channel active 24 V DC /RS 232C                         |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |
| 1-channel active 24 V DC /HART-Protocol®                  |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |
| 1-channel passive /HART-Protocol®                         |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |
| 2-channel active 24 V DC /None                            |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |
| 2-channel passive /None                                   |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |
| None /RS 485                                              |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |
| None /Profi-Bus DP                                        |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>Application</b>                                        |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |
| Standard                                                  |  |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |

**Additional written Ordering Information may always be included:**

**Instrument Tag**

German  
English  
French

**Electrode Design**

Standard  
Conical head (DN 10: 3/8: and up) Use for high fat content liquids

**Excitation Frequency**

6 1/4 Hz  
12 1/2 Hz Standard  
7 1/2 Hz (60 Hz line)  
15 Hz (60 Hz line)  
25 Hz

**Note:**

- Please indicate in writing if a calibration for ± 0.2 % of rate is required.

**COPA-XM / MAG-XM****Specifications Stainless Steel Flowmeters  
Model DM21 or DM23, DN 1 to DN 100: 1/25" to 4"****Ambient Conditions****Ambient Temperature**

-25 °C to + 60 °C (-13 °F to 140 °F)

**Fluid Temperature**

- 40 °C to + 130 °C (-40 °F to 266 °F), CIP-Cleaning capable, see Temperature Diagram and Max.Allowable Cleaning Temperature.

Maximum allowable ambient temperature as a function of the fluid temperature for stainless steel process connections and Wafer Design.

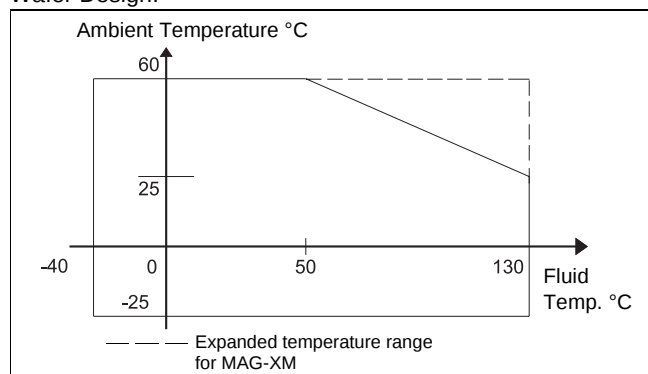


Fig.17 Temperature Diagram

**Storage Temperature**

- 25 °C to + 70 °C (-13 °F to +158 °F)

**Minimum Allowable Absolute Pressure**

| Liner       | Meter Size<br>DN Inch | P <sub>Operate</sub><br>mbar abs | at | T <sub>Operate</sub><br>°C |
|-------------|-----------------------|----------------------------------|----|----------------------------|
| PFA         | 3 – 100 1/10" - 4"    | 0                                | ≤  | 130                        |
| PEEK/Torlon | 1 – 2 1/25" - 1/12"   | 0                                | ≤  | 130                        |

**Max. Allowable Fluid Temperature and Pressure**

| Process Connection<br>Liner PFA | Meter Size<br>DN Inch             | P <sub>Operate</sub><br>bar | at          | T <sub>Operate</sub><br>°C |
|---------------------------------|-----------------------------------|-----------------------------|-------------|----------------------------|
| Wafer Design,<br>Weld stubs     | 3 – 100 1/10 - 4                  | 40<br>30<br>10              | ≤<br>≤<br>≤ | 20<br>130<br>130           |
| Flanges FAB1 DIN 11864-2        | 3 – 100 1/10 - 4                  | 10                          | ≤           | 130                        |
| Aseptic connection<br>DIN 11864 | 3 – 100 1/10 - 4                  | 16                          | ≤           | 130                        |
| Food ind. fitting<br>DIN 11851  | 3 – 40 1/10-1-1/2<br>50-100 2 - 4 | 40<br>25                    | ≤<br>≤      | 130<br>130                 |
| Tri-Clamp DIN 32676             | 3 – 100 1/10 - 4                  | 10                          | ≤           | 130                        |
| Male/female thds ISO 228        | 3 – 25 1/10 - 1                   | 10                          | ≤           | 130                        |
| PVC-Cement sleeve               | 3 – 25 1/10 - 1                   | 10<br>1                     | ≤<br>≤      | 20<br>60                   |
| Hose connector                  | 3 – 15 1/10 - 1/2                 | 10                          | ≤           | 130                        |
| 1/8"-Pipe thread                | 1 – 2 1/25-1/12                   | 10                          | ≤           | 130                        |

**Maximum Allowable Cleaning Temperature**

| CIP-Cleaning                          | Liner                       | T <sub>max</sub><br>°C | T <sub>max</sub><br>Minutes | T <sub>Umg</sub><br>°C |
|---------------------------------------|-----------------------------|------------------------|-----------------------------|------------------------|
| Steam cleaning or.<br>Liquid cleaning | PFA/PEEK<br>PFA/PEEK/Torlon | 150<br>140             | 60<br>60                    | 25<br>25               |

If the ambient temperature >25 °C, the max. cleaning temperature is to be reduced by the difference, T<sub>max</sub> - Δ °C where  
 $\Delta \text{ }^{\circ}\text{C} = (T_{\text{Amb.}} - 25 \text{ }^{\circ}\text{C})$ .

**Maximum Allowable Temperature Shock**

| Liner             | Temp.-Shock<br>max. Temp.-Diff. °C | Temp.-Gradient<br>°C/min |
|-------------------|------------------------------------|--------------------------|
| PFA, PEEK, Torlon | any                                | any                      |

**Specifications Flowmeter Primary  
Flowmeter Primary Materials**

| Liner<br>Material       | Electrode Material                                           |                                                                                              | Electrode Design |                                 |
|-------------------------|--------------------------------------------------------------|----------------------------------------------------------------------------------------------|------------------|---------------------------------|
|                         | Standard                                                     | Others                                                                                       | Standard         | Others                          |
| PFA,<br>PEEK,<br>Torlon | Hast.-C4<br>(1.4539 for<br>Food ind. fitting<br>& Tri-Clamp) | Hast.-B2<br>SST 1.4539<br>SST1.4571[316Ti]<br>Tantalum, Tita-<br>nium, Platinum-Iri-<br>dium | Flat head        | Conical<br>head<br>(≥DN10:3/8") |

| Process Conn. Material                                                                                             | Standard                                                                                   | Option                                                                   |
|--------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Wafer Design                                                                                                       | None                                                                                       |                                                                          |
| Weld stubs, Flanges,<br>Pipe coupling, Tri-<br>Clamp<br>Male/female threads,<br>Hose connector<br>1/8"-Pipe thread | SST No.1.4301[304]<br>SST No.1.4404[316L]<br>for flanges<br><br>SS No.1.4571[316Ti]        | SST No.1.4571[316Ti]<br>SST No. 1.4404[316L]<br>Others<br><br>POM, Brass |
| PVC-Cement sleeve                                                                                                  | PVC                                                                                        | –                                                                        |
| Connection box<br>COPA-XM                                                                                          | Cast Aluminum<br>painted,<br>Paint coat<br>Frame: sky blue,<br>RAL 5012<br>Cover: RAL 9006 |                                                                          |
| MAG-XM                                                                                                             | Stainless steel                                                                            | –                                                                        |
| Metering tube                                                                                                      | SST No. 1.4301[304]                                                                        | –                                                                        |
| Pg-Connector                                                                                                       | Polyamide                                                                                  | PVDF                                                                     |
| Primary housing                                                                                                    | Deep drawn housing                                                                         | SST No. 1.4301[304]                                                      |

**Gasket Material, Electrical Connections,  
Weight and Design**

| Process Conn. Material                                                                                                | Gasket Material                                                                  |
|-----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| Wafer Design,                                                                                                         | None                                                                             |
| Weld stubs, Flanges,<br>Food ind. fitting<br>Tri-Clamp<br>Male/female threads<br>Hose connector,<br>PVC-cement sleeve | EPDM (Ethylene-Propylene) Std.<br>with/without FDA-Approval<br>Silicone (option) |
| Flat housing gasket                                                                                                   | Silicone                                                                         |

**Supply power**

From converter

**Weight**

See Dimensions Page 21-24

**Process Connections****DN 1 – 2: 1/25" - 1/12"**

1/8"-Pipe thread with hose connector and with 2 grounding electrodes made of the same material as the measuring electrodes, standard.

**DN 3 – 100: 1/10" - 4"**

Wafer Design, Flanged, Tri-Clamp, Food ind. fittings, sanitary connection, Male/female threads, PVC-Cement sleeve, Hose connector, Others upon request

**Protection Class**

IP 67 Standard

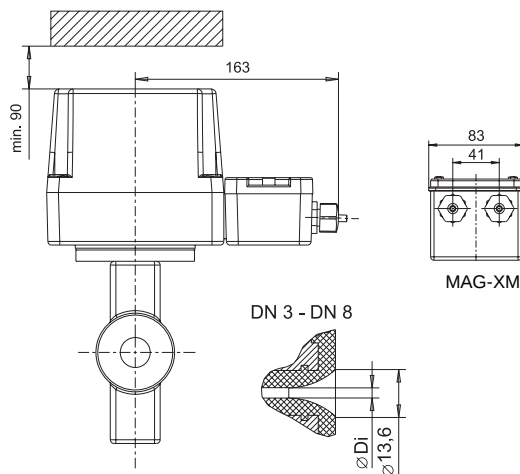
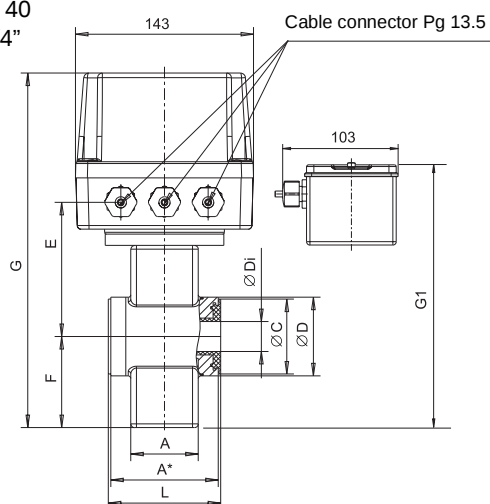
IP 68 (only for MAG-XM) with Pg hose connector

## Dimensions Stainless Steel Flowmeters

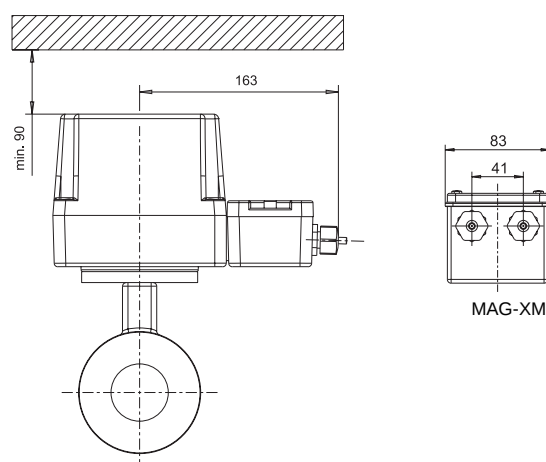
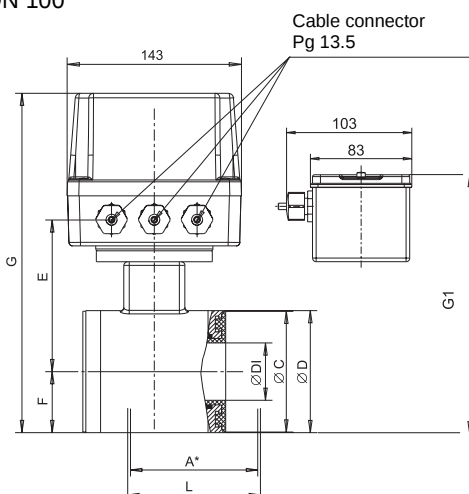
### Flowmeters DN 3 to DN 100: 1/10" to 4", Wafer Design

### Models DM21W and DM23W

DN 3 – DN 40  
1/10" – 1-1/4"



DN 50 – DN 100  
2" – 4"

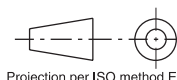


Dimensions of fastening element, optional, upon request

| Meter Size<br>DN | Inch  | Press.<br>Rating              | L <sup>1)</sup> | A*  | A  | ØC  | ØDi | ØD  | E   | F    | G     | G1<br>MAG-XM | COPA-XM<br>Wgt. appr. kg | MAG-XM<br>Wgt. appr. kg |
|------------------|-------|-------------------------------|-----------------|-----|----|-----|-----|-----|-----|------|-------|--------------|--------------------------|-------------------------|
| 3                | 1/10  | PN 10-40<br>CL 150/<br>CL 300 | 68              | 64  | 37 | 42  | 3   | 45  | 96  | 62   | 262   | 197          | 5.0                      | 1.5                     |
| 4                | 5/32  |                               |                 |     |    |     | 4   |     |     |      |       |              |                          |                         |
| 6                | 1/4   |                               |                 |     |    |     | 6   |     |     |      |       |              |                          |                         |
| 8                | 5/16  |                               |                 |     |    |     | 8   |     |     |      |       |              |                          |                         |
| 10               | 3/8   |                               |                 |     |    |     | 10  |     |     |      |       |              |                          |                         |
| 15               | 1/2   |                               |                 |     |    |     | 13  |     |     |      |       |              |                          |                         |
| 20               | 3/4   |                               | 78              | 74  | 42 | 50  | 18  | 54  | 100 | 66   | 270   | 205          | 5.0                      | 2.0                     |
| 25               | 1     |                               |                 |     |    |     | 24  |     |     |      |       |              |                          |                         |
| 32               | 1-1/4 |                               |                 |     |    |     | 30  |     |     |      |       |              |                          |                         |
| 40               | 1-1/2 |                               |                 |     |    |     | 36  |     |     |      |       |              |                          |                         |
| 50               | 2     |                               |                 |     |    |     | 47  |     |     |      |       |              |                          |                         |
| 65               | 2-1/2 | PN 10-40<br>CL 150/<br>CL 300 | 103             | 99  | —  | 111 | 62  | 116 | 138 | 58   | 300   | 235          | 8.0                      | 4.5                     |
| 80               | 3     |                               | 103             | 99  | —  | 128 | 74  | 133 | 144 | 66.5 | 314.5 | 250          | 9.5                      | 6.5                     |
| 100              | 4     |                               | 133             | 129 | —  | 155 | 96  | 160 | 164 | 80   | 348   | 283          | 12.0                     | 8.5                     |

1) Installation lengths with 2 grounding rings L + 3 mm

All Dim's in mm



Projection per ISO method E

Fig.18 Dimensions, Models DM21W and DM23W, DN 3 to DN 100: 1/10" to 4", Wafer Design

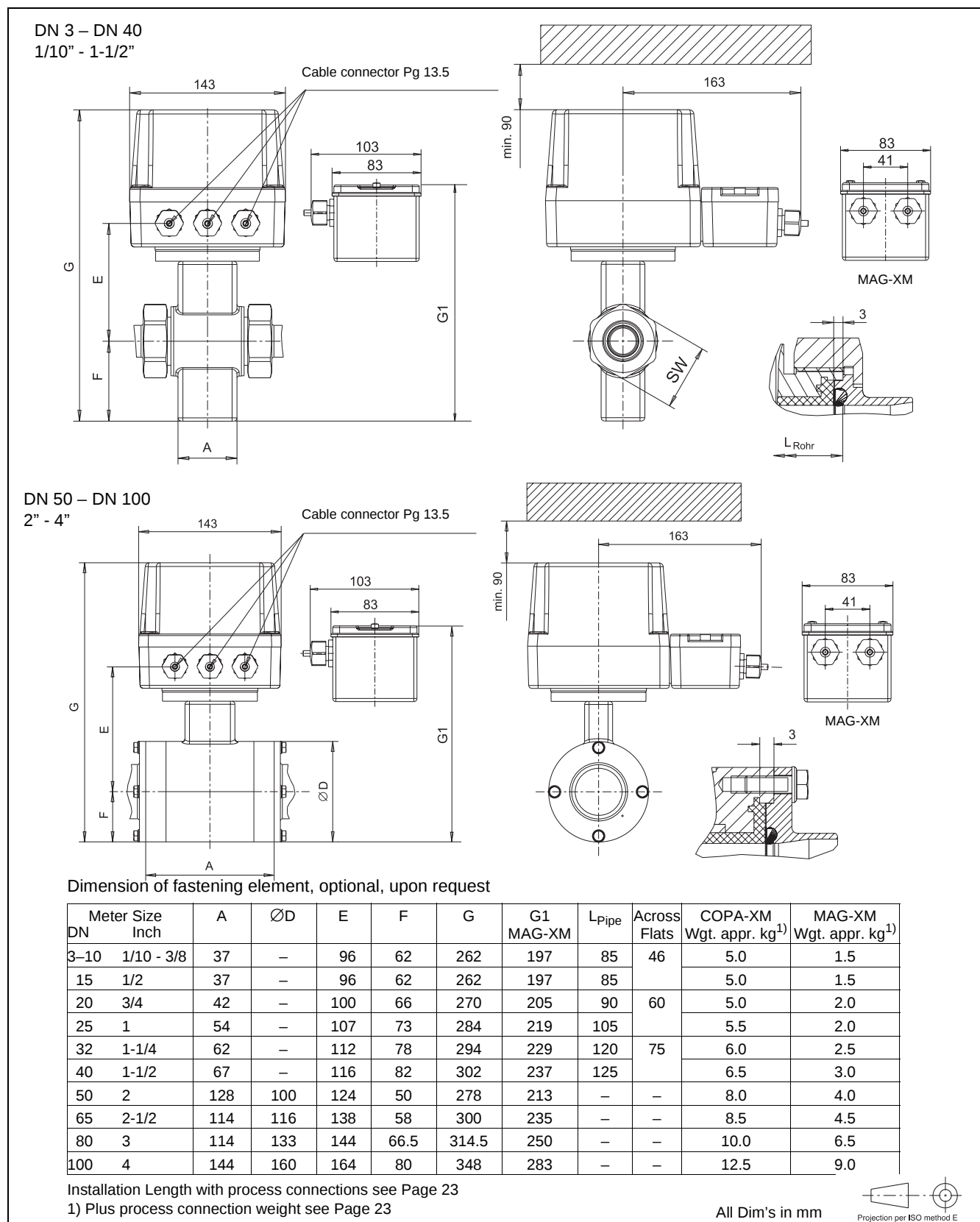
**COPA-XM / MAG-XM****Dimensions****Flowmeters, Variable Process Connections****Models DM21 and DM23**

Fig.19 Dimensions, Models DM21 and DM23, DN 3 to DN 100: 1/10" to 4", Variable Process Connections

## Dimensions Stainless Steel Flowmeters Adapter for Variable Process Connections Models DM21 and DM23

|                          |            | Weld Stubs |                          | Food ind. fitting |                          | Aseptic connection |                          | Tri-Clamp |                          |
|--------------------------|------------|------------|--------------------------|-------------------|--------------------------|--------------------|--------------------------|-----------|--------------------------|
| Meter Size<br>DN<br>Inch |            | DIN 11850  | Wgt.<br>kg <sup>1)</sup> | DIN 11851         | Wgt.<br>kg <sup>1)</sup> | DIN 11864-1        | Wgt.<br>kg <sup>1)</sup> | DIN 32676 | Wgt.<br>kg <sup>1)</sup> |
| 3-10                     | 1/10 - 3/8 | 127        | 0.4                      | 169               | 0.5                      | 161                | 0.5                      | 163       | 0.5                      |
| 15                       | 1/2        | 127        | 0.4                      | 169               | 0.5                      | 161                | 0.5                      | 163       | 0.5                      |
| 20                       | 3/4        | 132        | 0.7                      | 180               | 0.9                      | 170                | 0.9                      | 168       | 0.7                      |
| 25                       | 1          | 149        | 0.7                      | 207               | 0.9                      | 197                | 0.9                      | 192       | 0.8                      |
| 32                       | 1-1/4      | 166        | 1.0                      | 230               | 1.4                      | 220                | 1.4                      | 209       | 1.5                      |
| 40                       | 1-1/2      | 171        | 1.0                      | 237               | 1.4                      | 227                | 1.4                      | 214       | 1.4                      |
| 50                       | 2          | 173        | 1.0                      | 243               | 1.4                      | 233                | 1.4                      | 216       | 1.2                      |
| 65                       | 2-1/2      | 165        | 1.4                      | 245               | 2.2                      | 233                | 2.2                      | 221       | 1.6                      |
| 80                       | 3          | 169        | 2.0                      | 259               | 3.2                      | 245                | 3.2                      | 225       | 2.4                      |
| 100                      | 4          | 199        | 2.6                      | 307               | 4.4                      | 291                | 4.4                      | 255       | 3.1                      |

| Flange |       |                |                         |
|--------|-------|----------------|-------------------------|
| DN     | Inch  | DIN 11864-T2-B | Weight kg <sup>1)</sup> |
| 10     | 3/8   | 183            | 0.9                     |
| 15     | 1/2   | 183            | 1.0                     |
| 20     | 3/4   | 188            | 1.3                     |
| 25     | 1     | 207            | 1.6                     |
| 40     | 1-1/2 | 229            | 1.8                     |
| 50     | 2     | 231            | 2.2                     |
| 65     | 2-1/2 | 223            | 3.0                     |
| 80     | 3     | 227            | 4.0                     |
| 100    | 4     | 257            | 5.0                     |

| Hose connector |            |    |      |     |                         |
|----------------|------------|----|------|-----|-------------------------|
| DN             | Inch       | Di | Da   | L   | Weight kg <sup>1)</sup> |
| 3-10           | 1/10 - 3/8 | 10 | 14.5 | 159 | 0.4                     |
| 15             | 1/2        | 16 | 21   | 159 | 0.4                     |

| Male Threads ISO 228 / DIN 2999 |            |      |    |     |                         |
|---------------------------------|------------|------|----|-----|-------------------------|
| DN                              | Inch       | R    | a  | L   | Weight kg <sup>1)</sup> |
| 3-10                            | 1/10 - 3/8 | 3/8" | 18 | 139 | 0.4                     |
| 15                              | 1/2        | 3/8" | 18 | 139 | 0.4                     |
| 20                              | 3/4        | 3/4" | 25 | 164 | 0.8                     |
| 25                              | 1          | 1"   | 25 | 179 | 0.8                     |

| Female Threads ISO 228 / DIN 2999 |            |      |    |     |                         |
|-----------------------------------|------------|------|----|-----|-------------------------|
| DN                                | Inch       | R    | a  | L   | Weight kg <sup>1)</sup> |
| 3-10                              | 1/10 - 3/8 | 3/8" | 15 | 139 | 0.5                     |
| 15                                | 1/2        | 3/8" | 15 | 139 | 0.5                     |
| 20                                | 3/4        | 3/4" | 22 | 164 | 0.9                     |
| 25                                | 1          | 3/4" | 22 | 179 | 0.8                     |

| PVC-Cement sleeve |            |    |    |     |                         |
|-------------------|------------|----|----|-----|-------------------------|
| DN                | Inch       | Di | a  | L   | Weight kg <sup>1)</sup> |
| 3-10              | 1/10 - 3/8 | 16 | 14 | 143 | 0.4                     |
| 15                | 1/2        | 20 | 16 | 159 | 0.4                     |
| 20                | 3/4        | 25 | 19 | 164 | 0.6                     |
| 25                | 1          | 32 | 22 | 199 | 0.6                     |

1) Weight per pair

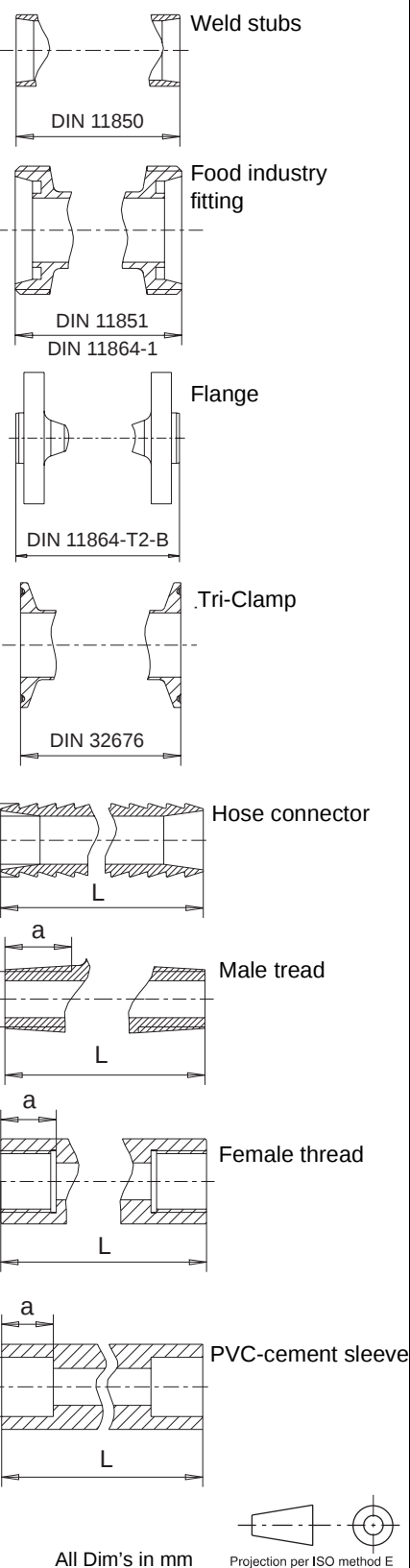


Fig.20 Dimensions, Models DM21 and DM23, DN 3 to DN 100:1/8" to 4", Adapters for Variable Process Connections

**COPA-XM / MAG-XM**

## Dimensions, Stainless Steel Flowmeters

### 1/8"-Pipe thread, DN 1 to DN 2: 1/25" to 1/12"

### Models DM23B and DM21B

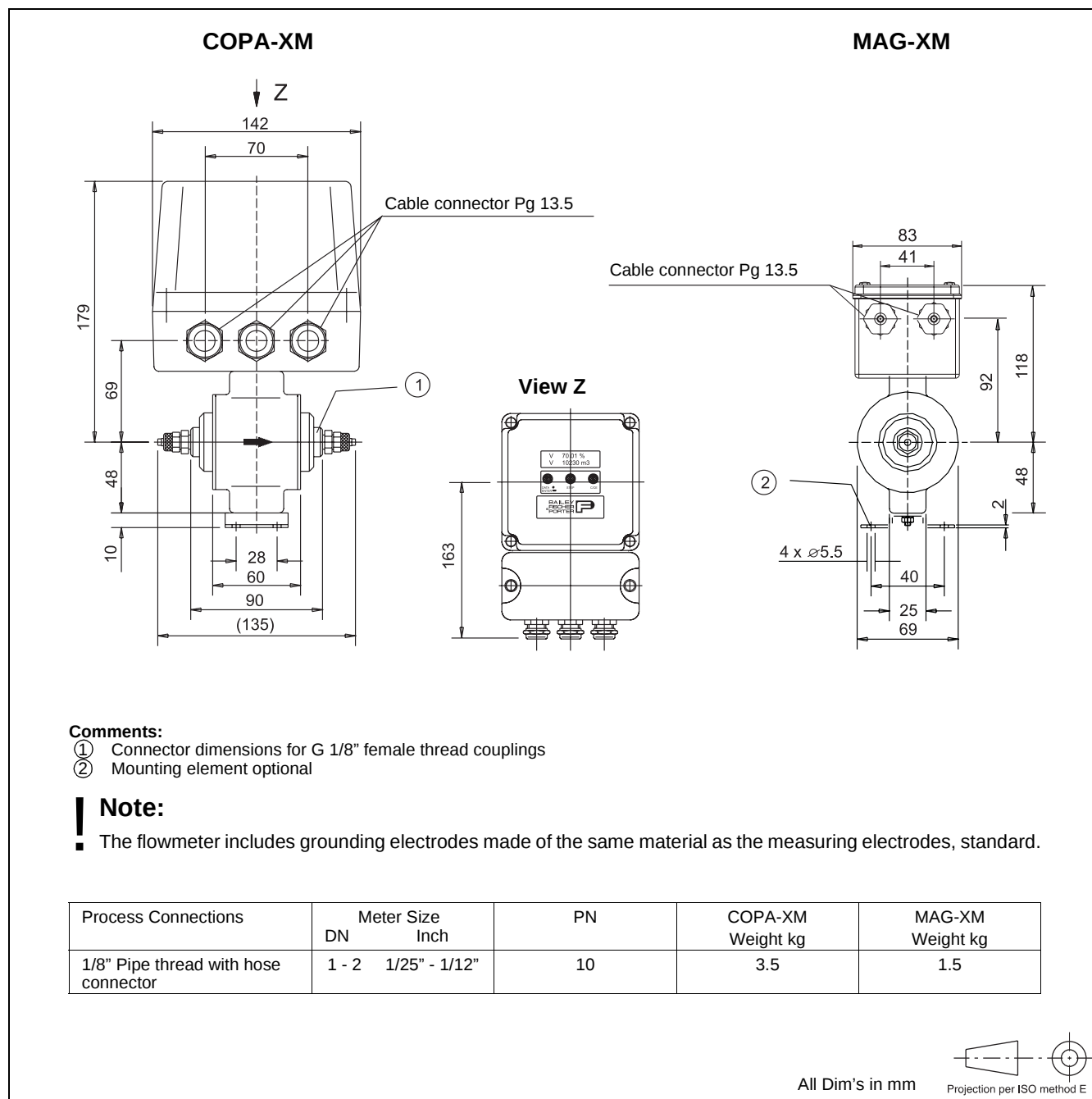


Fig.21 Flowmeter DN 1 to DN 2: 1/25" to 1/12"

**COPA-XM / MAG-XM****Ordering Information Stainless Steel Flowmeters**

In addition to the Ordering Number please supply the following information: fluid, fluid temperature, operating pressure, flow range, type of pipeline (grounding ring, grounding electrodes)<sup>1)</sup>

| COPA-XM                                                           |                                                                                                         |      |  |  |  |  |  |  |  |  |  |  |  | MAG-XM |  |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|------|--|--|--|--|--|--|--|--|--|--|--|--------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Ordering Number                                                   |                                                                                                         | DM23 |  |  |  |  |  |  |  |  |  |  |  | DM21   |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Process Connections                                               |                                                                                                         |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Wafer Design                                                      |                                                                                                         | W    |  |  |  |  |  |  |  |  |  |  |  | W      |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Flanges Type APV FAB1 DIN 11864-2                                 |                                                                                                         | L    |  |  |  |  |  |  |  |  |  |  |  | L      |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Aseptic connection DIN 11864-1                                    |                                                                                                         | A    |  |  |  |  |  |  |  |  |  |  |  | A      |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1/8"-Pipe thread DN 1-2:1/25"-3/32"                               |                                                                                                         | B    |  |  |  |  |  |  |  |  |  |  |  | B      |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Weld stubs DIN 11850                                              |                                                                                                         | R    |  |  |  |  |  |  |  |  |  |  |  | R      |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Pipe coupling DIN 11851                                           |                                                                                                         | S    |  |  |  |  |  |  |  |  |  |  |  | S      |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Tri-Clamp DIN 32676                                               |                                                                                                         | T    |  |  |  |  |  |  |  |  |  |  |  | T      |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Male thds ISO 228/DIN 2999 DN 3-25:1/8-1                          |                                                                                                         | E    |  |  |  |  |  |  |  |  |  |  |  | E      |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Fem. thds ISO 228/DIN 2999 DN 3-25:1/8-1                          |                                                                                                         | I    |  |  |  |  |  |  |  |  |  |  |  | I      |  |  |  |  |  |  |  |  |  |  |  |  |  |
| PVC-cement sleeve DN 3-25:1/8-1                                   |                                                                                                         | G    |  |  |  |  |  |  |  |  |  |  |  | G      |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Hose connector DN 3-15:1/8-1/2                                    |                                                                                                         | H    |  |  |  |  |  |  |  |  |  |  |  | H      |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Others                                                            |                                                                                                         | Z    |  |  |  |  |  |  |  |  |  |  |  | Z      |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Liner material                                                    |                                                                                                         |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| PFA                                                               |                                                                                                         | P    |  |  |  |  |  |  |  |  |  |  |  | P      |  |  |  |  |  |  |  |  |  |  |  |  |  |
| PEEK (DN 1-2: 1/25"-3/32")                                        |                                                                                                         | K    |  |  |  |  |  |  |  |  |  |  |  | K      |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Torlon (DN 1-2: 1/25"-3/32")                                      |                                                                                                         | N    |  |  |  |  |  |  |  |  |  |  |  | N      |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Meter Size                                                        |                                                                                                         |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 1                                                              | Inch 1/25                                                                                               |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 1.5                                                            | 1/17                                                                                                    |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 2                                                              | 1/12                                                                                                    |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 3                                                              | 1/8                                                                                                     |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 4                                                              | 5/32                                                                                                    |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 6                                                              | 1/4                                                                                                     |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 8                                                              | 5/16                                                                                                    |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 10                                                             | 3/8                                                                                                     |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 15                                                             | 1/2                                                                                                     |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 20                                                             | 3/4                                                                                                     |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 25                                                             | 1                                                                                                       |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 32                                                             | 1-1/4                                                                                                   |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 40                                                             | 1-1/2                                                                                                   |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 50                                                             | 2                                                                                                       |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 65                                                             | 2-1/2                                                                                                   |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 80                                                             | 3                                                                                                       |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DN 100                                                            | 4                                                                                                       |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Measuring Electrode Mat'l/Grounding Electrode Mat'l <sup>1)</sup> |                                                                                                         |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SST No. 1.4571[316Ti]                                             | /without                                                                                                |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Hastelloy B-2                                                     | /without                                                                                                |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Hastelloy C-4                                                     | /without standard                                                                                       |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Titanium                                                          | /without                                                                                                |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Tantalum                                                          | /without                                                                                                |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SST No. 1.4539                                                    | /without (Food Ind. Applications)                                                                       |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Platinum-Iridium                                                  | /without                                                                                                |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SST No. 1.4571[316Ti]                                             | /with                                                                                                   |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Hastelloy B-2                                                     | /with                                                                                                   |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Hastelloy C-4                                                     | /with standard                                                                                          |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Titanium                                                          | /with                                                                                                   |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Tantalum                                                          | /with                                                                                                   |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SST No. 1.4539                                                    | /with (Food Ind. Applications)                                                                          |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Platinum-Iridium                                                  | /with                                                                                                   |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Pressure Rating                                                   |                                                                                                         |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| PN 10                                                             | Standard for Flanges<br>Tri-Clamp, Male/female threads,<br>PVC-Solvent weld coupling,<br>Hose connector |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| PN 16                                                             |                                                                                                         |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| PN 25                                                             | Only Wafer Design, pipe coupling.,<br>and Weld stubs                                                    |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| PN 40                                                             |                                                                                                         |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| JIS K10                                                           |                                                                                                         |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ANSI CL 150                                                       |                                                                                                         |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ANSI CL 300                                                       |                                                                                                         |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Process Connection Material                                       |                                                                                                         |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| None                                                              | (Only Wafer Design)                                                                                     |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SST No. 1.4571[316Ti]                                             |                                                                                                         |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SST No. 1.4404[316L]                                              | Standard for flanges                                                                                    |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SST No. 1.4301[304]                                               | Standard                                                                                                |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| PVC                                                               | (Only PVC-Solvent weld coupling)                                                                        |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| POM                                                               | (DN 1-2: 1/25"-1/12")                                                                                   |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Others                                                            |                                                                                                         |      |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |  |  |

Continued on next page

1) Required only for Wafer Design and insulated lined pipelines or for PVC-Solvent weld couplings.

2) Always order with grounding electrode material for DN 1-2: 1/25"-3/32", standard.

**COPA-XM / MAG-XM****Ordering Information Stainless Steel Flowmeters**

| COPA-XM                                                     |  |                               |  |  |  |  |  |  |  |  |  |  | MAG-XM                                           |  |   |  |  |  |  |  |  |  |  |  |  |
|-------------------------------------------------------------|--|-------------------------------|--|--|--|--|--|--|--|--|--|--|--------------------------------------------------|--|---|--|--|--|--|--|--|--|--|--|--|
| Ordering Number                                             |  | DM23                          |  |  |  |  |  |  |  |  |  |  | DM21                                             |  |   |  |  |  |  |  |  |  |  |  |  |
| Accessories                                                 |  |                               |  |  |  |  |  |  |  |  |  |  |                                                  |  |   |  |  |  |  |  |  |  |  |  |  |
| 3 button operation w/o meter mounting element               |  | A                             |  |  |  |  |  |  |  |  |  |  | w/o mounting element                             |  | A |  |  |  |  |  |  |  |  |  |  |
| Magnetic stick oper. w/o meter mounting element             |  | B                             |  |  |  |  |  |  |  |  |  |  |                                                  |  |   |  |  |  |  |  |  |  |  |  |  |
| 3 button operation with meter mounting element              |  | C                             |  |  |  |  |  |  |  |  |  |  | with mounting element                            |  | C |  |  |  |  |  |  |  |  |  |  |
| Magnetic stick oper. with meter mounting element            |  | D                             |  |  |  |  |  |  |  |  |  |  |                                                  |  |   |  |  |  |  |  |  |  |  |  |  |
| Temperature Range                                           |  |                               |  |  |  |  |  |  |  |  |  |  |                                                  |  |   |  |  |  |  |  |  |  |  |  |  |
| Standard design<130 °C (266 °F)                             |  | S                             |  |  |  |  |  |  |  |  |  |  |                                                  |  | S |  |  |  |  |  |  |  |  |  |  |
| Approvals                                                   |  |                               |  |  |  |  |  |  |  |  |  |  |                                                  |  |   |  |  |  |  |  |  |  |  |  |  |
| None                                                        |  | A                             |  |  |  |  |  |  |  |  |  |  |                                                  |  | A |  |  |  |  |  |  |  |  |  |  |
| Agency certified for Cold Water & Waste Water (≥ DN 25: 1") |  | B                             |  |  |  |  |  |  |  |  |  |  |                                                  |  | B |  |  |  |  |  |  |  |  |  |  |
| Agency certified for Liquids Other than Water (≥ DN 25: 1") |  | C                             |  |  |  |  |  |  |  |  |  |  |                                                  |  | C |  |  |  |  |  |  |  |  |  |  |
| Inspection certificate 3.1B per EN 10204                    |  | D                             |  |  |  |  |  |  |  |  |  |  |                                                  |  | D |  |  |  |  |  |  |  |  |  |  |
| Protection Class                                            |  |                               |  |  |  |  |  |  |  |  |  |  |                                                  |  |   |  |  |  |  |  |  |  |  |  |  |
| IP 67                                                       |  | 2                             |  |  |  |  |  |  |  |  |  |  |                                                  |  | 2 |  |  |  |  |  |  |  |  |  |  |
| IP 68 (only MAG-XM)                                         |  |                               |  |  |  |  |  |  |  |  |  |  |                                                  |  | 3 |  |  |  |  |  |  |  |  |  |  |
| Power Supply                                                |  |                               |  |  |  |  |  |  |  |  |  |  | Ordering Information for Converter on<br>Page 35 |  |   |  |  |  |  |  |  |  |  |  |  |
| 230 V; 50/60 Hz                                             |  | B                             |  |  |  |  |  |  |  |  |  |  |                                                  |  |   |  |  |  |  |  |  |  |  |  |  |
| 115/120 V; 50/60 Hz                                         |  | C                             |  |  |  |  |  |  |  |  |  |  |                                                  |  |   |  |  |  |  |  |  |  |  |  |  |
| 110 V; 50/60 Hz                                             |  | D                             |  |  |  |  |  |  |  |  |  |  |                                                  |  |   |  |  |  |  |  |  |  |  |  |  |
| 48 V; 50/60 Hz                                              |  | E                             |  |  |  |  |  |  |  |  |  |  |                                                  |  |   |  |  |  |  |  |  |  |  |  |  |
| 24 V; 50/60 Hz                                              |  | F                             |  |  |  |  |  |  |  |  |  |  |                                                  |  |   |  |  |  |  |  |  |  |  |  |  |
| 24 V DC                                                     |  | H                             |  |  |  |  |  |  |  |  |  |  |                                                  |  |   |  |  |  |  |  |  |  |  |  |  |
| Display                                                     |  |                               |  |  |  |  |  |  |  |  |  |  |                                                  |  |   |  |  |  |  |  |  |  |  |  |  |
| With                                                        |  | D                             |  |  |  |  |  |  |  |  |  |  |                                                  |  |   |  |  |  |  |  |  |  |  |  |  |
| Contact Input                                               |  | /Contact Output               |  |  |  |  |  |  |  |  |  |  |                                                  |  |   |  |  |  |  |  |  |  |  |  |  |
| Opto coupler                                                |  | /Opto, General alarm          |  |  |  |  |  |  |  |  |  |  | 1                                                |  |   |  |  |  |  |  |  |  |  |  |  |
| Opto coupler                                                |  | /Relay, General alarm         |  |  |  |  |  |  |  |  |  |  | 2                                                |  |   |  |  |  |  |  |  |  |  |  |  |
| Opto coupler                                                |  | /Opto, Function configurable  |  |  |  |  |  |  |  |  |  |  | 3                                                |  |   |  |  |  |  |  |  |  |  |  |  |
| Opto coupler                                                |  | /Relay, Function configurable |  |  |  |  |  |  |  |  |  |  | 4                                                |  |   |  |  |  |  |  |  |  |  |  |  |
| Pulse output                                                |  | /Communication                |  |  |  |  |  |  |  |  |  |  |                                                  |  |   |  |  |  |  |  |  |  |  |  |  |
| 1-channel active 24 V DC                                    |  | /None                         |  |  |  |  |  |  |  |  |  |  | A                                                |  |   |  |  |  |  |  |  |  |  |  |  |
| 1-channel passive                                           |  | /None                         |  |  |  |  |  |  |  |  |  |  | B                                                |  |   |  |  |  |  |  |  |  |  |  |  |
| 1-channel active 24 V DC                                    |  | /RS 232C                      |  |  |  |  |  |  |  |  |  |  | C                                                |  |   |  |  |  |  |  |  |  |  |  |  |
| 1-channel active 24 V DC                                    |  | /HART-Protocol®               |  |  |  |  |  |  |  |  |  |  | D                                                |  |   |  |  |  |  |  |  |  |  |  |  |
| 1-channel passive                                           |  | /HART-Protocol®               |  |  |  |  |  |  |  |  |  |  | E                                                |  |   |  |  |  |  |  |  |  |  |  |  |
| 2-channel active 24 V DC                                    |  | /None                         |  |  |  |  |  |  |  |  |  |  | F                                                |  |   |  |  |  |  |  |  |  |  |  |  |
| 2-channel passive                                           |  | /None                         |  |  |  |  |  |  |  |  |  |  | G                                                |  |   |  |  |  |  |  |  |  |  |  |  |
| None                                                        |  | /RS 485                       |  |  |  |  |  |  |  |  |  |  | H                                                |  |   |  |  |  |  |  |  |  |  |  |  |
| None                                                        |  | /Profi-Bus DP                 |  |  |  |  |  |  |  |  |  |  | P                                                |  |   |  |  |  |  |  |  |  |  |  |  |
| Application                                                 |  |                               |  |  |  |  |  |  |  |  |  |  |                                                  |  |   |  |  |  |  |  |  |  |  |  |  |
| Standard                                                    |  |                               |  |  |  |  |  |  |  |  |  |  | 0                                                |  |   |  |  |  |  |  |  |  |  |  |  |

Additional written Ordering Information may always be included:

**Instrument Tag**

German  
English  
French

**Gasket Materials**

EPDM with FDA-Approval  
EPDM  
Silicone  
PTFE (Teflon)  
None

**Electrode Design**

Standard  
Conical head (DN 10: 3/8: and up)\*  
Others

**Excitation Frequency**

6 1/4 Hz  
12 1/2 Hz Standard  
7 1/2 Hz (60 Hz line)  
15 Hz (60 Hz line)  
25 Hz

\* Use for high fat content liquids

**Note:**

- Please indicate in writing if a calibration for ± 0.2 % of rate is required.

## Specifications Converter



Fig.22 Converter MAG-XM

### Flow Range

Continuously adjustable between 0.5 and 15 m/s

### Forward/Reverse Flow Metering

The direction is indicated in the display by a direction arrow and over a relay contact or optocoupler for an external signal.

### Accuracy

≤ 0.4 % of rate, optional 0.2 % of rate

### Minimum Conductivity

≥ 5 μS/cm (≥ 20 μS/cm for primaries DN 1; DN 1.5: 1/25", 1/16")

### Reproducibility

≤ 0.1 % of rate

### Response Time (0-99 % corresp. 5 τ)

For a step change 0-99 % ≥ 0.125 s to 0.5 s

### Supply Power

115/230 V AC -15 %/-10 %

24/48/110 V AC -15 %/+10 %

50/60 Hz ± 6 %

24/48 V DC -25 %/+30 % Ripple ≤ 1.5 Vs

### Magnetic Field Supply

Standard: 6 1/4, 7 1/2 Hz, 12 1/2, 15 Hz, 25, 30 Hz

### Power Consumption

≤ 23 VA (flowmeter primary including converter)

### Ambient Temperature

-25 to +60 °C (-13 °F to 140 °F)

### Protection Class per EN 60529

IP 65 for field mount housing, IP 00 for 19"-plug in unit

IP 67 COPA-XM

### Construction

Field mount housing in cast light metal<sup>1)</sup>

19"-plug in unit, 167 mm long, 3 HE, 21TE

- 1) Paint coat 60 μm thick, lower section RAL 5012 blue upper section (cover) RAL 9006 gray.

### Electrical Connections

Screw terminals, cable connector Pg 13.5

### Weight

Appr. 4.2 kg Field mount housing, appr. 1.8 kg 19"-plug in unit

### Signal Cable (only MAG-XM)

The max. cable length between the flowmeter primary and the converter is 200 m, ≥ 200 m upon request. A 10 m long signal cable is supplied with each meter. If more than 10 m are required, see Ordering Information Converter Page 35, Footnote.

### Parameter entry

Data is entered in one of 9 different languages using the keys on the converter. A magnetic stick option is available with which the data can be entered externally without opening the housing. Data is safeguarded by using an NV-RAM. All parameters and totalizer values are stored for period of 10 years when the power is off without the need for a battery.

### Display

2x16-character LC-Dot Matrix display with LED-Background lighting. The internal flow is totalized separately for each flow direction in 16 different units. The flowrate can be displayed in percent or in 45 different units.

|     |          |
|-----|----------|
| → F | 70.01 %  |
| → F | 10230 m3 |

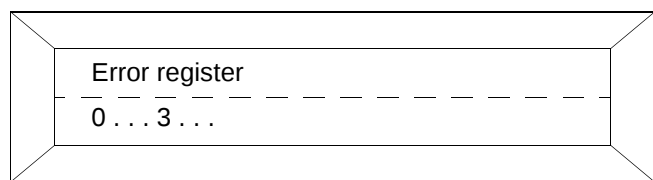
The units listed below can be selected using the arrow keys. The units refer to  $Q_{\max \text{ DN}}$ ,  $Q_{\max}$  forward and reverse and to the flowrate display, when the values are to be displayed in engineering units

In the multiplex mode the flowrate can be displayed in %, engineering units or as a bargraph, totalizer values, forward and reverse, TAG-No. or current output value can also be displayed in addition to the selections made for the 1st and 2nd lines of the display.

| Units                  | Seconds           | Minutes             | Hours             | Day      |
|------------------------|-------------------|---------------------|-------------------|----------|
| Milliliter             | ml/s              | ml/min              | ml/h              |          |
| Liter                  | l/s               | l/min               | l/h               |          |
| Hectoliter             | hl/s              | hl/min              | hl/h              |          |
| Megaliter              |                   | MI/min              | MI/h              | MI/day   |
| Cubic meter            | m <sup>3</sup> /s | m <sup>3</sup> /min | m <sup>3</sup> /h |          |
| Imperial-gallons per   | igps              | igpm                | igph              |          |
| U.S.-mill.-gallons per |                   |                     |                   | mgd      |
| U.S.-gallons           |                   | gpm                 | gph               |          |
| Barrel, beer           | bbl/s             | bbl/min             | bbl/h             |          |
| Barrel, petrochemical  |                   | bls/min             | bls/h             | bls/day  |
| Gram                   | g/s               | g/min               | g/h               |          |
| U.S. Ton               |                   | uton/min            | uton/h            | uton/day |
| Kilogram               | kg/s              | kg/min              | kg/h              |          |
| Ton, metric            | t/s               | t/min               | t/h               |          |
| Pound                  | lb/s              | lb/min              | lb/h              |          |
| Kilo-gallon            | kgal/s            | kgal/min            | kgal/h            |          |

**COPA-XM / MAG-XM****Specifications  
Converter****Data Storage Module (external EEPROM)**

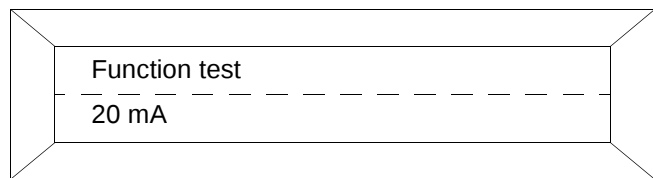
With each meter an external EEPROM is plugged into its socket on the connection board (19" - on the adapter board) of the converter. The calibration data for the flowmeter primary and the parameter settings are stored in this external EEPROM.

**System Monitoring – Alarm Output**

Automatic system monitoring with error diagnosis displayed and an error signal transmitted over the contact output. All errors are stored in the error register.

| Output Mode       | Optocoupler                                                                             | Relay                                                          |
|-------------------|-----------------------------------------------------------------------------------------|----------------------------------------------------------------|
| Terminals         | P1, P2                                                                                  | P1, P2                                                         |
| Functions         | EB, CB                                                                                  | 96, 97                                                         |
| Operating voltage | $16\text{ V} \leq U_{CEH} < 30\text{ V}$<br>$0\text{ V} \leq U_{CEL} < 2\text{ V}$      | $16\text{ V} \leq U < 30\text{ V}$                             |
| Operating current | $0\text{ mA} \leq I_{CEH} < 0.2\text{ mA}$<br>$2\text{ mA} \leq I_{CEL} < 15\text{ mA}$ | $0\text{ mA} \leq I < 250\text{ mA}$<br>$P \leq 3\text{ Watt}$ |

The individual internal subassemblies can be checked using the function test. All outputs can be simulated for start-up and monitoring.

**Automatic Empty Pipe Detector (for DN 10: 3/8" and up and 20 µS/cm and higher)**

Automatic empty pipe recognition using the empty pipe detector including a signal over the contact output and an indication in the display. The max. signal cable length is 50 m for MAG-XM. When the empty pipe detector is turned and an empty pipe condition exists the current is set to 0% (3.6 or 4 mA for 4-20 mA) or 130 % or the pulse range end value and the pulse integration interrupted.

**Note:**

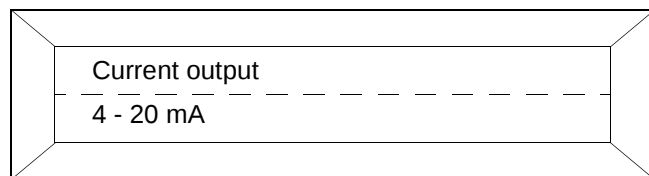
The meter conforms to the NAMUR-Recommendations "EMC-Guidelines for Manufacturers and Users of Electrical Instrument and Systems" Part 1, 5/93 and EMC-Guideline 89/336/EWG (EN 50081-1, EN 50082).

**Warning:**

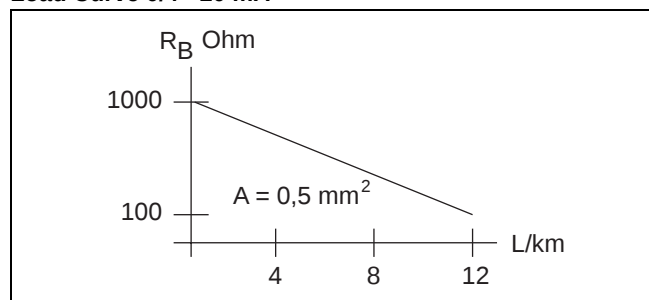
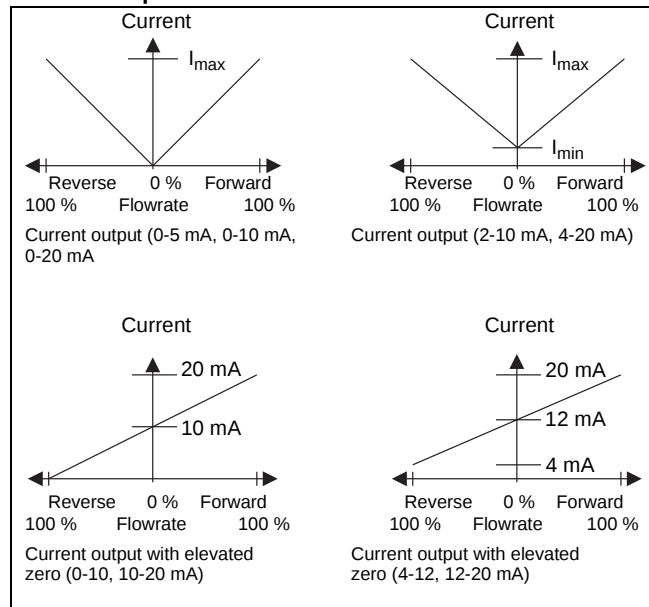
The EMC-Protection is voided when the housing cover is removed.

**Output Signals, Standard****Isolation In-/Output**

The current and pulse outputs are isolated from the input circuit and from each other.

**Current Output, Configurable, Terminals +/-**

| Range              | Resistance Load     |
|--------------------|---------------------|
| 0 - 5 mA           | $\leq 4000\ \Omega$ |
| 0/2 - 10 mA        | $\leq 2000\ \Omega$ |
| 0/4 - 20 mA        | $\leq 1000\ \Omega$ |
| 0 - 10, 10 - 20 mA | $\leq 1000\ \Omega$ |
| 4 - 12, 12 - 20 mA | $\leq 1000\ \Omega$ |

**Load Curve 0/4 - 20 mA****Current Output Characteristic**

## Specifications Converter

### Scaled Pulse Output

The scaled pulse output, 1-channel max. 5 kHz, pulse factor between 0.001 and 1000 times the value indicated in the display. E.g. 1 pulse/m<sup>3</sup> x 1000. The pulse width can be set from 0.100 ms to 2000 ms.

The output mode, passive or active, can be set using the jumpers on the connection board.

| Output Mode                     | Active                                                                                         |                  | Passive                                                                                                                                                   |                  |
|---------------------------------|------------------------------------------------------------------------------------------------|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
|                                 | COPA-XM                                                                                        | MAG-XM           | COPA-XM                                                                                                                                                   | MAG-XM           |
| Terminal Functions              | V1, V3<br>g2, 10                                                                               | V8, V9<br>10, g2 | V1, V3<br>G2, 61                                                                                                                                          | V8, V9<br>G2, 61 |
| Operating voltage               | 16 V ≤ U ≤ 30 V DC<br>load ≥ 150 Ohm<br>fmax = 5 kHz                                           |                  | 16 V ≤ U <sub>CEH</sub> < 30 V DC<br>0 V ≤ U <sub>CEL</sub> < 2 V<br>0 mA ≤ I <sub>CEH</sub> < 0.2 mA<br>2 mA ≤ I <sub>CEL</sub> < 250 mA<br>fmax = 5 kHz |                  |
| Operating current and frequency | When using a mechanical counter it is recommended that the pulse width ≥ 30 ms and fmax ≤ 3 Hz |                  | When using a mechanical counter it is recommended that the pulse width ≥ 30 ms and fmax ≤ 3 Hz                                                            |                  |

### Programmable Input

Contact input, active or passive, the following functions can be software selected:

| Input Mode                                                                                                                          | Active or Passive                                                                             |        |
|-------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|--------|
|                                                                                                                                     | Closes<br> |        |
| <b>External Zero Return</b><br>When the metering tube empties all output signals can be turned off.                                 | X                                                                                             | X      |
| <b>External Totalizer Reset</b><br>The totalizer values and the overflow counter can be reset from a contact.                       | X                                                                                             | X      |
| <b>Flow Range 1/2 *)</b><br>External flow range selection<br>Flow range 2 selected when the contact is closed.                      | X                                                                                             | X      |
| <b>START/STOP *) Preset Counter</b><br>External contact to start a preselected quantity. To initiate a safety stop, initiate again. | X                                                                                             | X      |
| Terminals                                                                                                                           | X1, U2 <sup>1)</sup><br>Jump G2 - g2                                                          | X1, G2 |
| Operating voltage                                                                                                                   | 16 V ≤ U <sub>CEH</sub> < 30 V<br>0 V ≤ U <sub>CEL</sub> < 2 V<br>R <sub>i</sub> = 2.0 kΩ     |        |
| Operating current                                                                                                                   | 0 mA ≤ U <sub>CEH</sub> < 0.2 mA<br>2 mA ≤ U <sub>CEL</sub> < 15 mA                           |        |

1) Optional functions for COPA-XM (internal 24 V DC-Supply)

\*) These functions must first be selected in the submenu "Operating mode".

X = Function is software selectable

### Alarm output

Automatic system monitor including monitoring of a CPU-Error with error diagnosis shown on the display and an error signal over the contact output. Errors 0-9 are stored in the submenu Alarm for checking purposes. The contact opens during an alarm condition.

### Programmable Output

Contact output, passive, the following functions can be software selected:

| Function                                     | Opens or Closes                                                                                                                    |                                                                                     |
|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                              |                                                 |  |
| General alarm                                | X                                                                                                                                  | X                                                                                   |
| Empty pipe                                   | X                                                                                                                                  | X                                                                                   |
| MAX-Alarm                                    | X                                                                                                                                  | X                                                                                   |
| MIN-Alarm                                    | X                                                                                                                                  | X                                                                                   |
| MAX-MIN-Alarm                                | X                                                                                                                                  | X                                                                                   |
| F/R-Signal                                   | Contact closed for the forward flow direction                                                                                      |                                                                                     |
| 2 flow ranges*)                              | Contact closed for Flow Range 2                                                                                                    |                                                                                     |
| Preset counter*)                             | Contact opens when the preset quantity is reached (contact closes for the next start command and remains closed during the cycle.) |                                                                                     |
| Output Mode                                  | Optocoupler or Relay                                                                                                               |                                                                                     |
|                                              | Optocoupler                                                                                                                        | Relay                                                                               |
| Terminals <b>COPA-XM</b>                     | G2, P7                                                                                                                             | G2, P7                                                                              |
| Function                                     | E9, C9                                                                                                                             | 39, 40                                                                              |
| Terminals <b>MAG-XM</b>                      | P1, P2                                                                                                                             | P1, P2                                                                              |
| Function                                     | EB, CB                                                                                                                             | 96, 97                                                                              |
| <b>Pulse Output Unscaled</b><br>f = 0-10 kHz |                                                                                                                                    |                                                                                     |
| Terminals <b>COPA-XM</b>                     | G2, P7                                                                                                                             | —                                                                                   |
| Function                                     | 59, 60                                                                                                                             | —                                                                                   |
| Terminals <b>MAG-XM</b>                      | V5, V6                                                                                                                             | —                                                                                   |
| Function                                     | 59, 60                                                                                                                             | —                                                                                   |
| Operating voltage                            | 16 V ≤ U <sub>CEH</sub> < 30 V<br>0 V ≤ U <sub>CEL</sub> < 2 V                                                                     | 16 V ≤ U ≤ 30 V                                                                     |
| Operating current                            | 0 mA ≤ U <sub>CEH</sub> < 0.2 mA<br>2 mA ≤ U <sub>CEL</sub> < 15 mA                                                                | 0 mA ≤ I < 250 mA<br>P ≤ 3 Watt                                                     |

### Note:

- The contact input should be closed for more than 1 s (preset counter START/STOP > 350 ms but not longer than 1.5 s).

## COPA-XM / MAG-XM

### Specifications Converter

#### Output Signal Option

##### HART®-Protocol

The HART®-Protocol provides for communication between a process control system, handheld terminal and the EMF field instrument. When communication using the HART-Protocol is desired the serial data link is not available. The digital communication occurs through an alternating current signal superimposed on the current output which does not affect any instruments connected to the output. This option is only available with 4-20 mA current output option. Terminals: +/-

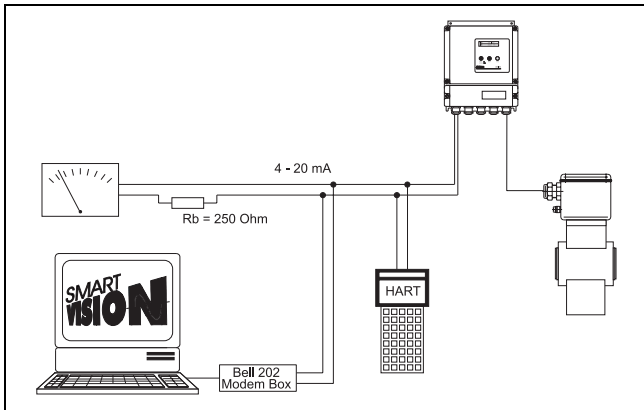


Fig.23 Communication with HART-Protocol

#### Transmission Mode

FSK-Modulation on the current output 4-20 mA per Bell 202 Standard.

#### Baudrate

1200 Baud

#### Representation

Log. 1: 1200 Hz, Log. 0: 2200 Hz

#### Cable

AWG 24 twisted

#### Max. Cable Length

1500 m

#### Max. Signal Amplitude

1.2 mA<sub>pp</sub>

#### Current Output Load

Min.: >250 Ω, max.: <1000 Ω

#### Serial Data Link

The serial data links are available as RS 485 or RS 232C/V24.

##### RS 232C

Generator side: high level = - 8 V, low level = + 8 V  
Typ. output current: 10 mA  
Receiver side: max. input voltage ± 30 V  
Typ. input current: ± 5.5 mA at ± 25 V input voltage,  
Max. cable length: ≤ 15 m, Baudrate: 110-9600 Baud.

A shielded data cable is recommended.

Terminals: V1, V2, V3, V4; Function g2, TD, g2, RD.

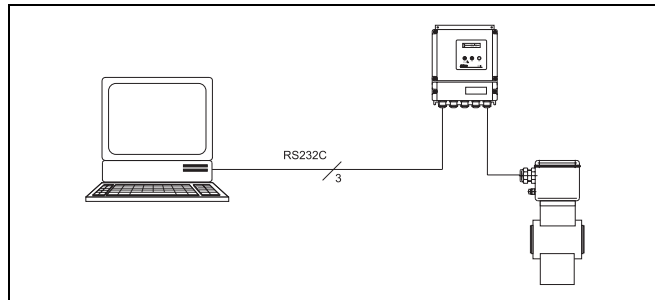


Fig.24 Communication with RS 232C Data link

##### RS 485

V<sub>pp</sub> = 5 V. Input impedance: ≥ 12 kΩ,

Max. cable length: ≤ 1200 m.

Baudrate: 110-9600 Baud, 14400/28800 Baud.

Max. 32 Instruments in parallel on a single bus.

A shielded data cable with twisted pairs is recommended.

Terminals: V1, V2, V3, V4; Functions T-, T+, R-, R+.

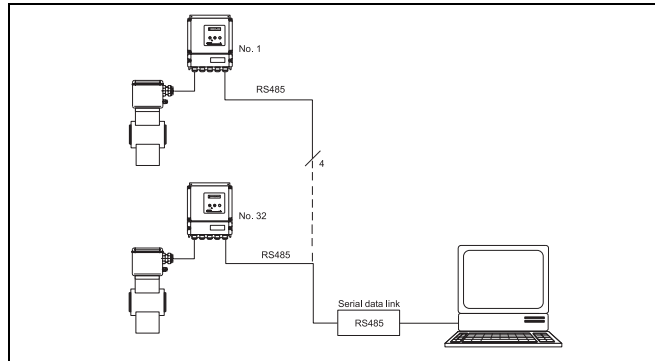


Fig.25 Communication with RS 485 Data Link

##### Profibus DP per DIN 19245

Terminals: V1, V2, V4, G2

| Terminal | Function    | Reference                     |
|----------|-------------|-------------------------------|
| V1       | B RxD/TxD-P | Receive/Send-Data-P           |
| V2       | A RxD/TxD-N | Receive/Send-Data-N           |
| V4       | VP          | Supply voltage Plus P5V       |
| G2       | C DGND      | Data reference potential-M 5V |

A twisted shielded data cable is recommended.

Max. cable length 1200 m (cable type A)

Typical impedance 135-165 Ohm

Max. 32 Instruments on a single bus

Baudrate: 9.6-1500 kbit/s

Capacity <30 pF/m, loop resistance 110 Ω/km

Stup line only to 1 m.

Entering and exiting cables on one terminal.

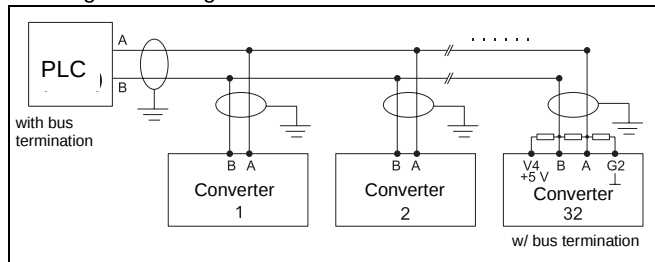


Fig.26





## Interconnection Diagram

### Converter MAG-XM

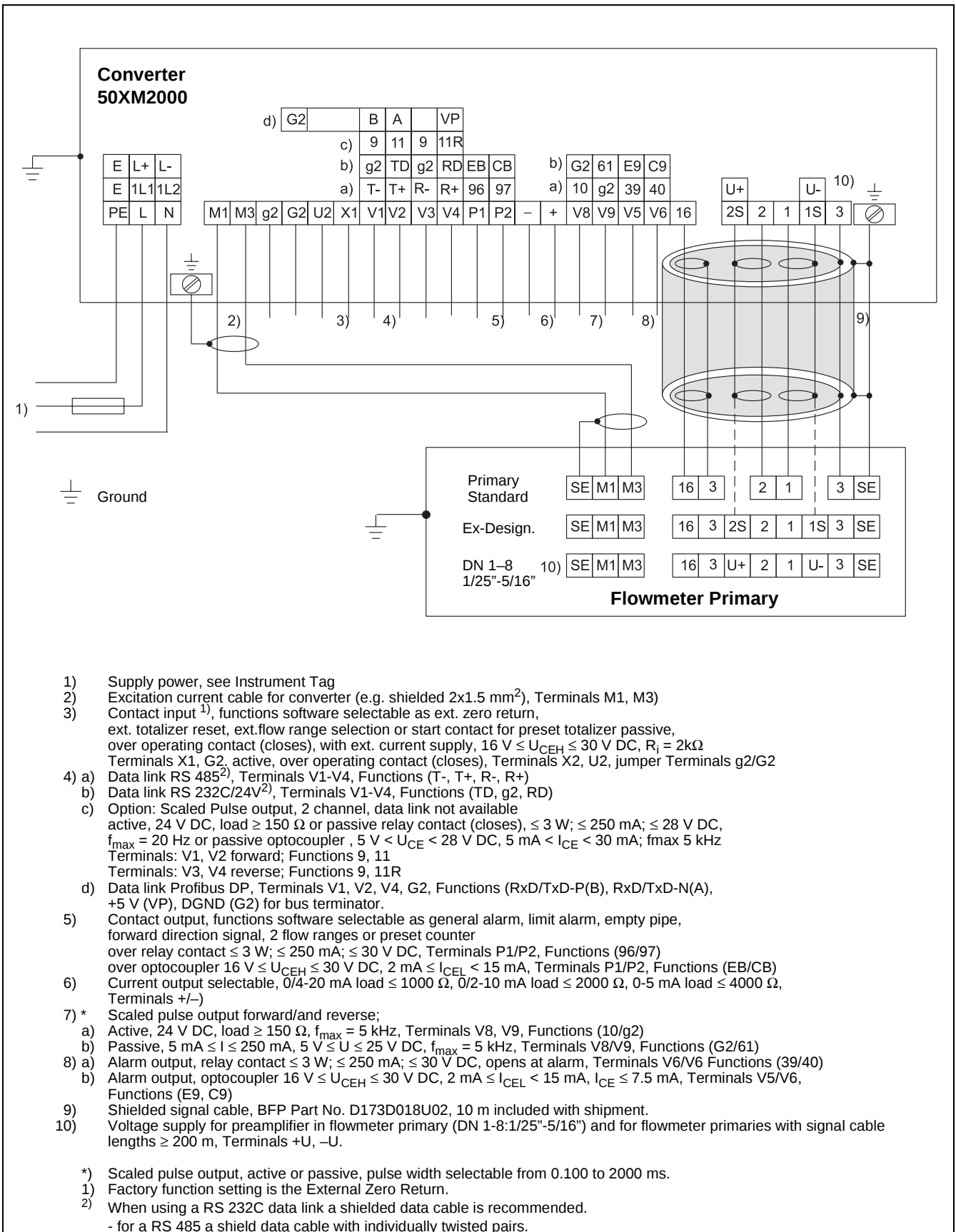


Fig.29 Interconnection Diagram MAG-XM

## COPA-XM / MAG-XM

### Dimensions

### Converter MAG-XM

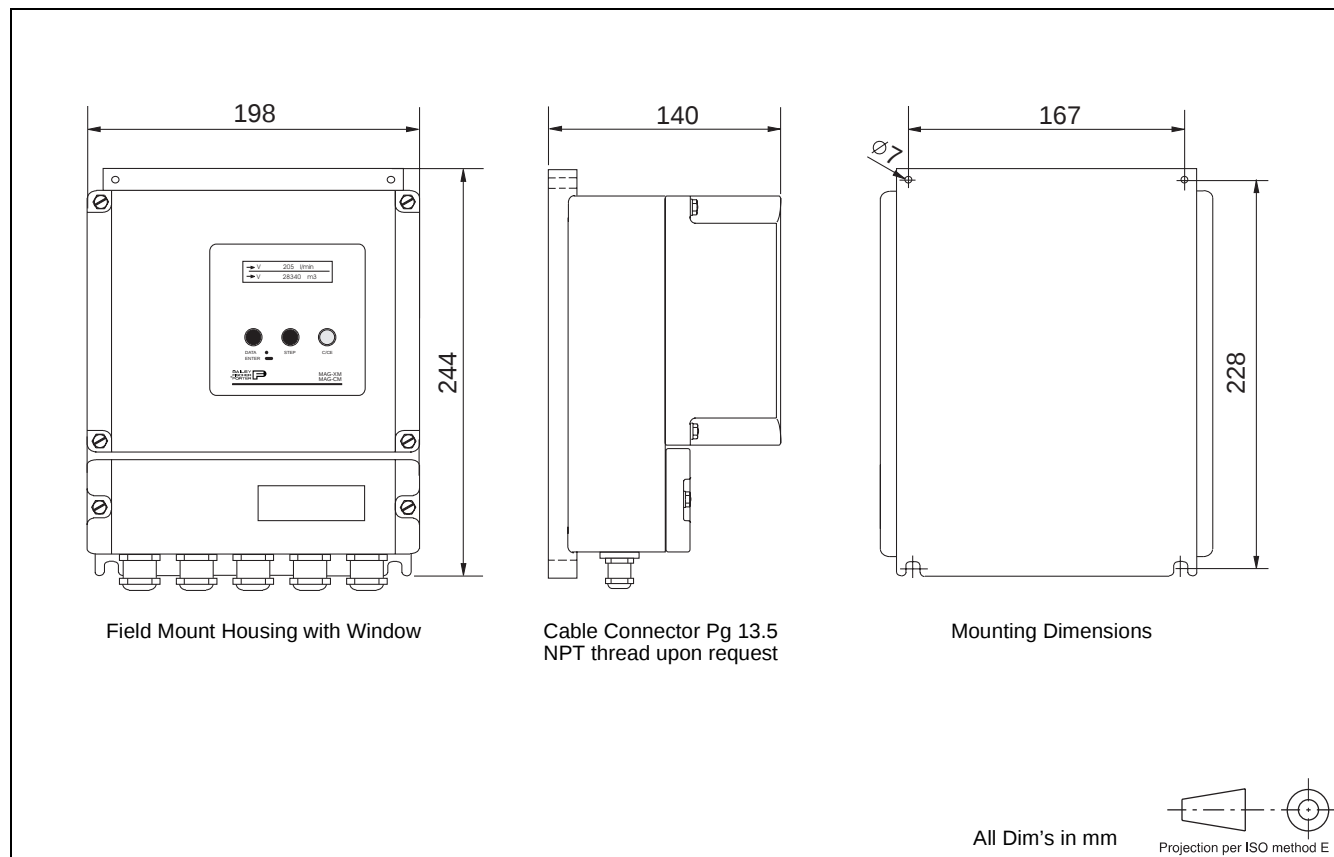


Fig.30 Dimensions Field Mount Housing Converter MAG-XM

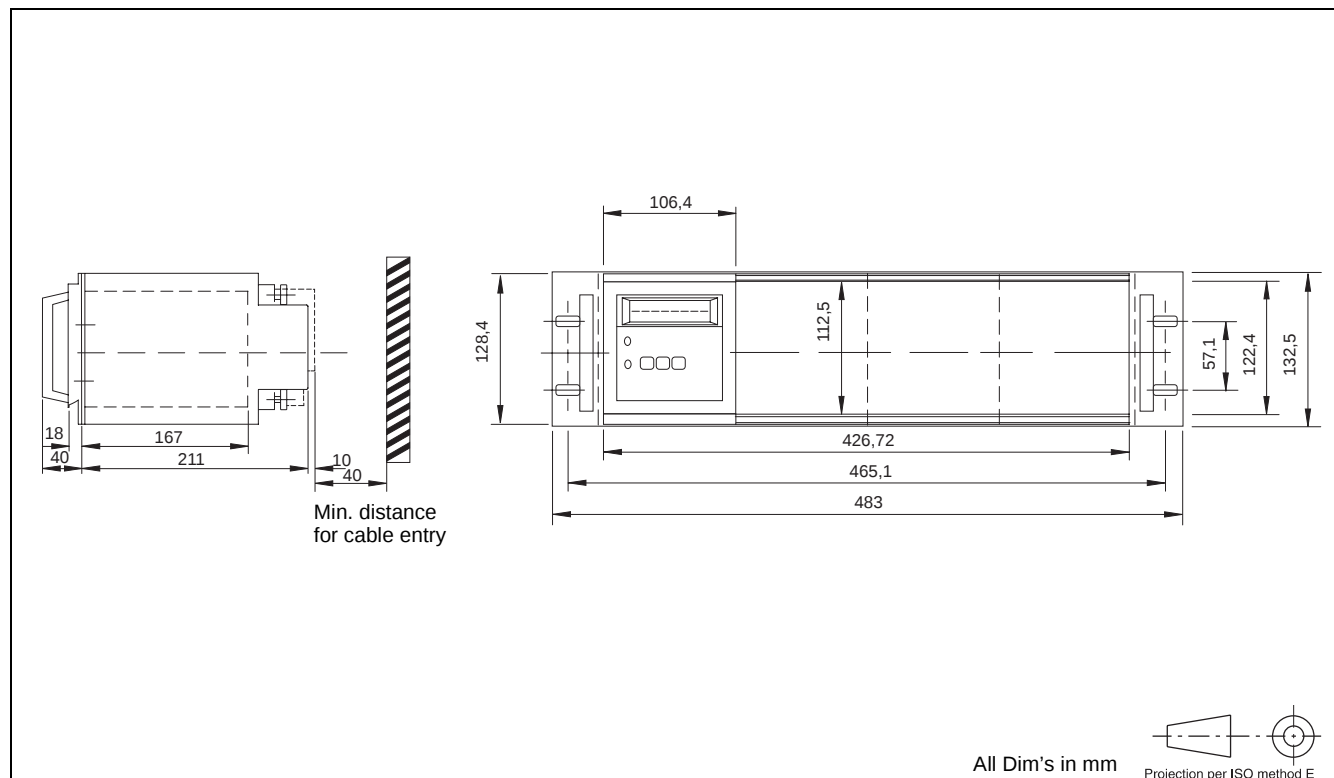


Fig.31 Dimensions 19"-Design Converter MAG-XM

**COPA-XM / MAG-XM****Ordering Information  
Converter MAG-XM****Accuracy: 0.4 % of rate, Optional 0.2 % of rate**

|                                                                             |              |   |   |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------------------------------------------------|--------------|---|---|--|--|--|--|--|--|--|--|--|--|
| <b>Ordering Number</b>                                                      | <b>50XM2</b> |   |   |  |  |  |  |  |  |  |  |  |  |
| <b>Remote Converter</b>                                                     |              |   |   |  |  |  |  |  |  |  |  |  |  |
| <b>For Connecting to Flowmeter Primary</b>                                  |              |   |   |  |  |  |  |  |  |  |  |  |  |
| Standard Flowmeter Primary                                                  | <b>1</b>     |   |   |  |  |  |  |  |  |  |  |  |  |
| Series 2000 DN 1-4:1/25"-5/32" and primary with preamplifier                | <b>2</b>     |   |   |  |  |  |  |  |  |  |  |  |  |
| EEx-Design (only Series 3000)                                               | <b>3</b>     |   |   |  |  |  |  |  |  |  |  |  |  |
| EEx-Design (only Series 3000) with preamplifier                             | <b>4</b>     |   |   |  |  |  |  |  |  |  |  |  |  |
| <b>Design Level</b> (specified by BFP)                                      |              | * |   |  |  |  |  |  |  |  |  |  |  |
| <b>Software Level</b>                                                       |              |   |   |  |  |  |  |  |  |  |  |  |  |
| Generation (specified by BFP)                                               |              |   | * |  |  |  |  |  |  |  |  |  |  |
| <b>Approvals</b>                                                            |              |   |   |  |  |  |  |  |  |  |  |  |  |
| None                                                                        |              |   |   |  |  |  |  |  |  |  |  |  |  |
| Agency certified for Cold Water & Waste Water                               |              |   |   |  |  |  |  |  |  |  |  |  |  |
| Agency certified for Liquids Other than Water                               |              |   |   |  |  |  |  |  |  |  |  |  |  |
| Others                                                                      |              |   |   |  |  |  |  |  |  |  |  |  |  |
| <b>Housing</b>                                                              |              |   |   |  |  |  |  |  |  |  |  |  |  |
| Field mount housing with window                                             |              |   |   |  |  |  |  |  |  |  |  |  |  |
| 19"-plug in unit 167 mm long <sup>1)</sup> with connection board            |              |   |   |  |  |  |  |  |  |  |  |  |  |
| <b>Contact Output</b>                                                       |              |   |   |  |  |  |  |  |  |  |  |  |  |
| Optocoupler                                                                 |              |   |   |  |  |  |  |  |  |  |  |  |  |
| Relay                                                                       |              |   |   |  |  |  |  |  |  |  |  |  |  |
| <b>Pulse Output, 1 Channel Terminal V8/V9 Standard</b>                      |              |   |   |  |  |  |  |  |  |  |  |  |  |
| Active                                                                      |              |   |   |  |  |  |  |  |  |  |  |  |  |
| Passive                                                                     |              |   |   |  |  |  |  |  |  |  |  |  |  |
| Option, passive relay only as replacement for XM1000                        |              |   |   |  |  |  |  |  |  |  |  |  |  |
| Option Pulse output 2 channel separate for forward and reverse upon request |              |   |   |  |  |  |  |  |  |  |  |  |  |
| <b>Operating Mode</b>                                                       |              |   |   |  |  |  |  |  |  |  |  |  |  |
| Continuous flowrate metering                                                |              |   |   |  |  |  |  |  |  |  |  |  |  |
| <b>Parameter Entry Mode</b>                                                 |              |   |   |  |  |  |  |  |  |  |  |  |  |
| Standard with 3 buttons <sup>2)</sup>                                       |              |   |   |  |  |  |  |  |  |  |  |  |  |
| With magnetic stick                                                         |              |   |   |  |  |  |  |  |  |  |  |  |  |
| <b>Accessories</b>                                                          |              |   |   |  |  |  |  |  |  |  |  |  |  |
| None                                                                        |              |   |   |  |  |  |  |  |  |  |  |  |  |
| Serial data link RS 232C                                                    |              |   |   |  |  |  |  |  |  |  |  |  |  |
| Serial data link RS 485                                                     |              |   |   |  |  |  |  |  |  |  |  |  |  |
| HART-Protocol                                                               |              |   |   |  |  |  |  |  |  |  |  |  |  |
| Profibus DP                                                                 |              |   |   |  |  |  |  |  |  |  |  |  |  |
| <b>Power Supply</b>                                                         |              |   |   |  |  |  |  |  |  |  |  |  |  |
| 230 V, 50/60 Hz                                                             |              |   |   |  |  |  |  |  |  |  |  |  |  |
| 115/120 V, 50/60 Hz                                                         |              |   |   |  |  |  |  |  |  |  |  |  |  |
| 110 V, 50/60 Hz                                                             |              |   |   |  |  |  |  |  |  |  |  |  |  |
| 48 V, 50/60 Hz                                                              |              |   |   |  |  |  |  |  |  |  |  |  |  |
| 24 V, 50/60 Hz                                                              |              |   |   |  |  |  |  |  |  |  |  |  |  |
| 24 V/48 V DC                                                                |              |   |   |  |  |  |  |  |  |  |  |  |  |
| <b>Instrument Tag</b>                                                       |              |   |   |  |  |  |  |  |  |  |  |  |  |
| German                                                                      |              |   |   |  |  |  |  |  |  |  |  |  |  |
| English                                                                     |              |   |   |  |  |  |  |  |  |  |  |  |  |
| French                                                                      |              |   |   |  |  |  |  |  |  |  |  |  |  |
| Others upon request                                                         |              |   |   |  |  |  |  |  |  |  |  |  |  |

1) The Ordering Information for the Subrack may be found on Page 36.

2) Requires removing the housing cover.

**Signal Cable:** A 10m long signal cable is included with each meter. For longer lengths please order Part No. D173D018U02.

**COPA-XM / MAG-XM****Ordering Information  
Subrack, Test Simulator, Adaptor****Card Frame for MAG-XM – 19"**

| Ordering Number                                   | 55BT1 |   |   |   |  |  |
|---------------------------------------------------|-------|---|---|---|--|--|
| 3 HE, 84TE                                        | 11    |   |   |   |  |  |
| For 4 inserts, 21 TE 167 mm deep with guide rails |       | 1 |   |   |  |  |
| For 3 inserts with one blank plate                |       | 2 |   |   |  |  |
| For 2 inserts with two blank plates               |       | 3 |   |   |  |  |
| For 1 insert with three blank plates              |       | 4 |   |   |  |  |
| Design Level                                      |       |   | A |   |  |  |
| Accessories                                       |       |   |   | A |  |  |

**Test Simulator**

| Ordering Number                        | D55CX4 |   |   |   |   |  |
|----------------------------------------|--------|---|---|---|---|--|
| <b>Flow Signal Settings</b>            |        |   |   |   |   |  |
| 3-Digit switch in 1000 steps           | 1      |   |   |   |   |  |
| Others                                 | 9      |   |   |   |   |  |
| <b>Power supply <sup>1)</sup></b>      |        |   |   |   |   |  |
| Schuko plug 110 V - 240 V 50/60 Hz     |        | 1 |   |   |   |  |
| Banana plug (4 mm) 24 V - 48 V AC/DC   |        | 2 |   |   |   |  |
| USA plug for 110 V - 240 V 60 Hz       |        | 3 |   |   |   |  |
| Others-                                |        | 9 |   |   |   |  |
| <b>Accessories</b>                     |        |   |   |   |   |  |
| None                                   |        |   | 0 |   |   |  |
| Adaptor for converter 50XM2000         |        |   | 1 |   |   |  |
| Adaptor for 19"-Design                 |        |   | 4 |   |   |  |
| <b>Design Level</b> (specified by BFP) |        |   |   | * |   |  |
| <b>Instrument Tag</b>                  |        |   |   |   |   |  |
| German                                 |        |   |   |   | 1 |  |
| English                                |        |   |   |   | 2 |  |
| French                                 |        |   |   |   | 3 |  |
| Others                                 |        |   |   |   | 9 |  |

1) Supply power also provides power to converter.

**Software****HART-Operating Software**

Smart Vision®

PC-Operator level for HART-Communication

Prices upon request

**Meter Selection Program****FlowSelect** the selection program for flowmeters with**FlowCalc** (calculation program) at no charge.

PC requirements: 486, 8 MB RAM,

7 MB free hard drive capacity, 256 colors,

Windows 3.1, Windows 95 or Windows NT,

On 3 1/2" disks.

Bailey-Fischer &amp; Porter reserves the right to make changes which represent technical improvements without prior notice.

**The Product Program Includes:** ● Variable Area Flowmeters ● Electromagnetic Flowmeters  
 ● Vortex/Swirl Flowmeters ● Mass Flowmeters ● Transmitters for Pressure and Differential Pressure  
 ● Gas/Liquid Filling Systems ● Ultrasonic Metering Systems for Concentration Measurements



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Certified per DIN EN ISO 9001

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