Technical Specification

Technical specification 560 mm V2.0

Classification	Final
Category	MP20
Area of responsibility	Production
Document owner	Production Manager

Document history

Version	Date	Author	Changes
V1.0	26.10.2021	S. Lüttich	Initial Version Astyx MPS GmbH
V2.0	29.02.2024	S. Lüttich	Minor changes

Company history

The company Astyx GmbH has been sold February 2021 to GM Cruise. The microwave positioning sensor division has been carved out from Astyx GmbH and all products and services are now being provided by Astyx MPS GmbH in Germany and Verve Satcom Inc., our subsidiary in the United States. The company is still located in Ottobrunn Germany.

Microwave sensor

Cylinder Bore/ Astyx MPS mark	**560 mm / 7035**
Measuring range	up to 20 meter
Non-Linearity	typ. ± 12 mm
Non-Linearity	max. ± 27 mm (calibrated, over 2m, 20°C)
Measurement rate	> 125 Hz
Velocity	4 m/s max.
Deviation of absolute distance between 0 and 5 bar	at 10m position: ~ 60mm
Analog Output Interface	
Operating voltage	18 … 30 VDC
Current	120 mA max.
Power	3.6 W max.
Customer interface	4 – 20 mA active current loop
Resolution	12 bits D/A converter (17.000 mm / 4096 = 4,2 mm)
Error signals	0 mA: broken cable, 1-3 mA: internal failure
Load resistor	< 300 Ω
Profibus Interface	
Operating voltage	20 … 30 VDC
Power	Typical max. 9 W, absolute max. 12 W
Customer interface	See ProfibusDPCanSlaveGateway_Protocol_ReleaseSpec_v1.4
Frequency band	430 .. 500 MHz, < 5 mW, wave guided
Medium	Nitrogen
Operating pressure	20 bar max.
Test pressure	≤ 100 bar
Operating temperatures:	
Antenna	- 20 °C ... + 70 °C
Evaluation Box	- 20 °C ... + 40 °C
Storage temperatures	- 25 °C ... + 70 °C

Continuous and absolute measurement system for use in cylinders filled with Nitrogen (or compressed air for calibration). For use in hydraulic equipment.

Vibration	10 Hz - 60 Hz with ± 0.35 mm, 1 oct/min, number of 5 cycles
	60 Hz - 150 Hz with 5 g sine according IEC 68 part 2-6, 1 oct/min, number of 5 cycles
Shock	30 g, 11 ms half sine according IEC 68 part 2-27, number of 3 each direction
	15 g, 6 ms half sine according IEC 68 part 2-29, number of 1000 each direction

Usage requires sensor to cylinder calibration by ASTYX MPS expert personnel.

The Microwave Sensor may only be used with special designed cylinders released by ASTYX MPS.

Antenna module

The antenna module has to be installed properly to a cylinder according required mechanical interface description. To reduce the influence of liquid inside the measuring area, the piston requires a special designed piston plate. The antenna module is installed in a downward direction. For operation the Evaluation Box is needed.

Housing Stainless steel AISI 316 / 1.4401

Conformity 2014/14/EU (ATEX)

IP class IP67

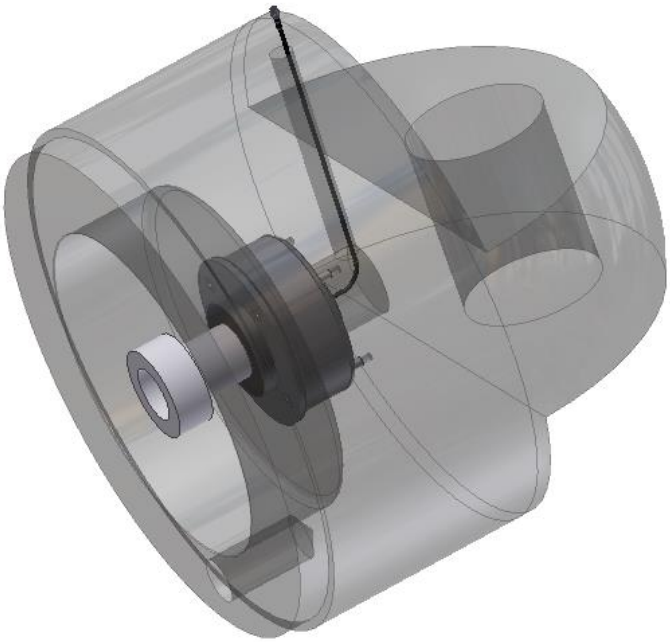
Cylinder Bore/ Astyx MPS mark	**560 mm / 7035**
Antenna	Stainless steel AISI 316 / 1.4401
Dimensions	Ø190 x 194 mm
Weight	< 25 kg
Explosion safety CE Ex	II 3G Ex ec IIB T4 Gc
Technical report	MP13-Prüfbericht 7035-ATEX Zone 2 Zertifizierung
Antenna Cable	Huber & Suhner Enviroflex 142
Cable length to EV-Box	2m
Recommended backside sealing (not delivered)	Axial: O-ring 107,54mm x 3,53mm, NBR 90 shore A lubricated, ISO 3601
Recommended mounting bolts (not delivered)	4x DIN4762 M10 x 80mm, A4-70 (stainless steel)

Protect SMA cable against environmental impact for use under harsh conditions.

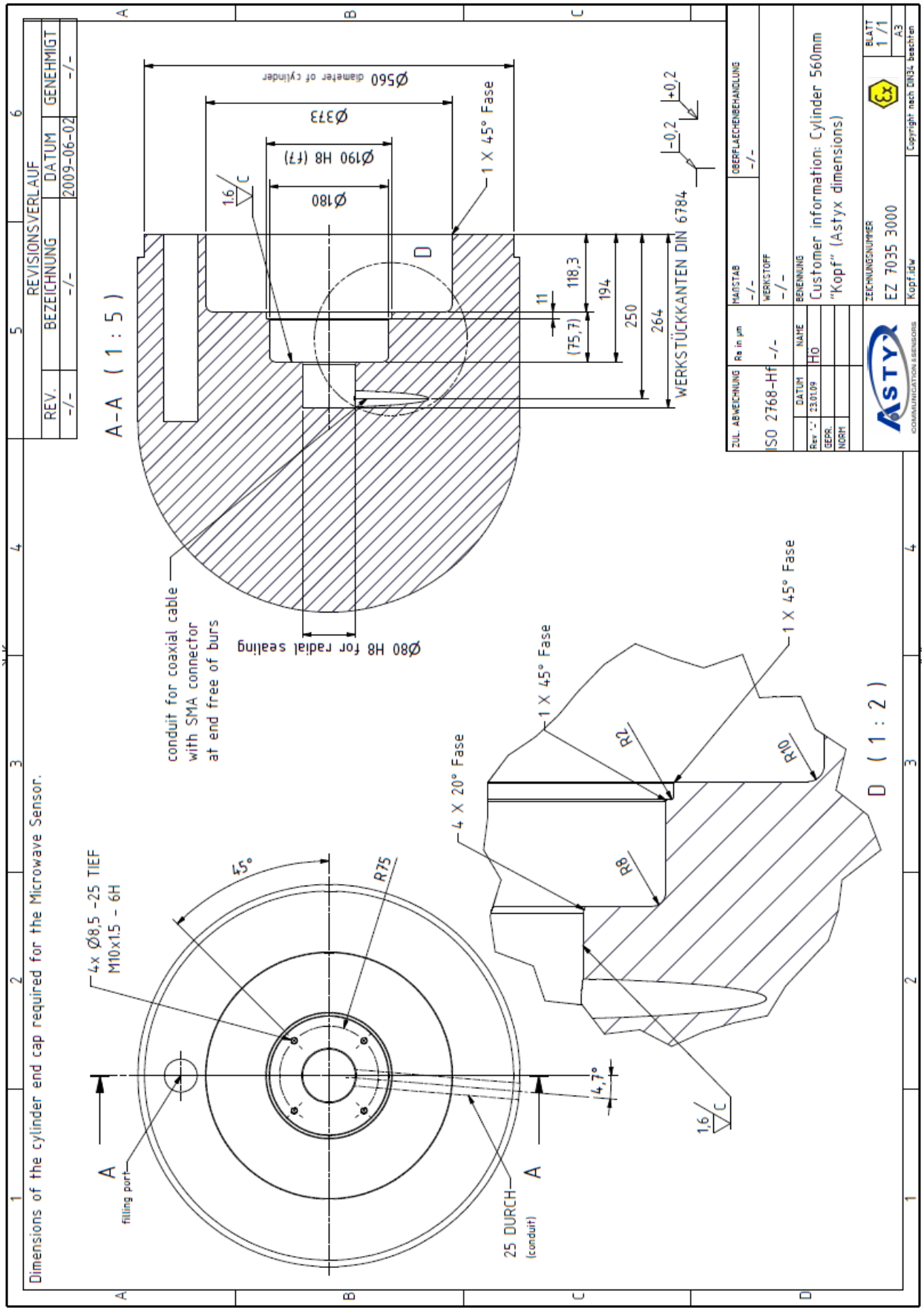
Electrical Interface see Manual

Regard to the manual for installation and operation for functional, safety and explosion safety reasons. Installation has to be in accordance to IEC/EN 60079-14.

Antenna and Cylinder End Cap 560mm



Cylinder End Cap Requirements 560 mm



Evaluation Box

The Evaluation Box operates together with an antenna module. It carries the software and device dependent calibration data. Device means a fix combination of antenna module, Evaluation Box and cylinder.

Housing: Stainless steel AISI 316L / 1.4404

Technor TNCD282815 Ex d enclosure

Technor TNCC281915 Ex e connection enclosure

Interface	Analog Output Interface	Profibus Interface
Power & Communication Gland	Hawke 501/421/C2/M40	Hawke 501/453/Universal A M20
Glands for Pressure Sensors	2x Hawke 501/421/Os/M20	-
Communication Gland	-	Hawke 501/453/Universal O M20
Antenna Cable Gland	Hawke SB474/C-M32-M32	
Explosion safety CE Ex	II 2G Ex de IIC T6 Gb	

Drain Plug M20

Dimensions: 280 mm x 470 mm x 150 mm

Weight: < 45 kg

IP class: IP66

EMC / EMI: Radiated Emission Electric Field, 30 MHz to 1 GHz, CISPR 11:2003/A2:2006

Build-in Electronic Box: Immunity to radiated electromagnetic fields, 80 MHz to 2,7 GHz 10 V/m, IEC 61000-4-3:2006

Immunity to electrostatic discharges, IEC 61000-4-2:1995 +A1:1998 +A2:2000

Immunity to electrical fast transients, IEC 61000-4-4:2004

Immunity to asymmetric RF, 150 kHz to 80 MHz

Conformity: 2014/34/EU (ATEX)

Electrical Interface: see manual

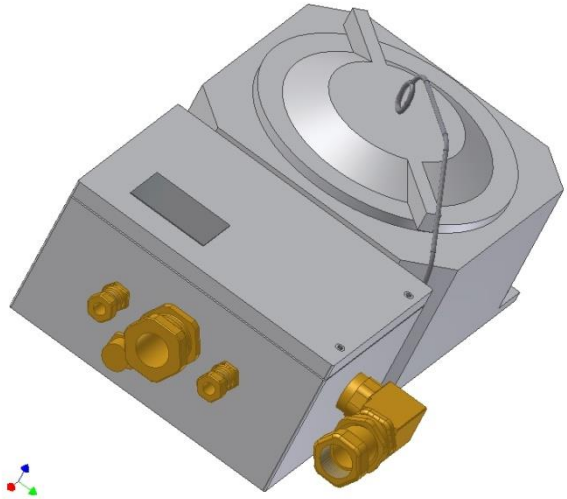
Included equipment:

- A Security line of stainless steel with around 60 cm length for cover of Exd enclosure.
- A vapour space inhibitor is provided inside the Evaluation Box.
- For the analog output interface, 2 separate M20 Blind plugs are provided to plug pressure cable glands if no pressure sensors are connected.

Regard to the manual for installation and operation for functional, safety and explosion safety reasons.

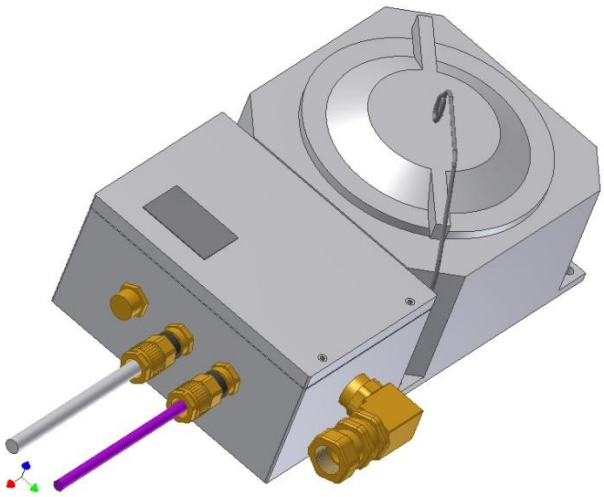
Installation has to be in accordance to IEC/EN 60079-14.

Analog Output Interface



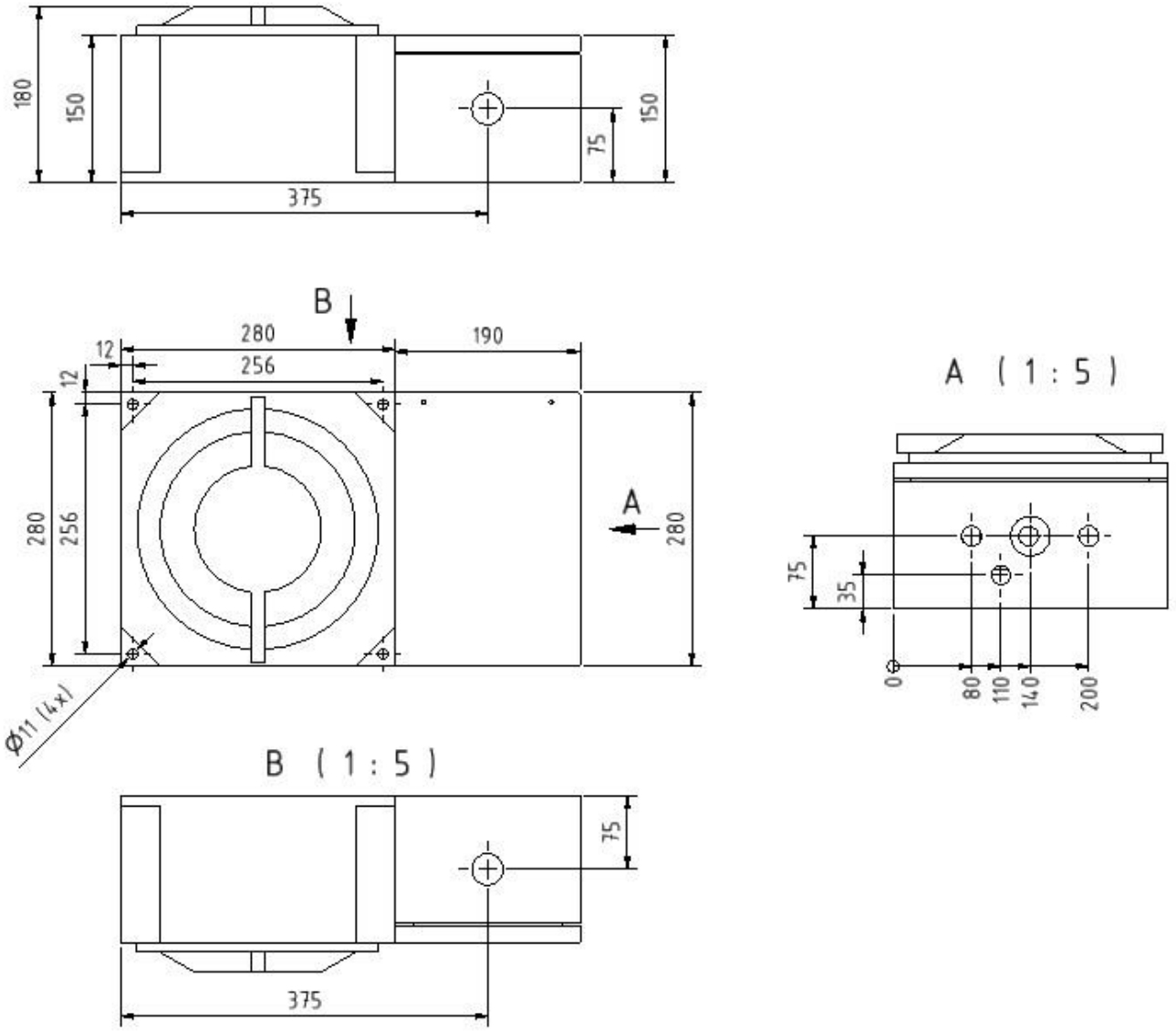
(Illustration, details may be different)

Profibus Interface

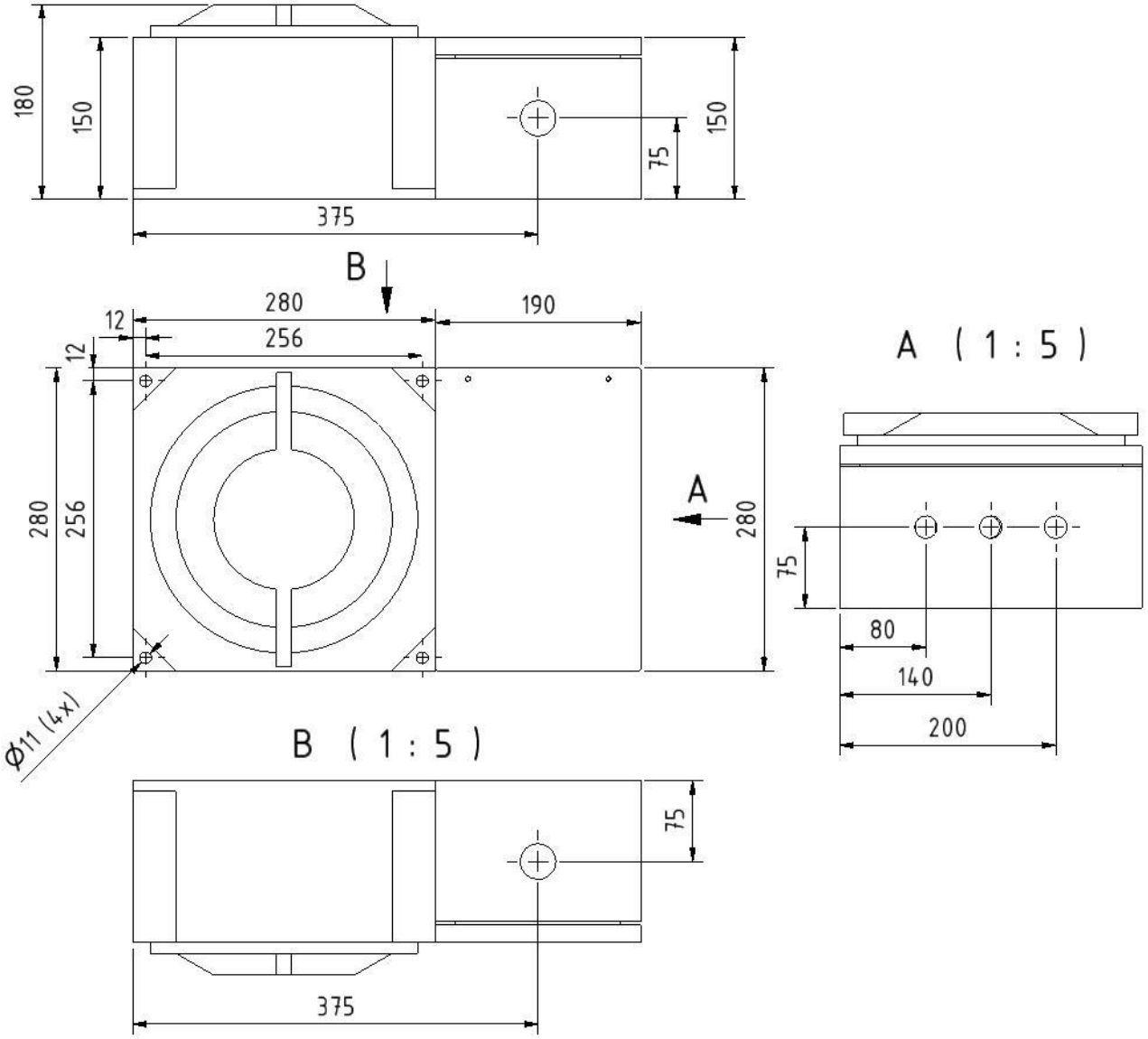


(Illustration, details may be different)

Dimensions of the Evaluation Box for Analog Output Interface



Dimensions of the Evaluation Box for Profibus Interface



Warning!

- Voltages higher than 30 VDC applied to any of the electrical connection points might damage the sensor electronics.
- Mechanical contact between antenna and piston will damage the sensor.
- Calibration of the sensor in a cylinder with identical geometrical properties (bore, piston geometry) is required after mounting.
- Fluid on top of the piston or in the antenna will influence measurements and might cause unexpected offset changes in the output signal.
- Opening of enclosures or disassembly of the microwave sensor is allowed to authorized staff only.

Danger!

- An ESD discharge from the piston rod to the microwave antenna has to be prevented, as it might damage the evaluation box.
- Never power up the sensor outside the grounded cylinder or without proper shielding against electromagnetic radiation (refer to local authorities for applicable regulations).
- A damaged sensor (antenna or evaluation Box) may not be powered or used