



# Technical specification 560 mm V3.0



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
V3.0	17.01.2025	S. Lüttich	New IZ drawings and glands on the FPH

## 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. $\pm 12$ mm
Non-Linearity	max. $\pm 27$ 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: $\sim 60$ mm
<b>Analog Output Interface</b>	
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 $\Omega$
<b>Profibus Interface</b>	
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	$\leq 100$ bar
<b>Operating temperatures:</b>	
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 $\pm 0.35$ 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

<b>Cylinder Bore/ Astyx MPS mark</b>	<b>560 mm / 7035</b>
Antenna	Stainless steel AISI 316 / 1.4401
Dimensions	Ø190 x 194 mm
Weight	< 25 kg
Explosion safety  	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)

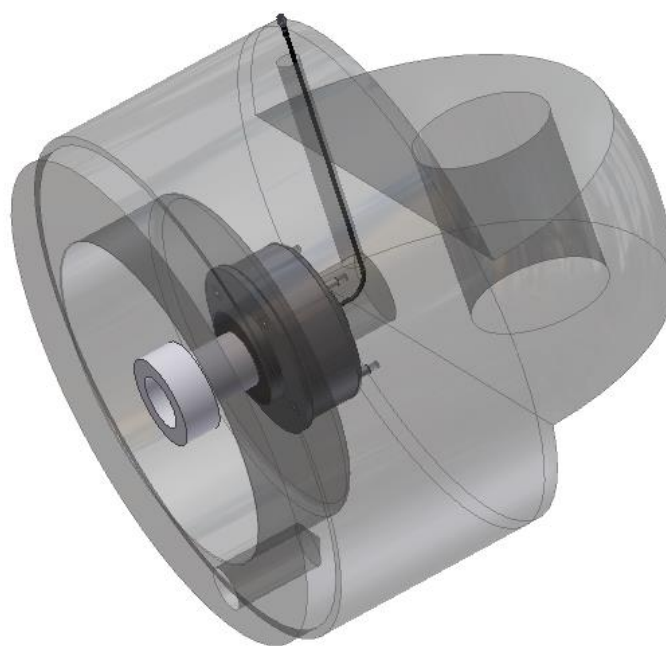
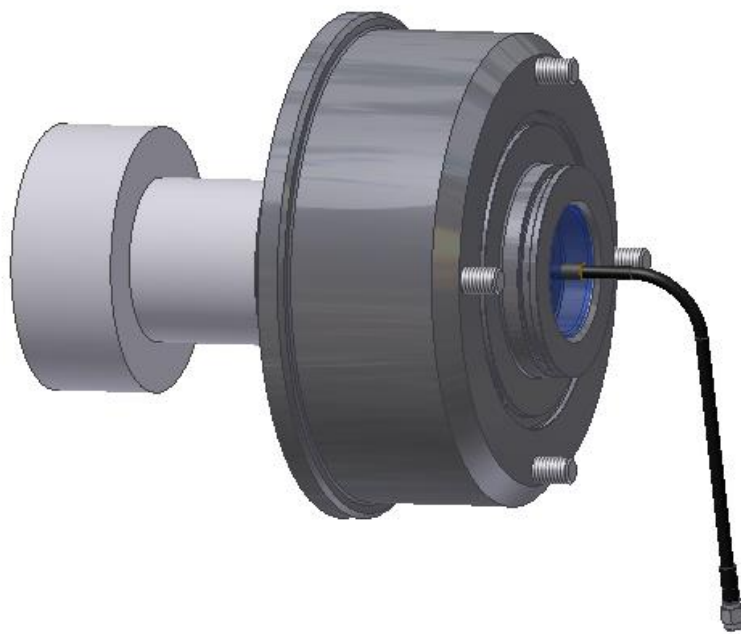
Protect SMA cable against environmental impact for use under harsh conditions.

Electrical Interface        see Manual

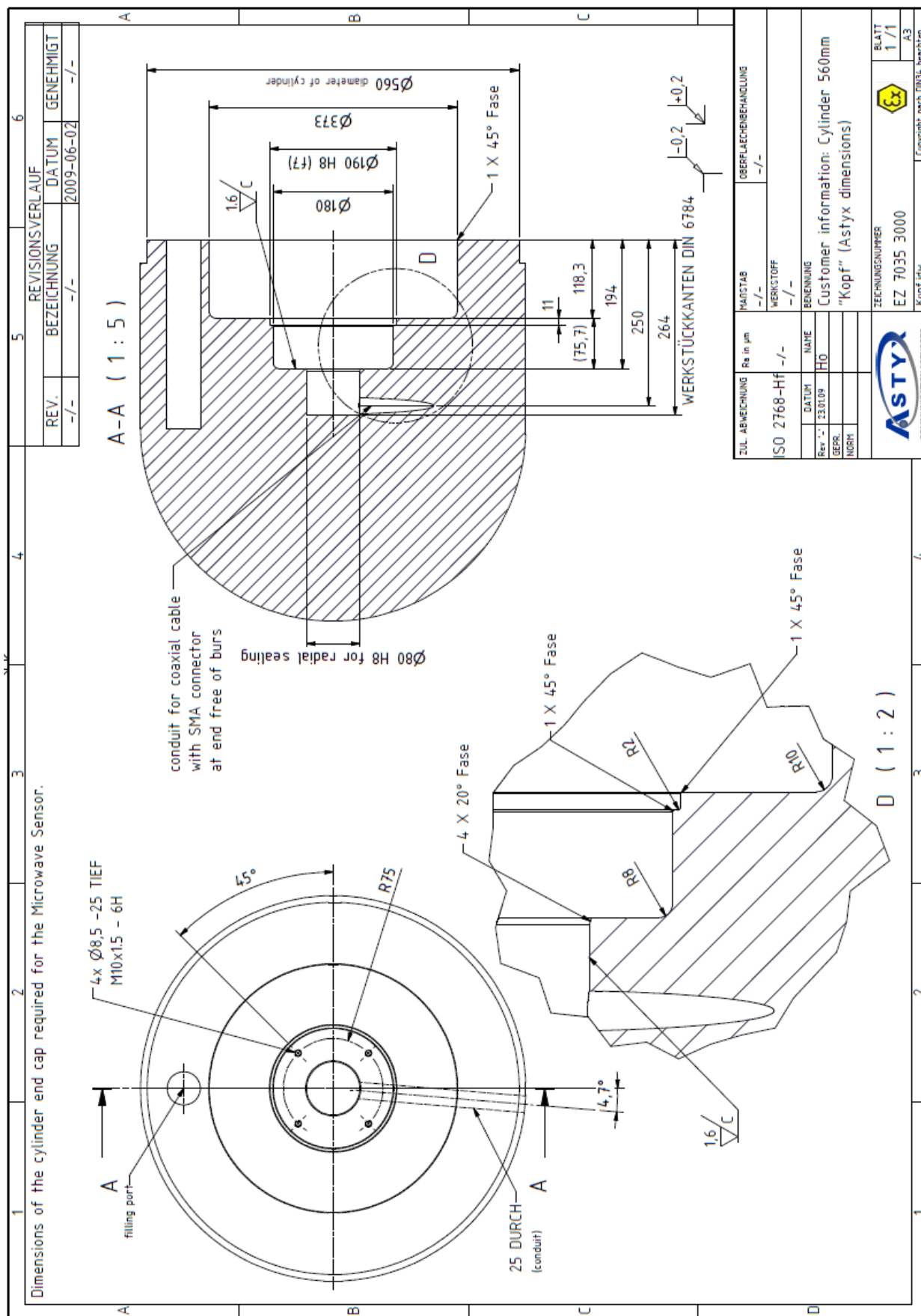
Regard to the manual for installation and operation for functional, safety and explosion safety reasons.  
Installation has to be in accordance to IEC/EN 60079-14.



## 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/B-M25-M25/S (alternative sealing for 1x cable 5mm diameter)	
Explosion safety  	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:

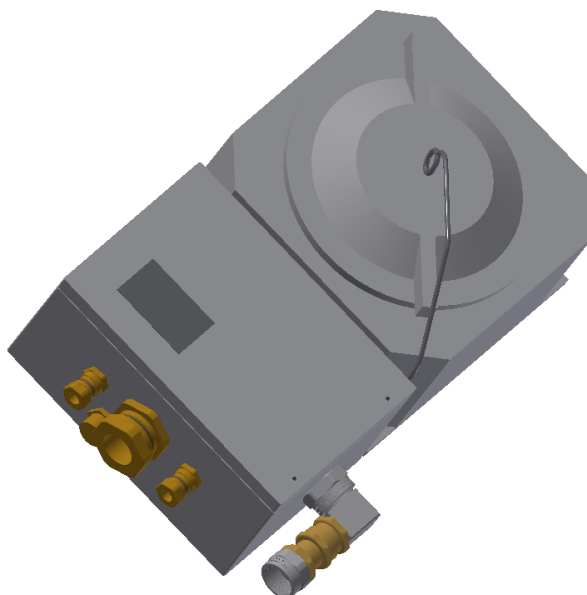
- A Security line of stainless steel with around 60 cm length for cover of Exd enclosure.
- A vapour space inhibitor is provided inside the Evaluation Box.
- For the analog output interface, 2 separate M20 Blind plugs are provided to plug pressure cable glands if no pressure sensors are connected.

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.

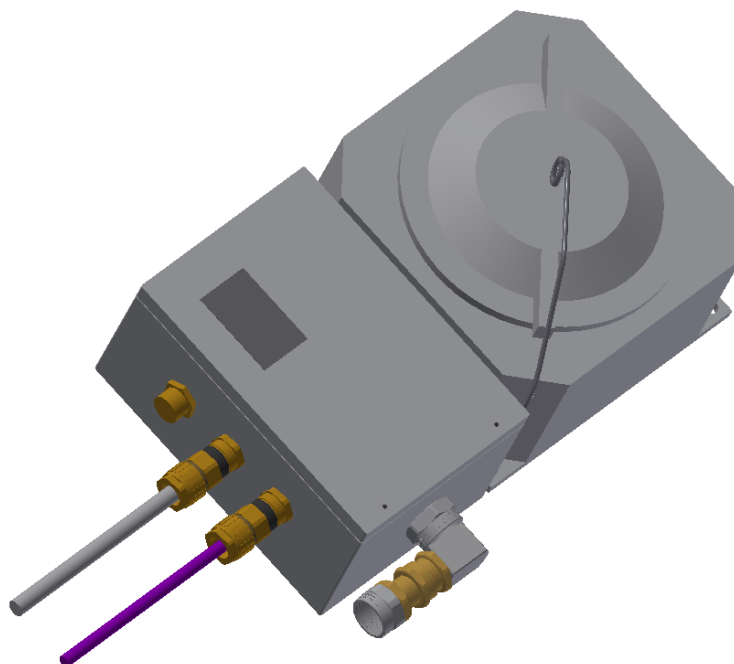


### Analog Output Interface



(Illustration, details may be different)

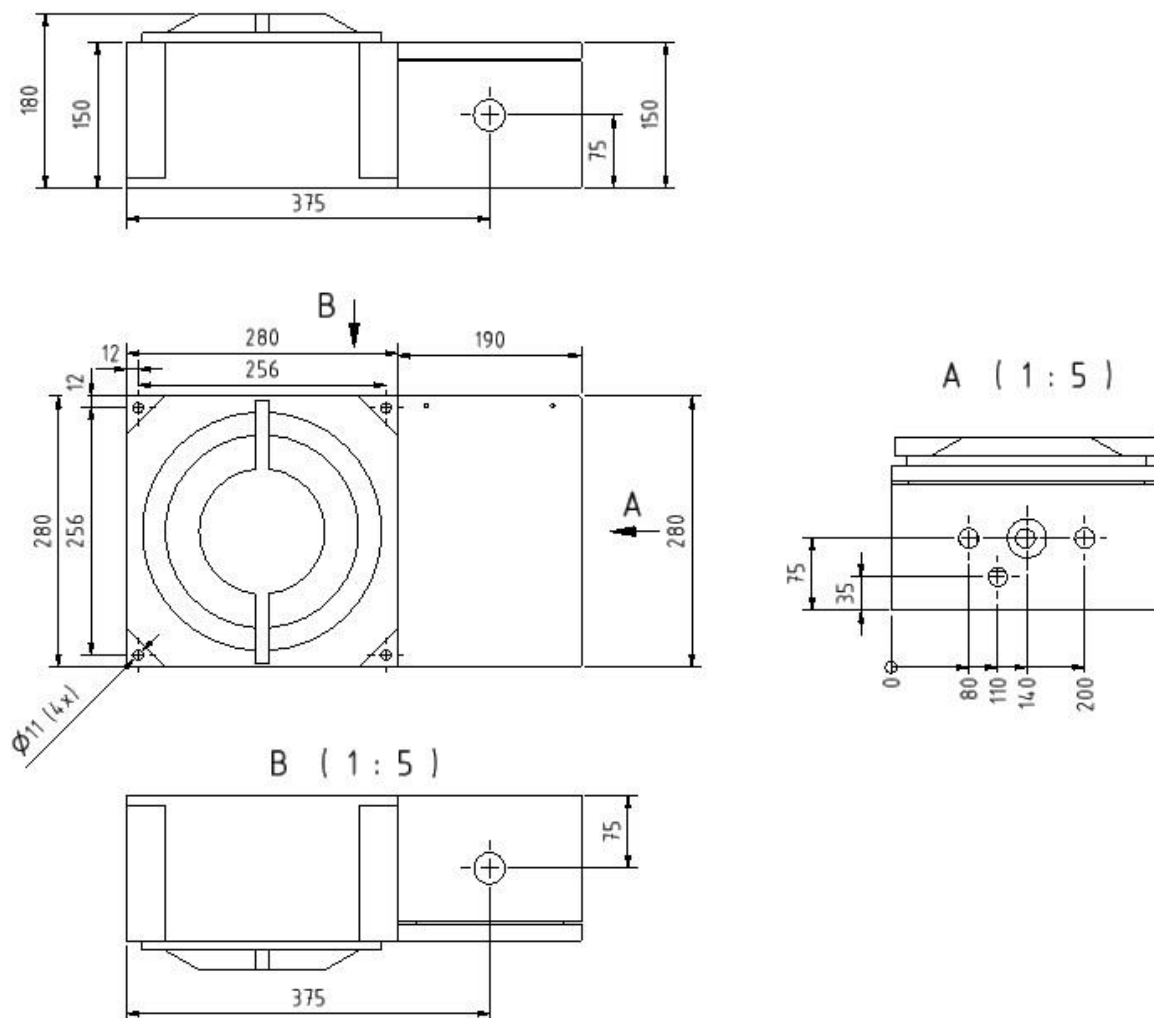
### Profibus Interface



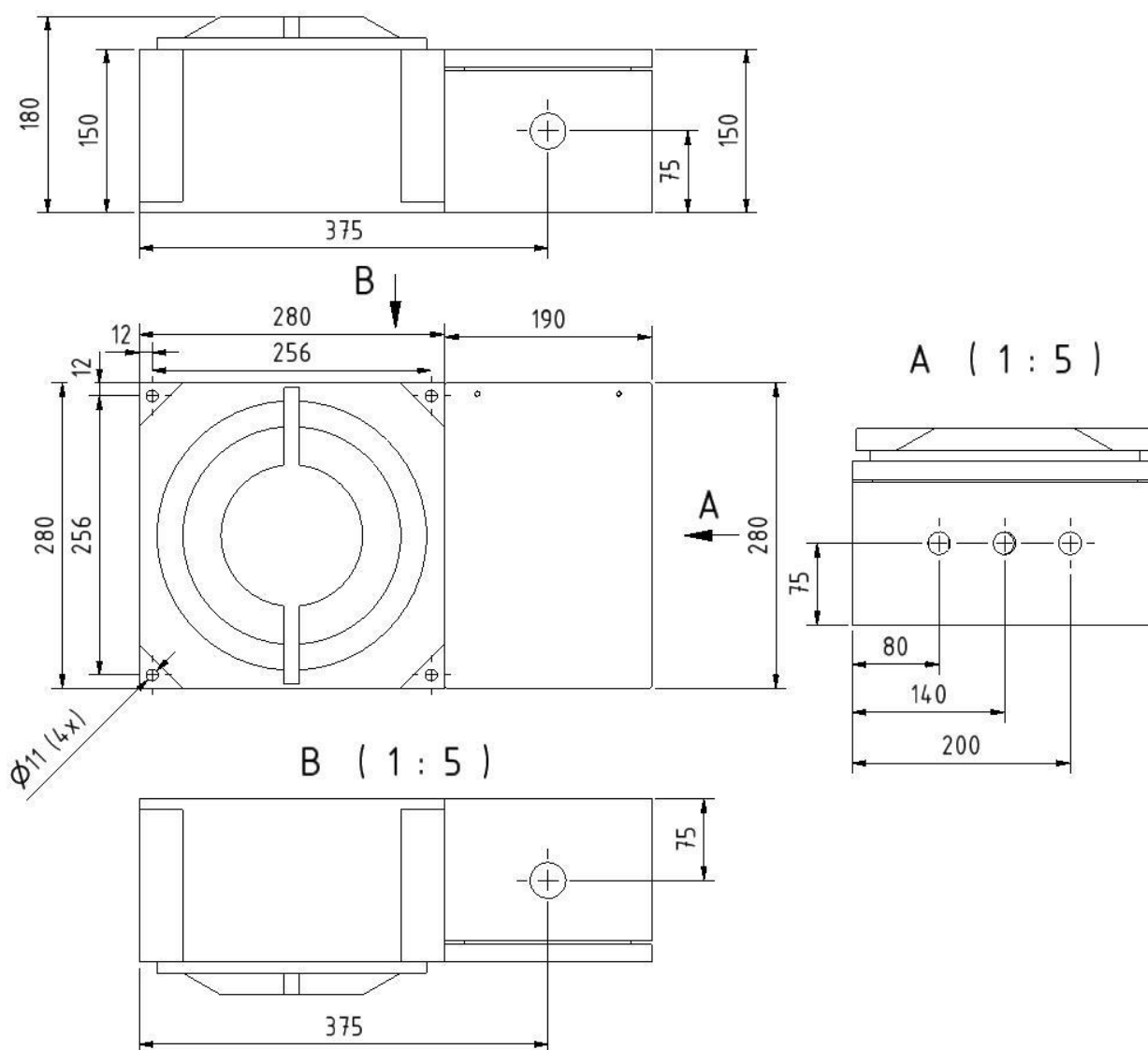
(Illustration, details may be different)



### 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