TENSOTECHNIQUE

M44 Four-Component (Rotating) Transducer

The M44 measures 4 components of force (Fx, Fy, Fz) along the three orthogonal axis (X, Y, Z) and torque (Mz) during the rotating. The M44 can be used for logging of the friction stir weldind (FSW) parameters.

The transducer consists of rotor and stator without bearings and brush contacts. The rotor comprises a measuring body applied with strain gauges, a transmitter, a photoelectric detector of the rotation speed and a coil of air transformer for transmitting the excitation voltage and the measuring signal. The measuring body has a metal construction made of steel-treated alloy. In addition, the rotor has flanges to mount the transducer on the test object.

The stator has the cylindrical ring-like housing with the single-turned coils on it for inductive power supply and data transmission. Within the housing are the electronic signal receiver unit, the power generator and the infrared emitter of the speed sensor. The housing includes connecting plugs for power cable and data transmission. There are special holes for mounting of the transducer on a test bench.

The rotor of the transducer is mounted on the test object with the tapered spindle adapter (in the scope of supply). For mounting the tool, tool holder is available (in the scope of supply, its drawing see in the Appendix 1). The stator is mounted on the frame so that its single-turned coils wrap the rotor coils with the minimal axial offset.

Nominal Force Ranges

Measured force, torque	Spindle adapter type, transducer type	Nominal value	Nominal measuring range
F_x	Spindle adapter – 40 M44-10k-40k-100	10 000 N	± 10 000 N
F_y		10 000 N	± 10 000 N
F_z		40 000 N	± 40 000 N
M_z		100 Nm	± 100 Nm
F_x	Spindle adapter – 45 M44-25k-50k-200	25 000 N	± 25 000 N
F_y		25 000 N	± 25 000 N
F_z		50 000 N	± 50 000 N
M_z		200 Nm	± 200 Nm

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Technical Data

1. Measurement system

Combined error (hysteresis and nonlinearity) at the nominal force F_x, F_y, F_z, torque M_z	%	≥ ± 1.0
Temperature effect per 10 °C on the zero signal, related to the nominal force F_x, F_y, F_z,	%/10°C	≥ ± 0.2
Interference	%	≥ ± 5.0
Measurement frequency range	Hz	≤ 0 … 100 (- 1.5 dB)
Nominal supply voltage	V (DC)	12 … 30
Power consumption	W	≥ 5
Digital output		
Interface		USB 2.0
Data transfer rate	Kbps	100
Sample rate	kHz	5.0
Input-output galvanic isolation		+

2. Resistance to environment and mechanical exposures

Nominal temperature range	°C	0 … + 60
Humidity	%	≥ 95 (+ 35 °C)
Atmospheric pressure	kPa	84 … 106.7 (630 … 800 mm Hg)
Storage temperature range	°C	- 10 … + 70
Storage humidity	%	≥ 95 (+ 30 °C)
Vibration resistance: Frequency range Duration Acceleration	 Hz h m/s^2	 10 … 55 1 40
Impact resistance: Number of impacts Duration Acceleration	 n ms m/s^2	 1 000 10 400
Degree of protection		IP40

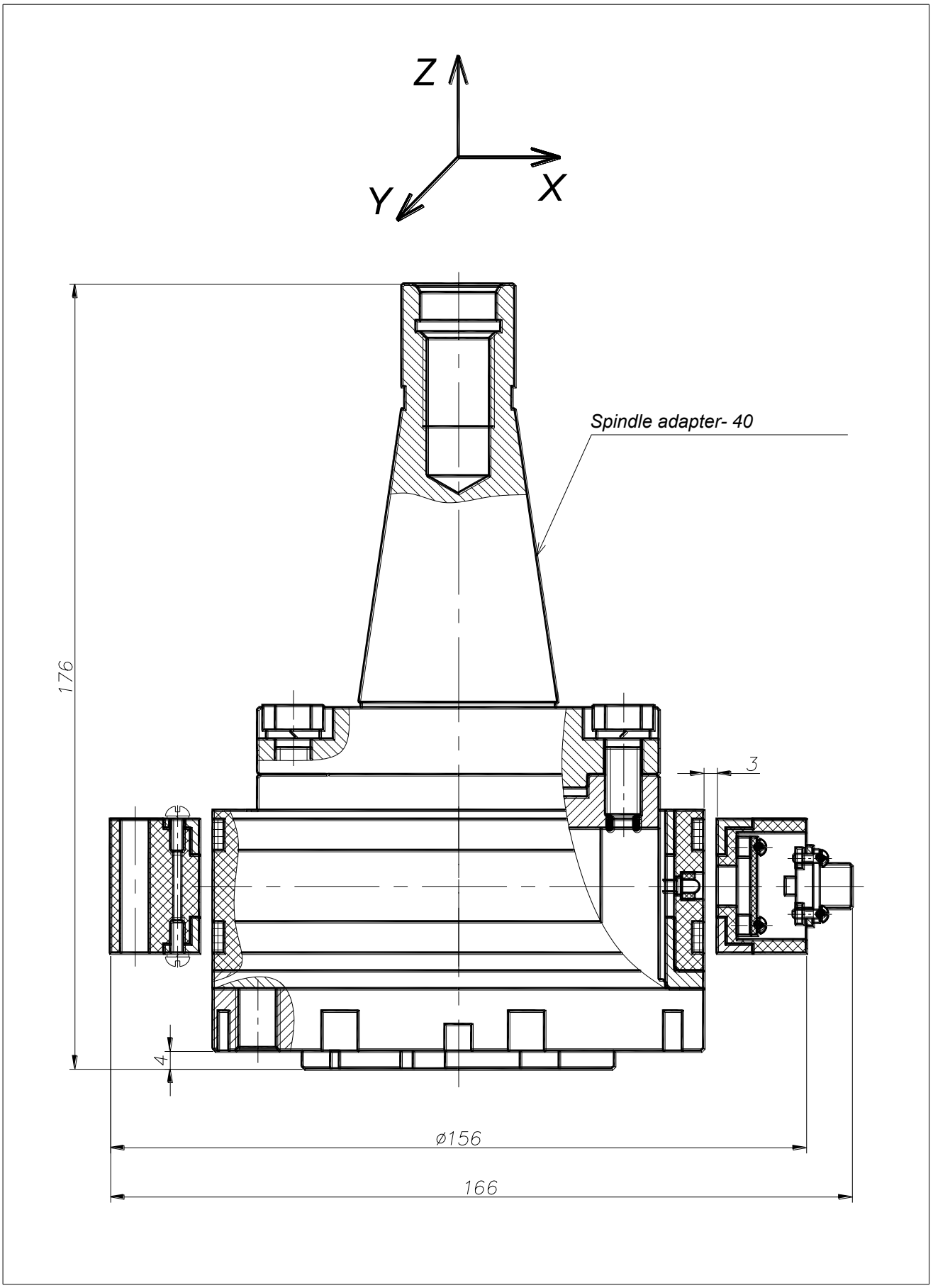
3. Mechanical Values and Operating Limitations

Limit force related to max. F_x, F_y, F_z – 120 %
Limit bending moment related to max. M_x, M_y– 1 500 Nm
Limit torque M_z– 500 Nm

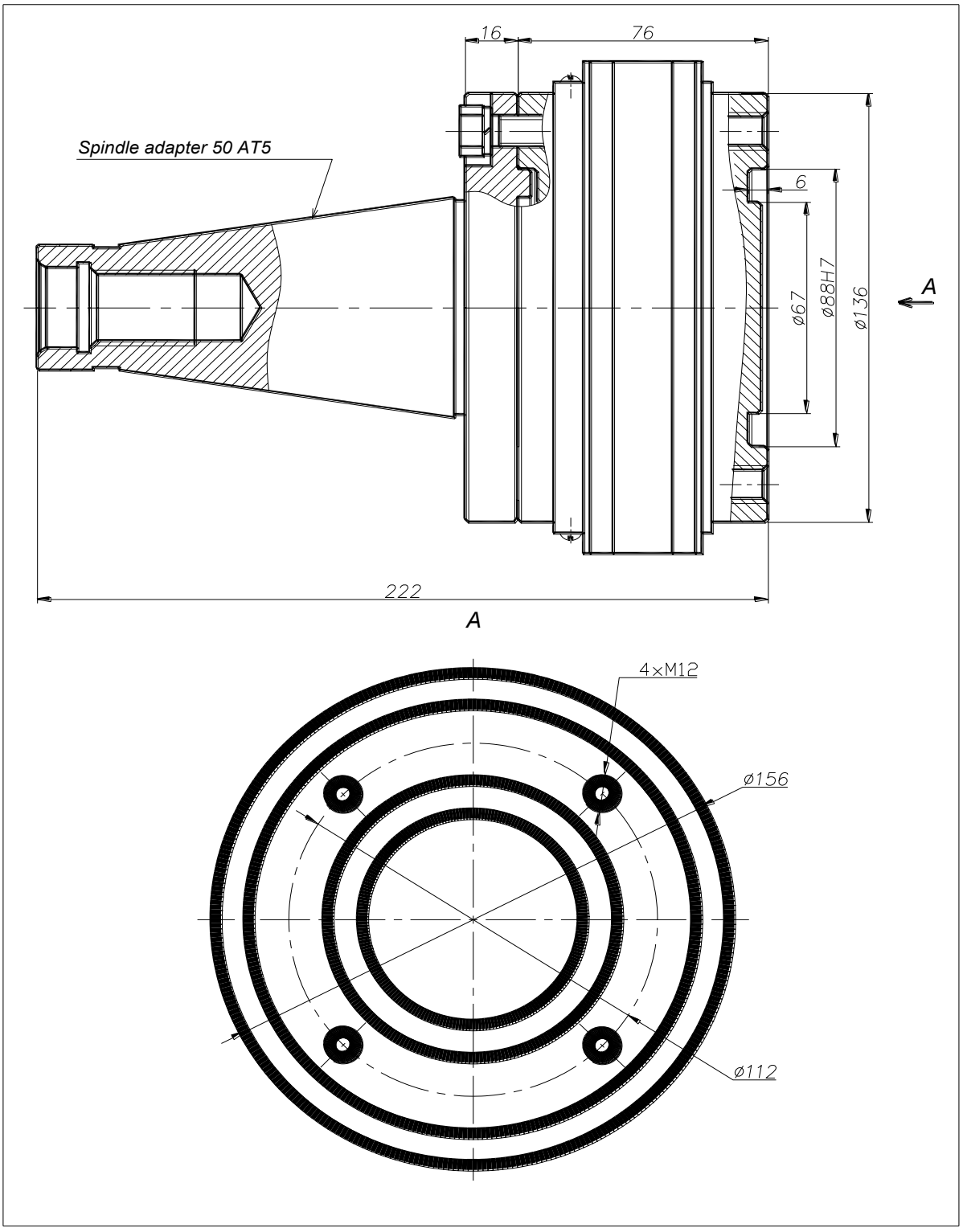
Scope of Supply

M44 4-component rotating transducer (rotor, stator)	1
AT1.3-1 USB-adapter	1
Signal cable, 5 m long	1
USB cable	1
Spindle adapter	1
Tool holder	1
PROFI software for MS® Windows 7, XP,8, 10	1
Operating manual for transducer	1
PROFI user manual (on the CD)	1

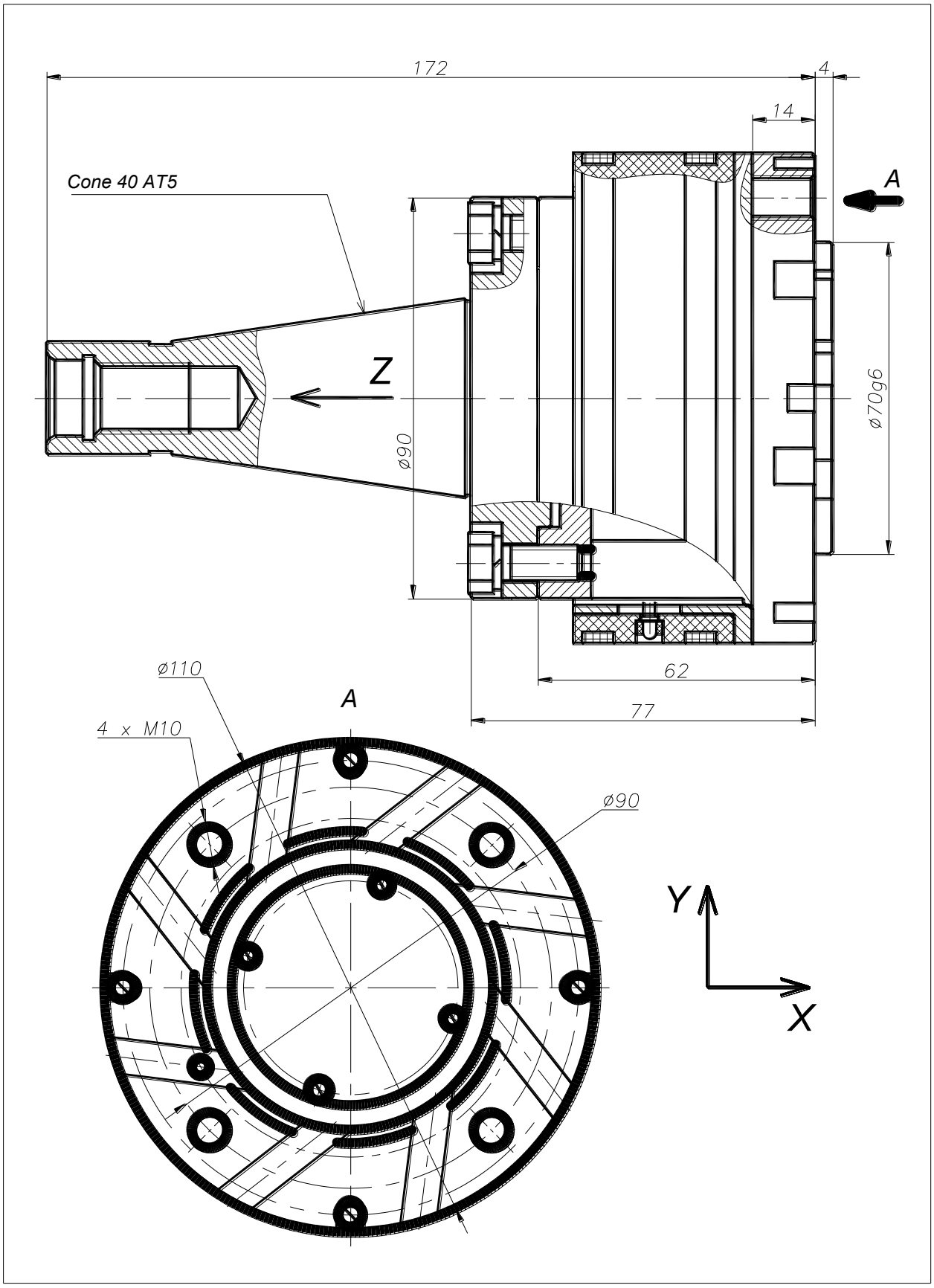
M44-10k-40k-100 4-component transducer. General view, dimensions in mm.



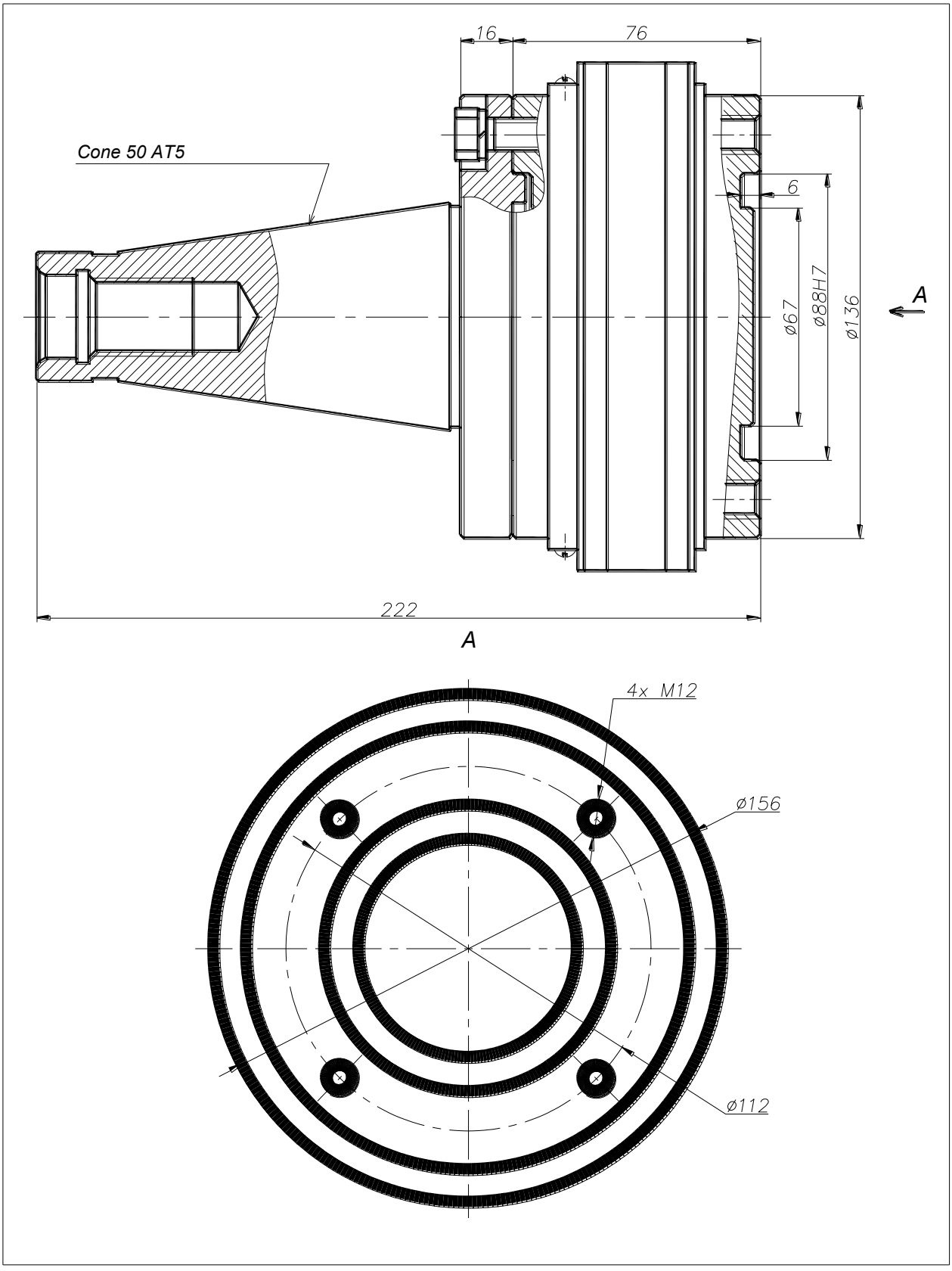
M44-25k-50k-200 4-component transducer. General view, dimensions in mm.



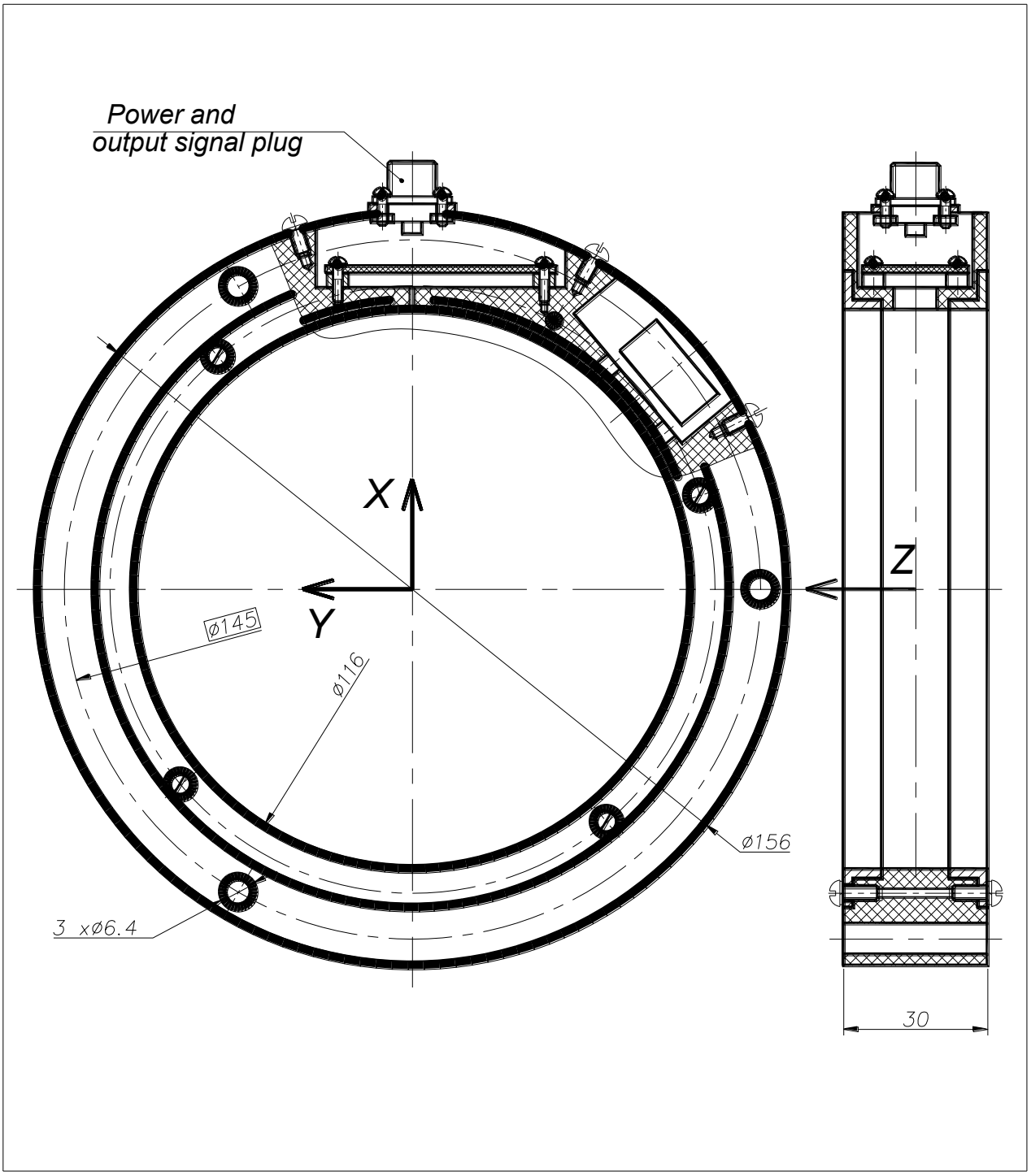
M44-10k-40k-100 4-component transducer. Rotor. Dimensions in mm



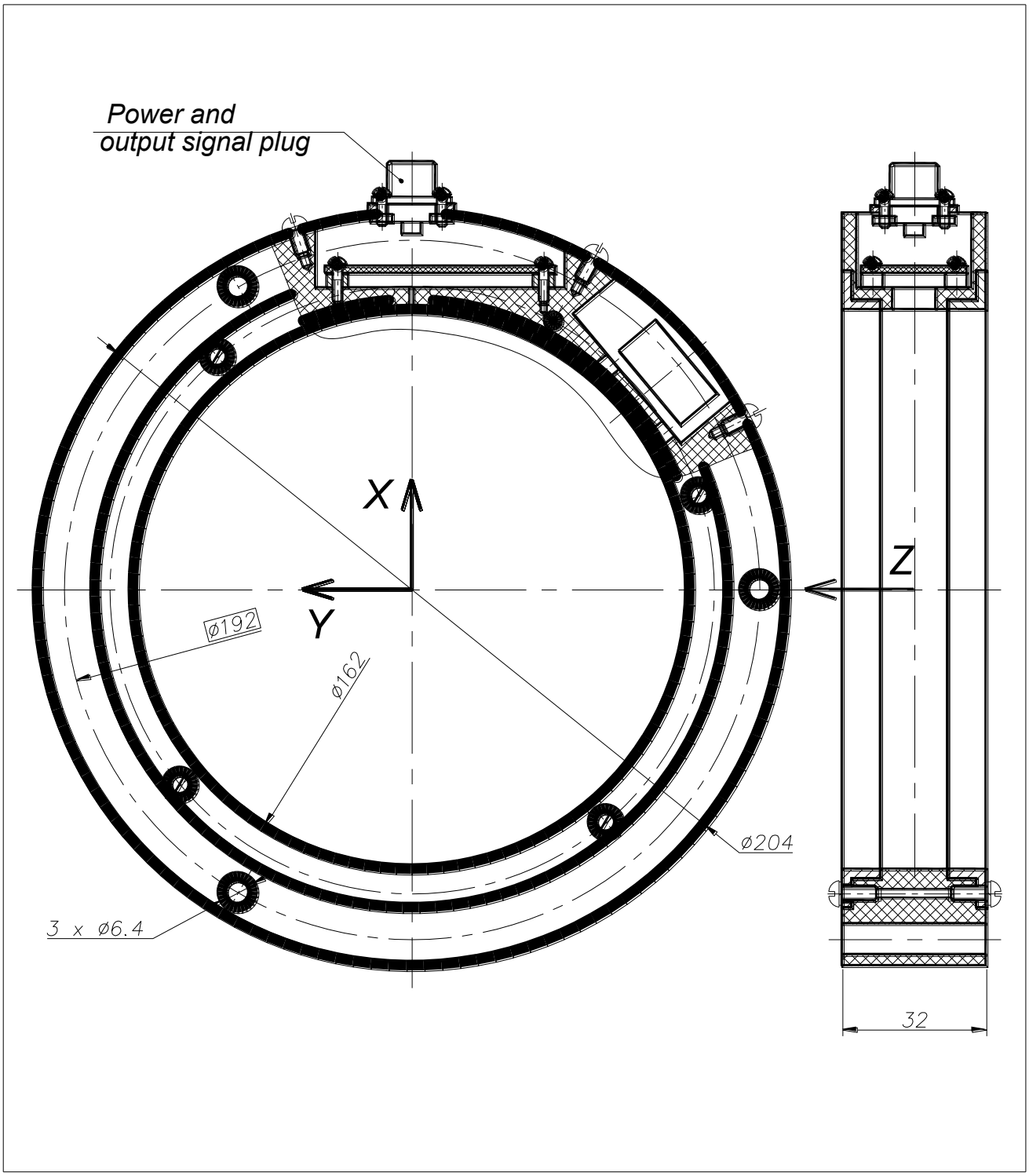
M44-25k-50k-200 4-component transducer. Rotor. Dimensions in mm.



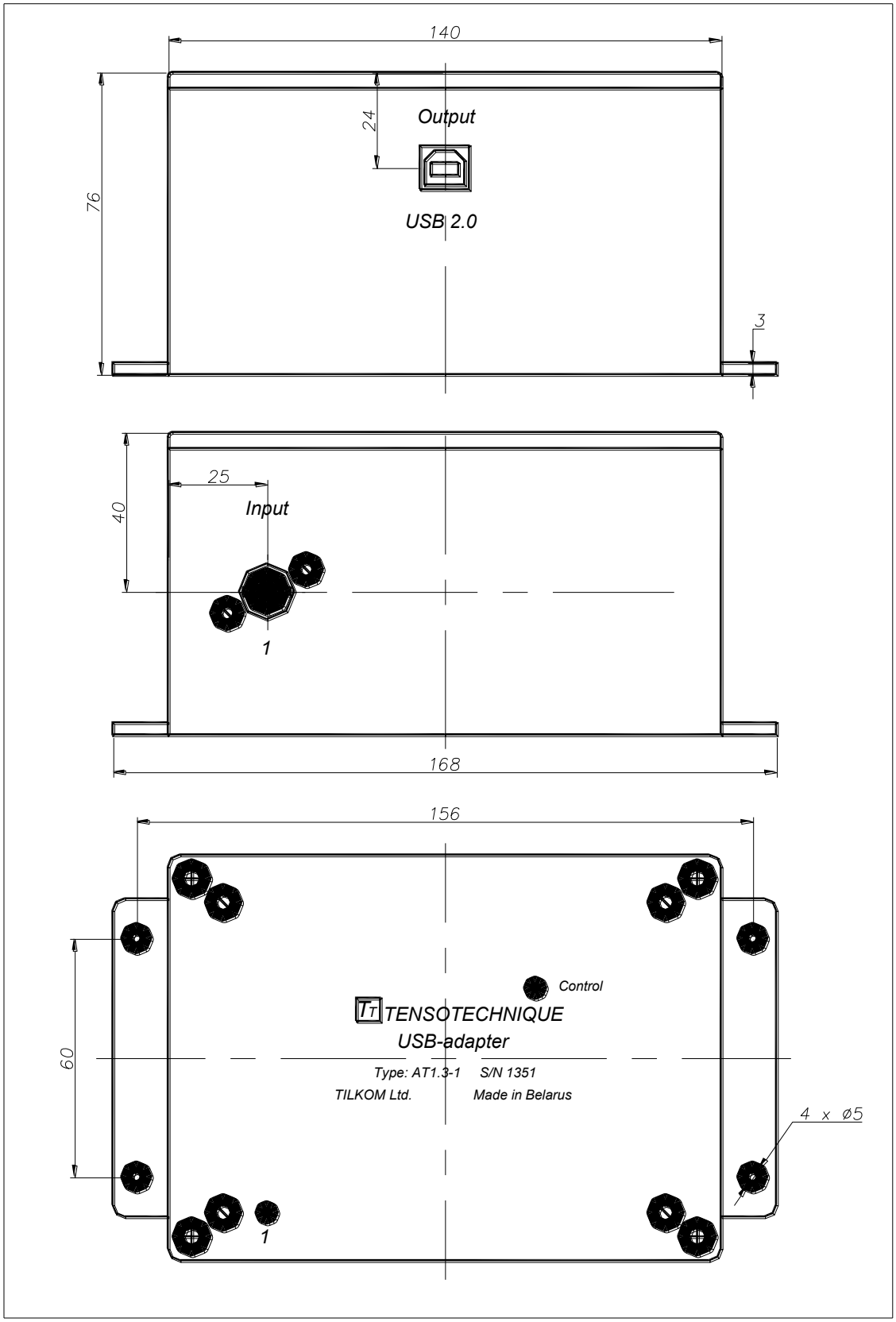
M44-10k-40k-100 4-component transducer. Stator. Dimensions in mm.



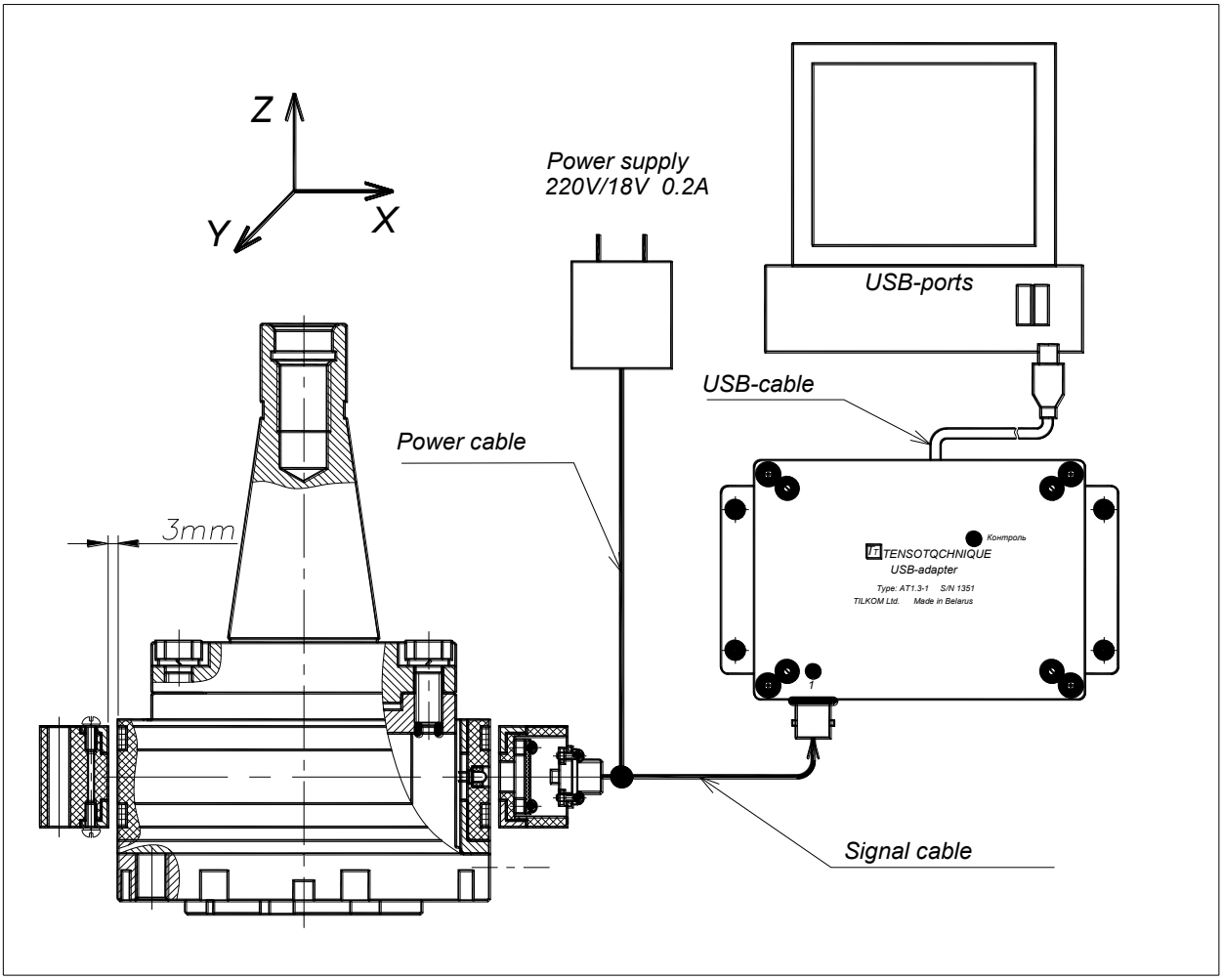
M44-25k-50k-200 4-component transducer. Stator. Dimensions in mm



AT 1.3-1 USB-adapter. Dimensions in mm.



Electrical connection to a PC.



Software

PROFI software for Microsoft® Windows XP, 7, 10 enables the acquisition of measurement data, visualization and its storage in PC memory.

By rotating, the infrared receiver of the rotor gets regularly into the beam source zone. The beam source is mounted on the stator. Therefore, the infrared receiver generates one pulse per revolution of the rotor. The revolution speed is calculated by the program.

The acquisition and visualization of the data transmitted from the transducer to the PC is performed while the speed measuring system signal is in effect (i. e. by rotor spinning). Otherwise, the acquisition and visualization of the data is possible when PROFI setup mode is on. This is due to rotor coordinate system related to the fixed coordinate system of the stator. Thus by the system setup the rotor spinning emulation mode is very useful. Do it while rotor is stationary by means of the mechanic interruption of the optopair light flux from the speed measuring system.

The power supply of the rotor electronics and SG bridge is provided by the air transformer with high-frequency current.

Modifications reserved.

We also produce customized torque transducers to meet your specific requirements

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