M27 Torque Transducer

The M27 is a rotating torque transducer. It has square connection design. The outer and inner connecting square ends are produced according to ISO 1174-2.

The M27 transducer measures torque within the range of nominal values from 5 to 1 000 Nm. The M27 are digital transducers, where SG signal is converted into digital code and is transmitted from the rotor to the stator by means of contactless telemetry. The digital coded signal has high interference immunity, provides high accuracy of measurements and can be transmitted over significant distances without distortion and loss of information.

The M27 torque transducer measures static and dynamic varying torque from – $\mathbf{M_N}$ to + $\mathbf{M_N}$ (from counterclockwise (negative) torque to clockwise (positive) torque). The optoelectronic sensor is built-in to control the speed measurements.

The M27 torque transducers can provide digital (USB2.0, RS232, RS485 (Modbus protocol)), analogue (± 5 V, ± 10 V, 4 … 20 mA) and frequency (10 ± 5 kHz, 60 ± 30 kHz) output signals according to the custom requirements. They can be directly connected to a PC to monitor the measuring process and to save data. The special software is in the scope of supply.

Type-Survey

Type	Nominal toque M_N, Nm	Max. speed, rpm
M27-5 … 20	5 10 12 15 20	3 000
M27-30 … 100	30 40 50 60 80 100	
M27-120 … 200	120 150 200	
M27-300 … 500	300 400 500	
M27-600 … 1k	600 800 1 000	

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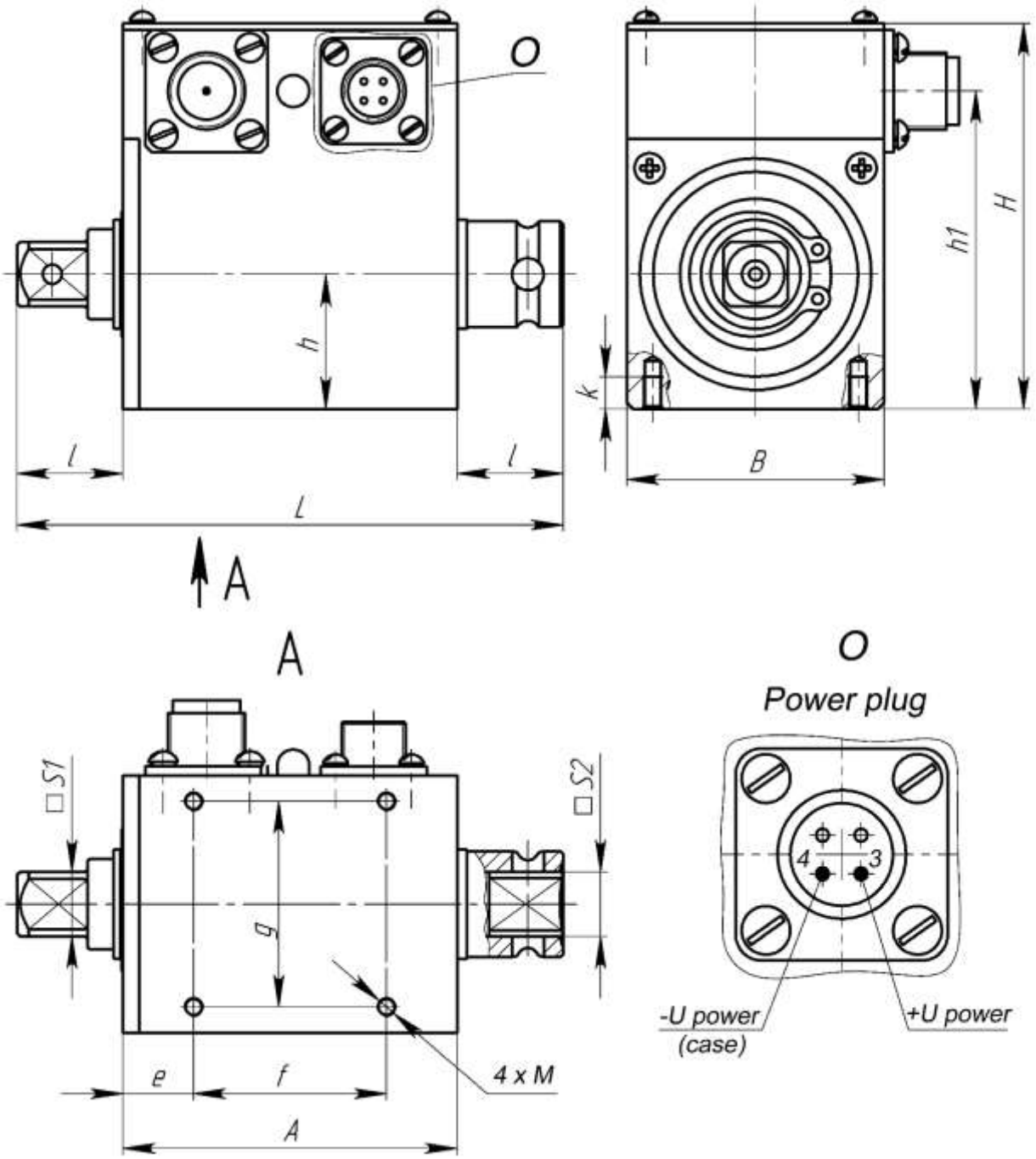
M27 Transducer, 5 … 200 Nm. Dimensions in mm.



Type	A	B	C	H	h	h1	L	l
M27-5 … 20	52	40	52	60	21	49.5	85	16.5
M27-30 … 100	52	48	60	67	24	56.0	94	21.0
M27-120 … 200	52	52	64	71	26	60.5	100	24.0

Type	Connecting square				e	f	g	k	M
	outer		inner						
	ISO 1174-2	□S1	ISO 1174-2	□S2					
M27-5 … 20	F10	$9.53_{-0.07}$	G10	$9.58^{+0.09}$	11	30	32	5.0	M3
M27-30 … 100	F12.5	$12.7_{-0.07}$	G12.5	$12.76^{+0.11}$	11	30	38	6.5	M4
M27-120 … 200	F1.5	$12.7_{-0.07}$	G12.5	$12.76^{+0.11}$	11	30	40	6.5	M4

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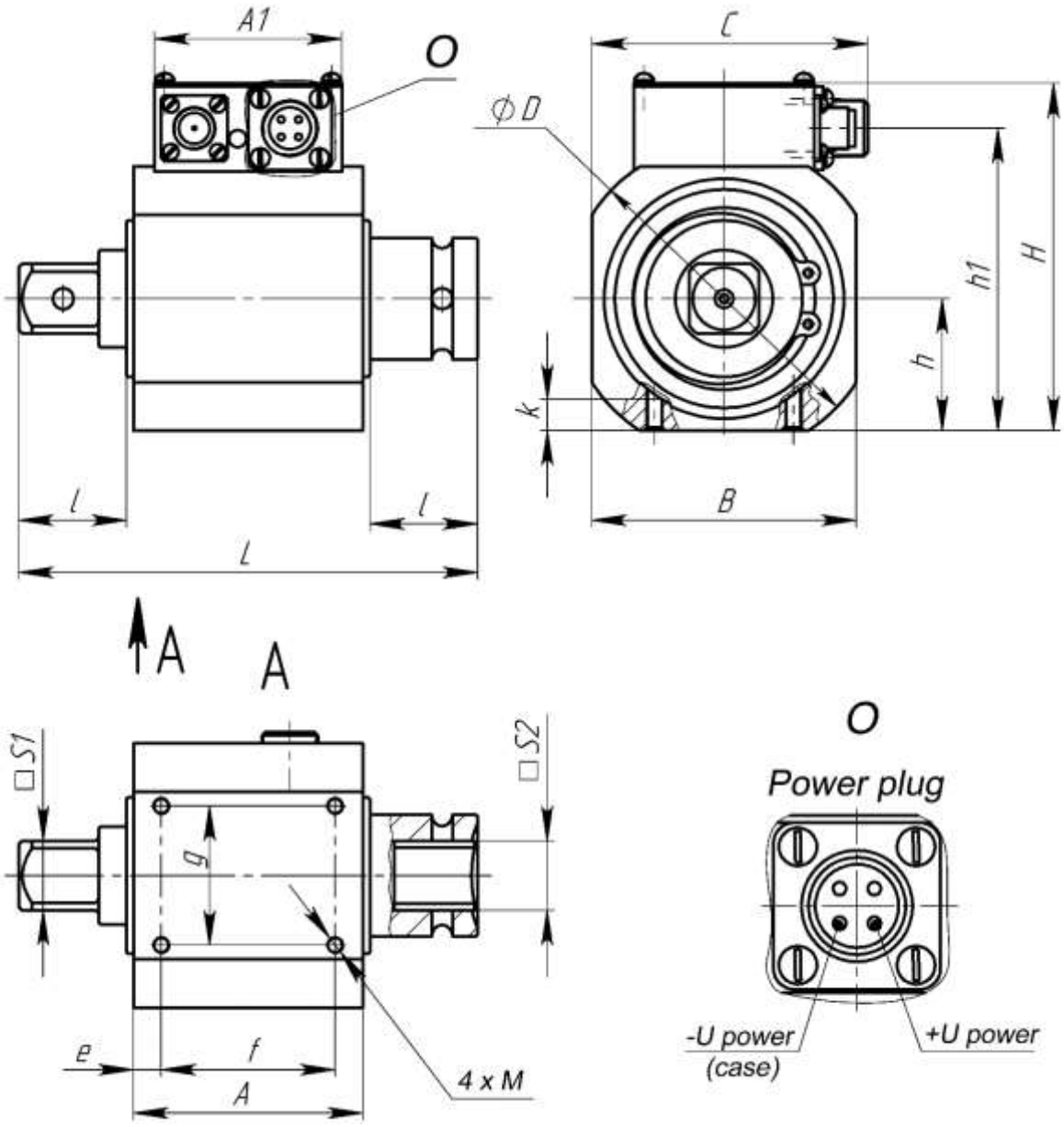
M27 Transducer, 300 … 1 000 Nm. Dimensions in mm.



Type	A	B	C	H	h	h1	L	l
M27-300 … 500	66	76	80	100	38	87	132	31
M27-600 … 1k	66	76	80	100	38	87	132	31

Type	Connecting square				e	f	g	k	M
	outer		inner						
	ISO 1174-2	□S1	ISO 1174-2	□S2					
M27-300 … 500	F20	$19.05_{-0.08}$	H20	$19.11^{+0.13}$	8	50	40	5	M5
M27-600 … 1k	F25	$25.4_{-0.08}$	H25	$25.46^{+0.3}$	8	50	40	5	M5

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Technical data

Nominal torque M_N and max. speed see table «Type-Survey».

Accuracy class		0.2
Deviation of the actual output signal at the nominal torque from the nominal value (including hysteresis and nonlinearity)	%	± 0.2
Temperature effect per 10 °C on the zero signal, related to the nominal output value	%	± 0.1
Nominal supply voltage	V (DC)	12 … 30
Power consumption	W	< 5
Measurement frequency range	Hz	0 … 1000 (- 1.5 dB)
Amplitude ripple (0 … 500 Hz)	dB	≤ 0.1
Frequency output (T23 decoder)		
Frequency output signal with positive nominal torque	kHz	15 (90)
Frequency output signal with negative nominal torque	kHz	5 (30)
Frequency output signal at torque = zero	kHz	10 (60)
Load resistance	kΩ	≥ 2
Output voltage	V	5 ± 1(symmetrical meander)
Input-output galvanic isolation		+
Analogue output (T24 decoder)		
Nominal output signal with positive (right-hand) nominal torque	V	+ 5 (+ 10)
Nominal output signal with negative (left-hand) nominal torque	V	- 5 (- 10)
Output signal at torque = zero	V	0
Load resistance	kΩ	≥ 10
Analogue output (T24/4 … 20 mA decoder)		
Output current	mA	4 … 20
Output current at loading = zero	mA	12
Output current at nominal positive loading	mA	20
Output current at nominal negative loading	mA	4
Load resistance	kΩ	≥ 100
Digital output (T45 decoder)		
Interface		USB 2.0
Data transfer rate (Full-Speed)	Mbit/sec	13
Sample rate	kSample	5.0
Input-output galvanic isolation		+
Digital output (T37 decoder)		
Interface		Ethernet
Data transfer rate	Mbit/sec	10; 100
Sample rate	kSample	5.0
Input-output galvanic isolation		+
Digital output (T46 decoder)		
Interface		RS485
Protocol		MODBUS RTU
Data transfer rate	baud	2 400 - 115 200
Parity check		+
Sample rate	kSample	5.0
Input-output galvanic isolation		+
Digital output (T42 decoder)		
Interface		RS232
Data transfer rate	baud	2 400 - 115 200
Parity check		+
Sample rate	kSample	5.0
Input-output galvanic isolation		+
Rotation speed measuring system		
Accuracy (within 30 … 20 000 rpm)	%	± 0.1
Pulses per revolution depending on a decoder — T23, T24		1
Pulses per revolution depending on a decoder — T23/3, T24/3		60, 120, 360, 480, 720 (optionally)
Min. detected speed	rpm	30
Amplitude of output pulse voltage with analogue (frequency) output	V	5 ± 1

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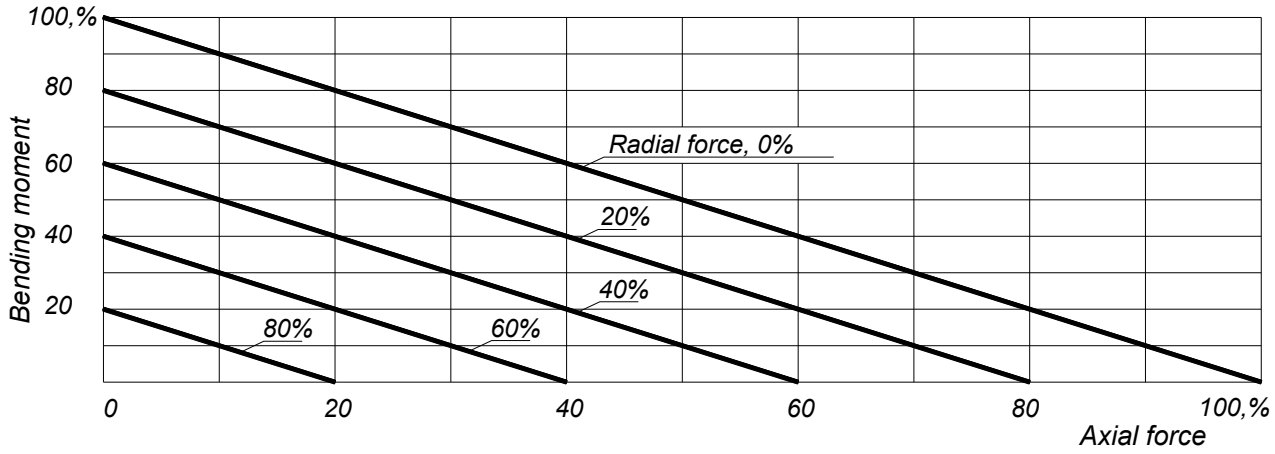
Parameters of resistance to environment and mechanical exposures

Nominal temperature range	°C	+ 5 … + 50
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

Limit torque, related to M_N

Type	Nominal toque M_N, Nm	Limit torque related to M_N, %
M27-5 … 30	5 10 12 15 20 30	150
M27-50 … 120	50 60 80 100 120	
M27-150 … 300	150 200 250 300	
M27-400 … 1k	400 500 600 800 1 000	

Axial force, radial force and bending moment have to be reduced according to graph 1, if they act together, as they are interdependent.



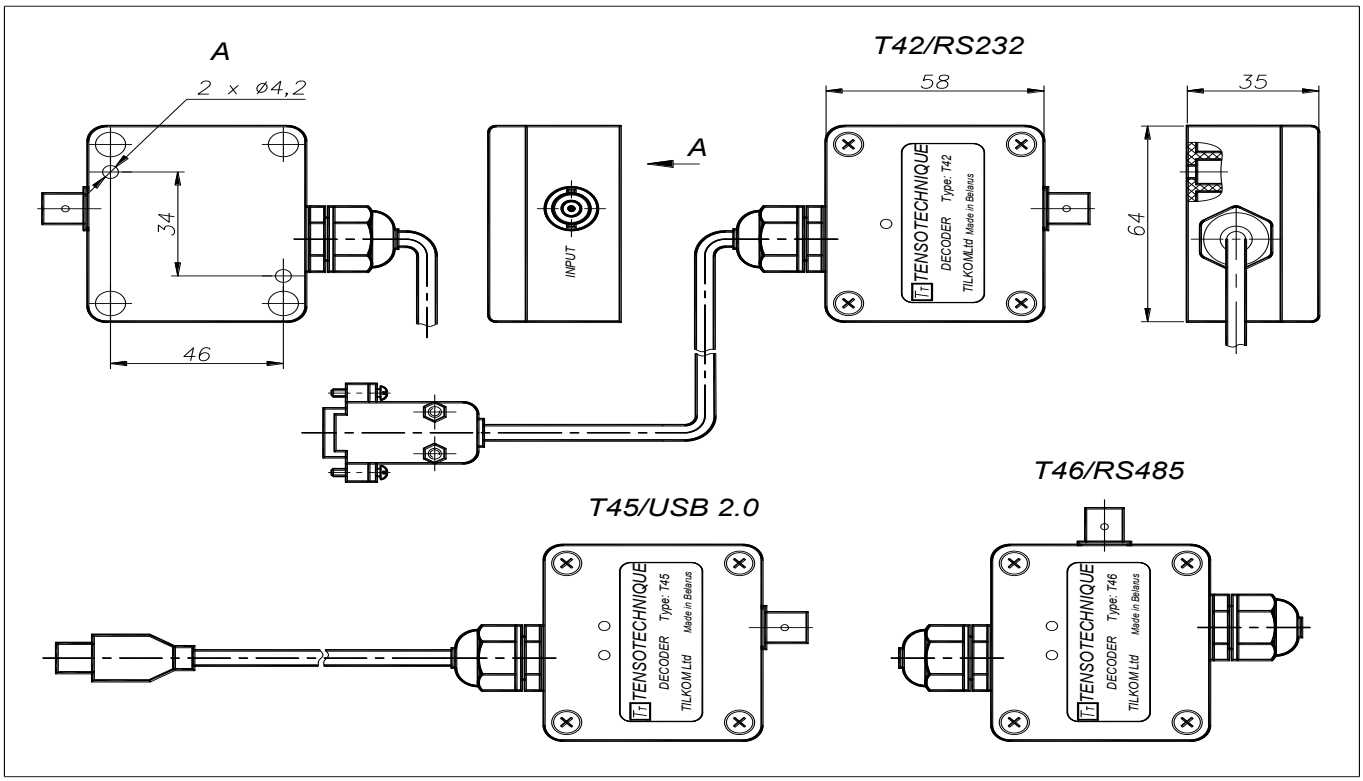
Scope of delivery

M27 torque transducer	1
Decoder Txx	1
Output signal cable, 5 m long (optionally can be over in length)	1
Power supply connector PC4	1
“Transducer” Software for Windows XP, 7, 8, 10	1
Operating manual	1
Software user manual	1

Accessories (to be ordered separately and optionally)

T40 display unit (displaying of torque, rotating speed, power)	1
T41 display unit (plastic case)	1
T50 display unit (oversize unit for long distances 50 – 70 m)	1
T24 analogue decoder (output (± 5 V; ± 10 V or 4 … 20 mA)	1
T23 frequency decoder (output 10 kHz ± 5 kHz or 60 kHz ± 30 kHz)	1
T45 digital decoder (output USB 2.0)	1
T42 digital decoder (output RS 232)	1
T46 digital decoder (output RS 485)	1
T37 digital decoder (output Ethernet)	1
AC/DC adapter 12 … 24 V	1

T42, T45, T46 digital decoder. Dimension in mm



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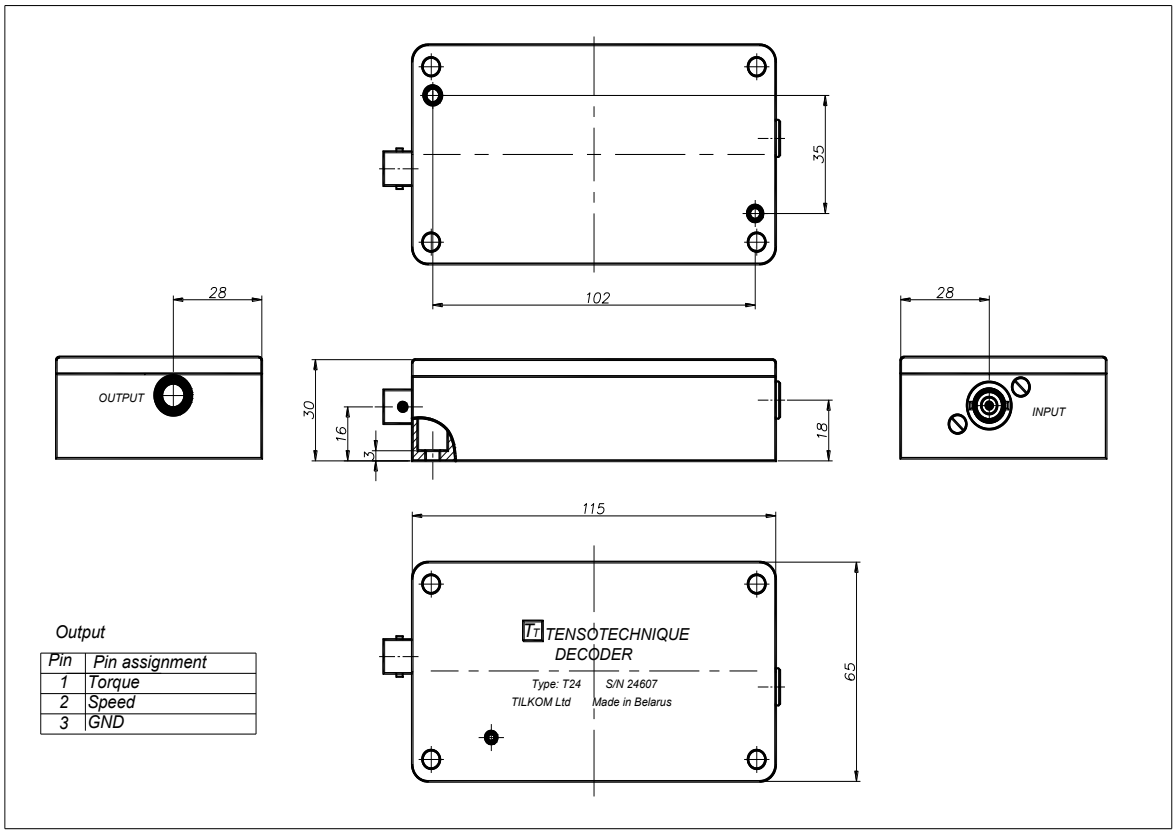
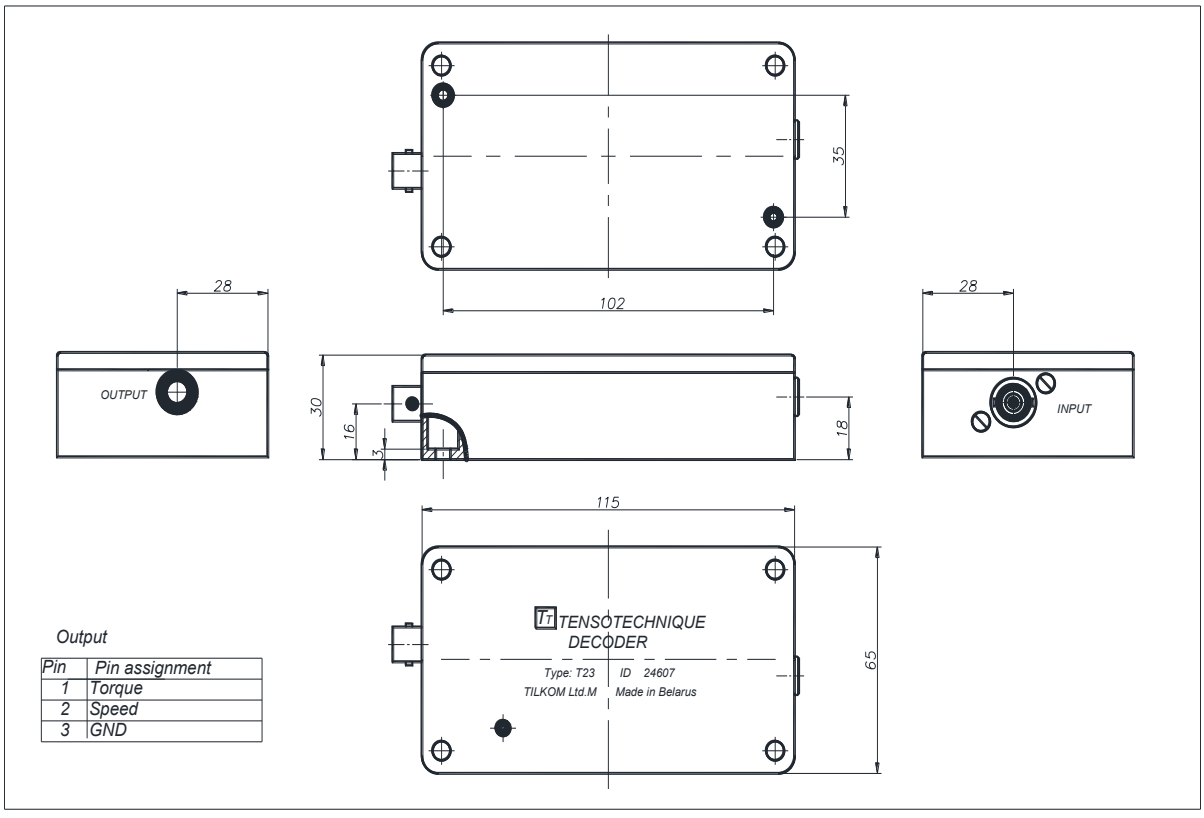
T24 analogue decoder. Dimension in mm



Output

Pin	Pin assignment
1	Torque
2	Speed
3	GND

T23 frequency decoder. Dimensions in mm.



Output

Pin	Pin assignment
1	Torque
2	Speed
3	GND

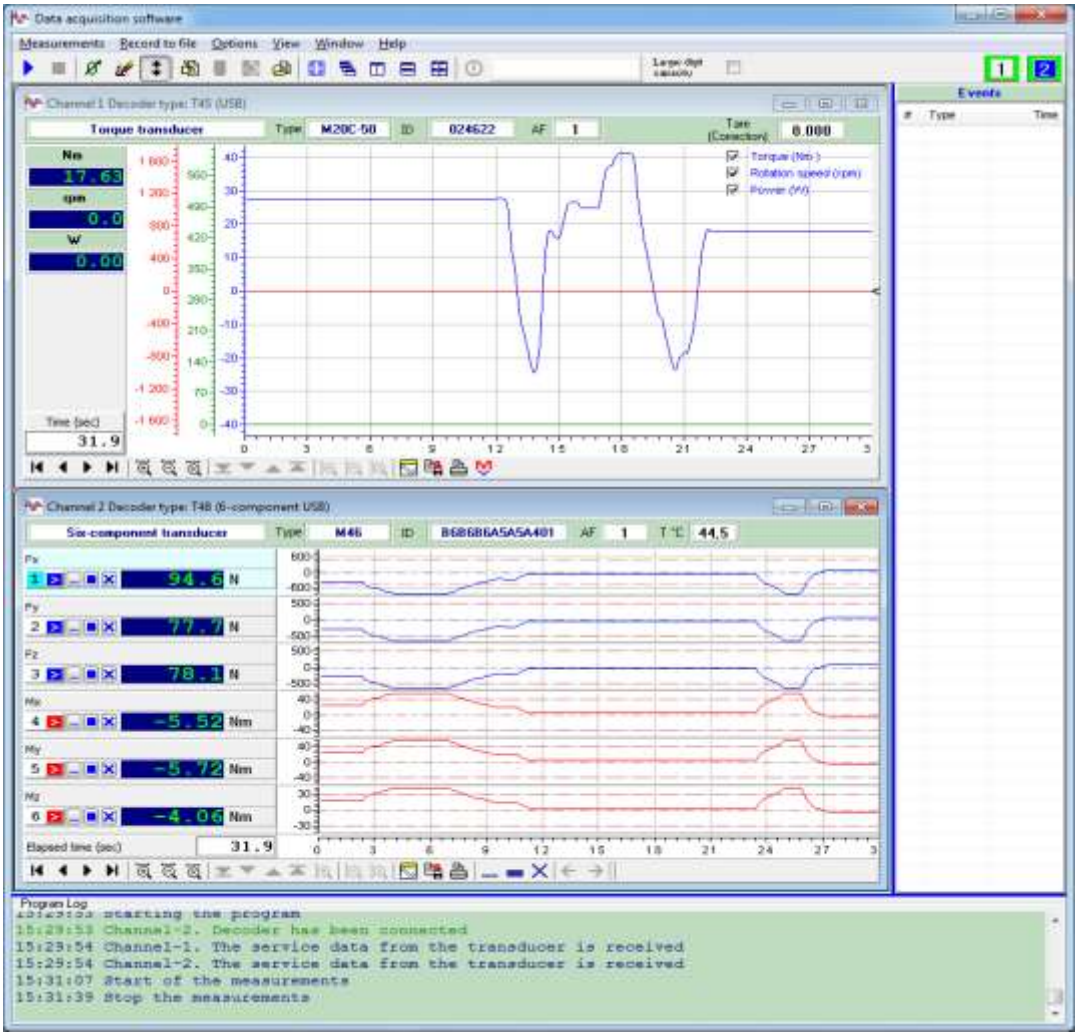
Software

The Windows-based software supplied with transducer enables the acquisition of measurement data and its storage in a file. The measurements can be visualized on-line with digital indicators and x/y displays. A text file is provided for storage so that the measurement data can be read and processed by other programs.

The software provides auto identification of type of transducer, serial number (ID), and measuring range.

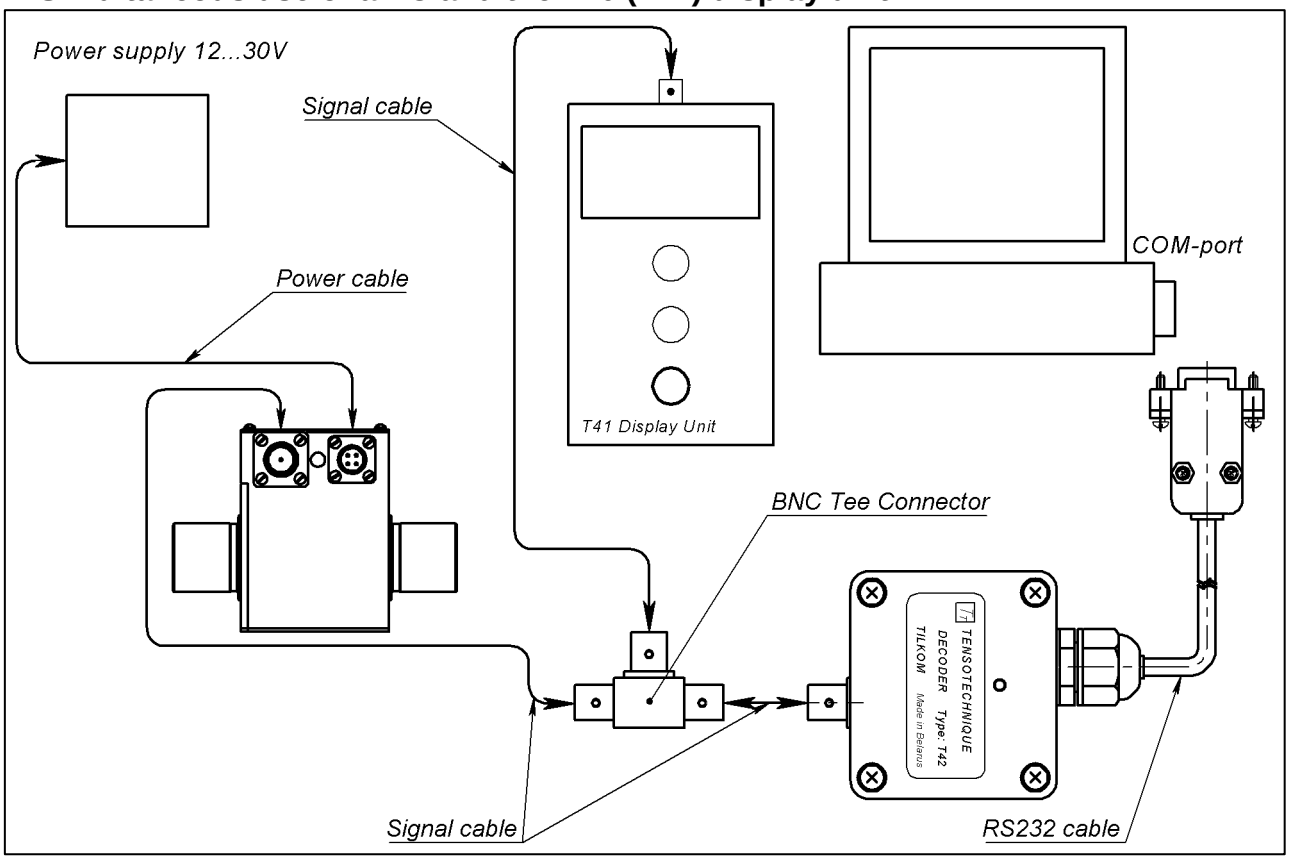
Features: support up to 8 (eight) transducers simultaneously, mathematical computation of mechanical power, rotation speed and torque, measurement signal filter and signal averaging, zero shift adjustment, fast records, slow records, scaling of x-axis and y-axis, digital indicator of high resolution, real-time display of measured values, their storage and playback. The software has a function of recording data without averaging at the maximum speed of receiving data; this enables you to analyze the dynamic processes. The software is also available in English.

The main window of the "Transducer" software

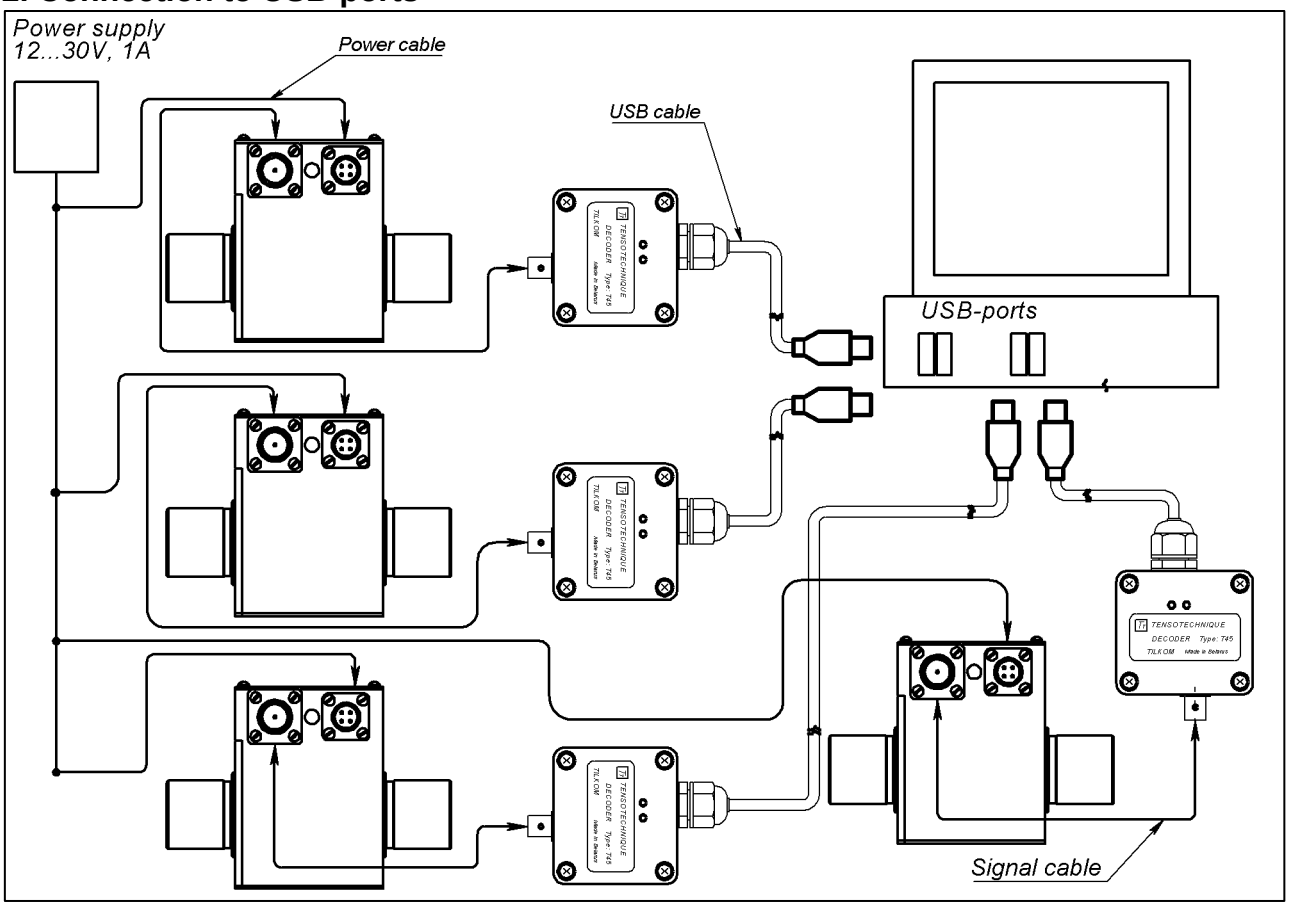


Electrical connections

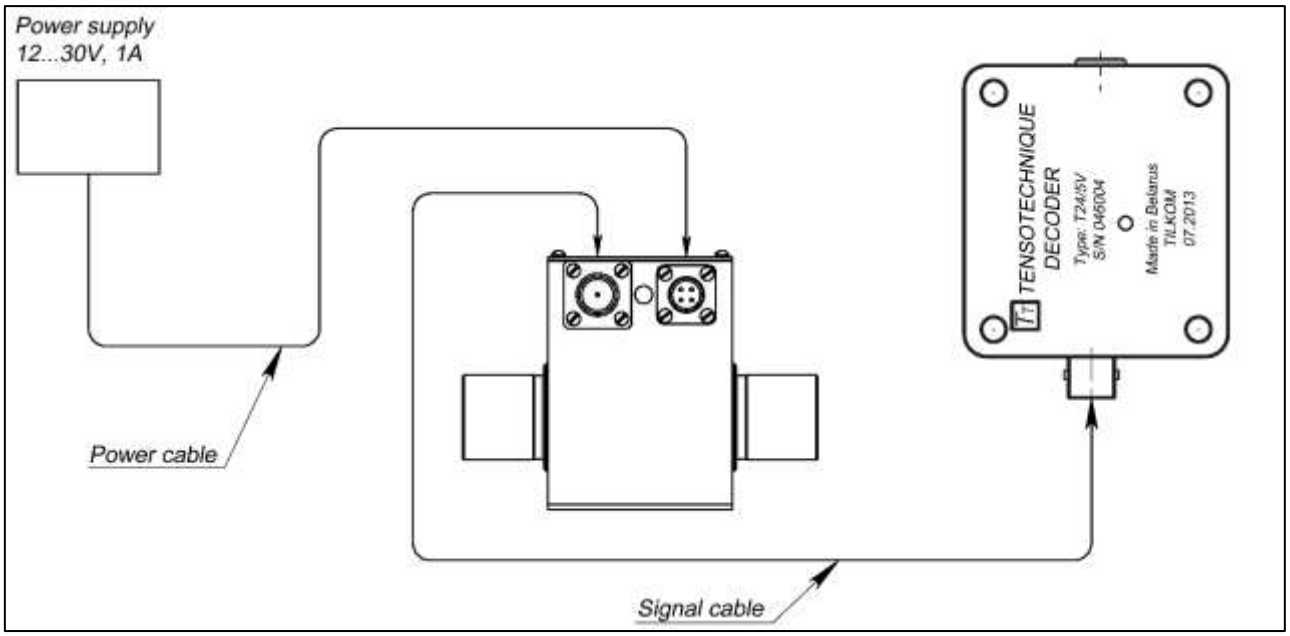
1. Simultaneous use of a PC and the T40 (T41) display unit



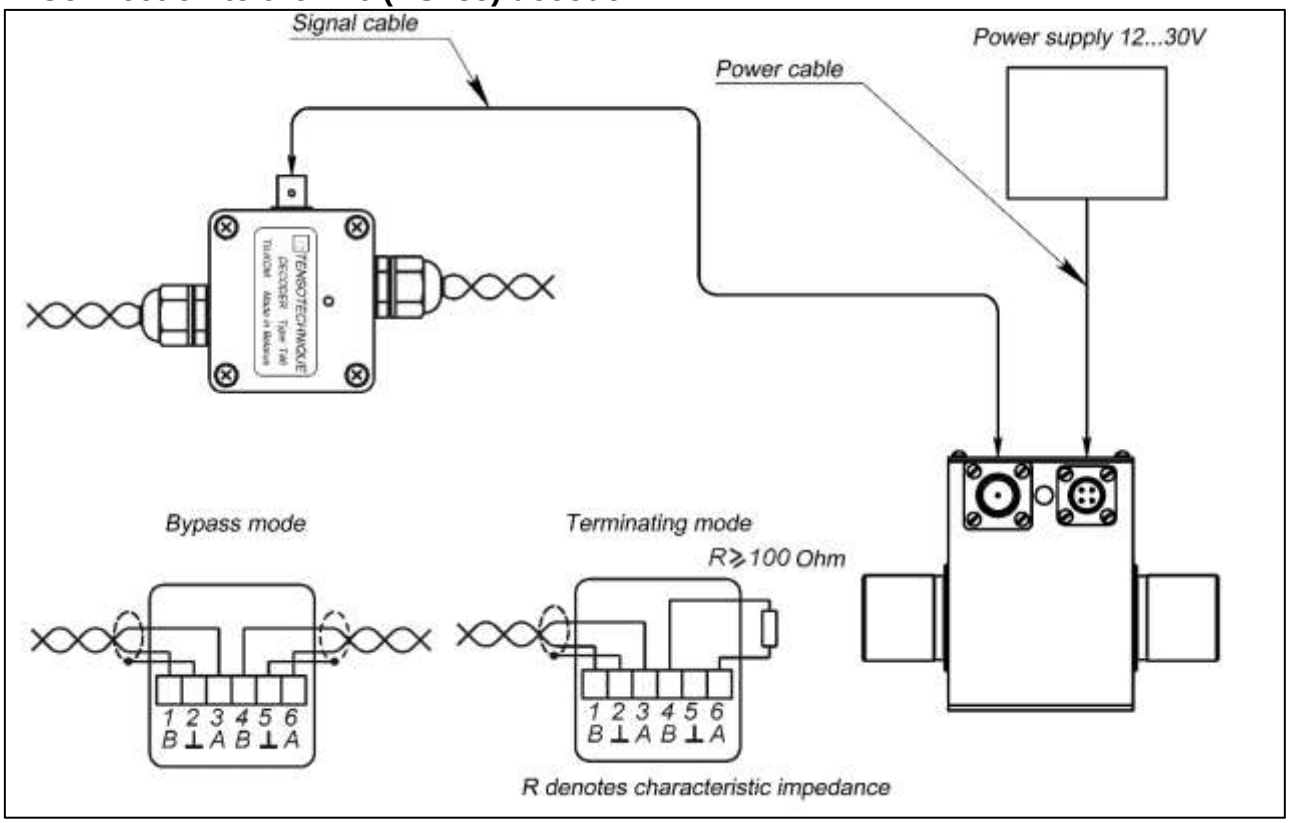
2. Connection to USB-ports



3. Connection to the T24 analogue decoder (± 5 V, ± 10 V or 4…20 mA)



4. Connection to the T46 (RS485) decoder



5. Connection to the T40 display unit