M25 Torque Transducer

The M25 digital torque transducer is cylindrical shaft transducer.

The M25 may be used for torque measurement within the wide range of nominal values from 10 Nm to 2 kNm. Depending on the nominal torque, maximum speed up to 12 000 rpm is permissible.

The M25 transducers are the generation of digital transducers, where the SG signal is converted into digital code and is transferred from the rotor to the stator by means of telemetry.

This 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 rotor is mounted in the stator on ball bearings. The M25 torque transducers measure 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 M25 torque transducers can provide digital (USB2.0, RS232, RS485 (Modbus protocol)), analogue (± 5 V, ± 10 V, 4 … 20 mA) and frequency (10 kHz ± 5 kHz, 60 kHz ± 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
M25-10 … 30	10 15 20 25 30	12 000
M25-40 … 120	40 50 60 80 100 120	12 000
M25-150 … 300	150 200 250 300	10 000
M25-400 … 1k	400 500 600 800 1 000	8 000
M25-1.2k … 2k	1 200 1 500 2 000	6 000

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Dimensions in mm

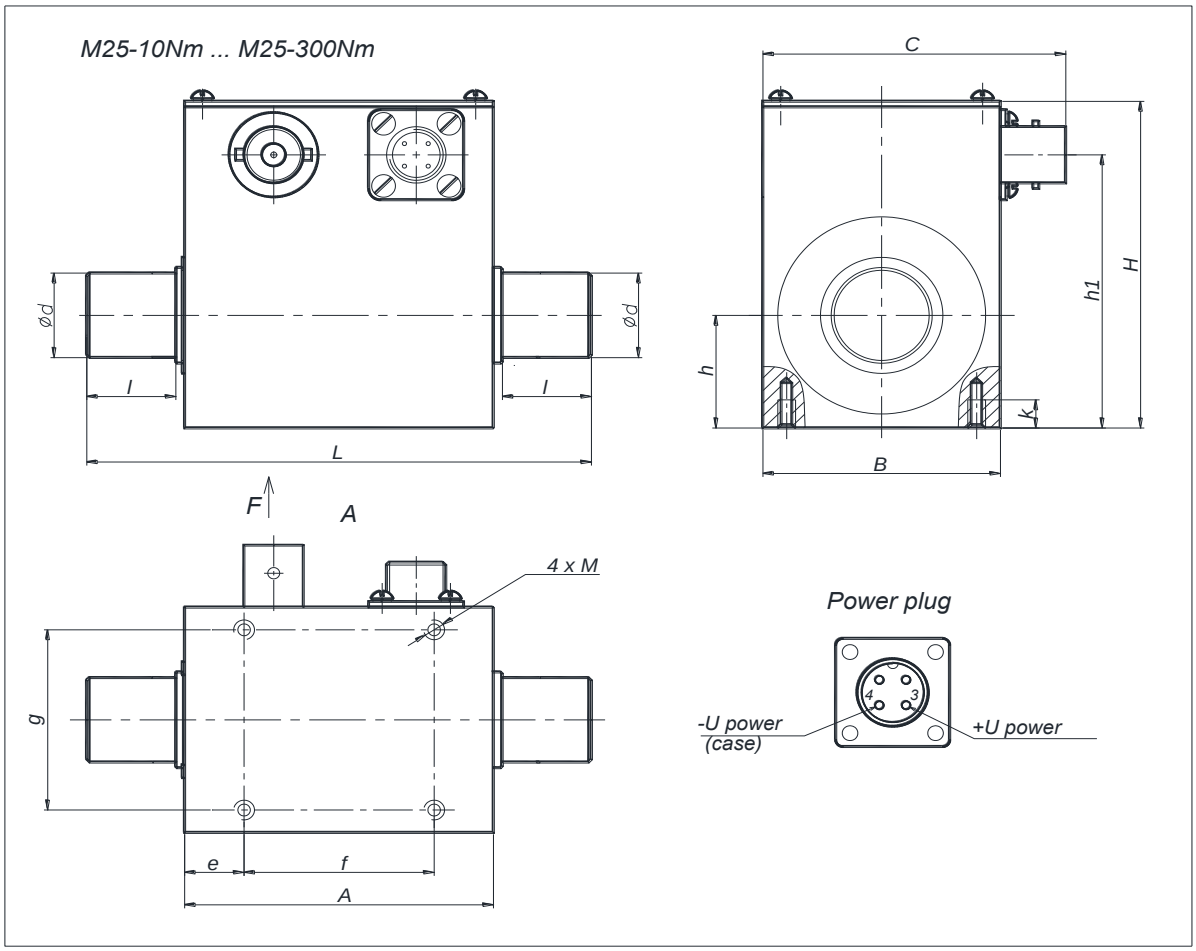

Figure 3a

Type	Ød	A	B	C	H	h	h1
M25-10 … M25-30	15g6	52	40	51	58	20	48.5
M25-40 … M25-120	20g6	52	48	59	66	24	57
M25-150 … M25-300	24g6	52	52	63	71	26.5	61

Type	L	l	e	f	g	k	M
M25-10 … M25-30	85	15	10	32±0.1	32±0.1	5	M3
M25-40 … M25-120	94	20	7	38±0.1	38±0.1	6.5	M4
M25-150 … M25-300	100	23	7	38±0.1	40±0.1	6.5	M4

Dimensions in mm

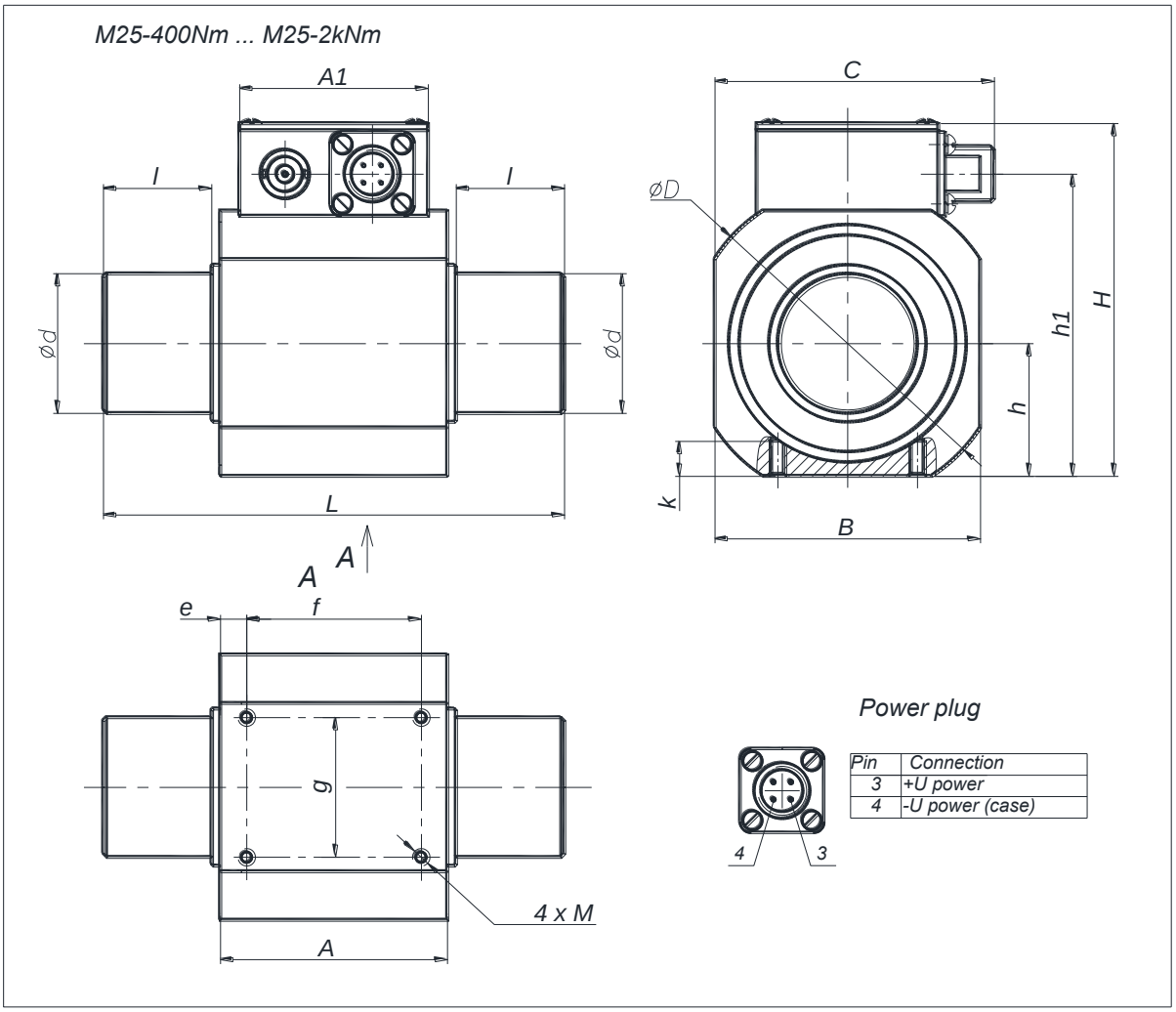

Figure 3b

Type	Ød	A	B	C	H	h	h1
M25-400 … M25-1k	40g6	66	76	80	101	38	86.5
M25-1.2k … M25-2k	50g6	76	88	86	113	44	98.5

Type	L	l	e	f	g	k	M
M25-400 … M25-1k	132	31	7.5	50±0.1	40±0.1	10	M5
M25-1.2k … M25-2k	150	35	10	56±0.1	46±0.1	10	M6

Technical Data

1. 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	12
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
	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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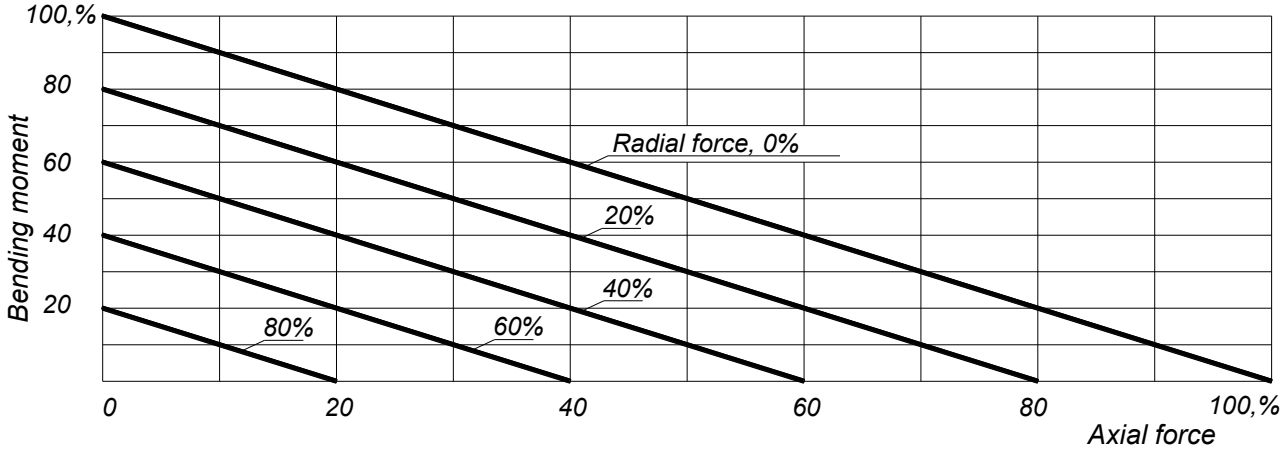
2. Parameters of resistance to environment and mechanical exposures

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. Limit torque, related to M_N

Type	Nominal toque M_N, Nm	Limit torque related to M_N, %
M25-10 … 30	10 15 20 25 30	150
M25-50 …150	50 60 80 100 150	150
M25-200 … 300	200 250 300	150
M25-500 … 1k	500 600 800 1000	150
M25-1.5k … 2k	1 500 2 000	150

Axial force, radial force and bending moment have to be reduced according to graph 1, if they act together. To prevent from excessive stress due to misalignment and thermal influences the transducer should be fitted between flexible couplings. We offer such flexible torsionally rigid couplings MB series



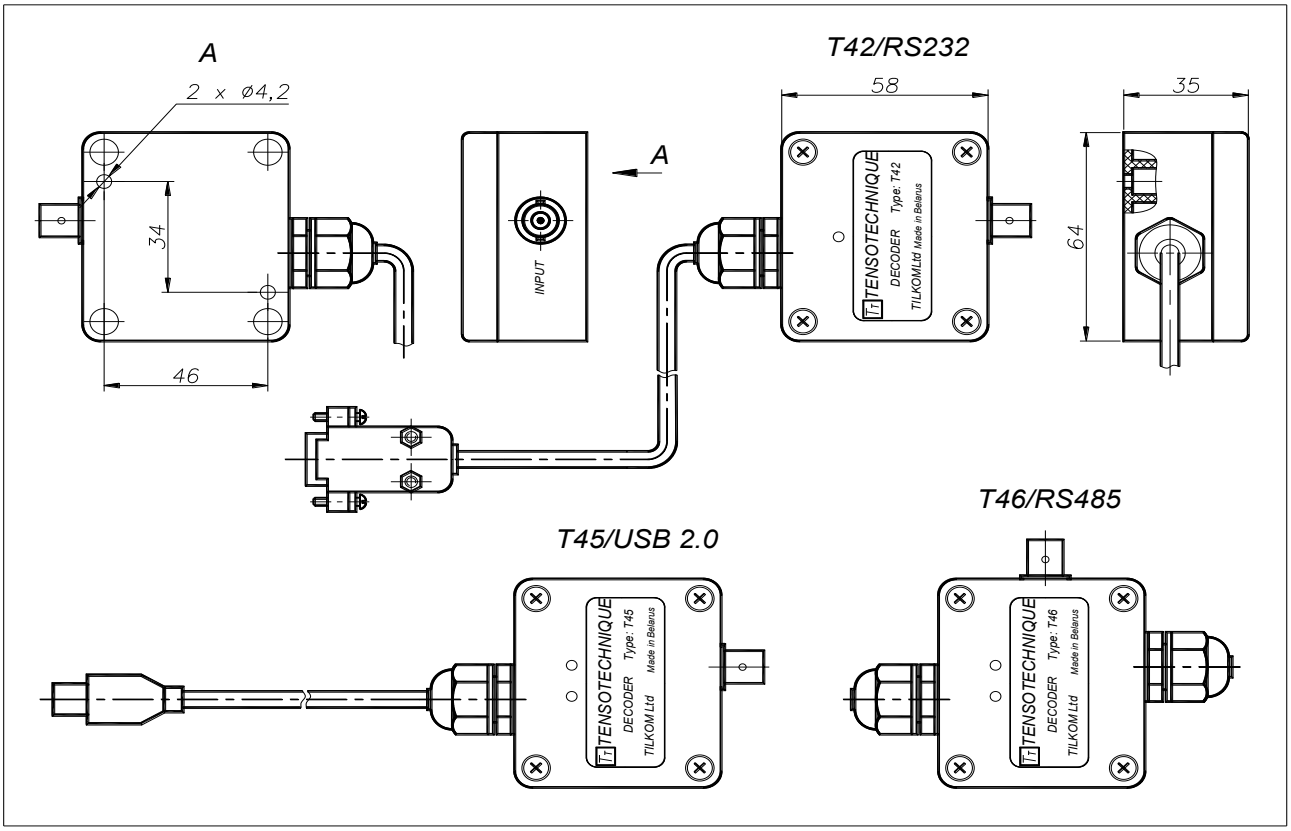
Scope of delivery

M25 torque transducer	1
Txx decoder	1
Output signal cable, 5 m long (optionally can be over in length)	1
Power supply connector (PC4 or 2PM14)	1
Software for Windows XP, 7, 8, 10	1
Operating manual	1
Software user manual	1

Accessories (to be ordered separately and optionally)

Flexible torsionally rigid couplings MB	2
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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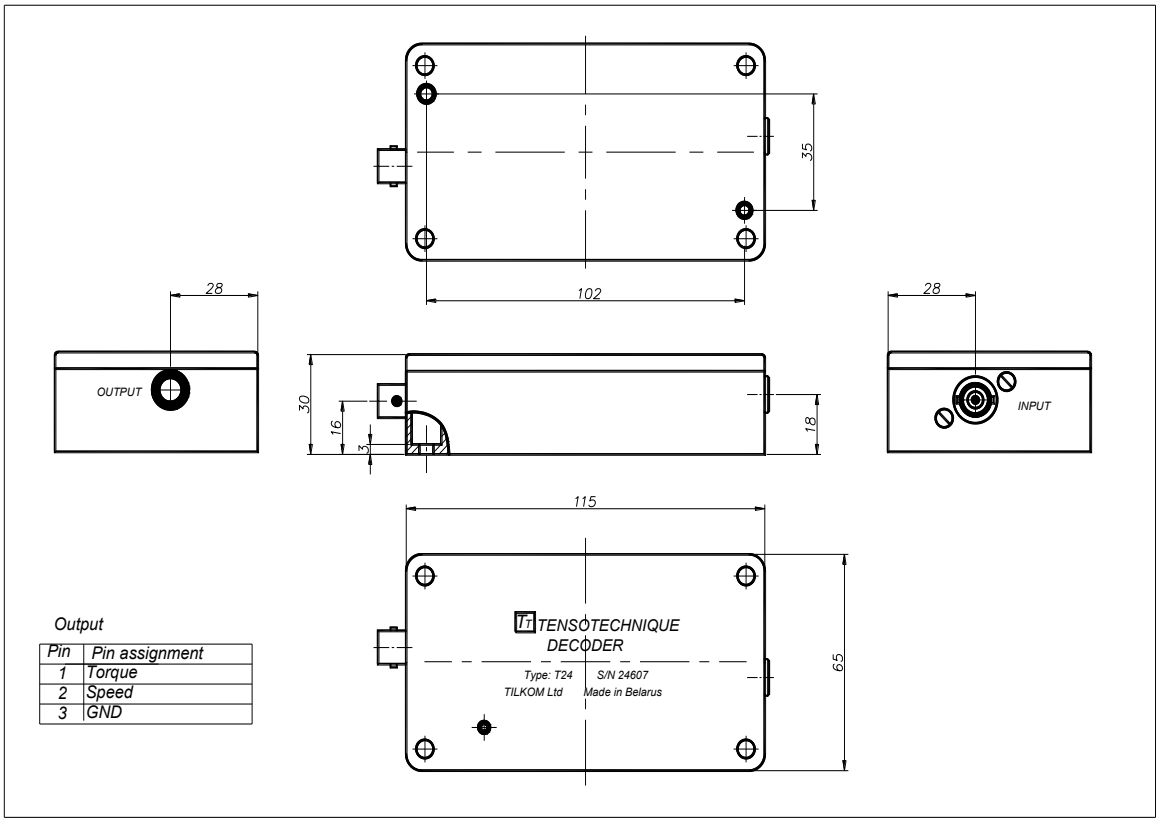
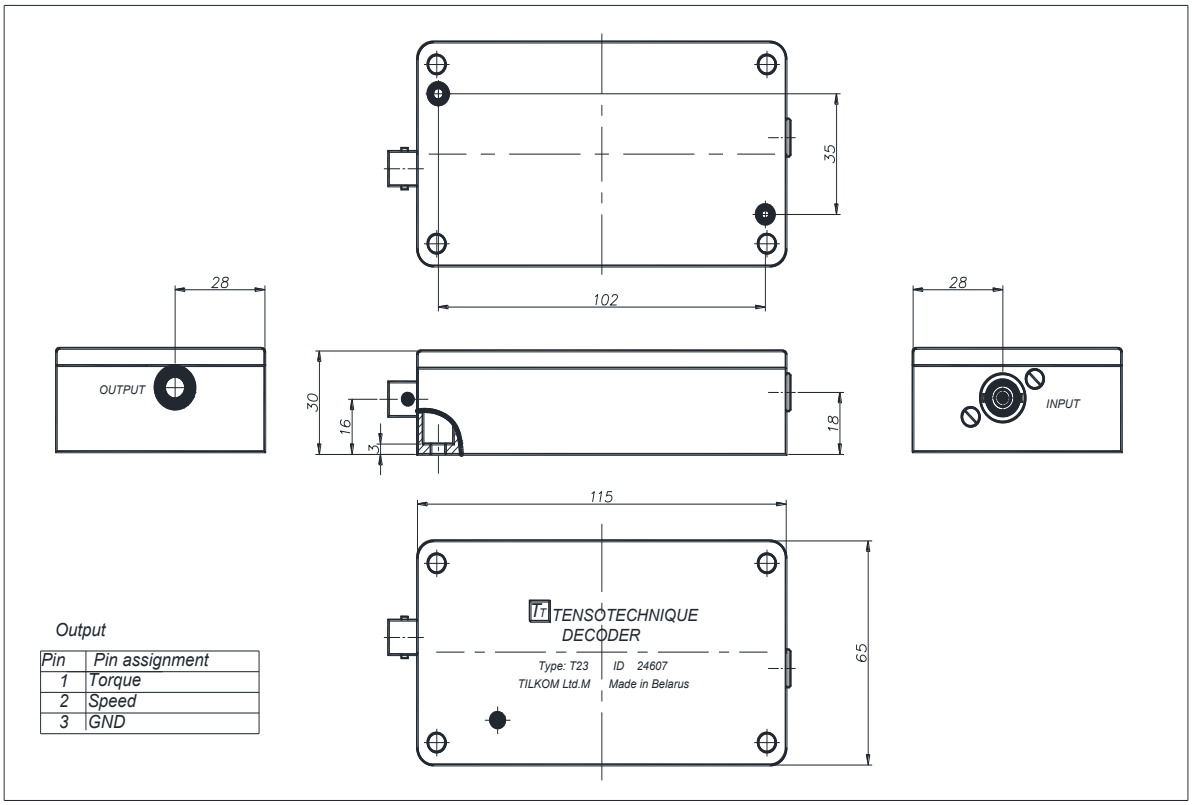
T24 analogue decoder. Dimension in mm



Output

Pin	Pin assignment
1	Torque
2	Speed
3	GND

T23 frequency decoder. Dimensions in mm.



Output

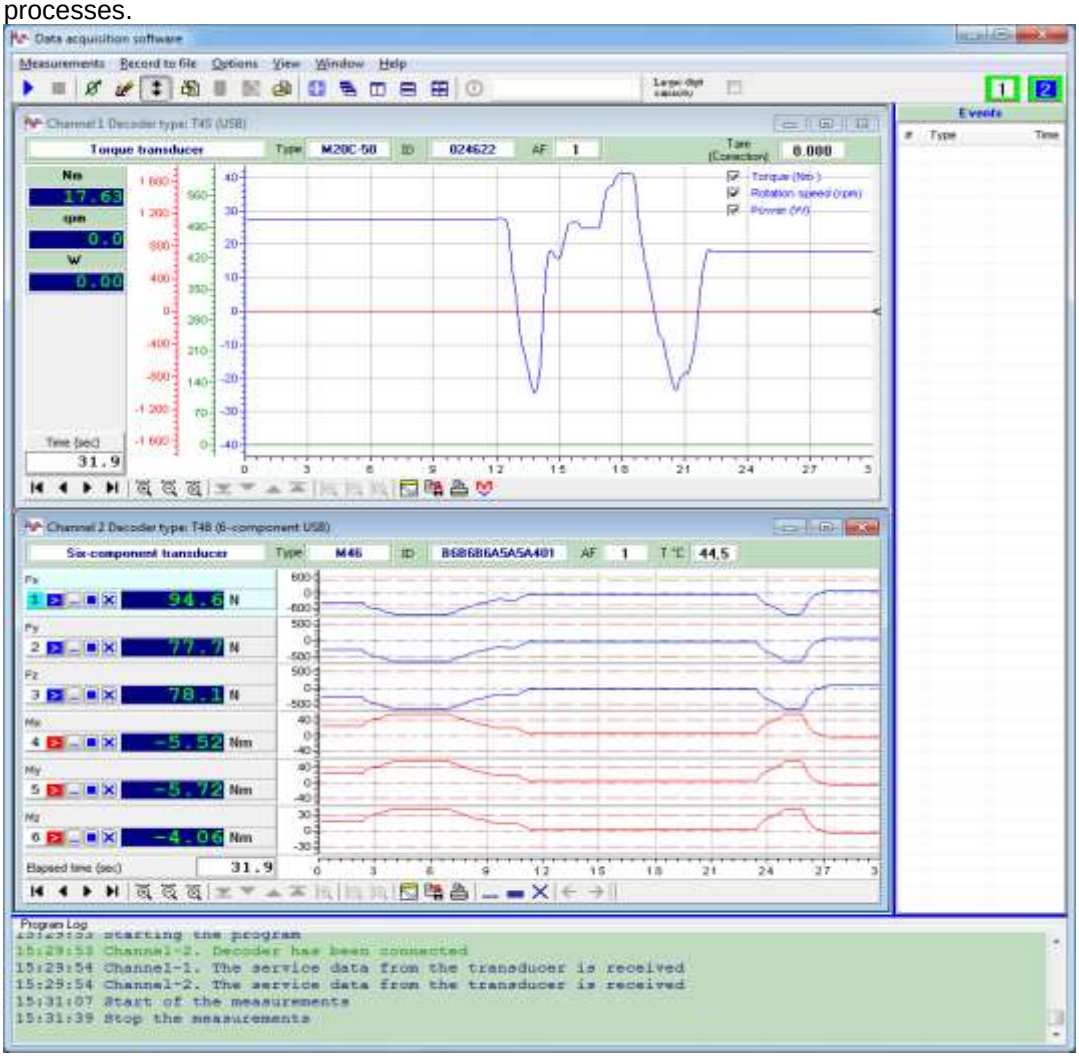
Pin	Pin assignment
1	Torque
2	Speed
3	GND

Software

The MS-Windows software for M25 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.

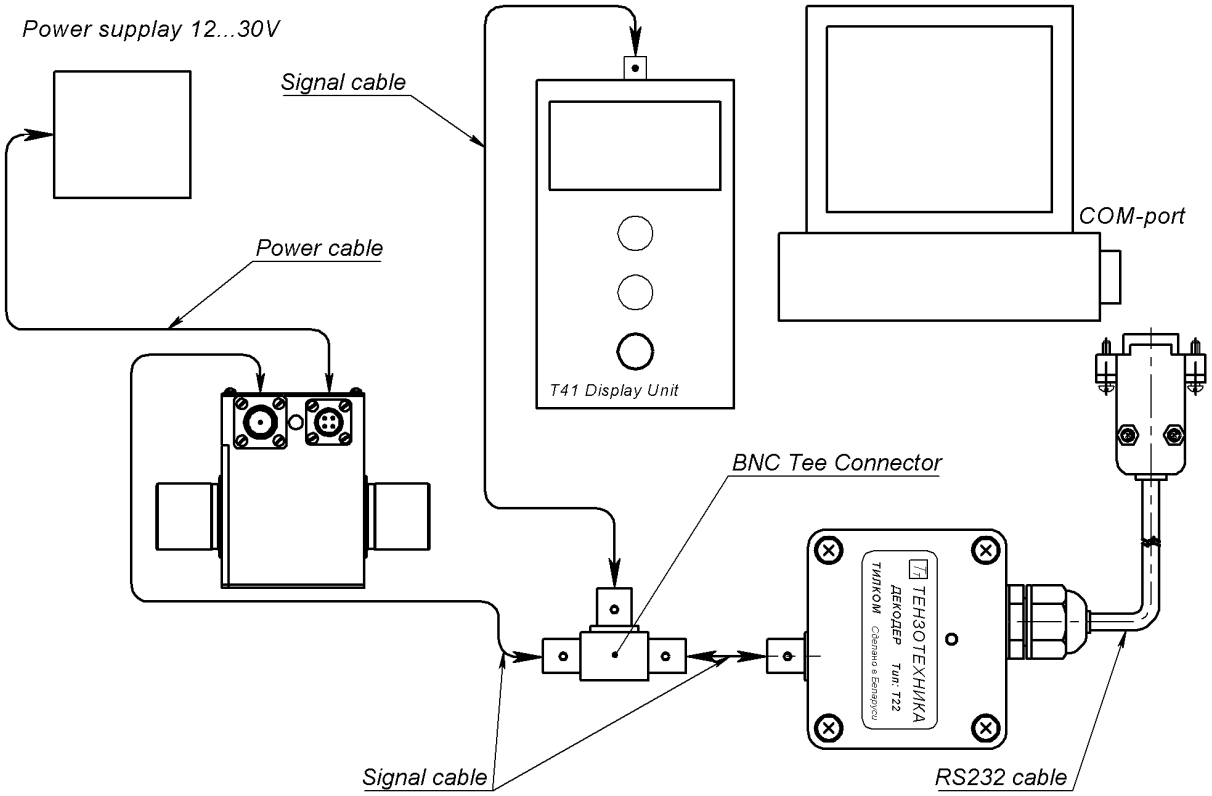
The software provides auto identification of the type of transducer, serial number, measuring range.

Features: support up to 4 (four) 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.

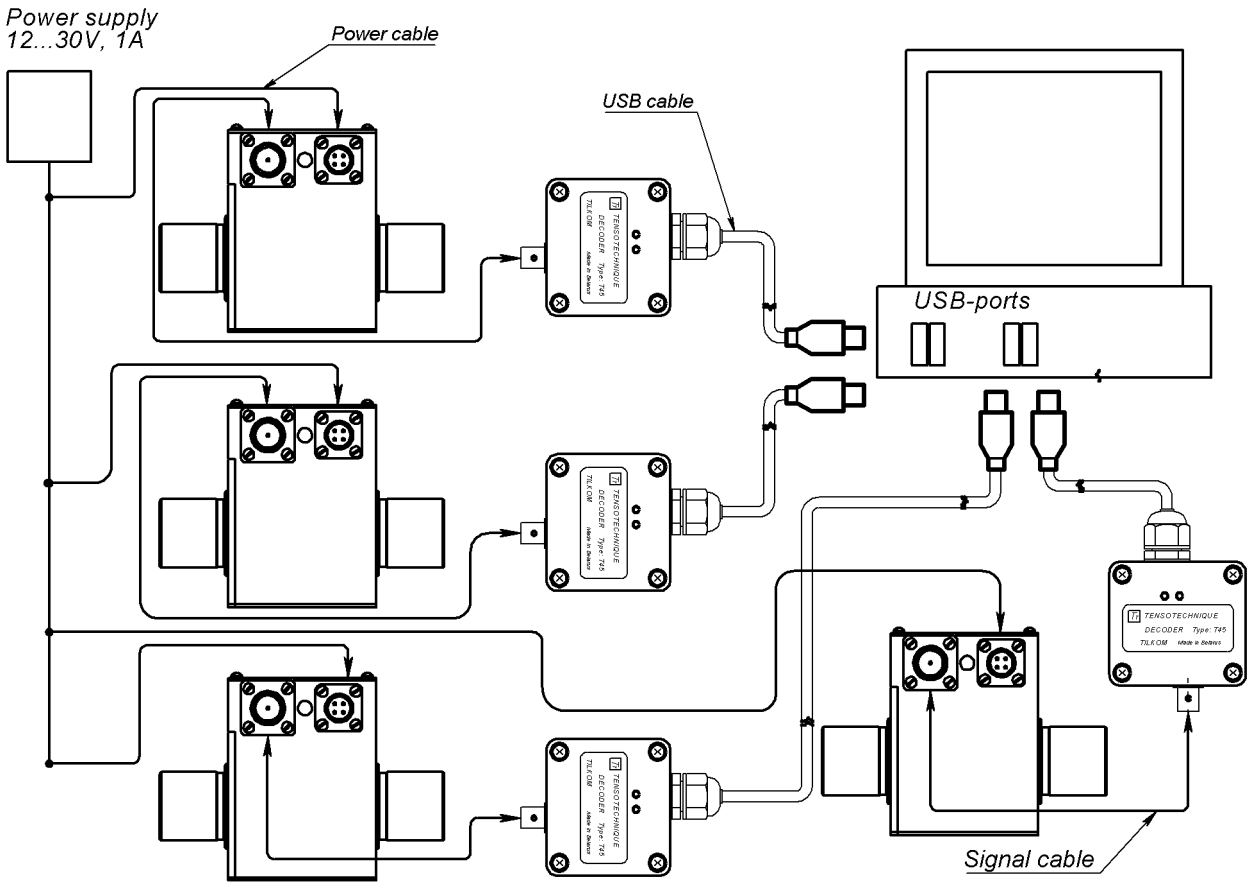


Electrical connections

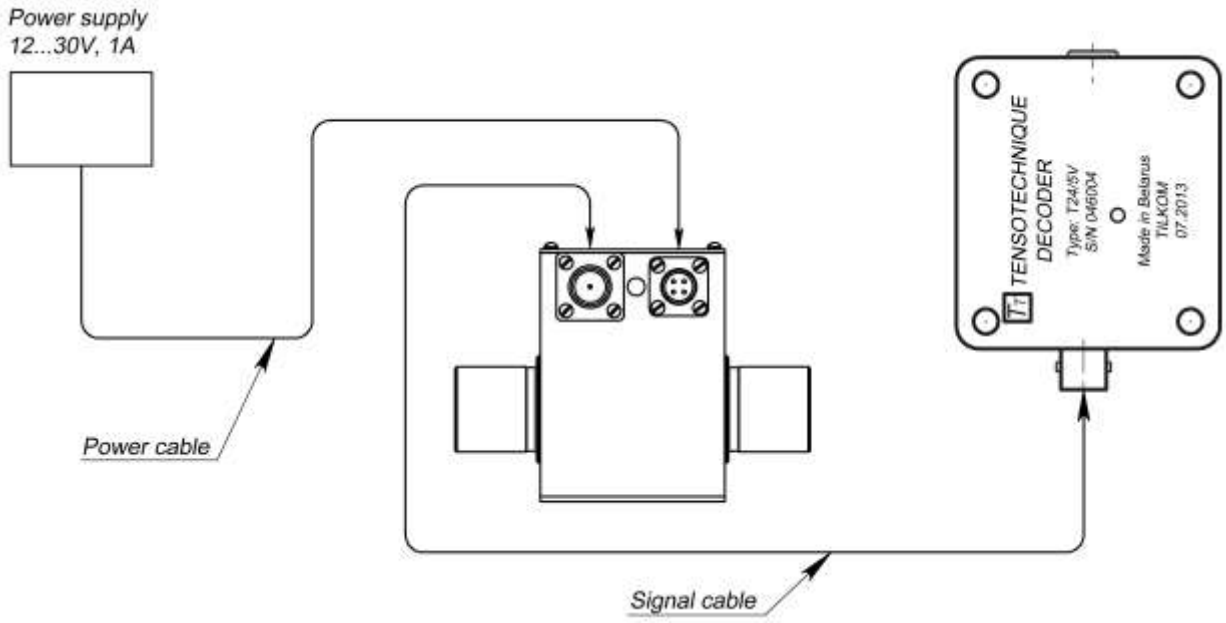
1. Simultaneous use of a PC and the T40 (T41) display unit



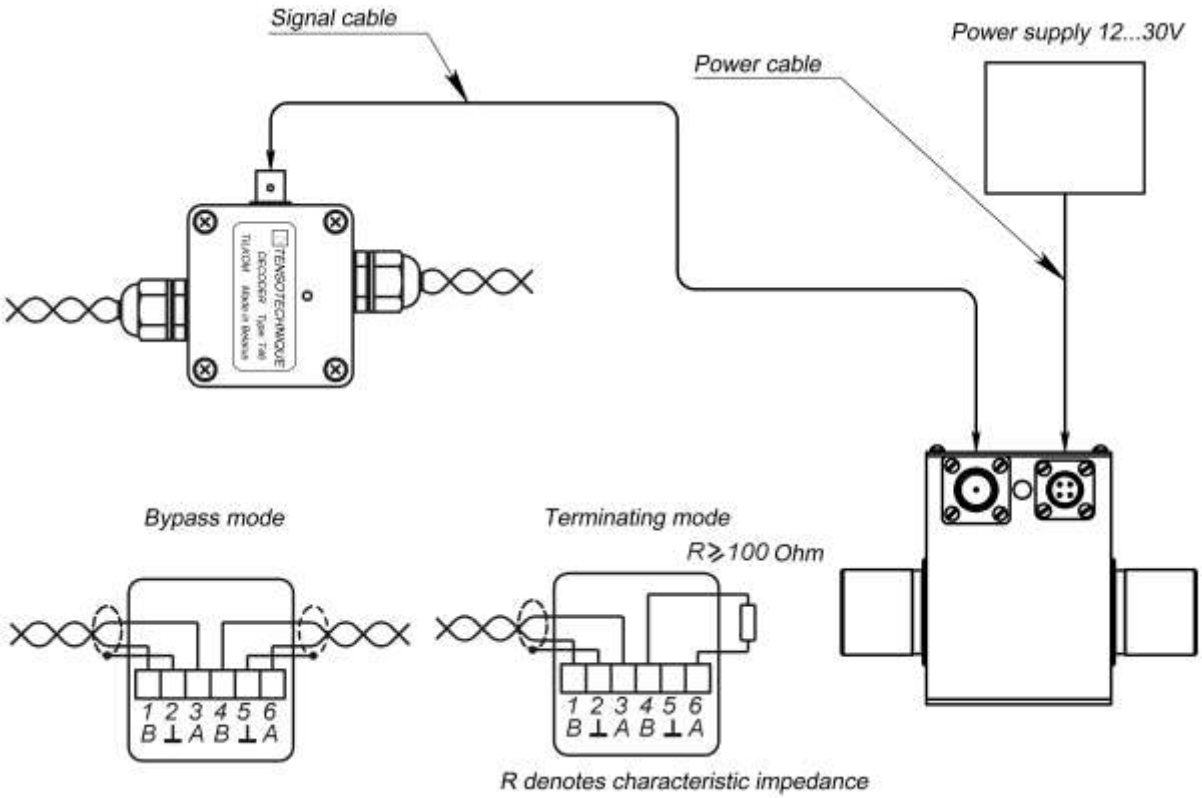
2. Connection to USB-ports



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