TT TRANSDUCERS & TELEMETRY

Torque Transducers M20C

The M20C Torque Transducers are used to measure constant and variable torque at the wide measuring range and at the wide range speed rotation. They represent a new generation of digital torque transducers with advanced performance.

The Torque Transducers are designed without slip-rings. They consist of two components: a rotor and a stator. The rotor comprises a measuring body applied with strain gauges and two mounting flanges. It is equipped with the electronic system and a coil for transmitting the excitation voltage and the measuring signal. The stator includes the housing with electronics and stationary coil. The stationary coil and the rotating coil form an air transformer for inductive power supply and data transmission. The rotor is supported on the stator at one end by ball bearings.

The M20C Torque Transducers are equipped with the advanced digital telemetry system for contactless transmission of the measured torque data from the rotor to the stator and for a precise rotation speed measurement. By means of telemetry additional parameters such as temperature of the rotor and the transducer's unique identification number can be acquired.

The MS-Windows software for measurement data acquisition and processing is included with M20C.

The torque output signal is digital (RS232/485, USB 2.0 interface), analogue ±5V (±10V) and frequency 10±5kHz. Accuracy class is 0.2

The M20C Torque Transducers are available from 0.1Nm up to 30kNm.

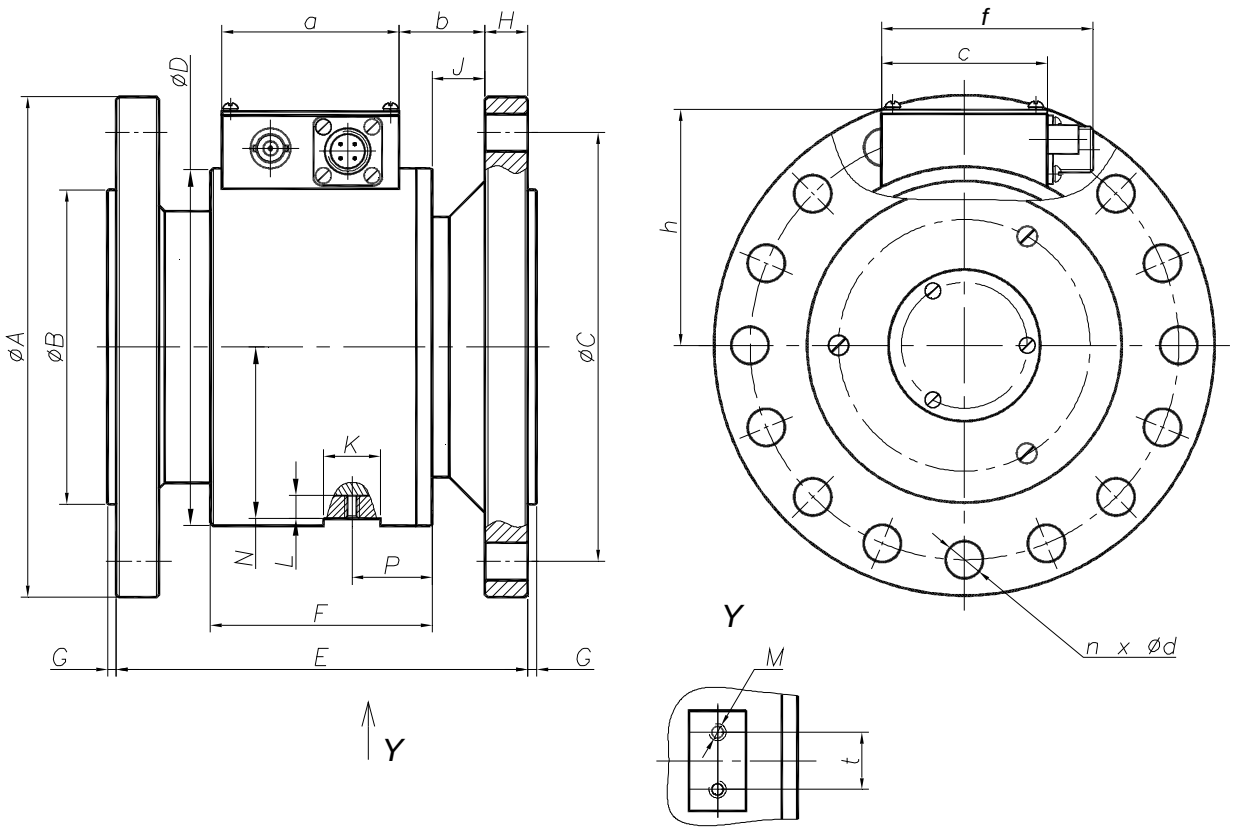
Type-Survey

Type	Nominal toque M_N	Max. speed
M20C-0.1…2	0.1Nm 0.2Nm 0.5Nm 1Nm 2Nm	12 000 min^{-1}
M20C-3…30	3Nm 5Nm 6Hm 8Nm 10Nm 15Nm 20Nm 25Nm 30Nm	10 000 min^{-1}
M20C-50…150	50Nm 60Nm 80Nm 100Nm 150Nm	9 000 min^{-1}
M20C-200…300	200Nm 250Nm 300Nm	9 000 min^{-1}
M20C-500…1k	500Nm 600Nm 800Nm 1000Nm	8 000 min^{-1}
M20C-1.5k…2.5k	1.5kNm 2kNm 2.5kNm	7 500 min^{-1}
M20C-3k 6k	3kNm 5kNm 6kNm	5 600 min^{-1}
M20C-8k…15к	8kNm 10kNm 15kNm	5 300 min^{-1}
M20C-20k…25k	20kNm 25kNm	3 800 min^{-1}
M20C-30k	30kNm	3 800 min^{-1}

TILKOM Ltd P. Brovky str. 17-401 220072 Minsk Belarus
Phone/fax (+375-17) 271-34-27, [284-11-83. E-mail: info@tilkom.com www.tilkom.com

Dimensions (in mm)

M20C-50Nm ... M20C-30kNm

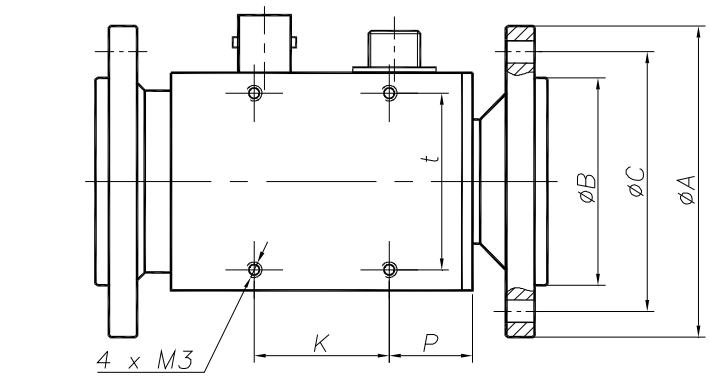


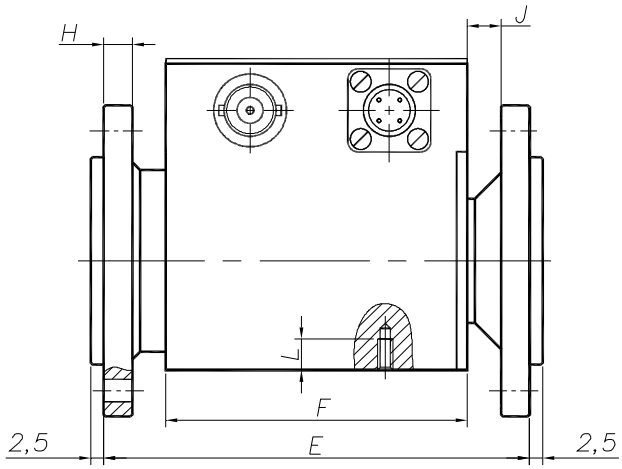
Type	ÆA	ÆB	ÆC	ÆD	E	F	G	H	J	K	L
M20C-50…150	78	50g6	66±0.1	56	90	57,5	$3^{+0,14}$	7	7.5	15	5.5
M20C-200…300	90	60g6	76±0.1	64	100	62	$3^{+0,14}$	8	9	15	7
M20C-500…1k	122	80g6	104±0.1	85	110	65	$3^{+0,14}$	11	9	18	7
M20C-1.5k…2.5k	142	90g6	120±0.12	96	124	67	$3^{+0,14}$	13	14	18	6
M20C-3k 6k	175	110g6	150±0.25	125	144	76.5	$3^{+0,14}$	15	18.5	20	8
M20C-8k…15к	200	130g6	170±0.25	138	158	77.5	$4^{+0,18}$	18	22.5	20	10
M20C-20k…25k	238	160g6	204±0.25	170	176	86.5	$4^{+0,18}$	20	24.5	20	8
M20C-30k	238	160g6	204±0.25	170	176	86.5	$4^{+0,18}$	20	24.5	20	8

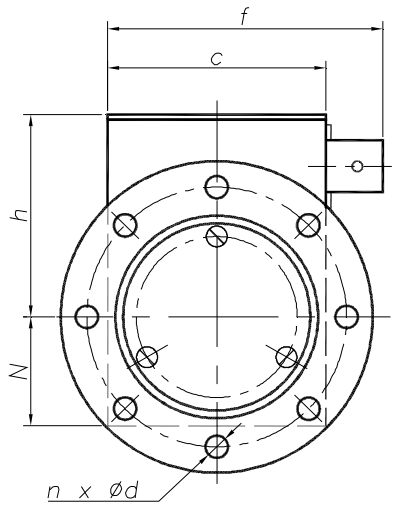
Type	M	t	N	P	a	b	C	f	h	Æd	n
M20C-50…150	M4	12	26	18	54	11	46	62	45	5.5H12	8
M20C-200…300	M4	14	30	22	58	13	52	68	49	6.5H12	8
M20C-500…1k	M5	20	40	24	60	14	50	66	61	8.5H12	12
M20C-1.5k…2.5k	M5	20	46	25	60	21	50	66	68	10.5H12	12
M20C-3k 6k	M5	22	60	28	62	30	58	74	83	13H12	16
M20C-8k…15к	M5	22	66	28	62	31	60	76	90	17H12	16
M20C-20k…25k	M5	22	82	28	62	39	60	76	107	19H12	16
M20C-30k	M5	22	82	28	62	39	60	76	107	21H12	16

Dimensions (in mm)

M20C-0.1Nm ... M20C-30Nm



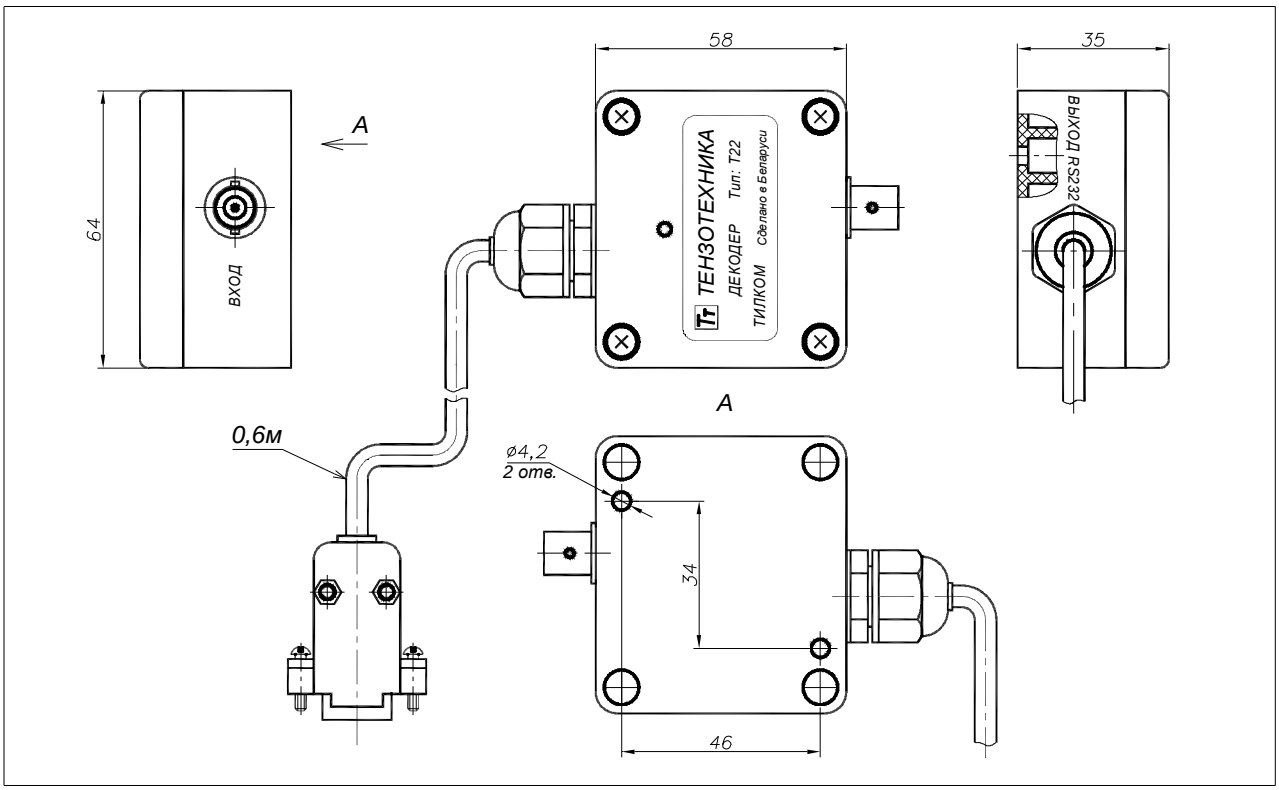




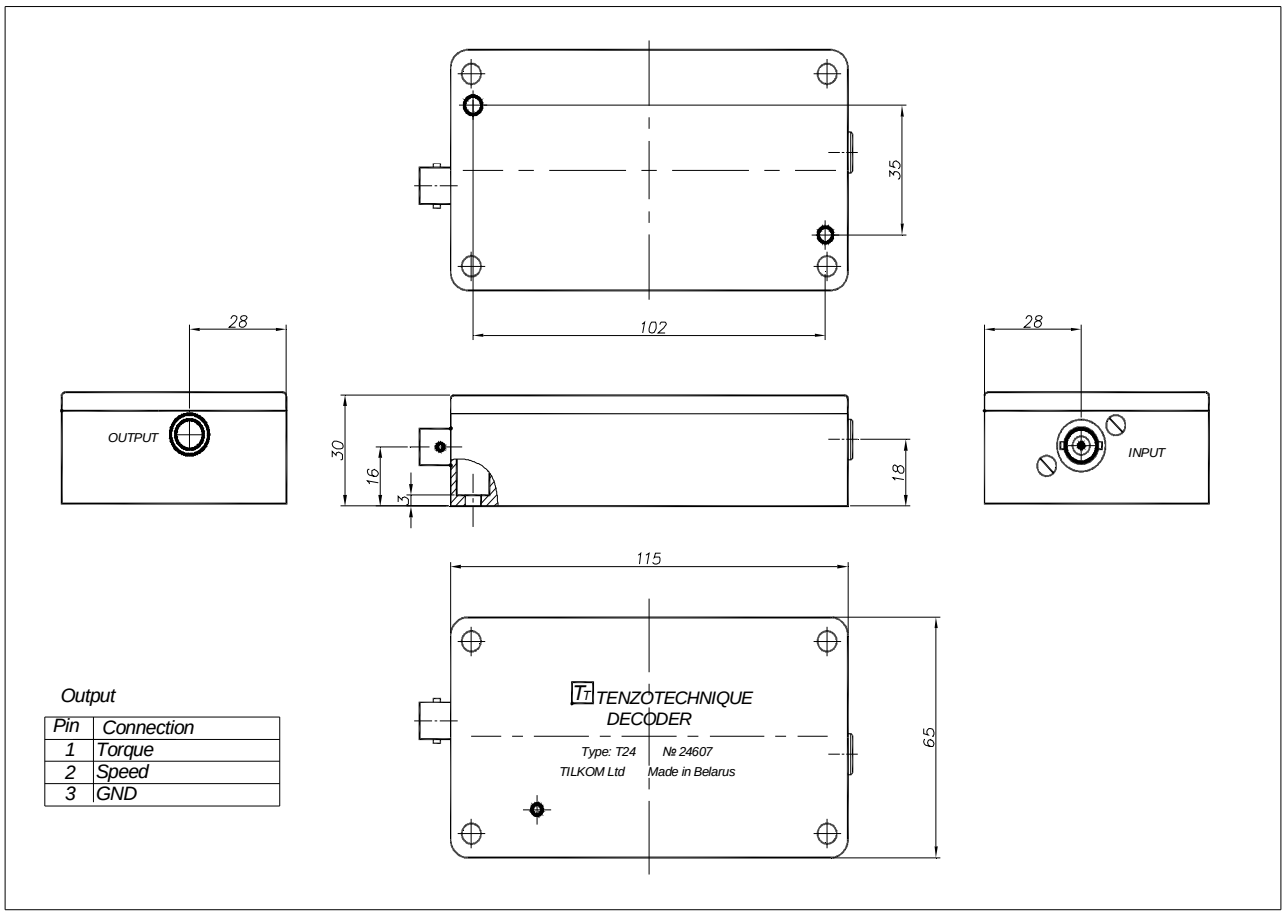
Type	ÆA	ÆB	ÆC	E	F	H	J	K	L
M20C-0.1…M20C-2	45	30g6	38±0.1	74	54	4	6	22±0.1	5
M20C-3…M20C-30	60	40g6	50±0.1	80	56	5,5	6,5	26±0.1	5

Type	N	P	t	h	c	f	Æd	n
M20C-0,1…M20C-2	15	14	22±0.1	33	30	42	3.4H12	4
M20C-3…M20C-30	20	17	34±0.1	38	40	51	4.5H12	8

T22 Digital Decoder. Dimension (in mm)



T24 Analogue Decoder. Dimension (in mm)



Output

Pin	Connection
1	Torque
2	Speed
3	GND

Technical data

Nominal toque 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	%	±0.2
Temperature effect per 10°C on the zero signal, related to the nominal output value	%	±0.1
Linearity deviation including hysteresis, related to the nominal output value	%	±0.1
Nominal supply voltage	V (DC)	12…30
Power consumption	W	<5

Digital output (T22 Decoder)

Interface		RS232
Sample rate	kSample	5.236
Digitalization	bit	13

Analogue output (T24 Decoder)

Nominal output signal with positive (right-hand) nominal toque	V	+5
Nominal output signal with negative (left-hand) nominal toque	V	-5
Output signal at toque = zero	V	0
Load resistance	kΩ	≥10
Measurement frequency range	Hz	0…1000 (-3 dB)

Frequency output (T23 Decoder)

Frequency output signal with positive nominal toque	kHz	15 (5V symmetric)
Frequency output signal with negative nominal toque	kHz	5 (5V symmetric)
Frequency output signal at toque = zero	kHz	10 (5V symmetric)
Load resistance	kΩ	≥2

Parameters of resistance to environment and mechanical exposures

Nominal temperature range	°C	0…+60
Storage temperature range	°C	-10…+70
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	 1000 10 400
Degree of protection		IP 40

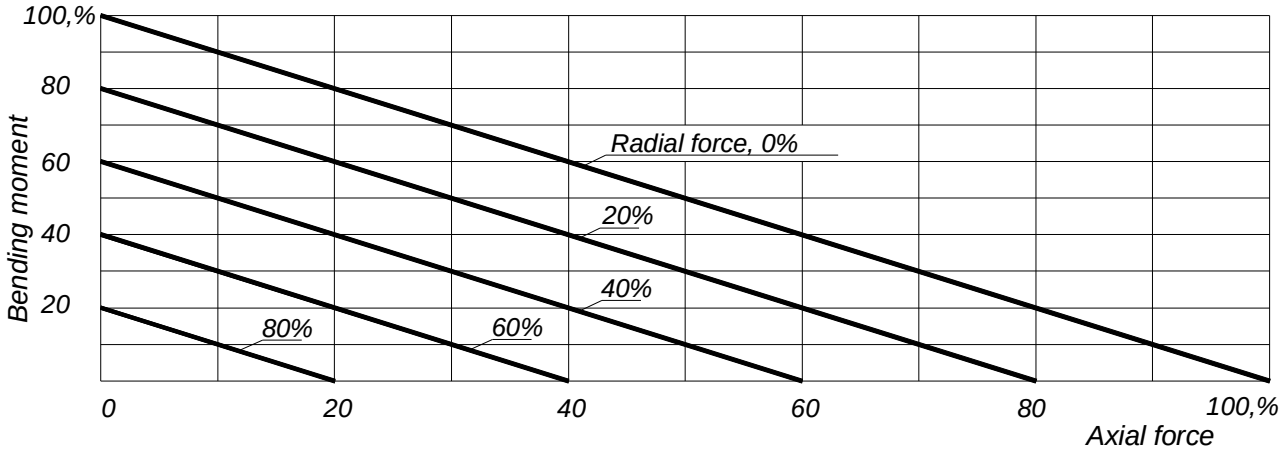
Rotation speed measuring system

Measuring system		Optical
Accuracy class		0.1
Minimum measurable speed	min^{-1}	1…30
Amplitude of output pulse voltage with T24, T23 decoder	V	5±10%
Load resistance	kΩ	10

Permissible load limits and mechanical values

Nominal toque M_N	Nm	1	2	5	10	20	50	100	200	1k	2k	5k	10k	25k
Limit toque, related to M_N	%	150												
Axial limit force on the rotor	kN	0.2	0.3	0.5	0.7	1.0	1.2	1.5	3	8	16	28	32	80
Lateral limit force on the rotor	N	3	5	10	20	30	40	80	120	600	1k	2k	4k	8k
Bending limit moment on the rotor	Nm	0.2	0.3	0.5	1	2	5	10	20	80	150	300	600	1.2к
Lateral limit force on the mounting surface of the stator	N	2	3	5	10	20	50	50	50	100	100	150	200	300
Torsional stiffness	kNm/rad	0.1	0.2	0.3	0.8	2.2	7.6	17	35	240	570	1820	3940	8200
Weight	kg	0.3	0.3	0.7	0.7	0.7	1.8	1.9	2.2	4.9	7.5	12.5	21.0	28.0

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. TILKOM offer such flexible torsionally rigid couplings MK series. Technical specification see in the data sheet entitled “MK Couplings”.



Graph 1

Scope of delivery

M20C Torque Transducer	1
T22 Digital Decoder	1
Output signal cable 6m (12m) length	1
Power supply connector	1
Software for MS Windows	1
Operating manual	1

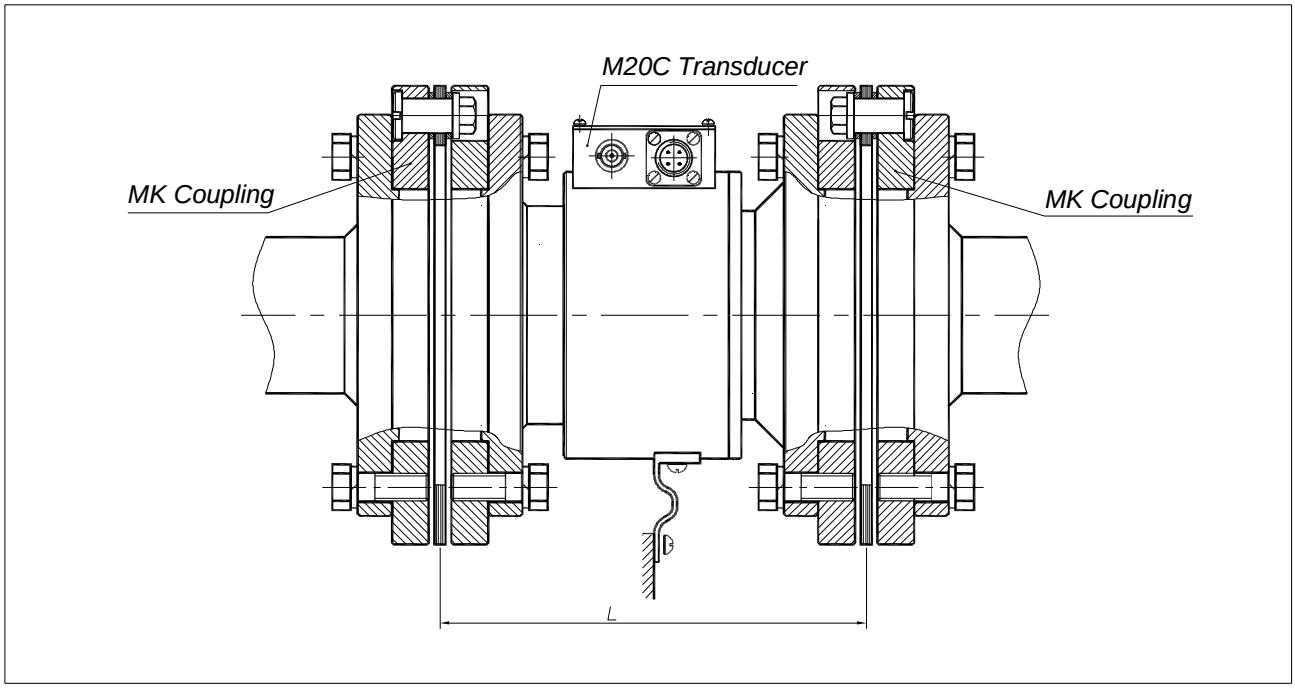
Accessories (to be ordered separately)

MK Flexible torsionally rigid couplings	2
T40 Measuring Unit	1
T41 Measuring Unit (plastic case)	1
T24 Analogue Decoder	1
T23 Frequency Decoder	1

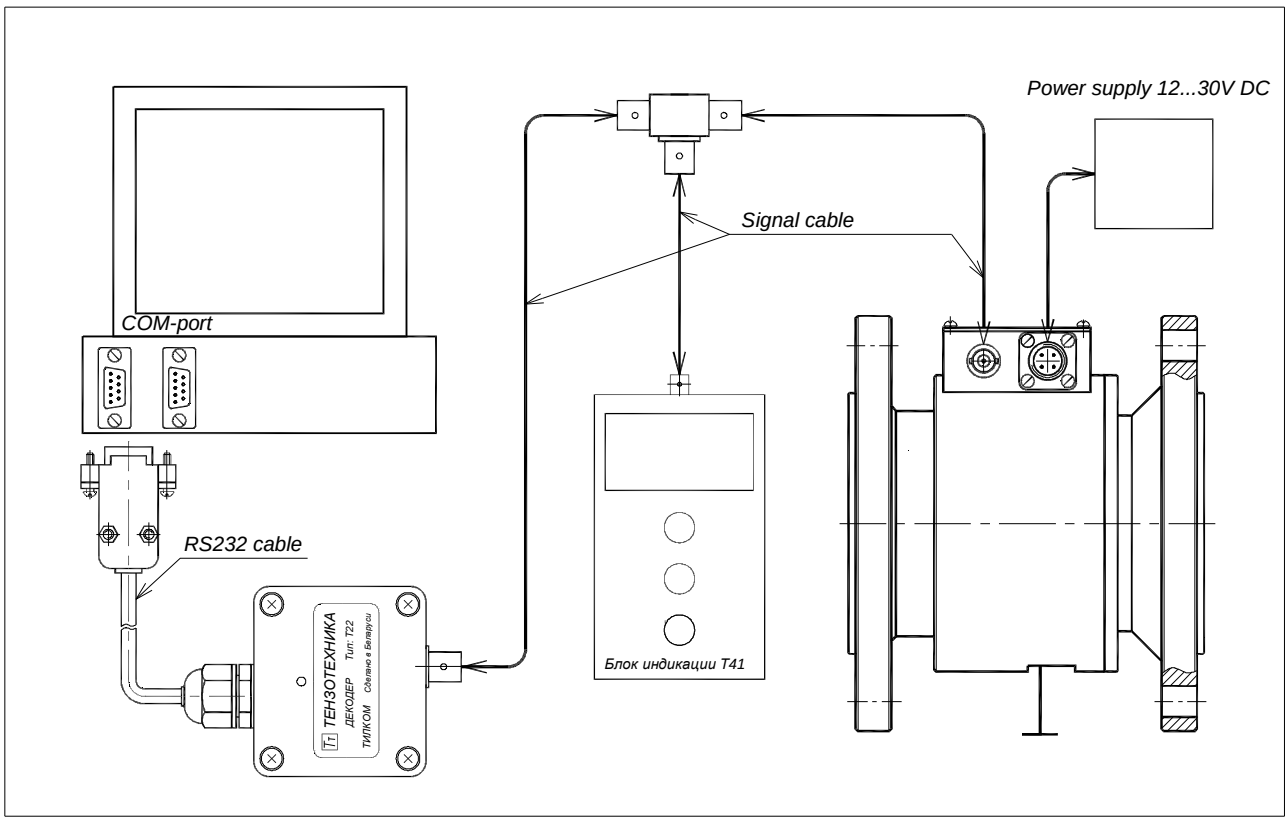
Software

The MS-Windows software for M20C Transducer enables the acquisition of measurement data and its storage in a file. The measurements can be visualised 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. A DLL can be used for creating a program under MS-Windows.
The software allows auto identification of type of transducer, serial number, measuring range.
Features: mathematical computation of mechanical power, measurement signal filter, zero shift adjustment, fast records, slow records, scaling of x-axis and y-axis, digital indicator of high resolution.

Installation example



Electrical connections



Modifications reserved.
TILKOM can produce torque transducers according to Customized specific requirements.

TILKOM Ltd P. Brovky str. 17-401 220072 Minsk Belarus
Phone/fax (+375-17) 271-34-27, [284-11-83. E-mail: info@tilkom.com www.tilkom.com