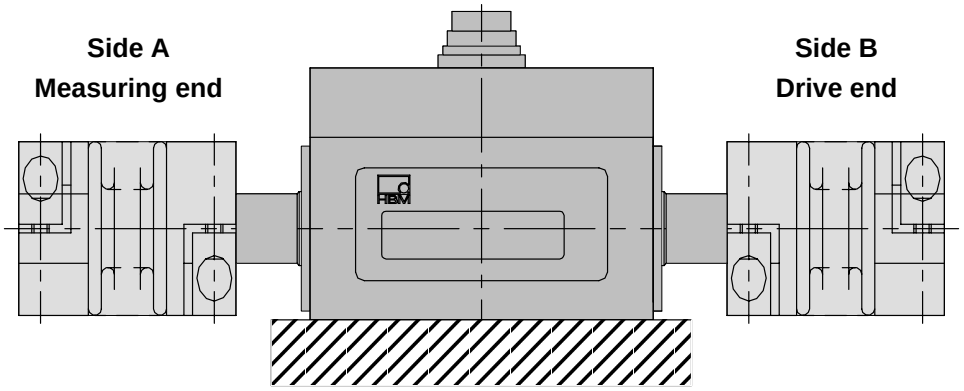
Data Sheet

T20WN

Torque Transducers

Special features

- **Nominal (rated) torques: 0.1 N·m, 0.2 N·m, 0.5 N·m, 1 N·m, 2 N·m, 5 N·m, 10 N·m, 20 N·m, 50 N·m, 100 N·m, 200 N·m**
- **Accuracy class: 0.2**
- **Contactless transmission of the measurement signal**
- **Measurement on rotating and stationary parts**
- **Cylindrical shaft ends for non-play friction joints**
- **Integrated measuring system for speed and angle of rotation**
- **Torque output signal: ±10 V**



This example requires two of the couplings offered

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Specifications T20WN

Type		**T20WN**										
Accuracy class		0.2										
Torque measuring system												
Nominal (rated) torque M_{nom}	N·m	0.1	0.2	0.5	1	2	5	10	20	50	100	200
for reference only	ft–lb	0.075	0.15	0.375	0.75	1.5	3.75	7.5	15	37.5	75	150
Nominal (rated) sensitivity (nominal (rated) signal range between torque = zero and nominal (rated) torque)	V	10										
Characteristic tolerance (deviation of the actual output quantity at M_{nom} from the nominal (rated) signal range)	%	±0.2										
Output signal at torque = zero	V	0±0.2										
Nominal (rated) output signal												
with positive nominal (rated) torque	V	+10										
with negative nominal (rated) torque	V	–10										
Load resistance	MΩ	> 1										
Long–term drift over 48 h	mV	<±50										
Cut-off frequency (–3 dB)	Hz	200										
Residual ripple	mV_{PP}	< 80										
Temperature influence per 10 K in the nominal (rated) temperature range												
on the output signal, related to the actual value of signal span	%	±0.2										
on the zero signal, related to the nominal (rated) sensitivity	%	±0.2										
Power supply												
Nominal (rated) excitation voltage (separated extra–low voltage)	V (DC)	12 (10.8...13.2)										
Release of calibration signal	V	5...13.2										
Current consumption in measuring mode	A	< 0.2										
Nominal (rated) power consumption	W	< 2.4										
Allowed residual ripple of excitation voltage	mV_{PP}	200										
Characteristic curve deviation related to the nominal (rated) sensitivity	%	<±0.2 (typ. <±0.1)										
Variability, related to the change in output signal	%	<±0.05										
Calibration signal	V	+10±0.2%										
Measuring system for speed/angle of rotation												
Measuring system		Optical										
Pulses per revolution	Number	360										
Output signal	V	5; two square wave signals 90° phase shifted										
Minimum speed for sufficient pulse stability	rpm	0										
Load resistance	kΩ	> 10										
Maximum measurable speed	rpm	3000										
General data												
EMC												
EMI (Immunity) (EN50082–2)												
RF enclosure	V/m	10										
RF common mode	V_{PP}	10										
Magnetic field	A/m	100										
Burst	kV	2/1										
DSE	kV	4/8										
EME (Emission) (EN55011)												
RFI-Voltage		Class B										
Field strength		Class B										
Degree of protection according to EN 60529		IP40										
Weight, approx.	kg	0.17					0.34			0.6		

Specifications T20WN

Nominal (rated) torque M_{nom}	N·m	0.1	0.2	0.5	1	2	5	10	20	50	100	200
for reference only	ft–lb	0.075	0.15	0.375	0.75	1.5	3.75	7.5	15	37.5	75	150
Nominal (rated) temperature range	°C [°F]	+5 [41]...+45 [113]										
Service temperature range	°C [°F]	0 [32]...+60 [140]										
Storage temperature range	°C [°F]	–5 [23]...+70 [158]										
Impact resistance, test severity level to IEC 68; part 2-27; IEC 68-2-27-1987												
Number of impacts	n	1000										
Duration	ms	3										
Acceleration (half-sine)	m/s^2	650										
Vibration resistance, test severity level to IEC 68, part 2-6; IEC 68-2-6-1982												
Frequency range	Hz	5...65										
Duration	h	1.5										
Acceleration (amplitude)	m/s^2	50										
Nominal (rated) speed	rpm	10 000										
Load limits [1]												
Limit torque, related to M_{nom}	%	200[2]										
Breaking torque, related to M_{nom}	%	> 280										
Axial limit force	kN	0.2	0.2	0.2	0.34	0.5	1.1	1.75	2.75	5.3	7.6	12.5
Lateral limit force	N	3.6	3.6	3.6	5.7	8.3	18.2	29	46	88	127	207
Bending limit moment	Nm	0.12	0.12	0.12	0.23	0.4	0.93	1.9	3.7	10	17	36
Oscillation bandwidth according to DIN 50100 (peak-to-peak) [3]	%	80										
Mechanical values												
Torsional stiffness C_T	kN·m / rad	0.03	0.03	0.03	0.05	0.07	0.91	1.9	3.25	14	21.9	32.6
Torsion angle at M_{nom}	degree	0.2	0.38	0.96	1.1	1.7	0.32	0.3	0.35	0.2	0.26	0.35
Max. limits for relative shaft vibration (peak-to-peak)[4]	µm	$s_{max} = \frac{4500}{\sqrt{n}}$										
Rms value for the vibration velocity of the housing according to VDI 2056	mm/s	$v_{eff} = \frac{\sqrt{n}}{3}$										
Mass moment of inertia of the rotor (around the axis of rotation) with speed mesuring system ($x10^{-3}$)	gm^2	0.06	0.06	0.06	0.063	0.068	6.1	6.13	6.23	53.7	54.6	57.2

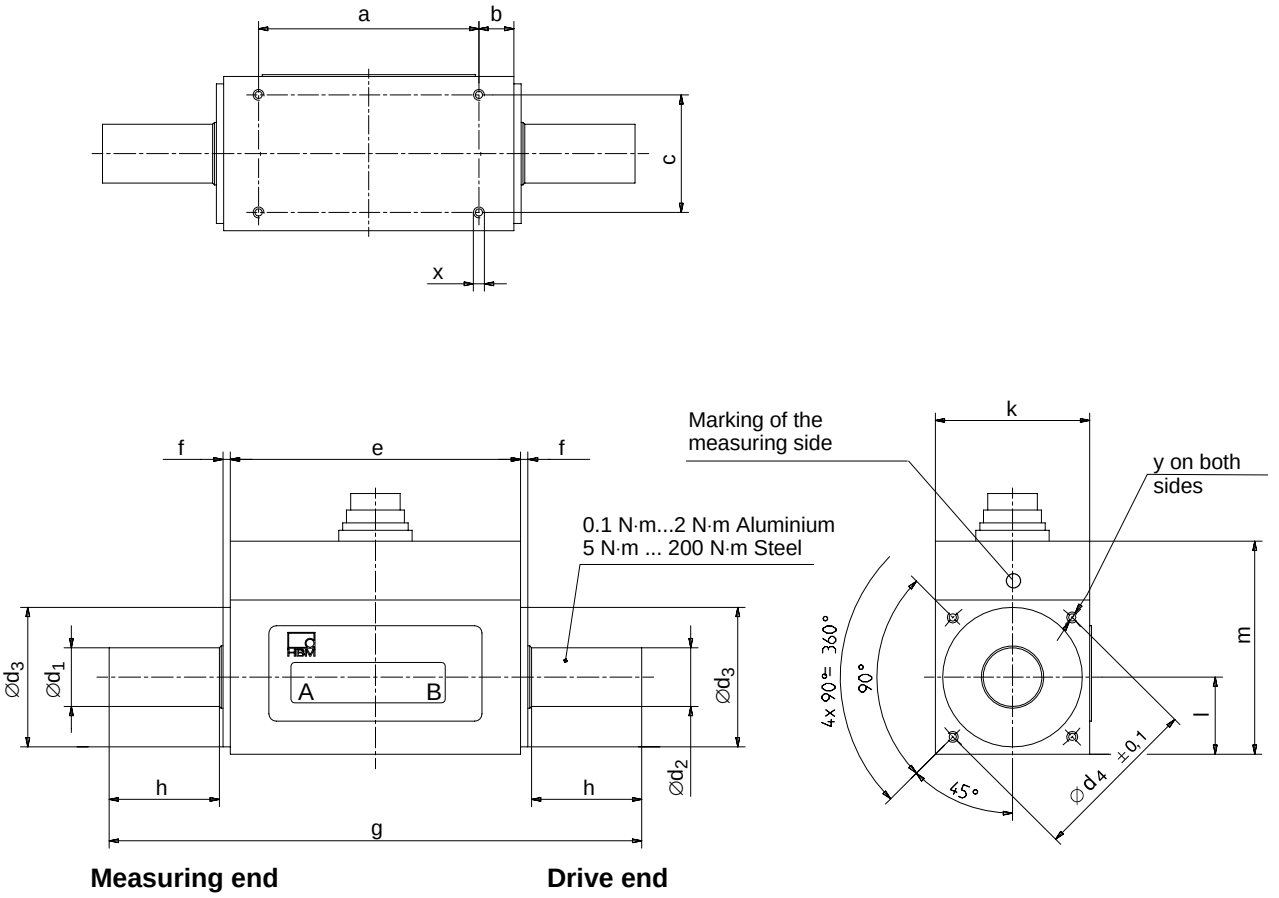
1) Each type of irregular stress can only be permitted with its given statistic load limit values (bending moment, lateral or axial load, exceeding the nominal (rated) torque) if none of the others can occur. Otherwise the limit values must be reduced. If for instance 30 % of the bending limit moment and also 30 % of the lateral limit force are present, only 40 % of the axial limit force are permitted, provided that the nominal (rated) torque is not exceeded. With the permitted bending moments, axial and lateral limit forces, measuring errors of about 1 % of the nominal (rated) torque can occur.

2) Please observe the coupling's maximum torque (T_{Kmax}).

3) The nominal (rated) torque must not be exceeded.

4) Relative undulations within the range of the adapter flange in accordance with DIN 45670/VDI 2059.

Dimensions T20WN

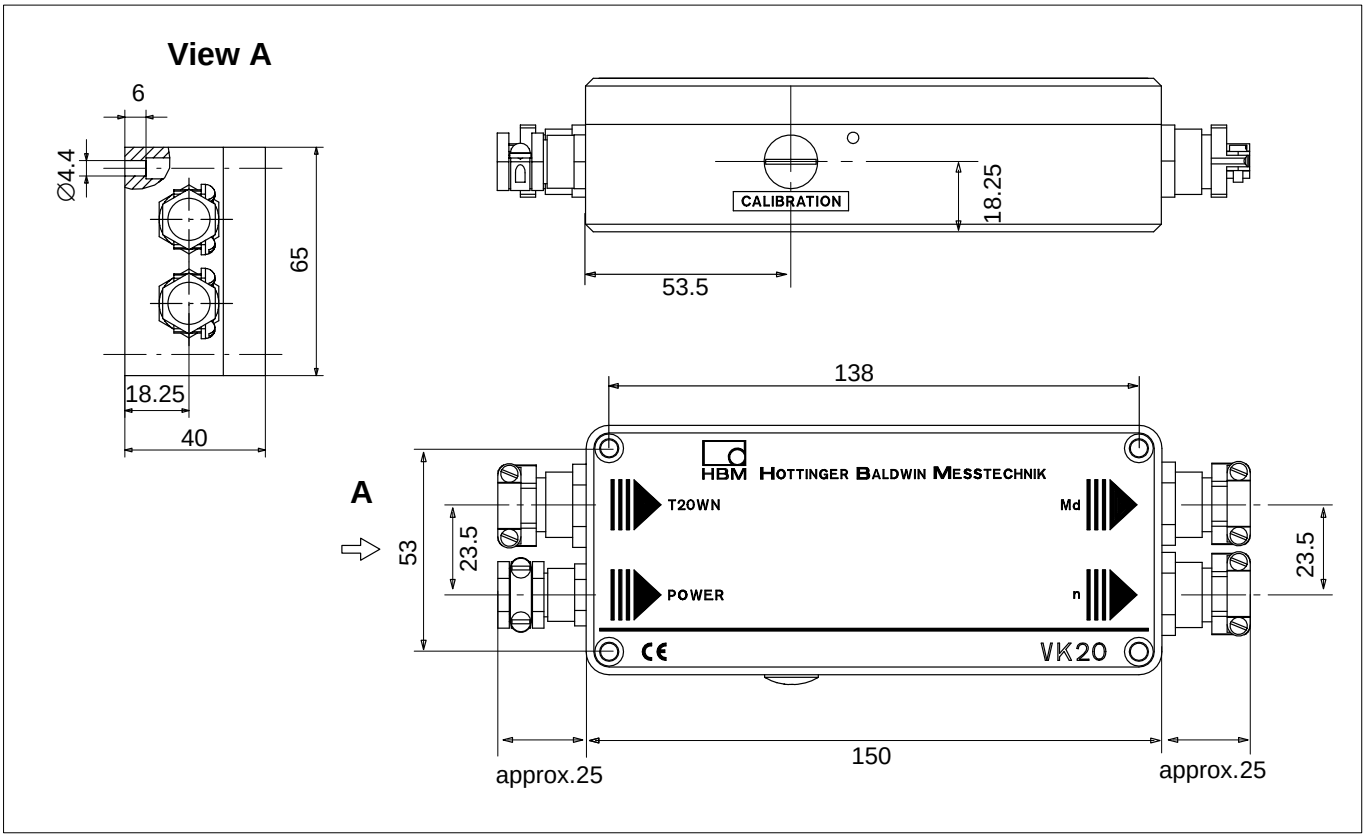


Measuring range	Dimensions in mm															
	a	b	c	e	f	g	h	k	l	m	$Ød_{1\ g6}$	$Ød_{2\ g6}$	$Ød_{3\ f7}$	$Ød_{4\ \pm 0.1}$	y	x
0.1 N·m	40	11	22	62	2	95	14	28	14	48.5	6	8	27	32	M3/6 depth	M3/5 depth
0.2 N·m	40	11	22	62	2	95	14	28	14	48.5	6	8	27	32	M3/6 depth	M3/5 depth
0.5 N·m	40	11	22	62	2	95	14	28	14	48.5	6	8	27	32	M3/6 depth	M3/5 depth
1 N·m	40	11	22	62	2	95	14	28	14	48.5	6	8	27	32	M3/6 depth	M3/5 depth
2 N·m	40	11	22	62	2	95	14	28	14	48.5	6	8	27	32	M3/6 depth	M3/5 depth
5 N·m	60	9.5	32	79	2	145	30	42	21	58	16	16	38	46	M3/6 depth	M3/6 depth
10 N·m	60	9.5	32	79	2	145	30	42	21	58	16	16	38	46	M3/6 depth	M3/6 depth
20 N·m	60	9.5	32	79	2	145	30	42	21	58	16	16	38	46	M3/6 depth	M3/6 depth
50 N·m	42	15	40	72	3	170	45	56	28	73	26	26	54	65	M4/8 depth	M4/8 depth
100 N·m	42	15	40	72	3	170	45	56	28	73	26	26	54	65	M4/8 depth	M4/8 depth
200 N·m	42	15	40	72	3	170	45	56	28	73	26	26	54	65	M4/8 depth	M4/8 depth

Specifications VK20

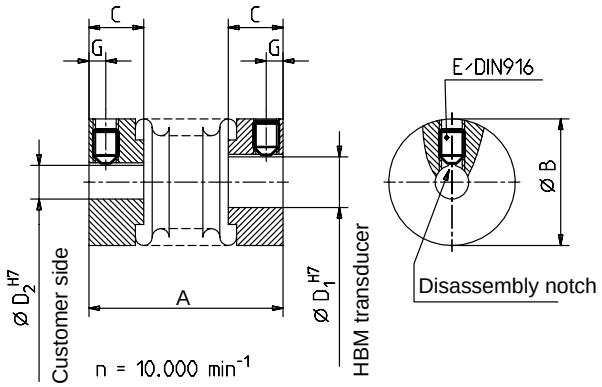
Type		VK20
Supply voltage	V	24
Supply voltage range	V	14 ... 30
Current consumption	mA	max. 300, typ. 150
Power consumption	W	max. 9
Transducers that can be connected max. length of cable to the transducer	 m	T20WN 50
Outputs		
Torque **Load-carrying capacity** **Accuracy** **max. cable length**	V m	–10..+10 V see T20WN see T20WN 500
Speed/angle of rotation Level Load-carrying capacity max. cable length	 V mA m	2 impulse signals 90° phase shifted for detection of direction of rotation 0/5 (complementary signals RS422) max. 20 500
External calibration signal trigger Off On	 V V	 less than 2 V (0 V ... 2 V) greater than 4 V (4 V ... 30 V)
Internal calibration signal trigger		by probe
Nominal (rated) temperature range	°C [°F]	–10 ... 60 [14 ... 140]
Operating temperature range	°C [°F]	–10 ... 60 [14 ... 140]
Storage temperature range	°C [°F]	–20 ... 70 [–4 ... 158]
Degree of protection acc. to EN 60 529		IP65
Interference suppression		under EN55011, class B
Electromagnetic compatibility		under EN50082–2
Weight	g	approx. 500

Dimensions VK20

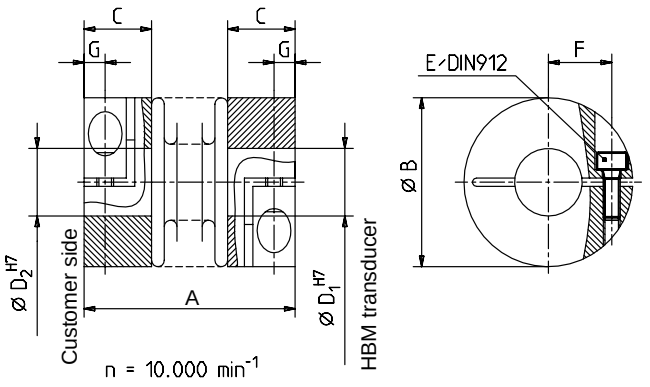


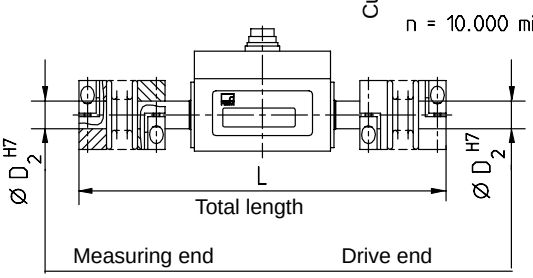
Bellow couplings

For measuring ranges 0.1 N·m...1 N·m



For measuring ranges 2 N·m ... 200 N·m





Dimensions

Measuring range [N·m]	Parts-No.	Dimensions in mm A	∅B	C	∅D_1 Measuring end T20WN	∅D_1 Drive end T20WN	∅D_2 variable from – to	E	F	G	L
0.1	3–4412.0001	23_{-1}	15	6.5	6	8	3–9	M3	–	2	128
0.2											
0.5											
1	3–4412.0002	25_{-1}	15	6.5	6	8	3–9	M3	–	2	132
2	3–4412.0003	40_{-1}	25	13	6	8	3–12.7	M3	8	4	149
5	3–4412.0004	50_{-1}	40	16	16	16	5–22	M4	15	5	213
10											
20	3–4412.0005	69_{-2}	56	21	16	16	10–32	M6	19	7.5	241
50	3–4412.0006	80_{-2}	66	23.5	26	26	12–32	M8	23	9.5	283
100	3–4412.0007	93_{-2}	82	28	26	26	19–40	M10	27	11	300
200	3–4412.0008	109_{-2}	110	35	26	26	24–56	M12	39	13	318

Please specify upon order: D_2 connecting holes as specified by customer within the stated limits; H7 boring tolerance.

By using only **one** bellow coupling, please indicate the construction side of the coupling:
Measuring end = 6 mm / Drive end = 8 mm

Specifications

Measuring range [N·m]	Coupling torque maxi-mum T_{Kmax} [N·m]	Mass moment of inertia [kg·cm²]	Weight [g]	Torsional stiffness [kNm/rad]	Max. permitted misalign-ment axial [mm]	Max. permitted misalign-ment radial [mm]	Max. permitted misalign-ment angular [deg]	Spring stiffness axial [N/mm]	Spring stiffness radial [N/mm]	Material of coupling hub and fastening ring	Tightening torque of clamping screws [N·m]
0.1	0.5	0.012	6	0.21	0.5	0.2	1.5	13.4	47.7	Aluminium	0.35
0.2											
0.5											
1	1	0.018	7	0.38	0.5	0.2	1.5	27.4	84.3		0.75
2	2	0.27	38	1.30	0.6	0.2	1.5	20.6	88		0.75
5	10	1.6	120	9.05	1	0.2	1.5	33.3	389		1.5
10											
20	30	1.2	300	31	1	0.15	1.5	50	366		14
50	60	2.0	400	72	1.5	0.15	1.5	67	679		35
100	150	20	1600	141	2	0.15	1.5	77	960	Steel	75
200	300	40	3800	157	2	0.15	1.5	124	2940		120

General notes

- Install the shafts in the coupling hubs before fastening the couplings' clamping screws!
- Do not stretch the bellow couplings beyond the specified permissible elasticities.
- The input and output shafts must be free from grease and burrs.
- The shaft diameters should be made with a j6 tolerance to obtain the H7/j6 preference fit.

Mounting position

The T20WN Torque Transducer with bellow couplings can be used in any mounting position (horizontal, vertical or oblique). With vertical or oblique operation, please ensure that additional masses are sufficiently supported.

Equipment as supplied

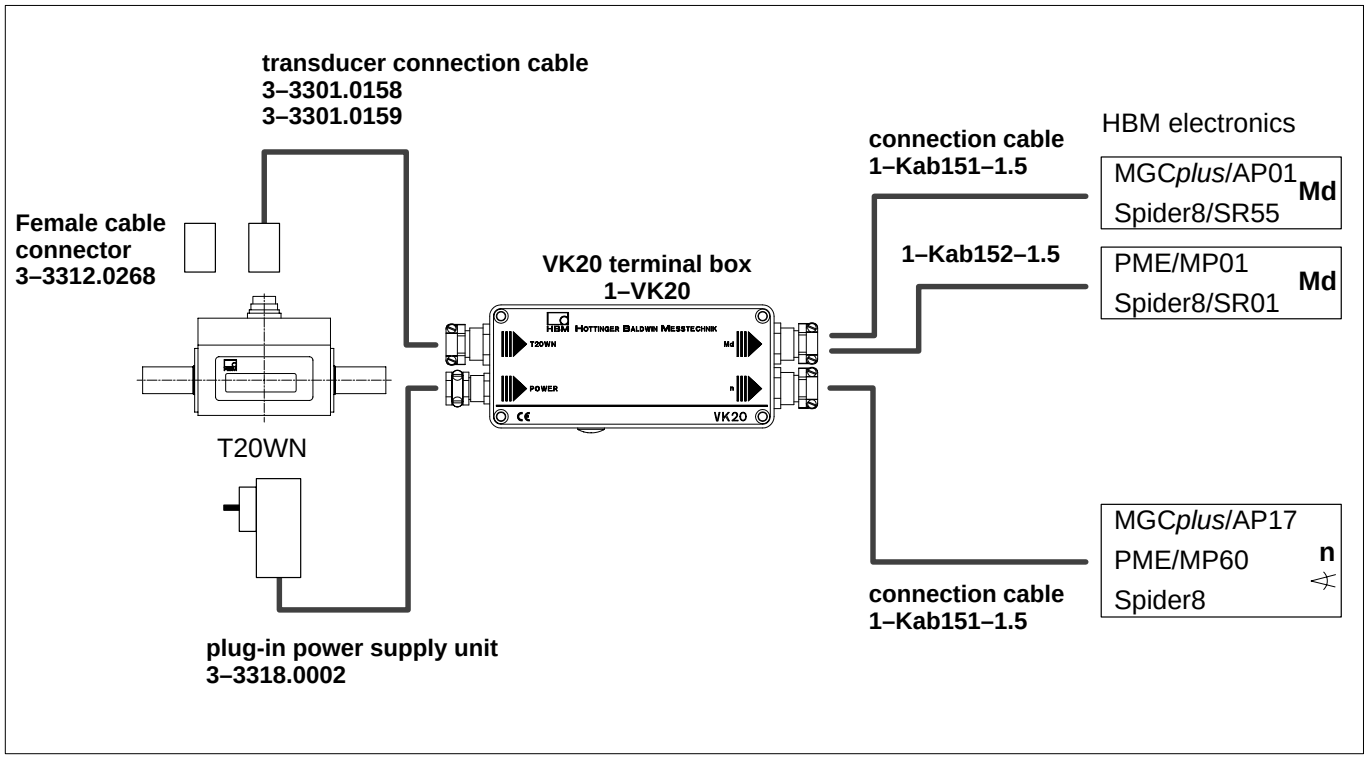
The couplings and the torque transducer are delivered separately ex-works.

Accessories T20WN, to be ordered separately

Connection cable, 5 m long, order no. 3-3301.0158
Connection cable, 10 m long, order no. 3-3301.0159
Cable socket, 12-pole (Binder), order no. 3-3312.0268
Terminal box, order no. 1-VK20
Bellows couplings

Accessories VK20, to be ordered separately

Mains device (14.4 V=/300 mA), order no. 3-3318.0002
Connection cable, 1.5 m long (D-Sub, 15-pole), order no. 1-Kab151-1.5
Connection cable, 1.5 m long (D-Sub, 5-pole), order no. 1-Kab152-1.5



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