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0260 DM
Torque sensor
Dual-range sensor

For test stands
Automotive
Aircraft industry
Machine engineering
Component test
R&D, production
Quality assurance



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Torque sensors 0260 DM

■ Introduction

These new digital torque sensors were developed for precise measurement of high peak torques and average operating torques.

For this task a conventional torque sensor would have to be overdesigned to avoid damage caused by shaft overloading.

The required sensitivity for measurement of average torques would also not exist.

The precise measurement of torques in rotating drives and components is an important criterion for ensuring effective product design and quality assurance in manufacture and assembly.

■ General

Torque sensors type 0260 DM operate according to the DMS-principle (strain-gauge) with new, extremely accurate integrated measuring electronics.

The torque signal is contactless and digitally transmitted from the rotating shaft. Output is analog-, frequency- or serial signal. In addition a control signal (calibration input) is available. The 'smart' function allows reading of sensor data (serial number, measuring range, next calibration, etc.).

The measuring range changeover is made through an external signal.

LED for operating conditions (green = OK / red = overload).

■ Special features

Rated torque: 0,2 Nm to 5.000 Nm.

Measuring range:
Rated torque : 10 or : 5.
Speed ranges up to 50 000 rpm.

Accuracy class in the rated torque range: 0,1 optionally 0,05.
In the second measuring range: 0,2

Integrated speed sensor.

Integrated over-load protection up to 3 Nm (size 1).

Serial data output RS 232 for torque values.

Retraceable calibration according to DIN/ISO 9000.



Pin assignment and connection diagram

0260 DM L and 0260 DM H Standard designs

Range Nm	n_{\max} „L“ min ⁻¹	Item no.	n_{\max} „H“ min ⁻¹	Item no.	Spring constant Nm/rad	Inertia of mass M/A kgcm ²	Option housing substructure (GU)
0,2	20 000	21338	50 000	21339	10	M 0,0015 / A 0,14	Art. 3799
0,5	20 000	21340	50 000	21341	10	M 0,0015 / A 0,14	Art. 3799
1	20 000	21342	50 000	21343	180	M 0,0054 / A 0,16	Art. 3799
2	20 000	21344	50 000	21345	250	M 0,006 / A 0,17	Art. 3799
5	20 000	21346	50 000	21347	450	M 0,006 / A 0,17	Art. 3799
10	20 000	21348	50 000	21349	520	M 0,008 / A 0,19	Art. 3799
20	20 000	21350	50 000	21351	580	M 0,008 / A 0,19	Art. 3799
50	12 000	21352	30 000	21353	9 100	M 0,54 / A 1,16	Art. 3801
100	12 000	21354	30 000	21355	13 500	M 0,54 / A 1,16	Art. 3801
200	8 000	21356	20 000	21357	60 000	M 4,0 / A 8,3	Art. 3922
500	8 000	21358	20 000	21359	100 000	M 4,2 / A 8,3	Art. 3922
1 000	8 000	21360	20 000	21361	135 000	M 4,2 / A 8,3	Art. 3922
2 000	5 000	21362	10 000	21363	520 000	M 61 / A 85	Art. 4020
5 000	5 000	21364	10 000	21365	720 000	M 61 / A 85	Art. 4020

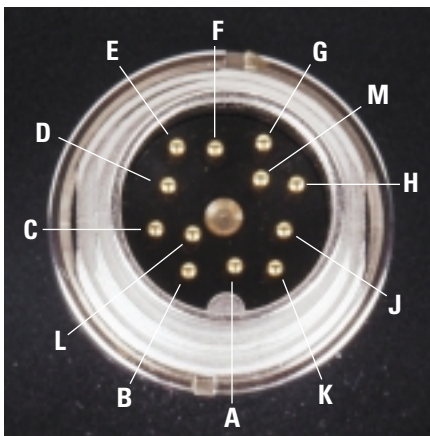
Angle pulse output:

TTL-signal, track A + B, 360 pulses/rev. up to max. 7 000 rpm on request

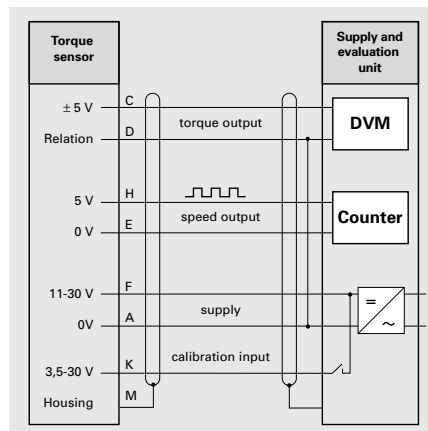
M = measuring end / A = drive end

For options refer to technical specifications

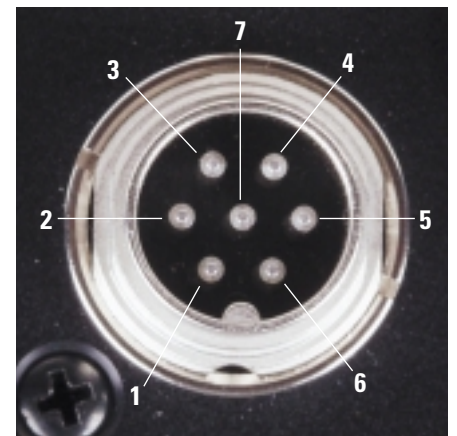
Pin assignment



Connection diagram



Pin assignment



Function	PIN	Description
Supply	F	+U _B +11 V DC...+30 V DC, power input 2,5 W.
	A	GND Related to +U _B
Shield	M	In the sensor on housing
Torque output	C	U _A ±5 V at ±M _{Nominal} at > 2 kΩ +5 V at control signal activation R _{i,C} = 10Ω, output short circuit protected after AGND.
	D	AGND Related to U _A
Speed pulses	H	Spur A Open collector output intern 1 kΩ resistance after +5 V (pull up),
	G	Spur B TTL-level
	J	Spur Z
100% control input	K	Kal Off: 0 V...2 V / On: 3,5 V...24 V R _{i,K} = 10 kΩ
RS-232 connection to the UMV 2000	B	TXD Digital send path to the UMV 2000
	L	RXD Digital receive path
Digital mass	E	DGND Related to speed pulses, calibration-/ control input RS-232 connection

PIN	A (Measuring range)	C (RS-232-Schnittstelle)
1	Range activation	n.v.
2	n.v.	n.v.
3	n.v.	n.v.
4	n.v.	n.v.
5	n.v.	TXD
6	n.v.	RXD
7	DGND	DGND

n.v. = not used

Option A (range change-over):

PIN 1 = 0 (U_{PIN 1,7} = 0 V)

normal range (1:1)

PIN 1 = 1 (U_{PIN 1,7} = 5 V)

second range (1:10, 1:5)

Option C (RS-232 interface):

RS-232 interface for the user PC

(baudrate 57 600 bps)

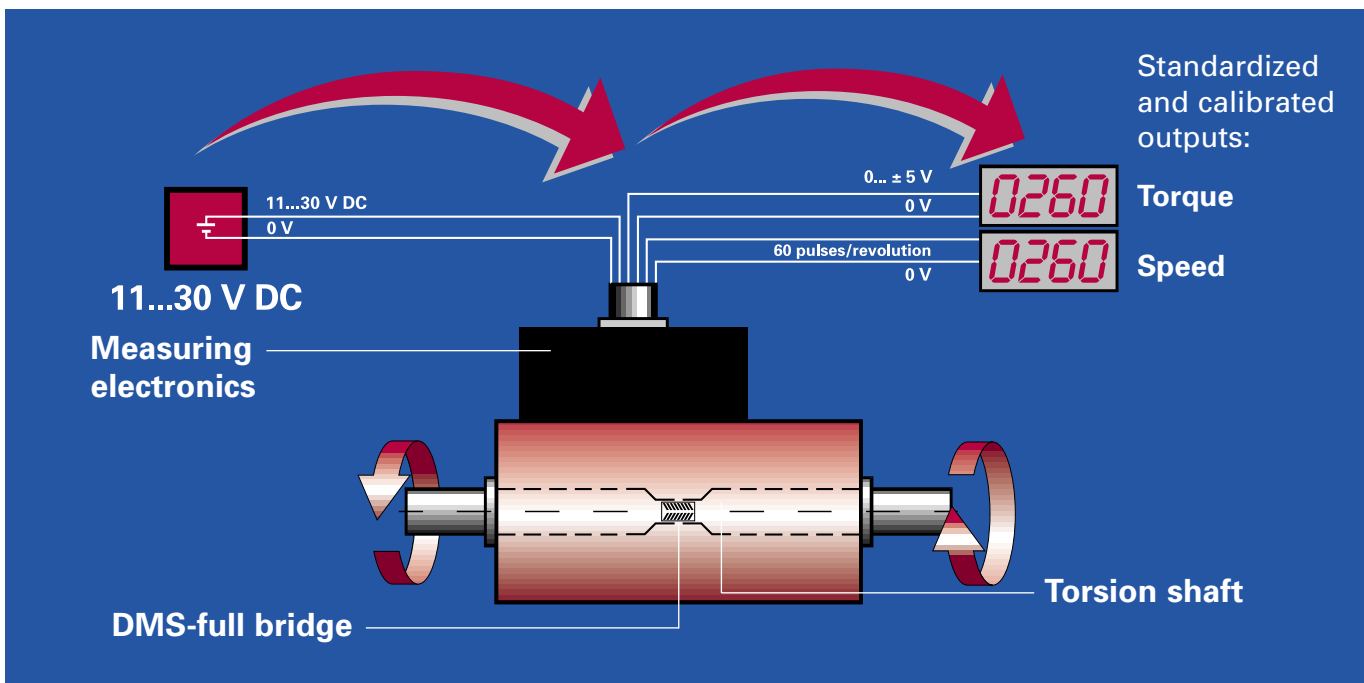
CAUTION: RS 232 connection to the UMV 2000 through standard connectors (12-pin) is not possible!

Limit values for dynamic load

Size	Rated torque Nm	Mass kg	Speed rpm ⁻¹	Measuring end			Drive end			
				Mass kg	Lateral force N	Axial force N	Mass kg	Lateral force N	Axial force N	
L 20 000 min ⁻¹ n _{max}	1	0,8	20 000	0,07	10	50	0,25	100	50	
				0,2	25	50	0,25	150	50	
				0,2	50	50	0,25	200	50	
	2	1,4	20 000	0,2	100	50	0,25	200	50	
				0,2	200	50	0,25	200	50	
				0,2	200	50	0,25	200	50	
	3	2,0	12 000	2,2	200	100	3,0	400	800	
				3,0	400	200	3,0	800	800	
	4	5,0	8 000	3,5	400	200	10	2 000	2 000	
				7	1 000	500	10	2 000	2 000	
				10	2 000	1 000	10	2 000	2 000	
	5	18	5 000	40	4 000	2 000	40	10 000	10 000	
				80	10 000	5 000	80	10 000	10 000	
	H 50 000 min ⁻¹ n _{max}	1	0,9	50 000	0,011	10	50	0,2	100	50
					0,34	25	50	0,2	150	50
0,060					50	50	0,2	200	50	
2		1,5	50 000	0,080	75	50	0,2	200	50	
				0,10	100	50	0,2	200	50	
				0,15	100	50	0,2	200	50	
3		2,1	30 000	0,20	100	50	0,2	200	50	
				0,38	200	100	2,5	300	100	
4		5,1	20 000	0,50	200	100	3,0	300	100	
				0,60	400	200	4	400	200	
				1,2	400	200	4	400	200	
5		18	10 000	2,2	400	200	4	400	200	
				10	4 000	2 000	40	4 000	2 000	
				25	4 000	2 000	80	4 000	2 000	

L = Low speed / H = High speed

■ Principle of function – standard design 0260 DM



Dimensions and designs

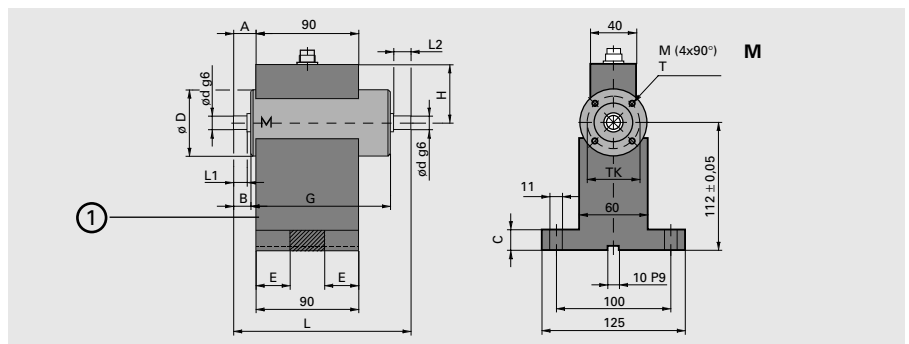
Size	1		2		3	4	5
Rated torque [Nm]	0,2 / 0,5	1,0	2 / 5	10 / 20	50 / 100	200 / 500 / 1000	2000 / 5000
L	160,5	159	163	166	180	267	418
L1	16	16	18	20	28	60	120
L2	16	16	18	20	28	61	120
Ø D	58	58	58	58	78	98	148
Ød g6	9	9	10	12	22	42 ¹⁾	70 ²⁾
A	23,5	22	24	25	43,5	83,5	—
B	19	17,5	19,5	20,5	34	64,5	—
C	18		18		18	15	—
E	30		30		30	32	—
G	122		122		113	137	—
H	51		51		66	78	—
TK	46		46		64	87	132
M	M5		M5		M6	M6	M8
T	10 deep		10 deep		12 deep	12 deep	16 deep
housing substructure	3799		3799		3801	3922	4020

(All dimensions in mm)

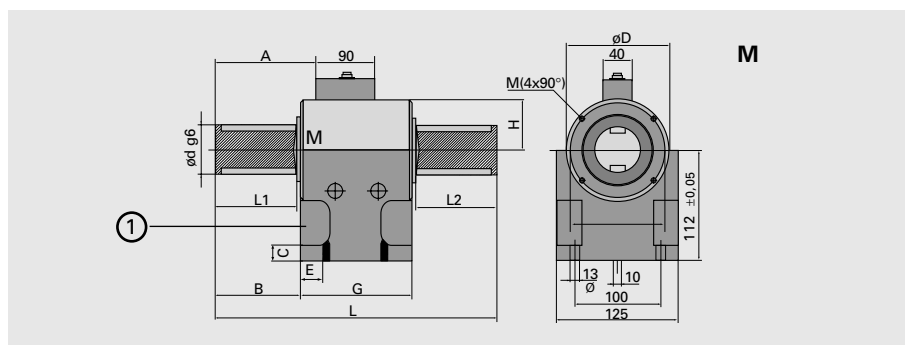
¹⁾ both shaft ends with leyways
(12 P9 x 50 / 2 x 180°) according to
DIN 6885, Bl. 1

²⁾ both shaft ends with leyways
(20 P9 x 110 / 2 x 180°) according to
DIN 6885, Bl. 1

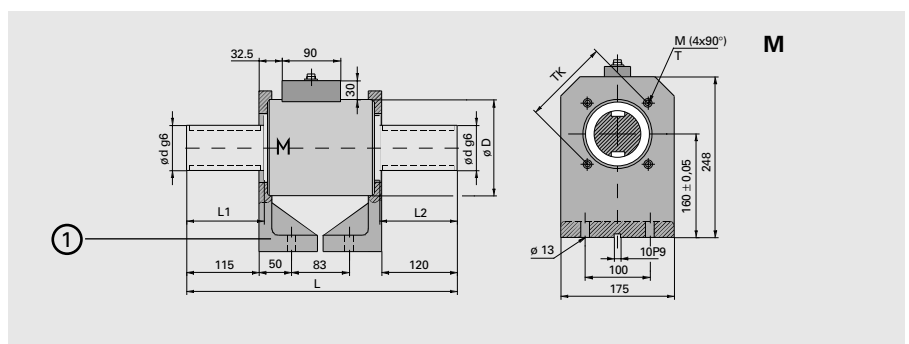
Size 1-3



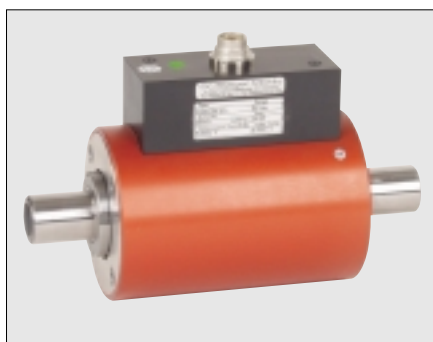
Size 4



Size 5



Design Dual-range sensor with the option housing substructure (GU)



Design Single-range sensor

① = Option housing substructure „GU“ / M = measuring end

Technical specifications

■ Mechanic basic data

Mechanic overload capacity operating torque.....	1,5 x rated torque
Alternatin torque.....	0,7 x rated torque
Rupture torque.....	4 x rated torque
Speed measurement.....	60 pulses/revolution
Max. Speed.....	depending on measuring range and design (see details)
Balancing class Q.....	6,3 in design 'L' and/or 2,5 in design 'H'
Housing.....	aluminium
Protecting class.....	IP 40

■ Electric specifications

Accuracy class.....	0,1
Linearity error including hysteresis:	
related to nominal value.....	< ± 0,1 % optional < ± 0,05 %
related to second measuring range.....	< ± 0,2 %
Repeatability nominal value (second range).....	< ± 0,05 % (< ± 0,1 %)
Voltage output at rated torque.....	± 5 VDC / optional ± 10 VDC / optional serial output RS 232
Limit frequency -3dB for voltage output.....	1 kHz
Temperature influence on the zero point (:10 Bereich).....	< ± 0,05 % / 10 K (< ± 0,2 % / 10 K)
Temperature influence on nominal value (:10 Bereich).....	< ± 0,1 % / 10 K (< ± 0,2 % / 10 K)
Temperature influence on the zero point (:5 Bereich).....	< ± 0,05 % / 10 K (< ± 0,2 % / 10 K)
Temperature influence on nominal value (:5 Bereich).....	< ± 0,1 % / 10 K (< ± 0,2 % / 10 K)
Control signal.....	100 % ± 0,2 %
100% control input.....	'on' > 3 V (max. 30 V) / 'off' < 1,5 V
Load resistance.....	> 10 k Ω
Rated temperature range.....	+ 10° C...60° C
Operating temperature range.....	0° C...70° C
Shelf temperature range.....	- 25° C...80° C
Electric connection.....	12 pin. or 7 pin. Tuchel-built-in plug
Supply voltage.....	11 VDC...30 VDC
Power input.....	approx. 2,5 W

■ Options

Option A1:	Dual-range sensor, rated torque : 10
Option A2:	Dual-range sensor, rated torque : 5
Option B1:	Output signal ± 10 V
Option B2:	Frequency output TTL
Option B3:	Frequency output 24 V
Option B4:	Frequency output push-pull (± 5 V)
Option C:	Increased accuracy
Option D:	RS 232-interface

■ Zubehör

Part # 703	Cable box 12-pin (Binder type 99-2030-02-R or similar)
Part # 517	Cable box 7-pin (Binder type 99-2026-09-07 or similar)
Part # 18642	Measuring cable
Part # 21468	RS 232 connection cable 7-pin < > Sub D 9-pin

■ Order example with options:

0260 DM 50L-A1-B2-D (Part # 21352)
Torque sensor, A1: 2 Measuring ranges,
1. rated torque 50 Nm, 2. rated torque
5 Nm, design L,
max. speed 20.000 rpm.,
B2: frequency output TTL,
D: RS 232-Interface

■ Order example without options:

0260 DM 50L (Part # 21352):
Torque sensor, 1 measuring range,
rated torque 50 Nm, design L,
max. speed 20.000 rpm.,
Standard-output signal ± 5 V

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UMV 2000

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