

Torque sensor

with rotating measuring shaft

Type 5413-1100/.., -1200/..
 5413-1160/.., -1260/..
 5413-1151/.., -1251/..

The torque sensors operate according to the strain gauge principle and supply a passive analog output signal in mV/V. The torque sensors with integrated angle of rotation measurement are optionally available as torque/angle of rotation sensors.

- Measuring range of 0.2 N·m to 5 000 N·m (according to type)
- SCHATZ AUTOCODE identification
- Cable or connection socket variants
- Standardized mechanical connections:
 - Square (size dependent on measuring range) DIN 3121
 - Hex (1/4 inch) DIN 3126
- Suitable for pulse tools (depending on type)



Type 5413-1100/.. and -1200/.. as connection socket / cable variants

Description

Robust rotating torque sensors Type 5413-1100/.., 5413-1160/.. and 5413-1151/.. as well as torque/angle of rotation sensors Type 5413-1200/.., 5413-1260/.. and 5413-1251/.. for measuring torques and torques/angles of rotation. The torque sensor measuring shaft is equipped with strain gauges and is protected by a metal housing. An incremental disk for angle of rotation measurement is optionally available on the measuring shaft. This passes through a double-forked light barrier. The angular impulse processing stage delivers two phase-shifted signals corresponding to the direction of rotation.

The robust steel or aluminum housing protects the interior of the sensor, so that measurements under production conditions are possible.

The sensors are optionally equipped with fixed cables (5 m) or with connection socket.

The integrated SCHATZ AUTOCODE system enables the sensor to be automatically detected and calibrated when it is connected to appropriately equipped measuring systems.

The torque sensors are delivered with a quality certificate. Upon request, the torque sensors are calibrated with traceability in our DAkkS-accredited calibration lab.



Type 5413-1160/.. and -1260/.. as connection socket / cable variants



Type 5413-1151/.. and -1251/.. as connection socket / cable variants

Application

The torque sensors with rotating measuring shaft are particularly suitable for dynamically determining torques during fastening processes of bolted joints.

Application areas for the sensors:

- Torque and torque/angle of rotation testing on rotating components, workpieces and tools.
- Random-sample testing in the fastening process with the measuring and evaluation unit INSPECTpro.

Type 5413-1100/.. and Type 5413-1200/..:

- Fastening assembly tools (Type 5413-1100/.. including pulse tools) can be tested and monitored during the fastening process in production, but also in the workshop or in the lab.
- Standard sensors for Analyse systems.

Type 5413-1160/.. and Type 5413-1260/..:

- The slim design allows reference measurements to be taken from fastening systems with several fastening assembly tools with a hole punch starting at 32 mm.

Type 5413-1151/.. and Type 5413-1251/..:

- These sensors are particularly suitable for the dynamic determination of torques on small fastening assembly tools as well as on spindles during fastening processes.

Technical data

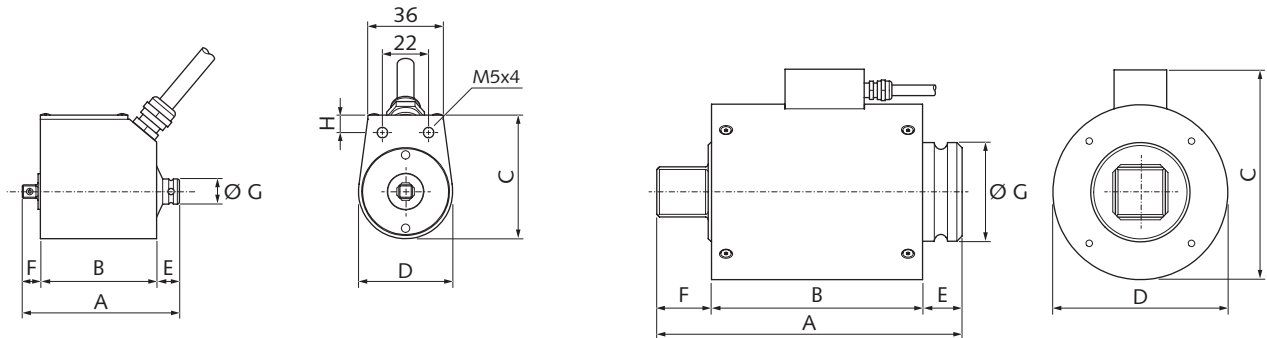
Basic mechanical / electrical data for the sensors

Maximum service torque	1.2 x nominal torque (20 % overload)
Maximum permitted torque	1.5 x nominal torque (50 % overload)
Bridge resistance	350 Ω
Calibration resistance	40 k Ω (+/- 0.1 %)
Nominal characteristic value	2 mV/V
Nominal supply voltage	5 V
Supply voltage operating range	2.5 ... 10 V
Operating temp. range (Nominal temp. range)	10 ... 40 °C
Service temp. range	0 ... 50 °C
Storage temp. range	-20 ... 70 °C
Relative humidity	max. 70 %, non-bedewing / non-condensing
Housing material	Steel Aluminum (Type 5413-1160/.. and Type 5413-1260/..)
Level of protection	IP 40
Electrical connection	
Connecting cable	fixed, 5 m
Connector	ODU: S12 L0C-P16PFG0
Connection socket	Lemo: ERY.2C.314.CLL

Torque sensor Type 5413-1100/1 to ../5k

 Technical data and dimensions
 Type 5413-1100/1 to ../1k

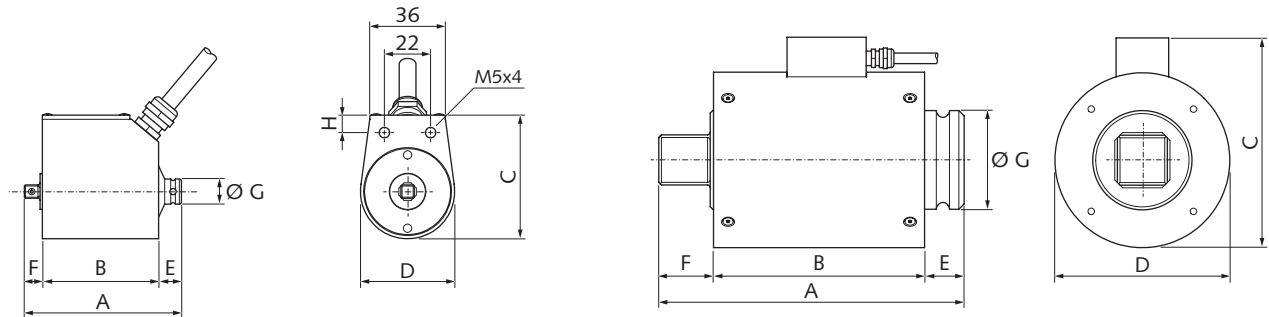
Type 5413-1100/2k and ../5k



Type 5413-1100/..	../1	../2	../5	../10	../20	../50
Nominal value	1 N·m	2 N·m	5 N·m	10 N·m	20 N·m	50 N·m
Square drive	1/4"	1/4"	1/4"	1/4"	1/4"	3/8"
Maximum permitted axial force	20 N	40 N	100 N	200 N	400 N	1 000 N
Maximum permitted bending	0.07 N·m	0.10 N·m	0.20 N·m	0.20 N·m	0.40 N·m	1.00 N·m
Achievable meas. uncertainty acc. to DIN EN ISO 51309	≤ 0.5 %					
Maximum rotational speed	5 000 rpm					
Dimensions						
A	94.0 mm	94.0 mm	75.0 mm	75.0 mm	75.0 mm	82.0 mm
B	55.5 mm	55.5 mm	55.5 mm	55.5 mm	55.5 mm	55.5 mm
C	59.0 mm	59.0 mm	59.0 mm	59.0 mm	59.0 mm	59.0 mm
D	45.0 mm	45.0 mm	45.0 mm	45.0 mm	45.0 mm	45.0 mm
E	18.0 mm	18.0 mm	11.0 mm	11.0 mm	11.0 mm	15.0 mm
F	20.5 mm	20.5 mm	8.5 mm	8.5 mm	8.5 mm	11.5 mm
G	Ø 10.0 mm	Ø 10.0 mm	Ø 12.0 mm	Ø 12.0 mm	Ø 12.0 mm	Ø 18.0 mm
H	8.5 mm	8.5 mm	8.5 mm	8.5 mm	8.5 mm	8.5 mm
Weight	0.6 kg	0.6 kg	0.6 kg	0.6 kg	0.6 kg	0.6 kg

Type 5413-1100/..	../100	../200	../500	../1k	../2k	../5k
Nominal value	100 N·m	200 N·m	500 N·m	1 000 N·m	2 000 N·m	5 000 N·m
Square drive	1/2"	1/2"	3/4"	1"	1 1/2"	1 1/2"
Maximum permitted axial force	1 000 N	2 000 N	2 500 N	2 500 N	2 500 N	2 500 N
Maximum permitted bending	2.00 N·m	2.50 N·m	8.00 N·m	16.00 N·m	16.00 N·m	16.00 N·m
Achievable meas. uncertainty acc. to DIN EN ISO 51309	≤ 0.5 %			≤ 1 %		
Maximum rotational speed	5 000 rpm			3 000 rpm		
Dimensions						
A	87.0 mm	87.0 mm	101.0 mm	112.0 mm	231.5 mm	231.5 mm
B	55.5 mm	55.5 mm	56.5 mm	60.0 mm	160.0 mm	160.0 mm
C	59.0 mm	59.0 mm	68.0 mm	83.0 mm	157.0 mm	157.0 mm
D	45.0 mm	45.0 mm	54.0 mm	68.0 mm	133.0 mm	133.0 mm
E	15.0 mm	15.0 mm	21.0 mm	24.0 mm	30.0 mm	30.0 mm
F	16.5 mm	16.5 mm	23.5 mm	28.0 mm	41.5 mm	41.5 mm
G	Ø 24.0 mm	Ø 24.0 mm	Ø 34.0 mm	Ø 44.5 mm	Ø 74.8 mm	Ø 74.8 mm
H	8.5 mm	8.5 mm	9.0 mm	9.0 mm	—	—
Weight	0.7 kg	0.8 kg	1.0 kg	1.3 kg	9.2 kg	9.2 kg

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Torque / angle of rotation sensor Type 5413-1200 /1 to ..5k
**Technical data and dimensions
Type 5413-1200/1 to ..1k**
Type 5413-1200/2k and ..5k


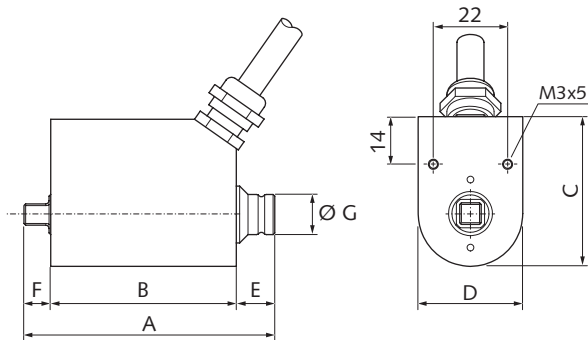
Type 5413-1200/..	../1	../2	../5	../10	../20	../50
Nominal value	1 N·m	2 N·m	5 N·m	10 N·m	20 N·m	50 N·m
Square drive	1/4"	1/4"	1/4"	1/4"	1/4"	3/8"
Maximum permitted axial force	20 N	40 N	100 N	200 N	400 N	1 000 N
Maximum permitted bending	0.07 N·m	0.10 N·m	0.20 N·m	0.20 N·m	0.40 N·m	1.00 N·m
Achievable meas. uncertainty acc. to DIN EN ISO 51309	≤ 0.5 %					
Maximum rotational speed for angle measurement	1 500 rpm					
Angle increments per revolution	360					
Dimensions						
A	94.0 mm	94.0 mm	75.0 mm	75.0 mm	75.0 mm	82.0 mm
B	55.5 mm	55.5 mm	55.5 mm	55.5 mm	55.5 mm	55.5 mm
C	59.0 mm	59.0 mm	59.0 mm	59.0 mm	59.0 mm	59.0 mm
D	45.0 mm	45.0 mm	45.0 mm	45.0 mm	45.0 mm	45.0 mm
E	18.0 mm	18.0 mm	11.0 mm	11.0 mm	11.0 mm	15.0 mm
F	20.5 mm	20.5 mm	8.5 mm	8.5 mm	8.5 mm	11.5 mm
G	Ø 10.0 mm	Ø 10.0 mm	Ø 12.0 mm	Ø 12.0 mm	Ø 12.0 mm	Ø 18.0 mm
H	8.5 mm	8.5 mm	8.5 mm	8.5 mm	8.5 mm	8.5 mm
Weight	0.6 kg	0.6 kg	0.6 kg	0.6 kg	0.6 kg	0.6 kg

Type 5413-1200/..	../100	../200	../500	../1k	../2k	../5k
Nominal value	100 N·m	200 N·m	500 N·m	1 000 N·m	2 000 N·m	5 000 N·m
Square drive	1/2"	1/2"	3/4"	1"	1 1/2"	1 1/2"
Maximum permitted axial force	1 000 N	2 000 N	2 500 N	2 500 N	2 500 N	2 500 N
Maximum permitted bending	2.00 N·m	2.50 N·m	8.00 N·m	16.00 N·m	16.00 N·m	16.00 N·m
Achievable meas. uncertainty acc. to DIN EN ISO 51309	≤ 0.5 %			≤ 1 %		
Maximum rotational speed for angle measurement	1 500 rpm					
Angle increments per revolution	360			468	1 044	
Dimensions						
A	87.0 mm	87.0 mm	101.0 mm	112.0 mm	231.5 mm	231.5 mm
B	55.5 mm	55.5 mm	56.5 mm	60.0 mm	160.0 mm	160.0 mm
C	59.0 mm	59.0 mm	68.0 mm	83.0 mm	157.0 mm	157.0 mm
D	45.0 mm	45.0 mm	54.0 mm	68.0 mm	133.0 mm	133.0 mm
E	15.0 mm	15.0 mm	21.0 mm	24.0 mm	30.0 mm	30.0 mm
F	16.5 mm	16.5 mm	23.5 mm	28.0 mm	41.5 mm	41.5 mm
G	Ø 24.0 mm	Ø 24.0 mm	Ø 34.0 mm	Ø 44.5 mm	Ø 74.8 mm	Ø 74.8 mm
H	8.5 mm	8.5 mm	9.0 mm	9.0 mm	—	—
Weight	0.7 kg	0.8 kg	1.0 kg	1.3 kg	9.2 kg	9.2 kg

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Torque sensor Type 5413-1160/1 to ../50

Technical data and dimensions

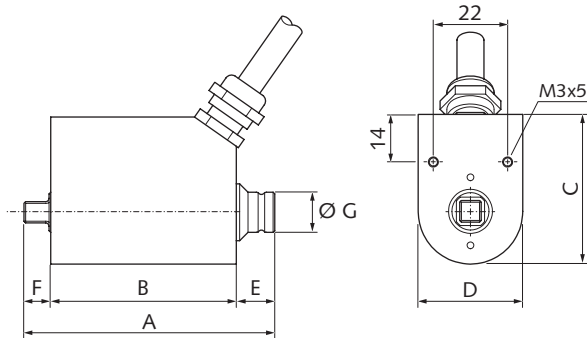


Type 5413-1160/..	../1	../2	../5	../10	../20	../50
Nominal value	1 N·m	2 N·m	5 N·m	10 N·m	20 N·m	50 N·m
Square drive	1/4"	1/4"	1/4"	1/4"	1/4"	3/8"
Maximum permitted axial force	20 N	40 N	100 N	200 N	400 N	1 000 N
Maximum permitted bending	0.07 N·m	0.10 N·m	0.20 N·m	0.20 N·m	0.40 N·m	1.00 N·m
Achievable meas. uncertainty acc. to DIN EN ISO 51309	≤ 0.5 %					
Maximum rotational speed	5 000 rpm					
Dimensions						
A	94.0 mm	94.0 mm	75.0 mm	75.0 mm	75.0 mm	83.0 mm
B	55.5 mm	55.5 mm	55.5 mm	55.5 mm	55.5 mm	55.5 mm
C	44.0 mm	44.0 mm	44.0 mm	44.0 mm	44.0 mm	44.0 mm
D	31.0 mm	31.0 mm	31.0 mm	31.0 mm	31.0 mm	31.0 mm
E	18.5 mm	18.5 mm	11.5 mm	11.5 mm	11.5 mm	16.0 mm
F	20.0 mm	20.0 mm	8.0 mm	8.0 mm	8.0 mm	11.5 mm
G	Ø 10.0 mm	Ø 10.0 mm	Ø 12.0 mm	Ø 12.0 mm	Ø 12.0 mm	Ø 20.0 mm
Weight	0.2 kg	0.2 kg	0.2 kg	0.2 kg	0.2 kg	0.25 kg

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Torque / angle of rotation sensor Type 5413-1260/1 to ../50

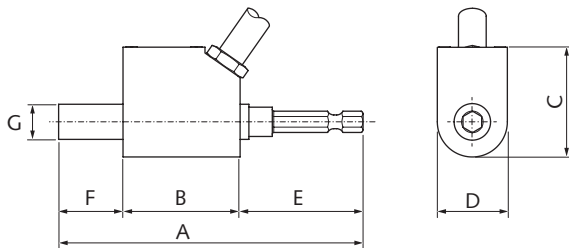
Technical data and dimensions



Type 5413-1260/..	../1	../2	../5	../10	../20	../50
Nominal value	1 N·m	2 N·m	5 N·m	10 N·m	20 N·m	50 N·m
Square drive	1/4"	1/4"	1/4"	1/4"	1/4"	3/8"
Maximum permitted axial force	20 N	40 N	100 N	200 N	400 N	1 000 N
Maximum permitted bending	0.07 N·m	0.10 N·m	0.20 N·m	0.20 N·m	0.40 N·m	1.00 N·m
Achievable meas. uncertainty acc. to DIN EN ISO 51309	≤ 0.5 %					
Angle increments per revolution	360					
Maximum rotational speed for angle measurement	2 500 rpm					
Dimensions						
A	94.0 mm	94.0 mm	75.0 mm	75.0 mm	75.0 mm	83.0 mm
B	55.5 mm	55.5 mm	55.5 mm	55.5 mm	55.5 mm	55.5 mm
C	44.0 mm	44.0 mm	44.0 mm	44.0 mm	44.0 mm	44.0 mm
D	31.0 mm	31.0 mm	31.0 mm	31.0 mm	31.0 mm	31.0 mm
E	18.5 mm	18.5 mm	11.5 mm	11.5 mm	11.5 mm	16.0 mm
F	20.0 mm	20.0 mm	8.0 mm	8.0 mm	8.0 mm	11.5 mm
G	Ø 10.0 mm	Ø 10.0 mm	Ø 12.0 mm	Ø 12.0 mm	Ø 12.0 mm	Ø 20.0 mm
Weight	0.3 kg	0.3 kg	0.3 kg	0.3 kg	0.3 kg	0.35 kg

Torque sensor Type 5413-1151/5 to ../20

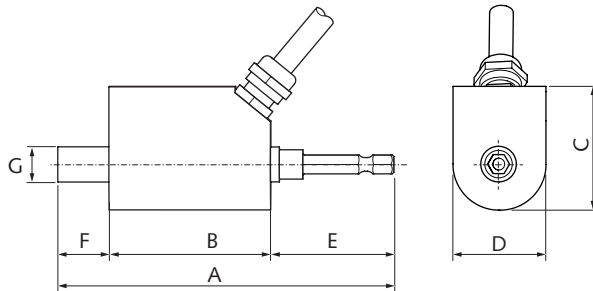
Technical data and dimensions



Type 5413-1151/..	../5	../10	../20
Nominal value	5 N·m	10 N·m	20 N·m
Hex drive	1/4" (6.3 mm)	1/4" (6.3 mm)	1/4" (6.3 mm)
Maximum permitted axial force	100 N	100 N	380 N
Maximum permitted bending	0.2 N·m	0.2 N·m	0.4 N·m
Achievable meas. uncertainty acc. to DIN EN ISO 51309	≤ 0.5 %		
Maximum rotational speed	5 000 rpm		
Dimensions			
A	104.0 mm	104.0 mm	104.0 mm
B	40.0 mm	40.0 mm	40.0 mm
C	37.5 mm	37.5 mm	37.5 mm
D	24.0 mm	24.0 mm	24.0 mm
E	42.0 mm	42.0 mm	42.0 mm
F	22.0 mm	22.0 mm	22.0 mm
G	Ø 12.0 mm	Ø 12.0 mm	Ø 12.0 mm
Weight	0.2 kg	0.2 kg	0.2 kg

Torque / angle of rotation sensor Type 5413-1251/5 to ../20

Technical data and dimensions



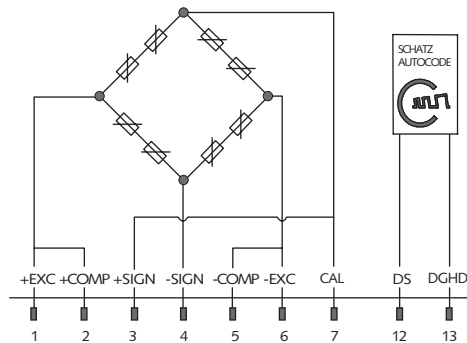
Type 5413-1251/..	../5	../10	../20
Nominal value	5 N·m	10 N·m	20 N·m
Hex drive	1/4"	1/4"	1/4"
Maximum permitted axial force	100 N	100 N	380 N
Maximum permitted bending	0.2 N·m	0.2 N·m	0.4 N·m
Achievable meas. uncertainty acc. to DIN EN ISO 51309	≤ 0.5 %		
Angle increments per revolution	360		
Maximum rotational speed for angle measurement	2 500 rpm		
Dimensions			
A	114.5 mm	114.5 mm	114.5 mm
B	55.0 mm	55.0 mm	55.0 mm
C	42.0 mm	42.0 mm	42.0 mm
D	31.0 mm	31.0 mm	31.0 mm
E	42.0 mm	42.0 mm	42.0 mm
F	17.5 mm	17.5 mm	17.5 mm
G	Ø 12.0 mm	Ø 12.0 mm	Ø 12.0 mm
Weight	0.2 kg	0.2 kg	0.2 kg

Electrical connection

Sensors with connecting cable and connector

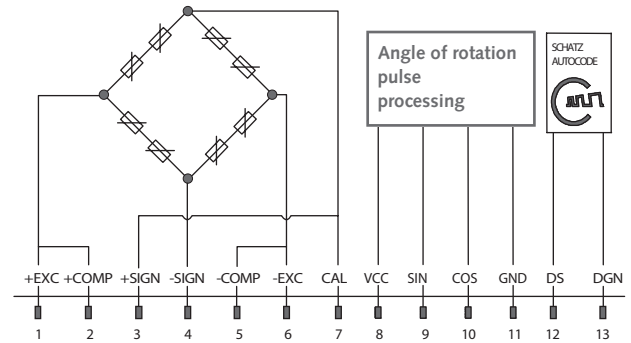
Torque measuring bridge of torque sensors

Type 5413-1100/..,
5413-1160/..,
5413-1151/..

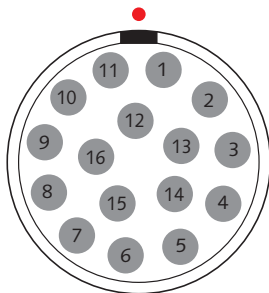


Torque measuring bridge and angle-pulse processing of the torque / angle of rotation sensors

Type 5413-1200/..,
5413-1260/..,
5413-1251/..



ODU Pin assignment

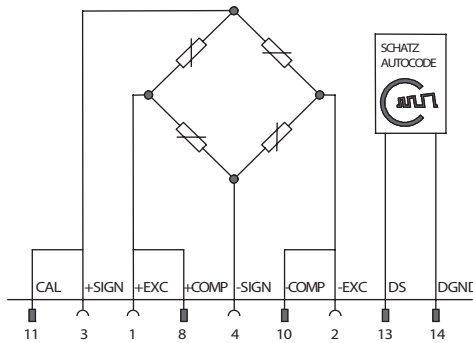


Electrical connection

Sensor with connection socket

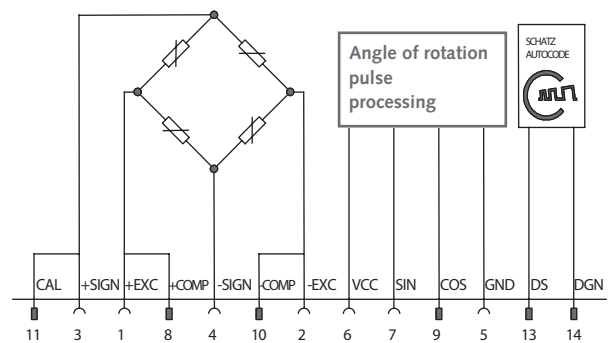
Torque measuring bridge of torque sensors

Type 5413-1100/...-S,
5413-1160/...-S,
5413-1151/...-S

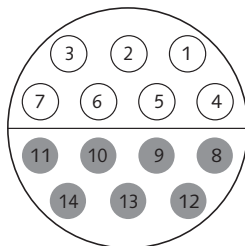


Torque measuring bridge and angle-pulse processing of the torque / angle of rotation sensors

Type 5413-1200/...-S,
5413-1260/...-S,
5413-1251/...-S



Lemo connection socket assignment



Optional accessories for sensors with connection socket

Sensor cable, 2 m
Sensor cable, 5 m

Type
18033256
18033257

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