



TORQUE MEASURING FLANGE



The major parameters in mechanical engineering are the torque and the rotational speed. They allow direct calculation of the power flow over a shaft. Due to automation and the demand for increasingly good efficiencies these parameters become more and more important these days.

In order to solve these tasks, Manner Sensortelemetrie developed special compact torque measuring flanges. All torque measuring systems of Manner Sensortelemetrie are characterized by contact-free transmission of the torque signal according to the patented procedure of sensor-telemetry. They all work without bearings and can thus be mounted without universal joint shaft, thus avoiding costs and enabling extremely compact test rigs.

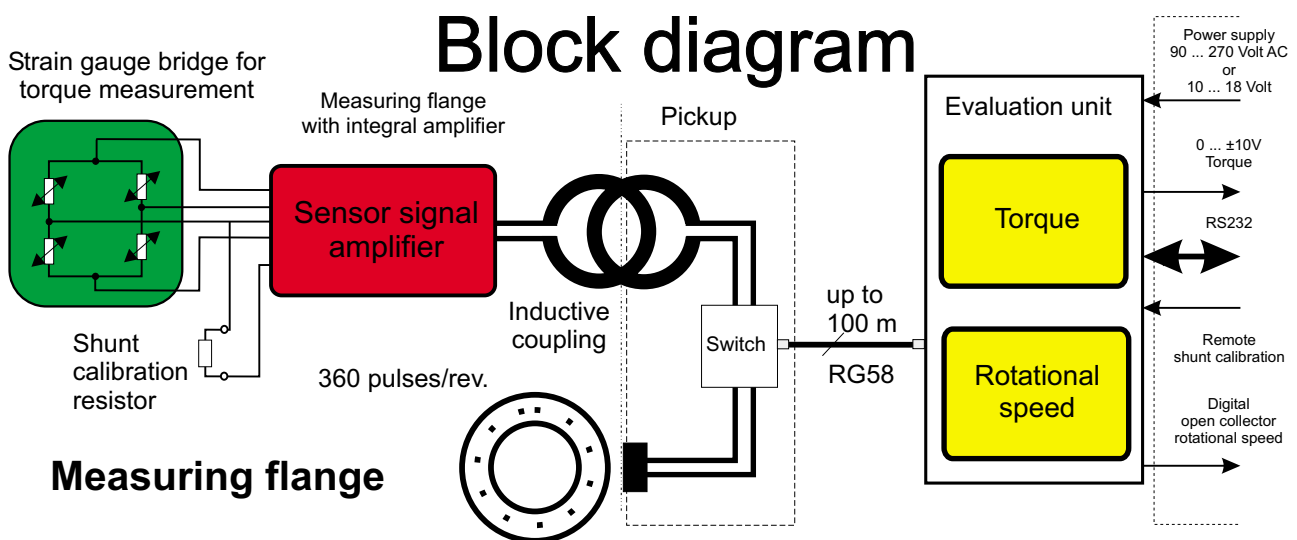
By means of the new optional function "Remote conditioning of measuring flange" the measuring flange can be calibrated electronically by the evaluation unit. The calibration data are stored electronically in the measuring flange. The measuring flange thus supplies a standardized output signal. The measuring flanges can be exchanged without subsequent calibration of the evaluation unit. Even a possible recalibration according to ISO 9000 is executed without mechanical change of the measuring flange. This is especially important for fully enclosed measuring flanges. In addition, every measuring flange has an electronic identification; this prevents that the measuring flanges are mixed up or a wrong measuring range is selected.

The rotational speed signal is measured contact-free, too. The power flow is calculated and recorded online. Beside classical analogue interfaces there are of course computer interfaces such as RS232 or RS485 available.

The torque signal is obtained on the basis of strain gauge bridges. This method ensures maximum precision. A high-precision, remote-programmable measuring amplifier on the shaft amplifies, conditions and digitizes the measuring value. The contact-free transmission is characterized by gaps of the antennas of up to 10 mm and is thus absolutely easy to assemble in the radial and axial directions. The inductive transmission technique is extremely robust and resistant against electromagnetic interferences according to DIN.

Today small-dimension, wear- and maintenance-free torque measuring flanges without bearings are in demand especially for test rigs. The demands for overload capacity, precision, pitch circle and temperature resistance are such different as the tasks of the test rigs themselves.

The engineering group Manner Sensortelemetrie manufactures custom-tailored torque measuring flanges with integral rotational speed measurement.



Properties

- compact and small-dimension (45 mm at 1 kNm)
- no bearings (no friction)
- contact-free measuring value transmission
- assembly without curved teeth coupling
- high shearing force and axial force stability
- great antenna distance torque sensor - stator (typically 10 mm)
- integral rotational speed measurement
- maintenance-free due to inductive energy feeding
- digital transmission (digitization in rotor electronics)
- very easy handling and assembly requiring little space
- customized measuring signal bandwidth from 0 to 10 kHz
- high protection class (IP 67)
- high immunity to interference, EMC tested according to DIN
- ambient temperature from -30° up to +125°C (optional up to 150°C)
- integral remote calibration function
- rotational speeds of up to 40 000 rpm (depending on type).
- integral evaluation display

The torque measuring system consists of:

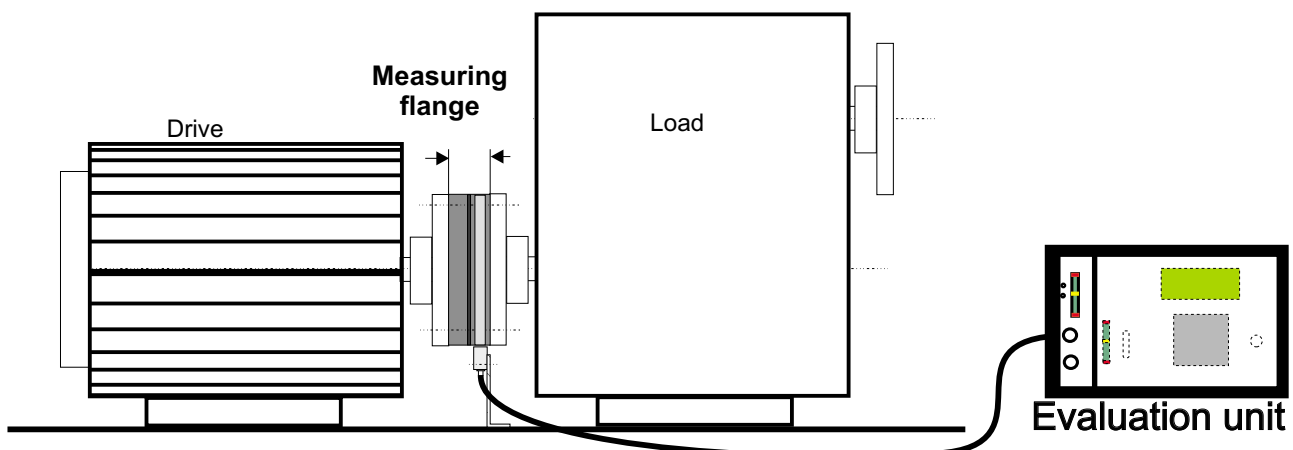
- measuring flange with measuring amplifier
- receiving antenna (pickup)
- evaluation unit (receiver)

Advantages of Manner torque measuring flanges in comparison with classic techniques

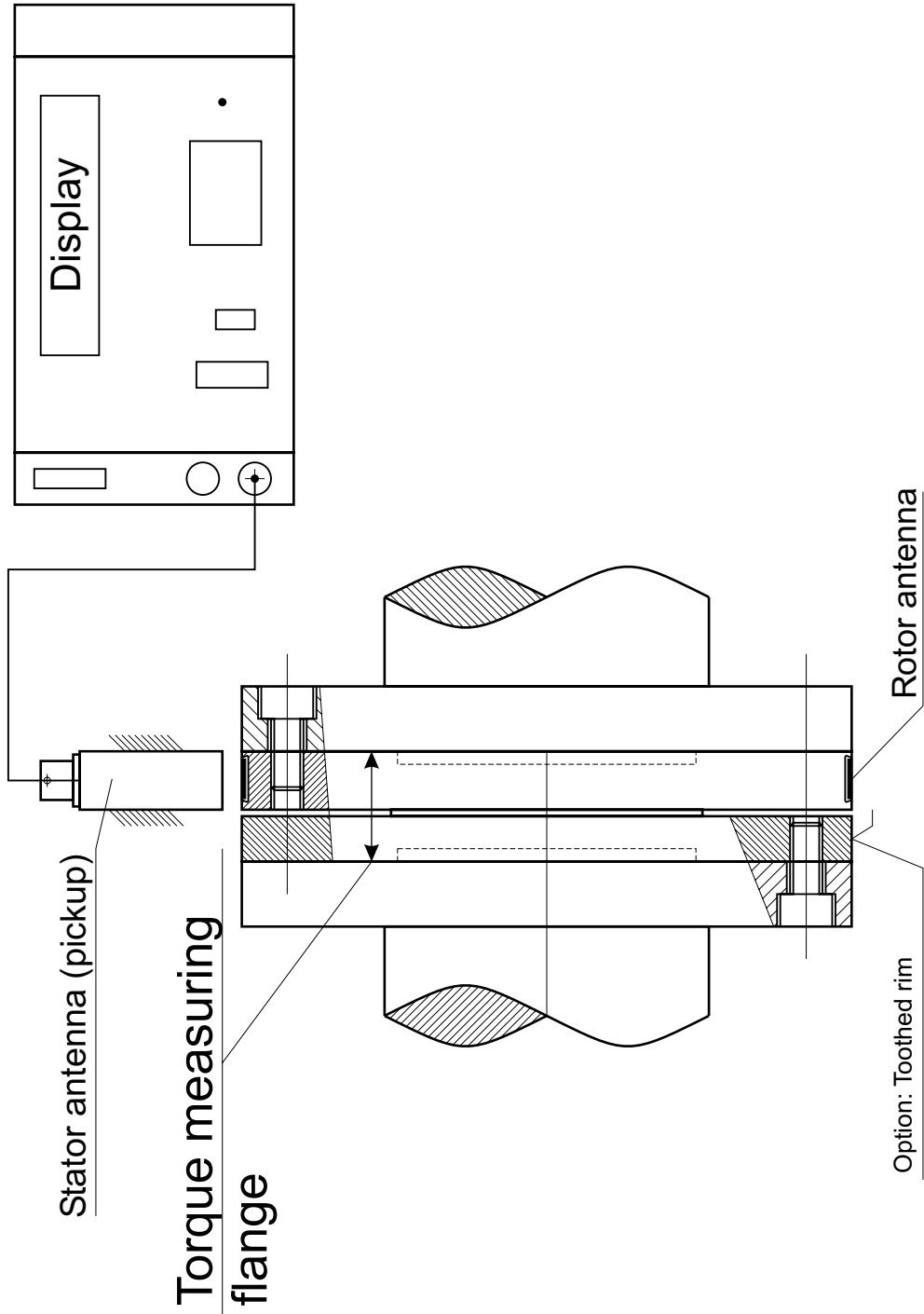
- allow for extremely compact test rigs
- compact design (1 kNm > diameter 132 mm, length = 45 mm)
- cost reduction due to missing couplings
- (customer specific pitch circle)
- high torsional rigidity
- easy assembly
- measuring flange can be remote conditioned
- recalibration without mechanical change of measuring flange
- electronic identification prevents danger of being mixed up
- can be easily adapted to various systems
- evaluation unit with power measurement

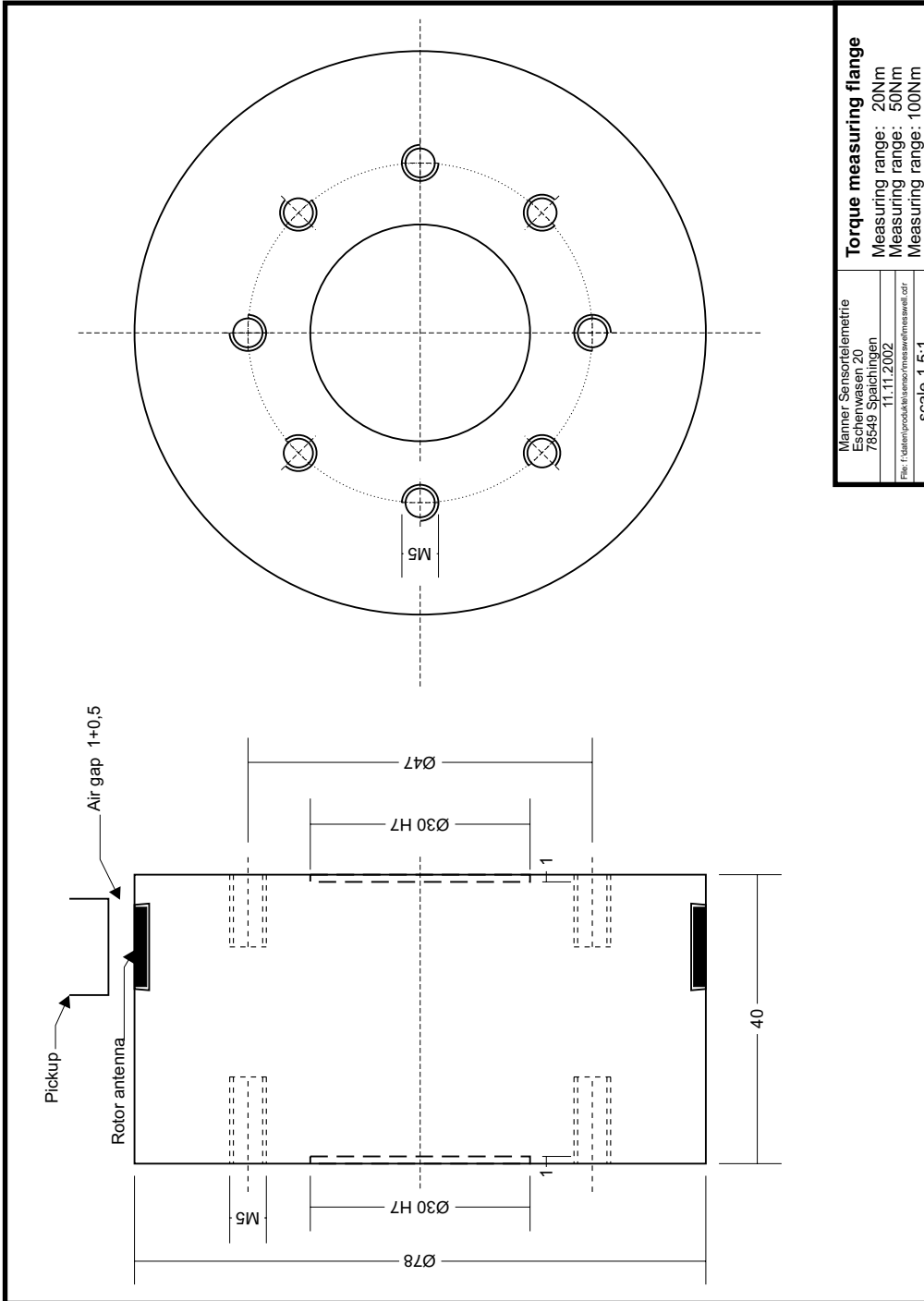
Applications

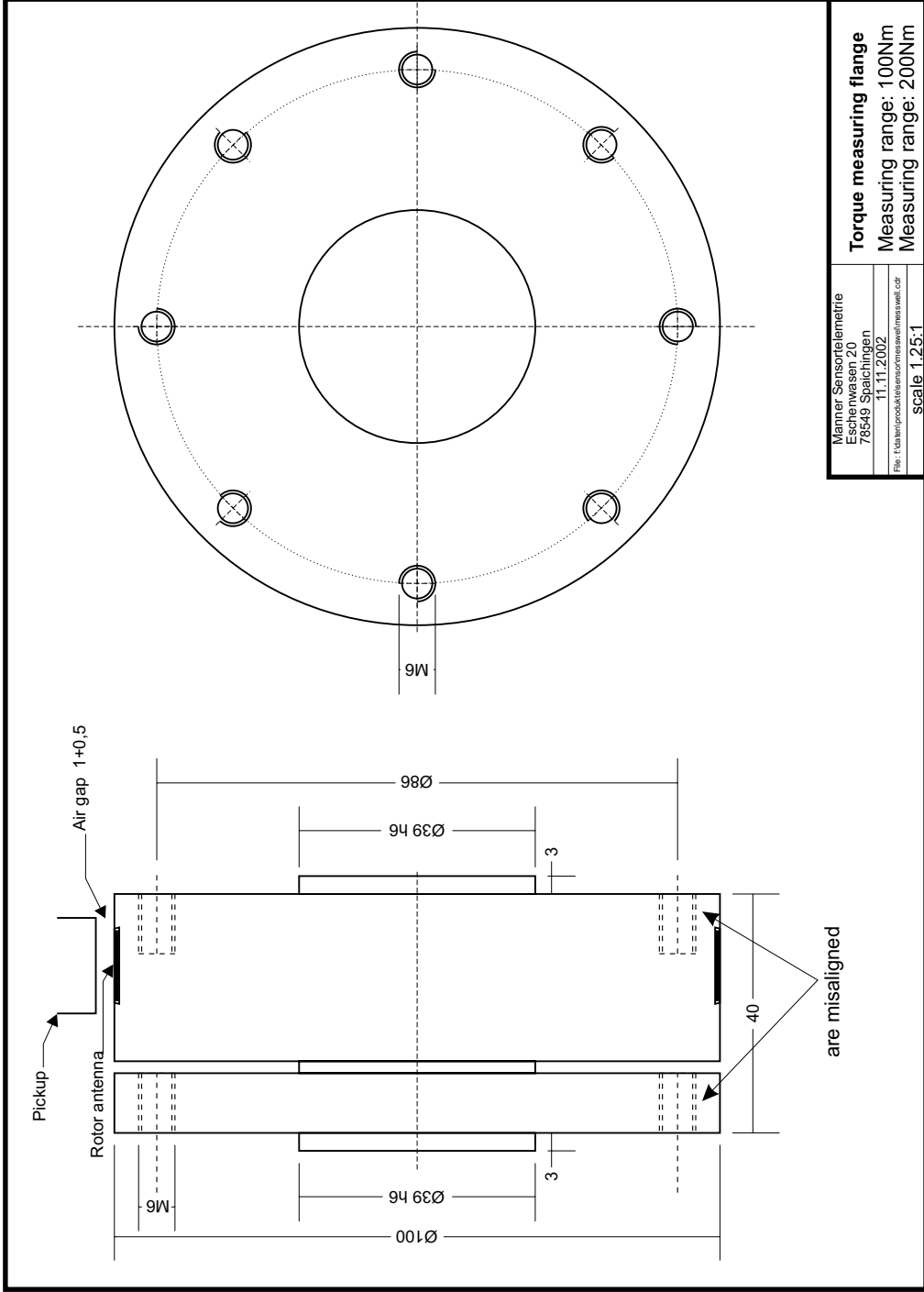
- test rigs
- industrial plants
- automobile measuring technology
- gearbox and engine measuring technology
- chemical engineering
- machine controls
- process controls
- rheometers
- agriculture
- ship's propulsions

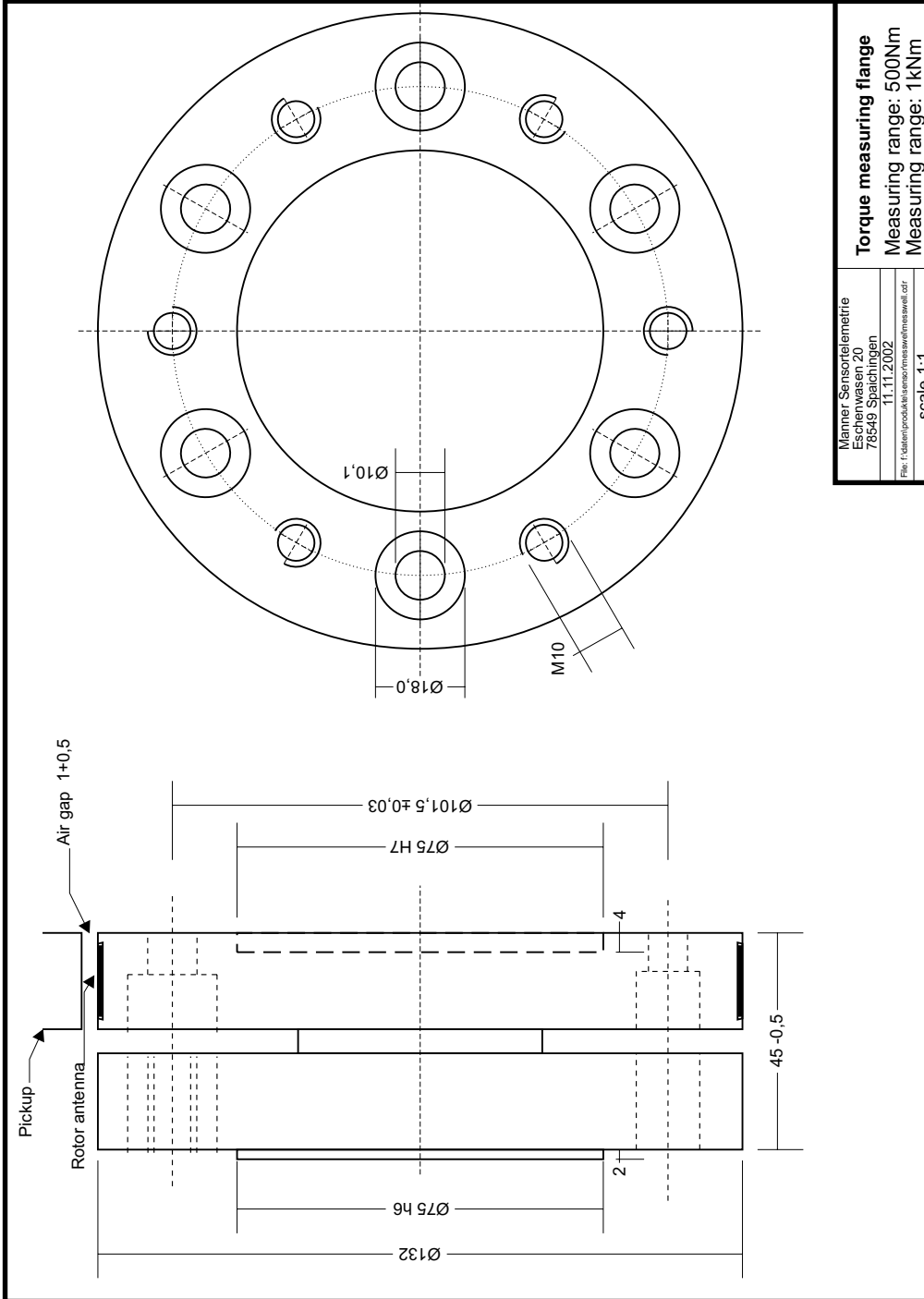


Mounting example for compact measuring flange



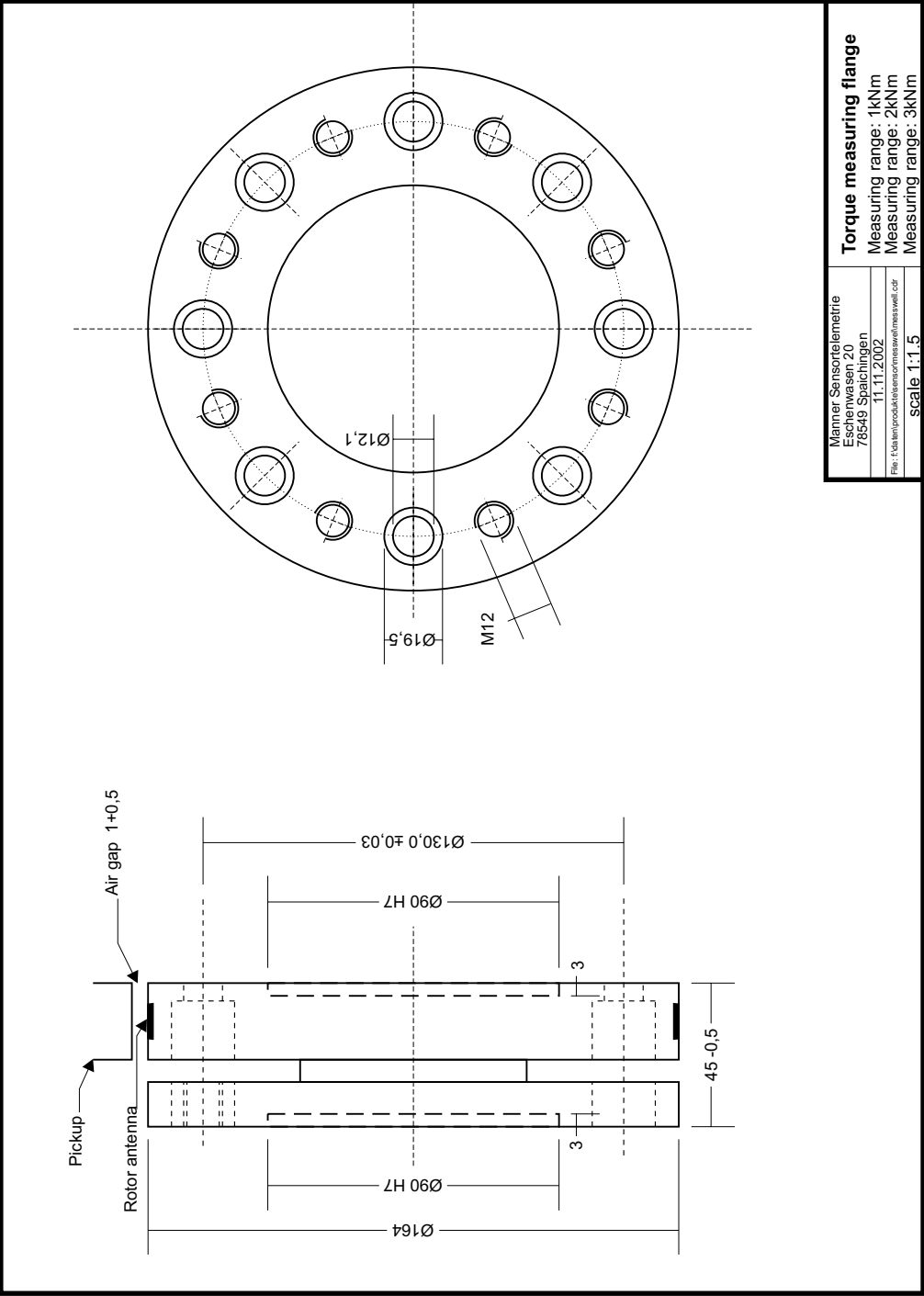
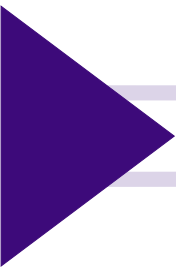


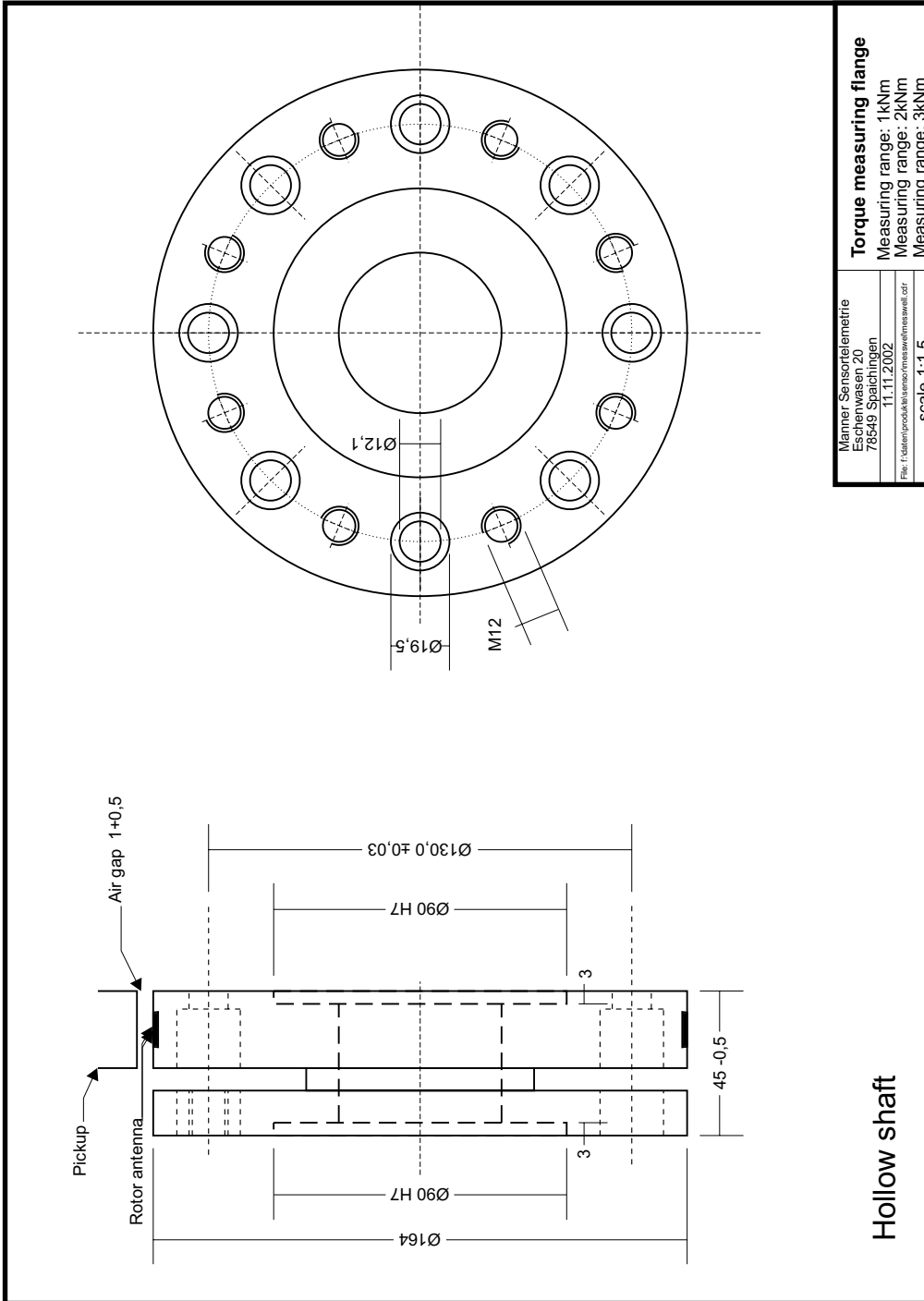


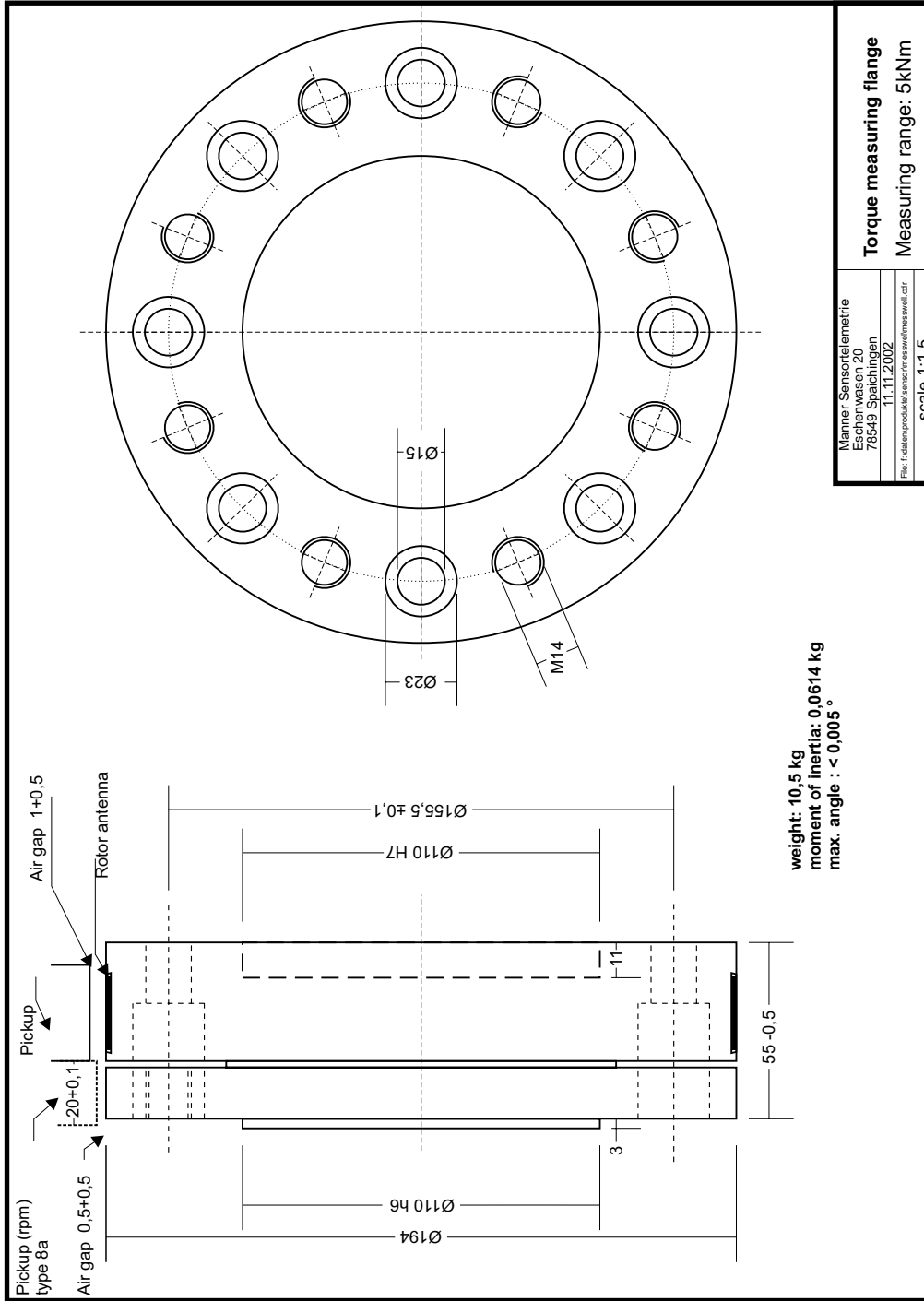


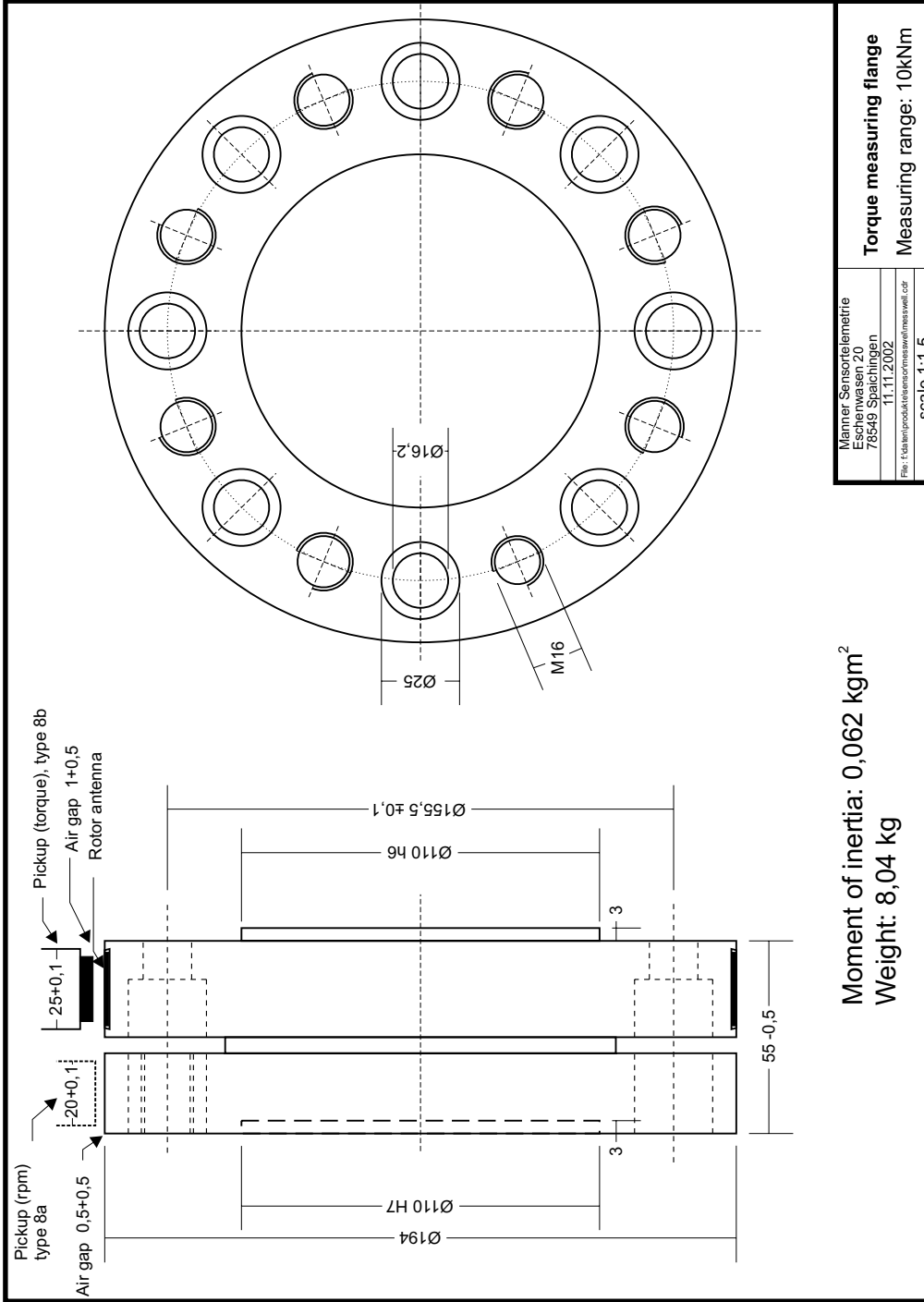
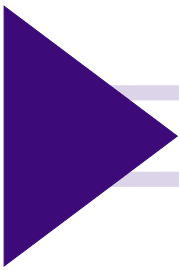
Manner Sensortelemetrie
 Fachgeschäft
 78549 Spachlingen
 11.11.2002
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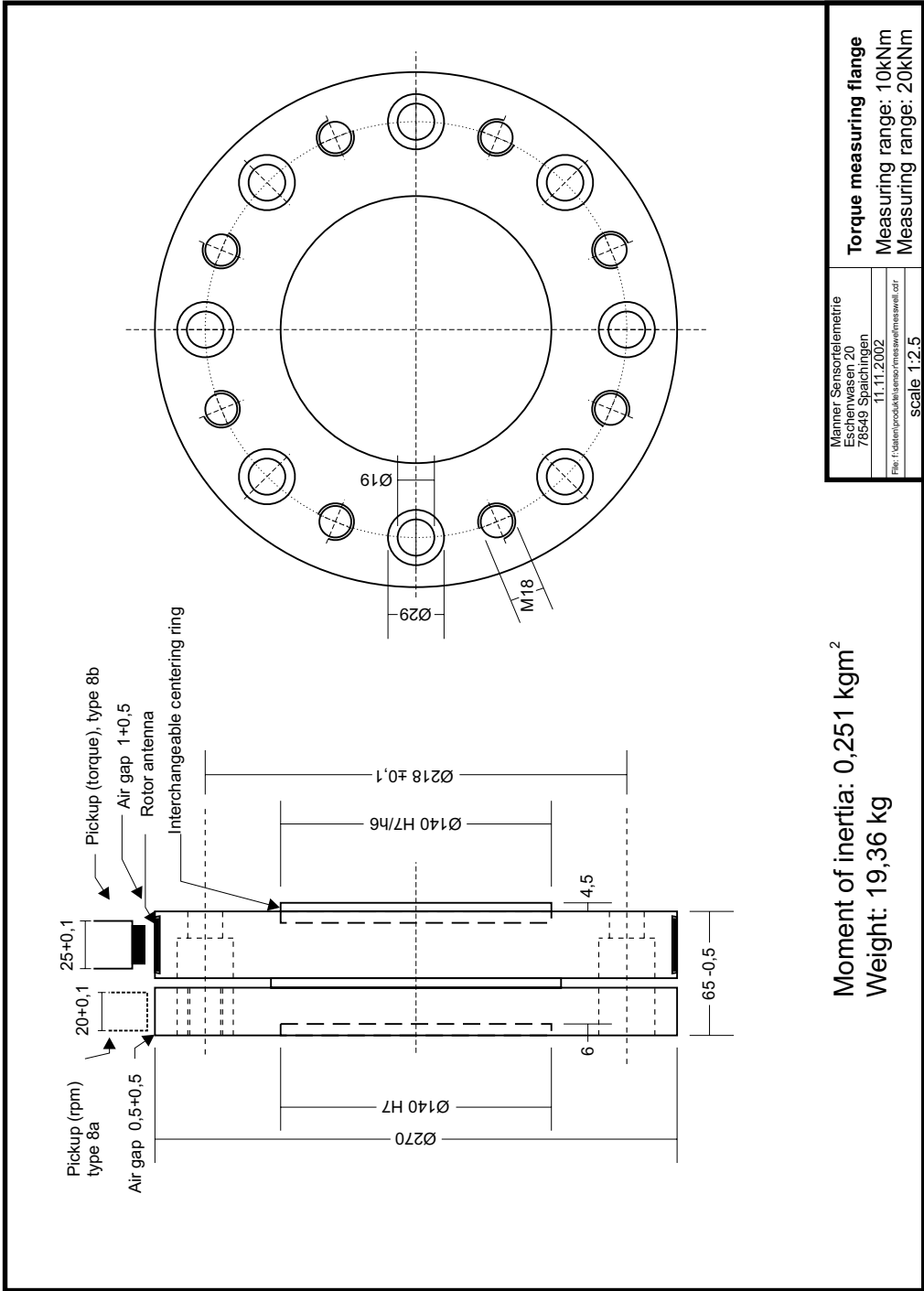
Torque measuring flange
 Measuring range: 500Nm
 Measuring range: 1kNm



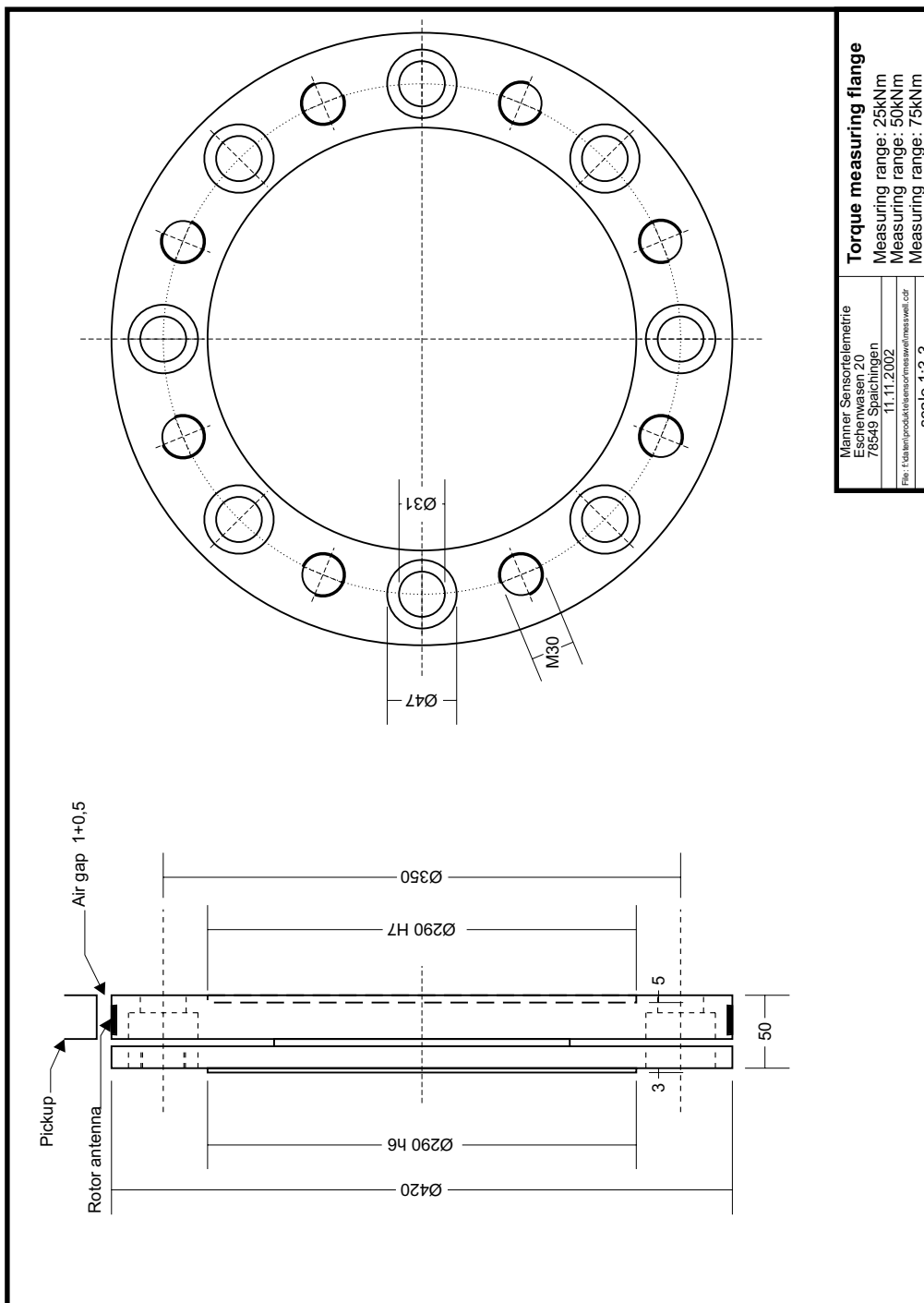
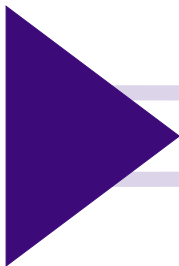


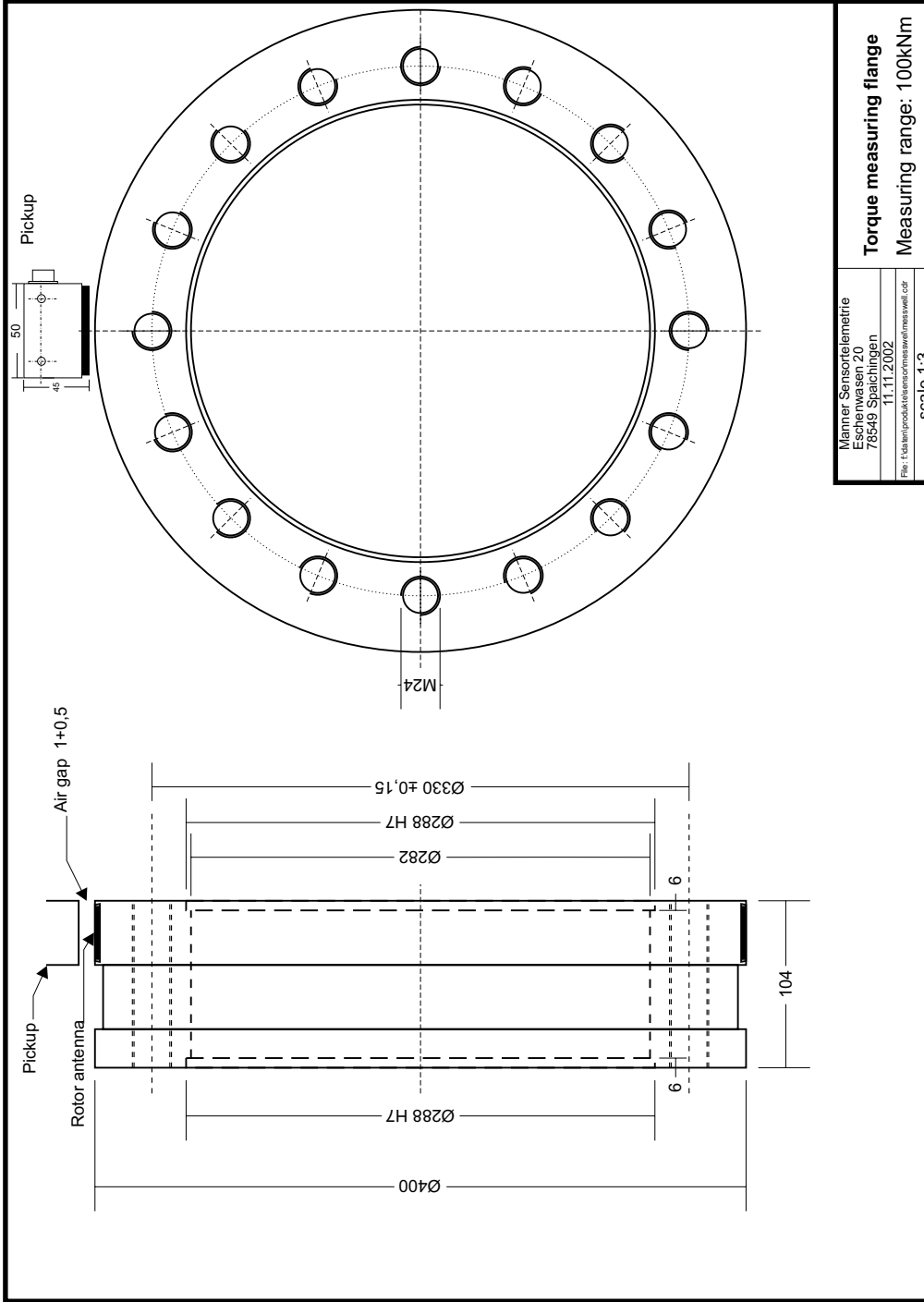







Moment of inertia: 0,251 kgm²
Weight: 19,36 kg





Manner Sensortechnik
 Schwanenweg 7
 78549 Spaichingen
 T. 11.2.002
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 scale 1:3

Torque measuring flange
 Measuring range: 100kNm



General data and formulae

Temperature ranges (ordering option temperature)

Standard temperature range: -25°C ... +85°C T085

Enlarged temperature range: -40°C ... +150°C T150

Variants (ordering option shaft type)

Solid shaft V0**

Hollow shaft V1**

Variants (ordering option rotational speed)

without rotational speed measurement V*0*

with rotational speed measurement:

toothed rim (number of teeth according to formula) V*1*

toothed rim with forward / backward recognition (") V*2*

magnet (1 pulse / revolution) V*3*

Formula for calculating the number of teeth (ordering option toothed rim)

$$\text{number of teeth} = \text{INT} \left(\frac{\text{outside diameter} - 2 * \text{module}}{\text{module}} \right)$$

with standard module = 1,5

The function INT calculates the next-smaller integer, if the result has a decimal behind the decimal point.

Precision classes (ordering option precision class)

Precision: < 0,3% V**0

Precision: < 0,1% V**1

Special designs

Special designs V999

Technical data

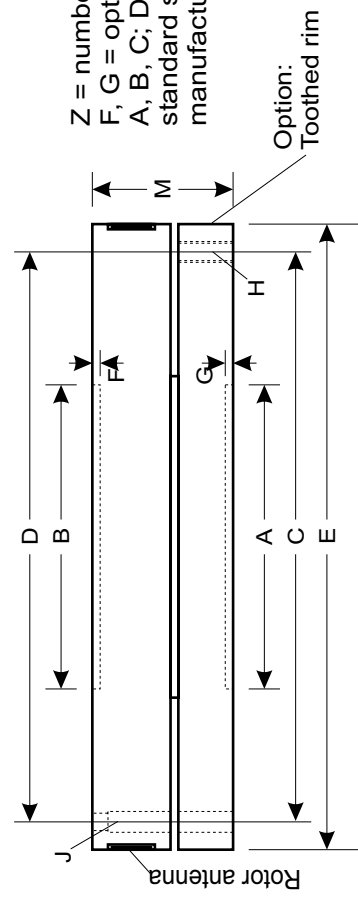
Nominal torque	Nm	50, 100, 200, 500, 1000, 2000, 3000, 5000, 10000, 20000, 50000, 100000
Precision class		<0,3% , 0,1%
Signal bandwidth	kHz	1, optional 10
Linearity deviation including hysteresis	%	0,3 , 0,1
Temperature influence per 10K referred to initial value (measuring value)	%	0,2 , 0,1 , optional 0,03
Temperature influence per 10K referred to initial value (zero point)	%	0,2 , 0,1 , optional 0,03
Temperature range	°C	-25 ... +85, optional -40 ... +150
Rotational speed	rpm	depending on measuring range, 0 ... 16000, optional 0 ... 20000
Rotational speed measurement	pulses / rev.	0, 1, depending on the size (see formula for number of teeth)
Static ultimate load	%	200
Static breaking load	%	400
Admissible bending moment (in % of nominal torque)	%	50
Admissible longitudinal force (in % of nominal torque)	N / Nm	7,5
Admissible shearing force (in % of nominal torque)	N / Nm	7,5
Twisting angle at nominal torque	degree	< 0,005
Protection type		IP42, optional IP67

Customized compact torque measuring flanges

Measuring range	Fit (mm) Ø A	Fit (mm) Ø B	Pitch circle (mm) Ø C	Pitch circle (mm) Ø D	Outside diameter (mm) Ø E	Length (mm) F	Length (mm) G	Thread (mm) H	Thread (mm) J	Length (mm) M	Number	Rotational speed (rpm)	Temperature range	Max. weight (kg)	Option: Toothed rim	Option: < x pulses/rev.	Option: 1 pulse/rev.	Option: Hollow shaft
50 Nm	30 H7	30 H7	47 ± 0.1	47 ± 0.1	78	1	1	M5	M5	40	8	16000		1.0	●	●	○	
100 Nm	39 h6	39 h6	86 ± 0.1	86 ± 0.1	100	3	3	M6	M6	40	8	14000		1.6	●	●	○	
200 Nm	39 h6	39 h6	86 ± 0.1	86 ± 0.1	100	3	3	M6	M6	40	8	14000		1.6	●	●	○	
500 Nm	75 H7	75 h6	101.5 ± 0.03	101.5 ± 0.03	132	3	2	M8	(M8)	45 - 0.5	6	8000		3.2	●	●	○	
1 kNm	90 H7	90 H7	130 ± 0.03	130 ± 0.03	164	4	4	M12	(M12)	45 - 0.5	6	8000		4.9	●	●	○	
2 kNm	90 H7 / h7	90 H7	130 ± 0.03	130 ± 0.03	164	4	4	M12	(M12)	45 - 0.5	8	8000		4.9	●	●	○	
3 kNm	90 H7 / h7	90 H7	130 ± 0.03	130 ± 0.03	164	4	4	M12	(M12)	45 - 0.5	8	8000		4.9	●	●	○	
5 kNm	110 H7	110 H7 / h6	155.5 ± 0.1	155.5 ± 0.1	194	4	4 / 4	M14	(M14)	60 - 0.5	8	4000		9.4	●	●	○	
10 kNm	140 H7	140 H7 / h6	218 ± 0.1	218 ± 0.1	270	6	6 / 4.5	M18	(M18)	65 - 0.5	8	2500		19.3	●	●	○	
20 kNm	140 H7	140 H7 / h6	218 ± 0.1	218 ± 0.1	270	6	6 / 4.5	M18	(M18)	65 - 0.5	8	2500		19.3	●	●	○	
25 kNm	290 h6	290 H7	350 ± 0.1	350 ± 0.1	420	3	5	M30	M30	50	8	1500		36.1	●	●	○	
50 kNm	175 H7	175 H7 / h6	328 ± 0.1	328 ± 0.1	380	7	7	M18	(M18)	90 - 0.5	16	1500		53.8	●	●	○	
100 kNm	288 H7	288 H7	330 ± 0.15	330 ± 0.15	400	6	6	M24	M24	104	16	1500		32.4	●	●	○	

○ not available
● available

Z = number of threads / bore holes
F, G = optional shaft or bore fit
A, B, C; D dimensions according to the standard series of the universal joint shaft manufacturers or customer wishes



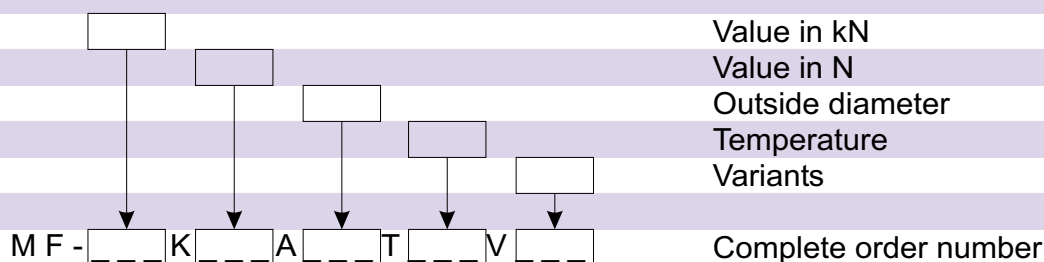
General technical data

Torque measuring flanges

Nominal torque	50Nm to 100kNm
Diameter	78mm to 420mm
Length	40mm to 104mm
Material property	salt- and acid-proof, corrosion-proof, high strength
Material density	~ 7,4
Rotational speed measurement	none // 1 pulse per revolution // x pulses per revolution
Weight	500g to 54kg

Ordering number

General data and formulae on the foregoing pages



Order number (example)

MF - 005K000A194T085V020

Measuring flange with 5kN , an outside diameter of 194cm ,
 an temperature range of up to 85°C, solid shaft,
 toothed rim with forward / backward recognition (127 teeth)
 and a precision of < 0,3%

Our competent engineering team will be happy to work out special torque measuring flanges or customized series products for you.

We reserve all rights to alter our products in accordance with technical improvements. The indicated data are only general and not binding.



www.systemtech.se

Tel: 013-35 70 30
 sales@systemtech.se
 Box 304 • 581 02 LINKÖPING