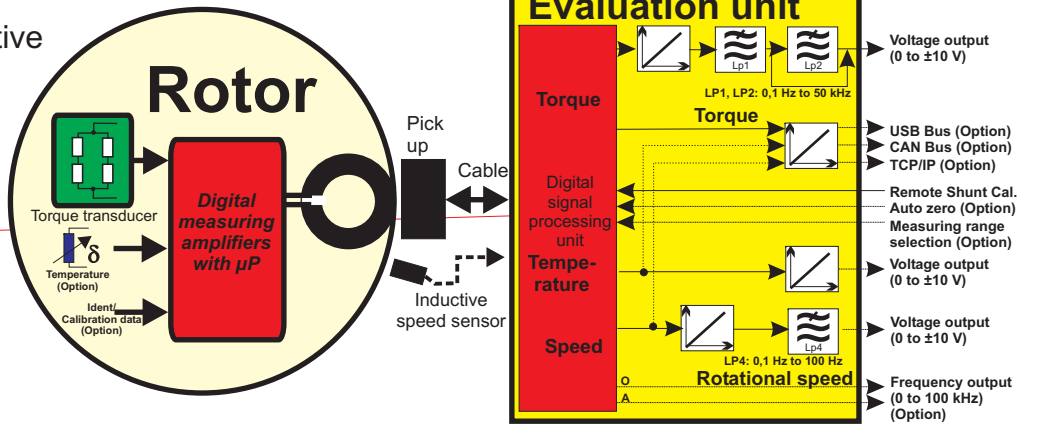
Special Torque Transducer

High Precise Dynamic Torque Meter for Propshaft

alternative



Supply 9 to 36 V DC
Output 0 to ±10V,
CAN, USB, Ethernet

Torque meter propshaft:

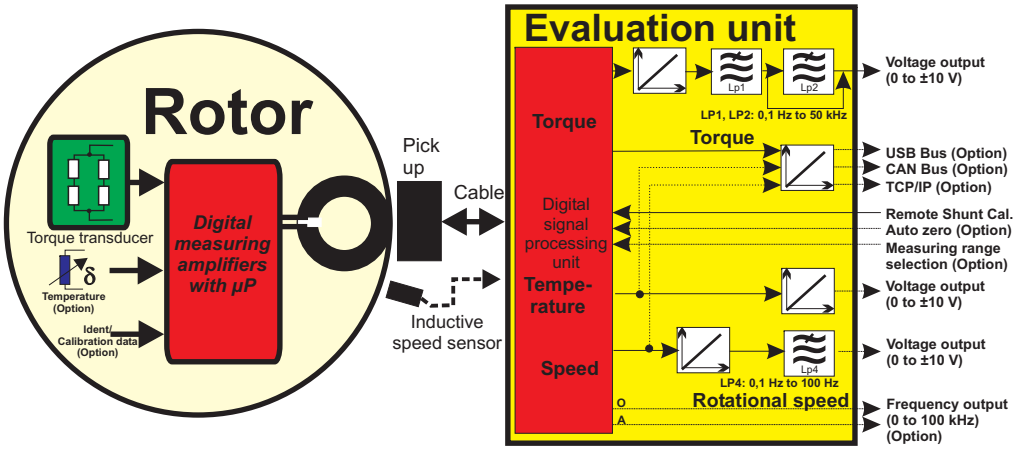
Torque ranges available: 1 Nm to 6 kNm
Linearity and hysteresis: < 0,1 %
High signal bandwidth 0 to 1 (10) kHz (-3 dB)
High reliable digital transmitting with 16 Bit resolution
Zerodrift / Gaindrift: 0,01 %/°C (0,002 %/°C optional))
Max. radial acceleration: 10000 g
Temperature range: -25 to + 160 °C
(Optional -40 to +160°C environmental temperature)
Optional speed acquisition
Optional additional temperature acquisition channel for E-modul drift compensation
Supply receiver: 9 to 36 V DC, 300 mA
Output voltage: 0 to ±10 V, USB, CAN-Bus, Ethernet

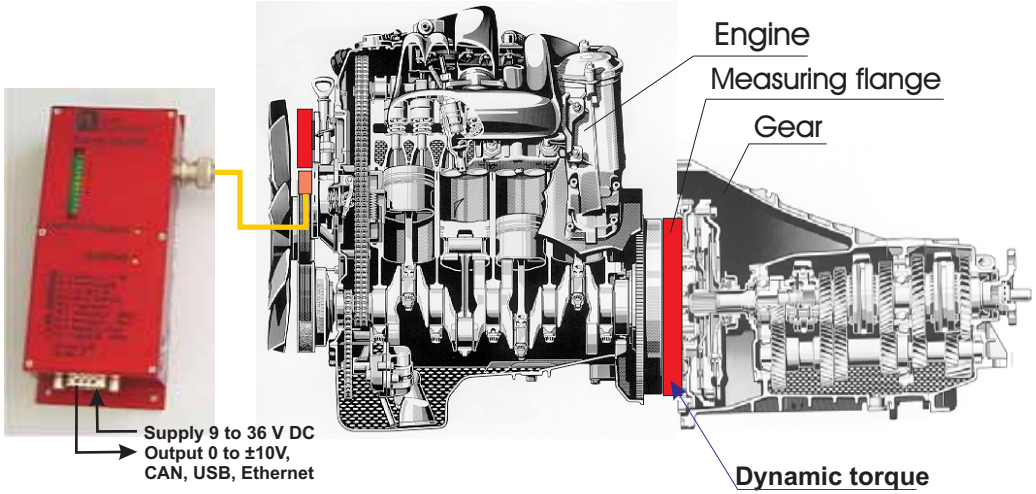
Type: MWP_<range>_ <accuracy>_<temp>_<6.3>_<PCM16>_<bandwidth>_<rmc>_oil_<Dz>

1 kNm	0,25	85	10 Hz	-	-
to	0,1	125	100 Hz	RC	1
6 kNm		160	1 kHz		60
			10 kHz		

MANNER® Sensortelemetrie

High Precise Torque Measuring Disk between Engine and Gear (Flexplate)





Torque meter Flexplate:

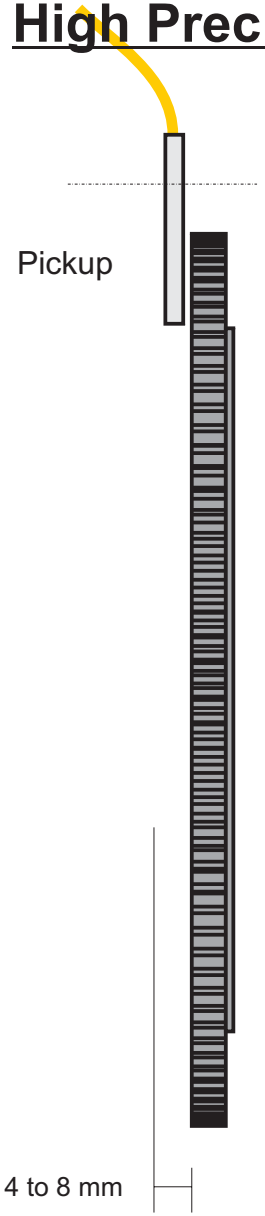
Torque ranges available: 500 Nm to 2000 Nm
Linearity and hysteresis: < 0,1 %
High signal bandwidth 0 to 1 (10) kHz (-3 dB)
High reliable digital transmitting with 16 Bit resolution
Zerodrift / Gaindrift: 0,01 %/°C (0,003 %/°C optional))
Max. radial acceleration: 10000 g
Temperature range: -25 to + 125 °C
(Optional -40 to +160°C environmental temperature)
Optional speed acquisition
Optional additional temperature acquisition channel for E-modul drift compensation
Supply receiver: 9 to 36 V DC, 300 mA
Output voltage: 0 to ±10 V, USB, CAN-Bus, Ethernet

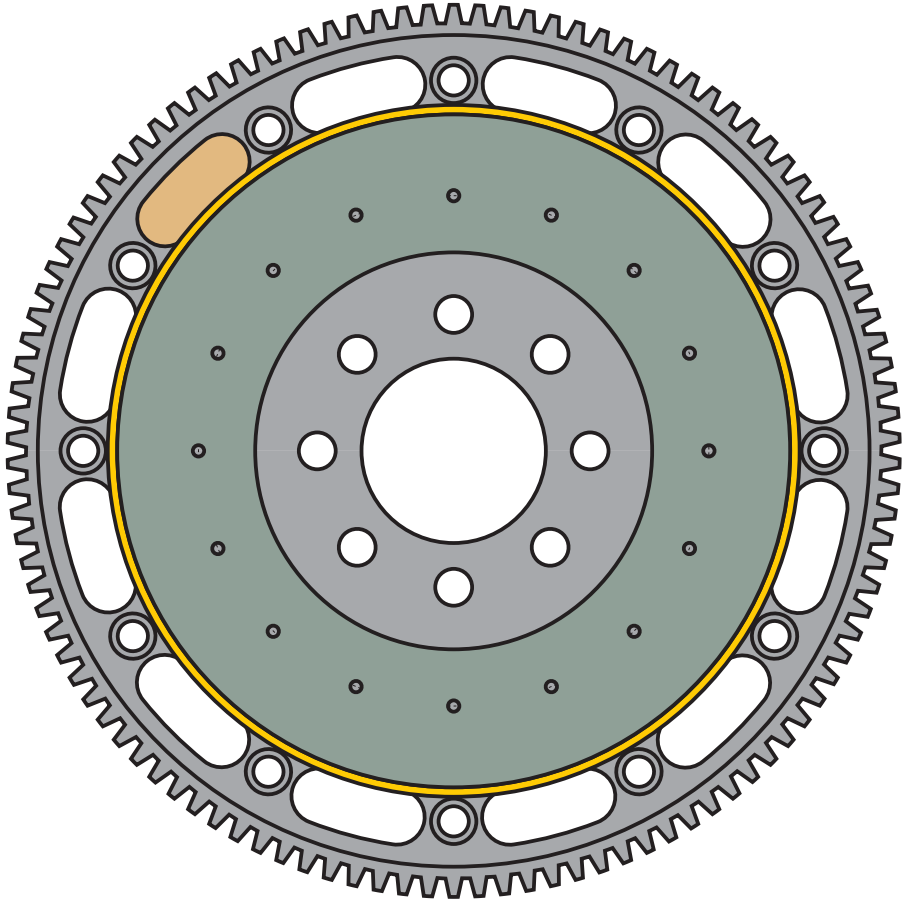
Type: MWF>_<range>_ <accuracy>_<temp>_<6.3>_<PCM16>_<bandwidth>_<rmc>_oil_<Dz>_<T>

500 Nm	0,25	85	10 Hz	-	1	-
to	0,1	125	100 Hz	RC	120	1
2000 Nm		160	1 kHz			
			10 kHz			

MANNER® Sensortelemetrie

High Precise Torque Measuring Disk between Engine and Gear (Flexplate)





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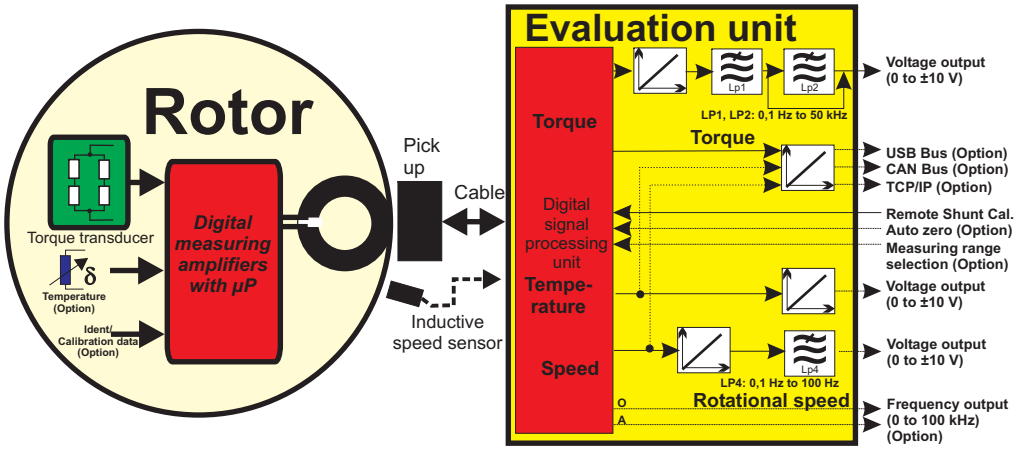
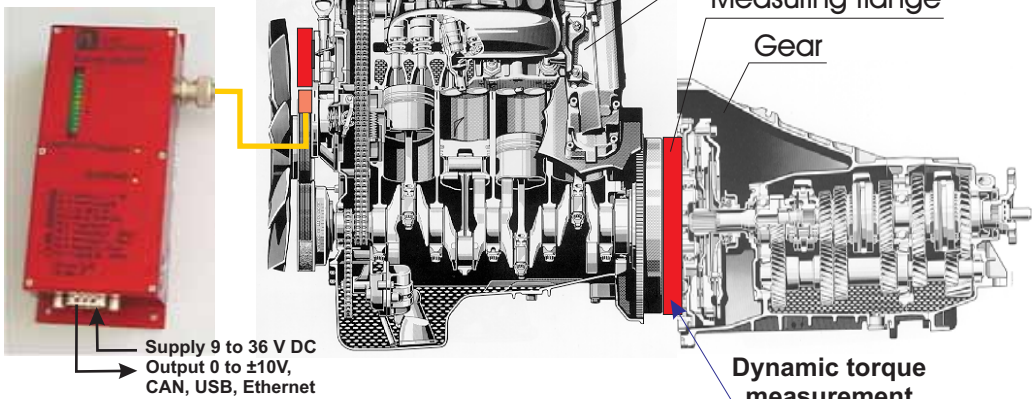
High Precise Torque Measuring Disk between Engine and Gear (Double-mass Flywheel)





Torque Meter Double-Mass Flywheel:

Torque ranges available: 500 Nm to 2000 Nm
Linearity and hysteresis: < 0,1 %
High signal bandwidth 0 to 1 (10) kHz (-3 dB)
High reliable digital transmitting with 16 Bit resolution
Zerodrift / Gaindrift: 0,01 %/°C (0,003 %/°C optional))
Max. radial acceleration: 10000 g
Temperature range: -25 to + 125 °C
(Optional -40 to +160°C environmental temperature)
Optional speed acquisition
Optional additional temperature acquisition channel for E-modul drift compensation
Supply receiver: 9 to 36 V DC, 300 mA
Output voltage: 0 to ±10 V, USB, CAN-Bus, Ethernet

Type: MWT_<range>_ <accuracy>_<temp>_<6.3>_<PCM16>_<bandwidth>_<rmc>_oil_<Dz>_<T>

500 Nm	0,25	85	10 Hz	-	1	-
to	0,1	125	100 Hz	RC	120	1
2000 Nm		160	1 kHz			
			10 kHz			

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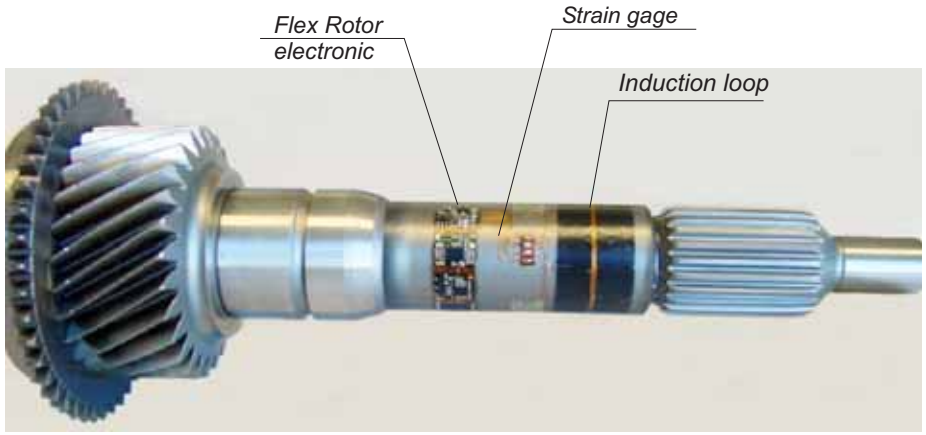
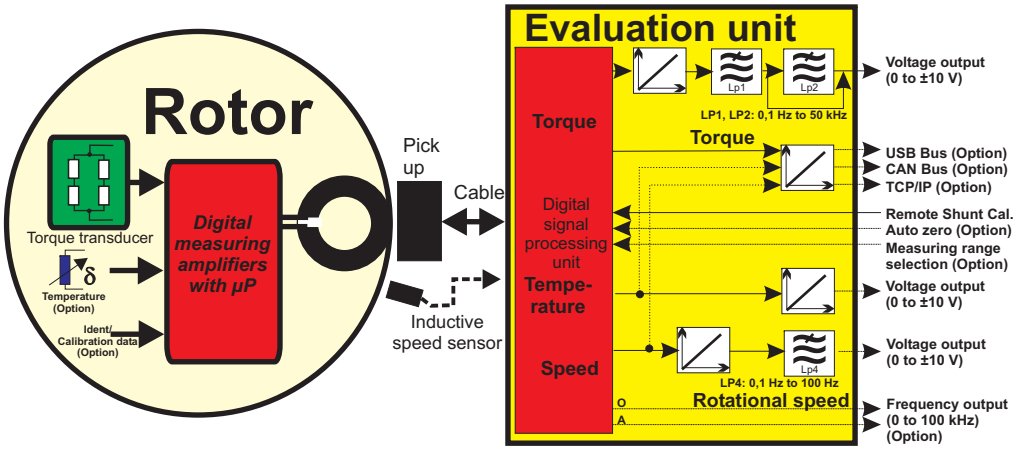
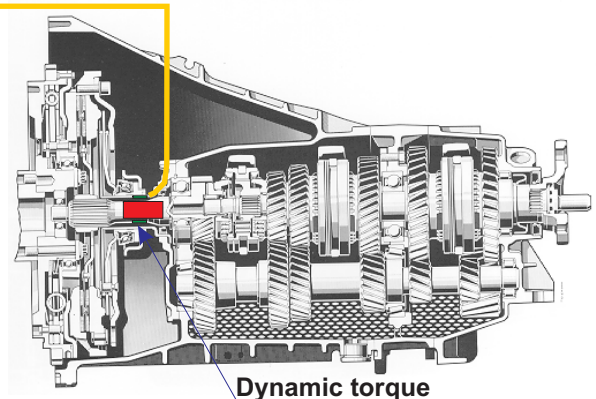
Torque Measuring at Gear Input Shaft





Supply 9 to 36 V DC
Output 0 to ±10V,
CAN, USB, Ethernet



Dynamic torque measurement at Input shaft

Torque Meter Input Shaft:

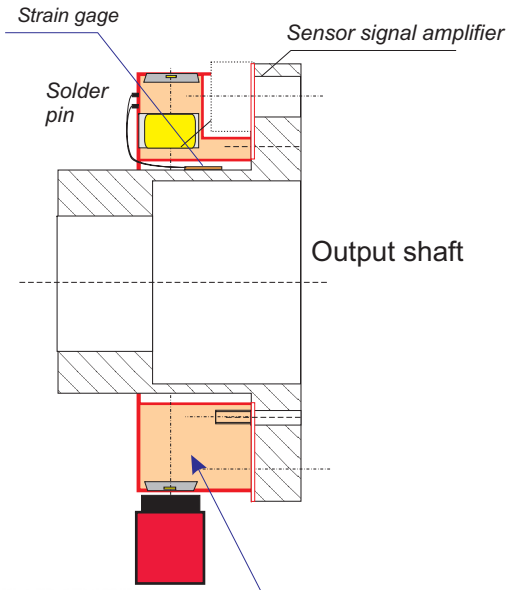
Torque ranges available: 500 Nm to 2000 Nm
Linearity and hysteresis: < 0,1 %
High signal bandwidth 0 to 1 (10) kHz (-3 dB)
High reliable digital transmitting with 16 Bit resolution
Zerodrift / Gaindrift: 0,01 %/°C (0,003 %/°C optional))
Max. radial acceleration: 10000 g
Temperature range: -25 to + 125 °C
(Optional -40 to +160°C environmental temperature)
Optional speed acquisition
Optional additional temperature acquisition channel for E-modul drift compensation
Supply receiver: 9 to 36 V DC, 300 mA
Output voltage: 0 to ±10 V, USB, CAN-Bus, Ethernet

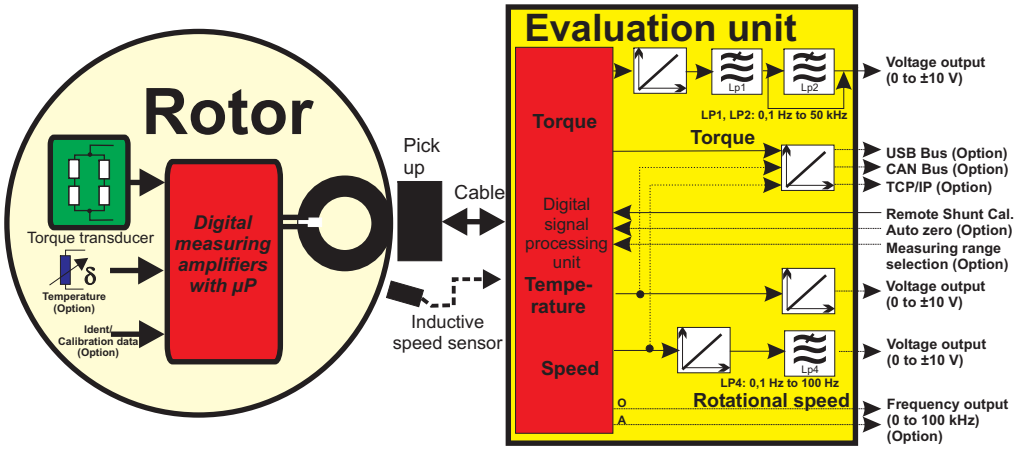
Type: MWGI_<range>_ <accuracy>_<temp>_<6.3>_<PCM16>_<bandwidth>_<rmc>_oil_<Dz>_<T>

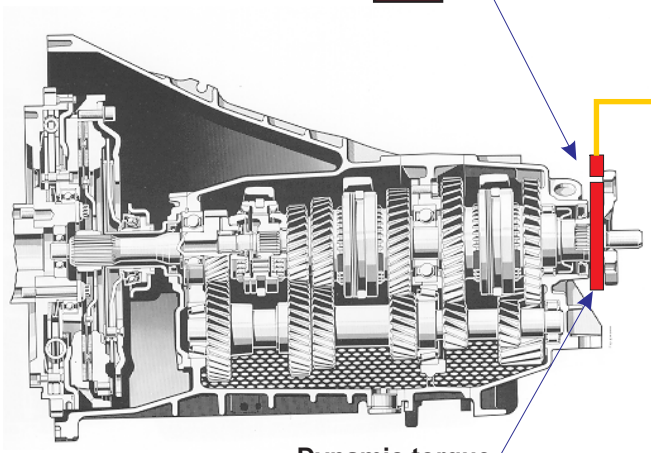
500 Nm	0,25	85	10 Hz	-	1	-
to	0,1	125	100 Hz	RC	120	1
2000 Nm		160	1 kHz			
			10 kHz			

MANNER® Sensortelemetrie

Torque Measuring at Gear Output Shaft







Dynamic torque measurement at output shaft

Supply 9 to 36 V DC
Output 0 to ±10V,
CAN, USB, Ethernet

Torque Meter Output Shaft:

Torque ranges available: 1000 Nm to 6000 Nm
Linearity and hysteresis: < 0,1 %
High signal bandwidth 0 to 1 (10) kHz (-3 dB)
High reliable digital transmitting with 16 Bit resolution
Zerodrift / Gaindrift: 0,01 %/°C (0,003 %/°C optional))
Max. radial acceleration: 10000 g
Temperature range: -25 to + 125 °C
(Optional -40 to +160°C environmental temperature)
Optional speed acquisition
Optional additional temperature acquisition channel for E-modul drift compensation
Supply receiver: 9 to 36 V DC, 300 mA
Output voltage: 0 to ±10 V, USB, CAN-Bus, Ethernet

Type: MWGO_<range>_ <accuracy>_<temp>_<6.3>_<PCM16>_<bandwidth>_<rmc>_oil_<Dz>_<T>

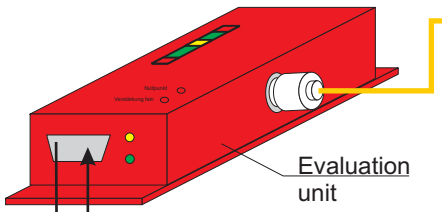
500 Nm	0,25	85	10 Hz	-	1	-
to	0,1	125	100 Hz	RC	120	1
2000 Nm		160	1 kHz			
			10 kHz			

MANNER® Sensortelemetrie

Dynamic Troque Measurement at an Engine

Dynamic torque measurement at camshaft

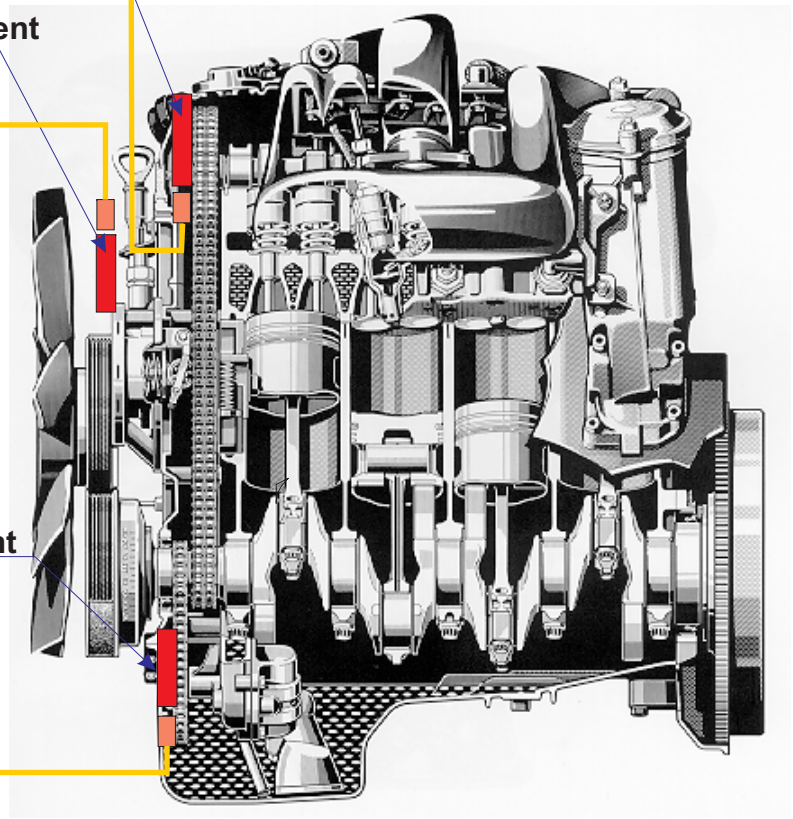
Dynamic torque measurement at generator



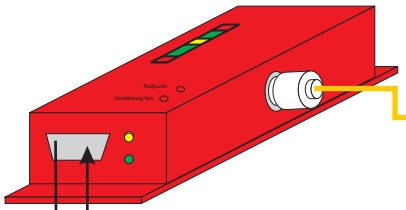
Evaluation unit

Supply 9 to 36 V DC

Output 0 to ±10V

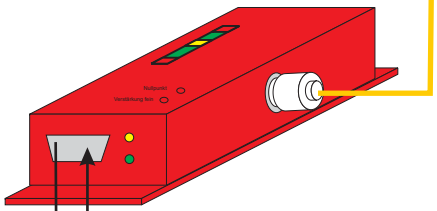


Dynamic torque measurement at oil pump



Supply 9 to 36 V DC

Output 0 to ±10V



Supply 9 to 36 V DC

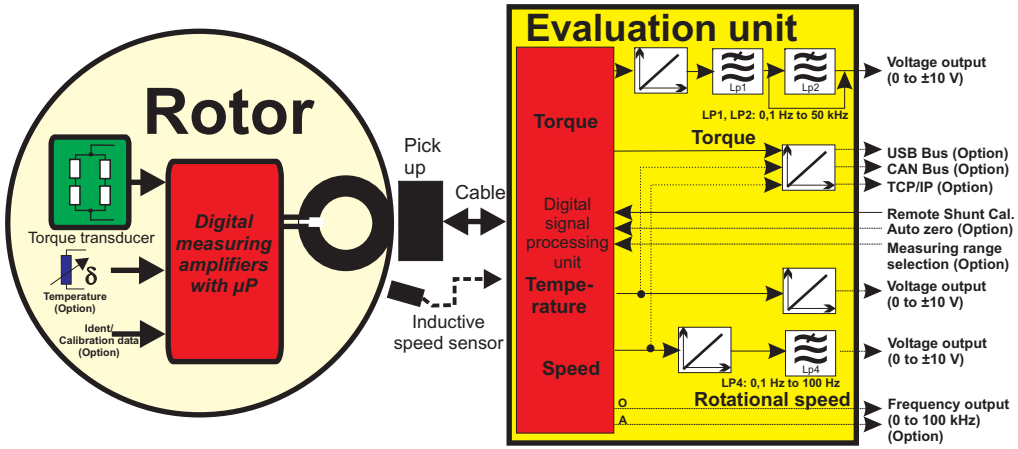
Output 0 to ±10V

Technical Data:

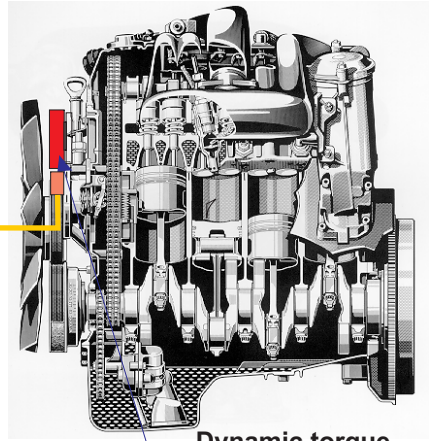
Transducer: strain gages, torque
Transmitting: PCM (pulse code modulation), inductive
Resolution: 16 Bit
Bandwidth: 1 kHz (-3dB)
Enviromental temperature: -30 to 160°C

MANNER® Sensortelemetrie

High Precise Dynamic Torque Acquisition Pulley Climate Compressor



Supply 9 to 36 V DC
Output 0 to ±10V,
CAN, USB, Ethernet



Dynamic torque measurement at climate compressor

Torque Meter Climate Compressor:

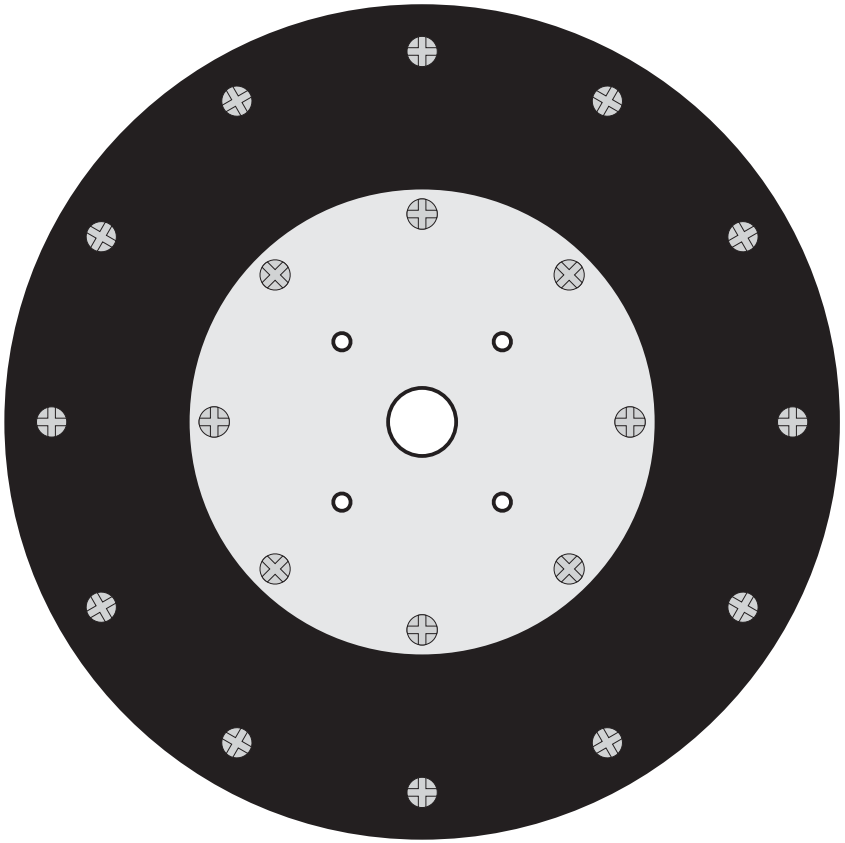
Torque ranges available: 5 Nm to 200 Nm
Linearity and hysteresis: < 0,1 %
High signal bandwidth 0 to 1 (10) kHz (-3 dB)
High reliable digital transmitting with 16 Bit resolution
Zerodrift / Gaindrift: 0,01 %/°C (0,003 %/°C optional))
Max. radial acceleration: 10000 g
Temperature range: -25 to + 125 °C
(Optional -40 to +160°C environmental temperature)
Optional speed acquisition
Optional additional temperature acquisition channel for E-modul drift compensation
Supply receiver: 9 to 36 V DC, 300 mA
Output voltage: 0 to ±10 V, USB, CAN-Bus, Ethernet

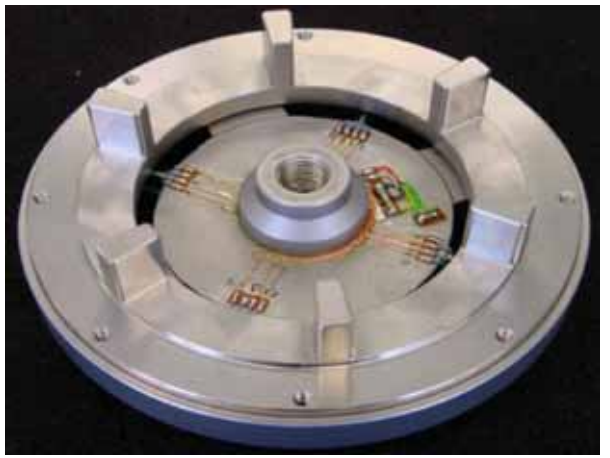
Type: MWC_<range>_ <accuracy>_<temp>_<6.3>_<PCM16>_<bandwidth>_<rmc>_oil_<Dz>_<T>

5 Nm	0,25	85	10 Hz	-	1	-
to	0,1	125	100 Hz	RC	120	T
200 Nm		160	1 kHz			
			10 kHz			

MANNER® Sensortelemetrie

Pulley for Climate Compressor





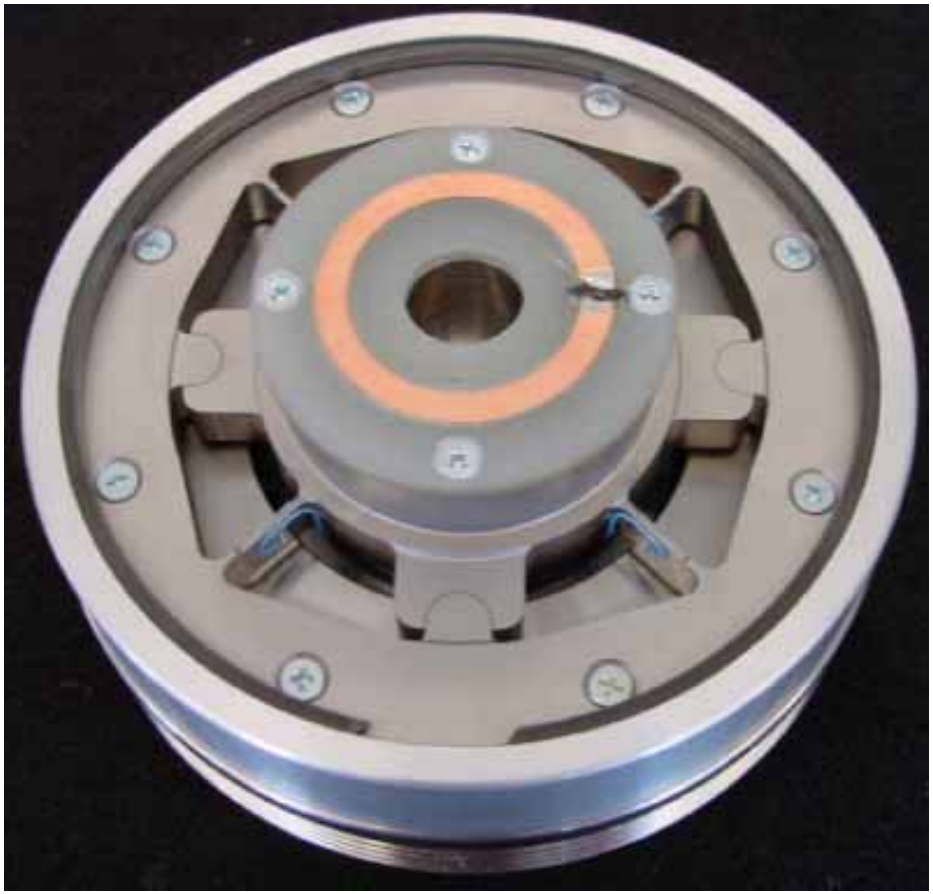
28,5

MANNER® Sensortelemetrie

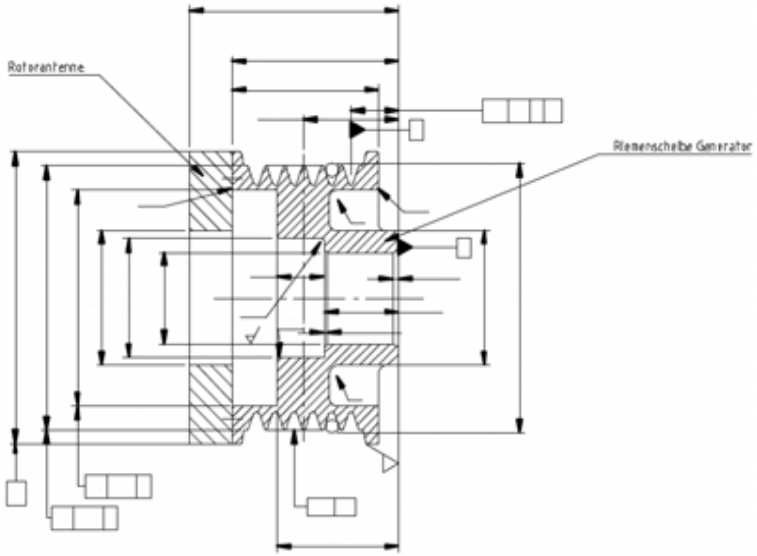
Integrated Torque Limiter for Pulley Climate Compressor

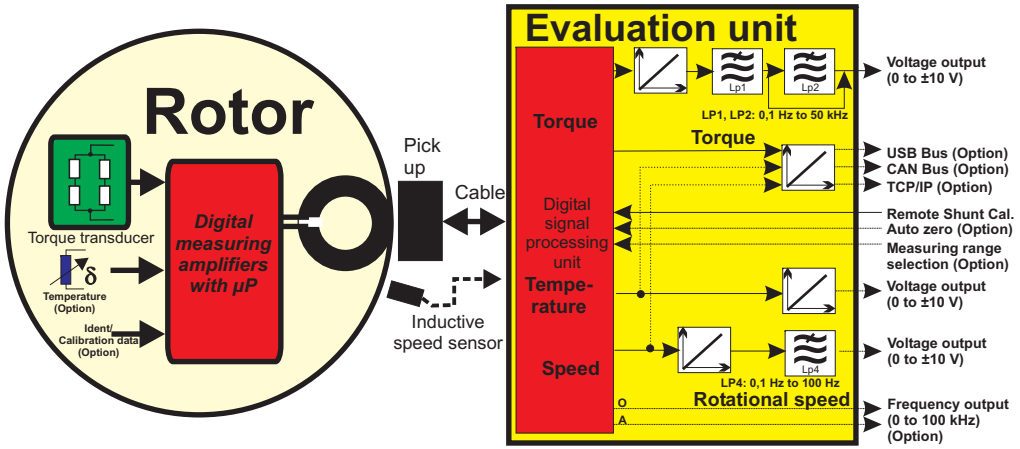
Calsonic-Climate Compressor

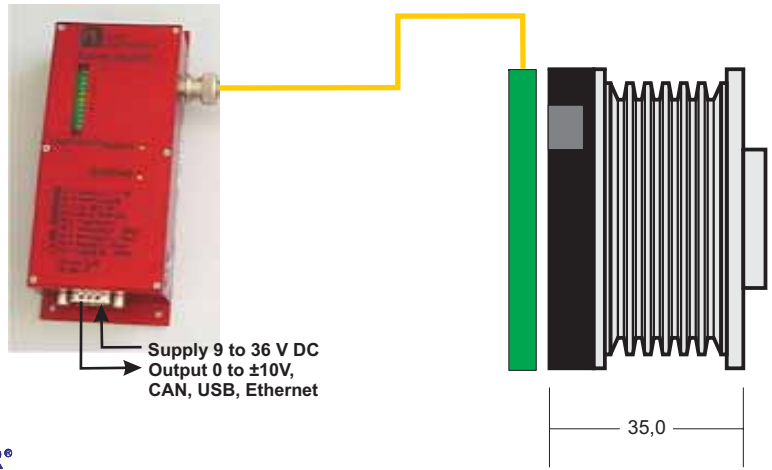
Denso-Climate Compressor



Torque Meter Pulley for Generator







Torque Meter Pulley Generator:

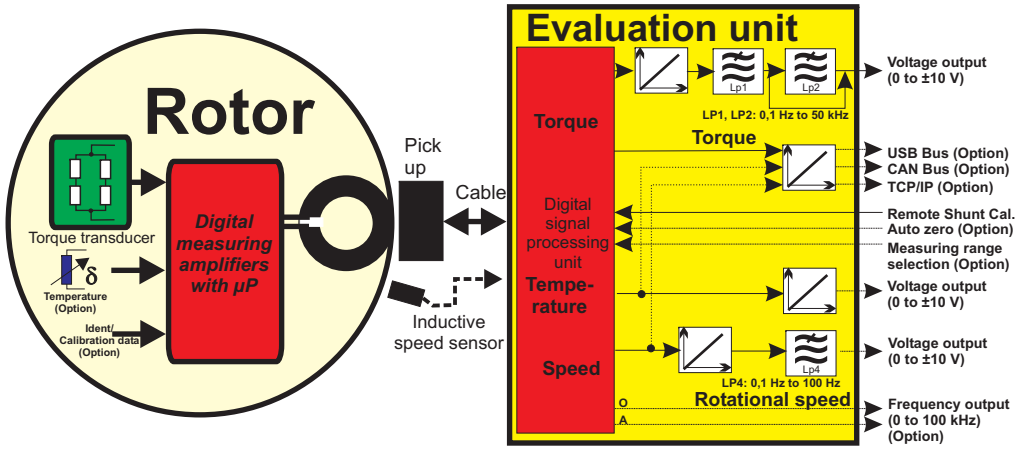
Torque ranges available: 5 Nm to 200 Nm
Linearity and hysteresis: < 0,1 %
High signal bandwidth 0 to 1 (10/40) kHz (-3 dB)
High reliable digital transmitting with 16 Bit resolution
Zerodrift / Gaindrift: 0,01 %/°C (0,003 %/°C optional))
Max. radial acceleration: 10000 g
Temperature range: -25 to + 125 °C
(Optional -40 to +160°C environmental temperature)
Optional speed acquisition
Optional additional temperature acquisition channel for E-modul drift compensation
Supply receiver: 9 to 36 V DC, 300 mA
Output voltage: 0 to ±10 V, USB, CAN-Bus, Ethernet

Type: MWN_<range>_ <accuracy>_<temp>_<6.3>_<PCM16>_<bandwidth>_<rmc>_oil_<Dz>_<T>

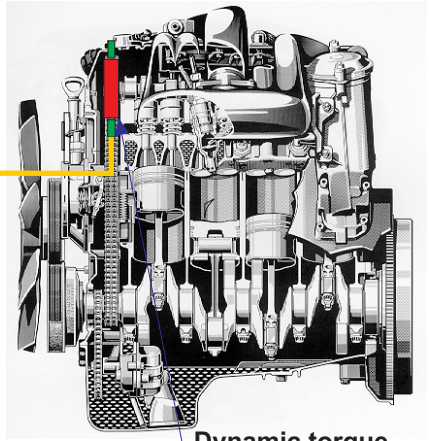
5 Nm	0,25	85	10 Hz	-	-	-	
to	0,1	125	100 Hz	RC	1	T	
100 Nm		160	1 kHz		68		
			10 kHz				
			40 kHz				

MANNER® Sensortelemetrie

High precise dynamic Torque Acquisition on Camshaft



Supply 9 to 36 V DC
Output 0 to ±10V,
CAN, USB, Ethernet



Dynamic torque measurement at climate compressor

Torque Meter Climate Compressor:

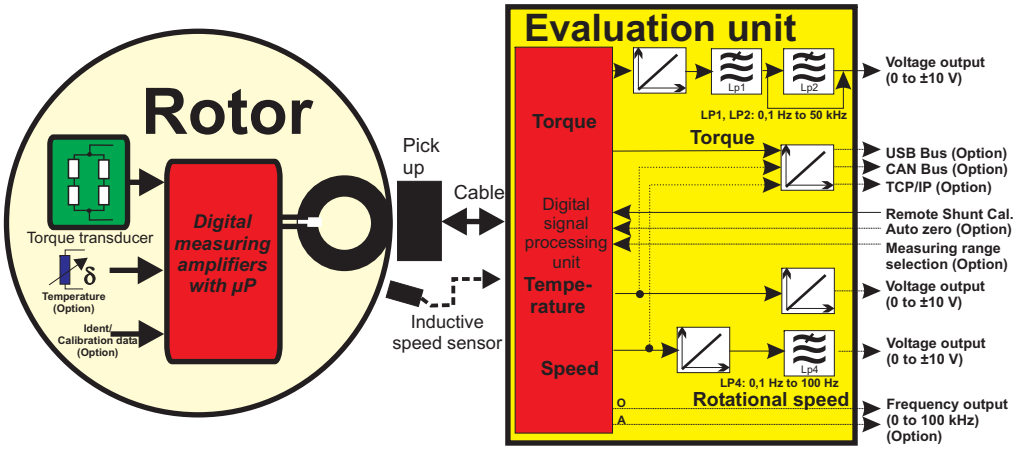
Torque ranges available: 5 Nm to 200 Nm
Linearity and hysteresis: < 0,1 %
High signal bandwidth 0 to 1 (10) kHz (-3 dB)
High reliable digital transmitting with 16 Bit resolution
Zerodrift / Gaindrift: 0,01 %/°C (0,003 %/°C optional))
Max. radial acceleration: 10000 g
Temperature range: -25 to + 125 °C
(Optional -40 to +160°C environmental temperature)
Optional speed acquisition
Optional additional temperature acquisition channel for E-modul drift compensation
Supply receiver: 9 to 36 V DC, 300 mA
Output voltage: 0 to ±10 V, USB, CAN-Bus, Ethernet

Type: MWN_<range>_ <accuracy>_<temp>_<6.3>_<PCM16>_<bandwidth>_<rmc>_oil_<Dz>_<T>

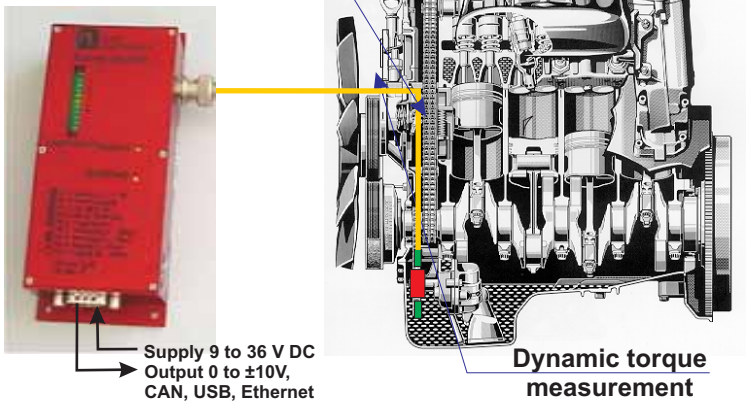
5 Nm	0,25	85	10 Hz	-	-	-	
to	0,1	125	100 Hz	RC	1	T	
100 Nm		160	1 kHz		68		
			10 kHz				
			40 kHz				

MANNER® Sensortelemetrie

High precise dynamic Torque Acquisition Oil Pump



Dynamic torque measurement at oil pump



Torque meter Oil pump:

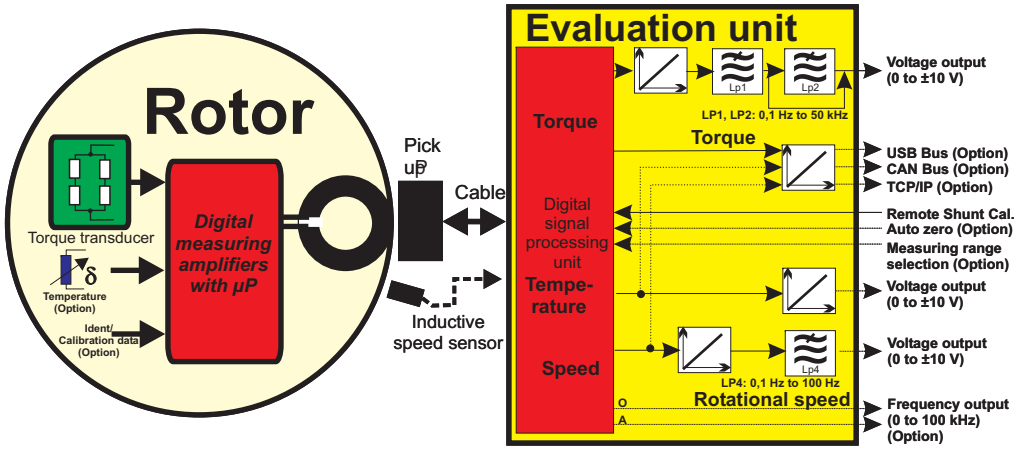
Torque ranges available: 5 Nm to50 Nm
Linearity and hysteresis: < 0,1 %
High signal bandwidth 0 to 1 (10) kHz (-3 dB)
High reliable digital transmitting with 16 Bit resolution
Zerodrift / Gaindrift: 0,01 %/°C (0,003 %/°C optional))
Max. radial acceleration: 10000 g
Temperature range: -25 to + 125 °C
(Optional -40 to +160°C environmental temperature)
Optional speed acquisition
Optional additional temperature acquisition channel for E-modul drift compensation
Supply receiver: 9 to 36 V DC, 300 mA
Output voltage: 0 to ±10 V, USB, CAN-Bus, Ethernet

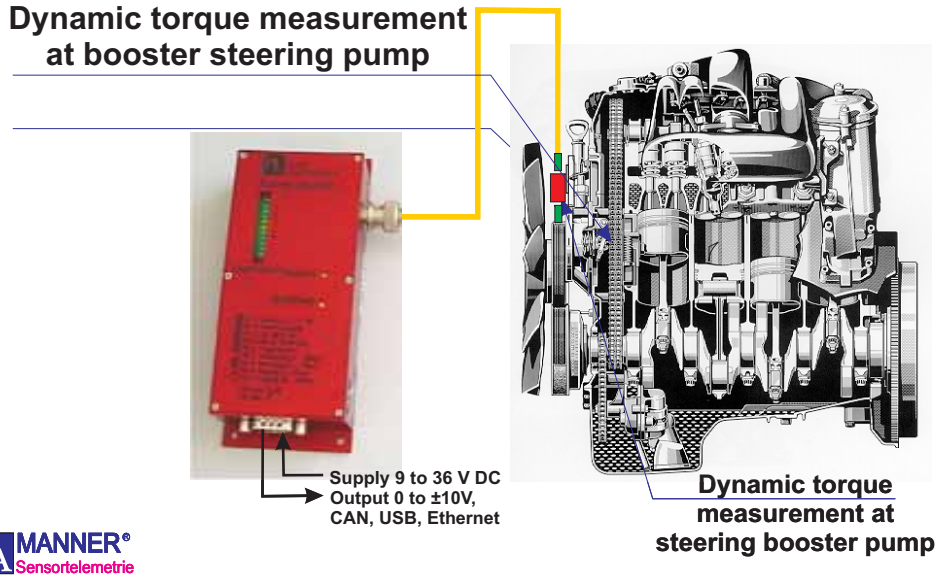
Type: MWO_<range>_ <accuracy>_<temp>_<6.3>_<PCM16>_<bandwidth>_<rmc>_oil_<Dz>_<T>

5 Nm	0,25	85	10 Hz	-	-	-	
to	0,1	125	100 Hz	RC	1	T	
100 Nm		160	1 kHz		68		
			10 kHz				
			40 kHz				

MANNER® Sensortelemetrie

High precise dynamic Torque Acquisition Steering Booster Pump





Torque Meter steering Booster Pump:

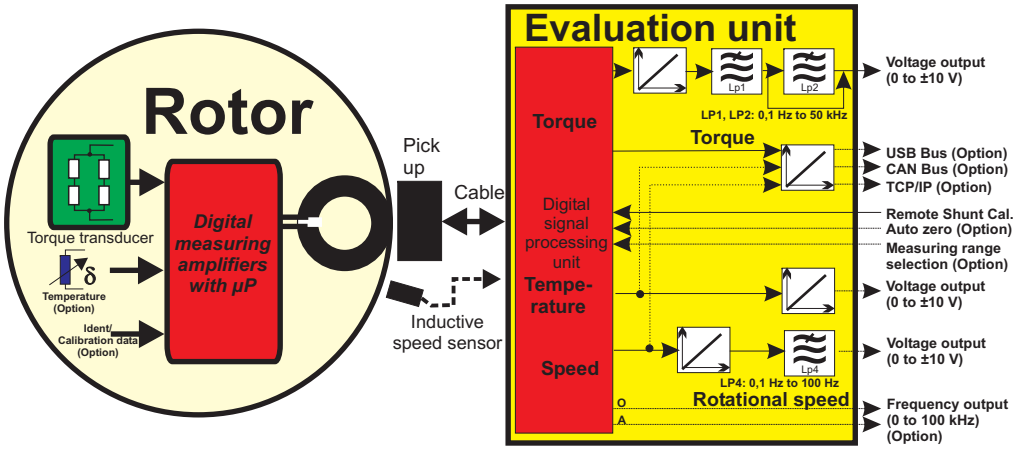
Torque ranges available: 5 Nm to50 Nm
Linearity and hysteresis: < 0,1 %
High signal bandwidth 0 to 1 (10) kHz (-3 dB)
High reliable digital transmitting with 16 Bit resolution
Zerodrift / Gaindrift: 0,01 %/°C (0,003 %/°C optional))
Max. radial acceleration: 10000 g
Temperature range: -25 to + 125 °C
(Optional -40 to +160°C environmental temperature)
Optional speed acquisition
Optional additional temperature acquisition channel for E-modul drift compensation
Supply receiver: 9 to 36 V DC, 300 mA
Output voltage: 0 to ±10 V, USB, CAN-Bus, Ethernet

Type: MWL_<range>_ <accuracy>_<temp>_<6.3>_<PCM16>_<bandwidth>_<rmc>_oil_<Dz>_<T>

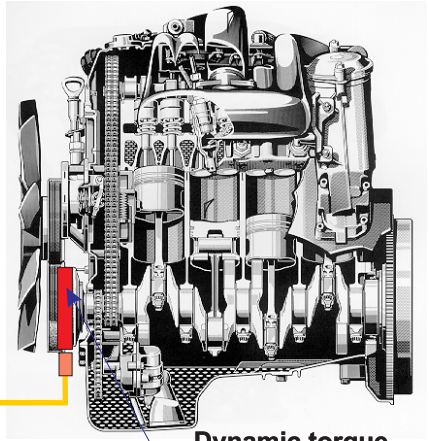
5 Nm	0,25	85	10 Hz	-	-	-	
to	0,1	125	100 Hz	RC	1	T	
100 Nm		160	1 kHz		68		
			10 kHz				
			40 kHz				

MANNER® Sensortelemetrie

High precise dynamic Torque Acquisition at Pulley Crankshaft with integrated Damper



Supply 9 to 36 V DC
Output 0 to ±10V,
CAN, USB, Ethernet



Dynamic torque measurement at steering booster pump

Torque Meter Pulley Crankshaft:

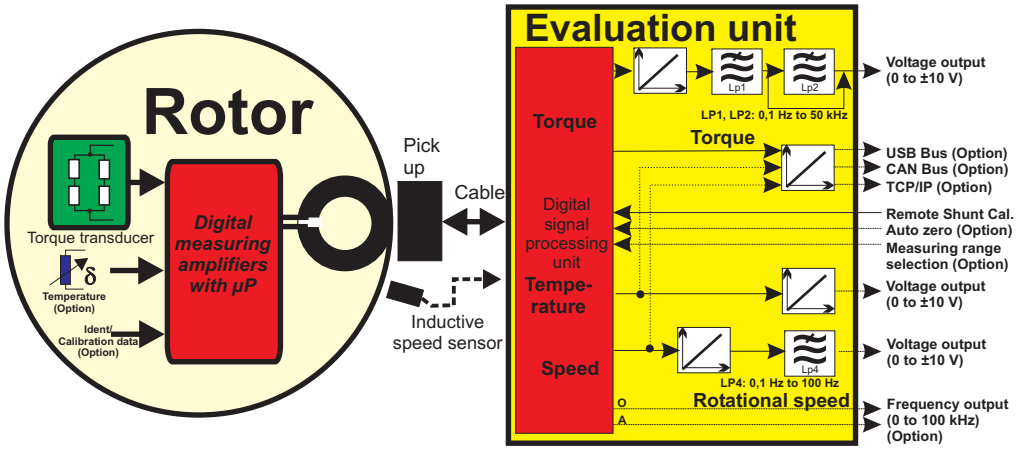
Torque ranges available: 50 Nm to 200 Nm
Linearity and hysteresis: < 0,1 %
High signal bandwidth 0 to 1 (10) kHz (-3 dB)
High reliable digital transmitting with 16 Bit resolution
Zerodrift / Gaindrift: 0,01 %/°C (0,003 %/°C optional))
Max. radial acceleration: 10000 g
Temperature range: -25 to + 125 °C
(Optional -40 to +160°C environmental temperature)
Optional speed acquisition
Optional additional temperature acquisition channel for E-modul drift compensation
Supply receiver: 9 to 36 V DC, 300 mA
Output voltage: 0 to ±10 V, USB, CAN-Bus, Ethernet

Type: MWK_<range>_ <accuracy>_<temp>_<6.3>_<PCM16>_<bandwidth>_<rmc>_oil_<Dz>_<T>

50 Nm	0,25	85	10 Hz	-	-	-	
to	0,1	125	100 Hz	RC	1	T	
200 Nm		160	1 kHz		68		
			10 kHz				

MANNER® Sensortelemetrie

High Precise Dynamic Torque Meter with mechanical modified Drive Shafts



Supply 9 to 36 V DC
Output 0 to ±10V,
CAN, USB, Ethernet

MANNER® Sensortelemetrie

Torque Meter Drive Shaft modified:

Torque ranges available: 0,5 kNm to 4 kNm
Linearity and hysteresis: < 0,1 %
High signal bandwidth 0 to 1 (10) kHz (-3 dB)
High reliable digital transmitting with 16 Bit resolution
Zerodrift / Gaindrift: 0,01 %/°C (0,002 %/°C optional))
Max. radial acceleration: 10000 g
Temperature range: -25 to + 160 °C
(Optional -40 to +160°C environmental temperature)
Optional speed acquisition
Optional additional temperature acquisition channel for E-modul drift compensation
Supply receiver: 9 to 36 V DC, 300 mA
Output voltage: 0 to ±10 V, USB, CAN-Bus, Ethernet

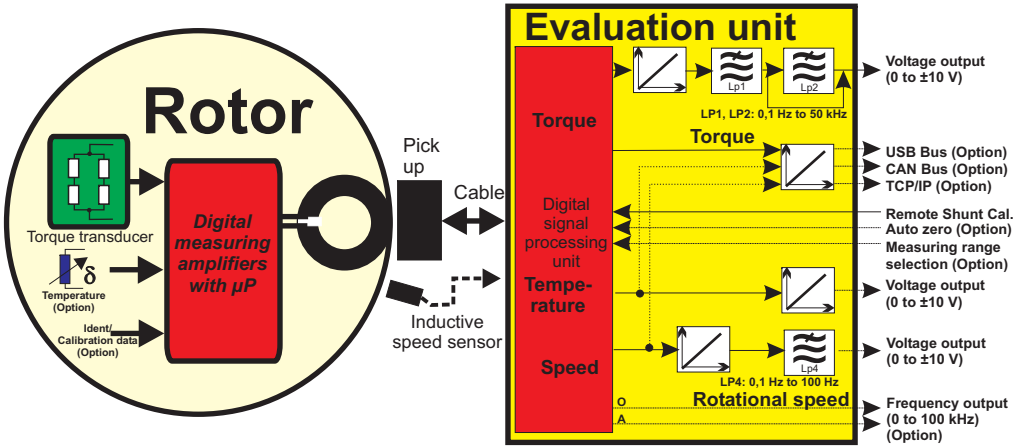
Type: MWDr_<range>_ <accuracy>_<temp>_<6.3>_<PCM16>_<bandwidth>_<rmc>_oil_<Dz>

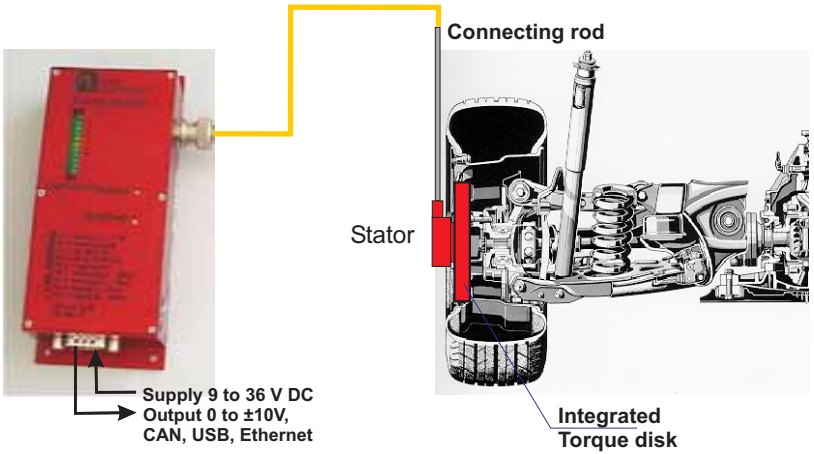
1 kNm	0,1	85	10 Hz	-	-
to		125	100 Hz	RC	1
6 kNm		160	1 kHz		48
			10 kHz		

Applications with flexible adaptive Stator Antenna

MANNER®
Sensortelemetrie

High precise Wheel Torque Sensor





Wheel Torque Meter with inductive Transmission:

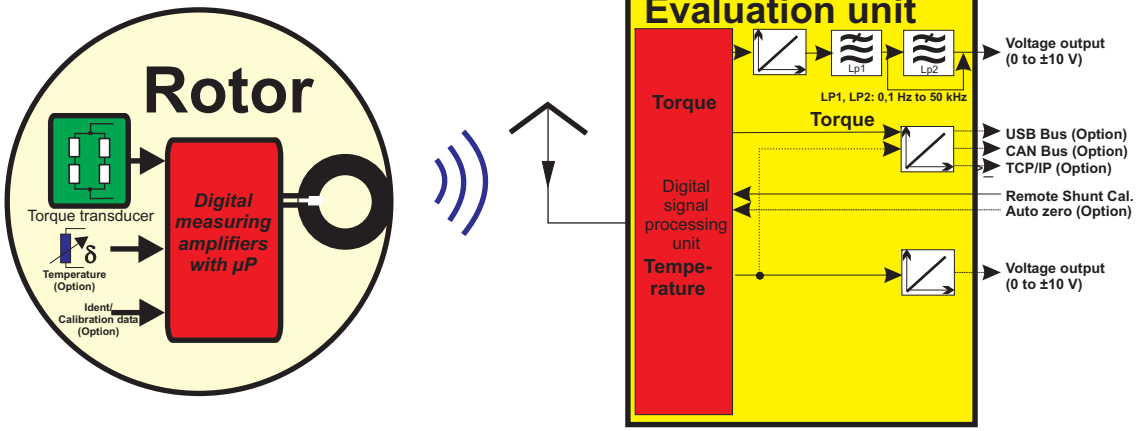
Torque ranges available: 0,5 kNm to 5 kNm
thin disk integrated in rim (20 mm)
very light (material Titanium)
Linearity and hysteresis: < 0,1 %
High signal bandwidth 0 to 1 kHz (-3 dB)
High reliable digital transmitting with 16 Bit resolution
Zerodrift / Gaindrift: 0,01 %/°C (0,003 %/°C optional))
Max. radial acceleration: 10000 g
Temperature range: -25 to + 125 °C
(Optional -40 to +160°C environmental temperature)
Optional speed acquisition
Optional additional temperature acquisition channel for E-modul drift compensation
Supply receiver: 9 to 36 V DC, 300 mA
Output voltage: 0 to ±10 V, USB, CAN-Bus, Ethernet

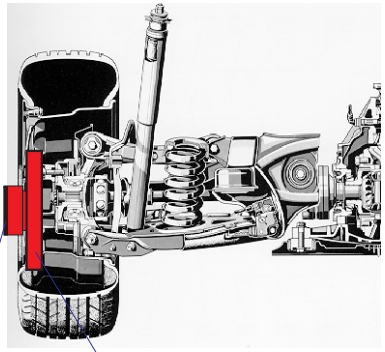
Type: MWR_<range>_ <accuracy>_<temp>_<6.3>_<PCM16>_<bandwidth>_<rmc>_<Dz>_<T>

0,5 kNm	0,25	85	10 Hz	-	-	-
to	0,1	125	100 Hz	RC	1	T
5 kNm		160	1 kHz		180	
					360	

MANNER® Sensortelemetrie

Wheel Torque Meter based on Radio Telemetry





Integrated Transmitting Antenna

Integrated Torque disk

Wheel Torque Meter for Cars (Radio Transmission):

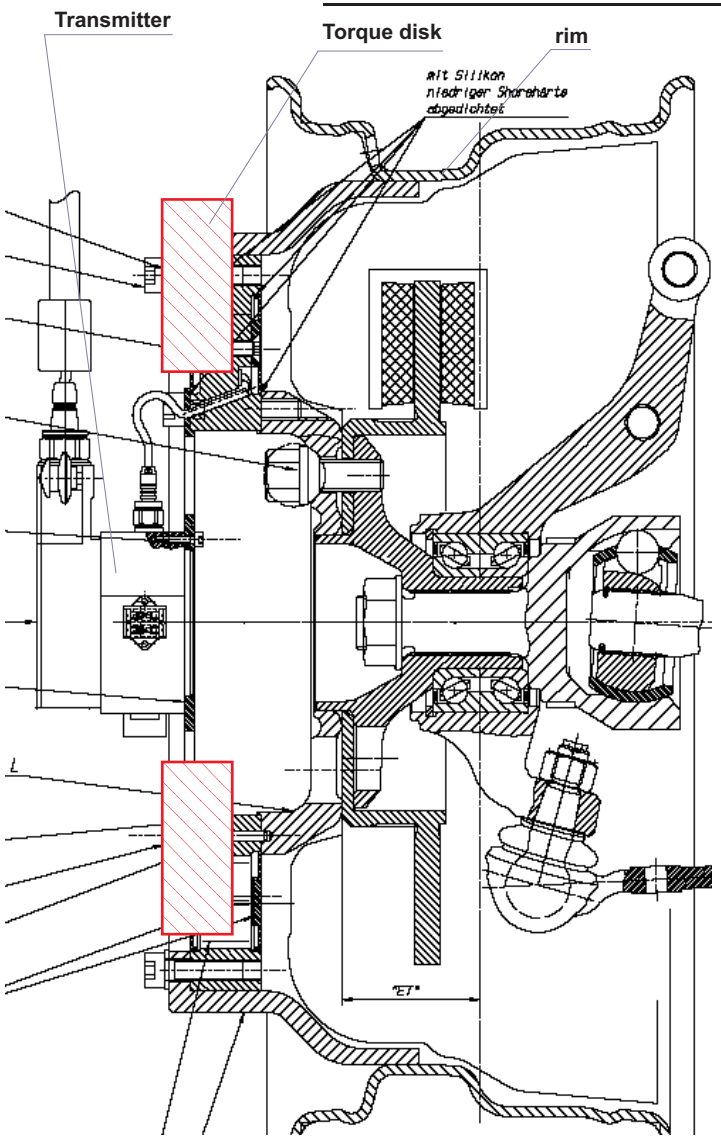
- Torque ranges available: 500 Nm to 4 kNm
- Linearity and hysteresis: < 0,1 %
- High signal bandwidth 0 to 1 (10) kHz (-3 dB)
- High reliable digital transmitting with 16 Bit resolution
- Zerodrift / Gaindrift: 0,01 %/°C (0,003 %/°C optional))
- Max. radial acceleration: 10000 g
- Temperature range: -25 to + 125 °C
- Easy mounting
- Transmitting: Radio f = 433/868 MHz, 16 different frequencies
- Integrated transmitting antenna, waterproof
- RF-Power: 10 mW; range: 20 m in open field
- Integrated data protection by checksum (16 Bit CRC)
- Low current consumption by low power C-MOS technique: 3,6 V supply with Accu-supply 3,6 V Lithium, max 35 hours (one cycle)
- Optional additional temperature aquisition channel for E-modul drift compensation
- Supply receiver: 9 to 36 V DC, 300 mA
- Output voltage: 0 to ±10 V, USB, CAN-Bus, Ethernet

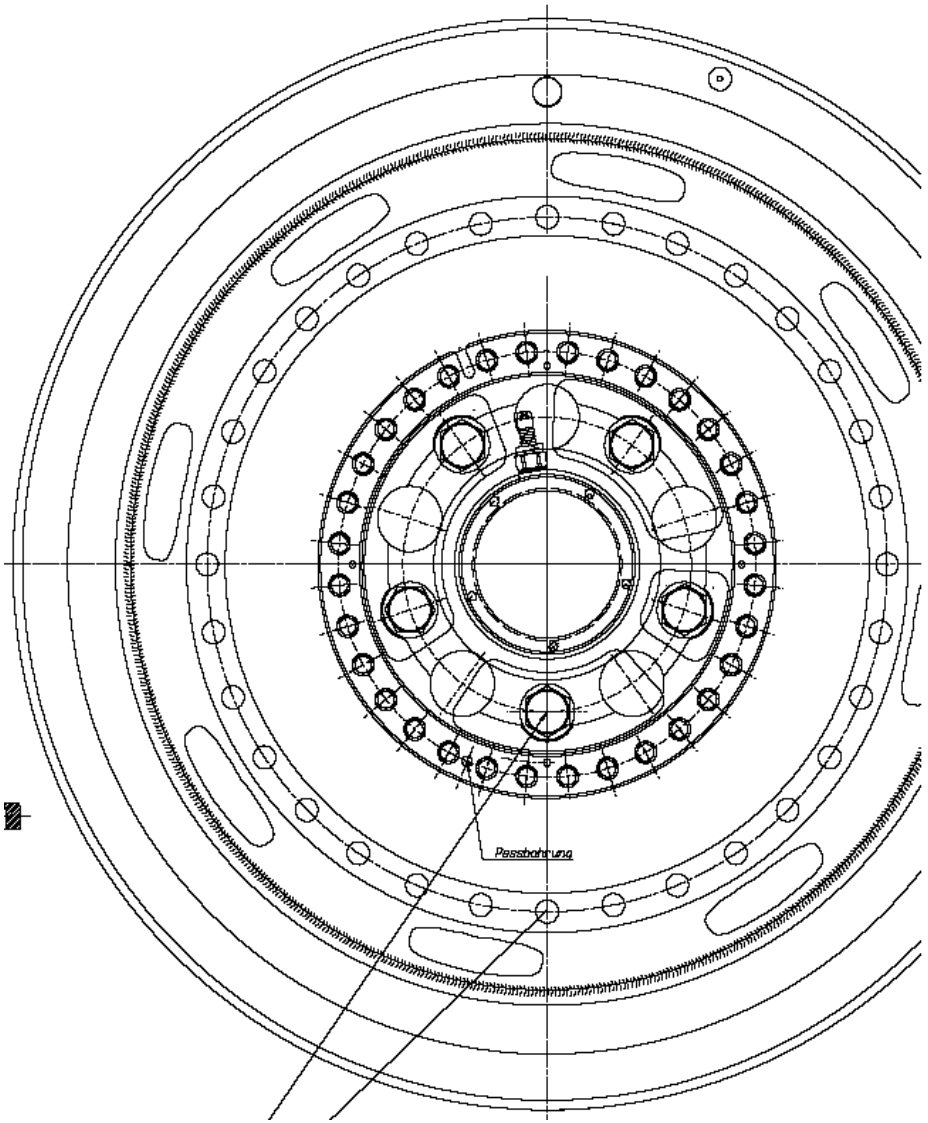
Type: MWR_<range>_ <accuracy>_<temp>_<Fu>_<6.3>_<PCM16>_<bandwidth>_<rmc>_<T>

0,5 kNm to 4 kNm	0,25 0,1	85 125	10 Hz 100 Hz 1 kHz	- RC	- T

MANNER® Sensortelemetrie

Mechanical Setup Wheel Torque Meter



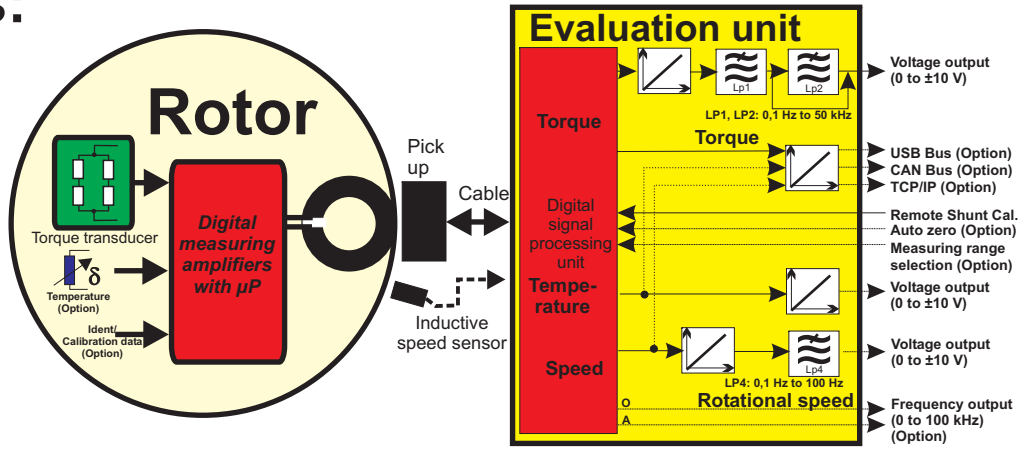


MANNER® Sensortelemetrie

High Precise Dynamic Traktor Power Take Off Torque Meter

Applications:

* tractors
* power take off
* agricultural applications



Traktor Power take off Torque Meter :

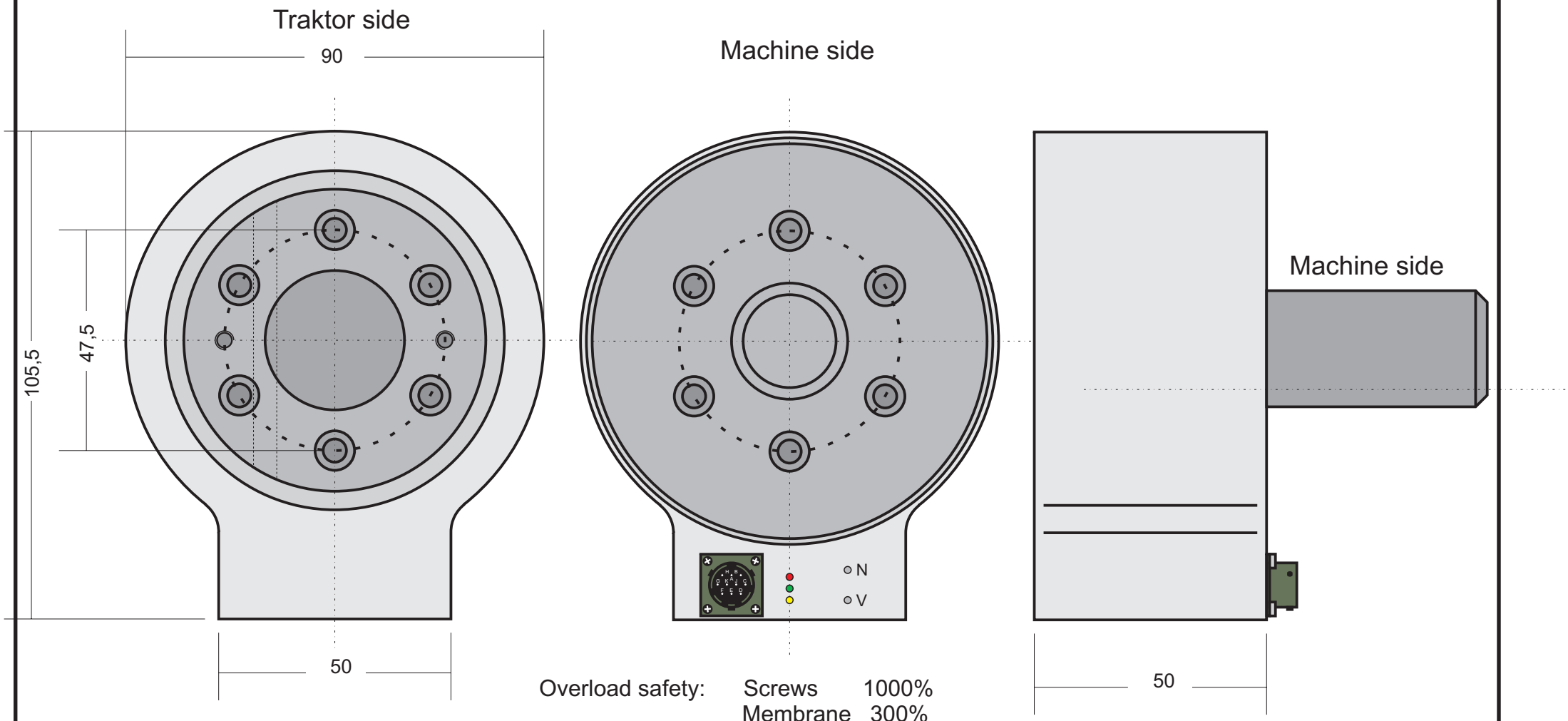
Torque ranges available: 0,5 kNm to 5 kNm
exchange connection parts (
over load proofnes: 300 %
Linearity and hysteresis: < 0,1 %
High signal bandwidth 0 to 1 kHz (-3 dB)
High reliable digital transmitting with 16 Bit resolution
Zerodrift / Gaindrift: 0,01 %/°C (0,003 %/°C optional))
Max. radial acceleration: 10000 g
Temperature range: -25 to + 125 °C
Integrated speed acquisition
Optional additional temperature acquisition channel for E-modul drift compensation
Protection IP65
Supply receiver: 9 to 36 V DC, 300 mA
Output voltage: 0 to ±10 V, USB, CAN-Bus, Ethernet

Type: MWB_<range>_ <accuracy>_<temp>_<6.3>_<PCM16>_<bandwidth>_<rmc>_<Dz>_<T>_wa

0,5 kNm to 5 kNm	0,25 0,1	85	10 Hz 100 Hz 1 kHz	- RC	- 120	- T

MANNER® Sensortelemetrie

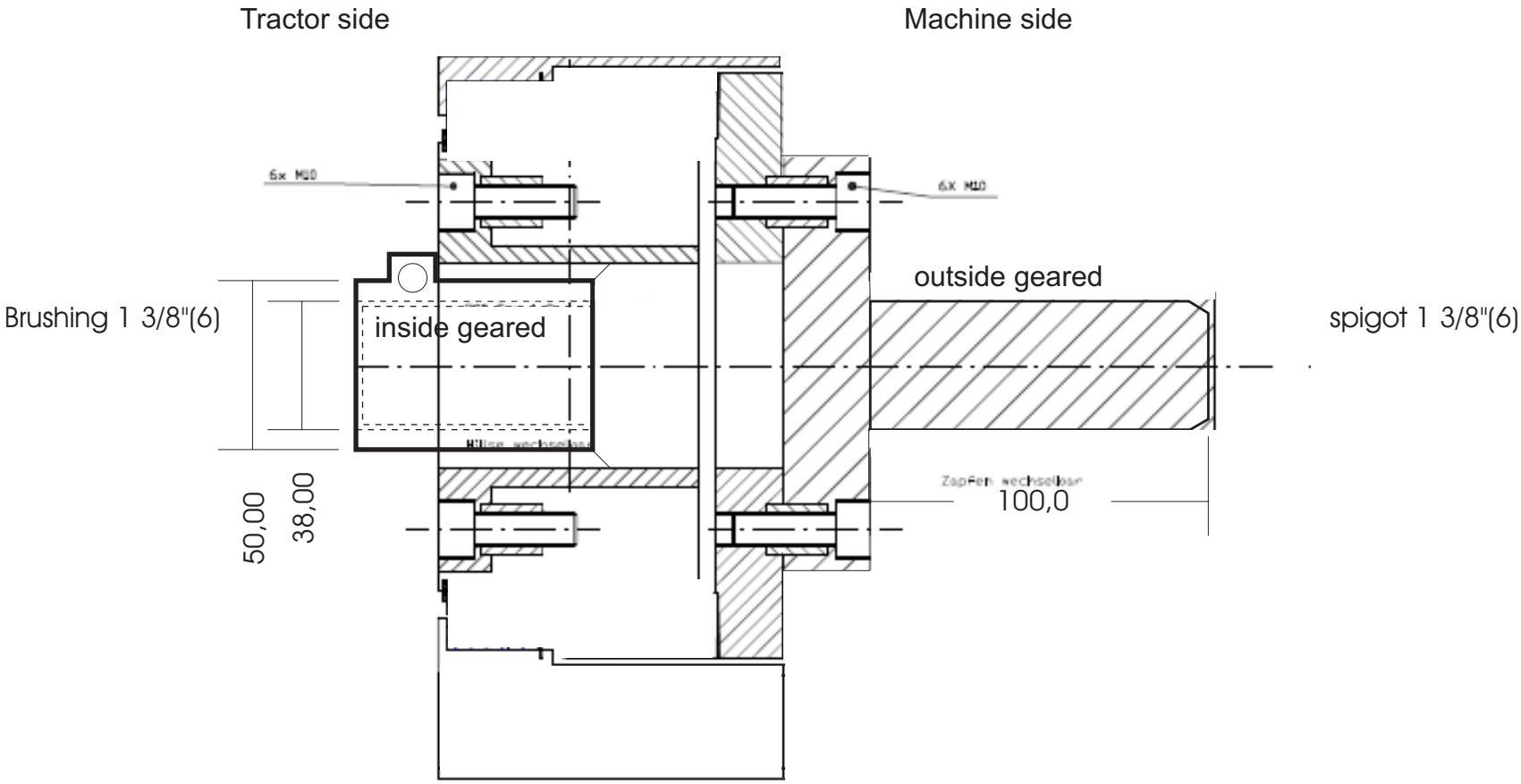
Mechanical Outline Traktor Power Take Off Torque Meter



Overload safety: Screws 1000%
Membrane 300%

MANNER® Sensortelemetrie

Mechanical Outline Traktor Power Take Off Torque Meter replaceable Connection Parts



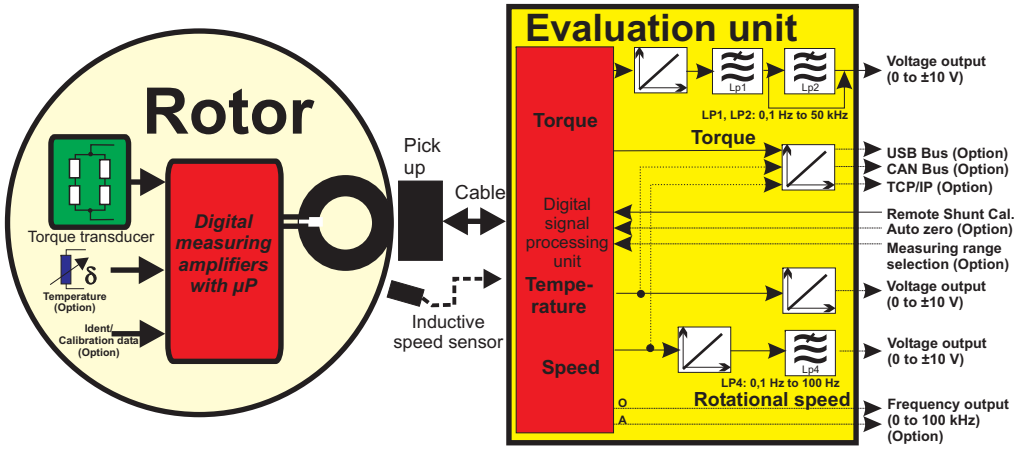
Power take off measuring system
2500Nm
with 1 3/8"(6) adapter

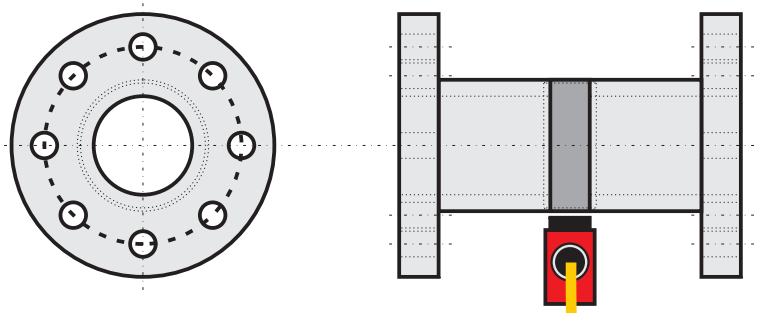
MANNER® Sensortelemetrie

Custome spec. High Speed Torque Meter

Applications:

* gas turbines
* turbo pumps
* test rigs
* high speed couplings
* custome spec appl.





Supply 9 to 36 V DC
Output 0 to ±10V,
CAN, USB, Ethernet

Evaluation unit

High Speed Torque Meter:

Torque ranges available: 1 kNm to 1000 kNm
Speed> 0 to 25000 rpm (range depending)
Contactless, no maintanance
Linearity and hysteresis: < 0,1 %
Very stiff: 0,02 degree (nominal), low inertia
high admissible bending moment
High signal bandwidth 0 to 1 kHz (-3 dB)
High reliable digital transmitting with 16 Bit resolution
Zerodrift / Gaindrift: 0,01 %/°C (0,003 %/°C optional))
Max. radial acceleration: 10000 g
Temperature range: -25 to + 125 °C (optional -40..+160°C)
Optional speed acquisition
Optional additional temperature acquisition channel for E-modul drift compensation
Supply receiver: 9 to 36 V DC, 300 mA
Output voltage: 0 to ±10 V, USB, CAN-Bus, Ethernet

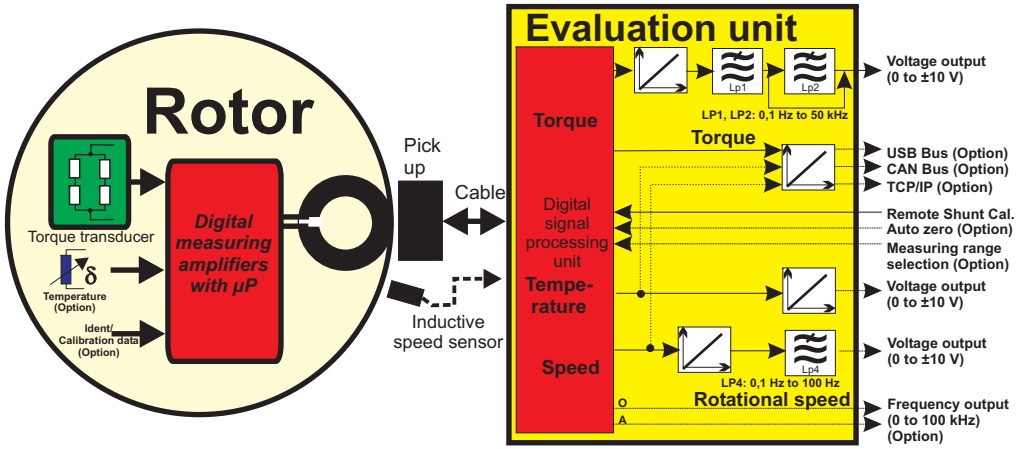
Type: MWD_<range>_	<accuracy>_	<temp>_	<6.3>_	<PCM16>_	<bandwidth>_	<rmc>_	<Dz>_	<T>_	<wa>_	<Ex>
1 kNm	0,25	85			10 Hz	-	-	-	-	-
to	0,1	125			100 Hz	RC	1	T	IP65	Ex
1000 kNm		160			1 kHz		48			
					2 kHz					
					10 kHz					

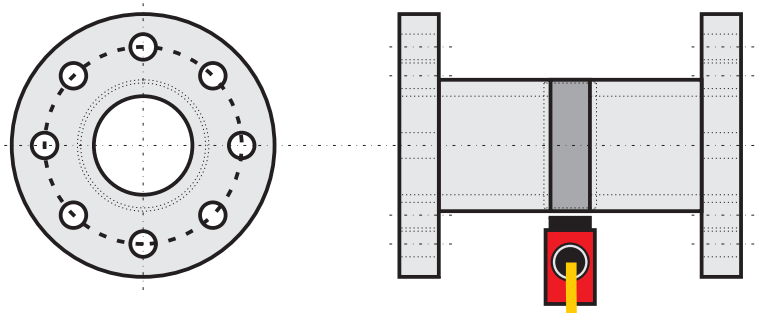
MANNER® Sensortelemetrie

Custome spec. Torque Meter based on modified Customer Part

Applications:

* process monitoring
* over load supervision
* test rigs
* couplings
* custome spec appl.





Evaluation unit

Supply 9 to 36 V DC
Output 0 to ±10V,
CAN, USB, Ethernet

High Speed Torque Meter:

Torque ranges available: 10 Nm to 1000 kNm
cultivated customer part with mechanical modifcation
Contactless, no maintanance
Linearity and hysteresis: < 0,3 % (depends on steel quality and geometry)
Very stiff: 0,02 degree (nominal), low inertia
high admissible bending moment
High signal bandwidth 0 to 1 kHz (-3 dB)
High reliable digital transmitting with 16 Bit resolution
Zerodrift / Gaindrift: 0,01 %/°C (0,003 %/°C optional))
Max. radial acceleration: 10000 g
Temperature range: -25 to + 125 °C (optional -40..+160°C)
Optional speed acquisition
Optional additional temperature acquisition channel for E-modul drift compensation
Supply receiver: 9 to 36 V DC, 300 mA
Output voltage: 0 to ±10 V, USB, CAN-Bus, Ethernet

Type: MWX_<range>_	<accuracy>_	<temp>_	<6.3>_	<PCM16>_	<bandwidth>_	<rmc>_	<Dz>_	<T>_	<wa>_	<Ex>
10 Nm	1	85			10 Hz	-	-	-	-	-
to	0,25	125			100 Hz	RC	1	T	IP65	Ex
1000 kNm		160			1 kHz		48			
					2 kHz					
					10 kHz					

MANNER® Sensortelemetrie

Custome spec. Torque Meter based on modified Customer Part

Torque meter integrated in
extruder coupling

Torque meter integration
on extruder coupling

Torque meter integrated in
propshaft

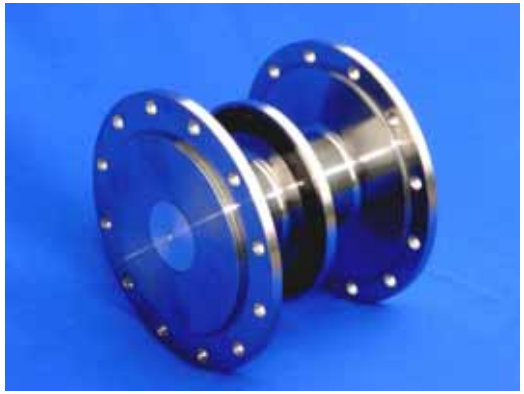
Torque meter integrated
in nut runner shaft

Torque meter integration
in intermediate part of coupling

Torque acqusition integrated in
coupling

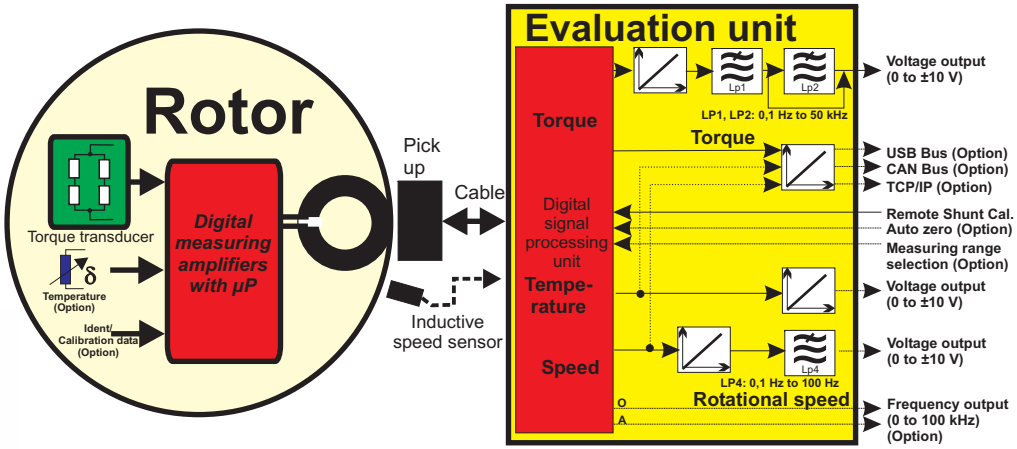
MANNER® Sensortelemetrie

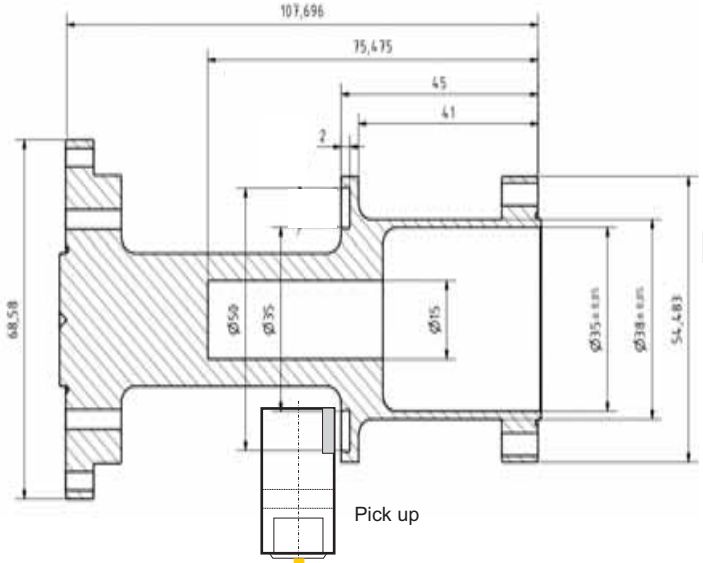
High Speed Torque Meter



Applications:

* Racing formula 1
* Gas turbines
* turbo pumps
* Helicopter test rigs
* Jet turbines





Evaluation unit

max. 50 m

Supply 9 to 36 V DC
Output 0 to ±10V,
CAN, USB, Ethernet

High Speed Torque Meter:

Torque ranges available: 0,2 kNm to 5 kNm
Speed> 0 to 36000 rpm
Contactless, no maintanance
Linearity and hysteresis: < 0,1 %
Very stiff: 0,02 degree (nominal), low inertia
Admissible londitudinal force: 7,5 N/Nm (niminal)
High signal bandwidth 0 to 1 kHz (-3 dB)
High reliable digital transmitting with 16 Bit resolution
Zerodrift / Gaindrift: 0,01 %/°C (0,003 %/°C optional))
Max. radial acceleration: 10000 g
Temperature range: -25 to + 125 °C (optional -40..+160°C)
Optional speed acquisition
Optional additional temperature acquisition channel for E-modul drift compensation
Supply receiver: 9 to 36 V DC, 300 mA
Output voltage: 0 to ±10 V, USB, CAN-Bus, Ethernet

Type: MHS_<range>_ <accuracy>_<temp>_<6.3>_<PCM16>_<bandwidth>_<rmc>_<Dz>_<T>_<wa>

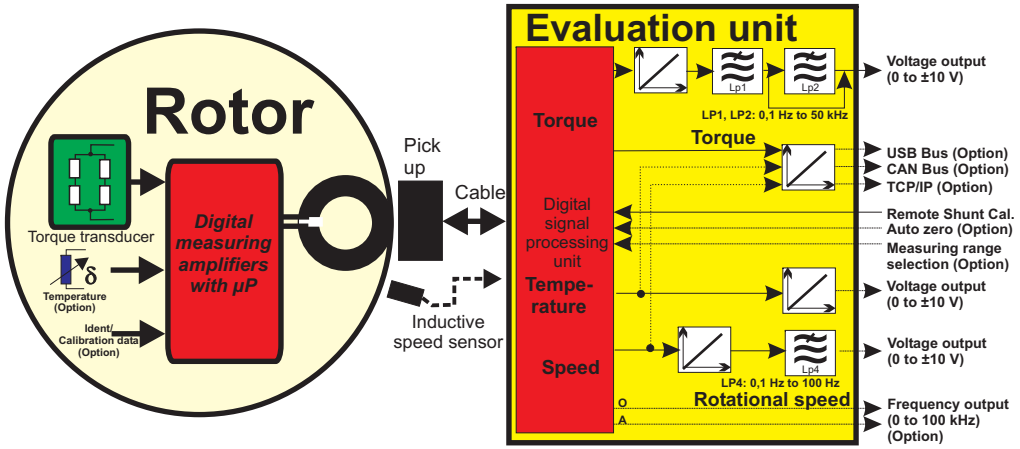
0,2 kNm	0,25	85	10 Hz	-	-	-	-	
to	0,1	125	100 Hz	RC	1	T	IP65	
5 kNm		160	1 kHz		48			
			2 kHz					
			10 kHz					

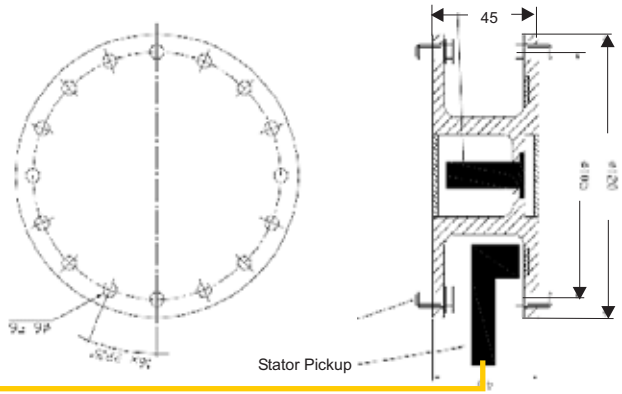
MANNER® Sensortelemetrie

High Speed Torque Meter (very short)

Applications:

* Racing formula 1
* Gas turbines
* Compressors
* Turbo pumps
* Helicopter test rigs
* Jet turbines





Evaluation unit

High Speed Torque Meter:

Torque ranges available: 0,2 kNm to 5 kNm
Speed> 0 to 36000 rpm
Contactless, no maintanance
Linearity and hysteresis: < 0,1 %
Very stiff: 0,02 degree (nominal), low inertia
Admissible londitudinal force: 7,5 N/Nm (niminal)
High signal bandwidth 0 to 1 kHz (-3 dB)
High reliable digital transmitting with 16 Bit resolution
Zerodrift / Gaindrift: 0,01 %/°C (0,003 %/°C optional))
Max. radial acceleration: 10000 g
Temperature range: -25 to + 125 °C (optional -40..+160°C)
Optional speed acquisition
Optional additional temperature acquisition channel for E-modul drift compensation
Supply receiver: 9 to 36 V DC, 300 mA
Output voltage: 0 to ±10 V, USB, CAN-Bus, Ethernet

Type: MHS_<range>_ <accuracy>_<temp>_<6.3>_<PCM16>_<bandwidth>_<rmc>_<Dz>_<T>_<wa>

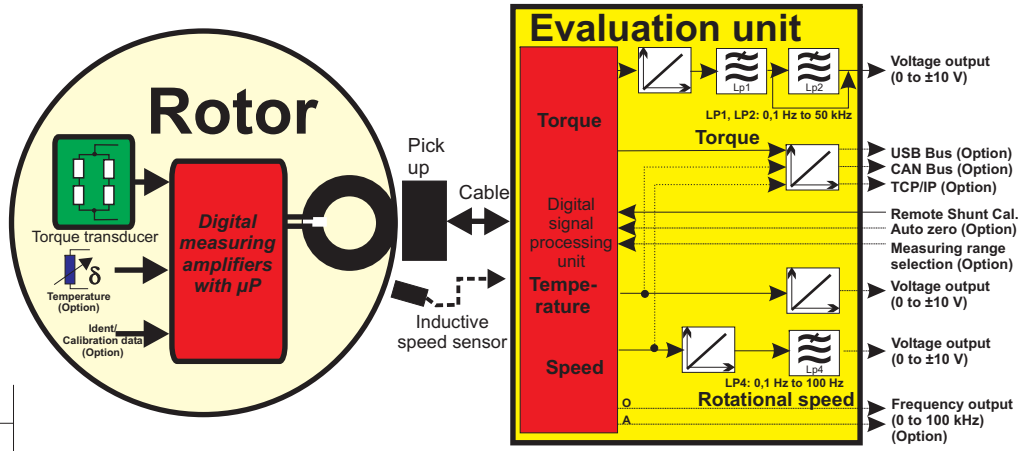
0,2 kNm	0,25	85	10 Hz	-	-	-	-	
to	0,1	125	100 Hz	RC	1	T	IP65	
5 kNm		160	1 kHz		48			
			2 kHz					
			10 kHz					

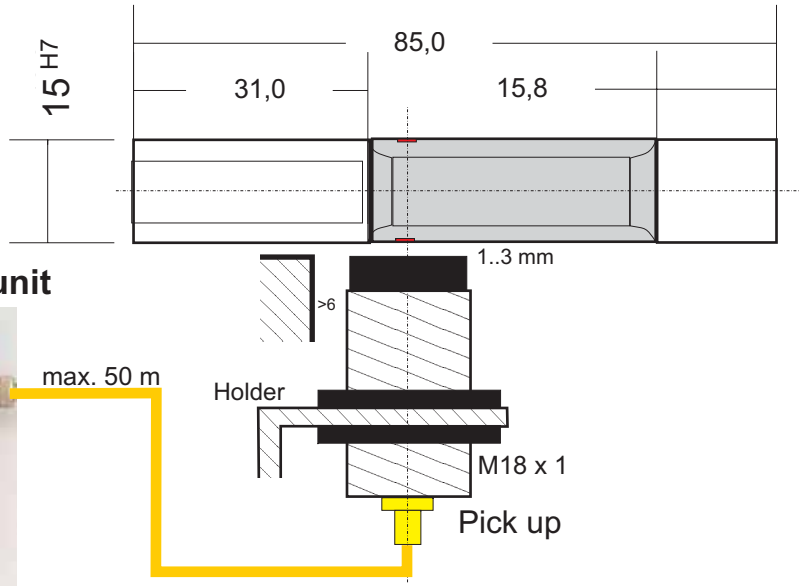
MANNER® Sensortelemetrie

High Speed Torque Meter (miniaturised)

Applications:

* Test rigs
* Load monitoring
* Nut runners





Evaluation unit

High Speed Torque Meter:

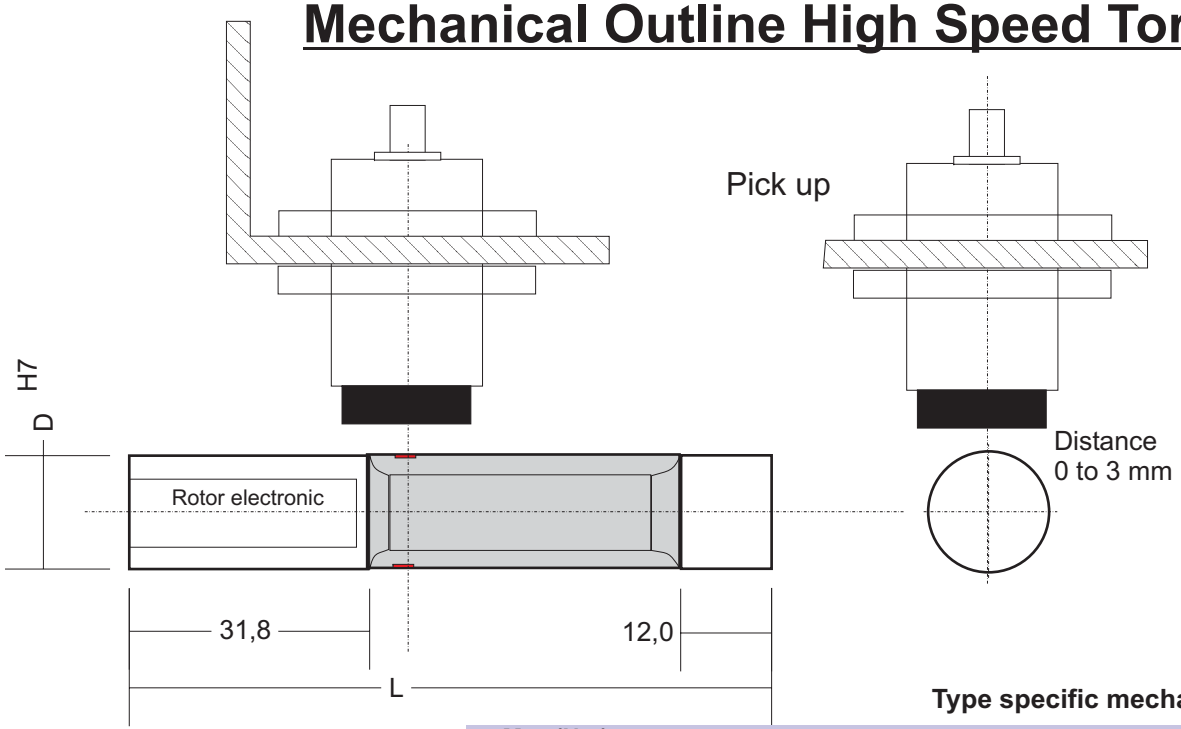
Torque ranges available: 5 Nm to 500 Nm
Speed> 0 to 50000 rpm
Contactless, no maintanance
Linearity and hysteresis: < 0,1 %
Very low inertia
High signal bandwidth 0 to 1 kHz (-3 dB)
High reliable digital transmitting with 16 Bit resolution
Zerodrift / Gaindrift: 0,01 %/°C (0,003 %/°C optional))
Max. radial acceleration: 10000 g
Temperature range: -25 to + 125 °C (optional -40..+160°C)
Optional speed acquisition
Optional additional temperature acquisition channel for E-modul drift compensation
Supply receiver: 9 to 36 V DC, 300 mA
Output voltage: 0 to ±10 V, USB, CAN-Bus, Ethernet

Type: MWS_<range>_ <accuracy>_<temp>_<6.3>_<PCM16>_<bandwidth>_<rmc>_<Dz>_<T>_<wa>

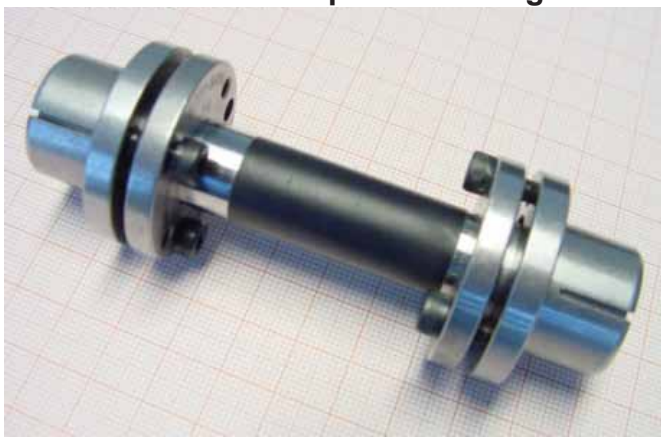
5 Nm	0,25	85	10 Hz	-	-	-	-
to	0,1	125	100 Hz	RC	2	T	IP65
500 Nm		160	1 kHz				
			2 kHz				
			10 kHz				

MANNER® Sensortelemetrie

Mechanical Outline High Speed Torque Meter (miniaturised)



Torque measuring shaft



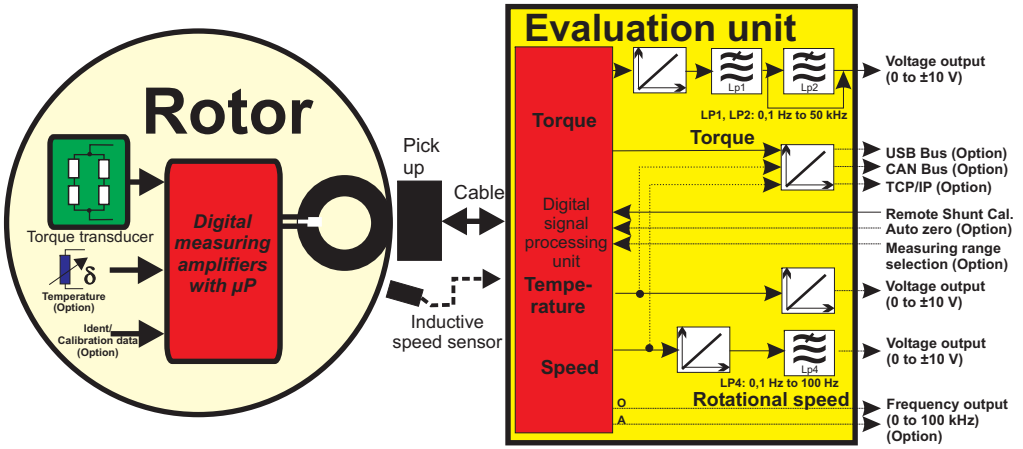
Type specific mechanical Data (Typ MWS....)

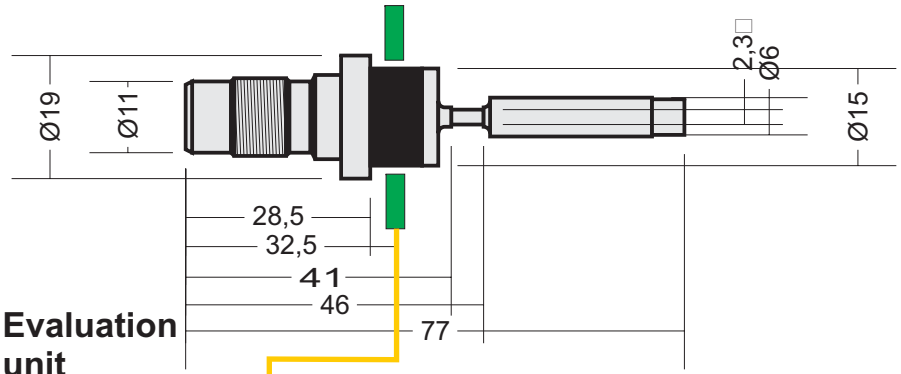
M_{nom} (Nm)	1	5	10	20	50	100	200	500
Diameter D(mm)	15	15	15	15	15	20	25	35
Length L (mm)	85	85	85	85	85	120	150	200
Weight (Rotor) (kg):	0.15	0.15	0.2	0.4	0.4	0.4	0.4	0.4
Inertia (10^{-6} kgm^2):	1,45	1,5	1,7	3	6	10	25	110
(With/without speed system)								
Torsional stiffness (Nm/°):	0,04	0,04	0,04	0,08	0,20	0,40	0,80	2,00
Torsional angle related to M_{nom} (°):	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Axial stiffness (kN/mm) c_a:	5	5	7	9	12	15	18	21
Radial stiffness (kN/mm) c_r:	30	30	40	50	200	400	500	600
Bending moment stiffness (kNm/°) c_b:	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35
Max. axial load (kN):	0.06	0.10	0.14	0.18	0.37	0.75	0.75	0.75
Max. radial load (kN):	0.06	0.06	0.14	0.18	0.30	0.50	0.65	0.8
Max. bending moment (kNm):	0.01	0.05	0.07	0.15	0.20	0.40	0.60	0.70
Max. excursion at max. axial force (mm):	<0.04	<0.04	<0.04	<0.04	<0.04	<0.08	<0.08	<0.08
Balance quality level (DIN ISO 1940):					G2.5			
Max. speed (rpm):	50,000	50,000	20,000	20,000	20,000	18,000	16,000	14,000
Highspeed option (rpm):	100,000	100,000	80,000	80,000	80,000	36,000	32,000	28,000
Speed acquisition (inductive, teeth/turn):	6	6	6	6	10	12	14	16

Type: MWS_<range>_ <accuracy>_<temp>_<6.3>_<PCM16>_<bandwidth>_<rmc>_<Dz>_<T>_<wa>

MANNER® Sensortelemetrie

Special Torque Meter Turbo Charger (0,5 Nm ... 10 Nm)





Evaluation unit

Supply 9 to 36 V DC
Output 0 to ±10V,
CAN, USB, Ethernet

MANNER® Sensortelemetrie

Type specific mechanical Data

M_{nom} (Nm)	0,1	1	5	10
Weight (Rotor) (kg):	0.15	0.15	0.15	0.2
Inertia (10^{-6} kgm^2):	1,5	1,5	1,5	1,7
(With/without speed system)				
Torsional stiffness (Nm/°):	0,01	0,01	0,04	0,04
Torsional angle related to M_{nom} (°):	0.1	0.1	0.1	0.1
Axial stiffness (kN/mm) c_a:	1	1	5	7
Radial stiffness (kN/mm) c_r:	10	10	30	40
Bending moment stiffness (kNm/°) c_b:	0.1	0.1	0.35	0.35
Max. axial load (kN):	0.05	0.05	0.18	0.18
Max. radial load (kN):	0.05	0.05	0.15	0.15
Max. bending moment (kNm):	0.10	0.10	0.10	0.10
Max. excursion at max. axial force (mm):	<0.04	<0.04	<0.04	<0.04
Balance quality level (DIN ISO 1940):				
Max. speed (rpm):	100.000	100.000	30,000	20.000
Highspeed option (rpm):	180.000	150.000	100.000	80.000
Speed acquisition (inductive, teeth/turn):	0/2	0/2	0/2	0/2

Turbo Charger Torque Meter:

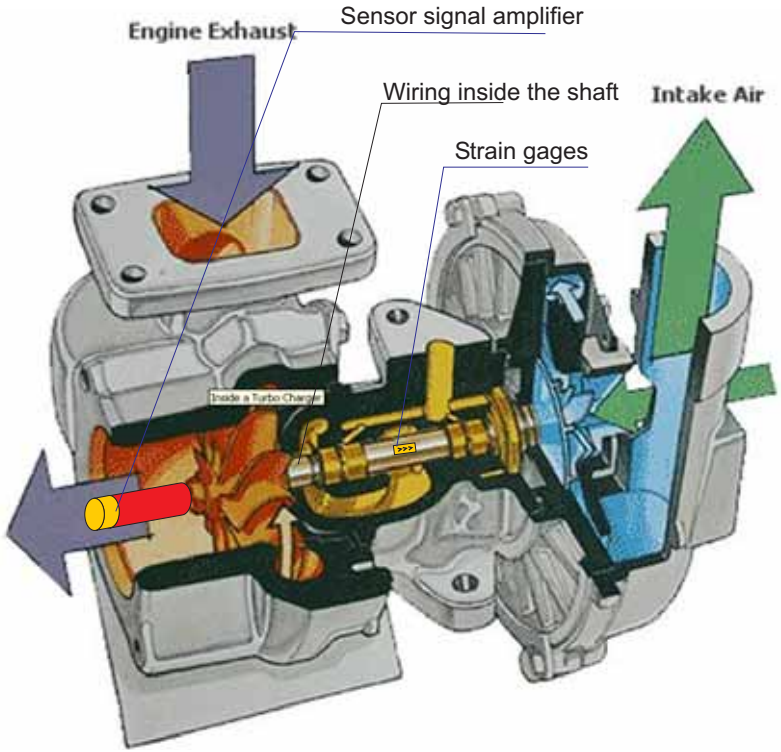
Torque ranges available: 0,1 Nm to 10 Nm
Speed> 0 to 180000 rpm
Contactless, no maintanance
Linearity and hysteresis: < 0,1 %
Very low inertia
High signal bandwidth 0 to 1 kHz (-3 dB)
High reliable digital transmitting with 16 Bit resolution
Zerodrift / Gaindrift: 0,01 %/°C (0,003 %/°C optional))
Max. radial acceleration: 10000 g
Temperature range: -25 to + 125 °C (optional -40..+160°C)
Optional speed acquisition
Optional additional temperature acquisition channel for E-modul drift compensation
Supply receiver: 9 to 36 V DC, 300 mA
Output voltage: 0 to ±10 V, USB, CAN-Bus, Ethernet

Type: MWST_<range>_ <accuracy>_<temp>_<6.3>_<PCM16>_<bandwidth>_<rmc>_<Dz>_<T>_<wa>

0,1 Nm	0,25	85	10 Hz					
to	0,1	125	100 Hz	-	-	-	-	
10 Nm			1 kHz	RC	2	T	IP65	
			2 kHz					
			10 kHz					

Car Turbocharger Transmitters (Cylinder Form), 200 000 rpm

Torque measuring at turbo charger

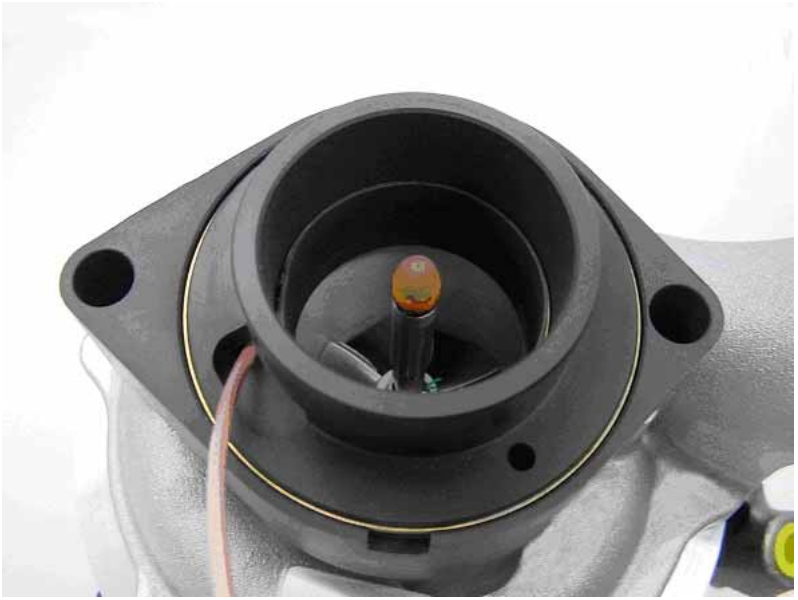


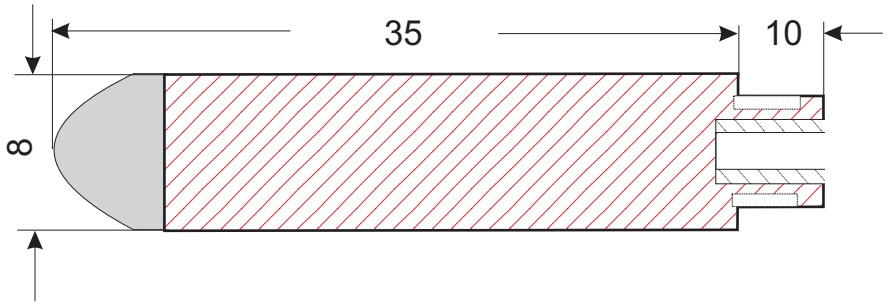
Torque Sensing

- Torque range: 0 to 1 Nm
- Type of sensing: strain gage
- Accuracy: 1%
- Bandwidth 0 to 1 kHz
- Temperature range: 0 to 150°C
- Brigde supply: 3,3 V
- Digital transmission, inductive supply (axial)
- Integrated filters
- Resolution: 16 Bits
- Remote shunt calibration
- Max speed: 200,000 rpm
- Transmitter: axial mounting on shaft
- Type: MW_T_D_1_150_PCM_...

MANNER® Sensortelemetrie

Car Turbo Charger Transmitters (Cylinder Form), 200 000 rpm



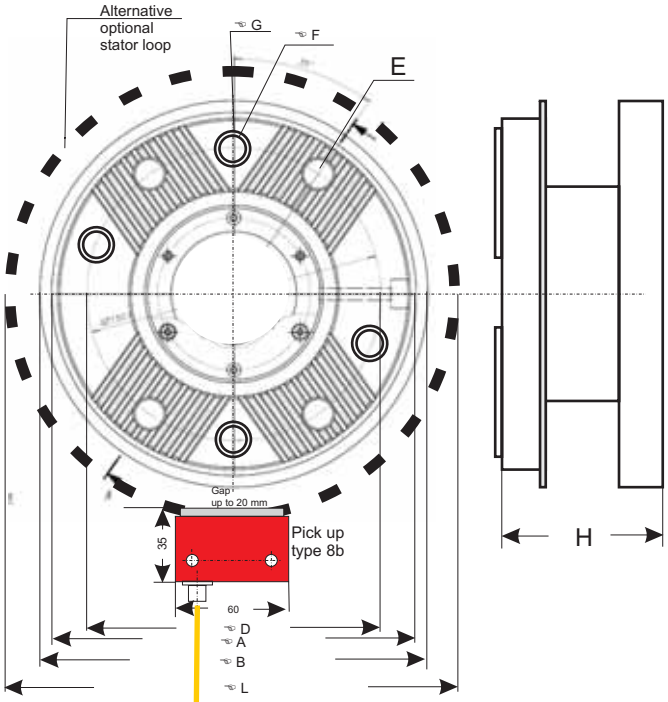


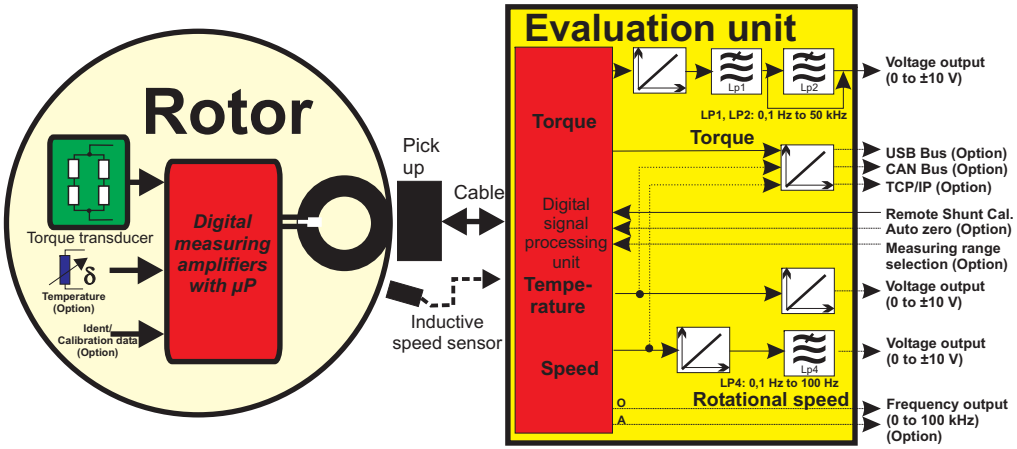
1/4 Channel PCM Transmitter

For thermocouple and strain gage (torque)
Sensitivity: 0,5 mV/V to 20 mV/V
Bandwidth: 10 Hz (0) Hz to 1 kHz
Brigde supply: 3,3 V
Digital transmission, inductive supply (axial)
Integrated filters
Resolution: 16 Bits
Remote shunt calibration
Enviromental temperature: -25 to 125°C (160°C)
Max speed: 200 000 rpm
Axial mounting on shaft
Type: MSV_P_D_2_125_PCM_...

MANNER® Sensortelemetrie

Flanges with X-Toothing





Evaluation unit

Supply 9 to 36 V DC
Output 0 to ±10V,
CAN, USB, Ethernet

Type X-Toothing according to ISO 12667		MWK_ 5kNm KV120	MWK_ 10kNm KV150	MWK_ 20kNm KV165	MWK_ 30kNm KV180	MWK_ 40kNm KV200
A	mm	120h7	150h7	165h7	180h7	200h7
B	mm	132h7	162h7	177h7	192h7	212h7
C	mm	132h7	162h7	177h7	1922h7	212h7
D	mm	100	130	140	150	165
E	mm	M10x1	M12	M12	M14	M14
F	mm	11	13	13	15	15
G	mm	18	20	20	22	22
H	mm	50	50	55	60	60
I	mm	140	170	185	200	220
opt. K	mm	166	194	209	244	244

Torque Meter with X-Toothing:

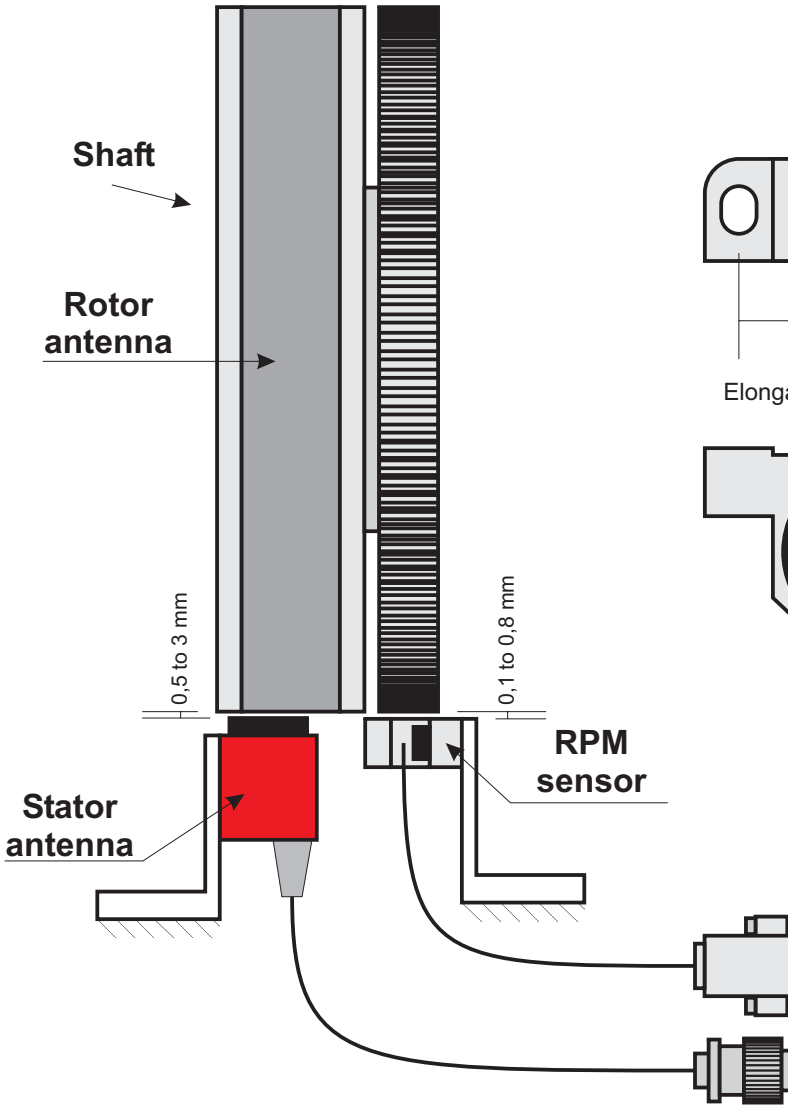
Torque ranges available: 5 Nm to50 Nm
Linearity and hysteresis: < 0,1 %
High signal bandwidth 0 to 1 (10) kHz (-3 dB)
High reliable digital transmitting with 16 Bit resolution
Zerodrift / Gaindrift: 0,01 %/°C (0,003 %/°C optional))
Max. radial acceleration: 10000 g
Temperature range: -25 to + 125 °C
(Optional -40 to +160°C environmental temperature)
Optional speed acquisition
Optional additional temperature acquisition channel for E-modul drift compensation
Supply receiver: 9 to 36 V DC, 300 mA
Output voltage: 0 to ±10 V, USB, CAN-Bus, Ethernet

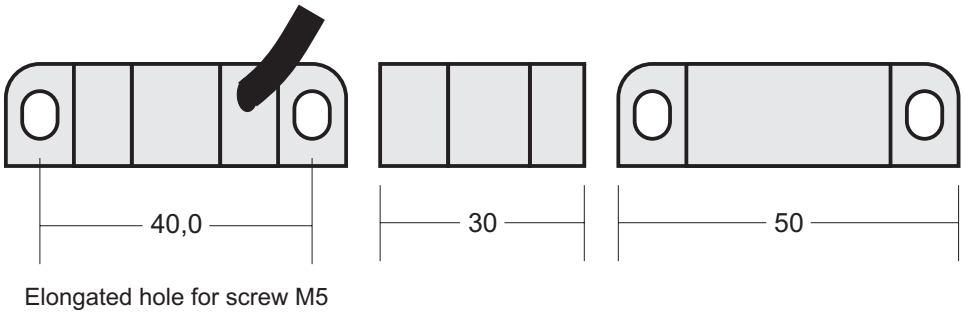
Type: MWV_<range>_ <accuracy>_<temp>_<6.3>_<PCM16>_<bandwidth>_<rmc>_oil_<Dz>_<T>

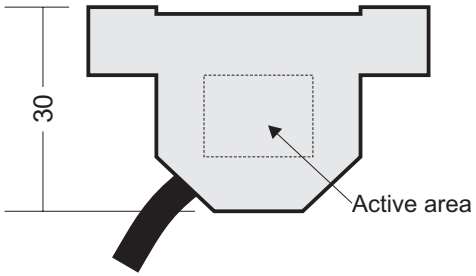
5 KNm	0,3	85	10 Hz	-	-	-	
to	0,1	125	100 Hz	RC	1	T	
40 KNm		160	1 kHz		128		
			10 kHz				

MANNER® Sensortelemetrie

Measuring Rotational Speed



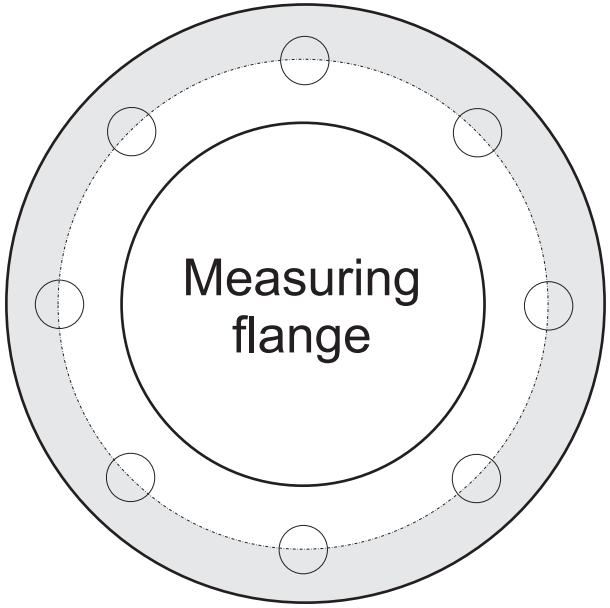


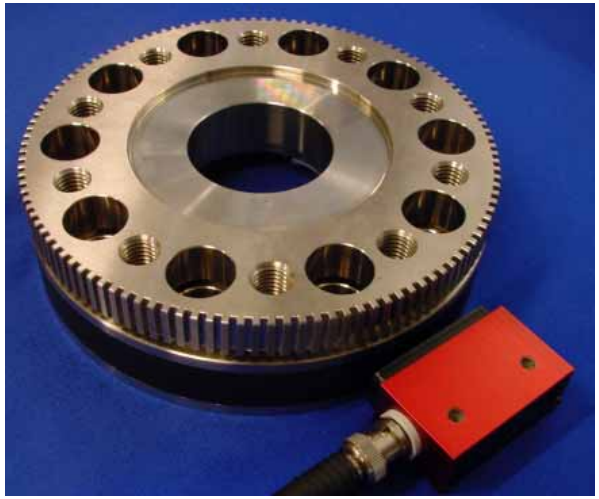


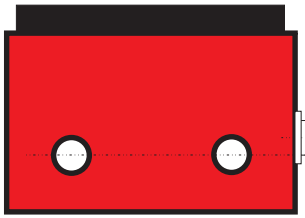
Technical data (rpm)
Phase Sensor 1 to Sensor 2: 90°
Frequency: 0 to 25 kHz
Air gap: 0,5 -0,4;+0,3 mm
Module: 1,5 (others optional)

MANNER® Sensortelemetrie

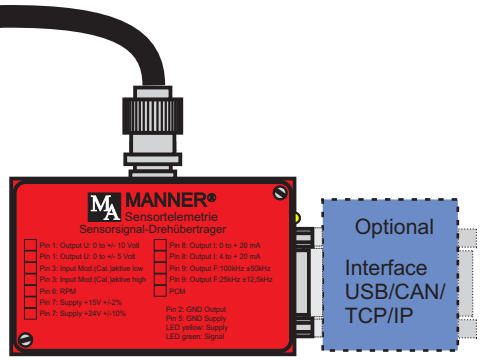
Torque Measuring System AW_D Evaluation Unit



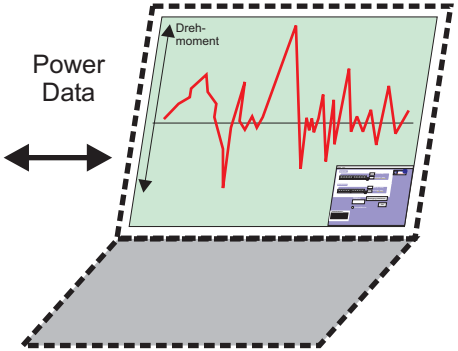




Connector
BNC



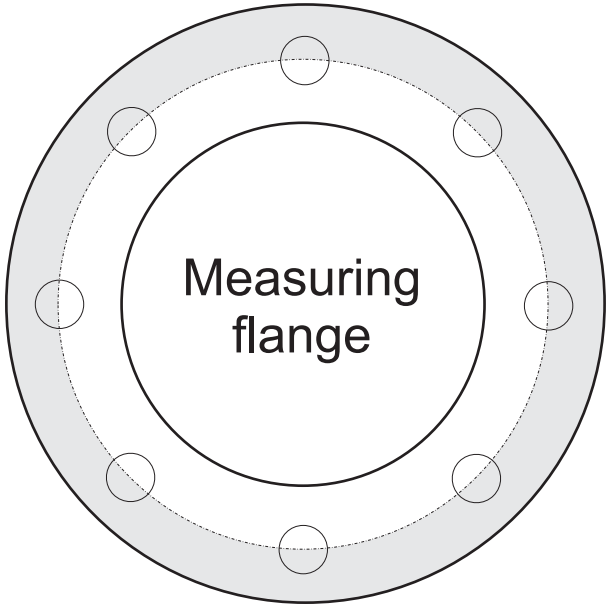
Power
Data

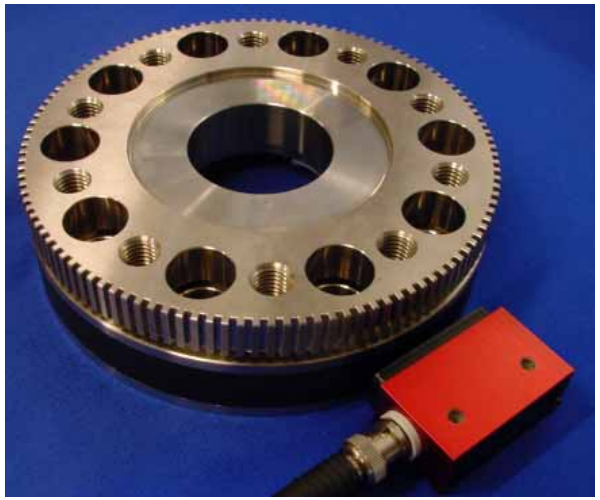


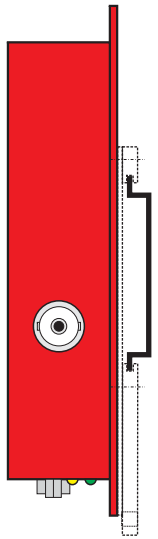
Option

MANNER®
Sensortelemetrie

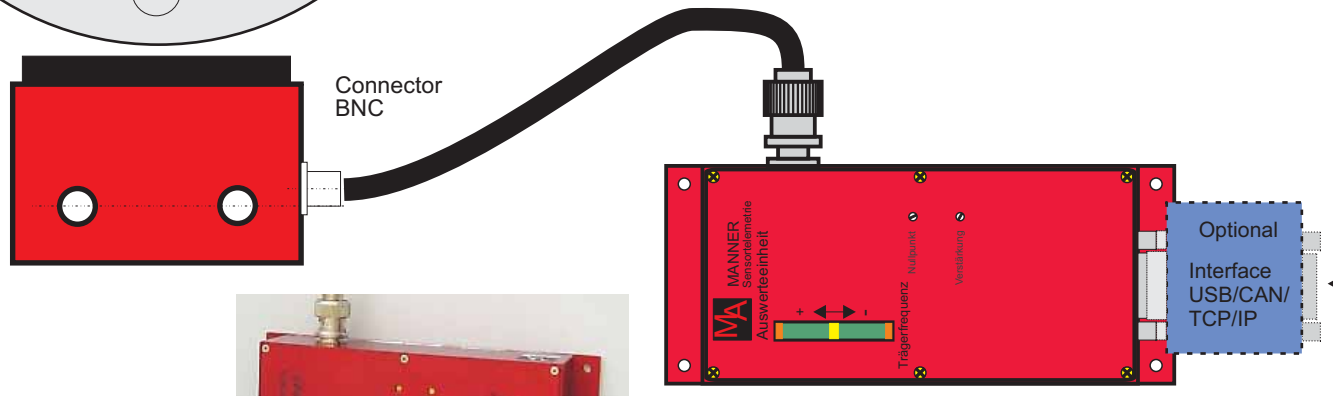
Torque Measuring System with Compact Evaluation Unit



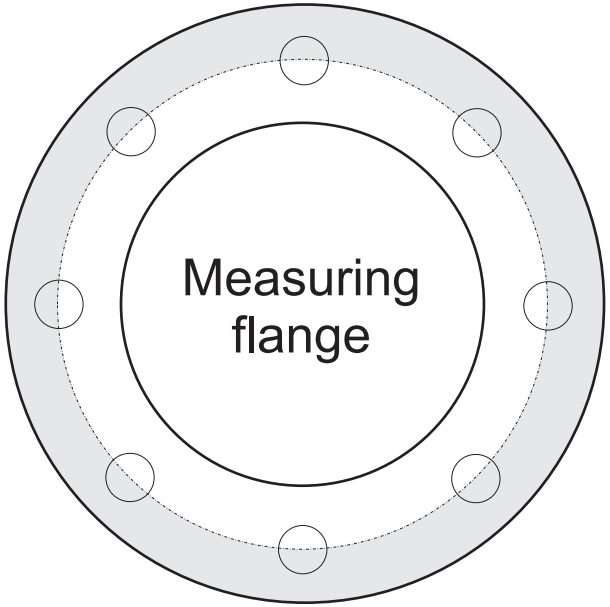


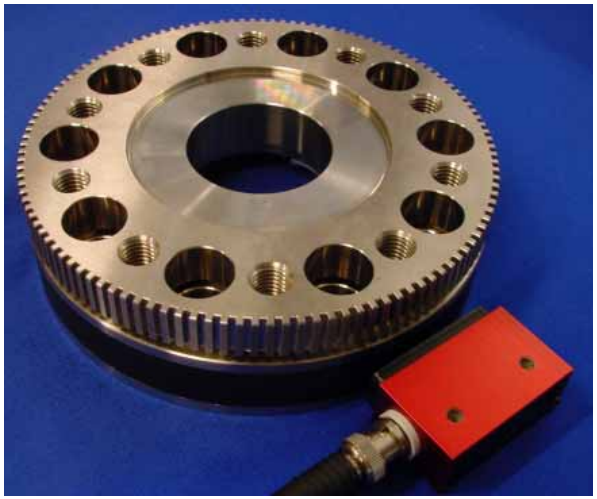


Mounting type: NS 35/7,5, NS 35/15
(option)

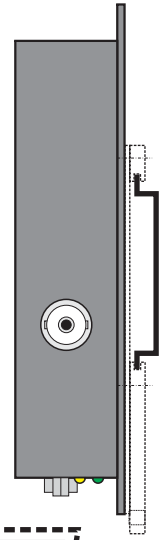


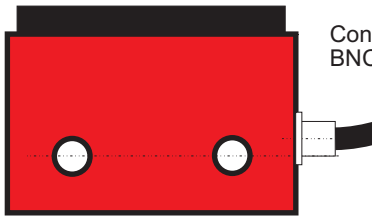
Torque Measuring System with Power Evaluation Unit



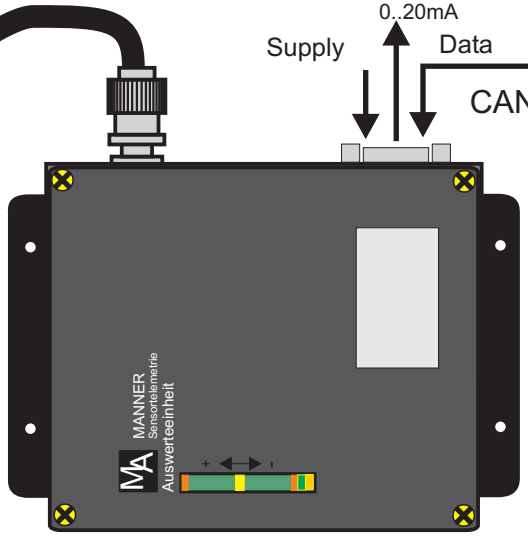


Mounting type: NS 35/7,5, NS 35/15
(option)





Connector
BNC

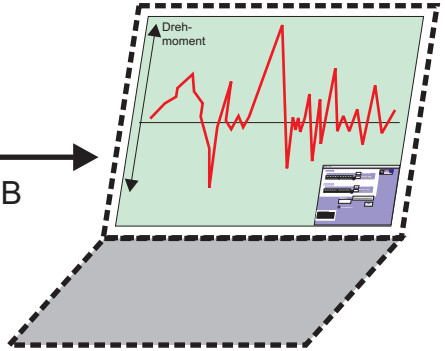


0..+/-10V
0..20mA

Supply

Data

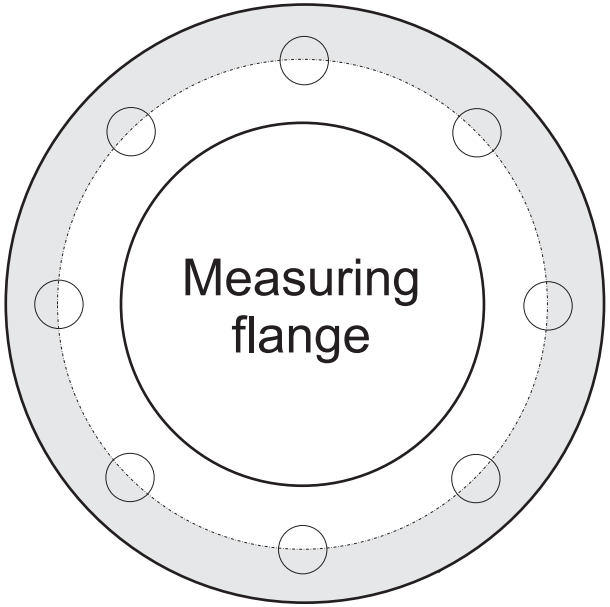
CAN, TCP, USB

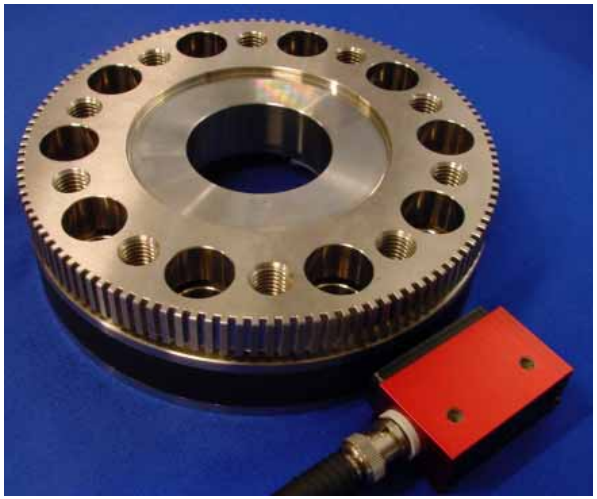


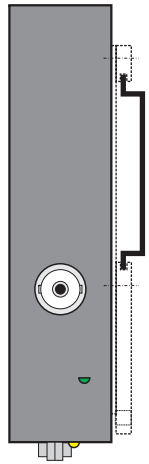
Option

MANNER®
Sensortelemetrie

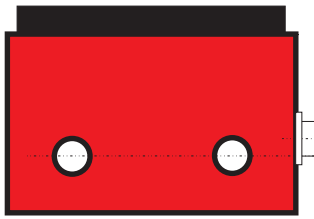
Torque Measuring System with Digital Evaluation Unit

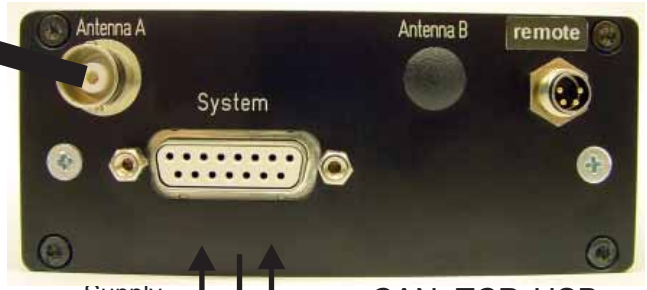


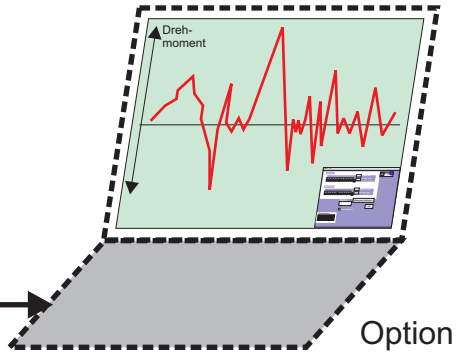




Mounting type: NS 35/7,5, NS 35/15
(option)







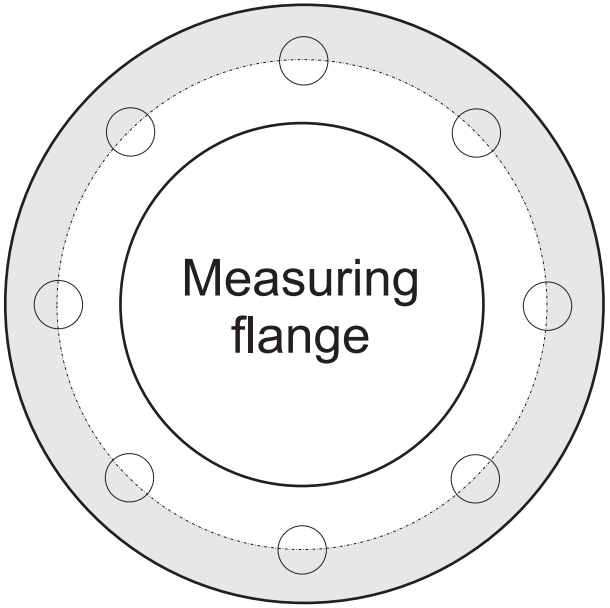
Supply
Data

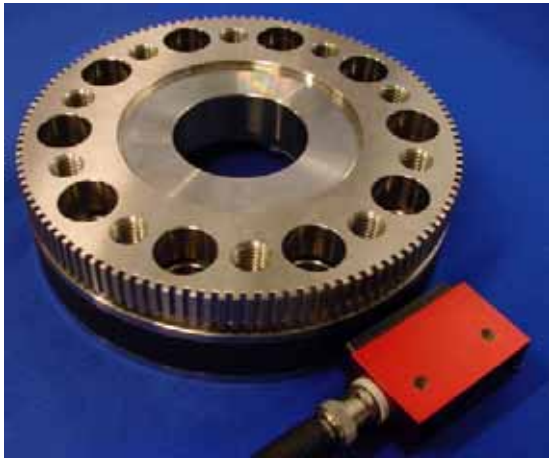
0..+/-10V
0..20mA

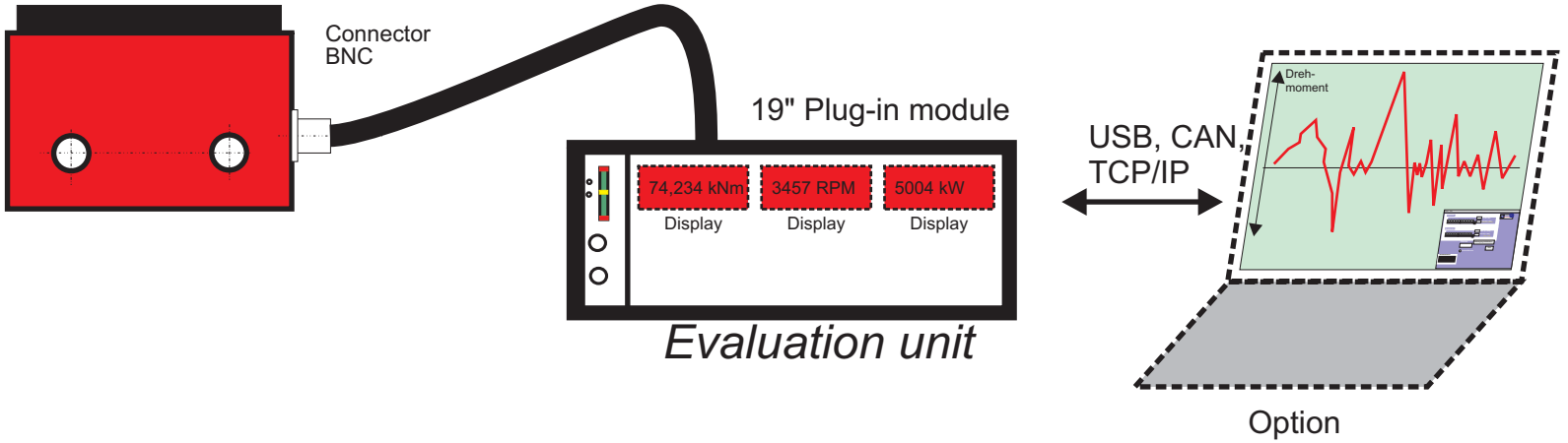
CAN, TCP, USB

MANNER®
Sensortelemetrie

Torque Measuring System with 19" Evaluation Unit

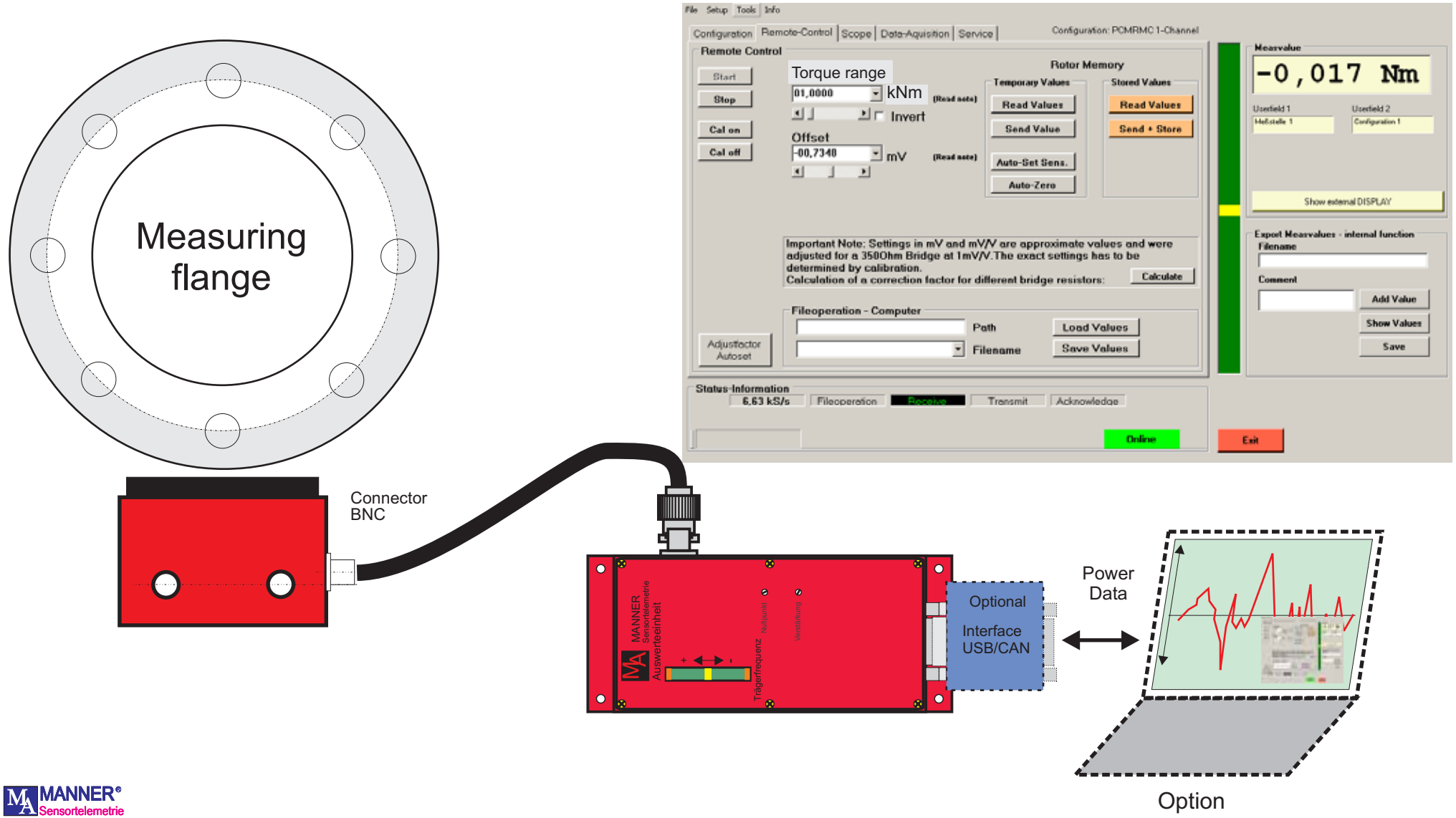




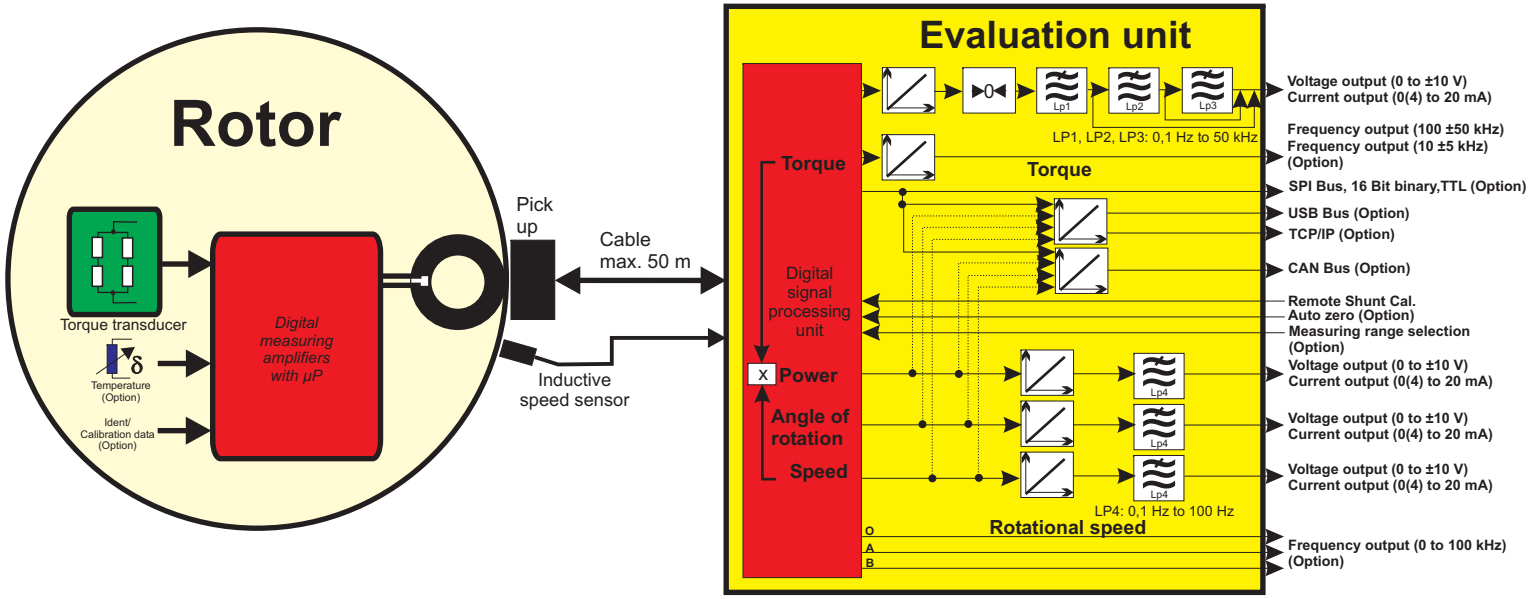


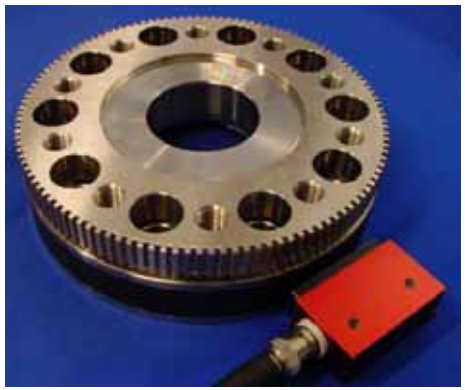
MANNER® Sensortelemetrie

Torque Measuring System with Compact Evaluation Unit

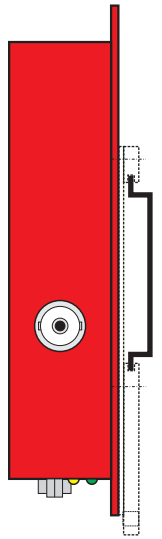


Block Diagram / Signal Flow of Digital Torque Flange / Shaft





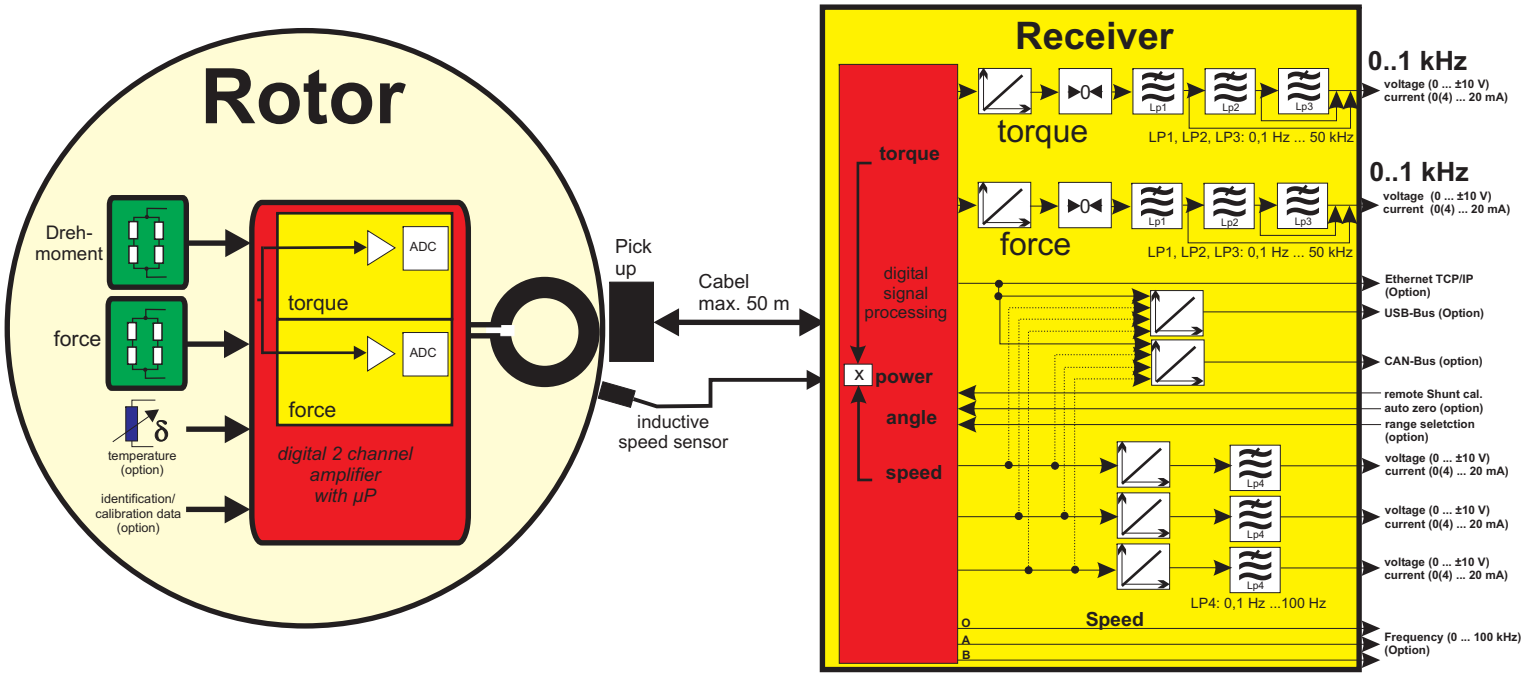
Compact evaluation unit

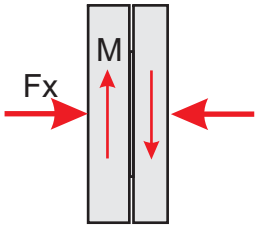


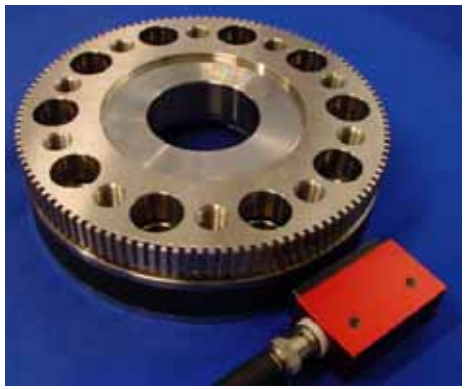
Mounting type: NS 35/7,5, NS 35/15 (option)

MANNER® Sensortelemetrie

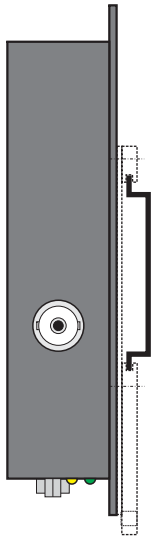
Block Diagram / Signal Flow digital
Torque Flange with integrated Force Sensor (2 Channels)







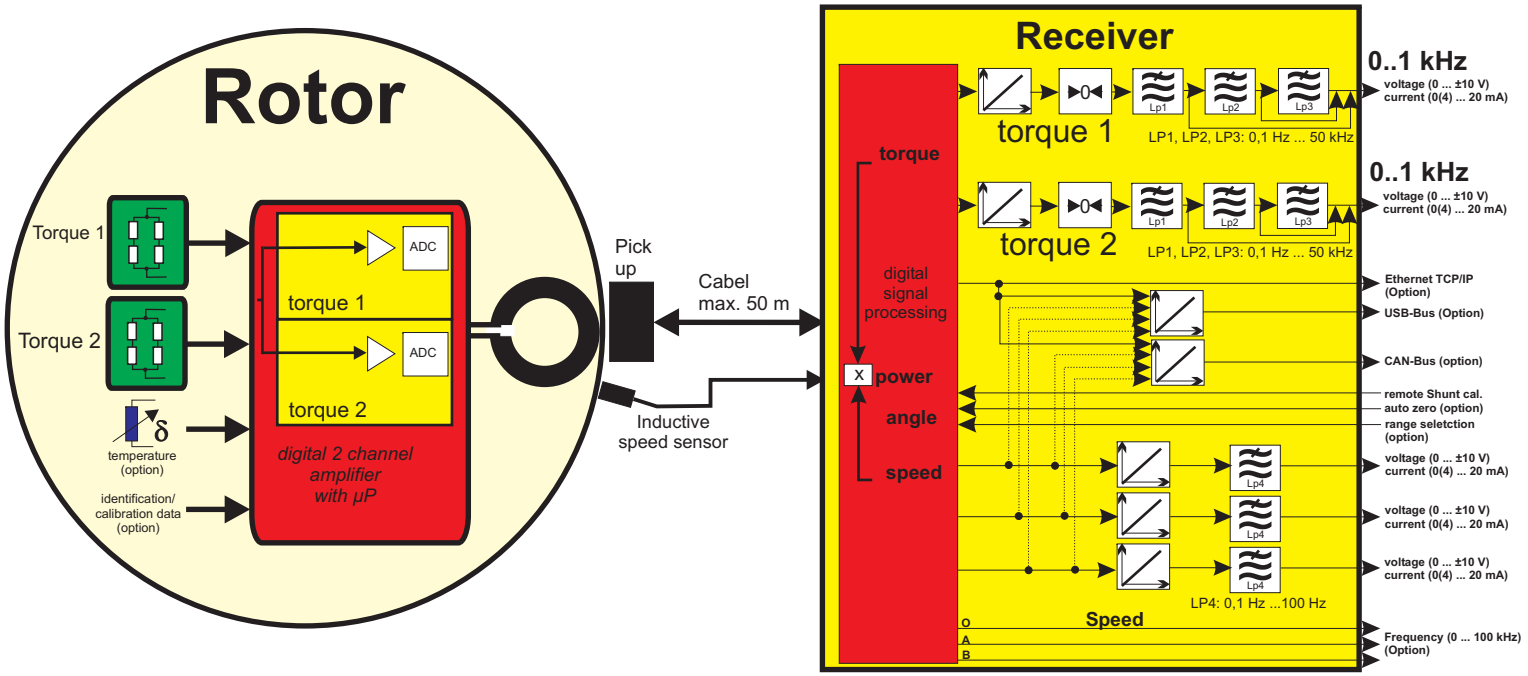
receiver

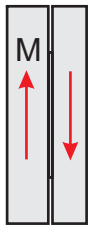


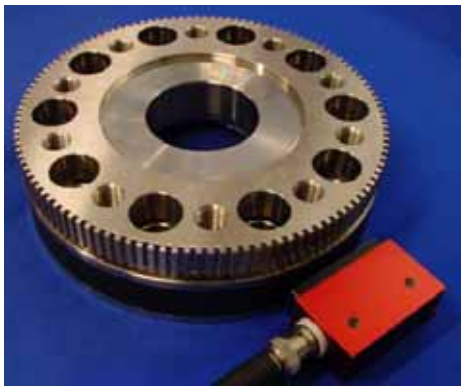
Mounting type: NS 35/7,5, NS 35/15
(option)

MANNER® Sensortelemetrie

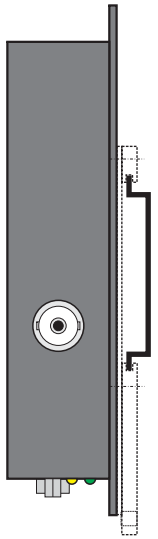
Block Diagram / Signal Flow digital simultaneous double Range Torque Flange / Shaft (2 Channels)







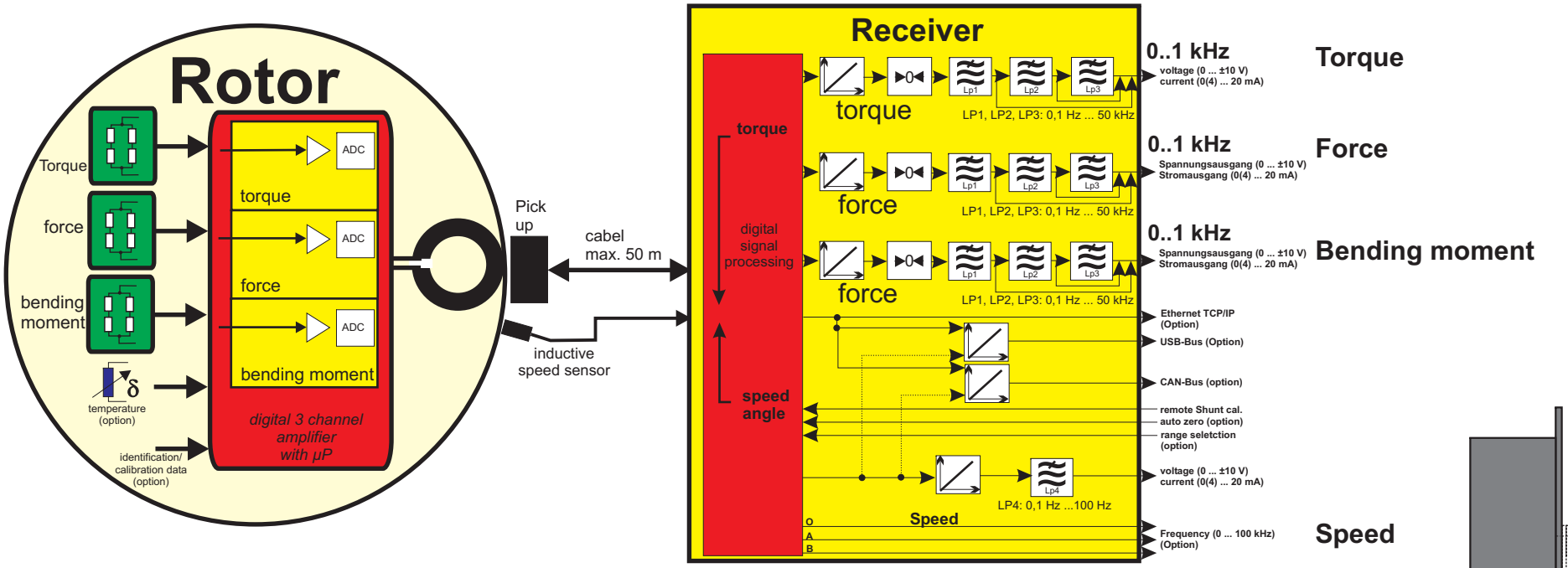
Receiver

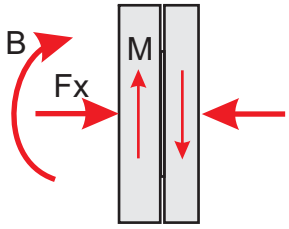


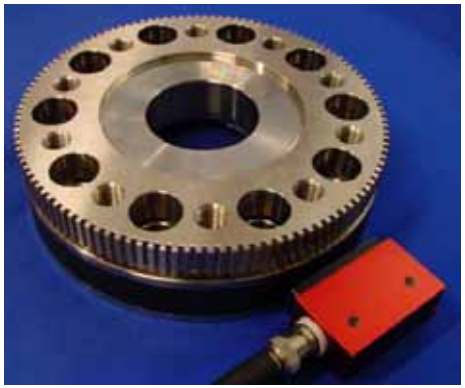
Mounting type: NS 35/7,5, NS 35/15 (option)

MANNER® Sensortelemetrie

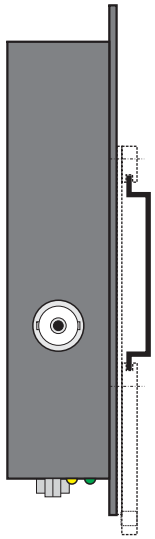
Block Diagram / Signal Flow digital
Combination Flange Torque, axial Force, bending Moment (3 Channels)







Receiver



Mounting type: NS 35/7,5, NS 35/15 (option)

MANNER® Sensortelemetrie

General Specification Torque Transducer MW...

Torque

Deviation of Linearity including hysteresis (total system, related to M_{Nom})
Digital / analog: <0.1 % (0.05 %, 0.03 % Option)

Repeatability
(DIN 1319, standard deviation): <±0.03 %

Available Output Signals
Voltage: 0 to ±10 V (rated to torque range), $R_{internal}$ = 50 Ω
Current: 0(4) to 20 mA (rated to torque range), max. load = 300 Ω
Frequency: 100 ±50 kHz (rated to torque range), $R_{internal}$ = 50 Ω
SPI Bus (Data, Clock, Frame)
USB Bus
CAN Bus

Available Signal Bandwidth (Low pass filter 5th order Bessel):
Group delay time:

Bandwidth	Frequency / Digital	Analog
10 Hz (-3 dB):	60 ms	100 ms
100 Hz (-3 dB):	6 ms	10 ms
1 kHz (-3 dB):	**600 µs**	**1,000 µs**
10 kHz (-3 dB):	120 µs	200 µs
50 kHz (-3 dB):	20 µs	40 µs

Option switchable low pass filter

Resolution electrical signal: 16 Bit
Residual signal ripple output voltage: <5 mV
Remote controlled shunt signal: 80 % of M_{Nom}

Temperature drift per 10 K of the output signal
Zero point (rated to M_{Nom}, total system)
Analog output: ±0.05 % (±0.01 % Option)
Digital / frequency output: ±0.04 % (±0.005 % Option)
Signal span (rated to M_{Nom}, total system)
Analog output: ±0.05 % (±0.02 % Option)
Digital / frequency output: ±0.03 % (±0.01 % Option)

Long-term drift over 48 hours (votage output): <3 mV

EMC: Emission per EN6126
RFI voltage \ power \ field strength: Class A
Immunity from interference (EN61326-1)
Electromagnetic field: 30 V/m
Magnetic field: 50 A/m
ESD: 10 kV

Degree of protection (EN 60529): IP54 (IP65 Option)

Reference temperature: 23 °C
Working temperature: -10 to +85 °C (-45 to +160 °C Option)
Storage temperature: -25 to +90 °C (-55 to +170 °C Option)

Vibration resistance: 1,000 g for 1 h
Impact resistance: 2,000 g
Balance quality per DIN ISO 1940: see type
Max. axial displacement (flange to pick up): <1.5 mm
Max. radial distance (flange to pick up): 0.3 to 2 mm (0 to 20 mm)

Max. loads
Max. torque (related to M_{Nom}): 400 % (800 % Option)
Breaking torque (related to M_{Nom}): 800 % (1600 % Option)
Oscillation (peak to peak) DIN 50100 (related to M_{Nom}): 300 %

Speed system

Type: massive toothed rim, inductive pick up
Number of increments: see special data sheet
Outputs
1 trace: digital TTL
2 trace: digital TTL, 90° phase shift (Option)
Analog output range: 0 to +10 V, related to $speed_{Nom}$ (Option), $R_{internal}$ = 50 Ω
Bandwidth: 100 Hz (-3dB)
Group delay time (digital): <10 µs
Temperature drift: <0.02 % of related $speed_{Nom}$

Pick up 8a

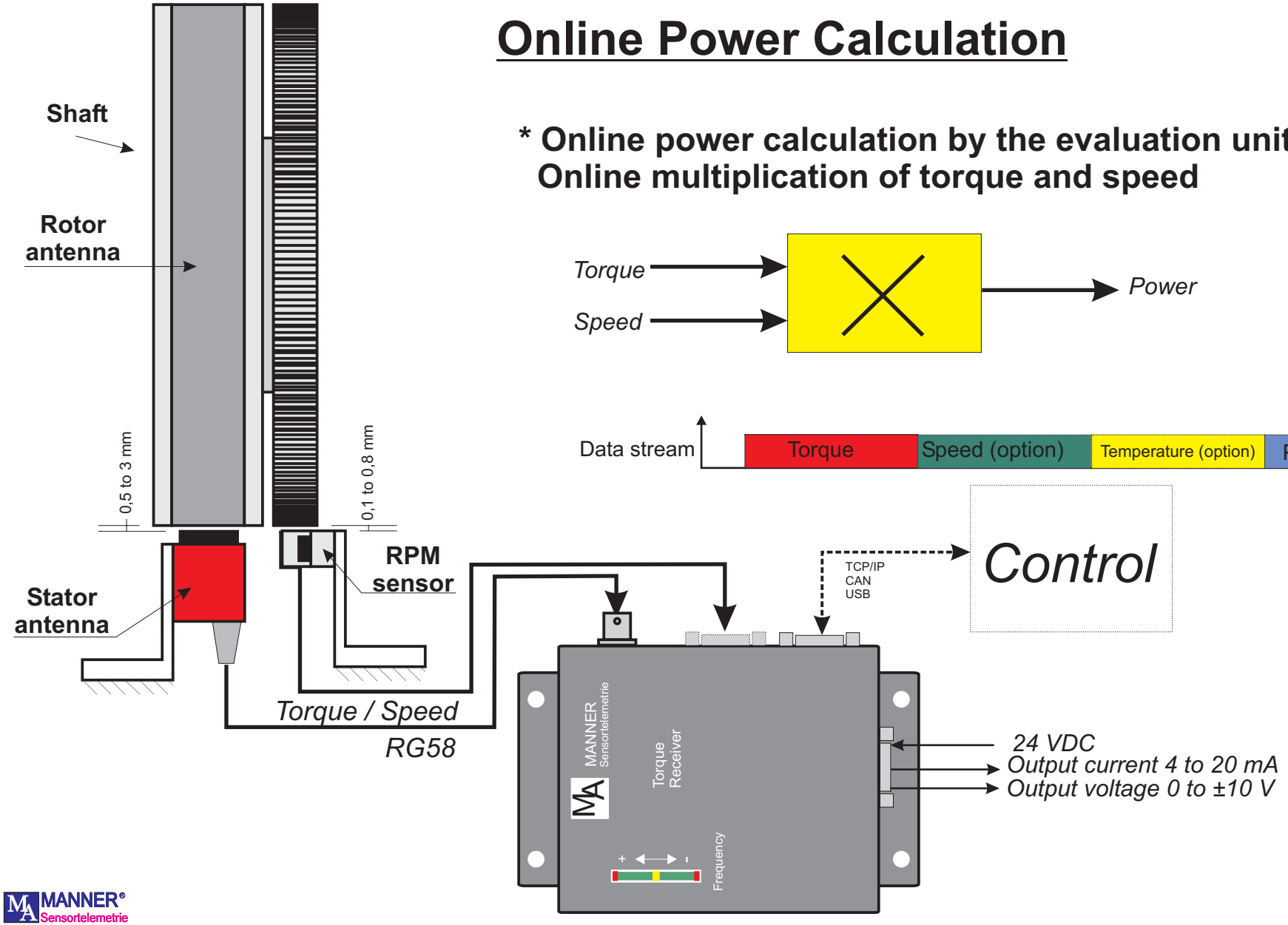
Weight: 0.1 kg
Dimensions: 50 x 35 x 20 mm (60 x 55 x 40 mm Option)

Receivers

(available types)
Receiver compact supply: 24 V DC, 1 A, (9 to 36 V DC Option)
Receiver plug-in card 19" Rack supply: ±15 V DC, 1 A
19" Rack supply: 90 to 270 V AC, 50 / 60 Hz

Online Power Calculation

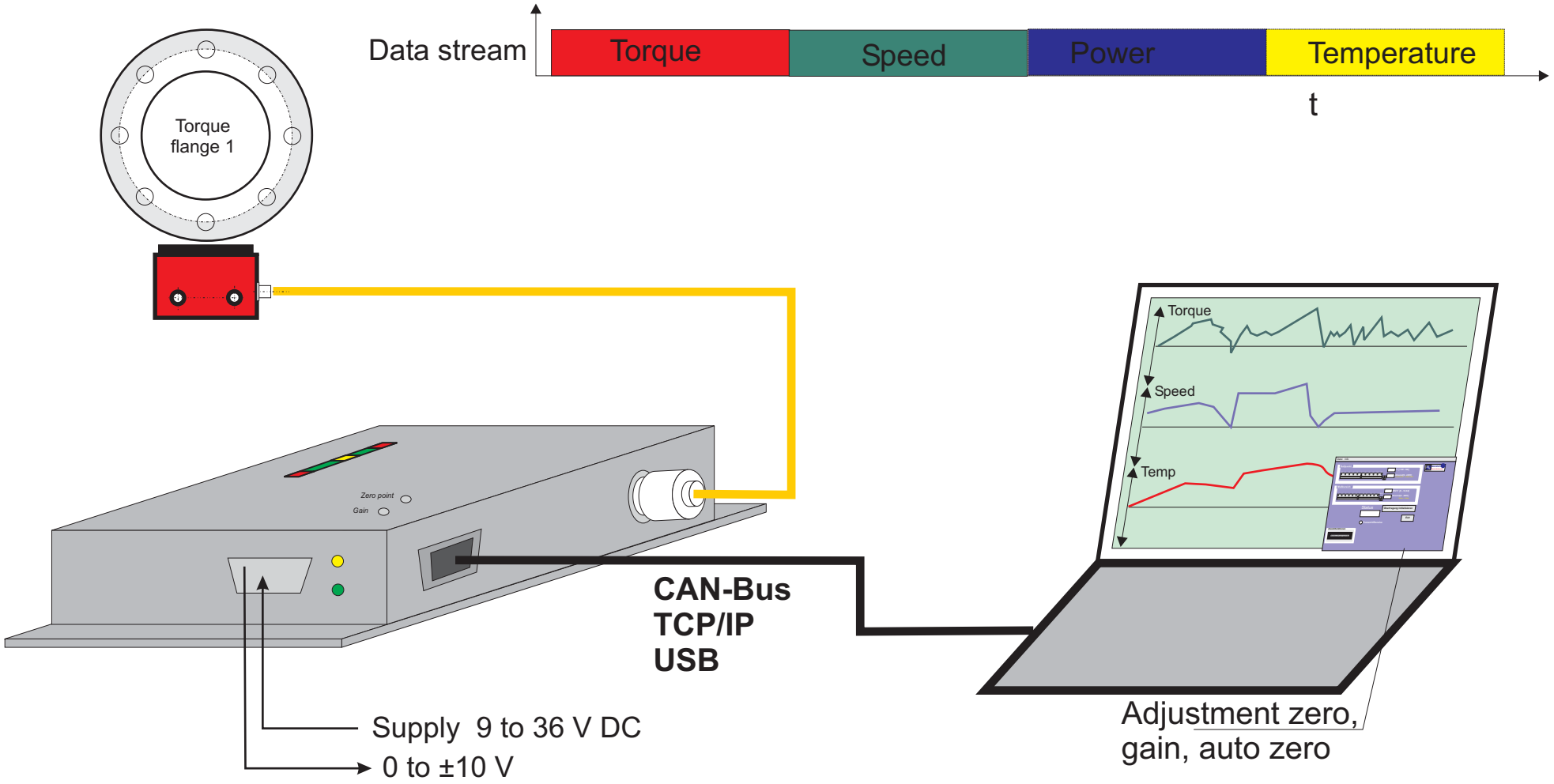
*** Online power calculation by the evaluation unit**
Online multiplication of torque and speed



MANNER® Sensortelemetrie

Configuration

(direct signal data acquisition,torque, no analog output)



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Data Recording Software

(Software package data acquisition - optional)

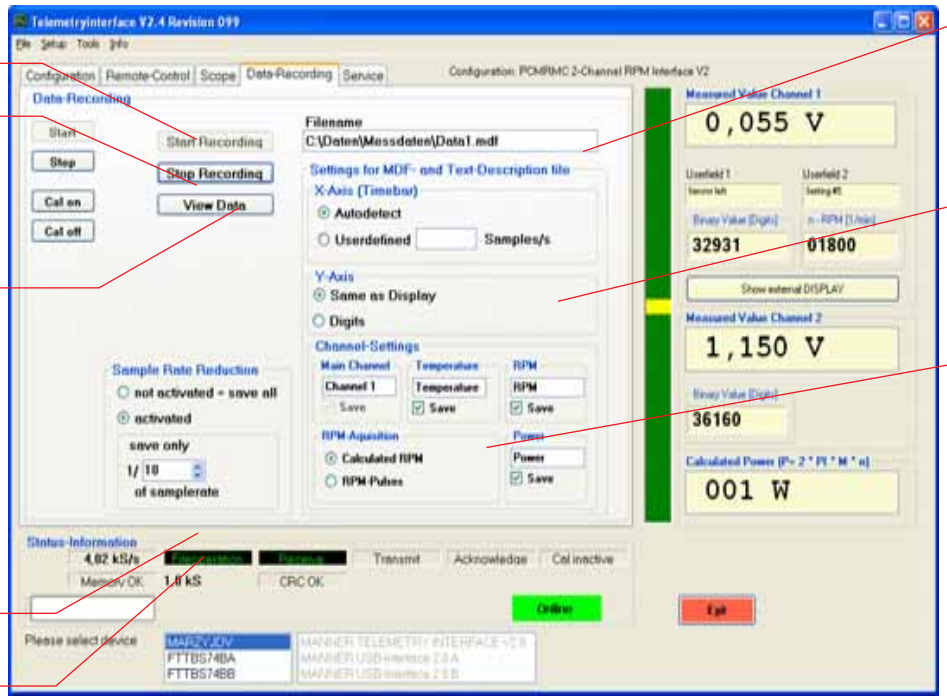
Start recording into a file

Stop recording into a file

Show data with additional external viewer PVIEW - if installed

Display file operation activity

Number of saved samples



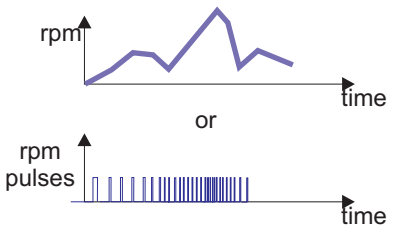
Input field for path and file name

Additional information, which is saved in the description files

Option for RPM-systems save calculated rpm or save rpm-pulses to datafile

On menue setup, there is the possibility to activate an averaging for the calculated rpm.
For option 'Calculated RPM' take care of the correct setting at configuration (Samplerate).

No other program must be active at the PC while recording data into a file.
This can effect a loss of data.



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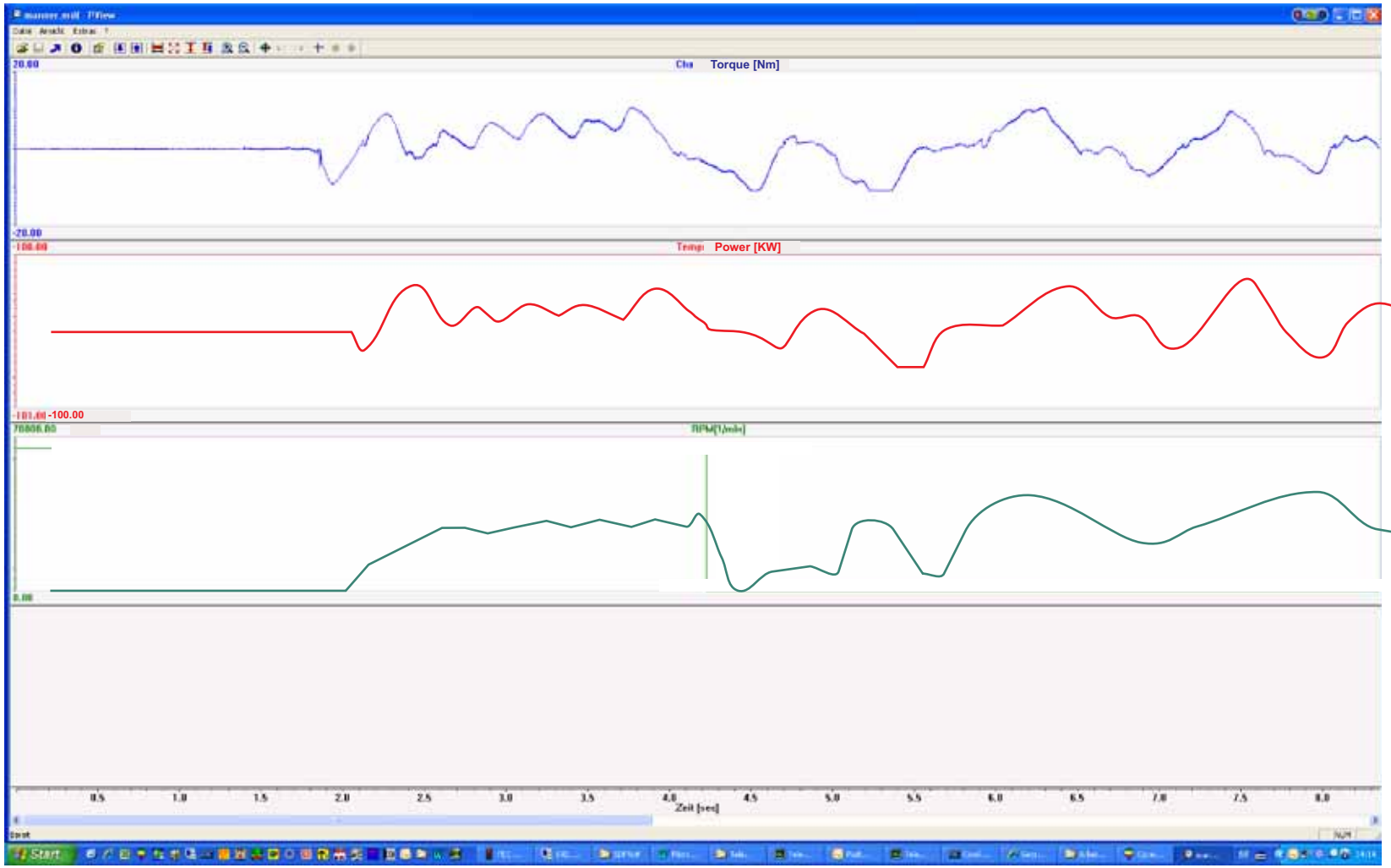
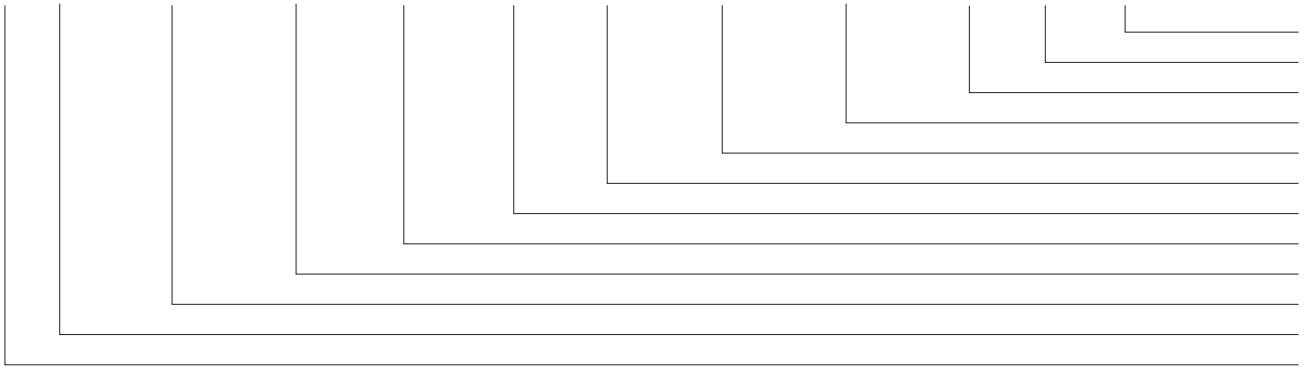
Data Display Software Pview

(Software package data acquisition - optional)

Visualisation of recorded Datas



MANNER® Sensortelemetrie

Product Key Special Torque Sensors

Type: MW<x>_<range>_ <accuracy>_<temp>_<Freq>_<sys>_<mod>_<bandwidth>_<rmc>_<wa>_<Dz>