Digital RMC-Sensor-Telemetry with 16 Bit resolution and direct PC Interface

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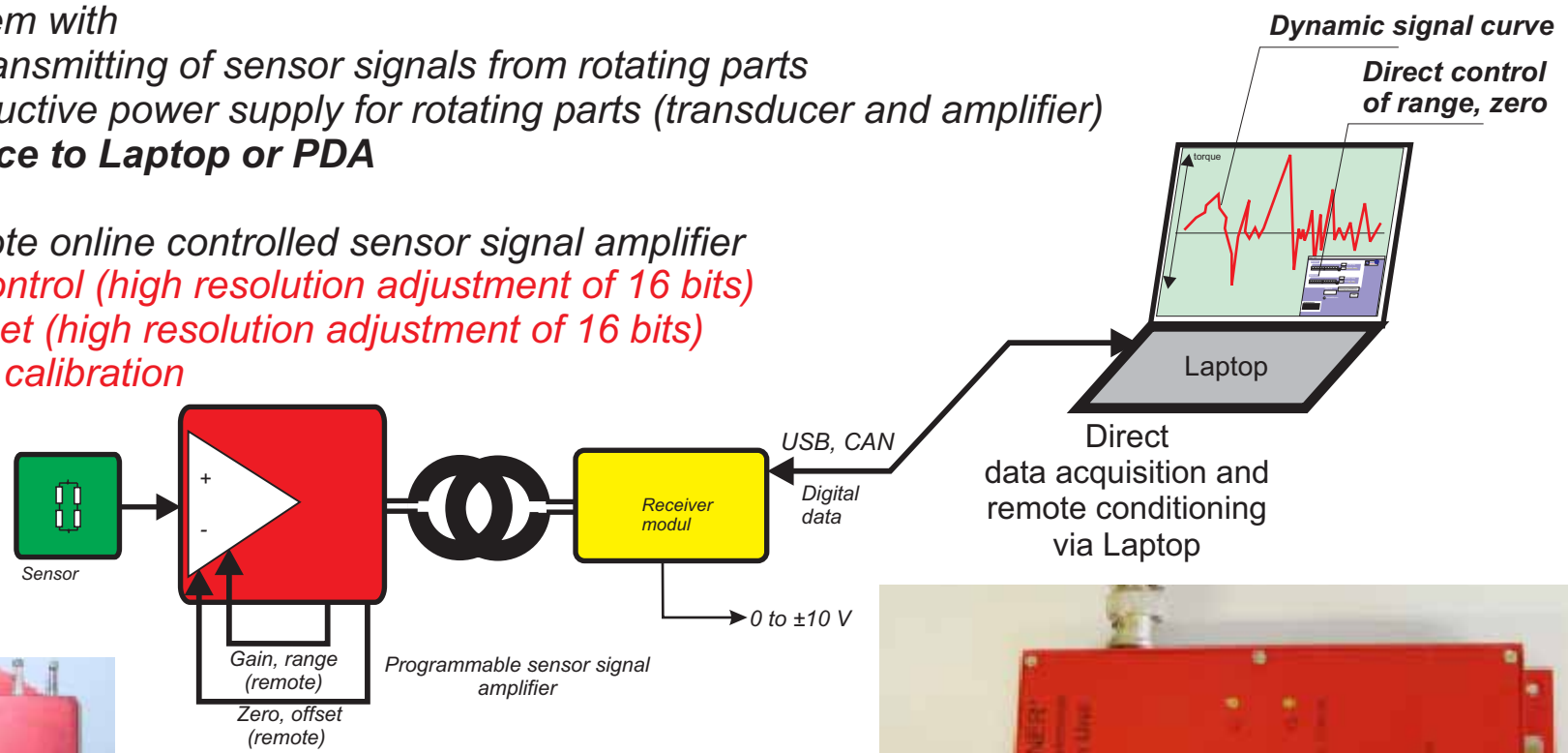
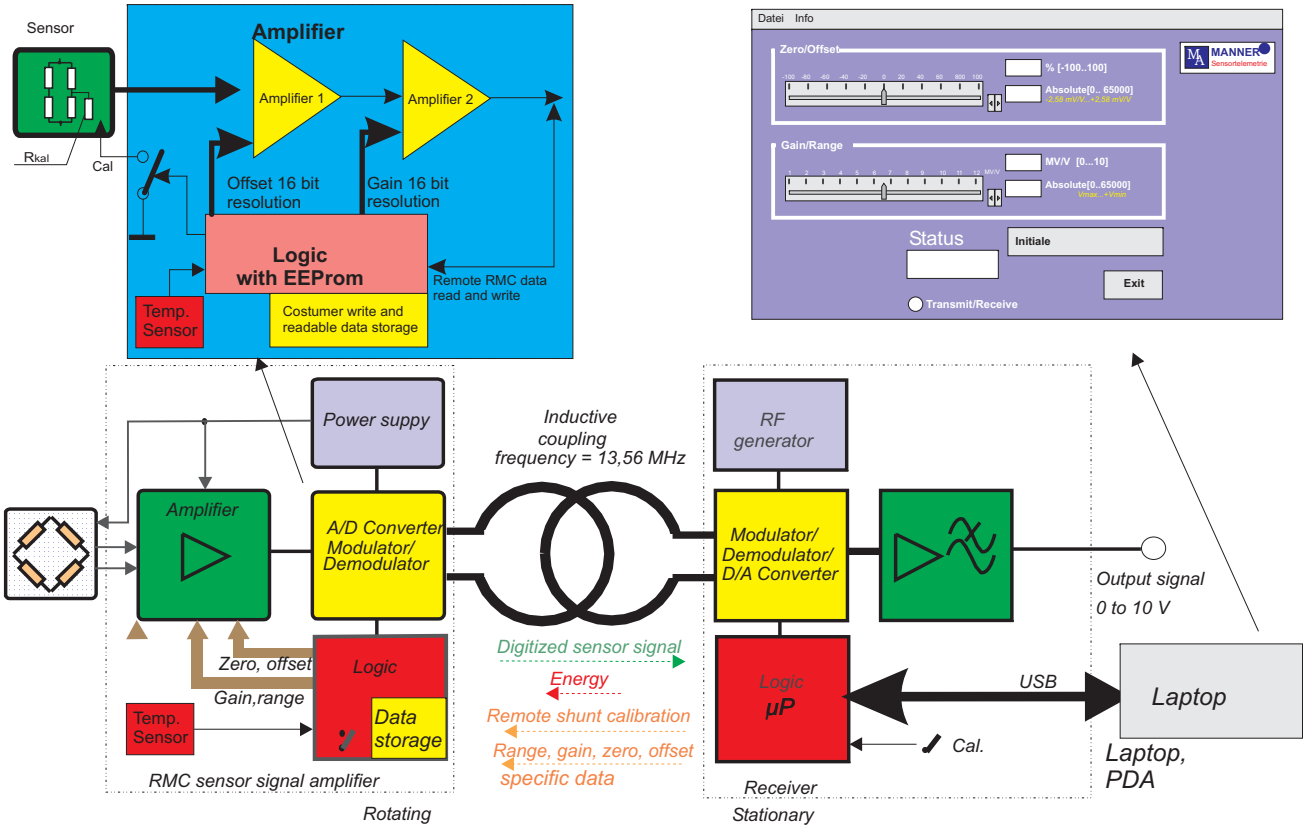
What is RMC-Sensor-Telemetry ?

Telemetry system with
** contactless transmitting of sensor signals from rotating parts*
** integrated inductive power supply for rotating parts (transducer and amplifier)*
**** direct interface to Laptop or PDA***
and
integrated remote online controlled sensor signal amplifier
** Gain, range control (high resolution adjustment of 16 bits)*
** Zeropoint, offset (high resolution adjustment of 16 bits)*
** Remote shunt calibration*



How does RMC-Sensor-Telemetry work ?

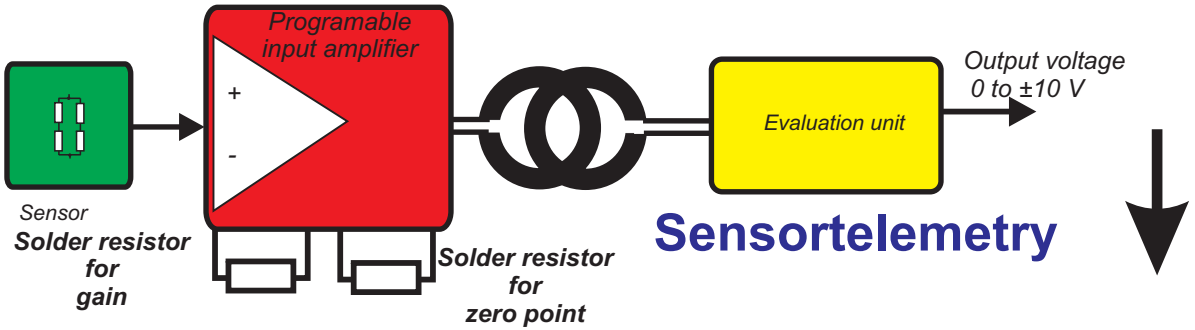


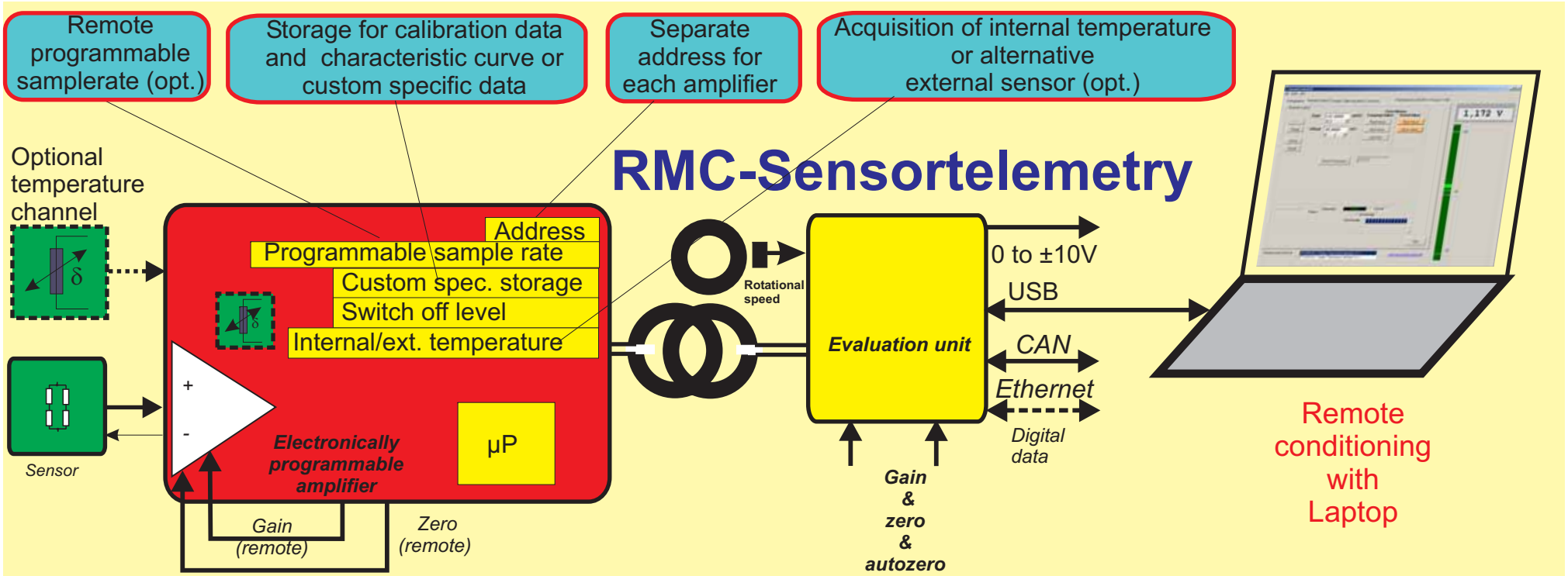
The control data for gain and zero will be online transfered via the telemetry channel

Features:

* *Remote high resolution adjustment (16 bit) of gain, range (0,05 mV/V to 10 mV/V)*
* *Auto zero*
* *Remote high resolution adjustment (16 bit) zero, offset (±500% from the adjusted range)*
* *Digitalizing of sensor signal with 16 bit resolution inside sensor signal amplifier*
* *Integrated sensor signal amplifier for direct interface of strain gage: standard: strain gage, PT100, Option: thermocouple, piezoelectric, ICP, LVDT*
* *Remote shunt calibration (option)*
* *Integrated power supply for transducer and amplifier*
* *Very small zero/gain drift: 0,003%/°C*
* *Very good linearity : <0,003%*
* *environment temperature: -25 to +125°C (-45 to +160°C, Option)*
* *Housing: IP67*
* *Integrated speed sensor (option)*
* *Serial interface USB, direct control of gain and zero by Laptop, PDA*
* *Additional int. temperature channel (via digital interface)*
* *Read/writeable integrated memory for calibration sheet*

Remote programmable Sensor Telemetry





Remote controlled range (online via telemetry channel)

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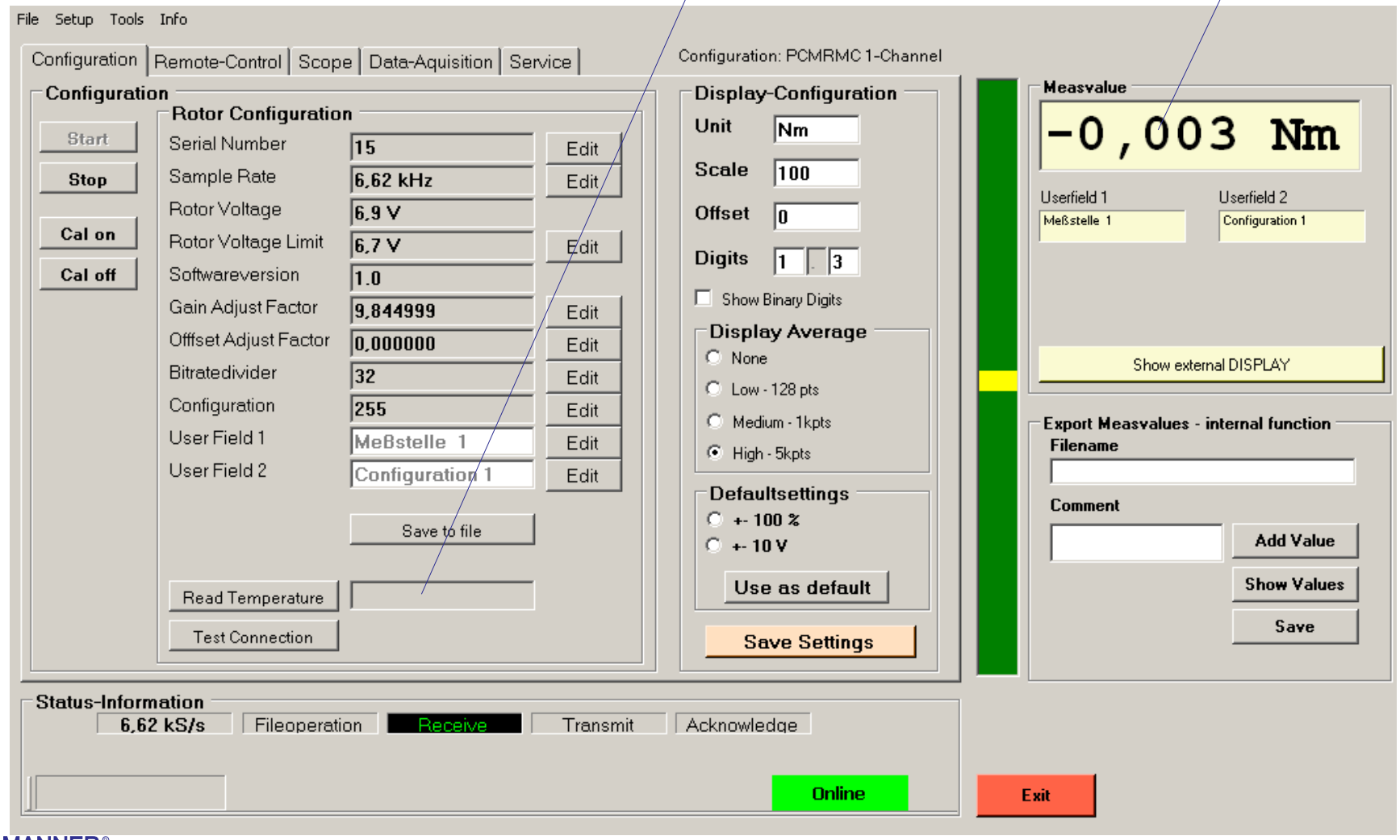
Mask 1
Basis

Actual torque value reading

External / internal temperature



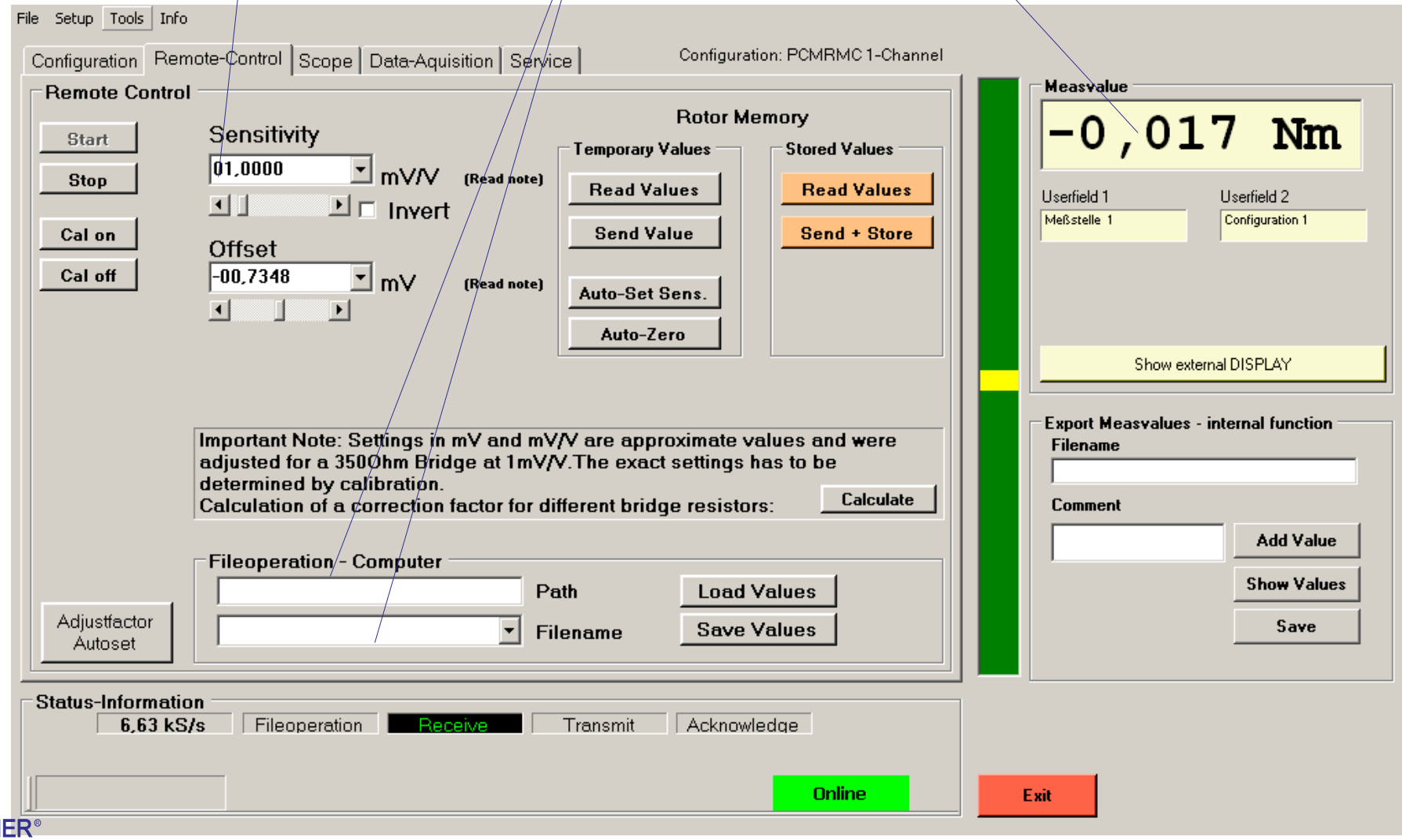
Mask 2
Remote Control

Storage of conditioning data

Fine adjustment of gain
16 bit resolution

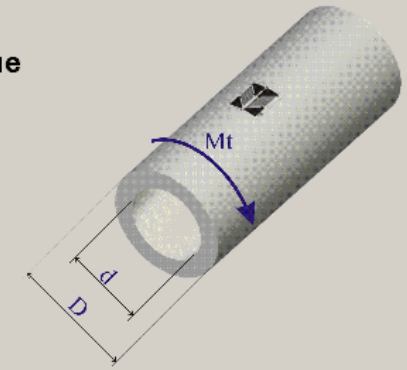
Autozero

Actual torque value reading



Mask 3
Calculation of Gain

M_t	1000	[Nm]	Moment of torosion, torque
D	60	[mm]	Outside Diameter
d	56	[mm]	Core Diameter
			Material
E	210000	[N/mm²]	E-Module
ν	0,32	[1]	Transvers Elasticity
k	2,2	[1]	K-Factor Strain Gage
n	4	[1]	Strain Gage Bridge Factor
Rb	350	[Ohm]	Bridge Resistance (for Calculation of the Cal-Resistor)



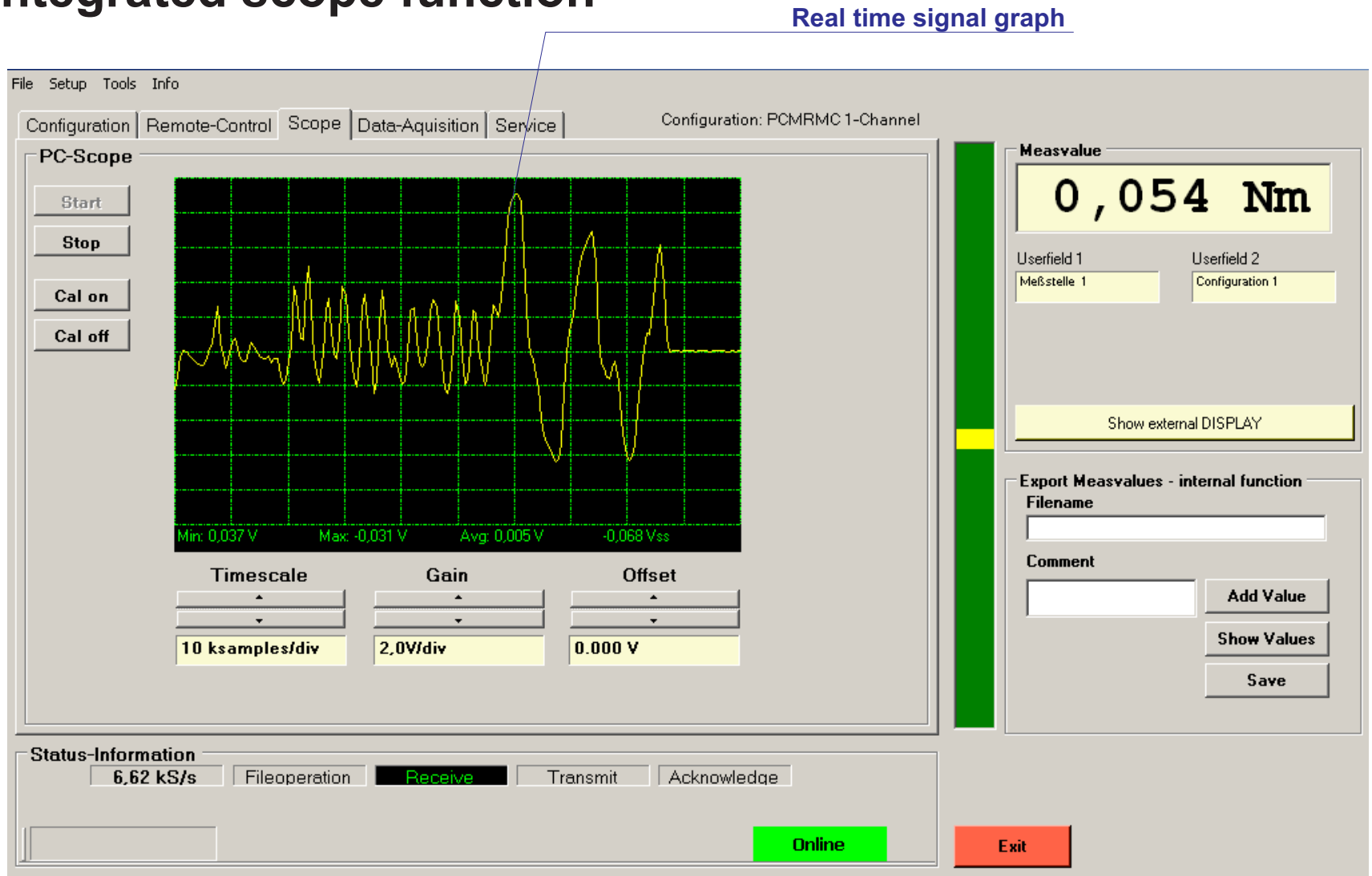
Calculate

e_0		[mV/V]	Sensitivity for unloaded bridge
Rcal		[kOhm]	Cal-Resistor for 80% Excitation

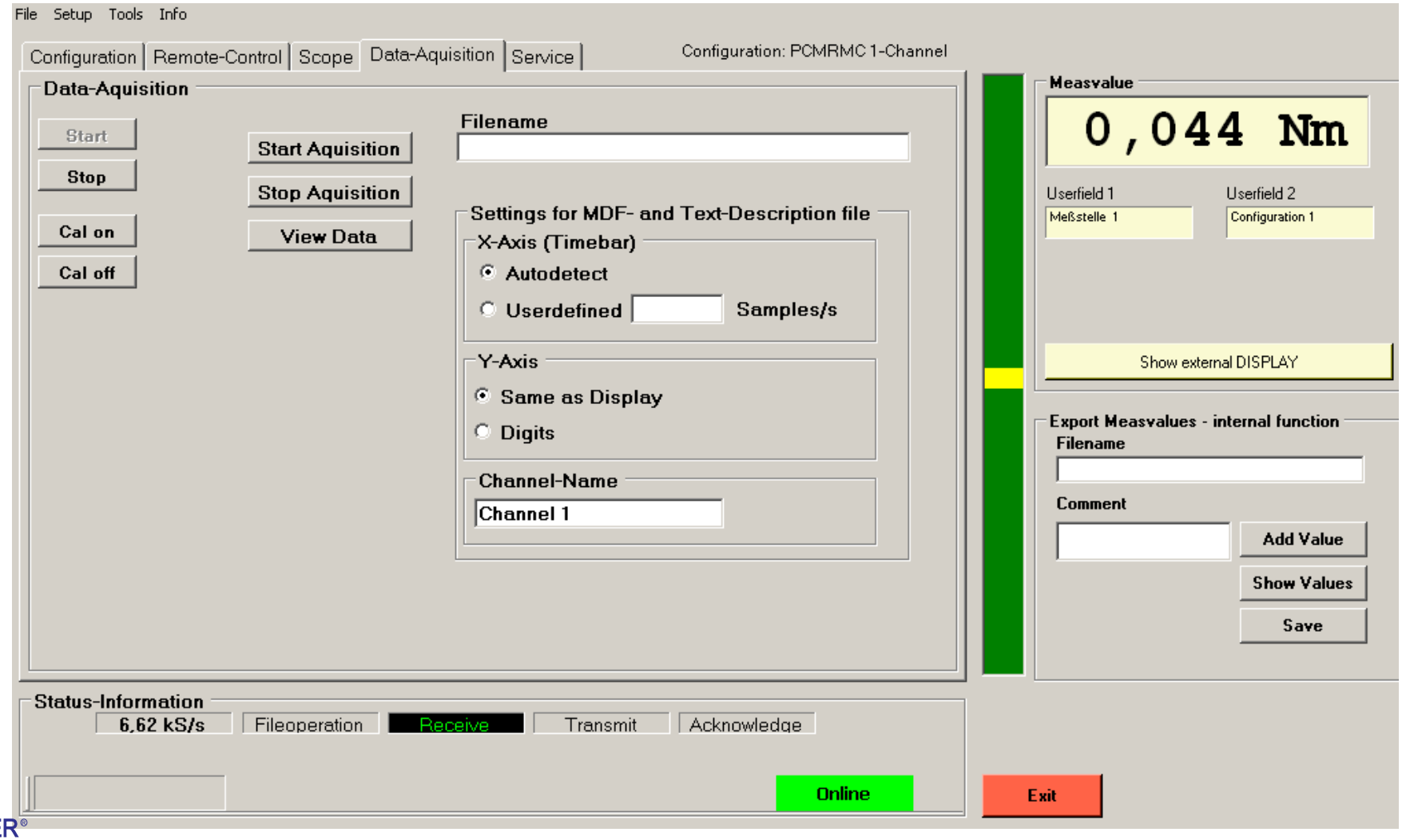
=> Copy Value to Clipboard

Exit

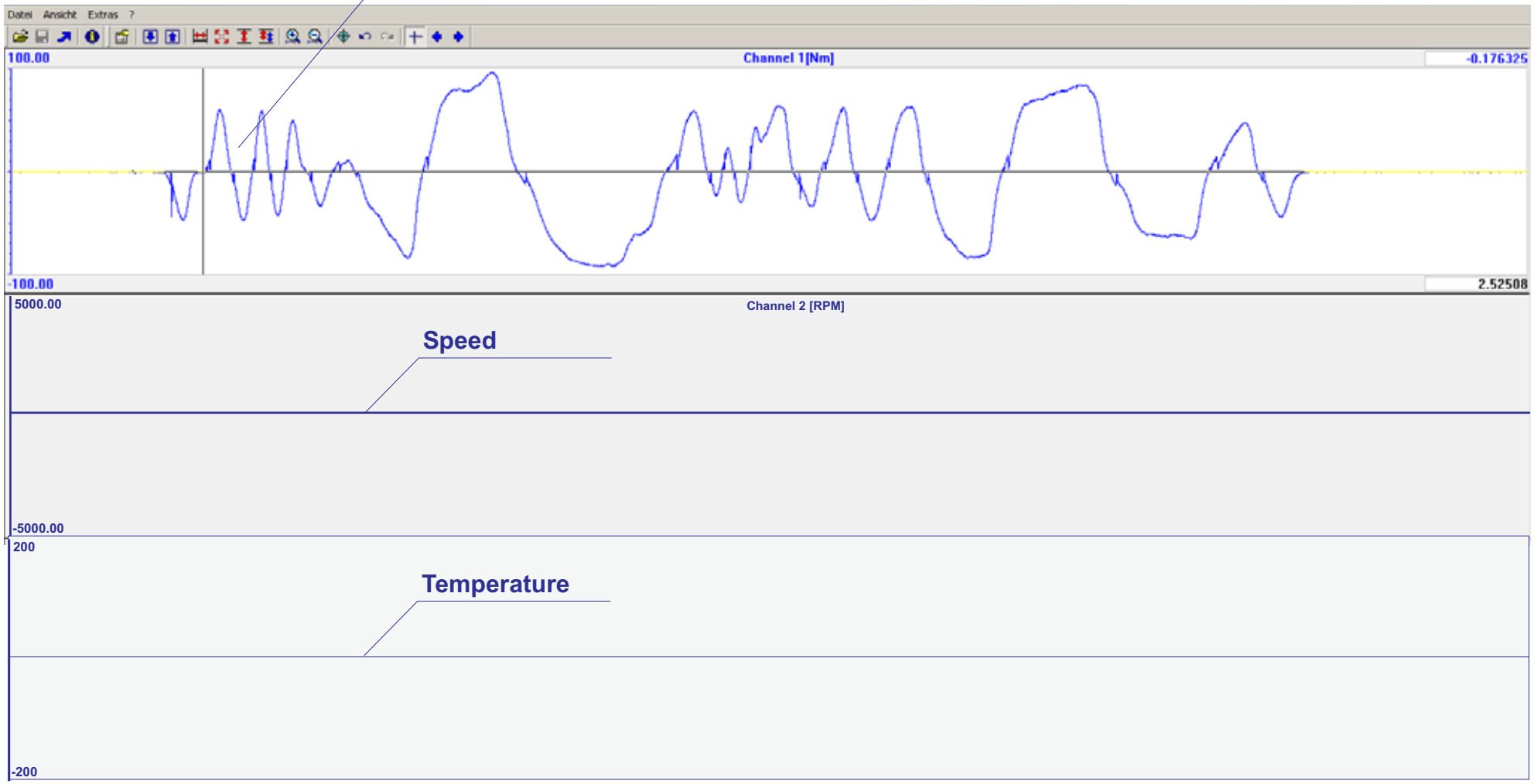
Mask 4
Integrated scope function



Mask 5
Online signal recording (mdf format) (torque, speed, temperature)



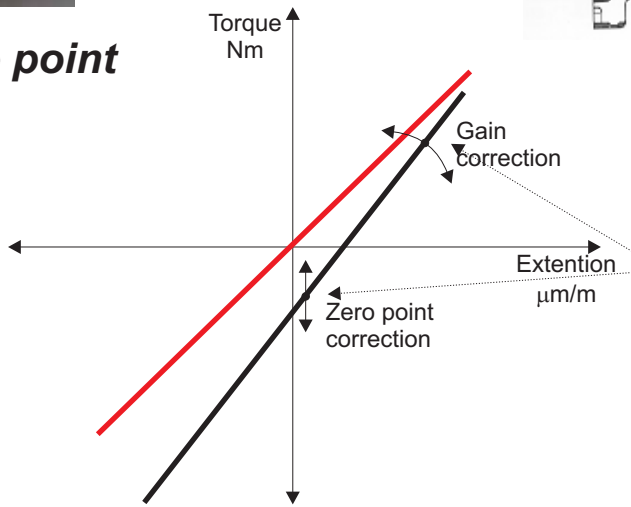
Mask 6
Data records



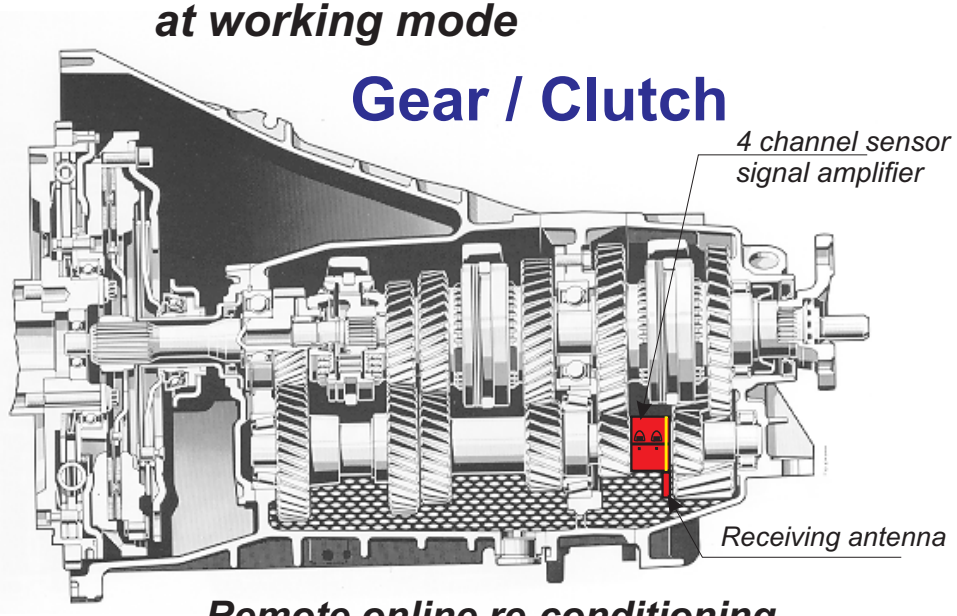
Why RMC-Sensor-Telemetry?

Initial remote setup of the of strain gage application at installation

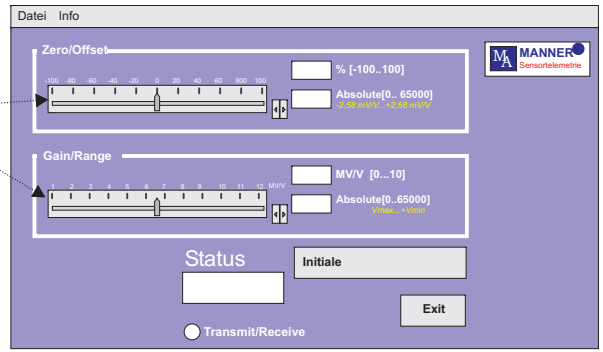
Adjusting tolerances in zero point
Adjusting tolerances in gain



No access to the rotor electronic at working mode



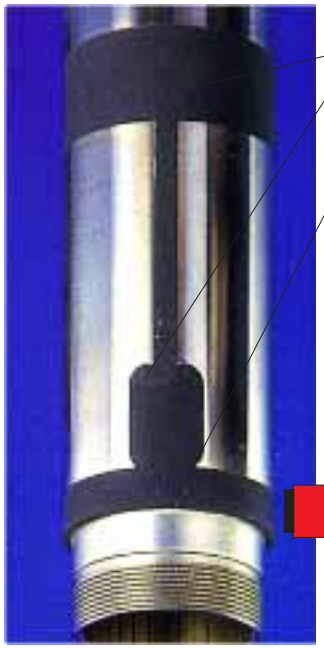
Remote online re-conditioning without opening the gear possible



Why RMC-Sensor-Telemetry?
fully sealed torque transducer

Initial remote setup of the torque sensor (range, zero) after sealing and re-setup at recalibration

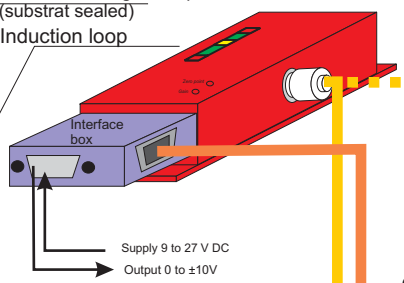
Custom spec. completely sealed torque transducer (water proof)



Strain gage encapsulated

RMC-Sensor signal amplifier (substrat sealed)

Induction loop

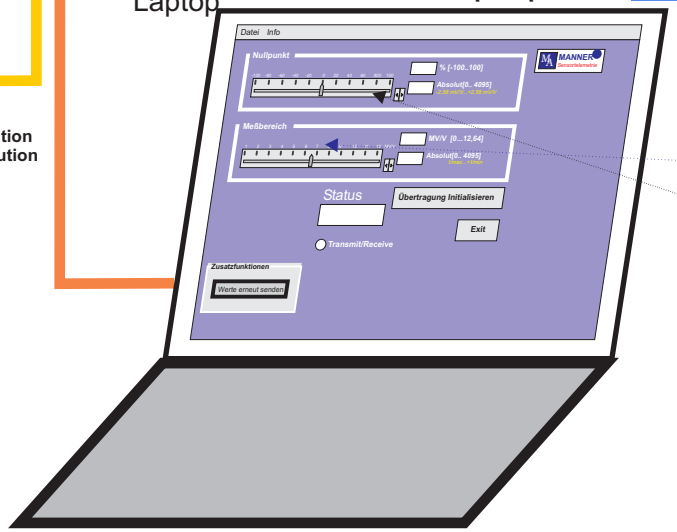


Sensorsignal amplifier in metal housing

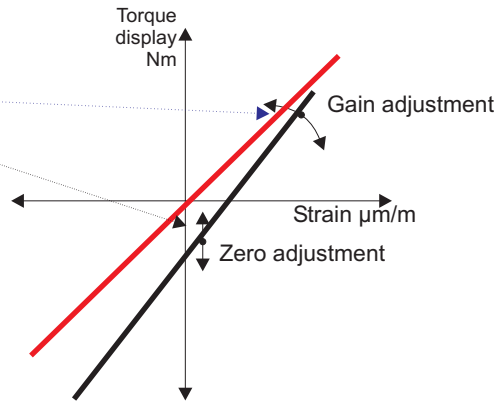
Axle shaft application

Remote conditioning with Laptop

Laptop



*** Zero adjustment with 16 bits resolution**
*** Gain adjustment with 16 bits resolution**
*** EE storage inside rotor electronic**



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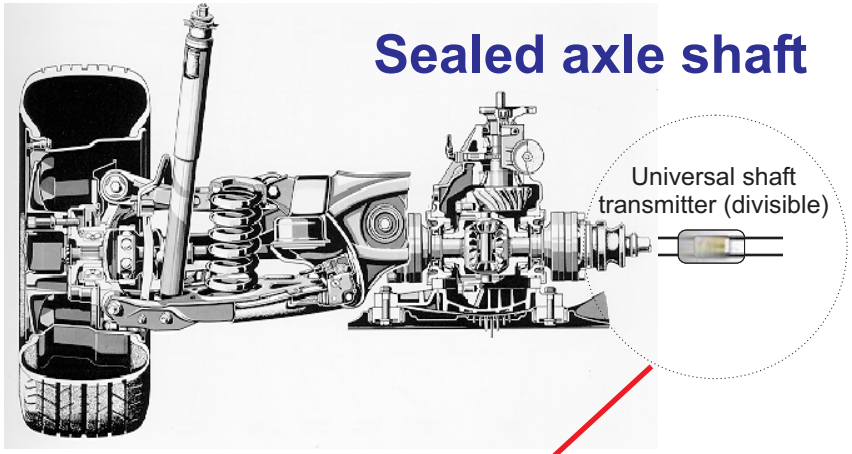
Why RMC-Sensor-Telemetry?



No access to the rotor electronic

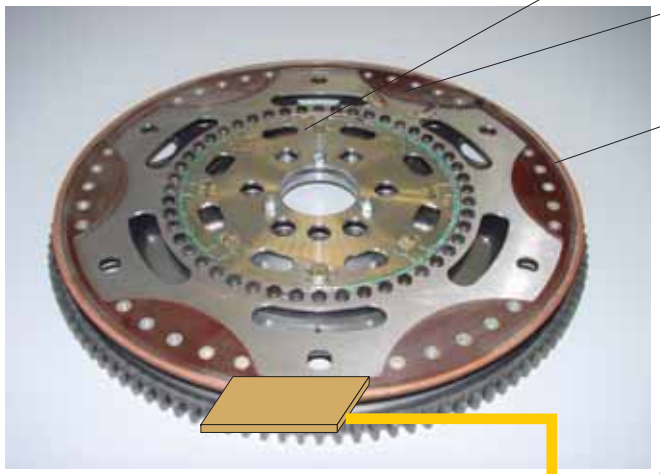
Multi channel sensortelemetry

Many channels (helicopters, turbines) >>
Big work load for conditioning

Why RMC-Sensor-Telemetry?

Change of torque range online possible !!!

Custom spec. flex plate torque transducer (car)



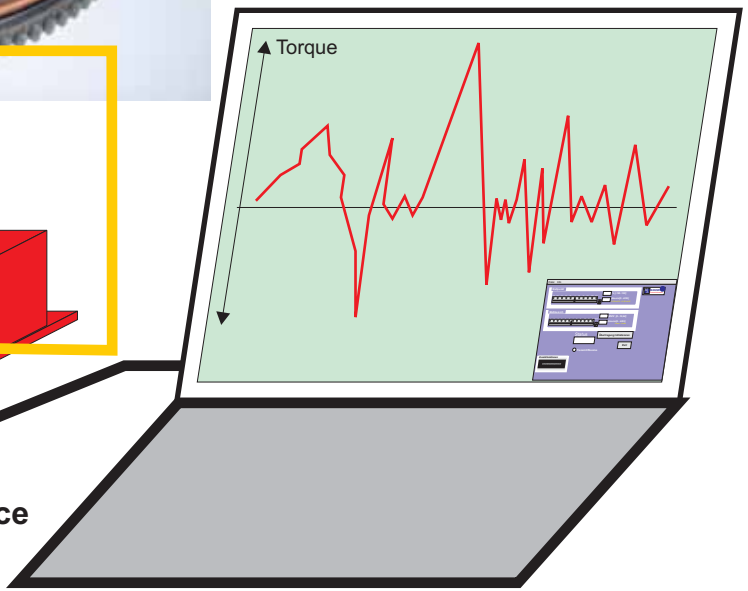
Torque transducer

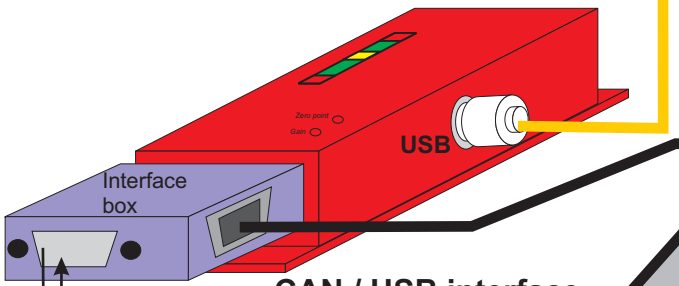
RMC-Sensor signal amplifier

Induction loop

Pick up

Laptop or PDA





CAN / USB interface

Supply 9 to 27 V DC

0 to ±10 V

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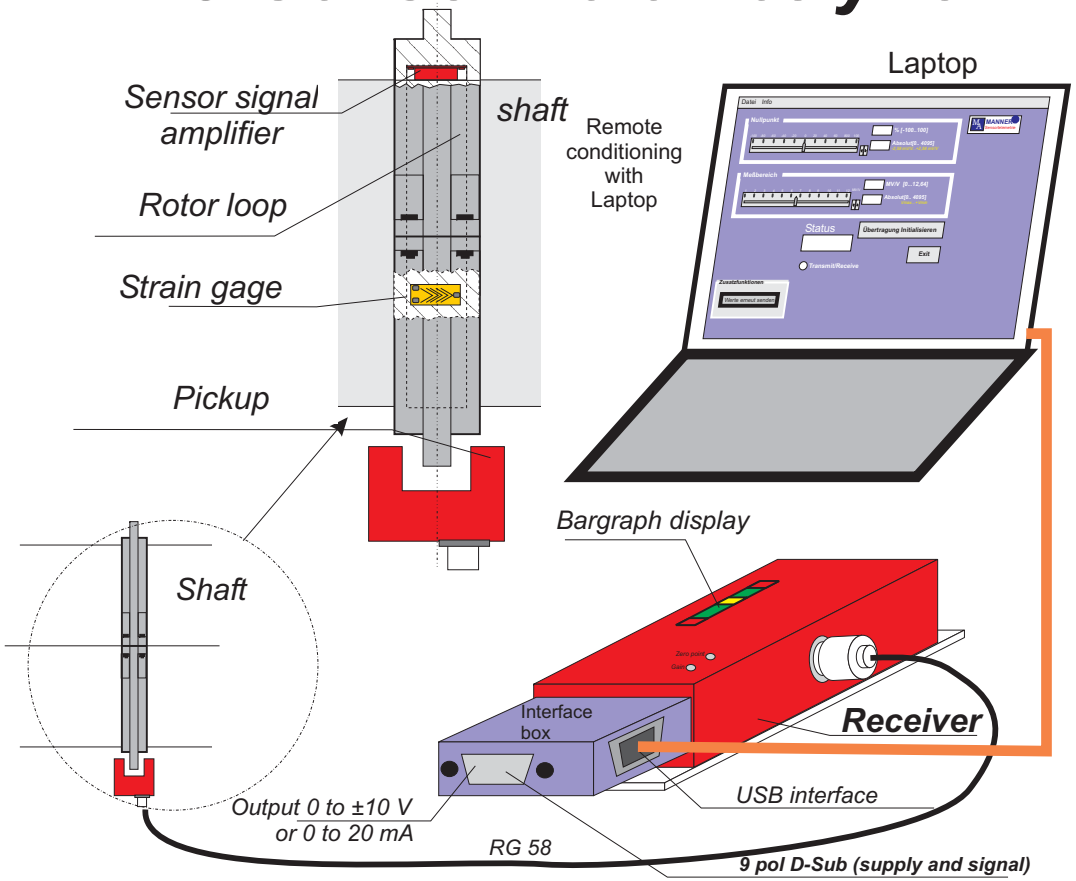
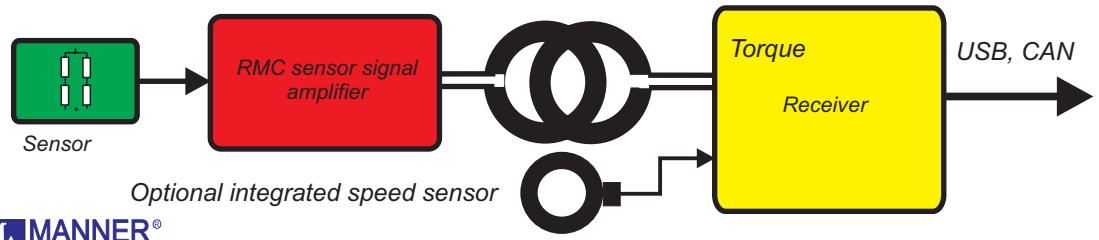
RMC Sensor Telemetry for Power Monitoring on Ships





Advantages:

* Easy mounting
* Initial remote setup (condition) of the torque sensor at installation
* Integrated speed pick up (option)
* Direct display of torque on Laptop or PDA
* Remote online re-adjustment of torque (power) range possible
* Serial transmitting of digital data to monitoring system

Rotor loop

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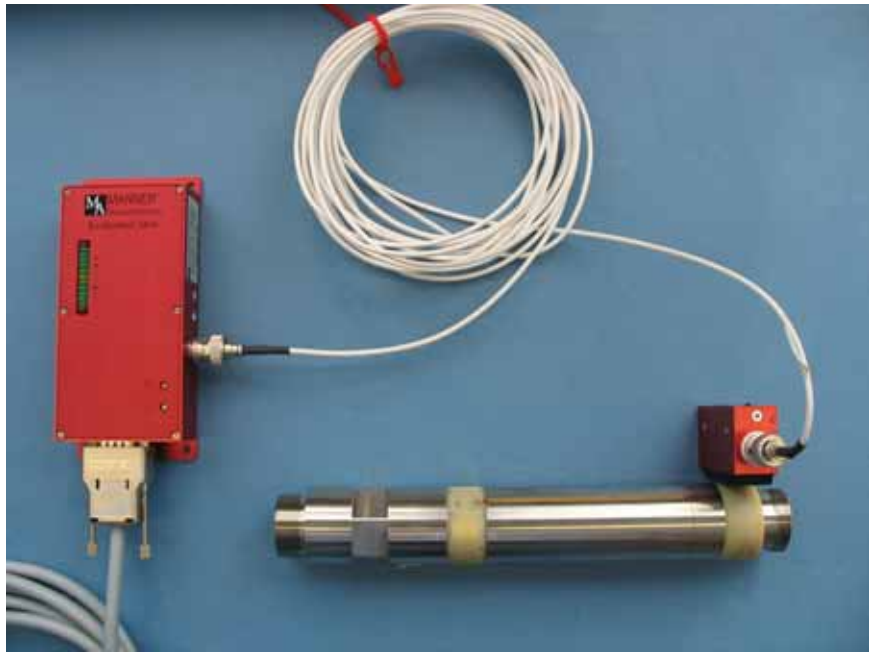
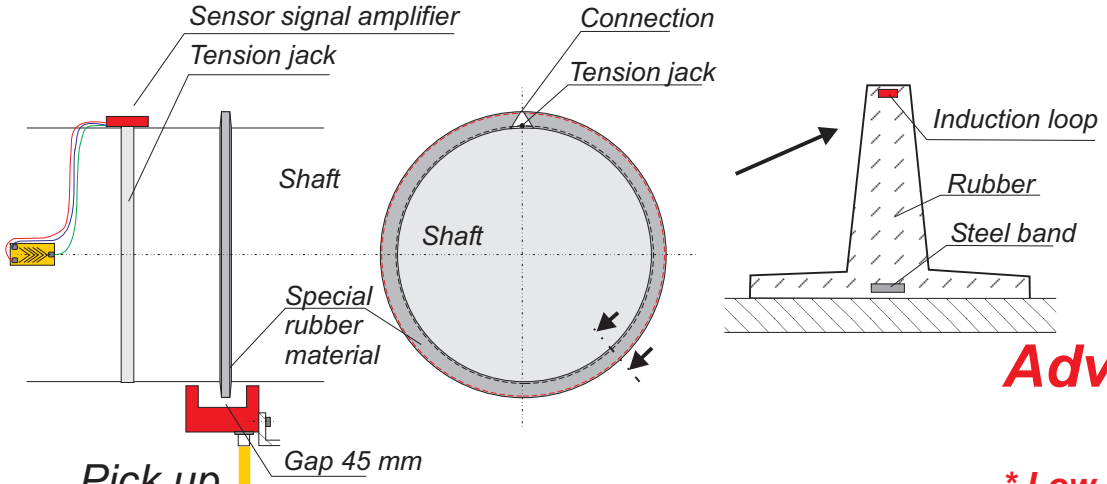
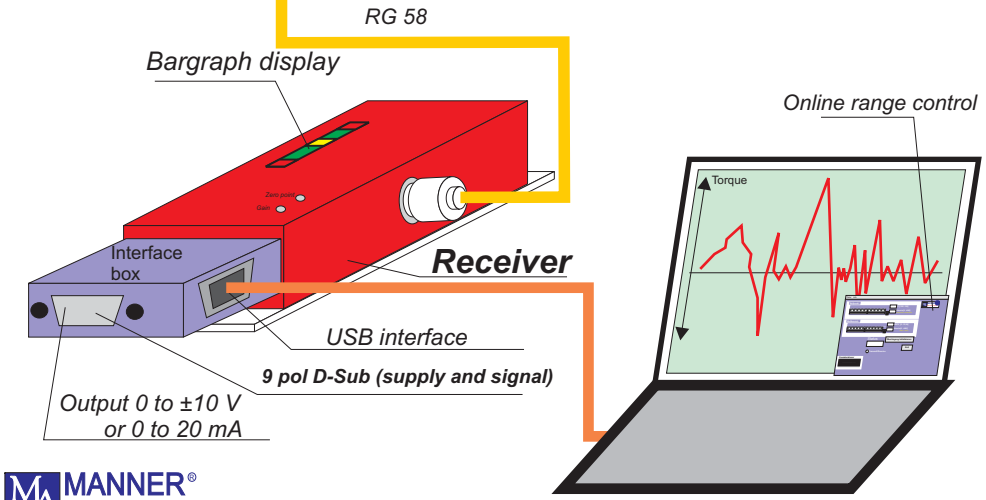


Low Weight Powerful RMC Sensor Telemetry for Mobile Use in Field



Advantages:

* Low weight (ideal for use in field, travelling by plane)
* Flexible rotor loop (product sold by meter) for different shaft diameters and easy mounting
* Easy mounting by special available flexible rotor loop
* Shaft diameters up 2000 mm
* Direct strain gage interface (no batteries)
* High resolution and absolutly noise free digital transmission (16 bits, integrated failure detection)
* Direct acquisition of dynamic signal by USB interface without any additonal data-aqquisition system
* Remote high resolution (16 bits) online range and zero point conditioning by PC
* Auto zero function inside rotor electronic
* Integrated RPM option
* Program for calcalution of true values (Nm, N, µ-strain,etc.)



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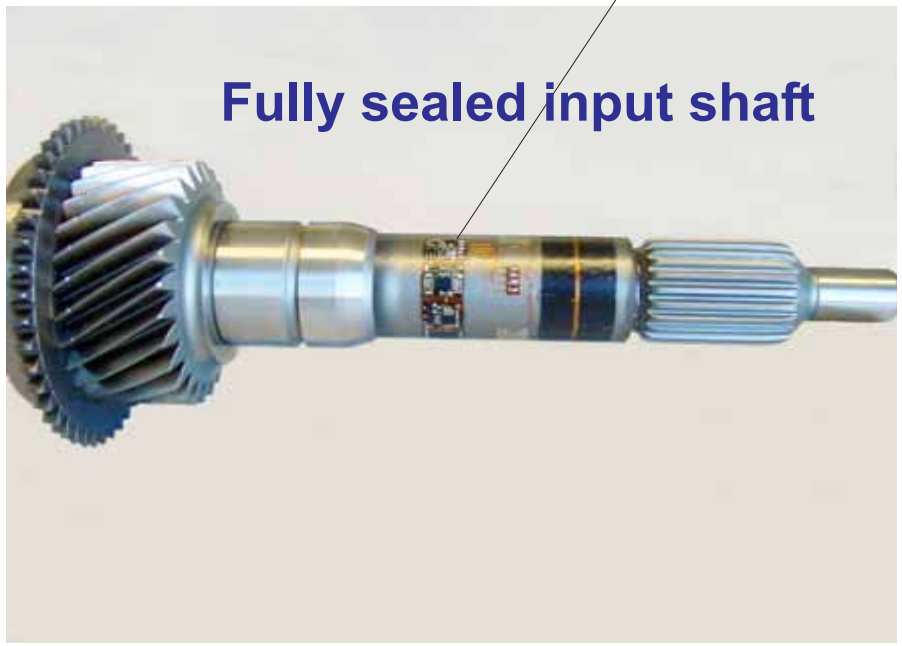
RMC-Telemetry in Flex Substrat Version for Inputshaft in Cars

Range conditioning after sealing !!!

Special use

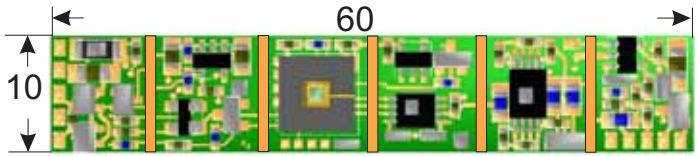


Features:

* Channels: 1
* Transmitting sensor telemetry inductive
* Digital transmitting: 16 bit resolution
* Geometry: flex substrat
* Width: 2,5 mm, size: 10 x 60 mm
* Smallest circle: diameter 14 mm
* High resolution (16 bits) remote range conditioning (gain, zero) by programmable input amplifier
* Range: 0,05 to 10 mV/V
* Transducer: strain gage (350/1000 Ω), NiCr.-Ni,
* Zero drift: 0,003%/°C
* Environmental temperature: -40 to 160°C

Type: SV_Flex_1_0.003_125_PC

Flexible sensor signal amplifier



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Data Sheet:

Transmitting frequency: 13,56 MHz (ISM)
Modulations: absorption modulation (Patent of Manner)
Coding: 16 Bit PCM with CRC
Resolution: 16 Bit
Strain gage brigde supply: 3,3 V (5,0 V optional)
Strain gage : ≥350 Ω
Sensitivity: 0,05 to 10 mV/V
Sample rate: 6,7 kHz
Filter cut off (-3 dB): 1 kHz (2 kHz, 10 kHz optional)
Filter type: 8 pol. Bessel
Additional channel for monitoring sensor amplifier
Output voltage: 0 to ±10 V
Digital output: USB, CAN, RS232
Software control / monitoring operating system: XP, Windows
Environmental temperature range (SV) : -25 to + 85°C (160°C option)
Zero drift: <0,003%/°C at 1 mV/V
Gain drift: <0,002%/°C at 1 mV/V
Linearity: <0,01% at 1 mV/V
Max. acceleration load: 40 000 g
Weight: depending on housing (min. 3g)
Size: see different types
Supply receiver: 9 to 36 V DC / 90 to 270 V AC
Additional functions:
Integrated temperature sensor with readout
Integrated storage 32 bytes for serial no., calibration value, history

Using the Interface Software

(data acquisition- optional)

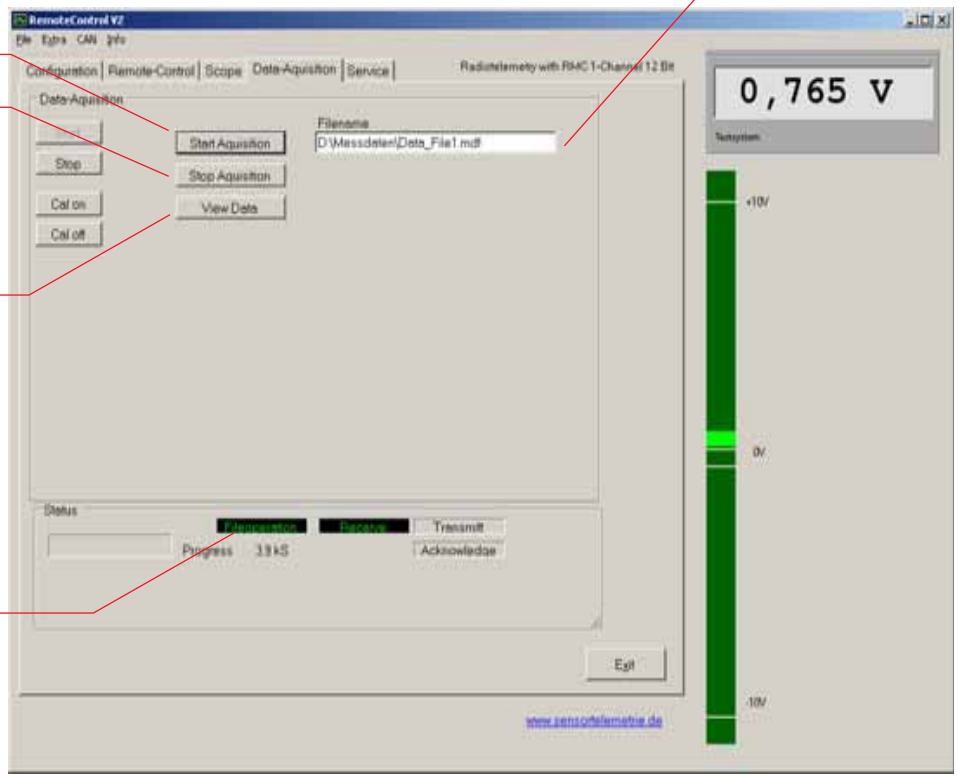
Input of path and file name

Start recording into a file

Stop recording into a file

Show data with additional data viewer PVIEW - if installed

Display file operation active



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

Data File

Data Format

The data are recorded in the MDF-Format.
Two files are generated. One binary file with the ending '.DAT' and one belonging description file with the ending '.MDF'.
The description file is necessary for the data viewing software PVIEW from Stiegele Datensysteme GmbH.
The binary file can be used from other data display or data analysing systems that are able to import digital values.

Format of the Binary File (.DAT)

Definition: LB= Low Byte, HB=High-Byte
First the Low-Byte and then the High-Byte of a channel is recorded.
The range of a 16 bit system is from 0 to 65535, the range of a 12 bit system is from 0 to 4095

Assignment to the analog values:

Excitation 100%	(correspond to analog output +10V)	digital value 62259 for 16 Bit-Systems	3891 for 12 Bit-Systems
Excitation 0%	(correspond to analog output 0V)	digital value 32768 for 16 Bit-Systems	2048 for 12 Bit-Systems
Excitation -100%	(correspond to analog output - 10V)	digital value 3277 for 16 Bit-Systems	205 for 12 Bit-Systems

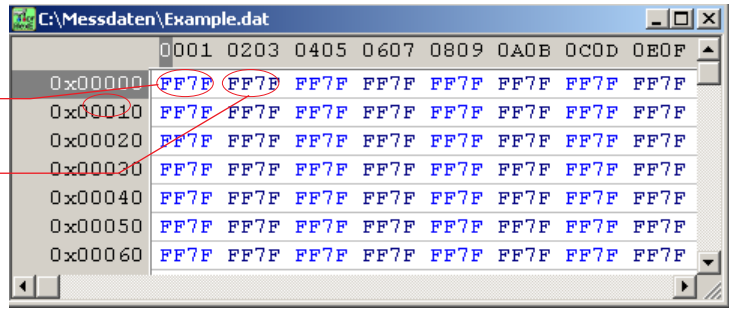
Exciation [%] = (Digital-Value - 32768) / 294.91 for 16 Bit-Systems
Exciation [%] = (Digital-Value - 2048) / 18,43 for 12 Bit-Systems

Values out of this range are not within the measuring range and cannot be transmitted correctly.

Sample file shown with a Hex Viewer

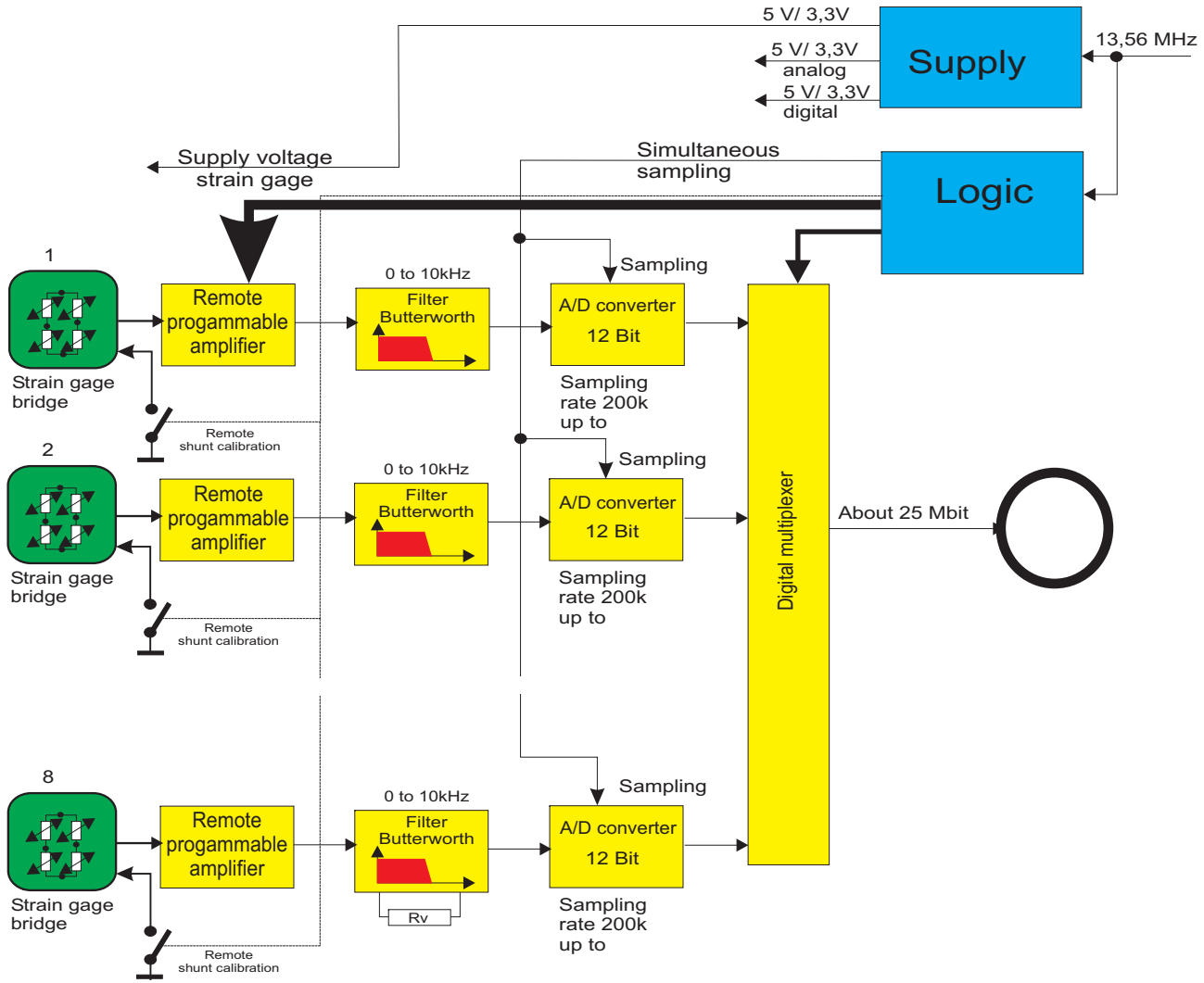
First measvalue
FF=Low Byte
7F=High Byte channel 16

Second measvalue



RMC Multi Channel Sensor Telemetry with Time Multiplexing

Overview
Multi Channel Sensor Telemetry



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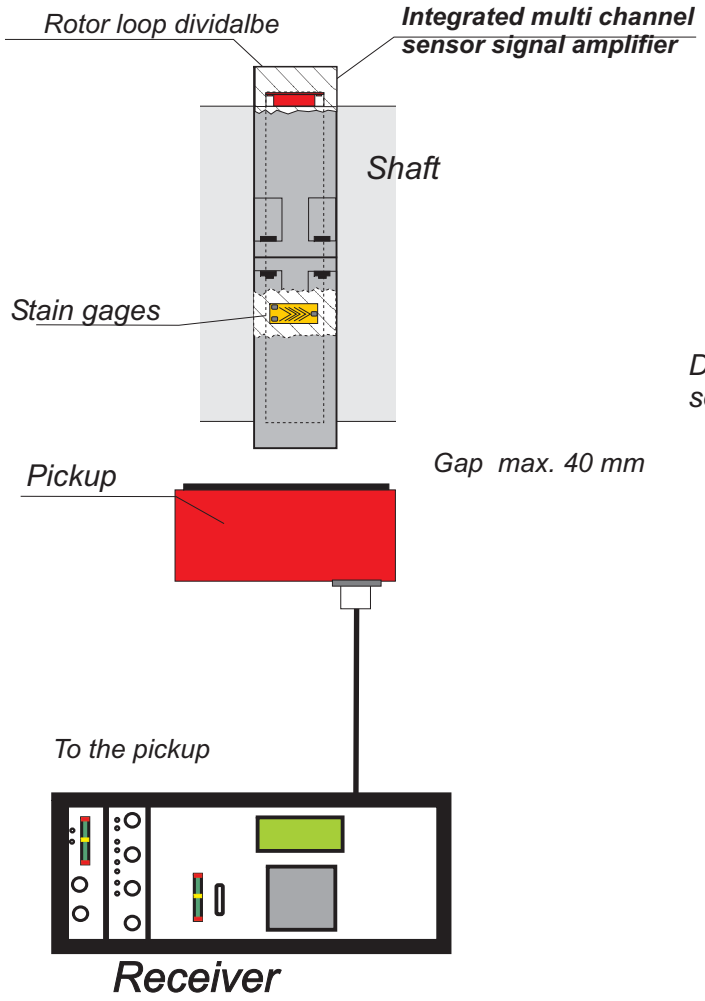
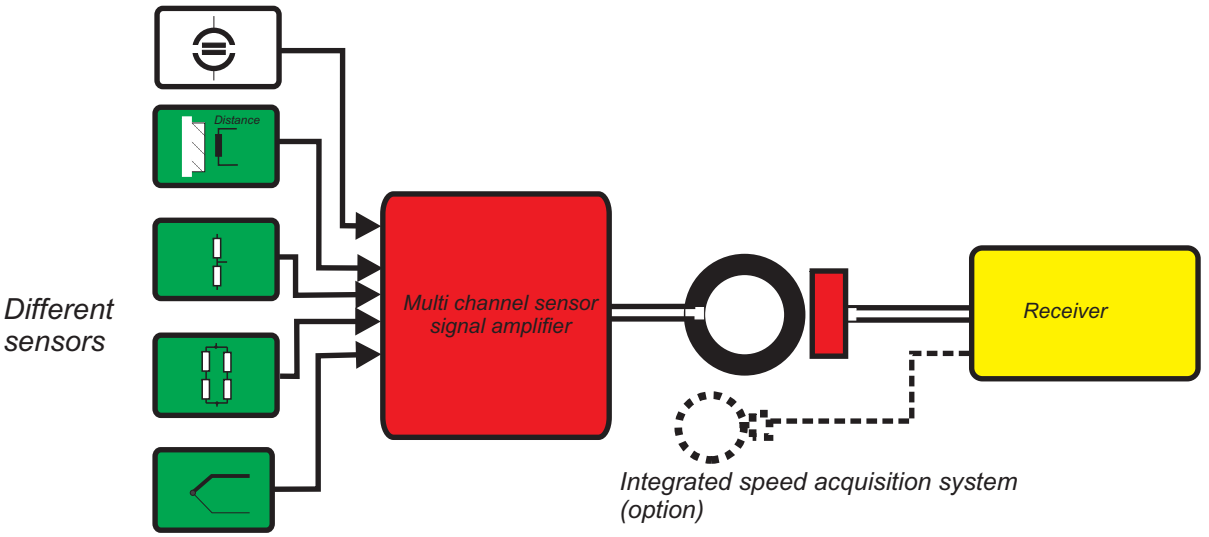
RMC Sensor Telemetry for Universal Use
Multi channel sensor telemetry on Drive Shaft

(without batteries)





Features:

Channel count: max. 64 (time multiplex)
Sample rate per channel: 40000 sample/sec (max. 200 000)
Integrated sensor signal amplifier channel (remote controlled): 0,064 mV/V to 10 mV/V

Auto zero per channel (remote controlled)
Sensor: Strain gage, thermocouple, distance sensor (µ-Epsilon)
zero drift: 0,01 %/° Celsius

Environmental temperature: -25 to 125° C (150°C)

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