Operating manual
Evaluation Unit Tabletop Unit

MAW_42TE / MAW_84TE (6HE, 9HE)

Multichannel, PCM

Revision History:

Document code	Date	Modification	Approval
11036, 1, en_US	2019-11-08	Creation of documentation	2019-11-08, von Borcke

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1 Safety

1.1 Definition of Warnings

DANGER!
Hint for possible dangerous situation. Ignoring the security terms may cause death or serious injury.

WARNING!
Hint for possible dangerous situation.

Ignoring the security terms may cause injury.

CAUTION!
Hint for possible damage of property, if the corresponding protective measure were disregarded.

Further information

1.2 General Warnings

The system startup has to be carried out by trained qualified personnel, who is able to evaluate the potential risks. All chapters of this instruction manual had to be read and fully understood before startup.

On non-observance it's not possible to assert a claim for the incurred losses from the manufacturer. Any changes to the system, except those described in the instruction manual and customer documentation, will invalidate any warranty.

DANGER!
Risk of Injury by Incorrect Installation
Incorrect installation can cause injury to persons directly while the installation or during the subsequent startup

Note the Mounting Hint (see chapter 4, installation instruction)

The system startup has to be carried out by instructed qualified personnel that's familiar with

– the professional handling of security relevant components,
– the valid regulations for operational safety und rules for accident prevention.

DANGER!
Risk of Injury by Unintentional Startup
Rotating or moving of parts by inadvertent startup of the machine can cause injury .

During all mounting, demounting or repairing the system has to be powered-off. Note the mounting instructions.

DANGER!

Risk of Injury by Movable Parts

While normal operation, as well as inadvertent loosening of parts of the telemetry system during operation, present persons may be injured if protective equipment is absent.

Check the safety function of the protective equipment particularly

- – before each startup
- – after each replacement of a component
- – after a longer standstill
- – after each defect

Independent thereof the safety function of the protective equipment must be checked in suitable time intervals as part of the maintenance work!

WARNING!

Risk of Burn Injury

While operation the sensor signal amplifier and the stator antenna may become warm.

Avoid contact.

CAUTION!

Risk of Property Damage

If the connectors disconnected / connected while the system is powered on the telemetry system as well as the connected devices can be damaged.

Plug connectors must not be disconnected / connected when the system is powered on.

2   Conventional Usage

Sensor telemetry systems are used for contact-free data and power transfer from passive and active sensors (e.g. on rotating shafts).

> **DANGER!**
>
> **Risk of Subsequent Damages caused by Malfunctions**
>
> *If the telemetry system is used for controlling or regulating functions it is not conceive for, subsequent damages up to injury to persons can be caused.*
>
> **The delivered system has to be used exclusively used for the purpose for which it was ordered.**
>
> The operator must take care of his health and safety.
>
> The operator of the equipment must prevent subsequent errors following faulty measuring results. This is particularly necessary if the telemetry system is used in controlling or regulating functions.

The customer, as the builder of a system with an integrated sensor telemetry system, is responsible for the correct and conform operation and also assumes the responsibility for ensuring that the system at start-up complies with all provisions of Directives 2014/53/EU and 2014/35/EU.

Scope of Delivery

A telemetry system normally contains:

- Evaluation unit
- Stator antenna
- Rotor antenna
- Sensor signal amplifier
- HF cable

> For the detailed purchased parts package of the delivered telemetry system mind the corresponding shipping ticket.

3 Technical Data

3.1 Measuring System

Technical Data Telemetry System

Term	Value
HF frequency	13.56 MHz (*)
Number of channels	(*)
Bandwidth	standard: 0 to 1 kHz (*)

(*) see project documentation

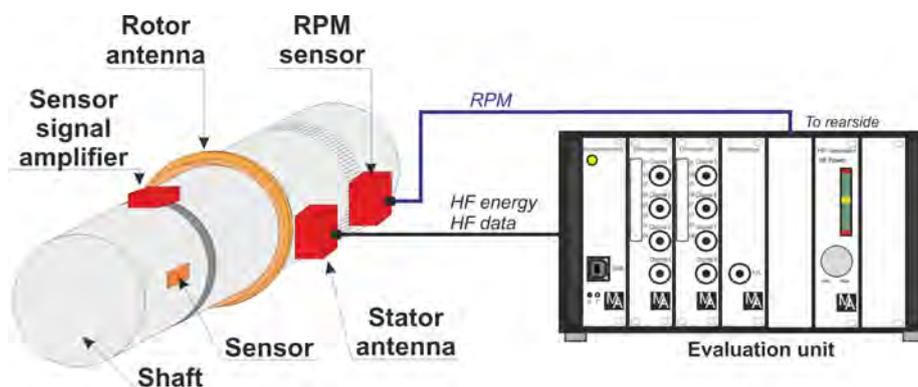**General Measuring Configuration *(Example)***

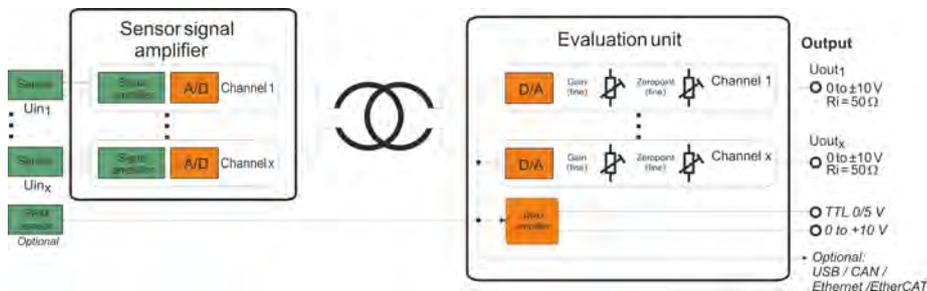Fig. 1: General measuring configuration

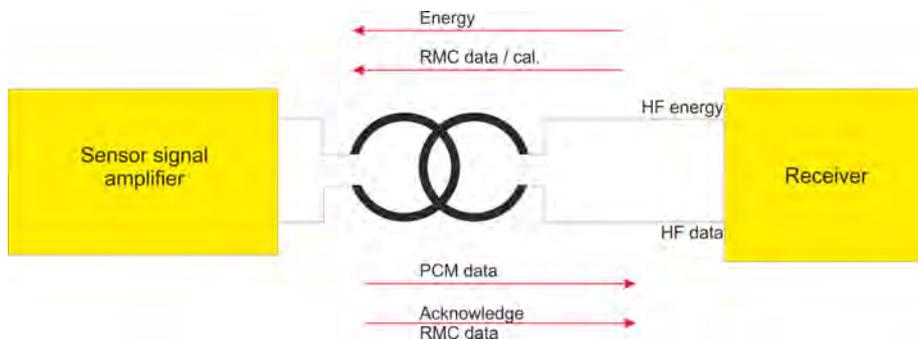**Block Diagram**

Fig. 2: Block diagram

Energy and data flow

Fig. 3: Energy and data flow

3.2 Evaluation Unit MAW_42TE_PCM16

Technical Data Evaluation Unit MAW_42TE_PCM16

Term	Value
Evaluation unit type	**MAW_42TE_PCM16**
Supply voltage evaluation unit	90 to 270 V AC, 50/60 Hz or: 10 to 36 V DC **optional:** Hybrid AC & DC
Maximum current drain	(*)
HF power	3W / 5 W **optional:** adjustable (*)
HF frequency	13.56 MHz (*)
Channel sample rate	4 kS/s (*)
Number of channels	(*)
Output voltage [U_{out}]	0 to ±10 V, R_i = 50 Ω
Protection class	IP20
Temperature range	-10 to +70°C
Optional available interfaces	USB, CAN, Ethernet, EtherCAT®

(*) see project documentation

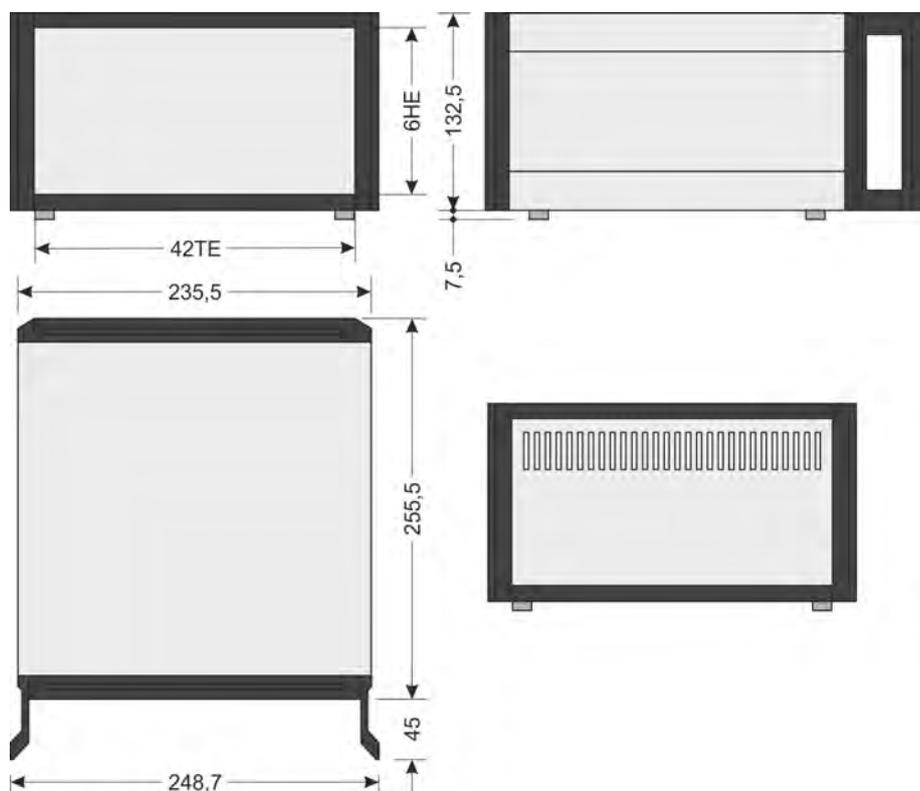**Scale Drawing Evaluation Unit MAW_42TE_PCM16**

Fig. 4: Scale drawing MAW_42TE_PCM16 Ratiopac

Evaluation Unit, Front View
MAW_42TE_PCM16 *(Example)*
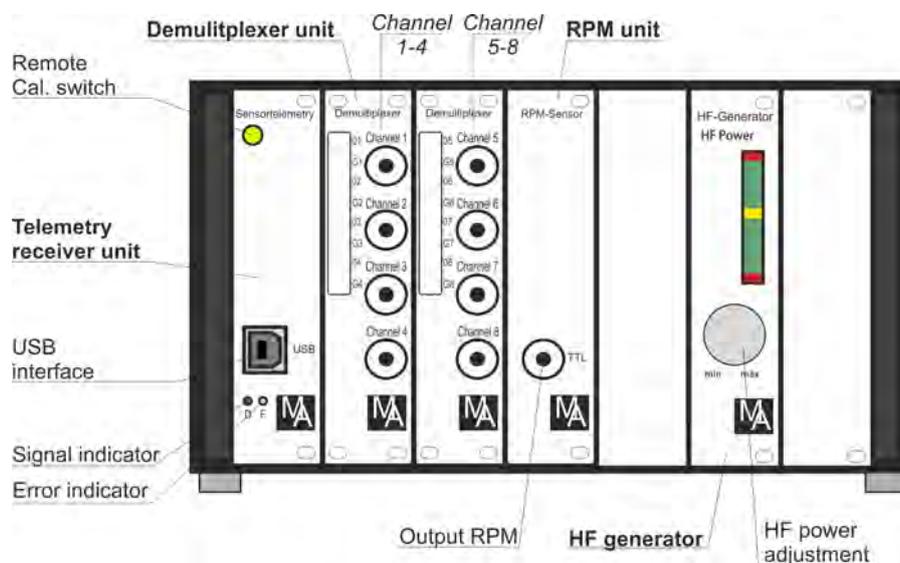
Fig. 5: MAW_42TE_PCM16, front view

Control LEDs

	o.k.	no signal	Power low	CRC error
green LED (Signal indicator)	on	off	flashing	off
yellow LED (Error indicator)	off	on	off	on

Evaluation Unit, Rear View MAW_42TE_PCM16

Example 1: MAW_42TE_PCM16 with AC supply and max. 3 Watt HF power (BNC)
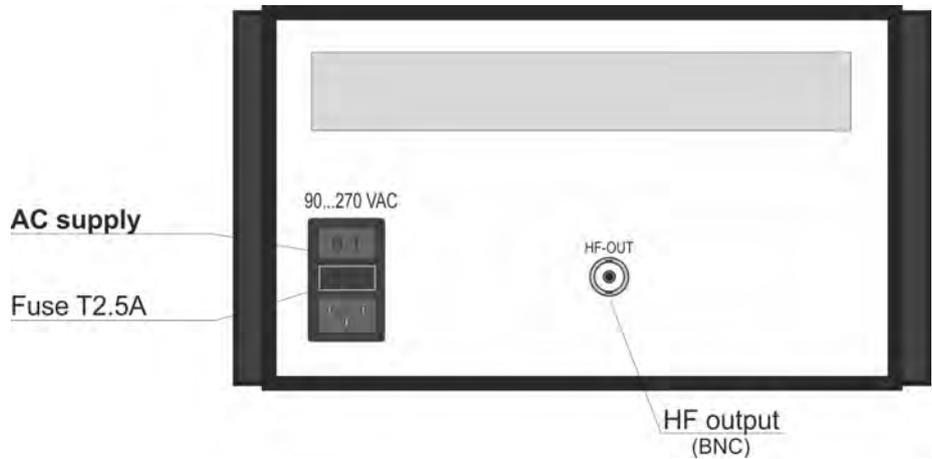
Fig. 6: MAW_42TE_PCM16, rear view

Example 2: MAW_42TE_PCM16 with DC supply, RPM input and >3 Watt HF power (N)
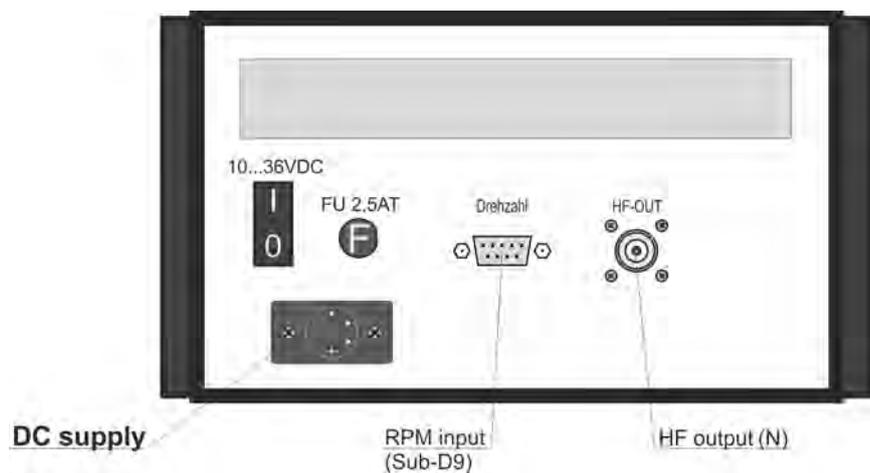
Fig. 7: MAW_42TE_PCM16, rear view

Pin Assignment DC Supply
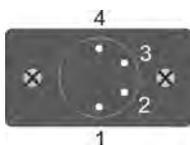
Pin	Assignment
1	GND
2	nc
3	nc
4	10 to 36 V DC

3.3 Evaluation Unit MAW_84TE_PCM16

Technical Data Evaluation Unit MAW_84TE_PCM16

Term	Value
Evaluation unit type	**MAW_84TE_PCM16**
Supply voltage evaluation unit	90 to 270 V AC, 50/60 Hz
Maximum current drain	(*)
HF power	3W / 5 W **optional:** adjustable (*)
HF frequency	13.56 MHz (*)
Channel sample rate	4 kS/s (*)
Number of channels	(*)
Output voltage [U_{out}]	0 to ±10 V, R_i = 50 Ω
Protection class	IP20
Temperature range	-10 to +70°C
Optional available interfaces	USB, CAN, Ethernet, EtherCAT®

(*) see project documentation

Scale Drawing Evaluation Unit MAW_84TE_PCM16

*Fig. 8: Scale drawing MAW_84TE_PCM16 Ratiopac*

Alternative Available Heights
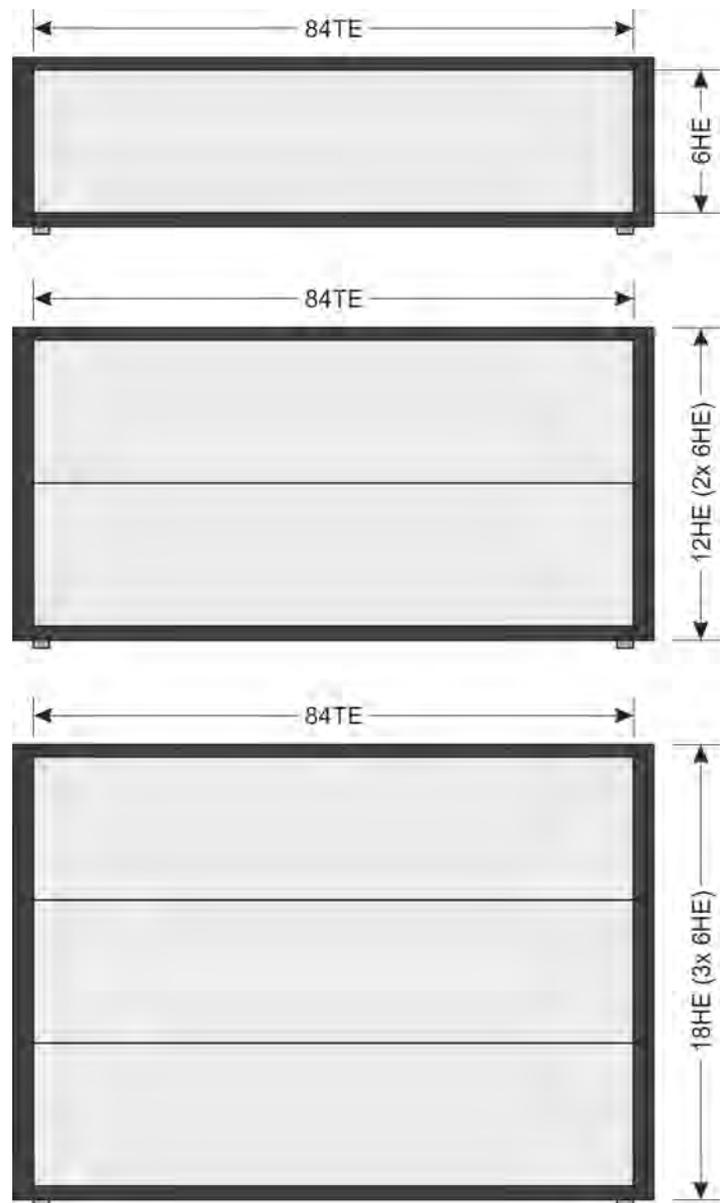
Fig. 9: Heights MAW_84TE_PCM16 Ratiopac

**Evaluation Unit, Front View
MAW_84TE_PCM16** *(Example)*

Example 1: MAW_84TE_PCM16 with 16 analog channels
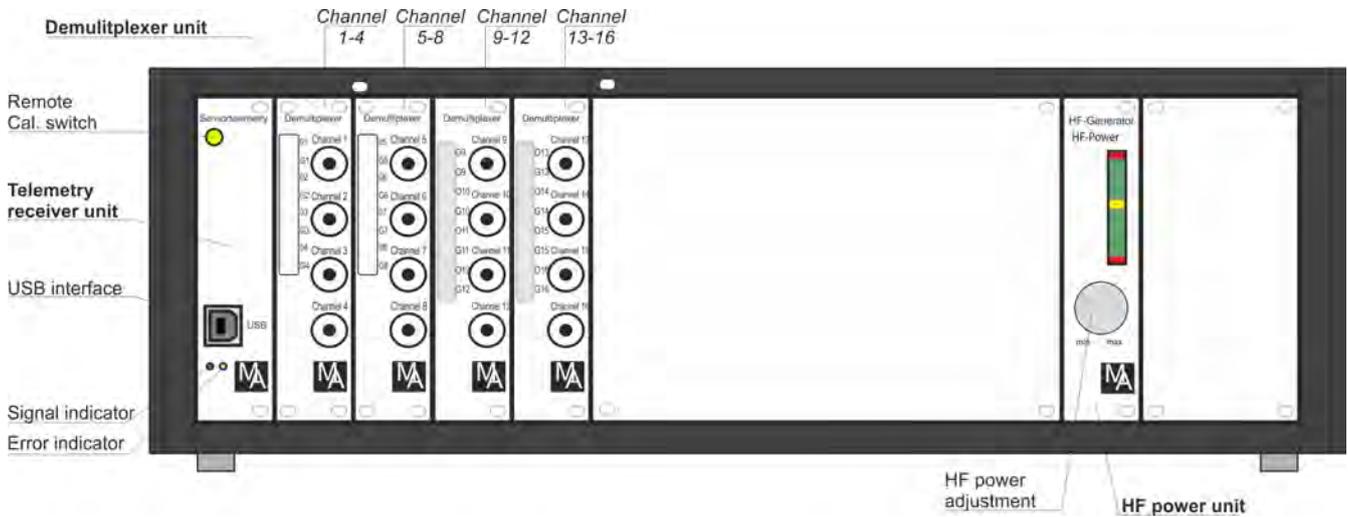
Fig. 10: MAW_84TE_PCM16, front view

Example 2: MAW_84TE_PCM16 with CAN and Ethernet interfaces, without analog outputs

Fig. 11: MAW_84TE_PCM16, front view

Control LEDs

	o.k.	no signal	Power low	CRC error
green LED (Signal indicator)	on	off	flashing	off
yellow LED (Error indicator)	off	on	off	on
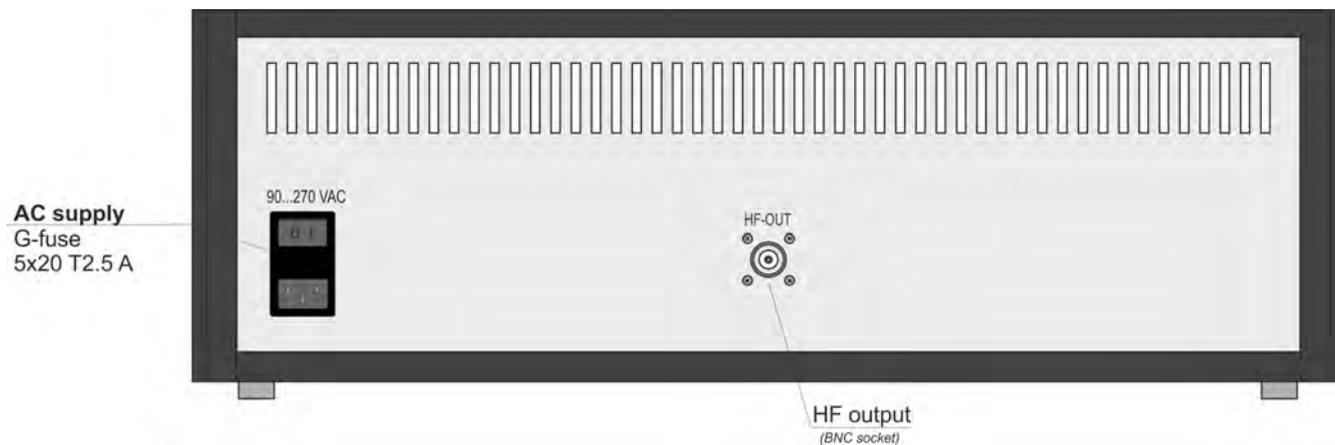
Fig. 12: MAW_84TE_PCM16, rear view

4   HF Generator (optional)

HF Generator

Fig. 13: HF power

Power adjustment
of the HF generator

*Fig. 14: HF generator, power
adjustment*

HF Power

The HF output power of the generator can be varied and adjusted to the require-
ments.

> **!** **NOTICE!**
>
> If the antennas are mounted within the specified coupling distance,
> the HF power should be sufficient if the LED bar lights up to the
> yellow LED!
>
> In order to avoid damage to the system, observe the correct step-
> by-step start-up!
>
> **Attention: A higher HF power can damage the system!**
>
> P_{max} if sensor signal amplifiers: <5 W

5   RPM Detection (optional)

**Pin Assignment D-Sub
connector, female (RPM)**
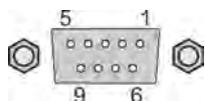
Pin 1	do not connect
Pin 2	do not connect
Pin 3	do not connect
Pin 4	do not connect
Pin 5	GND power supply-output RPM sensor
Pin 6	RPM- input signal A
Pin 7	Power supply output RPM sensor
Pin 8	RPM- input signal B
Pin 9	do not connect

6 Software Description Interface for Multichannel Systems V2.3 R430

Requirements   Windows 7, Windows 10 (German, English Version) - 32 Bit / 64 Bit

1 GHz processor or higher, depending on the data throughput of the system during recording.

1 GByteRAM, 500 MByte free hard disc space

Net Framework 3.5

6.1 Installation of the USB Driver - Installation steps for Windows 7 / 10

> ⓘ For other Windows versions the messages may be different.

1. ▷ Connect the USB interface of the telemetry systems to the PC

2. ▷ The USB interface is recognized by the PC:

Fig. 15

3. ▷ Mark 'NO connection to Windows Update'

Fig. 16

4. ▷ Mark 'Install the software NOT automatically'

Fig. 17

Fig. 18

5. ▷ Enter the path and the name of the driver (e.g: from the CD)

6. ▷ Repeat step 3 to 5, thus two instances of the driver were installed

Fig. 19

7. ▷ *[Get ready]*

⇨ The installation of the driver is now finished. The device can now be used with the Manner Interface Software. For using more devices repeat the installation steps.
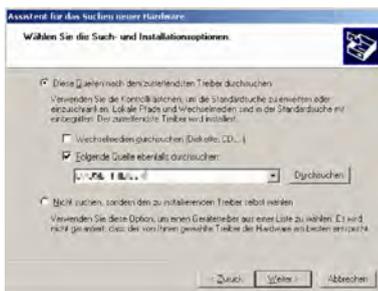
> ⓘ If there are troubles with the installation of the driver e.g. incompatibility with other devices which also use the USB converter of FTDI Chip, the already installed driver can be removed from the driver path with the program 'FTDIUNIN.EXE'. Then restart the installation.

6.2 Installation of the Software

1. ▷ Select path of the installation software with the Windows Explorer and start program `Setup.exe`, e.g.
`D:\Interface_Multichannel_V2.3.xxx\Interface_Multichannel_V2.3_xxx_32Bit`
respectively
`D:\Interface_Multichannel_V2.3.xxx\Interface_Multichannel_V2.3_xxx_64Bit`
and follow the instructions

If required, please install also Net Framework 2.0 you can obtain this from Microsoft over internet (**Net Framework 3.5 redistributable x86**) or install from the folder `\Netframework35` on CD

2. ▷ The program can now be started either with a link item at the desktop or with *[Start] -> [Program] -> [Manner] -> [Interface_MultichannelVx]*

6.3 Installation of the additional Data Viewer Software for MDF Files

PVIEW (optional with data acquisition)

On the enclosed data storage (USB stick or CD) there is also a free data viewer from Stiegele Datensysteme GmbH (*http://www.stiegele-systems.de*). The software shows the content of the MDF file that is recorded while the measuring period.

1. ▷ Select path of the additional software with the Windows Explorer and start program `SETUP.EXE`

(e.g. `D:\PVIEW\setup.exe` on the installation CD in drive D:)

2. ▷ Select language and continue the installation.

Fig. 20

3. ▶ Set path to `C:\Programme\PVIEW`. In this case the Interface_USB software of Manner and the PVIEW software are directly linked together

4. ▶ Perform the further installation steps and complete installation

> ℹ At systems with limited user rights, the software will output an error, however, the software will work correct.
>
> Screenshots are from a German Windows System.

6.4 RMC Multichannel V1 (PIC)
6.4.1 Setup of the Interface Software

[Hardware Configuration]
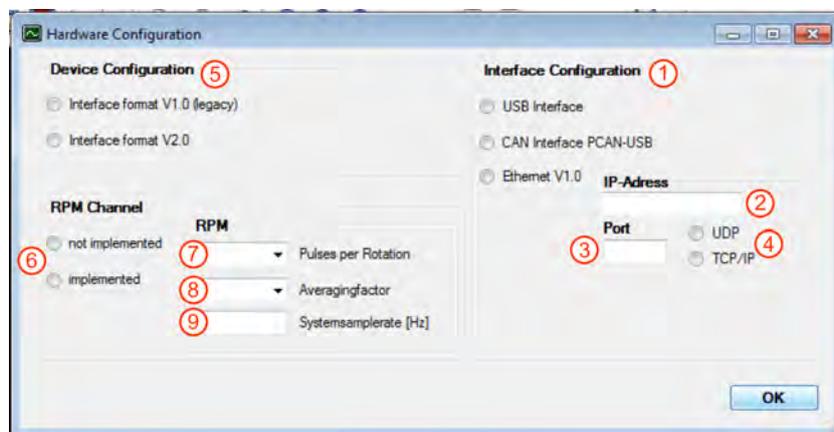
Fig. 21

[Menu]->[Setup]->[Hardware Configuration]

The interface setup must be proceeded for every single user of the computer.

	Description	System-specific Setting
1	Interface Configuration	USB
	Ethernet settings (optional)	
2	IP-Adress	--
3	Port	--
4	UDP or TCP/IP	--
5	Device Configuration	V2
6	RPM Channel	not implemented
	RPM settings (optional)	
7	Pulses per Rotation	--
8	Averagingfactor	--
9	Systemsamplerate [Hz]	--

[Software Configuration]

Fig. 22

[Menu]-> [Setup] -> [Software Configuration]

	Description	System-specific Setting
1	Display Settings (Selection between standard-systems and temperature-systems)	Standard output
2	Assignment	--
3	Channelorder (Output order of channels)	Inverse
4	CPU Ressource-Usage	Full
5	Data file format for Acquisition (Selection between binary format and ASCII format)	Binary
6	Integrated Remote Control (Activates or deactivates functions for RMC-programming of systems, which support data-Acquisition and programming over the same USB-interface)	V1 (PIC)
7	Calibration Command over Bus (If this function is supported by the hardware the remote calibration function can be triggered.)	Disabled
8	Periodical Test Connection	Disabled

[Authorisation Level]

[Menu] -> [Setup] -> [Authorisation Level]

With this settings, it is possible to set different modes for the pc-software. The settings are still present at next start of the software.

User (no password required)

Settings for normal operation mode. With this setting, no permanent modifications on the measurement- system are possible.

Administrator

In this mode, modifications on the measurement-system are possible (e.g. changing amplification over RMC) The password for this mode is "RMC2000"

Manufacturer

This mode is reserved for the manufacturer.

6.4.2 Using the Interface - Software (for Acquisition Mode)
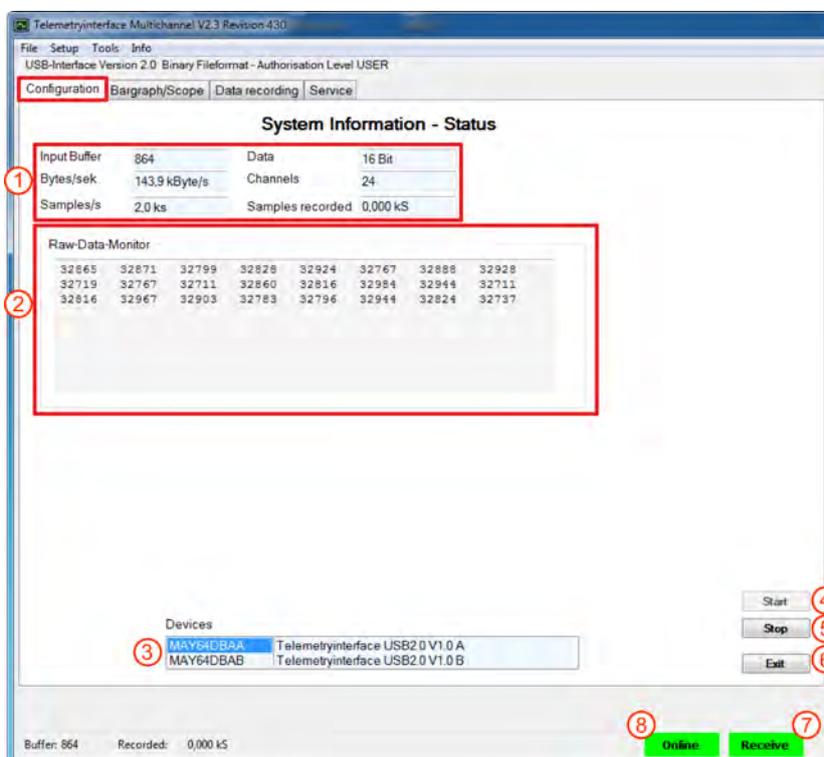
[Configuration]

Fig. 23

1	Information about Data rate, Sample rate etc.
2	Display of the binary values as they are sent (inverse to the output at the evaluation unit)
3	Display of the selected device (if multiple available)
4	Start data display
5	Stop data display
6	Exit program When data recording is active then stop data recording before exiting the program to prevent loss of data
7	Activity display (green) at file operation
8	Activity display (green) at data transmission from the Telemetry System

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

[Bargraph/Scope]

> ℹ️ Values, which are displayed in Volt accords to the voltage output to standard-systems. Temperature-measurement-systems or custom calibrated systems can differ from these values.
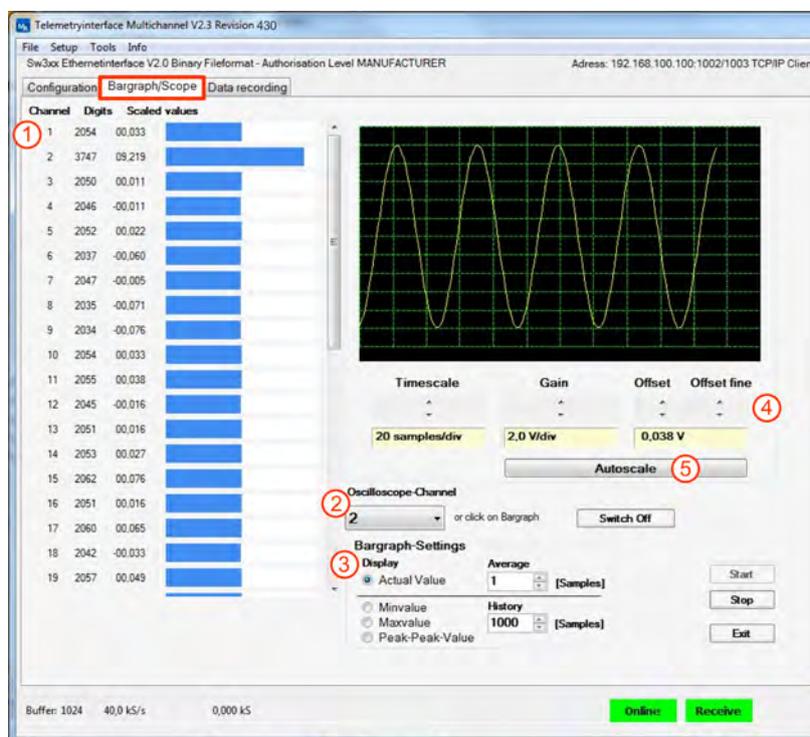

Fig. 24

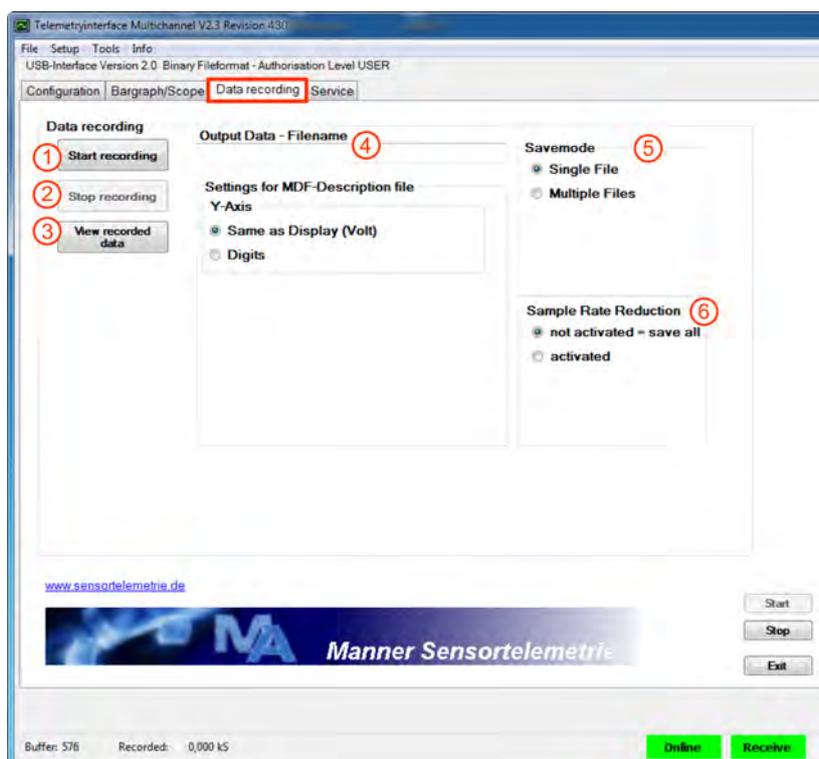| 1	Display of received measuring channels with digital values and the analog output voltages with bar graph
2	Selection of the channel shown at the oscilloscope
3	Analyze functions for the display
4	Selection of time, gain and offset
5	Auto-scale function for the settings of gain and offset

[Data recording]

Fig. 25

1	Start recording into a file
2	Stop recording into a file
3	Show data with additional data viewer PVIEW - if installed
4	File name
5	Recording of the measurement data in a single file or in multiple files (to define in periods)
6	Reducing of the sampling rate

> No other program must be active at the PC while recording data into a file. This can effect in buffer overflow and the loss of data. If buffer overflow occurs, it will be displayed in a field on the left side of "Data recording" Due to some limitations, the maximum file size should not exceed 4 GB.

6.4.3 Data File - Binary Format

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 analyzing systems that are able to import digital values.

Format of the Binary File (.DAT)
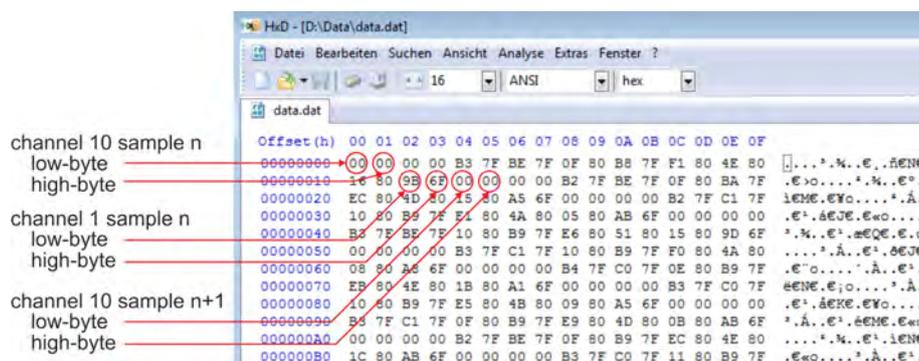
Example 10 Channel System

Fig. 26

Definition: LB= Low Byte, HB=High-Byte, CH_x = Channel x (e.g. Ch_1 = Channel 1 corresponding to the analog output channel at the evaluation unit)

First the Low-Byte and then the High-Byte of a channel is recorded.

LB-K10, HB-K10, LB-K9, HB-K9, … , LB-K1, HB-K1 (first data set)

LB-K10, HB-K10, LB-K9, HB-K9, … , LB-K1, HB-K1 (next data set)

…

LB-K10, HB-K10, LB-K9, HB-K9, … , LB-K1, HB-K1 (last data set)

6.4.4 Data File - ASCII Format

Data Format

The data are recorded in the CSV-Format.

The measured values are separated with a semicolon.

After each complete data set a 'Carriage Return' + 'Linefeed' is added.

The channel description is in the first row of the file.

Correlation of the measured values

The range of a 12 bit system is from 0 to 4095, the range of a 16 bit system is from 0 to 65535 Assignment to the analog values (custom specific systems and temperature-systems can differ from these values):

Analog value	Digital value (16 Bit-system)	Digital value (12 Bit-system)
-10 V	3277	205
0 V	32768	2048
+10 V	62259	3891

Values out of this range are not inside the measuring range and cannot be displayed correctly at the analog outputs.

The analog value can be calculated by the following equation: U_{out} [V]=(Digit value-32768) / 2949.1 (16 Bit) or U_{out} [V]=(Digit value-2048) / 184.3 (12 Bit)

This correlation is only valid with calibrated analogue-output.

Format of the ASCII File   **The sample shows a recorded dataset of a 10 channel system:**

```
 CH10; CH08; CH08; CH07; CH06; CH05; CH04; CH03; CH02; CH01
00000;00000;32691;32702;32783;32969;33009;32846;32790;28571
00000;00000;32690;32702;32783;32698;33004;32845;32789;28581
00000;00000;32690;32702;32783;32698;33004;32845;32789;28581
00000;00000;32690;32705;32784;32697;32993;32842;32773;28587
00000;00000;32691;32702;32784;32697;32998;32849;32789;28573
```

7 Maintenance

The systems of Manner Sensortelemetrie are low-maintenance.

⚠️ **DANGER!**
Risk of Injury Caused by Defects on System Built-Up
Particularly loose or damaged parts may endanger present persons

Carry out the maintenance regularly and assiduously.

Within a periodical repeating maintenance following operations have to be done:

- Clean the antenna system, vacuuming of dust deposit
- Check the antenna system for scrub marks or mechanical damages
- Check the fastening of the stator antenna for a fix seat and tighten of the screwed fastenings where necessary.
- Check the plug connections and cables

ⓘ Document the completed annual maintenance

8   Contact

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