

Tempsonics®

Magnetostrictive Linear Position Sensors

TempoLink Smart Assistant Operation Manual



V
THE NEW GENERATION

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1. Introduction

1.1 Purpose and use of this manual

Before starting the operation of TempoLink smart assistant, read this documentation thoroughly and follow the safety information. Keep this manual for future reference!

The content of this technical documentation is intended to provide information on mounting, installation and commissioning by qualified automation personnel¹ or instructed service technicians who are familiar with the project planning and dealing with Temposonics® products.

1.2 Used symbols and warnings

Warnings are intended for your personal safety and for avoidance of damage to the described product or connected devices. In this documentation, safety information and warnings to avoid danger that might affect the life and health of operating or service personnel or cause material damage are highlighted by the pictogram, defined below.

Symbol	Meaning
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NOTICE	This symbol is used to point to situations that may lead to material damage, but not to personal injury.
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2. Safety instructions

2.1 Intended use

This product may be used only for the applications defined under item 1 and item 2 and only in conjunction with the third-party devices and components recommended or approved by MTS Sensors. As a prerequisite of proper and safe operation, the product requires correct transport, storage, mounting and commissioning and must be operated with utmost care.

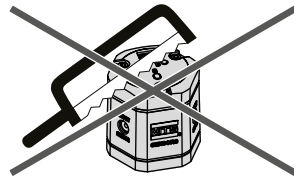
- 1/ The term “qualified technical personnel” characterizes persons who
- are familiar with the safety concepts of automation technology applicable to the particular project
 - are competent in the field of electromagnetic compatibility (EMC) or
 - have received adequate training for commissioning and service operations
 - and are familiar with the operation of the device and know the information required for correct operation provided in the product documentation

1. The sensor systems of all Temposonics® series are intended exclusively for measurement tasks encountered in industrial, commercial and laboratory applications. The sensors are considered as system accessories and must be connected to suitable evaluation electronics, e.g. a PLC, IPC, indicator or other electronic control unit.
2. TempoLink smart assistant is an accessory for Temposonics® R-Series V sensors for reading out and adjusting of sensor parameters as well as monitoring status values.

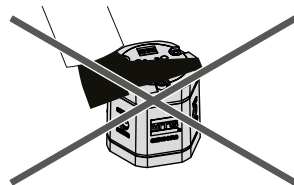
2.2 Foreseeable misuse

Foreseeable misuse	Consequence
Wrong sensor connection	The sensor and TempoLink smart assistant will not work properly or can be damaged
Power supply is out of the defined range	The TempoLink smart assistant can be damaged
Cables are damaged	Short circuit – the sensor and TempoLink smart assistant can be destroyed / sensor does not respond
Wrong connection of ground / shield	Signal output is disturbed The electronics can be damaged

Do not alter the TempoLink smart assistant.
→ The TempoLink smart assistant might be damaged.



Do not step on the TempoLink smart assistant.
→ The TempoLink smart assistant might be damaged.



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2.3 Installation, commissioning and operation

The position sensors and TempoLink smart assistant must be used only in technically safe conditions. To maintain this condition and to ensure safe operation, installation, connection and service, work may be performed only by qualified technical personnel.

If danger of injury to persons or of damage to operating equipment is caused by sensor failure or malfunction, additional safety measures such as plausibility checks, limit switches, EMERGENCY STOP systems, protective devices etc. are required. In the event of trouble, shut down the sensor and protect it against accidental operation.

Safety instructions for commissioning

To maintain the sensor's and TempoLink smart assistant's operability, it is mandatory to follow the instructions given below.

1. Protect the sensor and TempoLink smart assistant against mechanical damage during installation and operation.
2. Do not open or dismantle the sensor and TempoLink smart assistant.
3. Connect the sensor and TempoLink smart assistant very carefully and pay attention to the polarity of connections and power supply.
4. Use only approved power supplies.
5. Ensure the sensor and TempoLink smart assistant are operating within the defined limits for supply voltage, environmental conditions, etc.
6. Check the function of the sensor and TempoLink smart assistant regularly and provide documentation of the checks.
7. Before applying power, ensure that nobody's safety is jeopardized by starting machines.

2.4 Safety instructions for use in explosion-hazardous areas

The TempoLink smart assistant is not suitable for operation in explosion-hazardous areas.

2.5 Warranty

MTS Sensors grants a warranty period for the Temposonics® position sensors and supplied accessories relating to material defects and faults that occur despite correct use in accordance with the intended application.² The MTS Sensors obligation is limited to repair or replacement of any defective part of the unit. No warranty can be provided for defects that are due to improper use or above average stress of the product, as well as for wear parts. Under no circumstances will MTS Sensors accept liability in the event of offense against the warranty rules, no matter if these have been assured or expected, even in case of fault or negligence of the company.

MTS Sensors explicitly excludes any further warranties. Neither the company's representatives, agents, dealers nor employees are authorized to increase or change the scope of warranty.

2.6 Return

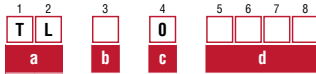
For diagnostic purposes, the TempoLink smart assistant can be returned to MTS Sensors or a repair facility explicitly authorized by MTS Sensors. Any shipment cost is the responsibility of the sender². For a corresponding form, see operation manuals of the R-Series V sensors (available at: www.mtssensors.com).

2.7 Removal from service/dismantling

The product contains electronic components and must be disposed of in accordance with the local regulations.

^{2/} See also applicable MTS Sensors sales and supply conditions, e.g. under www.mtssensors.com

3. Identification



a	Type
T L	TempoLink smart assistant kit
b	Power supply
1	Plug-in power supply with plug adapters (AU, CCC, EU, UK, US)
2	Cable for insertion in existing sensor power supply with sensor mating connector and barrel connector (for connection type D56)
3	Cable for insertion in existing sensor power supply with sensor mating connector and barrel connector (for connection type D58)
4	Barrel connector with pig-tail for connection to an existing power supply
c	Option
O	No options
d	Adapter cables for connection to R-Series V
E M O 8	Cable with M8 female connector (4 pin) for connection type D56 (EtherCAT®/EtherNet/IP™/POWERLINK/PROFINET) (part no. 254 887-1)
E M 1 2	Cable with M12 female connector (4 pin) for connection type D58 (EtherCAT®/EtherNet/IP™/POWERLINK/PROFINET) (part no. 254 897-1)
S D 7 0	Cable with M16 female connector (7 pin) for connection type D70 (SSI) (part no. 254 990-1)
A S O O	Cable with 6 × terminal clamps for connection type cable output (Analog/SSI) (part no. 255 043-1)
A D 6 0	Cable with M16 female connector (6 pin) for connection type D60 (Analog) (part no. 254 989-1)

DELIVERY

- TempoLink smart assistant kit**
- TempoLink smart assistant
 - One of the three options for the power supply
 - One adapter cable to connect TempoLink smart assistant to R-Series V sensor
 - USB cable for optional connection of TempoLink smart assistant to a computer
- Adapter cables to connect TempoLink smart assistant to sensors of R-Series V can be ordered separately

4. Package content

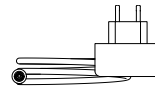
1 TempoLink smart assistant



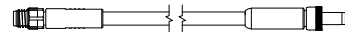
2 Power supply

Each kit includes one of the listed options for power supply

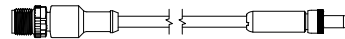
Plug-in power supply



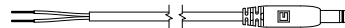
Cable for insertion in existing power supply for connection type D56



Cable for insertion in existing power supply for connection type D58



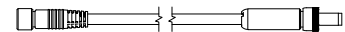
Barrel connector with pig-tail



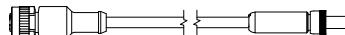
3 Adapter cable

Each kit includes one of the listed adapter cables for connecting the TempoLink smart assistant to an R-Series V sensor

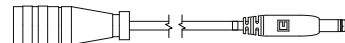
Adapter cable for connection type D56



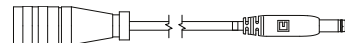
Adapter cable for connection type D58



Adapter cable for connection type D60



Adapter cable for connection type D70



Adapter cable for cable output

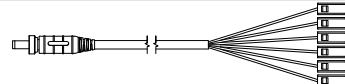


Fig. 1: Package content of the TempoLink kit, part 1

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4 USB cable
For optional connection of the TempoLink smart assistant to a computer

Fig. 2: Package content of the TempoLink kit, part 2

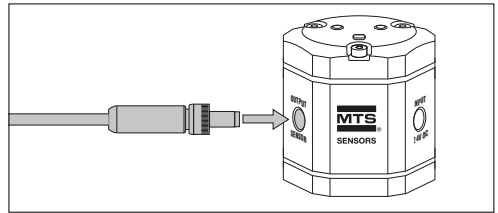


Fig. 4: Connecting the adapter cable to the TempoLink smart assistant

5. Connection of TempoLink smart assistant to R-Series V sensor

The TempoLink smart assistant can be connected to all sensors of the R-Series V family. Depending on the sensor output, different adapter cables are available to connect the TempoLink smart assistant to the R-Series V sensor. Use the appropriate adapter cable ③ for the sensor output. Connect the barrel connector of the adapter cable to the connection point labeled “OUTPUT SENSOR” on the TempoLink smart assistant (Fig. 4). Next, connect the opposite end of the adapter cable to the power supply at the R-Series V sensor. The TempoLink smart assistant also provides the power supply for the sensor. Fig. 5 shows the connection of the TempoLink smart assistant to the R-Series V. The adapter cable is available in different versions depending on the sensor output. See the specific R-Series V operation manual for more information.

If the sensor is connected to another power supply disconnect the power supply before connecting TempoLink smart assistant to the sensor.

NOTICE

- When disconnecting the power supply of the sensor possibly error messages occur at the connected controller.
- Do not exceed the maximum cable length between TempoLink smart assistant and R-Series V sensor of 30 m (1,181 in.)

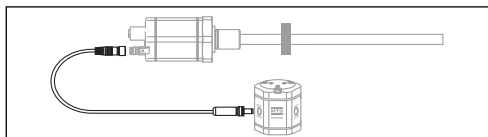


Fig. 3: Connection of TempoLink smart assistant to R-Series V sensor

A D 6 0 / S D 7 0
R-Series V Analog/SSI with connector output

A S 0 0
R-Series V Analog/SSI with cable output

Color sensor cable	Color adapter cable	Function
GY	GY	-
PK	PK	-
YE	YE	-
GN	GN	-
BN	BN	+ 24 VDC
WH	WH	DC Ground (0 V)

E M 0 8 / E M 1 2
R-Series V EtherCAT®/Ethernet/IP™/POWERLINK/
PROFINET

Fig. 5: Connecting the adapter cable to the R-Series V sensor inclusive connector wiring for AS00

6. Connection of TempoLink smart assistant to power supply

Connect the barrel connector for the power supply ② to the "INPUT 24 VDC" port on the TempoLink smart assistant (Fig. 6).

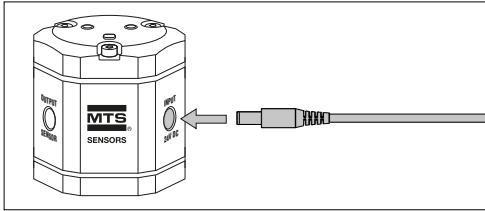


Fig. 6: Connecting the power supply to the TempoLink smart assistant

Depending on the ordered kit configuration, the other end of the cable for power supply of the TempoLink smart assistant is connected to a power supply.

6.1 Using the plug-in power supply with plug adapters

Insert the plug ② into the outlet (Fig. 8). Additional outlet adapters are supplied to support regional requirements.

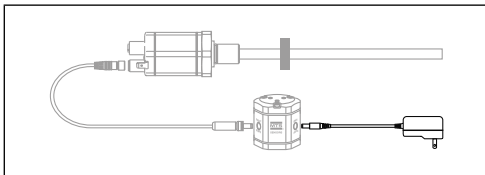


Fig. 7: Connection of TempoLink smart assistant with the plug-in power supply

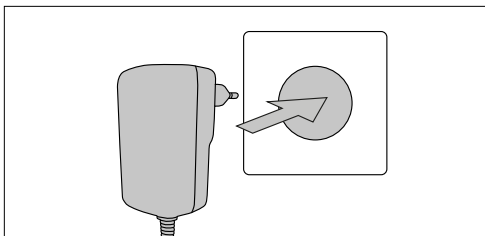


Fig. 8: Connecting the power supply to outlet

6.2 Using the cable for insertion in an existing power supply

For R-Series V with EtherCAT®, EtherNet/IP™, POWERLINK or PROFINET the TempoLink smart assistant can be inserted in an existing power supply. Connect the sensor male connector ② to the female connector of your existing power supply that was removed from the sensor (Fig. 10).

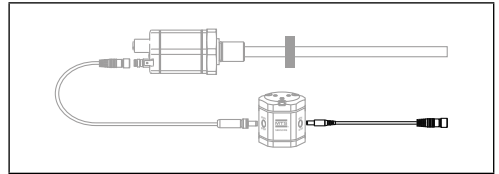


Fig. 9: Connecting the TempoLink smart assistant with the cable for insertion in an existing sensor power supply cable for R-Series V EtherCAT®, EtherNet/IP™, POWERLINK and PROFINET

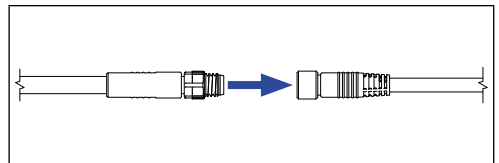


Fig. 10: Connecting the male connector to the female connector of the existing power supply

6.3 Using the barrel connector with pig-tail

Connect the cable ② to a power supply unit according to the pin assignment in Fig. 12.

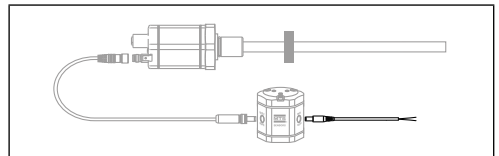


Fig. 11: Connecting the TempoLink smart assistant with the barrel connector with pig-tail

Cable	Function
● RD	+24 VDC
● BK	DC Ground (0 V)

Fig. 12: Connecting the pig-tail to power supply

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7. Connection of TempoLink smart assistant to smartphone, tablet or computer

Connect to a smartphone, tablet or computer to display the graphical user interface of the TempoLink smart assistant.

7.1 Connecting a Wi-Fi enabled device to the integrated Wi-Fi access point³

Activate Wi-Fi on the device and choose the network "TempoLink_xxxx" (xxxx indicates the last four digits of the serial number). The access to the Wi-Fi is password protected. The default password is the serial number printed on the label on the bottom of the TempoLink smart assistant.

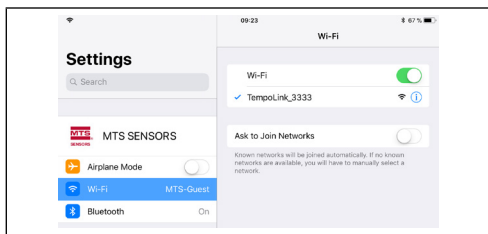


Fig. 14: Choose the network "TempoLink_xxxx" in the Wi-Fi settings of the Wi-Fi-enabled device

NOTICE

If you are using a mobile device, ensure cellular data is off. Depending on your operation system, message can appear, that there is no internet access. TempoLink smart assistant does not need internet access. Connecting to the user interface may take longer if Wi-Fi and cellular data are active.

7.2 Connecting a computer via USB connection

The TempoLink smart assistant can also be connected via USB. If the computer is Wi-Fi enabled deactivate Wi-Fi on the computer before setting up the USB connection.

Connect the USB cable ④ with the micro USB connector to the port labeled "USB" on the TempoLink smart assistant. Next, connect the USB type-A connector to a free USB port of the computer. The USB connection simulates a network card. In the folder "network connections" on the computer the connection is shown as "IP-over-USB" or "Remote NDIS".

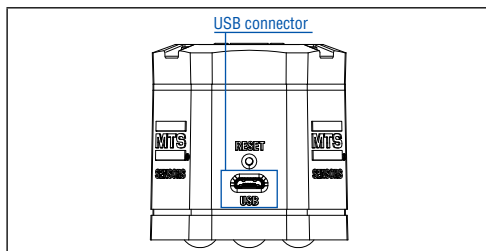


Fig. 13: USB port on the TempoLink smart assistant

NOTICE

Only one device can be connected to the TempoLink smart assistant at a time in order to display the graphical user interface.

NOTICE

Disable all Wi-Fi and LAN connections before connecting TempoLink smart assistant via USB. Connecting to the user interface may take longer if Wi-Fi and LAN connections are active. It may be useful to press CTRL + F5 to delete cached text and images from prior to launching the <http://tempolink.local> website.

3/ The integrated Wi-Fi access point does not provide internet access

8. Establishing a connection via browser

After the connection via Wi-Fi or USB is established, open the browser and go to the website-URL: **http://tempolink.local**
It is recommended to use the browser Mozilla Firefox, Google Chrome, Microsoft Edge or Safari.

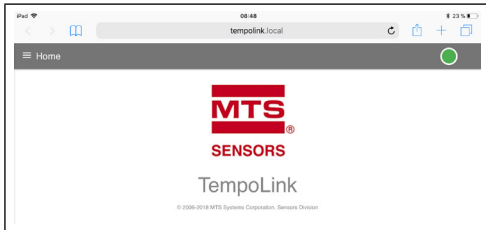


Fig. 15: Start page of the graphical user interface

The connection icon in the top right shows the status of the connection between the TempoLink smart assistant and the sensor.




Connection status		
Green	Information	
	ON	Connection to sensor is established
Red	Information	
	ON	Connection to sensor is not established
Blue	Information	
	ON	Sensor in command mode

Fig. 16: Connection status

9. Graphical user interface

Click the menu symbol ≡ in the top left to get to the main menu of the graphical user interface (GUI) (Fig. 17):

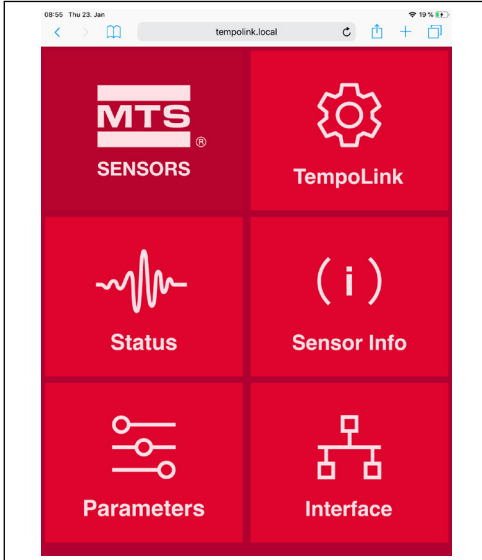


Fig. 17: Main menu of the graphical user interface

9.1 Menu item TempoLink

The TempoLink menu item includes information about the TempoLink smart assistant like its serial number, firmware version and part number. In addition you can change the password and update the firmware of your TempoLink smart assistant.

Updating the TempoLink firmware

Firmware updates of the TempoLink smart assistant are available for download from the MTS Sensors website www.mtssensors.com. The firmware update is packed in a zip file. Download the zip file, save it on your computer and unzip it. To install the firmware update, connect your TempoLink smart assistant to your computer via USB cable or via Wi-Fi. A firmware update is not possible when connecting via smartphone or tablet.

In the TempoLink menu item click the UPDATE button to open the “Configure TempoLink” window (Fig. 18). Click the CHOOSE FILE button. Use the dialog to navigate to the location where you saved the firmware update file and select the update.tar file. The selected file is displayed. To execute the update, click the SUBMIT button (Fig. 19).

During the update process, the TempoLink smart assistant will automatically shut down and restart. During installation, a USB drive will appear and disappear at your computer. The LEDs will also change during the process. Typically, the three LEDs will turn green before changing to orange. The installation may take several minutes (typically 3...4 minutes) even if the LEDs do not change. After successful installation, the orange LEDs go out. LED A and LED B light up depending on the connection. LED C lights up green. If you have connected your computer to the TempoLink smart assistant via Wi-Fi, restore the Wi-Fi connection after the installation is complete. The Wi-Fi connection is interrupted during the update. Refresh your browser and use the TempoLink smart assistant as usual.

NOTICE

- No action is required from you during the installation of the update. Do not disconnect the TempoLink smart assistant from the power supply during the update process.
- Check regularly if a new firmware is available. Use the latest firmware. Firmware updates will improve the performance or add further features.

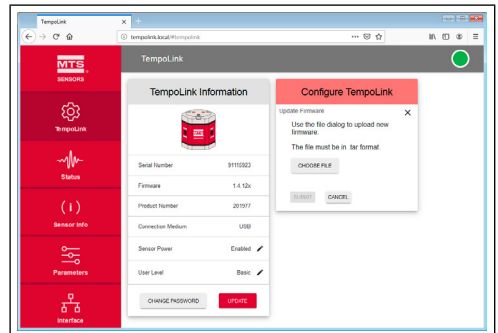


Fig. 18: Window “Configure TempoLink” for the firmware update

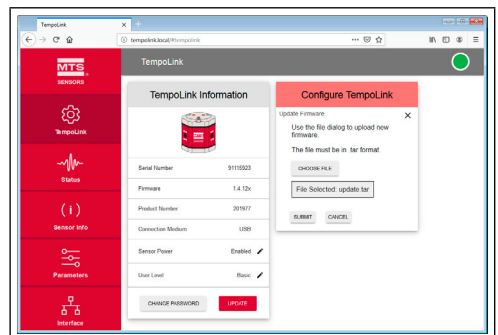


Fig. 19: Selected tar-file for the firmware update

9.2 Menu item status

The status menu includes current information about the sensor status (Fig. 20) such as:

- **Magnets Found:** Number of magnets detected on the sensor
- **Magnets Set:** Number of set magnets. By clicking on the red arrow on the left the current position of the magnet is displayed. The magnifying glass on the right of the magnet is displayed. The magnifying glass on the right of the magnet provides a graphical display of the magnet's position. Note, that the output of the position values for the graphical display is slower than the output of the position values to the controller (Fig. 21).
- **Temperature:** Current temperature inside the sensor electronics housing.
- **Input Voltage:** Current input voltage of the sensor.
- **Sensor Notices:** Current error messages
- **Lifetime Statistics:** By clicking the red arrow in the left information about the sensor statistics are displayed (depending on the connected sensor)
 - **Odometer:** Total distance travelled by the position magnet
 - **Magnet cycles:** Total number of directional changes of the magnet
 - **Operational Time:** Total operational hours of the sensor
 - **Max Temperature:** Maximum temperature inside the sensor electronics housing reached so far
 - **Min Temperature:** Minimum temperature inside the sensor electronics housing reached so far
 - **Temperature Violations:** Duration of exceeding or falling below the permissible operating temperature range
 - **Max Voltage:** Maximum input voltage reached so far
 - **Min Voltage:** Minimum input voltage reached so far
 - **Voltage Violations:** Duration of exceeding or falling below the permissible power supply range
- **Displayed Units:** You can change the units of the displayed values from metric units to imperial units. To do this, click on the black pencil in this line. The "Change Display Units" window opens. Select the desired unit and confirm by clicking OK (Fig. 22).

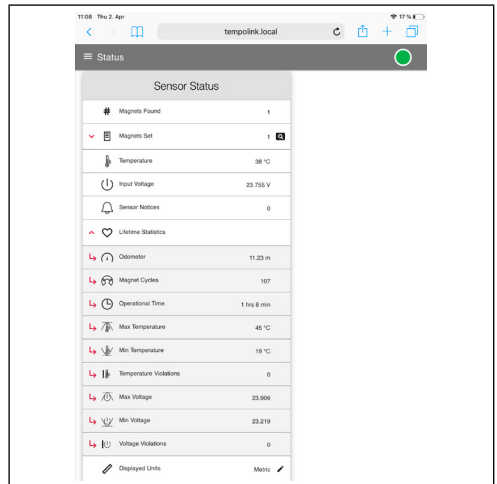


Fig. 20: Sensor status

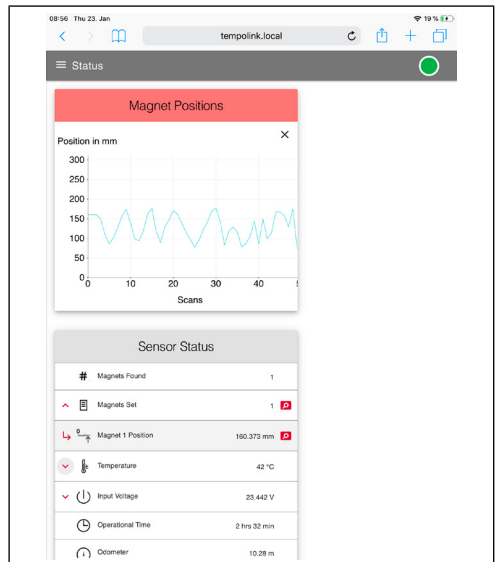


Fig. 21: Graphical display of position values

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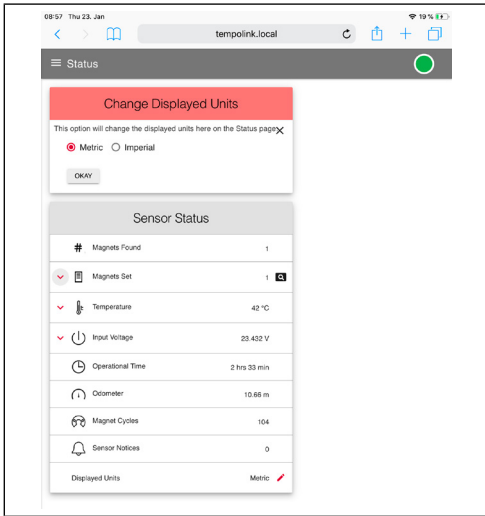


Fig. 22: Change displayed units

NOTICE

The displayed values are unprocessed raw data. These values are independent of parameter adjustments.

9.3 Menu Item Sensor Info

The Sensor Info menu includes information about the connected sensor like stroke length, serial number and order code.

9.4 Menu Item Parameters

The Parameter menu includes information about the operational settings and the statistics settings of the connected sensor. The displayed parameters depend on the sensor output. In addition some operational settings may not be adjustable.

NOTICE

For information about the parameters, check the R-Series V operation manual of the sensor connected to your TempoLink smart assistant.

To change parameters or to reset the sensor to factory settings, the command mode must be started. In command mode, the sensor does not output a position value. By clicking the button ENTER COMMAND MODE the “Enter Command Mode” window opens. After reading the information, enter the word COMMAND and confirm by clicking OK (Fig. 23). After entering the command mode the connection icon on the top right will turn from green to blue. By clicking the button FACTORY RESET the sensor is reset to the factory setting.

After the parameters have been configured or the factory reset has been carried out, click the button EXIT COMMAND MODE. The “Exit Command Mode” window for exiting the command mode will open. Click the button SAVE AND EXIT to exit the command mode and to transfer the changed parameters to the sensor (Fig. 24). If you click the button CANCEL, the changed parameters are not transferred to the sensor. The sensor returns to the normal function and outputs the current position value. The connection icon on the top right will turn to green.

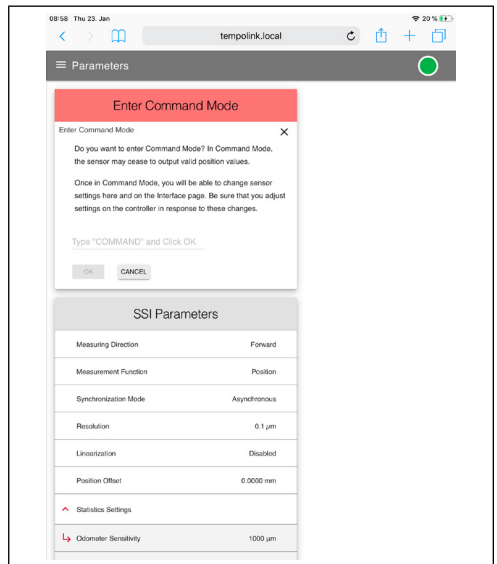


Fig. 23: Starting the command mode

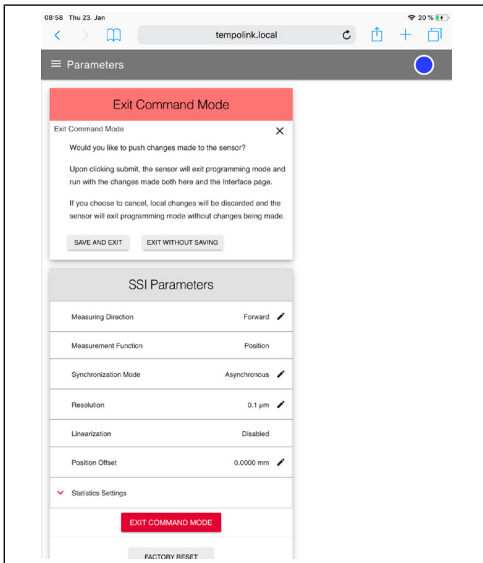


Fig. 24: Exiting the command mode

NOTICE

Do not enter the command mode and adjust parameters while the sensor is in operation.

9.5 Menu item interface

The interface menu includes information about the interface settings of the connected sensor. The displayed information depends on the sensor output. To change interface settings, the command mode must be started. See section 9.4 Menu Item Parameters.

NOTICE

Do not enter the command mode and change settings while the sensor is in operation.

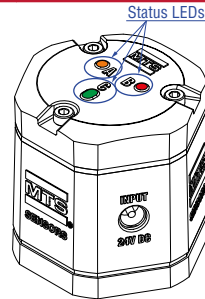
NOTICE

German version of the operation manual is available on our homepage: www.mtssensors.com

10. LEDs of TempoLink smart assistant

Three LEDs in the lid of the TempoLink smart assistant display the current status of the tool:

TempoLink smart assistant LEDs



LED A
Communication between TempoLink smart assistant and sensor

LED color	Information
Green Flashing	Data transfer between TempoLink smart assistant and sensor
Red ON	No connection between TempoLink smart assistant and sensor

LED B
Communication between TempoLink smart assistant and website

LED color	Information
Red ON	Website not accessed
Green Flashing	Data transfer between TempoLink smart assistant and website

LED C
USB & Wi-Fi connection

LED color (up)	Information
Green ON	USB connection exists
Red ON	USB connection error
– OFF	No USB connection
LED color (down)	Information
Green ON	Wi-Fi activated on TempoLink smart assistant
Red ON	Wi-Fi error on TempoLink smart assistant
– OFF	Wi-Fi deactivated on TempoLink smart assistant (USB connection exists)

Fig. 25: LED connection status

NOTICE

Initialization of the Wi-Fi connection or USB connection takes a few seconds. After initialization, the corresponding LED C lights up.

11. Technical data

Operating conditions	
Operating temperature	-20...+60 °C (-4...+140 °F)
Humidity	10...90 % relative humidity, no condensation
Ingress protection	IP30
Design / Material	
Housing	ABS plastic
Dimensions (h × w × d)	54 × 44 × 53 mm (2.1 × 1.7 × 2 in.)
Electrical connection	
Connection type	1 × micro USB 1 × barrel connector 2.1 × 5.5 mm (female) 1 × barrel connector 2.5 × 5.5 mm (female)
Operating voltage	+24 VDC
Power consumption	15 W (when connecting an R-Series V sensor)
Wi-Fi	
Wi-Fi standard	IEEE 802.11b/g/n
Frequency range	2.4 GHz: 2.412 GHz...2.472 GHz

Notes

UNITED STATES 3001 Sheldon Drive
MTS Systems Corporation Cary, N.C. 27513
Sensors Division Phone: +1 919 677-0100
Americas & APAC Region E-mail: info.us@mtssensors.com

GERMANY Auf dem Schüffel 9
MTS Sensor Technologie 58513 Lüdenscheid
GmbH & Co. KG Phone: +49 235 1 9587-0
EMEA Region & India E-mail: info.de@mtssensors.com

ITALY Phone: +39 030 988 3819
Branch Office E-mail: info.it@mtssensors.com

FRANCE Phone: +33 1 58 4390-28
Branch Office E-mail: info.fr@mtssensors.com

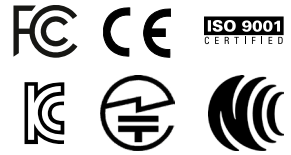
UK Phone: +44 79 44 15 03 00
Branch Office E-mail: info.uk@mtssensors.com

SCANDINAVIA Phone: +46 70 29 91 281
Branch Office E-mail: info.sca@mtssensors.com

CHINA Phone: +86 21 2415 1000 / 2415 1001
Branch Office E-mail: info.cn@mtssensors.com

JAPAN Phone: +81 3 6416 1063
Branch Office E-mail: info.jp@mtssensors.com

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