MANUAL

ODT-HH-MAH200
Handheld

Format A5

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SENSING YOUR NEEDS

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Contents

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1   Introduction

Congratulations

You have chosen a device manufactured by Pepperl+Fuchs. Pepperl+Fuchs develops, produces and distributes electronic sensors and interface modules for the market of automation technology on a worldwide scale.

Before you install this device and put it into operation, please read the operating instructions thoroughly. The instructions and notes contained in this operating manual will guide you step-by-step through the installation and commissioning procedures to ensure trouble-free use of this product. By doing so, you:

- guarantee safe operation of the device
- can utilize the entire range of device functions
- avoid faulty operation and the associated errors
- reduce costs from downtimes and incidental repairs
- increase the effectiveness and operating efficiency of your plant.

Store this operating manual somewhere safe in order to have it available for future work on the device.

Directly after opening the packaging, please ensure that the device is intact and that the package is complete.

Symbols used

The following symbols are used in this manual:

Note!

This symbol brings important information to your attention.

Handling instructions

You will find handling instructions beside this symbol

Contact

If you have any questions about the device, its functions, or accessories, please contact us at:

Pepperl+Fuchs GmbH
Lilienthalstraße 200
68307 Mannheim
Telephone: +49 621 776-4411
Fax: +49 621 776-274411
E-Mail: fa-info@pepperl-fuchs.com

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2 Declaration of conformity

This product was developed and manufactured under observance of the applicable European standards and guidelines.

Note!

A Declaration of Conformity can be requested from the manufacturer.

The product manufacturer, Pepperl+Fuchs GmbH, D-68307 Mannheim, has a certified quality assurance system that conforms to ISO 9001.

ISO**9001**

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3 Safety

3.1 Symbols relevant to safety

Danger!
This symbol indicates a warning about a possible danger.

In the event the warning is ignored, the consequences may range from personal injury to death.

Warning!
This symbol indicates a warning about a possible fault or danger.

In the event the warning is ignored, the consequences may course personal injury or heaviest property damage.

Caution!
This symbol warns of a possible fault.

Failure to observe the instructions given in this warning may result in the devices and any connected facilities or systems develop a fault or fail completely.

3.2 Intended use

Always operate the device as described in these instructions to ensure that the device and connected systems function correctly. The protection of operating personnel and plant is only guaranteed if the device is operated in accordance with its intended use.

The handheld was designed for identifying 1D and 2D codes and should be used for this purpose only. The handheld is flexible and can therefore be used to decode codes in many branches of industry, such as the logistics sector.

3.3 General safety notes

Class 2M laser product

This handheld is a class 2M laser product:

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> ⚠ **Warning!**
> Class 2M laser radiation
>
> Laser targeting beams can cause serious eye injuries.
>
> The irradiation can lead to irritation even in a dark environment. Do not point at people!
> Caution: laser light, do not look into the beam or observe laser light with optical instruments such as magnifying glasses, microscopes, telescopes or binoculars!
> Caution: visible and invisible laser radiation, do not look into the beam or observe with optical instruments such as magnifying glasses, microscopes, telescopes or binoculars!
> Maintenance and repairs should only be carried out by authorized service personnel!

These safety instructions are also printed on the back of the handheld next to the battery compartment:

LASER/LED RADIATION DO NOT STARE INTO BEAM OR VIEW DIRECTLY WITH OPTICAL INSTRUMENTS
CLASS 2M LASER/LED PRODUCT
Max Output <1mW, y:650-700 nm
IEC 60825-1:1993 +A11997 +A2:2001

> ⚠ **Warning!**
> Class 3R laser radiation
>
> Laser beam emissions can cause serious eye injuries when the housing is opened.
>
> Do not open the housing of the handheld. If the device develops a fault, please contact Pepperl+Fuchs. Avoid looking directly into laser beams.

These safety instructions are also printed on the inside of the housing:

CAUTION - CLASS 3R LASER RADIATION WHEN OPEN AVOID DIRECT EYE EXPOSURE
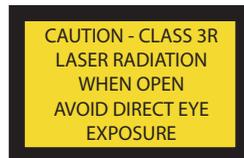
Do not open, burn or short-circuit the battery. The battery may ignite, explode, leak or heat up and become irreparably damaged.

Always charge the battery using approved cables.

Only use recommended original accessories.

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The operating company bears responsibility for observing locally applicable safety regulations.

Installation and commissioning of all devices must be performed by a trained professional only.

User modification and or repair are dangerous and will void the warranty and exclude the manufacturer from any liability. If serious faults occur, stop using the device. Secure the device against inadvertent operation. In the event of repairs, return the device to your local Pepperl+Fuchs representative or sales office.

Do not dispose of storage batteries with the household refuse.
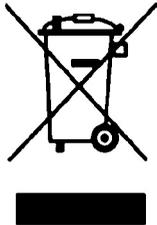
Consumers are obliged by law to dispose of used storage batteries in accordance with regulations. You can hand in your used batteries at public collection points in your area or sales points where batteries of that particular kind are sold. You can also send your used batteries directly to us for disposal. Please remember that this service is only available within the scope of normal use. If you wish to send back your used batteries, please affix sufficient postage stamps and send to our address. There are no extra charges for disposal.

Note!

Disposal

Electronic waste is hazardous waste. When disposing of the equipment, observe the current statutory requirements in the respective country of use, as well as local regulations.

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4   Product description

4.1   MAH 200 - Use and application

The MAH200 has raised the bar even higher in the world of handheld for 1D and 2D codes. The MAH200 incorporates a CMOS sensor with a resolution of 1.3 million pixels, an innovative field of vision with 2 reading areas and a 400 MHz processor, and is now presented as a lightweight, rapid handheld that fulfills all the requirements expected of a modern handheld for 1D and 2D codes.

Figure 4.1: The mobile ODT-HH-MAH200 handheld

A summary of features:

- reads 2D codes with high information density almost as quickly as 1D codes with low information density - irrespective of how large the codes are
- enables omnidirectional reading
- operation possible with or without cables
- unsurpassed reading rate

You have the option of using the handheld in the 3 following operating modes:

- **Cable mode**: the handheld is connected to the computer either via USB, PS/2 or RS232 interface cable.
- **Batch mode**: wireless operation with battery. Data is buffered in the handheld memory.
- **Bluetooth**: wireless operation with battery. Data is transferred to the computer via Bluetooth interface.

200930 2010-09

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4.2 Displays and Controls

1 **Right trigger button**: Programmable key assignment

2 **Left trigger button**: Programmable key assignment

3 LED ▭: Display of internal memory capacity/display of connection status

4 Illuminated LEDs

5 Laser targeting and camera

6 LED ⏻ : Power ON/display of battery capacity

Two LEDs are located on the top side of the handheld, which are identified with the symbols ▭ and ⏻ . The color of the LEDs varies according to the information transmitted from the handheld.

	LED ⏻	LED ▭
Green	The battery capacity is 50 - 100 %	100 % of the internal memory is free.
Yellow	The battery capacity is 20 - 50 %	20 - 99 % of the internal memory is occupied.
Red	The battery capacity is 0 - 20 %	Maximum memory capacity has been reached. No more data can be saved in the internal memory of the handheld.

The handheld also provides acoustic and tactile feedback.

The following table shows all feedback displayed by the handheld in the form of LEDs.

	LED ▢	LED ⏻	Acoustic signal
Handheld successful activated	flashes red, yellow or green	flashes red, yellow or green	1 beep
Handheld is being run by battery	-	flashes approx. every 15 seconds green, yellow or red (depending on battery capacity)	-
Handheld is connected with USB interface cable	-	lights up green continuously	1 beep
Reading successful in battery operation (data is being saved)	flashes yellow or red (depending on available memory space)	-	1 beep
Reading successful in cable operation (data is being send to computer)	-	lights up green continuously	1 beep
internal memory full	flashes red 3 times	-	3 beeps
Configuration code read and configuration complete	flashes red, yellow or green	-	1 beep, short pause, 1 beep
Configuration code read and configuration not complete	flashes red 3 times	flashes red 3 times	3 beeps
Attempt to set up Bluetooth connection	flashes blue	-	1 beep
Bluetooth connection setup successful	-	-	1 beep
Bluetooth connection setup unsuccessful	flashes red 3 times	flashes red 3 times	3 beeps
Bluetooth connected	flashes approx. every 15 seconds	-	-
Bluetooth data transmission	flashes blue	-	-

4.3 Interfaces and Connections
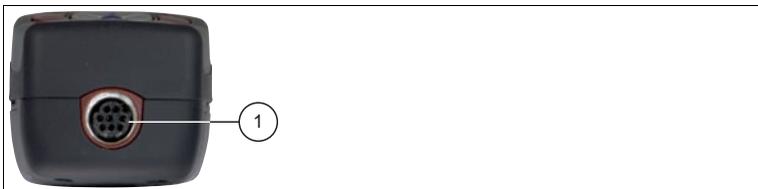
1   8-pin connecting socket

4.4 Delivery package

- ODT-HH-MAH200
- Quick start Guide

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4.5 Field of vision of the handheld
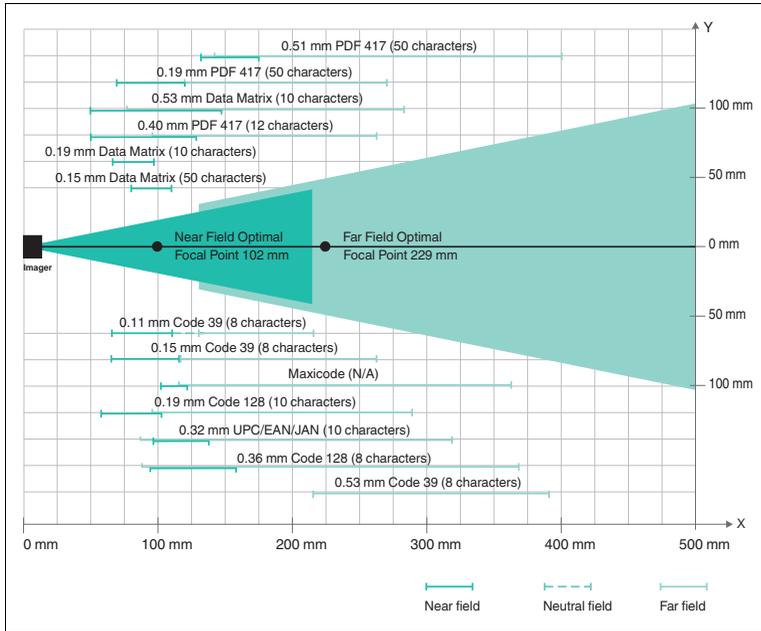
Figure 4.2: Field of vision of handheld ODT-HH-MAH200

4.6 Accessories

Various accessories are available.

4.6.1 Accessories for interfaces

The following interfaces are available as optional accessories:

Designation	Description
ODZ-MAH-B15-M3	Bluetooth modem (without cable), preset to USB

4.6.2 Handles

The following handles are available as an optional accessory:

Designation	Description
ODZ-MAH-GRIP1	Handle, without battery
ODZ-MAH-GRIP2	Handle, with integrated lithium ion battery, capacity 1950 mAh
ODZ-MAH-GRIP3	Handle, with integrated lithium ion battery, capacity 3900 mAh

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4.6.3 Connecting cable

The following connecting cables are available as an option:

Designation	Description
ODZ-MAH-CAB-B14	Connecting cable USB interface, length approx. 180 cm
ODZ-MAH-CAB-B14-3.7m	Connecting cable USB interface, length approx. 370 cm
ODZ-MAH-CAB-R2	Connecting cable RS 232 interface, length approx. 120 cm
ODZ-MAH-CAB-R6	Connecting cable PS/2 interface, length approx. 120 cm

4.6.4 Storage batteries

The following batteries are available as an optional accessory:

Designation	Description
ODZ-MAH-BAT	Lithium ion battery, capacity 1950 mAh
ODZ-MAH-BLANK	Battery blank (for cable operation)

4.6.5 Chargers

The following chargers are available as an optional accessory:

Designation	Description
ODZ-MAH200-CHARGER	Charger for 2 lithium ion storage batteries
ODZ-MAH-CHARGER	Battery charging tray for handles with integrated lithium ion storage battery
ODZ-MAH200-SUPPLY + ODZ-MAH-CAB-CHARGE	Plug supply unit with cable for direct connection of the Handheld
ODZ-MAH-CHARGER-SINGLE	Charger for handhelds with integrated battery ODZ-MAH-BAT

4.6.6 Brackets

The following brackets are available as an option:

Designation	Description
ODZ-MAH200-BRACKET	Table bracket for handhelds

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5 Installation

5.1 Storage and transport

For storage and transport purposes, package the unit using shockproof packaging material and protect it against moisture. The best method of protection is to package the unit using the original packaging. Furthermore, ensure that the ambient conditions are within allowable range.

5.2 Preparation

Unpacking the unit

1. Check that all package contents are present and undamaged.

   ↳ If anything is damaged, inform the shipper and contact the supplier.

2. Check that all items are present and correct based on your order and the shipping documents.

   ↳ If you have any questions, please contact Pepperl+Fuchs.

3. Keep the original packing material in case you need to store or ship the unit at a later time.

Fitting the battery

Fit the battery as follows:

1. Turn the battery so that you can remove it as shown in the illustration.

2. Slide the plastic tab on the battery into the corresponding recess on the Handheld.

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3. Push the locking device upwards and push in the battery.

4. Push the battery in the Handheld, hold in position and release the locking device so that the battery engages.

▶ Charging the battery

Charge the battery as follows:

1. Connect the handheld device with battery to an interface cable.

2. Make sure the computer is switched on and then connect the interface cable to computer.

↳ When the handheld device is switched on, the symbols displayed in the status bar on the handheld device indicate the charge state.

Note!

If you are operating the handheld via an RS 232 interface, connect the RS 232 interface power supply unit to the socket to charge the battery.

Note!

Completely discharged storage batteries

If the storage battery is completely discharged, you will have to wait at least 10 minutes before the Handheld is ready for operation again.

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5.3 Handle installation

▶ Fitting a handle with cable connection

Fit the handle to the Handheld as follows:

1. Remove the battery from the battery compartment of the Handheld if necessary.
2. Carefully pull the rear, flexible part of the handle attached to the plug downwards.
3. Attach the cable connection socket on the Handheld to the plug on the handle.
4. Slide the plastic tab on the battery into the corresponding recess on the Handheld.

↳ The Handheld is now fitted to the handle.

5. Push down the Handheld carefully until the locking device on the Handheld engages in the handle.
6. Connect the interface cable to the cable connection socket underneath the handle.

↳ The Handheld is now ready for operation.

▶ Fitting a handle with integrated storage battery

A handle with integrated battery is also available for this Handheld as an optional accessory. Fit the handle to the Handheld as follows:

1. Remove the battery from the battery compartment of the Handheld if necessary.
2. Slide the plastic tab on the battery into the corresponding recess on the Handheld.
3. Push down the Handheld carefully until the locking device on the Handheld engages in the handle.

↳ The Handheld is now fitted to the handle.

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Securing the interface cable to prevent inadvertent removal

You have the option of attaching a cord grip to prevent the interface cable from being pulled out inadvertently. Proceed as follows:

1. Secure the interface cable to the cable connection socket on the handle.

2. Guide the cable through the slot on the cord grip and slide the cord grip towards the cable connection socket.

3. Make sure that you slide the cord grip over the interface cable and into the correct position.

4. Screw the cord grip to the handle using the screws provided.

↳ The interface cable is secured against inadvertent removal.

Note!

Note!

For secure mounting of the Handheld, we recommend that you secure the Handheld using the screws supplied. Two holes have been drilled on the lower section of the handle for this purpose (see illustration).

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▶ Removing the handle

Remove the handle as follows:

1. If you have secured the handheld with screws on the handle, remove the screws.

2. Push the locking device in the direction of the arrow and press the handheld out of the retainer.

↳ The handle is removed.

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6   Commissioning

6.1   Positioning and reading technology

This handheld uses digital camera technology to record an image of the code to be read. Once an image has been recorded, the handheld evaluates the data contained in the image using a highly developed evaluation process.

The handheld reads both extremely small two-dimensional codes (e.g. Data Matrix codes) and larger one-dimensional codes (e.g. bar codes). The handheld has an innovative field of vision with two areas that are read simultaneously: the near field covers a lens with an optimal focal point of about 10 cm and is specially designed for reading smaller codes. The far field covers a lens with an optimal focal point of about 23 cm and is specially designed for reading larger codes. These combinations enable the handheld to cover a reading area between 5 and 50 cm.

The handheld is held either directly in the hand or fitted to a handle. The handle has a separate button. The two red trigger buttons on the top of the handheld also function when the handle is fitted.

Reading the 1D and 2D code

1. To read smaller codes, hold the handheld nearer to the code. To read larger codes, hold the handheld further away from the code.

2. Depending on the key assignment, press and hold in the trigger button for reading and center the laser targeting in any direction on the code to be read.

    ↳ If the reading process is successful, the status LED lights up green briefly. If you have activated the buzzer and the vibration alarm, an acoustic signal sounds and the handheld vibrates.

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6.2 Operating modes

> **Caution!**
> Data loss
>
> An incorrectly preset interface may lead to data loss.
>
> Make sure that the Handheld is connected to the interface (USB, RS 232, Bluetooth) preset in the Handheld. If necessary, use another interface cable or modify the settings in the Handheld.

6.2.1 Wireless operation (Batch mode)

For certain applications, wireless operation of the handheld is recommended. As soon as you remove the interface cable (USB, RS 232 cable), or you are outside the range of a Bluetooth connection, the handheld switches automatically into "Batch mode": In this mode, the data read is buffered in the internal memory of the handheld. This allows you to transfer the data saved in the handheld to a computer at a later time.

> **Caution!**
> Data loss
>
> An incorrectly preset interface may lead to data loss.
>
> Make sure that the Handheld is connected to the interface (USB, RS 232, Bluetooth) preset in the Handheld. If necessary, use another interface cable or modify the settings in the Handheld.

> **Note!**
> **Using batteries**
>
> You will require a battery or a handle with integral battery to operate the handheld device using a wireless connection.
>
> A battery is not normally required for cable operation via USB. However, this depends on the current strength that the computer supplies via the USB connection. If the computer does not supply sufficient power to the USB port, you will require a USB hub with a separate power supply or will have to fit a battery to the handheld device.
>
> This optional accessory is available from Pepperl+Fuchs.

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There are three operating modes in Batch mode:

Send & Buffer Mode (default setting)

The data is transferred automatically to the computer and deleted from the internal memory of the handheld as soon as you connect the handheld to an interface cable or the Bluetooth connection is active again.

Setting operating mode **Send & Buffer Mode**

To set the operating mode **Send & Buffer Mode**, proceed as follows:

1. Scan the code **Send & Buffer Mode (Default)**:

M075_01

2. Scan the Code **Save Settings:**

M188_02

Log Only Mode

The read data is not transferred to the computer or deleted from the internal memory of the handheld even if you have connected the handheld to an interface cable or the Bluetooth connection is active again. You will have to transfer and delete the data manually as required (see "Transferring and deleting data manually" on page 21).

Setting the operating mode **Log Only Mode**

To set the operating mode **Log Only Mode**, proceed as follows:

1. Scan the code **Log Only Mode**:

M072_01

2. Scan the code **Save Settings:**

M188_02

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Send & Log Mode

Data is transferred automatically to the computer as soon as you connect the handheld to a computer via an interface cable or the Bluetooth connection is active again. A backup copy of the data that you may have to delete manually remains in the handheld memory (see "Transferring and deleting data manually" on page 21).

Setting operating mode **Send & Log Mode**

To set the operating mode **Send & Log Mode**, proceed as follows:

1. Scan the code **Send & Log Mode**:

M076_01

2. Scan the code **Save Settings:**

M188_02

Preventing automatic data transmission in cable mode

The handheld sends all data to the computer automatically as soon as you connect the handheld in delivery state to a computer via an interface cable. This may lead to data loss if the handheld interface settings are incorrect. To prevent the handheld from transferring data immediately after establishing a connection to the computer, proceed as follows:

1. Scan the code **Disable Auto Transfer Buffer Memory**:

M069_01

2. Scan the code **Save Settings:**

M188_02

↳ Data is not transferred automatically when a connection is established between the handheld and the computer and instead must be transferred manually.

Transferring and deleting data manually

1. To transfer all data from the internal memory of the handheld to the computer, scan the code **Transfer all Data in Memory**:

M077_02

2. Scan the code **Save Settings:**

M188_02

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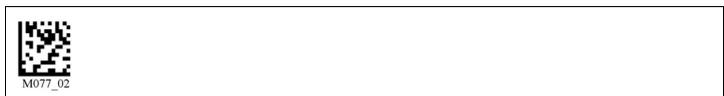
3. To transfer all data that has not yet been sent to the computer from the internal memory of the handheld to the computer, scan the code **Transfer Only Unsent Data in Memory** (this function is only available in Batch-Mode operating mode "Send&Log"):

M078_02

4. Scan the code **Save Settings:**

M188_02

5. To delete all data from the internal memory of the handheld, scan the code **Delete Scanned Data from Memory**:

M071_01

6. Scan the code **Save Settings:**

M188_02

▶ Activating automatic data transmission

To activate the automatic transmission, scan the code **Enable Auto Transfer Buffer Memory**:

M070_01

↳ After the connection with a computer has been set up, the data is transmitted automatically. Manual data transmission is no longer necessary.

6.2.2 Cable mode: USB interface

▶ Connecting the interface cable to the Handheld

To connect the interface cable to the Handheld, proceed as follows:

1. Turn the 8-pin DIN plug so that the arrows on the plug are pointing downwards.

2. Hold the Handheld in your hand with the controls facing upwards.

3. Insert the plug into the corresponding cable connection socket on the Handheld.

4. Press the plug firmly into the cable connection socket until the locking device audibly engages.

   ↳ The interface cable is now connected to the Handheld.

Note!

Connection cable with fitted grip

If you have mounted the Handheld to the optional grip, connect the interface cable to the cable connection socket on the grip.

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▶ **Connecting the handheld to the computer via the USB interface cable**

Connect the handheld to the computer as follows:

1. Insert the USB connector on the cable into a free USB port on the computer. You can do this during operation.

    ↳ The handheld switches on automatically once you have connected it to the computer.

2. To change the operating mode to USB, scan the code **USB Keyboard Mode**:

M134_02

3. To save the settings, scan the code **Save Settings**:

M188_02

↳ Voltage is supplied to the handheld via the USB interface. An additional power supply unit is therefore not necessary. If you use a 1950 mAH battery for batch operation, the battery is charged automatically as soon as the handheld is connected to a switched-on computer via the USB interface.

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Changing USB communication settings

Scan the respective code to change the individual USB connection settings (view table "USB communication settings" on page 24).

USB communication settings

USB Keyboard Mode	
Scan this code to transfer all subsequent scanned data from the handheld to the computer and process it as if a USB keyboard was connected for data input	M134_02
USB downloader	
Scan this code to transfer unformatted, unpacked data to the handheld via the USB interface.	M133_01
USB Native Two Way Mode	
Scan this code to establish bidirectional communication between handheld and an application on the computer via the USB interface. This communication prevents errors and data loss because both the handheld and the computer wait for an answer from the other device.	M135_04
USB Virtual COM 1 Way Mode	
Scan this code to port USB keyboard data in a serial application. You will also require a Virtual Com driver, available at www.pepperl-fuchs.com.	M668_01
Reset to USB Factory Defaults	
Scan this code to reset the handheld to the USB default settings.	M049_03
	Save Settings: M188_02

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6.2.3 Cable mode: PS/2 interface

Note!

Required PS/2 interface cable

You will require a PS/2 interface cable with the following connectors to connect the Handheld to the computer:

- **8-pin DIN connector** for connection to the Handheld.
- **PS/2 socket** for connecting an external keyboard.
- **PS/2 connector** for connection to the computer.

Connecting the interface cable to the Handheld

To connect the interface cable to the Handheld, proceed as follows:

1. Turn the 8-pin DIN plug so that the arrows on the plug are pointing downwards.
2. Hold the Handheld in your hand with the controls facing upwards.
3. Insert the plug into the corresponding cable connection socket on the Handheld.
4. Press the plug firmly into the cable connection socket until the locking device audibly engages.

   ↳ The interface cable is now connected to the Handheld.

Note!

Connection cable with fitted grip

If you have mounted the Handheld to the optional grip, connect the interface cable to the cable connection socket on the grip.

Connecting the handheld to the computer via the PS/2 interface cable

Connect the handheld to the computer as follows:

1. Switch off the computer.
2. If an external keyboard is connected to the computer, disconnect it.
3. If you are using a USB keyboard, connect the keyboard to the PS/2 socket on the interface cable using a suitable adapter. If you are using a keyboard with PS/2 connector, insert the connector directly into the PS/2 socket on the interface cable.
4. Connect the PS/2 connector on the interface cable to the keyboard port on the computer.
5. Switch on the computer.
6. To change the operating mode to PS/2, scan the code **PS2 Mode**:

M126_01

7. To save the settings, scan the code **Save Settings**:

M188_02

↳ The handheld is ready for operation. Voltage is supplied to the handheld via the PS/2 interface. An additional power supply unit is therefore not necessary.

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6.2.4   Cable mode: RS 232 interface

▶ Connecting the interface cable to the Handheld

To connect the interface cable to the Handheld, proceed as follows:

1. Turn the 8-pin DIN plug so that the arrows on the plug are pointing downwards.
2. Hold the Handheld in your hand with the controls facing upwards.
3. Insert the plug into the corresponding cable connection socket on the Handheld.
4. Press the plug firmly into the cable connection socket until the locking device audibly engages.

    ↳ The interface cable is now connected to the Handheld.

Note!

Connection cable with fitted grip

If you have mounted the Handheld to the optional grip, connect the interface cable to the cable connection socket on the grip.

▶ Connecting the handheld to the computer via the RS 232 interface cable

Note!

The operating mode **USB Mode** is preset in delivery state. As a result, an error message may appear on the handheld when the following steps are carried out.

Connect the handheld to the computer as follows:

1. Switch off the computer.
2. Connect the RS 232 connector on the interface cable to the RS 232 interface on the computer.
3.   Connect the low-voltage connector on the power supply unit to the low-voltage socket on the RS 232 interface cable.
4. Connect the power supply unit to the mains power supply.
5. Switch on the computer.

    ↳ If the operating mode **USB Mode** was preset beforehand, an error signal sounds after approx. 20 seconds because the handheld was connected to the RS 232 interface.

6. To change the operating mode to RS 232, scan the code **RS 232 One Way Mode**:

M131_01

7. To save the settings, scan the code **Save Settings**:

M188_02

↳ The handheld then uses the default settings for operation via an RS 232 interface cable (RS 232 one way mode, 56700 baud, 2 stop bits, 8 data bits, no parity) and is ready for operation.

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▶ Changing RS 232 communication parameters

Scan the respective code to change the individual RS 232 connection settings.

RS 232 communication settings

Setting data bit			
7 data bits	8 data bits (default)		
M100_01	M101_01		
Setting stop bit			
2 stop bits (default)	1 stop bit		
M106_01	F001_01		
Setting baud rate			
1200	2400	4800	9600
M092_01	M093_01	M094_01	M095_01
19200	38400	57600 (Default)	115200
M096_01	M097_01	M098_01	M099_01
Setting parity			
Even	Odd	None	
M102_01	M104_01	M103_01	
Scan this code to reset the handheld to the RS 232 default settings:		M418_02	

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Special features of the RS 232 interface

You have the option of connecting the handheld to a computer by an RS 232 interface. Two RS 232 operating modes are available for the connection by the RS 232 interface:

1. **Automatic cable detection (RS 232 Batch-Cable Detect)**: In this RS 232 operating mode, the handheld first checks whether it is connected to the computer via the RS 232 interface.

   • If the handheld is connected to a computer by the RS 232 interface, data is sent directly to the computer without intermediate storage in the internal memory.

   • If the handheld is not connected to a computer by the RS 232 interface, or an existing connection is interrupted, the scanned data is buffered in the internal memory. As soon as the handheld is connected to a computer by the RS 232 interface, the buffered data is transferred to the computer.

2. **Cable operation without power supply unit (RS 232 Cabled - No Power)**: In this RS 232 operating mode, the handheld is connected by the RS 232 interface. The handheld is supplied with voltage from the battery and does not require an external power supply unit. If the connection between handheld and computer is interrupted, the scanned data is lost because the handheld does not buffer the data in the internal memory in this RS 232 operating mode. This RS 232 operating mode is therefore mainly suitable for applications in which a voltage supply from an external power supply unit is not possible (e.g. with mobile measuring instruments, laptops, etc.) and where battery operation is the only feasible option for voltage supply to the handheld.

Changing RS 232 operating mode

To change the RS 232 operating mode, proceed as follows:

1. To activate the RS 232 operating mode **Check of cable connection**, scan the code **RS 232 Batch-Cable Detect (Default)**:

M073_02

↳ The desired RS 232 operating mode is activated.

2. To activate the RS 232 operating mode **Cable operation without power supply unit**, scan the code **RS 232 Cabled-No Power**:

M074_02

↳ The desired RS 232 operating mode is activated.

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6.2.5   Operation with Bluetooth

This handheld has a wireless Bluetooth interface with a radio device of class 1. This permits wireless point-to-point communication with other Bluetooth-compatible devices. If the other Bluetooth-compatible device also has a radio device of class 1, this results in a range of approx. 100 m in free field. In the case of connections with a Bluetooth-compatible device of class 2 or 3, the ranges are shorter accordingly.

If the handheld is outside the range, it saves the read data in the internal memory. The handheld continues attempting to send the read data until the connection to the Bluetooth-compatible device is restored. As soon as the handheld has sent the data to the evaluation unit, the data is deleted from the internal memory.

There are two Bluetooth operating modes:

1. 1way

- **1way Security**: One-way communication from the handheld to the evaluation unit. This operating mode offers higher reliability, but a shorter range. Use this operating mode only if you are using the handheld within the specific range or if you connect the handheld to a device without an operating system (e.g. printer).

  In spite of the stability of the connection, data loss is possible with one-way communication.

- **1way Max Range**: One-way communication from the handheld to the evaluation unit. This operating mode provides a longer range, but less reliability. Use this operating mode only if you are using the handheld within the specific range or if you connect the handheld to a device without an operating system (e.g. printer).

  In spite of the stability of the connection, data loss is possible with one-way communication.

2. **2way**: Two-way communication between handheld and evaluation unit. Data is trans-mitted in packages by protocol. This guarantees the reliability of the transmission as the handheld always waits for a reply from the evaluation unit before deleting data from the internal memory. If necessary, the data is transmitted again automatically. Further-more, both devices continuously check whether the connection to the respective ter-minal still exists (End-to-End Handshake).

Connecting the handheld via Bluetooth

Note!

You will require a MAC-address to establish a connection between the handheld and a Bluetooth-compatible device. This 12-digit numerical code is usually found on the Bluetooth-compatible device or in the manual accompanying your Bluetooth-compatible device.

If you are using a Pepperl+Fuchs Bluetooth modem, use the Data Matrix code printed on the top of the modem as a QuickConnect code.

Establish a connection between the handheld and a Bluetooth-compatible device (e.g. laptop with corresponding Bluetooth USB dongle) as follows.

1. Connect the Bluetooth-compatible device or the Pepperl+Fuchs Bluetooth modem to the computer.

2. Generate a Data Matrix code using the MAC-address on the Bluetooth-compatible device: visit www.pepperl-fuchs.com and use the **Quick Connect Code Generator** to generate the Data Matrix code. Print this Data Matrix code.

3. Scan the code **Reset to RF Factory Defaults**:

M684_01
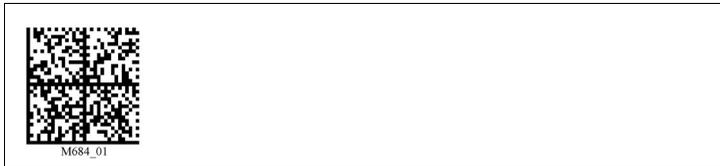
4. Scan the generated Data Matrix code or scan the code printed on the top of the Pepperl+Fuchs Bluetooth modem.

   ↳ The handheld automatically attempts to establish a connection to the computer via Bluetooth.

5. To save the settings, scan the code **Save Settings**:

M188_02

↳ The handheld is now ready for operation. Open the application on the computer to which you wish to send data.

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▶ Changing the Bluetooth operating mode

To change the Bluetooth operating mode, proceed as follows:

1. To activate the Bluetooth operating mode **1way Security**, scan the code **RF One Way Mode (Max Reliability)**:

M128_01

2. To activate the Bluetooth operating mode **1way Max Range**, scan the code **RF One Way Mode (Max Range)**:

M127_01

3. Operation of a Bluetooth mode from Pepperl+Fuchs requires the Bluetooth operating mode **2way**. To activate the Bluetooth operating mode **2way**, scan the code **RF Two Way Mode**:

M129_02

▶ Disconnecting Bluetooth

You have the option of disconnecting Bluetooth manually. In delivery state, an existing Bluetooth connection is disconnected automatically after 90 seconds (you have the option of modifying the time-out setting, see "Changing Bluetooth connection parameters" on page 34). To disconnect the existing Bluetooth connection manually, proceed as follows:

Scan the code **Bluetooth Disconnect**:

M114_02
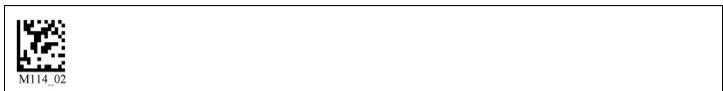
↳ Once you have scanned the code, you may have to wait between 10 to 15 seconds until the handheld is disconnected.

Restoring the Bluetooth connection

If you have secured the handheld in RF mode, the Bluetooth connection is restored under the following conditions:

- You switch on the handheld.
- The handheld switches to standby mode.
- You scan a new code.

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Activating/Deactivating permanent Bluetooth connection

It is usually possible to connect several devices to a single modem alternately. For many applications, connecting a handheld permanently to a modem via Bluetooth is more appropriate. In this case, communication is only possible between a handheld and the modem. To activate the permanent Bluetooth connection, proceed as follows:

1. If you are using a Pepperl+Fuchs Bluetooth modem, scan the Data Matrix code printed on the top of the modem or scan the Data Matrix code generated by the **Quick Connect Code Generator** (see "Connecting the handheld via Bluetooth" on page 30).

2. Scan the code **Lockout Link Mode**:

M710_02
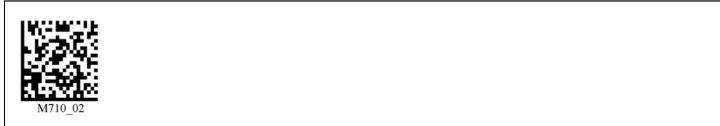
3. Set the standby time if necessary (view table "Bluetooth connection parameters" on page 34).

4. If you would like to connect other devices to the modem, you must first deactivate an existing permanent Bluetooth connection. Scan the code **Unlock Link Mode** to do this:

M711_01

Activating/Deactivating automatic Bluetooth connection

If this function is activated, once standby mode is deactivated or switched off the handheld automatically attempts to establish a connection to the Bluetooth-compatible device with which it was previously connected (this function is active in delivery state). An automatic connection can only be established if you have saved the previous Bluetooth connection with the code **Save Settings**. To activate or deactivate the automatic Bluetooth connection, proceed as follows:

1. To activate the automatic Bluetooth connection, scan the code **Bluetooth Radio Auto Connect On (Default)**:

M068_01

2. To deactivate the automatic Bluetooth connection, scan the code **Bluetooth Radio Auto Connect Off**:

M067_01

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Tip

If you have activate the automatic disconnection of the Bluetooth connection, we recommend that you also activate the function **Automatic Bluetooth connection setup**. Otherwise, before every data transmission you will have to scan the QuickConnect Code of the Bluetooth-compatible device to set up a connection.

Activating/deactivating automatic disconnection of the Bluetooth connection

As soon as the automatic disconnection of the Bluetooth connection is activated, the handheld disconnects the existing connection after every data transmission to the computer (this function is deactivated in delivery state). If you would like to connect several handhelds to the computer via the same Bluetooth-compatible device, activate this function. To activate or deactivate the automatic disconnection of the Bluetooth connection setup, proceed as follows:

1. To activate the automatic disconnection of the Bluetooth connection, scan the code **Bluetooth Radio Auto Disconnect On**:

    M066_01

2. To deactivate the automatic disconnection of the Bluetooth connection, scan the code **Bluetooth Radio Auto Disconnect Off**:

    M065_01

▶ Changing Bluetooth connection parameters

To change the individual parameters of the Bluetooth connection, scan the respective code (view table "Bluetooth connection parameters" on page 34).

Bluetooth connection parameters

Scan one of the following codes to set the time period after which the handheld switches to standby mode if it has not been active. The longer the handheld is ready for operation, the lower the battery runtime.	
90 seconds (default setting) M125_01	5 minutes M121_01
10 minutes M122_01	15 minutes M123_01
30 minutes M124_01	1 hour M119_01
2 hours M120_01	
Scan one of the following codes to select the alarm signal for indicating when the handheld has left the radio range of the Bluetooth-compatible device.	
Acoustic warning signal on M583_01	Vibration alarm on M582_01
Acoustic warning signal and vibration signal on M587_01	Acoustic warning signal/vibration alarm off (default setting) M581_01

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7 Optimizing the handheld

7.1 Factory defaults

▶ Resetting the handheld to factory defaults

To reset the handheld to the factory defaults of the operating mode, scan the appropriate code.

Operating mode	Code
USB	 M049_03
RS 232	 M418_02
PS/2	 M060_03
Bluetooth	 M684_01

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7.2 Programming different code symbologies

Note!

Code Save Settings

Always scan the code **Save Settings** after reading a configuration code. Thus the configuration code is saved permanently.

7.2.1 Aztec

Aztec On

M273_01

Aztec Off (Default)

M272_01

Save Settings

M188_02

Example:

7.2.2 Codabar

Codabar On (Default)

M275_01

Codabar Off

M274_01

Save Settings

M188_02

Example:

A123456789A

7.2.3 Codablock F

Codablock F On

M277_01

Codablock F Off (Default)

M276_01

Save Settings

M188_02

Example:

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7.2.4 Code 11

Code 11 On (Default)

M394_01

Code 11 Off

M393_01

Code 11 Checksum 1 digit

M395_01

Code 11 Checksum 1 digit & Strip from result

M397_01

Code 11 Checksum 2 digit & Strip from result

M396_01

Save Settings

M188_02

Example:

7.2.5 Code 39

Code 39 On (Default)

M235_01

Code 39 Off

M234_01

Code 39 Enable Checksum

M237_01

Code 39 Enable Checksum & Strip from result

M238_01

Disable Checksum (Default)

M236_01

Code 39 Extended Full ASCII On

M233_01

Code 39 Extended Full ASCII Off (Default)

M232_01

Code 39 Short Margin On

M390_01

Code 39 Short Margin Off (Default)

M389_01

Code 39 Trioptic On (Default)

M671_01

Code 39 Trioptic Off

M670_01

Save Settings

M188_02

Example: Code 39

12345678

Example: Trioptic Code 39

123456

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7.2.6 Code 93

Code 39 On (Default)	Code 93 Off	Save Settings
M281_02	M280_01	M188_02

Example:

123456789

7.2.7 Code 128

Code 128 On (Default)	Code 128 Off
M283_01	M282_01

Code 128 Short Margin On	Code 128 Short Margin Off (Default)	Save Settings
M392_01	M391_01	M188_02

Example:

12345678912345

7.2.8 Composite

Composite On	Composite Off (Default)	Save Settings
M285_02	M284_02	M188_02

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7.2.9 Data Matrix

Data Matrix Rectangle On	Data Matrix Rectangle Off (Default)

M242_01

M241_01

Data Matrix Inverse On	Data Matrix Inverse Off (Default)	Save Settings

M239_01

M240_01

M188_02

Example Data Matrix:

Example Data Matrix Rectangle:

7.2.10 GoCode

GoCode is a two-dimensional symbol in miniature format. GoCode was developed in such a way that it fits into one text line and has a multidimensional adaptable matrix pattern which can be reproduced practically on any surface. GoCode is a private symbology and can be used by obtaining a fixed-term license. GoCode has many important advantages when compared with usual linear bar codes and 2D symbols. Please contact Pepperl+Fuchs if you require any further information on the advantages of a private symbology.

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7.2.11 Interleaved 2 of 5

Int 2 of 5 On (Default)

M244_01

Int 2 of 5 Off

M243_01

Int 2 of 5 Two Digits On

M246_01

Int 2 of 5 Two Digits Off (Default)

M245_02

Int 2 of 5 Four Digits On

M248_01

Int 2 of 5 Four Digits Off (Default)

M247_01

Save Settings

M188_02

Example:

123456789

7.2.12 Maxicode

Maxicode On

M289_04

Maxicode Off (Default)

M288_01

Save Settings

M188_02

Example:

7.2.13 Matrix 2 of 5

Matrix 2 of 5 On (Default)

M675_01

Matrix 2 of 5 Off

M674_01

Save Settings

M188_02

Example:

0 1 2 3 4 5 6 7 8 9

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7.2.14 Micro PDF417

Micro PDF417 On

M301_01

Micro PDF417 Off (Default)

M300_01

Save Settings

M188_02

Example:

7.2.15 MSI Plessy

MSI Plessy On

M291_01

MSI Plessy Off (Default)

M290_01

Save Settings

M188_02

Example:

123456789

7.2.16 NEC 2 of 5

NEC 2 of 5 On

M673_01

NEC 2 of 5 Off (Default)

M672_01

Save Settings

M188_02

7.2.17 PDF417

PDF417 On (Default)

M293_01

PDF417 Off

M292_01

Macro PDF 417 On

M287_01

Macro PDF 417 Off (Default)

M286_01

Save Settings

M188_02

Example:

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7.2.18 Pharmacode

An explanation of the Pharmacode settings and all programming codes can be obtained from Pepperl+Fuchs.

7.2.19 Post Codes

All post codes (zipcodes) are deactivated as standard. Scan the following codes to activate the corresponding post symbology.

Note!

If you wish to change the activated symbologies, first scan the code **Disable all Postal Codes** and then the post codes for the desired symbology.

Australian Post On

M252_01

Japan Post On

M253_01

KIX

M254_01

Planet On

M256_01

Postnet On

M257_01

Planet & Postnet On

M255_01

Royal Mail On

M258_01

4-State CB On
(Intelligent Mail)

M748_01

Disable all Postal
Codes

M261_01

Save Settings

M188_02

Example:

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7.2.20 QR Code

QR Code On	QR Code Off (Default)
M261_01	M260_01

Enable Checksum	Disable Checksum (Default)
M265_01	M264_01

QR Code Inverse On	Both Inverse and Standard On
M262_01	M263_01

All QR On (includes Micro QR)	Inverse QR and Micro QR On	Save Settings
M609_03	M687_03	M188_02

Example QR Code

Example Micro QR

7.2.21 GS1 data bar

GS1 Limited On	GS1 14 and GS1 14 Truncated On	GS1 14 Stacked On
M268_01	M271_01	M270_01

GS1 Expanded On	All GS1 On	All GS1 Off (Default)	Save Settings
M269_01	M267_01	M266_01	M188_02

Example GS1 Limited Code

Example GS1 14 Truncated Code

Example GS1 14 Code

Example GS1 14 Stacked Code

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7.2.22 Telepen

Telepen On (Default)

M677_01

Telepen Off

M676_01

Save Settings

M188_02

Example:

23456781

7.2.23 UPC/EAN/JAN

UPC On (Default)

M295_01

UPC Off

M294_01

UPC Short Margin Enabled

M299_01

UPC Short Margin Disabled
(Default)

M298_01

UPC Extension On

M297_01

UPC Extension Off

M296_01

Save Settings

M188_02

Example:

1   23456   78912   8

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7.3 Optimization of the decoding performance

7.3.1 Optimization of the reading speed: windowing

In SXGA mode, the handheld needs more time to detect the codes due to the quantity of the processed data. Furthermore, you have the option of optimizing the reading speed by windowing (adapting the reading area to the code to be read).

1D codes

When windowing for 1D codes of invariable size, the handheld focus is reduced to a reading area of 200x1024 pixels.
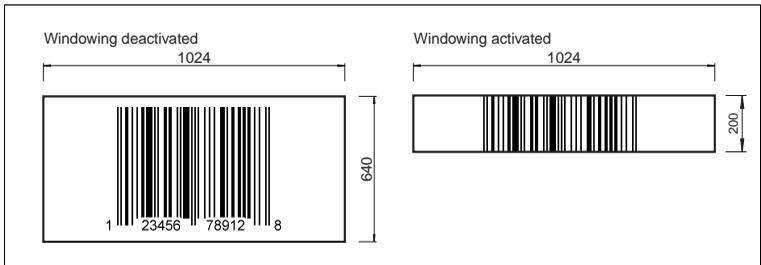

Figure 7.1: Effect of 1D windowing

The handheld must detect a narrow, horizontal strip to decode the 1D codes correctly. The area above and below the 200 pixels is ignored, reducing the data volume of the processed data and enabling the handheld to read the codes faster.

Activating 1D windowing

Note!

Activating 1D windowing may cause problems when other codes are read. If necessary, increase the distance between the handheld and the code you wish to read.

To activate 1D windowing, scan the code **1D Codes ONLY (200 x 1024 pixels)**:

M209_01

Save Settings:

M188_02

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2D codes

When windowing for 2D codes of invariable size, the handheld focus is reduced to a reading area of either 640 x 640, 512 x 512 or 480 x 480 pixels.
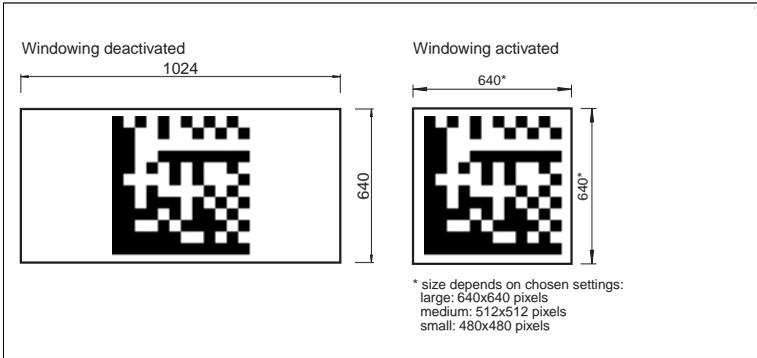

Figure 7.2: Effect of 2D windowing

Downsizing the reading area reduces the data volume of the processed data and enables the handheld to read the codes faster.

Activating 2D windowing

1. To activate 2D windowing for a reading area of 640 x 640 pixels, scan the code **Large 2D Codes (640 x 640 pixels)**:

2. To activate 2D windowing for a reading area of 512 x 512 pixels, scan the code **Medium 2D Codes (512 x 512 pixels)**:

3. To activate 2D windowing for a reading area of 480 x 480 pixels, scan the code **Small 2D Codes (480 x 480 pixels)**:

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4. Scan the code **Save Settings:**

M188_02

Windowing limits

■ Selecting a window of insufficient size has a negative influence of the performance of the handheld and the code may not be read:
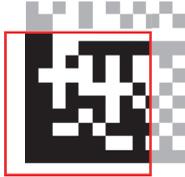
■ The windowing function is not suitable for detecting codes of different sizes.

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7.3.2   Optimization and Trigger Programming

From the moment you turn on your handheld, you are taking full advantage of the dual path 1.3 megapixel imager, the 400 MHz prozessor. The reader are able to read a wide range of symbology types and sizes, as well as a variety of printed media, within a wide range of environmental factors including light (natural or ambient lightning).

By defining if you are scanning large, small, high density or low sensity types of symbology(s), the reader has options that will maximize decoding speed.

The chart below shows options that will improve performance based on parameters listed in each box.

The settings distinguish between, e.g.:

- Code type (1D or 2D codes)
- Size of the code (small, medium, large)
- Information density of the code (low, medium, high)

	SXGA
Near field	High density codes small size 2D
Far field	Standard density codes Medium to large codes
Near and far field	High density and standard density codes small to large codes

You also have the option of assigning the selected settings to the trigger buttons of the handheld. The following are available:

- All buttons: Trigger buttons on handheld and handle button (handle is an optional extra,
- Left trigger button only
- Right trigger button only
- Continuous reading

Programming all trigger buttons

	SXGA
Near field	M614_02
Far field	M615_02
Near and far field	M613_02

Programming the left trigger button

	SXGA
Near field	M632_02
Far field	M633_02
Near and far field	M631_02

Taking pictures

To assign the "Take picture" function to the left trigger button, scan the Data Matrix code **Left Trigger Take Picture** :

M179_01

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Programming the right trigger button

	SXGA
Near field	M641_02
Far field	M642_02
Near an far field	M640_02

Taking pictures

To assign the "Take picture" function to the right trigger button, scan the Data Matrix code **Right Trigger Take Picture**:

 M186_01

Programming the handle trigger button

	SXGA
Near field	M623_03
Far field	M624_03
Near and far field	M622_03

Taking pictures

To assign the "Take picture" function to the handle trigger button, scan the Data Matrix code **Handle Trigger Take Picture** :

 M154_04

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Programming continuous scanning

	SXGA
Near field	 M650_02
Far field	 M651_02
Near and far field	 M649_02

Activating/Deactivating continuous scanning

To activate/deactivate continuous scanning, either scan the Data Matrix code

Continuous Scan Off (Default)
M141_02

or scan the Data Matrix code **Continuous Scan On**
M138_01

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Continuous reading - other setting options

Scan one of the following codes to set the time duration after which the cable-connected handheld in continuous reading mode switches to standby mode.

Cabled - 2 hours

M136_01

Cabled - unlimited

M137_01

Scan one of the following codes to set the time duration after which a handheld in continuous reading mode not connected by cable switches to standby mode.
Continuous reading mode is recommended for short periods only because it consumes the battery more quickly.

Not cable-connected - 5 minutes (default)

M145_01

Not cable-connected - 15 minutes

M146_01

Not cable-connected - 30 minutes

M147_01

Scan one of the following codes to define the time between individual readings.

0 seconds

M142_01

1 second

M143_01

3 seconds

M144_01

Scan one of the following codes to set the delay time for reading double codes.

0 seconds

M222_01

1 second

M223_01

3 seconds

M224_01

Scan one of the following codes to activate/deactivate the reading of codes on moving objects.

Activated

M701_01

Deactivated (default)

M702_01

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7.3.3 Target zone tolerance

The target zone is the area around the code recorded by the handheld. The target zone is measured in pixels from the outside edge of the code you intend to read (⟶ view Figure 7.3 on page 52). The smaller the target zone, the more accurate you must center the target laser on the code you are reading. The opposite also applies: the larger the target area outside of the code, the less precision is required when aiming. The probability that there is more than one code within the field of vision of the handheld is also greater. The symbol in the focus nearest to the target laser is then read.
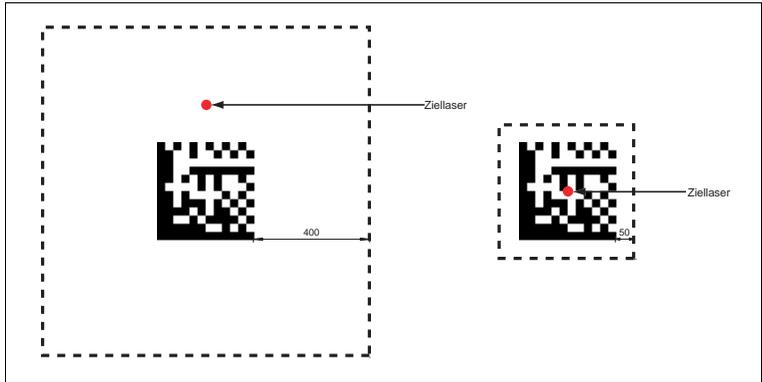

Figure 7.3: Presentation of different target zones

Defining target zone tolerances

Scan one of the following codes:

50 pixels (precise positioning of the target laser required)	75 pixels	100 pixels	125 pixels
M189_01	M190_01	M191_01	M192_01

150 pixels	200 pixels	400 pixels	1600 pixels (default)
M193_01	M195_01	M194_01	M196_01

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7.4 Handheld configuration

Locking handheld to prevent modifications to settings

Once you have adjusted all the necessary settings of the handheld, you have the option of locking the settings to prevent further modifications. To do so, proceed as follows:

1. Scan the code **Reader Settings Locked**:

M429_01

2. To unlock the handheld, scan the code **Reader Settings Unlocked**:

M428_01

3. Scan the code **Save Settings**:

M188_02

7.4.1 Volume and vibration setting

Vibration mode		
Vibration & Beep on	Vibration on/Beep off	Vibration off/Beep on (Default)
M107_01	M109_01	M108_01
Volume mode		
Beep off	Beep low	Beep High (Default)
M110_01	M111_01	M112_01

Scan the code **Save Settings** after selection:

M188_02

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7.4.2 Readability index

The readability index provides information on how well the handheld can decode a specific symbol and allows conclusions to be made regarding the reliability of labeling or identification systems. Factors such as contrast, symbology structure, error recognition, forward error correction (if applicable) and other characteristics affecting symbology are taken into consideration in the decoder algorithm and evaluated with a value between 01 (extremely poor readability) and 100 (excellent readability).

If you guide the handheld by hand, the readability index for the same symbol may differ slightly from reading to reading because of differences in movement, angle, reflection, focus and ambient lighting. If you use the handheld in a stationary position and the distance from the handheld to the symbol and the ambient conditions remain virtually unchanged as a result, the readability index is ideal for quality assurance purposes.

▶ Activating readability index

To activate the readability index, proceed as follows:

1. Scan the code **Code Readability Index Rule**:

M061_02

↳ The code resets the current readability index in the internal memory of the handheld.

2. To display the readability index, scan the code **Readability Index Output Enable**:

M062_02

↳ The handheld displays the readability index during every reading. The readability index is displayed separately with a comma and appears in front of the decoded data. The readability index is displayed until deactivated.

3. To deactivate the readability index, scan the code **Readability Index Output Disable**:

M063_02

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7.4.3 Laser targeting settings

Activating/deactivating laser targeting		
Laser targeting on (default) M055_01		Laser targeting off M054_01
Setting the brightness of the laser targeting		
High (default) M058_01	Medium M057_01	Low M056_01

7.4.4 Handheld switched off

1 hour	2 hours (default)	4 hours
M691_02	M688_02	M689_02

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7.4.5 Information on firmware and serial number of the reader

You have the option of displaying information on firmware and the serial number of the reader.

The information is structured as follows:

Xap/iVVVVWWWWXXXXSSSSSSSSSSPXXX-XX+XX-

Abbreviation	Character	Meaning
Xap/i	-	Internal ID
VVVV	4	Version number of application firmware
WWWW	4	Version number of bootloader firmware
XXXX	4	Version number of Bluetooth firmware
SSSSSSSSSS	10	Serial number of the reader
P	1	**A** for application firmware, **B** for bootloader firmware
XXX-XX+XX-	-	Internal ID

Reading firmware and serial numbers

To read information on firmware and the serial number of the reader, proceed as follows:

1. Open the text editing program (e.g., Notepad, Microsoft Word, etc.).

2. Scan the code **Reader ID and Firmware**:

M153_01

↳ Information on firmware and the serial numbers of the reader is transferred from the internal reader memory and displayed in the text editing program.

Note!

Current firmware and upgrades

Pepperl+Fuchs regularly releases new firmware for readers. Contact Pepperl+Fuchs for information on current firmware versions or upgrades.

7.4.6   Keyboard settings

US English Keyboard - No leading 0 (Default)	US English Keyboard - Leading 0	US English - ctrl+char for Non-Printable ASCII
M172_01	M602_01	M606_01
French	German	Japanese
M609_03	M604_01	M605_01
Universal Keyboard		Custom Keyboard
M173_01		M171_01
Alternative OS enable (Windows CE / MAC / Unix / Linux)		Alternative OS disable (Windows CE / MAC / Unix / Linux)
M585_02		M584_02

Scan the code **Save Settings:** after selection:
M188_02

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7.4.7 Mirror decoding

As soon as you activate mirror decoding, the handheld can read codes that have been inverted. Furthermore, all other code reading functions are deactivated.

Activating/Deactivating mirror decoding

1. To activate mirror decoding, scan the code **Mirroring on**:

M182_01

2. Scan the mirrored code **Save Settings**:

3. To deactivate mirror decoding, scan the code **Mirroring off (Default)**:

M181_02

4. Scan the code **Save Settings:**

M188_02

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7.4.8 Prefix and suffix settings

> **Caution!**
> Risk of data loss
>
> If you scan one of the following codes, data loss may result
>
> First save the settings on your handheld before scanning one of the following codes.

Defining prefix

For presentation of the read data, we recommend - besides the use of suffixes - the use of prefixes as separators between the individual data records. You can select between several separators. Combining several separators is also possible (e.g. a comma followed by a space, followed by the data record).

To define a prefix, scan the corresponding Data Matrix code in the following table.

Comma as a prefix	Space as a prefix	Tabulator as a prefix (USB mode)
M159_02	M164_02	M166_01

Tabulator as a prefix (RS 232 mode)	Carriage return line feed (RS 232 mode)
M218_02	M214_02

Deleting a prefix

To delete all prefixes, scan the Data Matrix code **Prefix - Erase**:

M404_01

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▶ Defining suffix

For presentation of the read data, we recommend - besides the use of prefixes - the use of suffixes as separators between the individual data records. You can select between several separators. Combining several separators is also possible (e.g. a comma followed by a space, followed by the data record). Proceed as follows to define a suffix:

To define a suffix, scan the corresponding Data Matrix code in the following table.

Comma as a suffix	Space as a suffix	Carriage return as a suffix (RS 232 mode)
M160_04	M165_04	M168_04
Line feed as a suffix (RS 232 mode)	Carriage return line feed (RS 232 mode)	Line break as a suffix (USB mode)
M169_04	M170_04	M161_04
Tabulator as a suffix (USB mode)	Tabulator as a suffix (RS 232 mode)	
M167_04	M219_04	

▶ Deleting a suffix

To delete all suffixes, scan the code **Suffix - Erase**:

M405_02

▶ Deleting prefixes and suffixes

To delete all prefixes and suffixes, scan the code **Erase Prefix & Suffix Data**:

M406_02

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