SIEMENS

SIMATIC HMI

HMI devices
Smart 700 IE V4, Smart 1000 IE V4

Operating Instructions

01/2023
A5E51638950-AB

Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

⚠ DANGER

indicates that death or severe personal injury **will** result if proper precautions are not taken.

⚠ WARNING

indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠ CAUTION

indicates that minor personal injury can result if proper precautions are not taken.

NOTICE

indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of Siemens products

Note the following:

⚠ WARNING

Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

Trademarks

All names identified by ® are registered trademarks of Siemens AG. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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Ⓟ 12/2022 Subject to change

Preface

Purpose of the operating instructions

These operating instructions provide information based on the requirements defined by IEC 62079 for documentation. This information relates to the HMI device, its storage, transportation, place of use, installation, use and maintenance.

These operating instructions are intended for a variety of target groups. The following table shows the chapters of these operating instructions that are of particular importance for the respective target group.

Target group	Chapter
All	"Safety instructions"
Operators The operator operates and monitors the system during the process control phase.	"Overview" "Operating the device"
Commissioning engineers The commissioning engineer integrates the HMI device into the system and ensures the operating capability of the HMI device for the process control phase.	All chapters. Depending on the use of the HMI device, certain chapters may not be of relevance to the commissioning engineer, e.g. the section "Maintenance and care."
Service technicians Service technicians rectify faults that occur during the process control phase.	All chapters. Depending on the use of the HMI device, certain chapters may not be of relevance to the service technicians, e.g. the section "Maintenance and care."
Maintenance technicians Maintenance technicians carry out servicing and maintenance work during the process control phase.	Maintenance and care

The WinCC flexible Smart online help contains additional information. The online help contains instructions, examples and reference information in electronic form.

Scope

These operating instructions apply to the following Smart HMI devices:

Product name	MLFB number
SIMATIC HMI Smart 700 IE V4	6AV6648-0DC11-3AX0
SIMATIC HMI Smart 1000 IE V4	6AV6648-0DE11-3AX0

Note

The firmware version must be V4.0.1.0.

Basic knowledge required

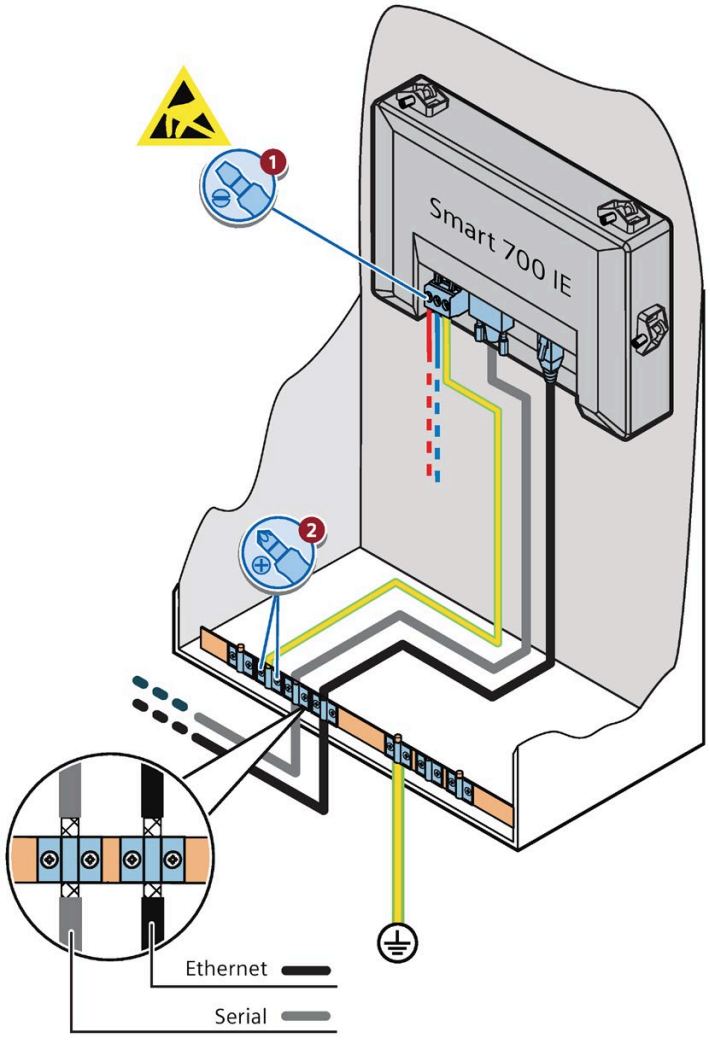
Knowledge of automation technology and process communication is necessary to understand the operating instructions.

An understanding of the use of computers and operating systems is also required.

Illustrations and text highlighting

This manual contains figures of the described devices. The figures may deviate from the supplied device in certain details.

The following graphical highlighting facilitates reading these operating instructions:

Graphical highlighting	Description
	If the instructions involve several tasks, the individual tasks are highlighted by a red number circle. A light blue highlight indicates components and tools that are required in the course of a task. Smart 700 IE is sometimes shown in the figures as a representation of all Smart IE Panels.

The following text highlighting facilitates reading these operating instructions:

Text highlighting	Scope
"Add screen"	• Terms that appear in the user interface, for example, dialog names, tabs, buttons, menu commands • Input values, for example, limits, tag values • Path information
"File > Edit"	Operational sequences, for example, menu commands, shortcut menu commands
<F1>	Keyboard operation

Note information highlighted as follows:

Note

A note contains important information on described products and their handling or on a section of this documentation.

Names of the hardware

These operating instructions describe the Smart IE V4 HMI devices. The term "HMI device" is used synonymously for a "Smart IE V4 HMI device" in these instructions.

Names of the software

Configuration and runtime software have different names as follows:

- "WinCC flexible Smart" refers to the configuration software used to create an HMI project.
- The term "runtime" refers to the "WinCC flexible Smart Runtime" software running on the HMI devices.

Trademarks

Names labeled with a ® symbol are registered trademarks of the Siemens AG. Other names used in this documentation may be trademarks, the use of which by third parties for their own purposes could violate the rights of the owner.

- HMI®
- SIMATIC®
- SIMATIC HMI®
- WinCC®

History

Edition	Comment
02/2022	First Edition
01/2023	Second Edition Description of HMI panel user interfaces and related operations are updated.

Table of contents

Overview

1

1.1 Product description

Optimal choice for simple applications - Smart Panel V4

Reliable new generation Smart Panel for small automation systems

Today, visualization is part of the standard repertoire for most machines. HMI devices with basic functions are fully sufficient for small machines and simple applications.

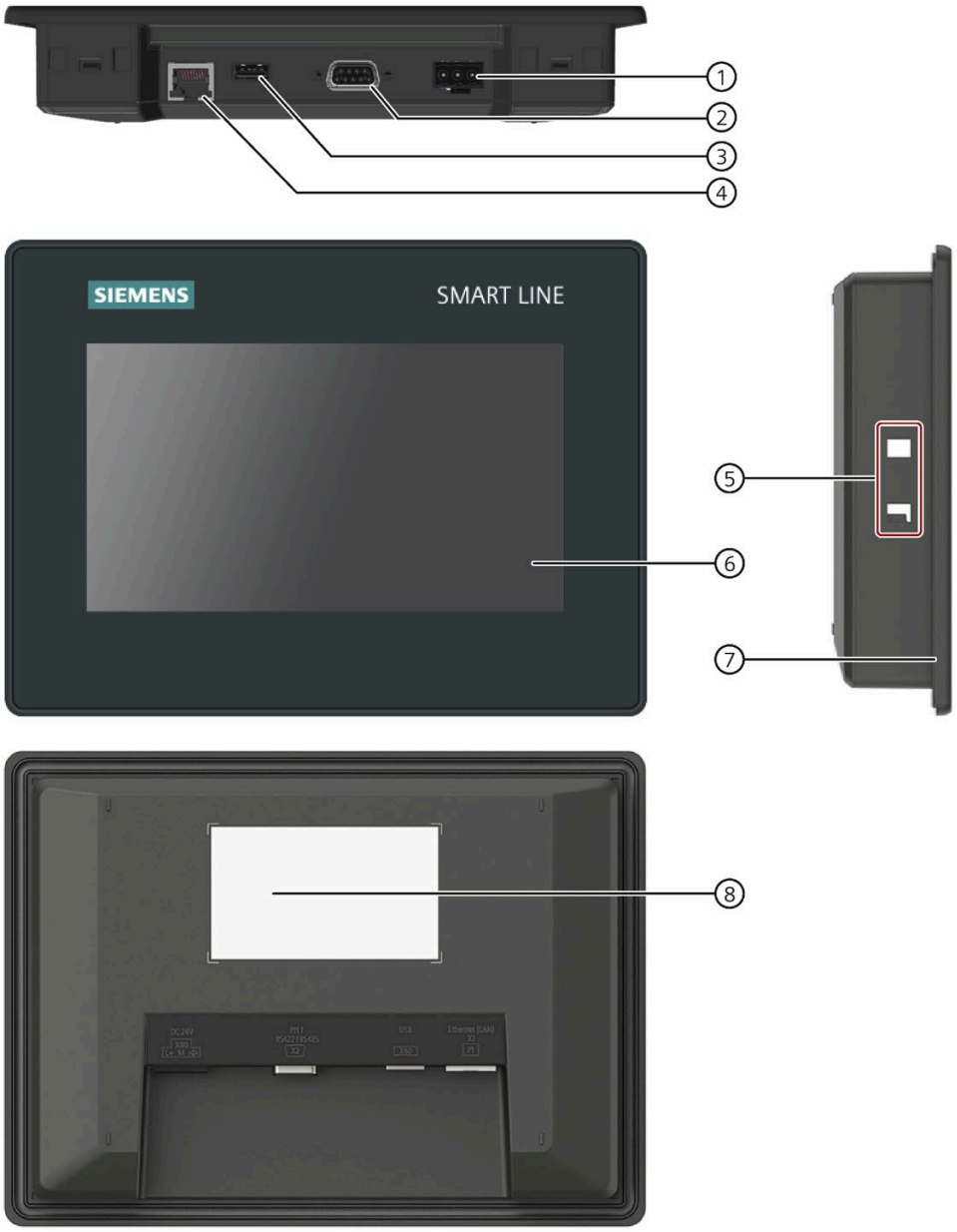
This is exactly the demand that the Smart Panel intends to meet. By enhancing functionalities, Smart Panel V4 goes on to offer exactly those basic features.

The scope of performance of the Smart Panel V4 has been expanded tremendously. Enhanced CPU and Memory contribute to increase the performance. The additional USB Host port is a significant interface improvement. The RTC real time clock with a maintenance-free capacitor system and the improved touch display offer much better user experiences. Configuration and operation of the new panels have become easier in connection with simplified programming by means of the new Engineering Software - WinCC flexible Smart V4.

For detailed technical information, please refer to chapter "Technical specifications (Page 64)".

1.2 Design of the HMI devices

The figure below shows the design of the HMI devices using Smart 700 IE V4 as an example.



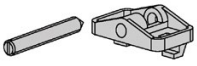
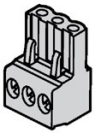
① Power supply connection
② RS 422/485 port
③ USB port
④ Ethernet port
⑤ Recesses for a mounting clip
⑥ Display/touch screen
⑦ Mounting seal
⑧ Rating plate

The Ethernet port can be configured via the Control Panel or the WinCC flexible Smart software.

The RS 422/485 port is configured via the WinCC flexible Smart software.

1.3 Scope of delivery

The scope of delivery of the HMI device includes the following components:

Name	Figure	Quantity
HMI device		1
Quick Installation Guide		1
1 OSS mini DVD with documentation and product information		
1 Accessory kit with mounting clips		According to the quantity required for mounting, in accessory kit
Power supply terminal		1, in accessory kit

1.4 Accessories

Accessories are not included in the HMI device scope of delivery, but can be ordered on the Internet under Industry Mall (http://mall.industry.siemens.com).

Safety instructions 2

2.1 General safety instructions

Working on the control cabinet

WARNING

The device constitutes open equipment on the back side

The device constitutes open equipment on the back side. This means that the device may only be integrated in an enclosure or cabinet which provides front access for operating the device. The enclosure, the cabinet or the electrical operating rooms must provide protection against electric shock and the spread of fire. The requirements regarding the mechanical strength must also be considered.

Access to the enclosure or cabinet in which the device is installed should only be possible by means of a key or tool and for trained and qualified personnel.

Dangerous voltage

Opening the cabinet will expose high voltage parts. Contact with these parts could be fatal.

Always disconnect the cabinet from the mains before opening it.

High frequency radiation

Note

Unwanted operating states

High-frequency radiation, for example, from cellular phones, can trigger unwanted operating states.

Installation as intended

WARNING

Installation only in machinery that conforms to the machinery directive

You are not permitted to commission the HMI device unless it has been verified that the machine in which the HMI device is to be installed complies with directive 2006/42/EC.

ESD

A device equipped with electronic components is an electrostatic sensitive device. Due to their design, electronic components are sensitive to overvoltage and thus to the discharge of static electricity. Note the corresponding regulations when handling ESD.

Industrial Security

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions constitute one element of such a concept.

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place.

For additional information on industrial security measures that may be implemented, please visit (https://www.siemens.com/industrialsecurity).

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends that product updates are applied as soon as they are available and that the latest product versions are used. Use of product versions that are no longer supported, and failure to apply latest updates may increase customer's exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed under (https://www.siemens.com/cert).

Disclaimer for third-party software updates

This product includes third-party software. Siemens AG only provides a warranty for updates/patches of the third-party software, if these have been distributed as part of a Siemens software update service contract or officially released by Siemens AG. Otherwise, updates/patches are undertaken at your own risk. You can find more information about our Software Update Service offer on the Internet at Software Update Service (http://www.automation.siemens.com/mcms/automation-software/en/software-update-service).

Notes on protecting administrator accounts

A user with administrator privileges has extensive access and manipulation options in the system.

Therefore, ensure there are adequate safeguards for protecting the administrator accounts to prevent unauthorized changes. To do this, use secure passwords and a standard user account for normal operation. Other measures, such as the use of security policies, should be applied as needed.

Disclaimer

Please note that the above recommended risk-minimizing security measures are not intended to be exhaustive. Therefore, please consult your security expert for final assessment and configuration.

2.2 Data protection

Siemens observes the principles of data protection, in particular the principle of data minimization (privacy by design). For this product SIMATIC HMI Smart 700/1000 IE V4, this means: The product does not process / store any personal data, only technical functional data (e.g. time stamp). If the user links this data with other data (e.g. shift plans) or stores personal data on the same medium (e.g. hard disk) and thus establishes a personal reference, the user must ensure compliance with data protection regulations.

2.3 Notes about usage

NOTICE
The HMI device is approved for indoor use only.
The HMI device may be damaged if it is operated outdoors.
Operate the HMI device indoors only.

Industrial applications

The HMI device is designed for industrial applications. It conforms to the following standards:

- Requirements of the emission standard for industrial environments, EN/IEC 61000-6-4
- ESD immunity requirements to EN/IEC 61000-6-2

Use in residential areas

Note

The HMI device is not intended for use in residential areas. Operation of an HMI device in residential areas can have a negative influence on radio/TV reception.

If the HMI device is used in a residential area, you must take measures to achieve Limit Class B conforming to EN 55011 for RF interference.

Individual acceptance is required.

Use with additional measures

The HMI device should not be used at the following locations unless additional measures are taken:

- In locations with a high degree of ionizing radiation
- In locations with severe operating conditions, for example, due to:
  - Corrosive vapors, gases, oils or chemicals
  - Electrical or magnetic fields of high intensity
- In systems that require special monitoring, for example, in:
  - Elevators
  - Systems in especially hazardous rooms

Notes on communication

Note

Communication errors caused by address conflict

Communication errors can occur if several devices in a network share the same bus address or IP address.

Make sure that your HMI device is assigned a unique address in the network.

Note

Updating tag values following a communication error

If the communication between HMI device and PLC is interrupted, all tag values displayed on the HMI device will be replaced by a hash mark ("#").

When the communication between the HMI device and the PLC is restored, all tag values will be updated immediately. The cycle time for updating the tag values begins again at "0".

Note on secure boot

Secure boot is used to prevent malicious software from loading when Smart 700 IE/1000 IE V4 starts up.

Secure boot is enabled in Smart 700 IE/1000 IE V4 by default. If you need to disable the secure boot, please contact technical support.

Note

If secure boot is disabled, all factory defaults images in Smart 700 IE/1000 IE V4, projects and user data are erased, and Smart 700 IE/1000 IE V4 can only run images generated by yourself.

If secure boot is disabled, SIEMENS would not provide technical support and maintenance service for the device.

If secure boot is disabled, you cannot enable the secure boot.

Mounting and connecting 3

3.1 Preparations

3.1.1 Checking the package contents

Check the package content for visible signs of transport damage and for completeness.

Note

Damaged parts

Do not install parts damaged during shipment. In the case of damaged parts, contact your Siemens representative.

The package content is described in section Scope of delivery (Page 11).

Keep the provided documentation in a safe place. The documentation is part of the HMI device and is required for subsequent commissioning.

3.1.2 Checking the operating conditions

Note the information in the following sections of these operating instructions before installing the HMI device:

- Certificates and approvals (Page 64)
- Electromagnetic compatibility (Page 65)
- Mechanical ambient conditions (Page 65)
- Climatic ambient conditions (Page 66)
- Protection classes (Page 68)
- Technical data (Page 71)

3.1.3 Selecting a mounting position

The device is suitable for installation in:

- Mounting cabinets
- Control cabinets
- Switchboards
- Consoles

In the following, all of these mounting options are referred to by the general term "cabinet".

The device is self-ventilated and approved for inclined mounting at angles up to +/-35° from the vertical in stationary cabinets.

NOTICE
Damage due to overheating Inclined installation reduces the convection by the device and therefore the maximum permitted ambient temperature for operation. If there is sufficient forced ventilation, the device can also be operated in the inclined mounting position up to the maximum permitted ambient temperature for vertical installation. The device may otherwise be damaged, and its certifications and warranty will be rendered null and void. The ambient temperature ranges listed in this section apply to the temperature inside the cabinet.

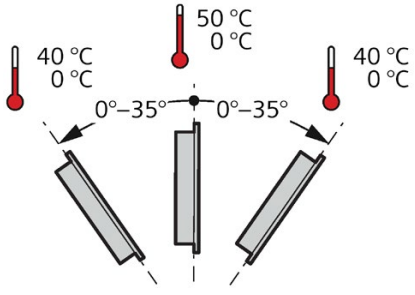
Mounting position

Select one of the approved mounting positions for your device. The approved mounting positions are described in the following sections.

Mounting in horizontal format

Ambient temperature in the cabinet with horizontal mounting:

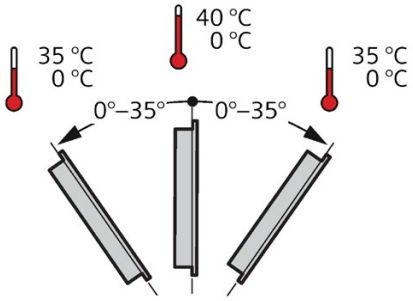
- Vertical mounting (0° inclined): Maximum +50 °C
- Inclined mounting (inclined up to 35°): Maximum +40 °C



Mounting in vertical format

Ambient temperature in the cabinet with vertical mounting:

- Vertical mounting (0° inclined): Maximum +40 °C
- Inclined mounting (inclined up to 35°): Maximum +35 °C



See also

Operating Conditions (Page 67)

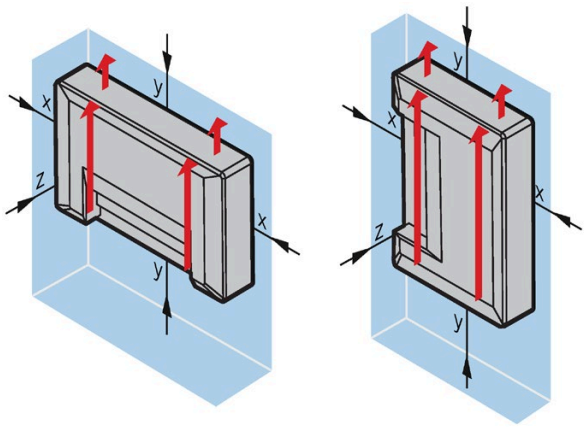
3.1.4 Checking clearances

The following clearances are required around the HMI device to ensure sufficient self-ventilation:

Required clearance around the HMI devices.

All dimensions in mm

	x	y	z
Smart Panels	15	50	10



3.1.5 Making the mounting cutout

Note

Stability of the mounting cutout

The material in the area of the mounting cutout must provide sufficient strength to guarantee the lasting and safe mounting of the HMI device.

The force of the mounting clips or operation of the device may not lead to deformation of the material in order to achieve the degrees of protection described below.

Degrees of protection

The degrees of protection of the HMI device can only be guaranteed if the following requirements are met:

- In order to achieve IP65 protection degree, the material thickness for the mounting cutout should be: 2 mm to 6 mm
- Permitted deviation from plane at the mounting cutout: ≤ 0.5 mm

  This condition must be met for the mounted HMI device.
- Permitted surface roughness in the area of the seal: ≤ 120 µm (R_z 120)

Mounting compatibility

The mounting cutouts of the Smart panels are compatible with the mounting cutouts of the following SIMATIC HMI devices:

Mounting cutout Smart panel	Compatible with the mounting cutouts of the HMI device
Smart 700 IE V4	Smart 700, Smart 700 IE V2, Smart 700 IE V3
Smart 1000 IE V4	Smart 1000, Smart 1000 IE V2, Smart 1000 IE V3

Dimensions of the mounting cutout

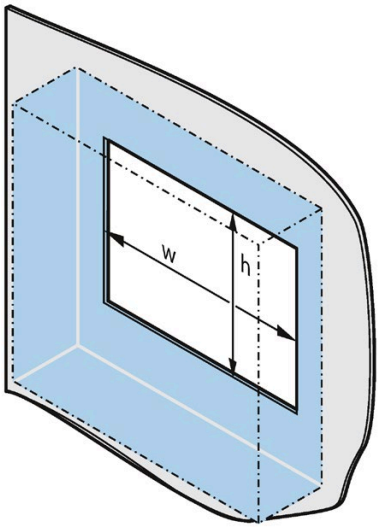
Dimensions of the mounting cutout for the Smart panel in horizontal mounting position:

	w^{+1}_{0}	h^{+1}_{0}
Smart 700 IE	192	138
Smart 1000 IE	259	201

Dimensions of the mounting cutout for the Smart panel in vertical mounting position:

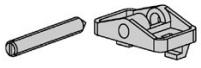
	w^{+1}_{0}	h^{+1}_{0}
Smart 700 IE	138	192
Smart 1000 IE	201	259

All dimensions in mm



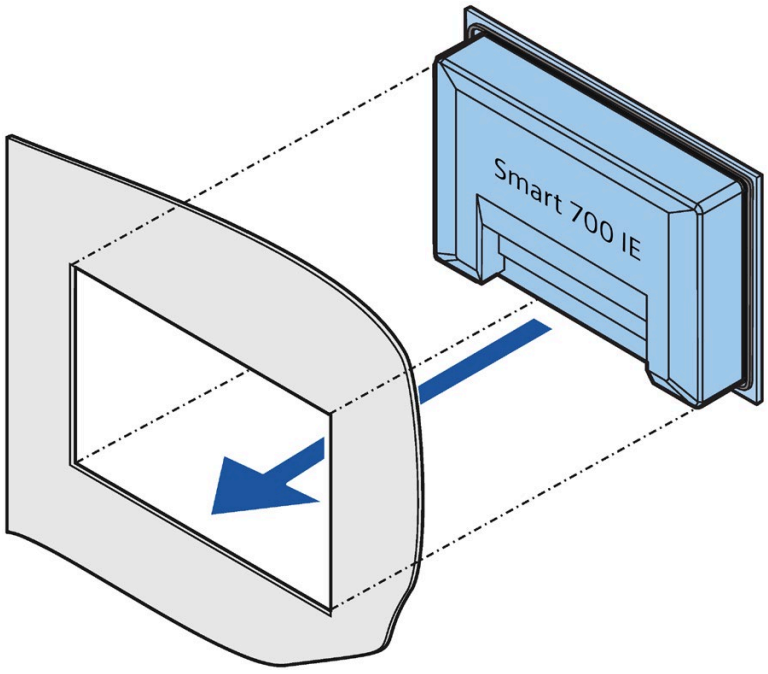
3.2 Mounting the HMI device

Required tools and accessories

	Slotted screwdriver, size 2		
	Mounting clips	Smart 700 IE V4	7
		Smart 1000 IE V4	7

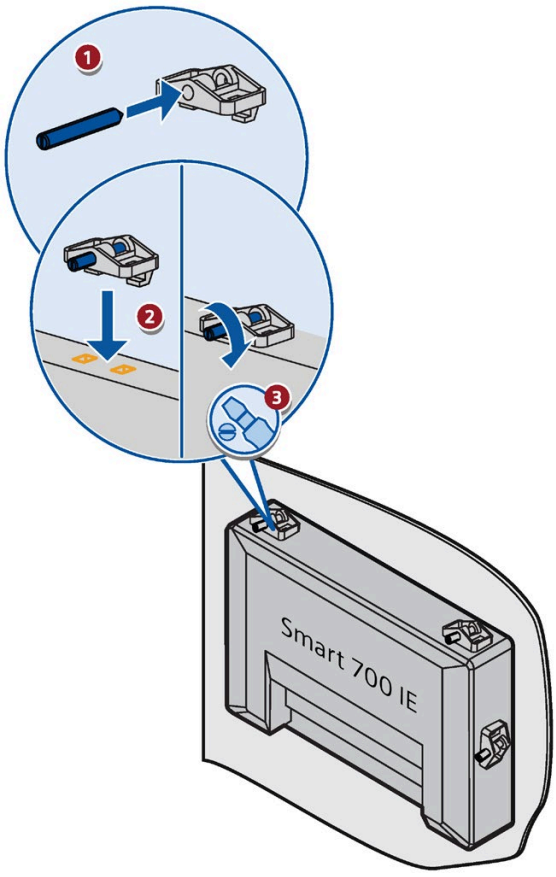
Inserting the HMI device

Insert the HMI device into the mounting cutout from the front.



Securing the HMI device with mounting clips

1. Insert a grub screw into the mounting clip bore hole and turn it several times.
2. Place the first mounting clip into the corresponding cutout.
3. Fasten the mounting clip with a size 2 screwdriver. The maximum permitted torque is 0.2 Nm.
4. Repeat steps 1 to 3 for all mounting clips required to secure your HMI device.



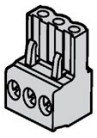
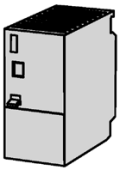
3.3 Connecting the HMI device

3.3.1 Connection sequence

Required tools and accessories

Before you start connecting the HMI device, have the following tools and accessories at hand:

	Slotted screwdriver, size 2
	Phillips screwdriver, size 3

	Crimp pliers
	Power supply terminal
	24 V DC with sufficient amperage. See Technical data (Page 71)

Procedure

Keep to the following sequence of tasks when connecting the HMI device:

1. Connecting the equipotential bonding circuit (Page 23)
2. Connecting the power supply (Page 26)
3. Connecting the configuration PC (Page 27)
4. Connecting the PLC (Page 29)

Note

Strain relief

Contacts can be broken or wires can be torn off if cables are not provided adequate strain relief.

Provide adequate strain relief for all cables.

3.3.2 Connecting the equipotential bonding circuit

Differences in electrical potential

Differences in electrical potential can develop between spatially separated system components. Such electrical potential differences can lead to high equalizing currents on the data cables and therefore to the destruction of their interfaces. Equalizing currents can develop if the cable shielding is terminated at both ends and grounded to different system parts.

Differences in potential may develop when a system is connected to different mains supplies.

General requirements for equipotential bonding

Differences in potential must be reduced by means of equipotential bonding conductors to ensure trouble-free operation of the relevant components of the electronic system. The following must therefore be observed when installing the equipotential bonding circuit:

- The effectiveness of equipotential bonding increases as the impedance of the equipotential bonding conductor decreases or as its cross-section increases.
- If two system parts are interconnected by means of shielded data cables and their shielding is bonded at both ends to the grounding/protective conductor, the impedance of the additionally installed equipotential bonding conductor must not exceed 10% of the shielding impedance.
- The cross-section of an equipotential bonding conductor must be capable of handling the maximum equalizing current. The best practical results for equipotential bonding between two cabinets have been achieved with a minimum conductor cross-section of 16 mm².
- Use equipotential bonding conductors made of copper or galvanized steel. Establish a large surface contact between the equipotential bonding conductors and the grounding/protective conductor and protect them from corrosion.
- Clamp the shielding of the data cable from the HMI device flush at the equipotential rail using suitable cable clamps. The equipotential rail should be very close to the HMI device.
- Route the equipotential bonding conductor and data cables in parallel and with minimum clearance between them.

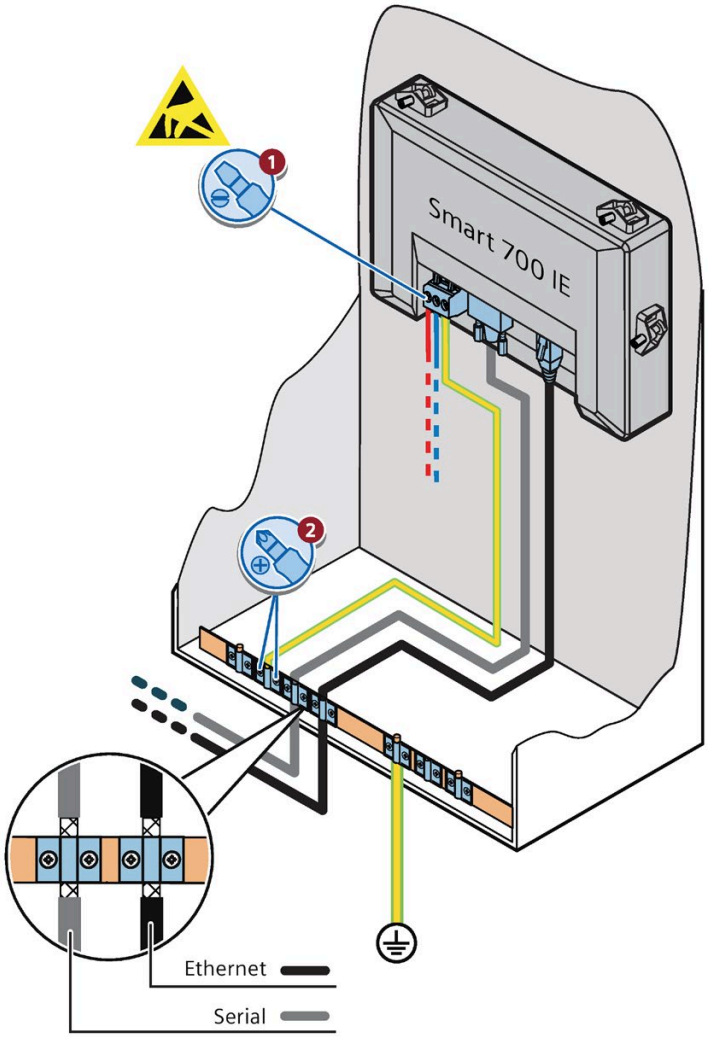
Note

Equipotential bonding conductor

Cable shielding is not suitable for equipotential bonding. Always use the prescribed equipotential bonding conductors. The cross-section of the equipotential bonding conductor must not be less than 16 mm². Always use cables with an adequate cross-section when installing MPI networks. The interface modules may otherwise be damaged or destroyed.

Procedure

1. Interconnect the functional earth connection of the HMI device with an equipotential bonding conductor, cross-section 4 mm^2.
2. Connect the equipotential bonding conductor to the equipotential bonding rail.
3. Strip the ends of the Ethernet and Serial cables.
4. Connect the shield to the equipotential bonding rail (see figure in the circle).

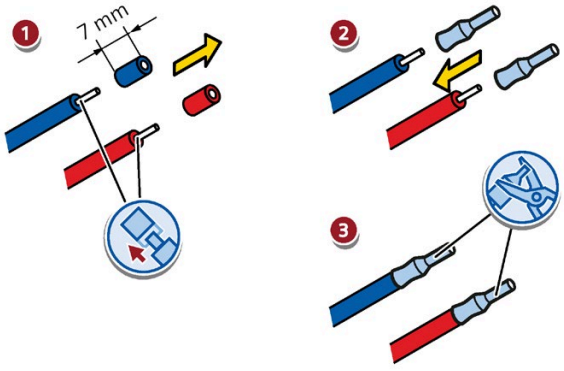


3.3.3 Connecting the power supply

Stripping the cable

Use power supply cables with a maximum cross-section of 1.5 mm^2.

1. Strip the ends of two power supply cables to a length of 6 mm.
2. Attach cable sleeves to the bare cable ends.
3. Install the end sleeves on the cable ends using the crimp pliers.



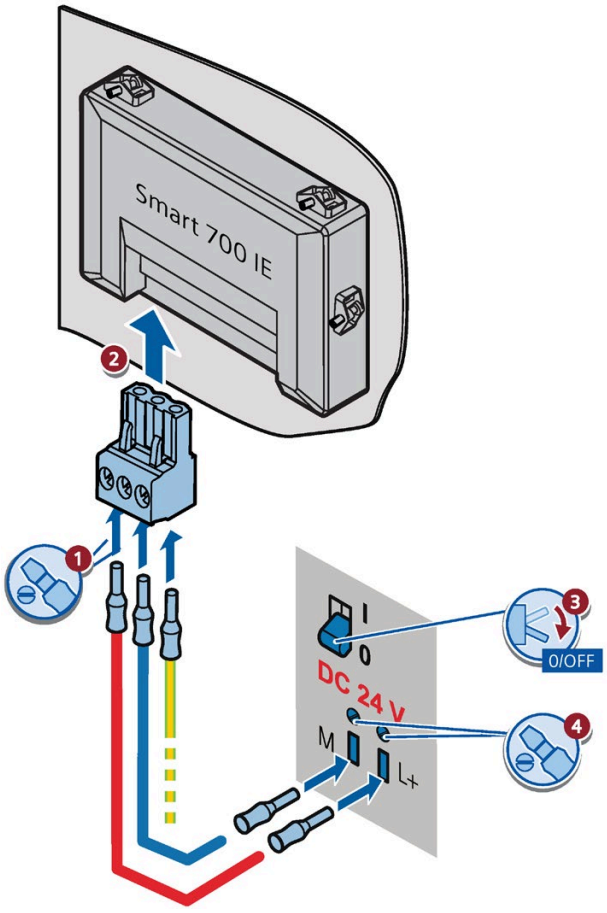
Procedure

NOTICE
24 V DC only An incorrectly dimensioned power supply can destroy the HMI device. Use a 24 V DC power supply with adequate amperage; see Technical data (Page 71).

NOTICE
Safe electrical isolation Use only 24 V DC power supply units with safe electrical isolation in accordance with IEC 60364-4-41 or HD 384.04.41 (VDE 0100, Part 410), for example, to PELV standard. The supply voltage must be within the specified voltage range. Otherwise, malfunctions at the HMI device cannot be ruled out. Applies to non-isolated system configurations: Connect the connection for GND 24 V from the 24 V power supply output to equipotential bonding for uniform reference potential. You should always select a central point of termination.

1. Insert the two power cables into the mains terminal and secure them with a slotted screwdriver.
2. Connect the mains terminal to the HMI device.
3. Switch off the power supply.
4. Insert the two remaining cable ends into the power supply terminals and secure them with the slotted screwdriver.

   Ensure correct polarity.



3.3.4 Connecting the configuration PC

A configuration PC gives you the following options:

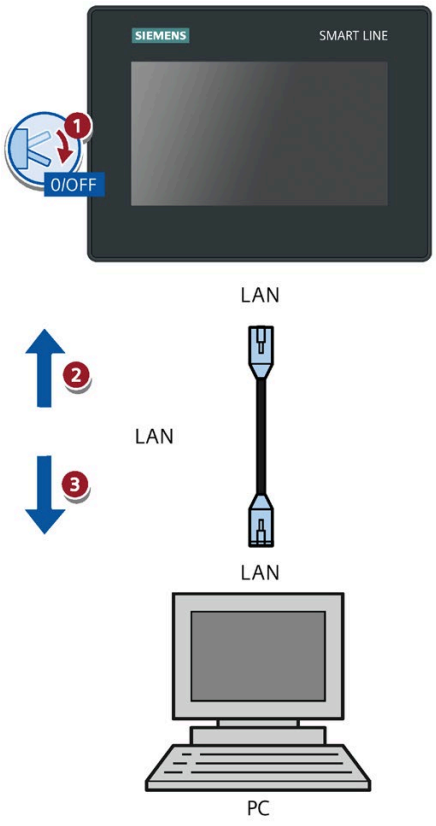
- Transfer a project
- Transfer an HMI device image
- Reset the HMI device to factory settings
- Backup and restore the HMI Data

Procedure

NOTICE
Data network security for communication via Ethernet With Ethernet-based communication, the end user is responsible for the security of the data network; proper functioning of the data network cannot be guaranteed under all circumstances, for example, in case of targeted attacks that result in an overload of the device.

Use a CAT5 Ethernet cable or higher to connect the configuration PC.

1. Shut down the HMI device.
2. Connect one RJ45 connector of the LAN cable to the HMI device.
3. Connect the other RJ45 connector of the LAN cable to the configuration PC.



3.3.5 Connecting the PLC

If the HMI device contains an operating system and an executable project, connect the HMI device to the PLC.

Note

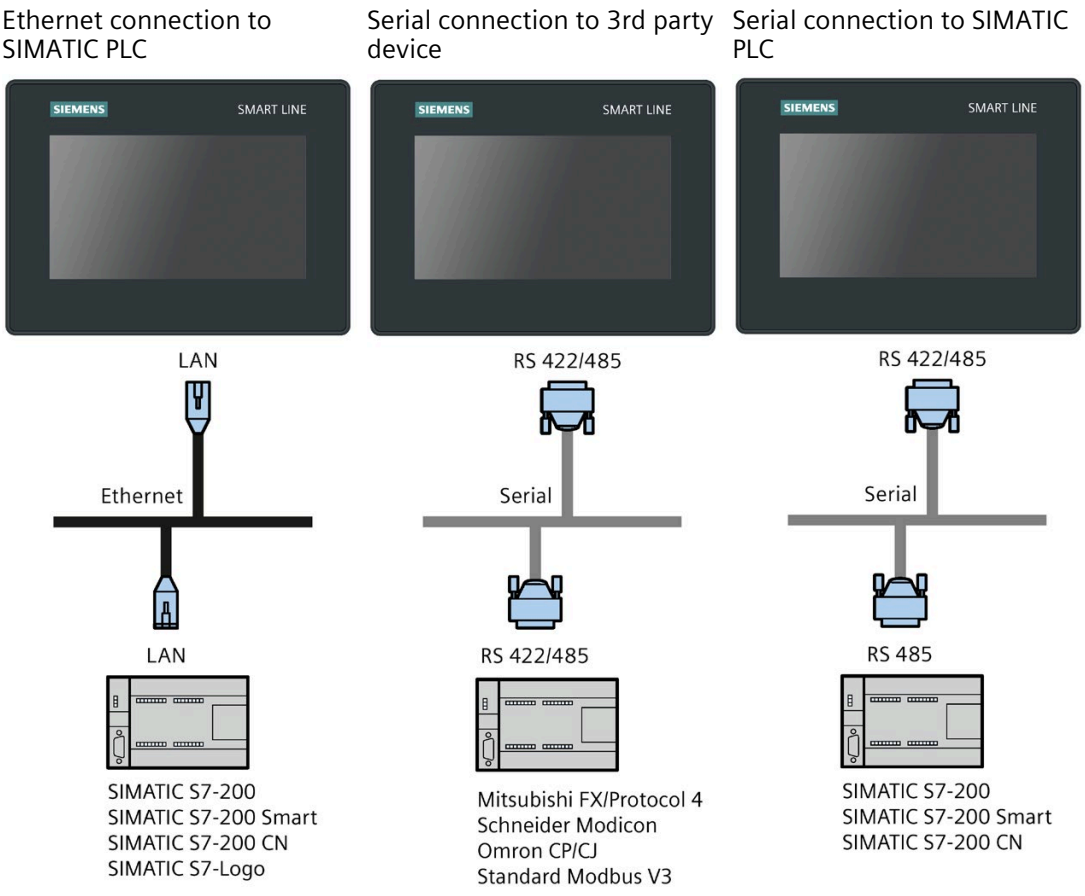
Note the following when connecting the PLC to a panel:

- Route the data lines parallel to the equipotential bonding conductors
- Connect the shields of the data lines to the ground

NOTICE
Data network security The end user is responsible for the security of the data network. Proper functioning of the data network cannot be guaranteed under all circumstances, for example, in case of targeted attacks that result in an overload of the device.

Connection type

Depending on the PLC type you are using, connect the PLC according to the following figures.



For more information, please refer to chapter "Communication with PLCs (Page 74)".

3.3.6 Connecting a USB device

Below are examples of devices designed for industrial use you can connect to the USB port of the HMI device:

- External mouse
- External keyboard
- USB memory stick
- USB hub

Note when connecting

Note

Connect a USB mouse or USB keyboard only for commissioning and servicing purposes to the USB port.

Only use a SIMATIC USB storage medium up to a maximum of 16 GB.

Note

A maximum of 40 projects can be detected in a USB stick.

A maximum of 40 firmware files can be detected in a USB stick.

Note

USB 2.0 certified cable required

If you use a USB cable which is not USB 2.0 certified, errors may occur during data transfer.

Use only USB cables that are labeled "Certified HI-SPEED USB 2.0".

Note

USB cable length maximum 1.5 m

USB cables with lengths more than 1.5 m do not ensure secure data transfer.

The cable may not be longer than 1.5 m.

Note

Functional problem with USB port

If you connect an external device with a 230 V power supply to the USB port without using an non-insulated installation, you may experience functional problems.

Use a non-insulated system design.

Note

Excessive rated load on port

A USB device with too high a power load may possibly cause functional problems.

Observe the values for the maximum load of the USB port. You can find the values in the chapter "USB - X60 (Page 74)".

Note

USB memory stick is not detected.

Depending on the USB memory stick you use, it may happen that the operating system does not detect the USB memory stick. In this case, use a different USB stick.

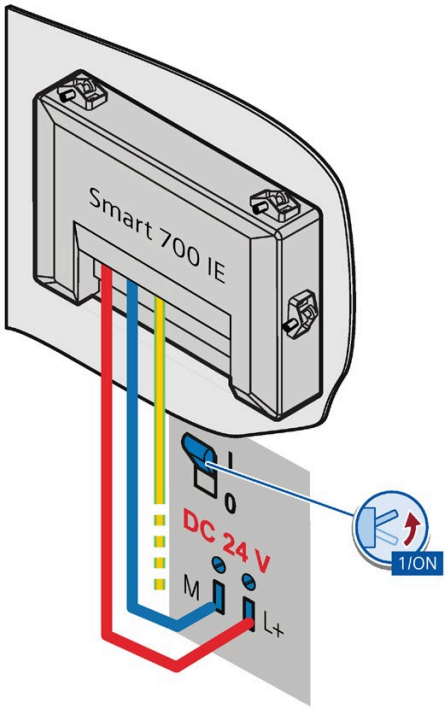
3.4 Switching on and testing the HMI device

Switching on the HMI device

Switching on the power supply.

The screen lights up shortly after power is switched on.

If the HMI device fails to start, you have probably crossed the cables on the power supply terminal. Check the connected cables and change their connection.



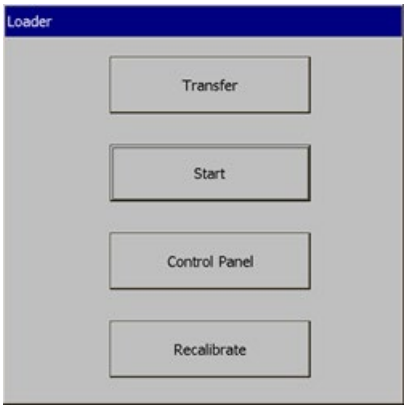
The Start Center opens after the operating system has started.

You operate the Start Center using the buttons on the touch screen or a connected mouse or keyboard.

- Press the "Transfer" button to set the HMI device to "Transfer" mode.

  The "Transfer" mode can only be activated when at least one data channel has been enabled for the transfer.
- Press the "Start" button to start the project on the HMI device.
- Press the "Control Panel" button to open the Control Panel of the HMI device.

  You can change various settings in the Control Panel, for example, the transfer settings.
- Press the "Recalibrate" button to calibrate the HMI device.



Shutting down the HMI Device

1. Close any active projects on the HMI device.
2. Shut down the HMI device. You have the following shutdown options:
   - Switch off the power supply.
   - Remove the power supply terminal from the HMI device.

3.5 Securing the cables

NOTICE
Strain relief Contacts can be broken or wires can be torn off if cables are not provided adequate strain relief. Provide adequate strain relief for all cables.

Operating the device

4

4.1 Overview

All Smart panels are equipped with a touch screen. You use the touch screen to operate the Control Panel or the project running on your HMI device.

⚠ CAUTION

Operation by trained professional personnel only

A project can contain certain operations that require in-depth knowledge about the specific system on the part of the operator.

Ensure that only trained professional personnel operate the system.

Operating the touch screen

NOTICE

Damage to the touch screen

Pointed or sharp objects can damage the plastic surface of the touch screen.

Operate the touch screen only with your fingers or with a touch pen.

Triggering unintended actions

Touching several operating elements at the same time can trigger unintended actions.

Touch only one operating element on the screen at a time.

Operating elements are touch-sensitive symbols on the screen of the HMI device.

They are basically operated in the same way as mechanical keys. You activate operating elements by touching them with your finger.

Note

The HMI device returns a visual feedback as soon as it detects that an operating element has been touched.

The visual feedback is independent of any communication with the PLC. The visual feedback signal therefore does not indicate whether or not the relevant action is actually executed.

Examples:

- Buttons
  Buttons can have the following states:

"Untouched"

Shadow bottom and right

"Touched"

Shadow top and left

- Invisible buttons
  The focus of invisible buttons is by default not indicated following selection. No optical operation feedback is provided in this case.
  The configuration engineer may, however, configure invisible buttons so that their outline appears as lines when touched. This outline remains visible until you select another operating element.
- I/O fields
  A screen keyboard appears as visual feedback after you touch an I/O field, for example, to enter a password. The type of keyboard depends on the mounting position and the touched operating element.
  The screen keyboard is automatically hidden again when input is complete.

Note

Description of all operating elements

A comprehensive description of all operating elements for your HMI device is provided in "Display and operating elements" section of the WinCC flexible Smart online help.

4.2 General functions of the screen keyboard

The following keys are available on the screen keyboard of all Smart panels:

	Cursor left
	Cursor right
	Delete characters left
	Cancel input
	Confirm input
	Display infotext. This key only appears when an infotext has been configured for the operating element.

4.3 The screen keyboards

A screen keyboard appears on the HMI device touch screen when you touch an operating element that requires input. Depending on the type of operating element and the required input, this may be an alphanumerical or a numerical keyboard.

Both keyboards are available in landscape and in portrait.

Text

Numbers

Note

Job mailbox

When job mailbox 51 "Select screen" is activated, the screen keyboard will be closed.

Key assignment

The alphanumerical screen keyboard layout is monolingual.

A language change within the project has no effect on the layout of the alphanumerical screen keyboard.

4.4 Entering data

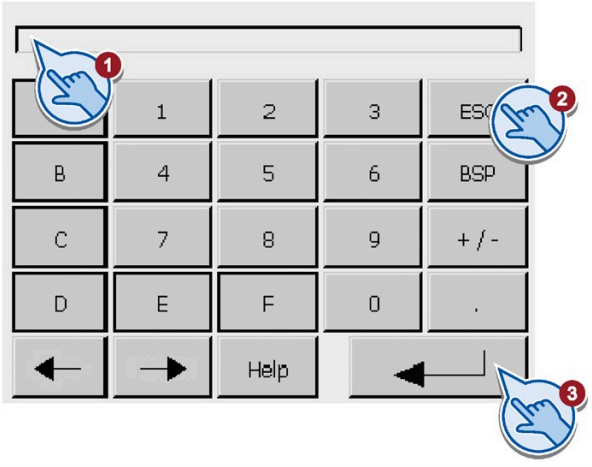
Entering alphanumerical values

1. Touch the desired operating element on the screen.

   The alphanumerical screen keyboard opens.
2. Enter the value. Depending on the settings, the HMI device outputs an audible signal.
   Use the <Shift> key to enter lower-case letters.
3. Press <Return> key to confirm your entries, or cancel them with <ESC>. Either action closes the screen keyboard.

Entering numerical values

1. Touch the desired operating element on the screen.
   The numerical screen keyboard opens.
2. Enter the value. Depending on the settings, the HMI device outputs an audible signal.
3. Press <Return> key to confirm your entries, or cancel them with <ESC>. Either action closes the screen keyboard.



Checking numerical value limits

Tags can be assigned limit values. Any entry of a value outside this limit is rejected. If an alarm view is configured, a system event is triggered and the original value is displayed again.

Decimal places of numerical values

The configuration engineer can define the number of decimal places for a numerical text box. The number of decimal places is checked when you enter a value in this type of I/O field.

- Decimal places that exceed the limit are ignored.
- Unused decimal places are padded with "0" entries.

Configuring the device

5

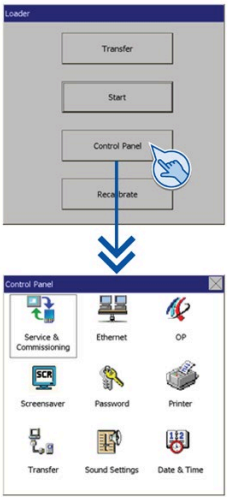
5.1 Opening the settings

The Loader opens after the HMI device has been switched on.

Use the "Control Panel" button to open the Control Panel for parameter assignment of the device.

You can make the following settings:

- Service and commissioning
- Ethernet parameters
- OP (Operator Panel) properties
- Sreensaver
- Password protection
- Printer
- Transfer settings
- Switch on/off the acoustic signal
- Date and time settings



Protecting the Control Panel with a password

You can protect the Control Panel against unauthorized operation with a password. If the Control Panel is password-protected, you can open the settings in read-only mode, but you have to enter the password to edit the settings.

This prevents inadvertent operations and increases security for the system or machine.

Note

If the Control Panel password is no longer available, you first have to update the operating system before you can edit the settings again.

All data on the HMI device is overwritten when you update the operating system.

5.2 Overview

The following table shows the functions available in the Control Panel for configuring your HMI device.

Symbol	Function
	Save and load data using a USB device. • Backup (Page 40) • Restore (Page 42) • OS Update (Page 43) • Project download (Page 44)
	Changing the Ethernet parameters (Page 45)
	Changing display orientation and startup delay time (Page 47) Displaying information about the HMI device (Page 48) Calibrating the touch screen (Page 49) Displaying licensing information for the HMI device (Page 50)
	Setting the screen saver (Page 50)
	Changing the password settings (Page 51)
	Enabling the Transfer channel (Page 52)
	Activating the acoustic signal (Page 53)
	Set the date and time (Page 54).

5.3 General functions in the Control Panel

The following keys are available on the right side of the title bar of each Control Panel dialog:

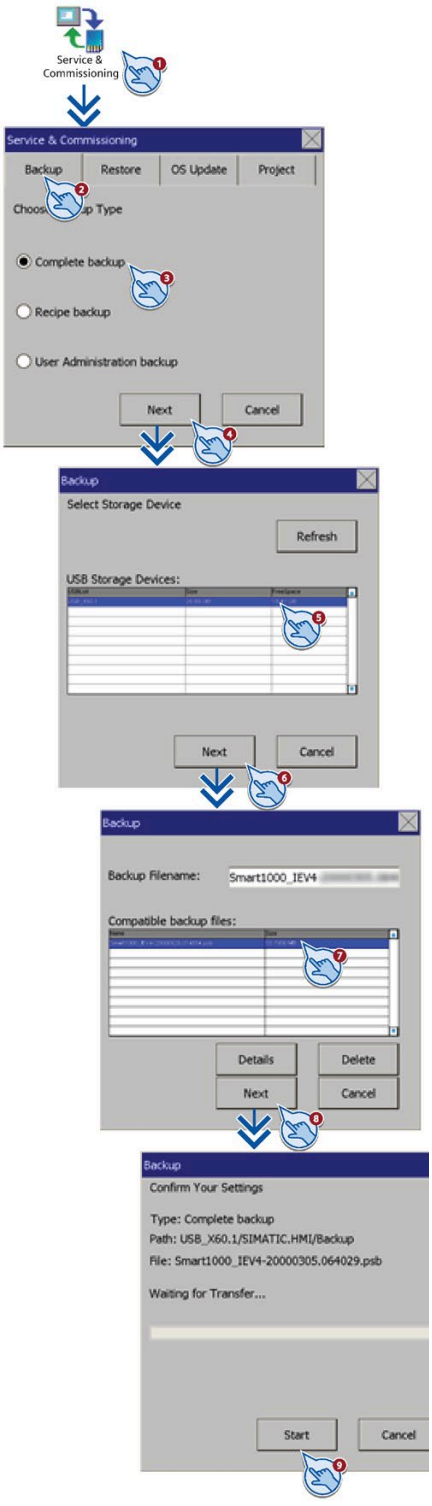
	Save changes and close dialog
	Discard changes and close dialog

5.4 Functions for Service and Commissioning

5.4.1 Backup

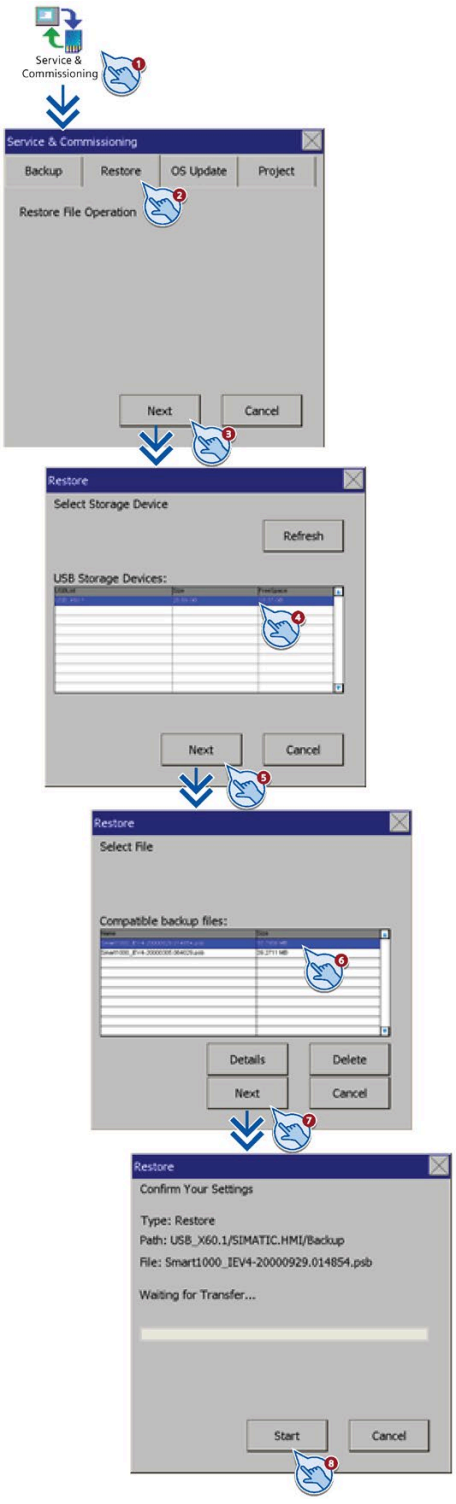
Use the "Backup" function under "Service & Commissioning" to save device data to a USB storage device.

1. Press "Service & Commissioning" to open the "Service & Commissioning" dialog.
2. Select the "Backup" tab.
3. Select the data to be backed up.
   - "Complete backup" generates a backup copy of the project, recipe data and the HMI device image to a file in PSB format.
   - "Recipe backup" generates a backup copy of the HMI device's recipe data records in PSB format.
   - "User administration backup" generates a backup copy of the HMI device's user data in PSB format.
4. Click "Next" to continue.
5. Select a USB device from the "USB Storage Devices" list. If the list is empty, connect a USB storage device to your Smart panel and click "Refresh".
6. Click "Next" to continue.
7. Specify a "Backup File name" or select an already existing backup file to overwrite from the "Compatible backup files" list.
8. Click one of the buttons at the bottom of the dialog:
   - "Details" will display the following data of a backup file you have selected in the list:
     - The device compatible with the backup file
     - The backup path on the USB storage device
     - The backup file name
     - The backup file size
   - "Next" will continue and save the data. If you click "Next", navigate to Step 9.
   - "Delete" will remove a selected backup file after confirmation.
   - "Cancel" will abort the backup operation.
9. Confirm the settings and click "Start". Then the backup operation starts.



5.4.2 Restore

Use the "Restore" function under "Service & Commissioning" to load a backup file from a USB storage device. The data which is loaded depends on the contents of the backup file. For details, refer to chapter "Backup (Page 40)".



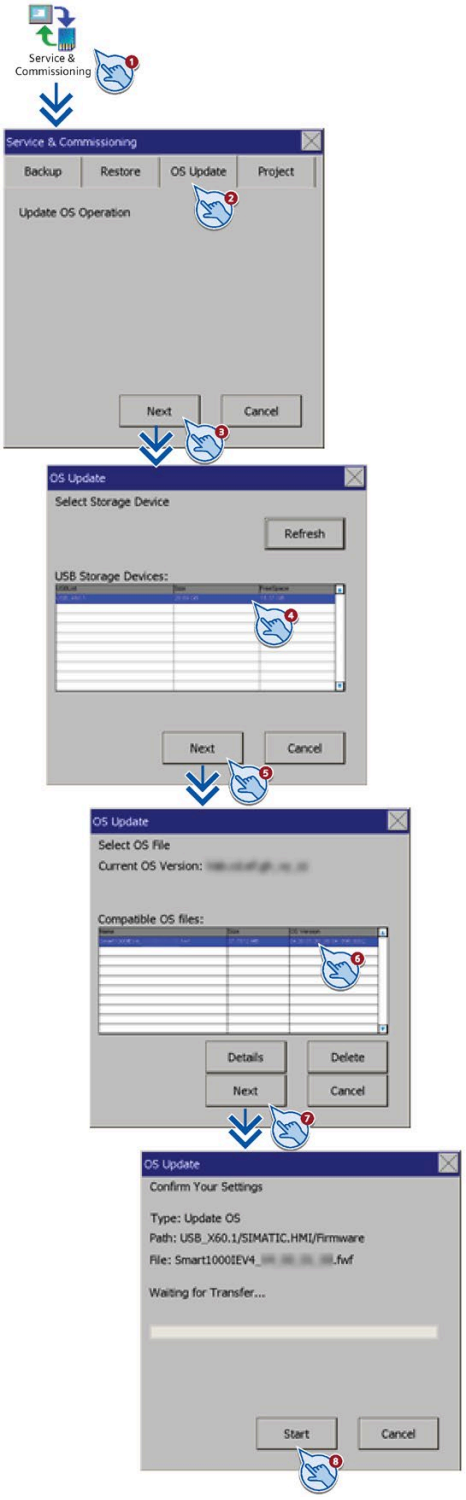
1. Press "Service & Commissioning" to open the "Service & Commissioning" dialog.
2. Select the "Restore" tab.
3. Click "Next" to continue.
4. Select a USB device from the "USB Storage Devices" list. If the list is empty, connect a USB storage device to your Smart panel and click "Refresh".
5. Click "Next" to continue.
6. Select a backup file to load from the "Compatible backup files" list.
7. Click one of the buttons at the bottom of the dialog:
   - "Details" will display the following data of a backup file you have selected in the list:
     - The device compatible with the backup file
     - The backup path on the USB storage device
     - The backup file name
     - The backup file size
   - "Next" will continue and load the data. If you click "Next", navigate to Step 8.
   - "Delete" will remove a selected backup file after confirmation.
   - "Cancel" will abort the restore operation.
8. Confirm the settings and click "Start". Then the restore operation starts.

5.4.3 OS update

Use the "OS Update" function under "Service & Commissioning" to update the operating system.

1. Press "Service & Commissioning" to open the "Service & Commissioning" dialog.
2. Select the "OS Update" tab.
3. Click "Next" to continue.
4. Select a USB device from the "USB Storage Devices" list. If the list is empty, connect a USB storage device to your Smart panel and click "Refresh".
5. Click "Next" to continue.
6. Select an already existing OS file to overwrite from the "Compatible OS files" list.
7. Click one of the buttons at the bottom of the dialog:
   - "Details" will display the following data of an OS file you have selected in the list:
     - The device compatible with the OS file
     - The OS update file path on the USB storage device
     - The OS file name
     - The OS version
     - The OS file size
   - "Next" will continue to update the operating system. If you click "Next", navigate to Step 8.
   - "Delete" will remove a selected OS file after confirmation.
   - "Cancel" will abort the OS update operation.
8. Confirm the settings and click "Start". Then the OS update operation starts.

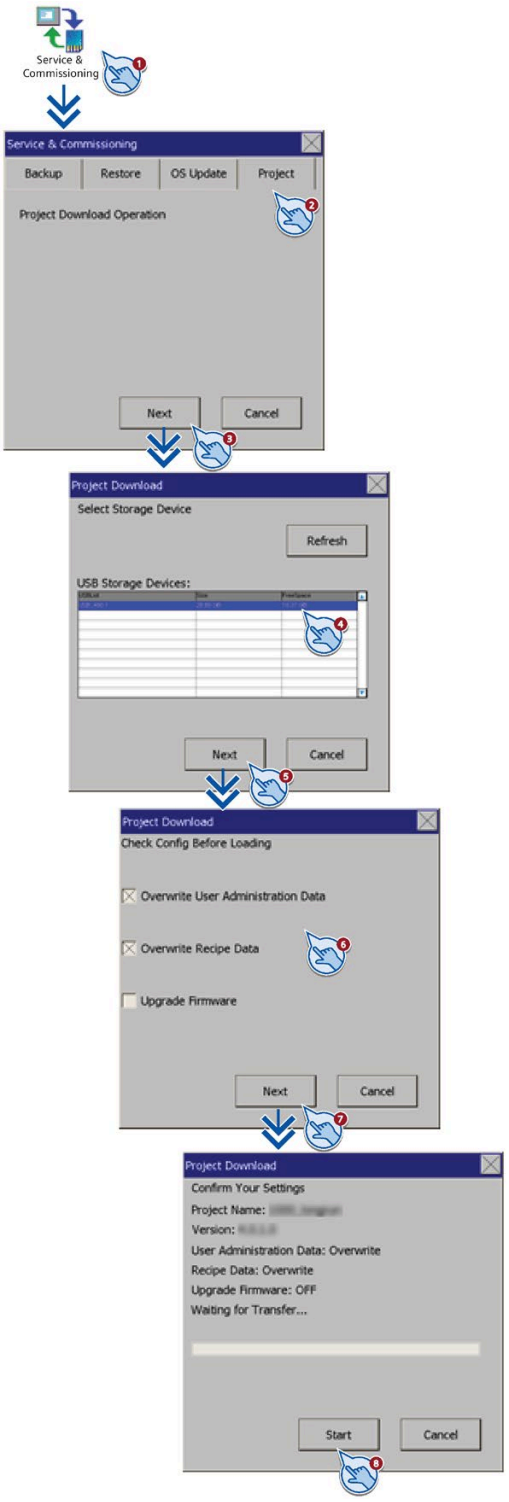
Note: After the operating system is updated, the control panel will restart automatically.



5.4.4 Project

Use the "Project" function under "Service & Commissioning" to download a project from a USB storage device.

1. Press "Service & Commissioning" to open the "Service & Commissioning" dialog.
2. Select the "Project" tab.
3. Click "Next" to continue.
4. Select a USB device from the "USB Storage Devices" list. If the list is empty, connect a USB storage device to your Smart panel and click "Refresh".
5. Click "Next" to continue.
6. Select an already existing project file to overwrite from the "Compatible Project files" list.
7. Click "Next" to continue.
8. Select the following checkbox as you need:
   - Overwrite User Administration Data: overwrites the HMI device's user administration data.
   - Overwrite Recipe Data: overwrites the HMI device's recipe data records.
   - Upgrade Firmware: updates the HMI device's firmware.
9. Click "Next" to continue.
10. Confirm the settings and click "Start". Then the project download starts.



5.5 Changing the Ethernet parameters

Note

Communication errors caused by IP address conflicts

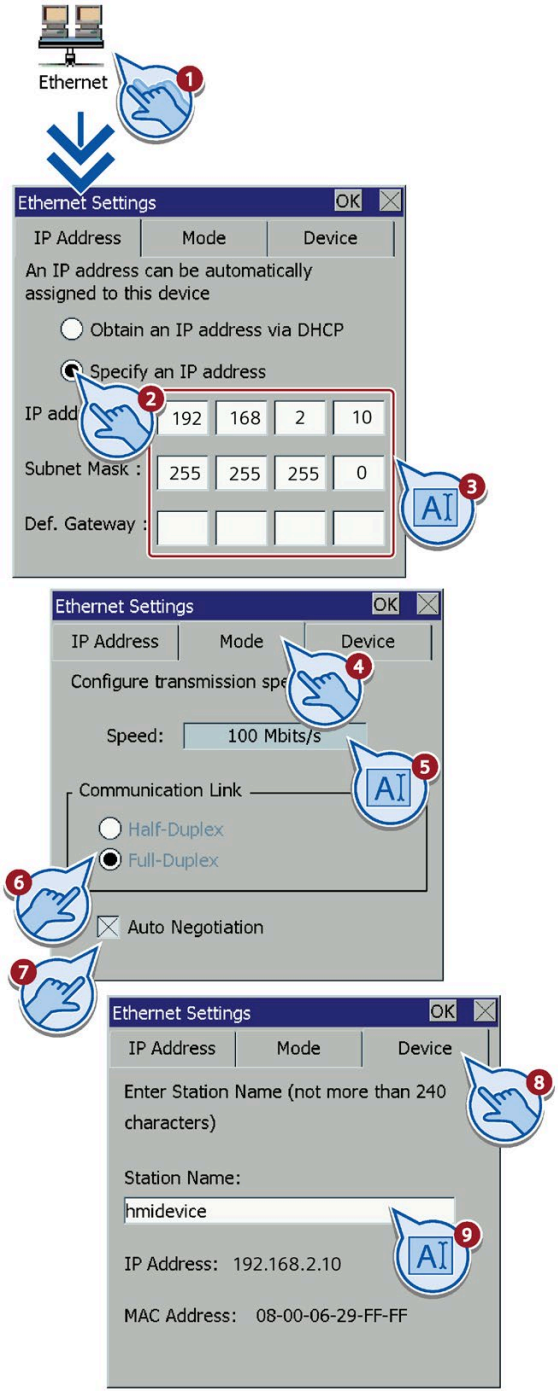
Communication errors can occur if several devices in a network share the same IP address. Assign a unique IP address to every HMI device in the network.

Note

The default IP address is 192.168.2.10.

1. Press "Ethernet" to open the "Ethernet Settings" dialog.
2. Choose either automatic address assignment via "DHCP", or user-specific address assignment.
3. If assigning a user-specific address, use the screen keyboard to enter valid values in the "IP address", "Subnet mask" text boxes and if applicable in the "Default gateway" text box.
4. Switch to the "Mode" tab sheet.
5. Specify the transmission rate in the "Speed" input field.
   Valid values are 10 Mbps or 100 Mbps.
6. Select "Half duplex" or "Full duplex" in the Communication Link section.
7. If the "Auto Negotiation" entry is selected, the transmission type and transmission rate in the network will be automatically detected and set.
8. Switch to the "Device" tab sheet.
9. Enter a network name for your HMI device in the "Device name" field.
   The name must meet the following conditions:

   The name may contain characters "a" to "z", numbers "0" to "9"; special characters: "-" and "."



5.6 Changing display orientation and startup delay time

Note

Orientation of the screen (portrait or landscape)

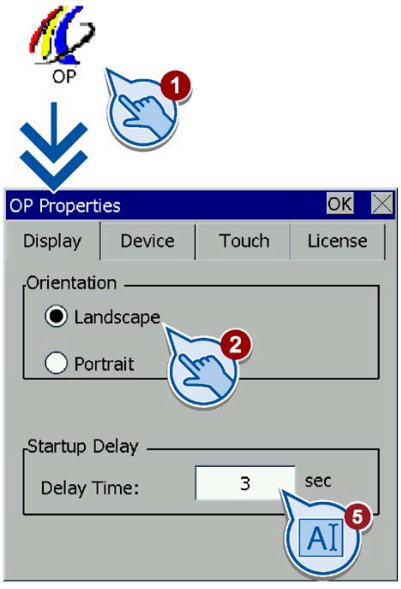
The screen orientation is defined by the configuration engineer in the course of project creation. The appropriate screen orientation is set automatically when you transfer the project to the HMI device.

Do not make any changes to the screen orientation if a project exists on the HMI device with a different orientation. The screen content may otherwise be truncated.

1. Press "OP" to open the "OP Properties" dialog.

2. Select the screen orientation:
   - "0° (Landscape)" for landscape
   - "90° (Portrait)" for portrait

3. Set the "Delay time" in the "Startup delay" section. The delay time in seconds defines the waiting time between the appearance of the loader and the start of the project. Valid range of values: 0 to 60 seconds.



5.7 Displaying information about the HMI device

1. Press "OP" to open the "OP Properties" dialog.

2. Switch to the "Device" tab.

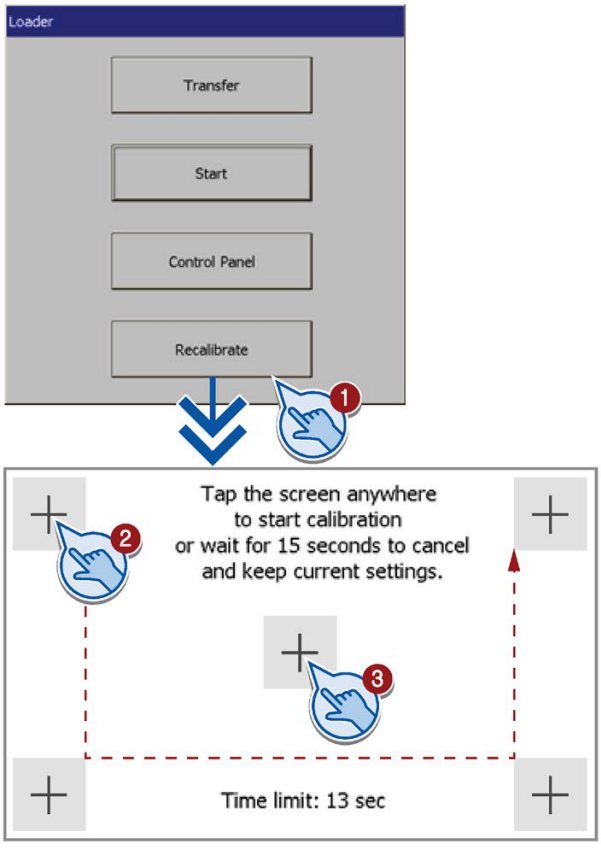
   The "Device" tab is used to display specific information on the HMI device. You will need this information when contacting Technical Support.
   - "Device:" HMI device name
   - "Flashsize": Size of flash memory
   - "Bootloader": Boot loader version
   - "Bootl. Re. Date": Release date of the boot loader
   - "Image": Image version of the device image.

5.8 Calibrating the touch screen

1. Click the "Recalibrate" button.
2. Touch the cross in the screen center.
3. Touch the floating cross in the corners of the screen one after the other.

   If you have not touched a calibration cross within the expected range, calibration will start once again.

   If you have touched all calibration crosses within the expected range, calibration is complete.



5.9 Displaying licensing information for the HMI device

1. Press "OP" to open the "OP Properties" dialog.

2. Switch to the "License" tab.

   The "License" tab is used to display the licensing information for the software of the HMI device.

5.10 Setting the screen saver

Note

Burn-in effect

The screen contents may leave a faint version (ghost) of the image in the background if they appear for too long.

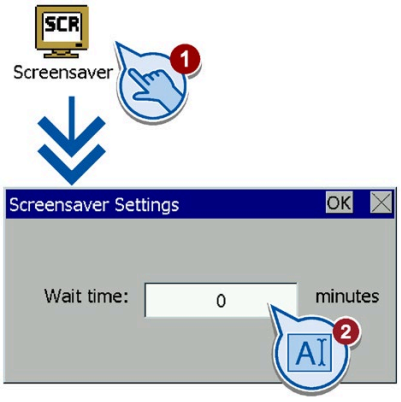
The "ghost" will disappear automatically after some time. The longer the same content is displayed on the screen, the longer it will take for the burn-in effect to disappear.

The screen saver helps to prevent burn-in.

Always use the screen saver.

1. Press "Screensaver" to open the "Screensaver Settings" dialog.

2. Enter the number of minutes before the screen saver is to be activated under "Wait time". Touch the text box to do this. You can enter values from 5 to 360 minutes. Entering "0" disables the screen saver.



5.11 Changing the password settings

Password protection prevents unauthorized access to the Start Center.

Note

It is recommended that you protect the control panel access with a strong password and set the password as follows:

A strong password

- is at least eight characters in length.
- contains upper and lower case letters, numbers and special characters except for `* ? . % / \ ' "`.
- cannot contain spaces.
- cannot be a word listed in a dictionary.
- cannot be a name or identifier that can be derived from personal information.
- cannot consist of a string of adjacent characters on the keyboard (for example, 123456 or asdfg).
- cannot contain the same character repeated several times (for example, AAAA).

Note

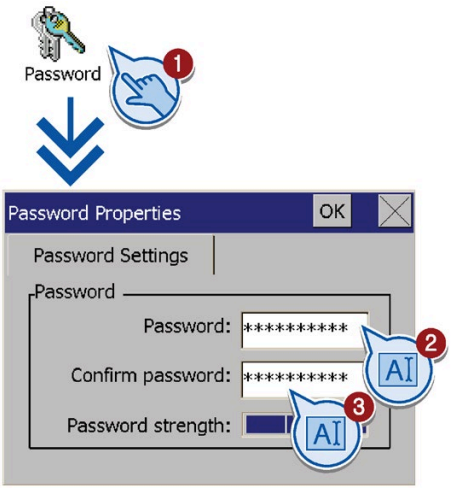
If the password is no longer available for the Start Center, you first have to update the operating system before you can make any changes in the Start Center. All data on the HMI device will be overwritten when you update the operating system.

Note

If you enter wrong password for three times consecutively, password verification is unavailable for 30 seconds. 30 seconds later, if you enter wrong password for one time, the duration that password verification is unavailable increases to 60 seconds and the duration increases by 30 seconds every time you enter wrong password, and the maximum of duration is one hour.

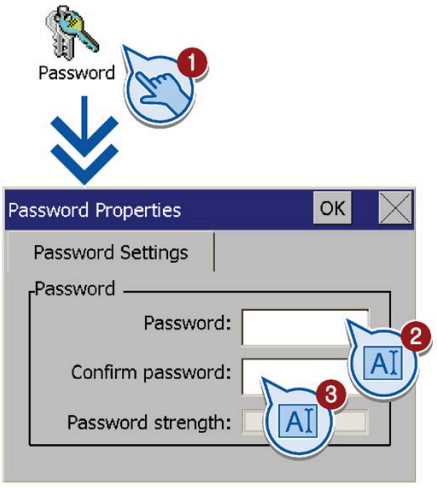
Activating password protection

1. Press "Password" to open the "Password Properties" dialog.
2. Enter a password in the "Password" text box. Touch the text box. The alphanumerical screen keyboard is displayed. The password strength is displayed.
3. Confirm the password in the "Confirm Password" text box.



Deactivating password protection

1. Press "Password" to open the "Password Properties" dialog.
2. Delete the entries in the "Password" text box.
3. Delete the entries in the "Confirm Password" text box.



5.12 Enabling the Transfer channel

You must enable one data channel to transfer a project to the HMI device.

Note

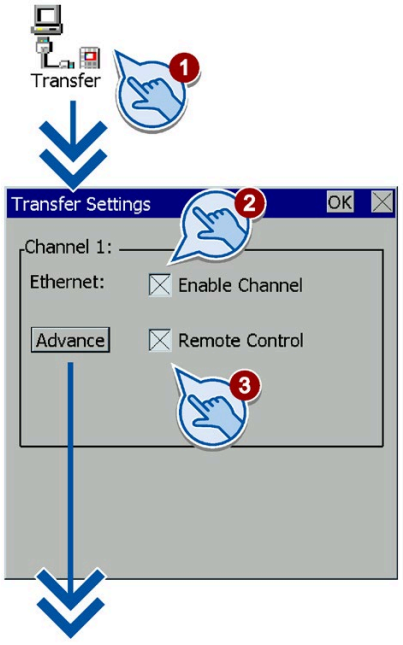
After having completed the project transfer, you can protect the HMI device against unintentional overwriting of project data and of the HMI device image by locking all data channels.

1. Press "Transfer" to open the "Transfer Settings" dialog.
2. Switch on "Enable transfer".
3. To enable automatic transfer, switch on "Remote Control".

   When the automatic transfer is activated, you can start a transfer from the configuration PC while the project is running. The running project is closed in this case and the new project is transferred.

   The new project starts after it has been transferred.

Use "Advanced" button to check the Ethernet settings, if required.

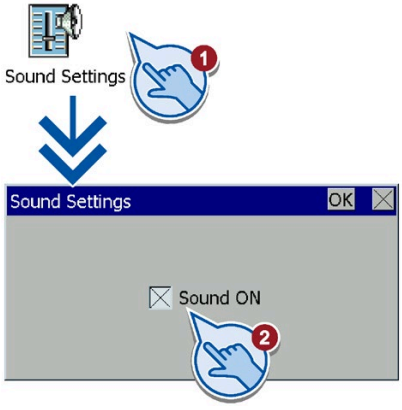


Changing the Ethernet parameters (Page 45)

5.13 Activating the acoustic signal

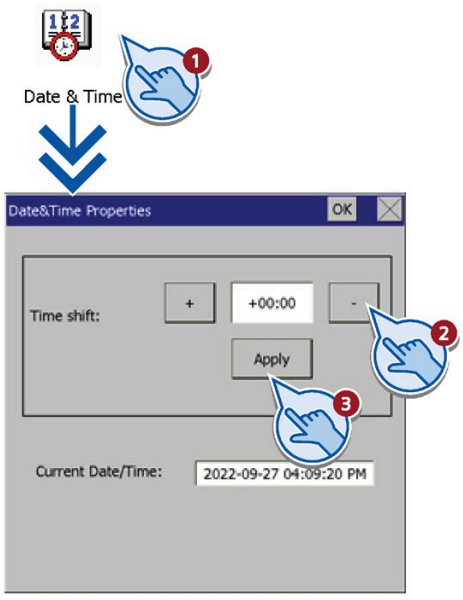
1. Press "Sound Settings" to open the "Sound Settings" dialog.
2. Set the "Sound" to "ON".

Once you have set the "Sound" to "ON", you receive an acoustic feedback each time you touch the touch screen.



5.14 Setting the date and time

1. Press "Date&Time" to open the "Date&Time Properties" dialog.
2. Click the plus icon or the minus icon in "Time shift" field.
3. Click the "Apply" button.



Commissioning a project

6

6.1 Overview

Configuration phase

A project – the process image of the working process – is created during configuration via a configuration PC to visualize automated working processes. The process displays for the project contain displays for values and messages which provide information about process statuses. The process control phase follows the configuration phase.

Process control phase

The project must be transferred to the HMI device if it is to be used in process control. Another prerequisite for process control is that the HMI device is connected online to a PLC. Current working processes - operating and observing - can then be subject to process control.

Transferring the project to the HMI device

You can transfer a project to an HMI device as follows:

- Transfer from the configuration PC
- Pack & Go:
  A project is transferred to the HMI device using a PC without ProSave. The configuration software does not need to be installed on the PC.
- Restore from USB:
  Load a complete backup file (see section "Restore (Page 42)").

Commissioning and recommissioning

Initial startup and recommissioning differ in the following respects:

- With initial startup, there is not project on the HMI device.

  The HMI device is also in this state after the operating system has been updated.
- When recommissioning, any project already on the HMI device is replaced.

6.2 Operating modes

Operating modes

The HMI device may be in the following operating modes:

- Offline
- Online
- Transfer

"Offline mode" and "Online mode" can be set on both the configuration PC and the HMI device. To set these modes on the HMI device, use a corresponding operating element of the project.

Changing the operating mode

The configuration engineer must have configured an appropriate operating element to allow a change of the operating mode on the HMI device during ongoing operation.

Additional information may be available in your system documentation.

"Offline" operating mode

In this mode, there is no communication between the HMI device and the PLC. Even though the HMI device can be operated, it cannot exchange data with the PLC.

"Online" operating mode

In this mode, the HMI device and the PLC communicate with each other. You can operate the project on the HMI device.

"Transfer" mode

In this mode, you can transfer a project from the configuration PC to the HMI device, backup and restore HMI device data or update firmware.

The following options are available for setting "Transfer" mode on the HMI device:

- When the HMI device starts up:
  Start "Transfer" mode manually in the HMI device Loader.
- During ongoing operation:
  Start the "Transfer" mode manually within the project using an operating element. The HMI device toggles to "Transfer" mode when automatic mode is set and a transfer is initiated on the configuration PC.

6.3 Data transmission options

Overview

The following table shows the options for data transfer between the HMI device and the configuration PC.

Data transmission type	USB stick	Serial	Ethernet
Backup/restore of an image file containing the following HMI device data: • Project data • Recipe data • User administration data	✓	-	✓
Operating system update	✓	-	✓
Operating system update with "Reset to factory settings"	-	-	✓
Project transfer	✓	-	✓

6.4 Transfer

6.4.1 Overview

Transfer the executable project from the configuration PC to the HMI device.

Use the following methods to transfer a project:

- Start the transfer manually
- Starting the transfer automatically
- A USB storage device, refer to chapter "Functions for Service and Commissioning (Page 44)"
- HMI device maintenance menu in Wincc flexible Smart.

  For detailed information, refer to the document *WinCC flexible SMART Information System System Manual*.

You can start the "Transfer" mode manually or automatically on the HMI device.

Transferred data is written directly to internal flash memory of the HMI device. Assign parameters of a corresponding data channel before you start the transfer.

Note

Unauthorized users are not allowed to access and download the WinCC flexible SMART project.

6.4.2 Starting the manual transfer

Introduction

You can manually switch the HMI device to "Transfer" mode as follows:

- At runtime, using a configured operating element.
- In the Loader of the HMI device.

Requirements

- The project is open in WinCC flexible Smart.
- The project is compiled.
- The HMI device is connected to a configuration PC via Ethernet.
- The Ethernet parameters are assigned on the HMI device.
- The HMI device is in "Transfer" mode.

Procedure

1. On the configuration PC, select the "Transfer settings" command from the "Project > Transfer" menu in WinCC flexible Smart.
   The "Select devices for transfer" dialog opens.
2. Select the HMI device in the left area of the dialog.
3. Select the type of interconnection for the HMI device and the configuration PC.
   Set the connection parameters.
4. Set the transfer parameters in the right area of the dialog.
5. Start the transfer in WinCC flexible Smart by selecting "Transfer".
   The configuration PC checks the connection to the HMI device. The project is transferred to the HMI device. An error message is displayed on the configuration PC if the connection is not available or disrupted.

Result

The project is available on the HMI device following successful transfer. The transferred project starts automatically.

6.4.3 Starting the transfer automatically

Introduction

If automatic transfer is activated, the HMI device automatically changes to "Transfer" mode at runtime as soon as a transfer is started on the connected configuration PC.

Automatic transfer is particularly suited for the test phase of a new project because transfer is completed without interfering with the HMI device.

Note

If automatic transfer is activated on the HMI device and a transfer is initiated on the configuration PC, the project currently running is automatically stopped. The HMI device then automatically switches to "Transfer" mode.

After the commissioning phase, deactivate the automatic transfer so that the HMI device cannot be inadvertently switched to transfer mode. Transfer mode can trigger unintentional actions in the system.

You can issue a password in the Control Panel to restrict access to the transfer settings and thus avoid unauthorized modifications.

Requirements

- The project is open in WinCC flexible Smart.
- The project is compiled.
- The HMI device is connected to a configuration PC via Ethernet.
- The Ethernet parameters are assigned on the HMI device.
- The automatic transfer is enabled in the Start Center.

Procedure

1. On the configuration PC, select the "Transfer settings" command from the "Project > Transfer" menu in WinCC flexible Smart.
   The "Select devices for transfer" dialog opens.
2. Select the HMI device in the left area of the dialog.
3. Select the type of interconnection for the HMI device and the configuration PC.
   Set the connection parameters.
4. Set the transfer parameters in the right area of the dialog.
5. Start the transfer in WinCC flexible Smart by selecting "Transfer".

Result

The configuration PC checks the connection to the HMI device. The HMI device shuts down the current project and automatically changes to "Transfer" mode. The project is transferred to the HMI device. An error message is displayed on the configuration PC if the connection is not available or disrupted.

The project is available on the HMI device following successful transfer. The transferred project starts automatically.

6.4.4 Testing a project

Introduction

You have the following options to test a project:

- Test the project on the configuration PC:
  You can test a project on a configuration PC, using a simulator. You can find more detailed information on this in the WinCC flexible Smart online help.
- Offline testing of the project on the HMI device:
  Offline testing means that communication between the HMI device and PLC is down while the test is being carried out.
- Online testing of the project on the HMI device:
  Online testing means that the HMI device and the PLC communicate with each other during testing.

Perform the tests, starting with the "Offline test", followed by the "Online test".

Note

You should always test the project on the HMI device on which the project will be used.

Check the following:

1. Check the correct layout of the screens.
2. Check the screen navigation.
3. Check the input objects.
4. Enter the tag values.

The test ensures that the project will run as you intended on the HMI device.

Offline testing

Requirement

- The project has been transferred to the HMI device.
- The HMI device is in "Offline" mode.

Procedure

In "Offline" mode, you can test individual project functions on the HMI device without them being affected by the PLC. PLC tags, therefore, are not updated.

Test the operating elements and visualization of the project as far as possible without connecting to the PLC.

Online testing

Requirement

- The project has been transferred to the HMI device.
- The HMI device is in "Online" mode.

Procedure

In "Online" mode, you can test individual project functions on the HMI device without them being affected by the PLC. PLC tags are updated in this case.

You have the option to test all communication-dependent functions, for example alarms, etc.

Test the operating elements and views of the project.

6.5 Backup and restore

Overview

You can back up and restore the following data in the internal flash memory of the HMI device with a PC or an USB storage device:

- Project and HMI device image
- Password list
- Recipe data

Use one of the following tools for backup and restore:

- A USB storage device, refer to chapter "Functions for Service and Commissioning (Page 40)"
- HMI device maintenance menu in Wincc flexible Smart. For detailed information, refer to the document *WinCC flexible SMART Information System System Manual*.

General information

Note

Power failure

If a complete restore operation is interrupted due to power failure on the HMI device, the previous operating system will be started.

Compatibility conflict

If a message is output on the HMI device warning you of a compatibility conflict during the restore operation, the operating system must be updated.

Note

A data transfer can take several minutes, depending on data volume and transmission rate. Observe the status display. Do not interrupt the data transfer.

6.6 Updating the operating system

A compatibility conflict may occur when transferring a project to the HMI device. This is caused by different versions of the configuration software used and the HMI device image available on the HMI device. If there are different versions, the transfer is aborted. A message indicating a compatibility conflict is displayed on the configuration PC.

There are two ways to match the versions:

- Update the HMI device image if the project was created with the most recent version of the configuration software.
- Transfer a matching version of the HMI device image if you do not want to adapt the project for the HMI device to the most recent version of the configuration software for the project.

Note

Data loss

All data on the HMI device, such as the project and licenses, will be deleted when you update the operating system.

Note

Calibrating the touch screen

After the update, you may have to recalibrate the touch screen.

Use one of the following tools to update the operating system:

- A USB storage device, refer to chapter "Functions for Service and Commissioning (Page 43)".
- HMI device maintenance menu in Wincc flexible Smart.

  For detailed information, refer to the document *WinCC flexible SMART Information System System Manual*.

  In Wincc flexible SMART, you can update the operating system with or without resetting to factory settings.

Note

Ethernet parameters {"Safety instruction";"Data channel"}

When resetting to factory settings, all Ethernet parameters are reset. A transfer can only be started after a reconfiguration of the Ethernet parameters.

Maintenance and care 7

7.1 Maintenance and care

Introduction

The HMI device is designed for maintenance-free operation. However, make sure you keep the touch screen clean.

Requirement

Use a cleaning cloth dampened with a cleaning agent to clean the equipment. Only use water with a little liquid soap or a screen cleaning foam.

Note

Unintentional response

When cleaning the touch screen, an unintentional response in the PLC can be triggered by touching screen objects.

Switch the HMI device off or, if available, activate the clean screen function before cleaning to prevent unintentional responses.

Note

Damage caused by unauthorized cleaning products

The HMI device may be damaged if compressed air, steam jet blowers, aggressive solvents or scouring powders are used for cleaning purposes.

Do not clean the HMI device with compressed air or steam jet blowers. Do not use aggressive solvents or scouring powder.

Procedure

Proceed as follows:

1. Shut down the HMI device.
2. Spray the cleaning solution onto a cleaning cloth. Do not spray directly onto the HMI device.
3. Clean the HMI device. When cleaning the display wipe from the screen edge inwards.

7.2 Recycling

Recycling and disposal

The HMI devices described in these operating instructions can be recycled due to the low levels of pollutants. Contact a certified disposal service company for environmentally sound recycling and disposal of your old devices.

Dispose the HMI devices in accordance with local regulations.

Technical specifications

8

8.1 Certificates and approvals

Note

The HMI device itself is approved as shown on the rear panel labels.

CE approval

The HMI device meets the general and safety-related requirements of the following EU directives and conforms to the harmonized European standards (EN) published in the official gazettes of the European Union:

- 2014/30/EU "Electromagnetic Compatibility" (EMC Directive)

RoHS directive

This product meets the requirements stated in the RoHS directive (Restriction of Hazardous Materials): 2011/65/EU

Compliance with the directive has been reviewed according to the following standard: EN IEC 63000

UKCA

The HMI device complies with the designated British standards (BS) published in the official consolidated list of the British Government. The HMI device meets the requirements and protection targets of the following regulations and related amendments:

- Electromagnetic Compatibility Regulations 2016 (EMC)
- Regulations on the restriction of the use of certain hazardous substances in electrical and electronic equipment 2012 (RoHS).

UK Declarations of Conformity for the respective authorities are available from:

Siemens AG
Digital Industries
Factory Automation
DI FA TI COS TT
P.O. Box 1963
D-92209 Amberg

The UK Declaration of Conformity is also available for download from the Siemens Industry Online Support website under the keyword "Declaration of Conformity".

WEEE label (European Union)

Disposal instructions, observe the local regulations and the section "Recycling" (Page 63).

8.2 Electromagnetic compatibility

The device is designed for industrial use.

8.2.1 Emitted interference

The device meets the requirements according to EN/IEC 61000-6-4. The device corresponds to limit class A defined in CISPR 11 or EN 55011.

Note

The HMI device is not intended for use in residential areas. Operation of an HMI device in residential areas can have a negative influence on radio/TV reception.

8.2.2 Immunity to interferences

The device meets the requirements according to EN/IEC 61000-6-2.

8.3 Mechanical ambient conditions

8.3.1 Transport and storage conditions

The following information is for a device that is transported and stored in its original packaging.

The device meets the requirements according to EN/IEC 61131-2 with the following amendments and limitations:

Type of condition	Permitted range
Free fall	≤ 0,3 m
Vibration to IEC 60068-2-6	5 to 8.4 Hz, deflection 3.5 mm 8.4 to 500 Hz, acceleration 1 g
Shock to IEC 60068-2-27	250 m/s^2, 6 ms, 1000 shocks per axis

8.3.2 Operating Conditions

The following information applies to a device installed according to the specifications in these operating instructions.

The HMI device is designed for stationary operation in a location protected from the effects of the weather.

The device meets the requirements according to EN/IEC 61131-2 with the following amendments and limitations:

Type of condition	Permitted range
Vibration to IEC 60068-2-6	5 to 8.4 Hz, deflection 3.5 mm 8.4 to 200 Hz, acceleration 1 g
Shock to IEC 60068-2-27	150 m/s^2, 11 ms, 3 shocks per axis

8.4 Climatic ambient conditions

8.4.1 Transport and storage conditions

The following information is for a device that is transported and stored in its original packaging.

The device meets the requirements according to EN/IEC 61131-2 with the following amendments and limitations:

Type of condition	Permitted range
Temperature	–20 °C to +60 °C
Atmospheric pressure	1140 to 660 hPa, corresponds to an elevation of -1000 m to 3500 m
Relative humidity	10% to 90%, without condensation
Pollutant concentration	SO_2: < 0.5 ppm; Relative humidity < 60%, no condensation H_2S: < 0.1 ppm; Relative humidity < 60%, no condensation

Note

Ensure that no condensation (dewing) develops on or inside the HMI device after transporting it at low temperatures or after it has been exposed to extreme temperature fluctuations.

The HMI device must have acquired room temperature before it is put into operation. Do not expose the HMI device to direct radiation from a heater in order to warm it up. If dewing has developed, wait approximately 4 hours until the HMI device has dried completely before switching it on.

8.4.2 Operating Conditions

The following information applies to a device installed according to the specifications in these operating instructions.

The HMI device is designed for stationary operation in a location protected from the effects of the weather.

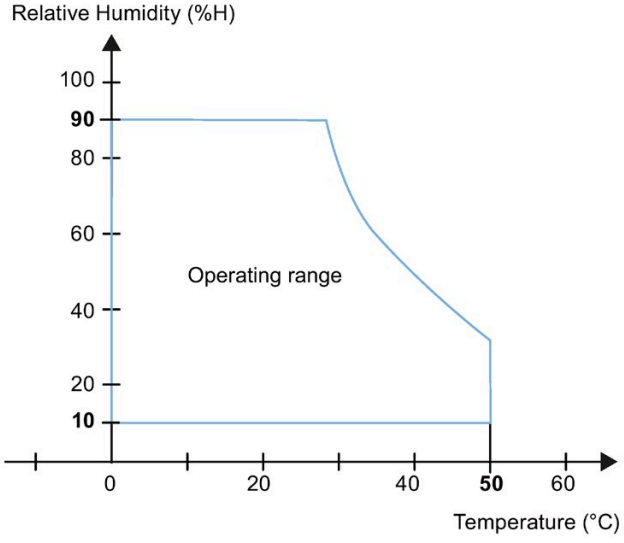
The device meets the requirements according to EN/IEC 61131-2 with the following amendments and limitations:

Type of condition		**Permitted range**
Temperature, device in landscape format	Vertical installation	0 °C to 50 °C
	Inclined installation up to 35°	0 °C to 40 °C
Temperature, device in portrait format	Vertical installation	0 °C to 40 °C
	Inclined installation up to 35°	0 °C to 35 °C
Atmospheric pressure	1140 to 795 hPa, corresponds to an elevation of -1000 m to 2000 m	
Relative humidity	10% to 90%, without condensation	
Pollutant concentration	SO_2: < 0.5 ppm; Relative humidity < 60%, no condensation H_2S: < 0.1 ppm; Relative humidity < 60%, no condensation	

8.4.3 Climate diagram

The diagram below shows the extended range for temperature and humidity during operation based on EN/IEC 61131-2.

The information applies to a device installed in landscape without inclination.



8.5 Protection classes

8.5.1 Insulation test

The device meets the requirements according to EN/IEC 61010-2-201.

Circuits with a nominal voltage of U_e to other circuits or ground	Test voltage
< 50 V	707V DC

8.5.2 Protection against foreign objects and water

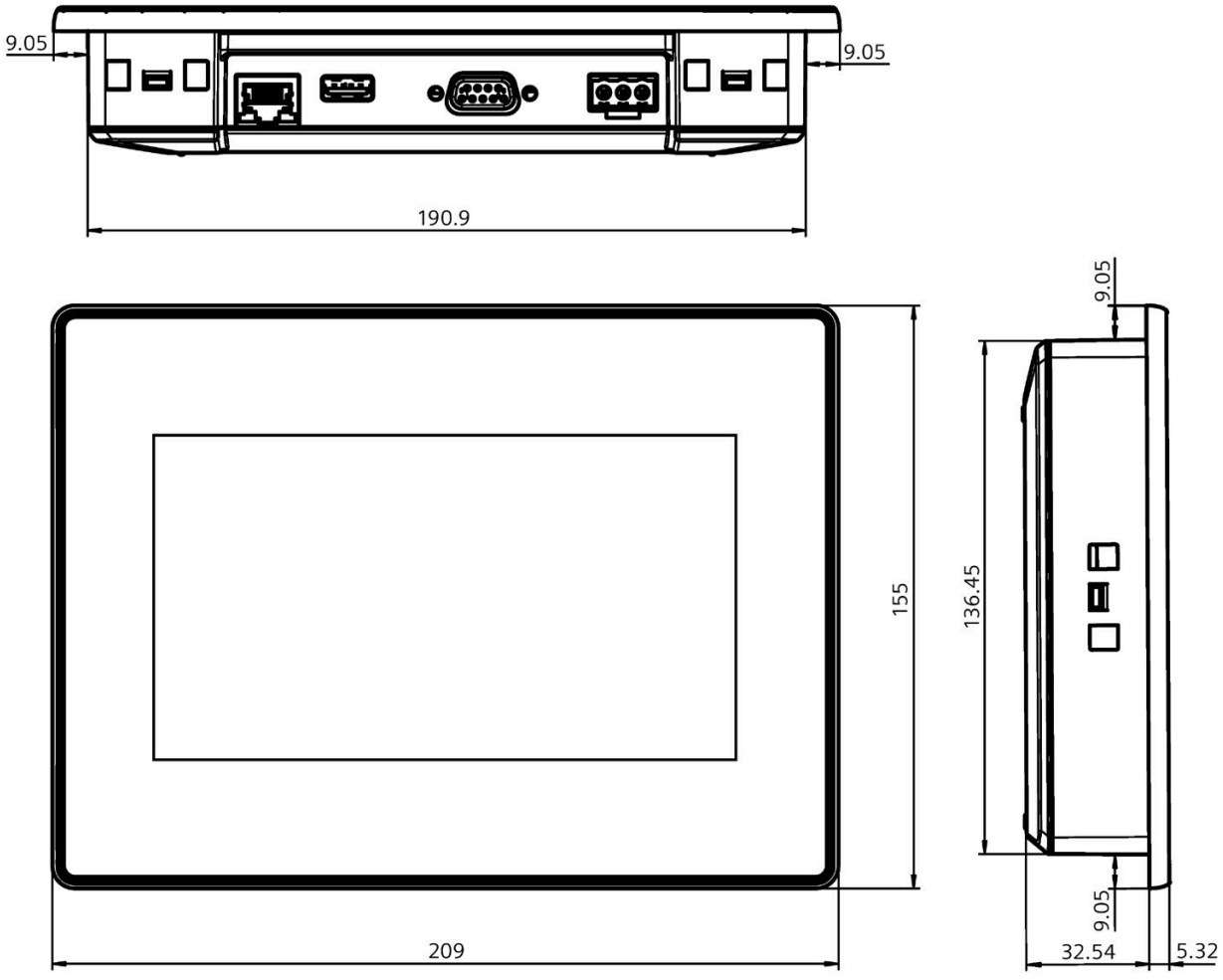
The device meets the requirements according to EN 60529.

Device side	Degree of protection
Front	IP65, when mounted
Rear	IP20, Touch protection test with standard test probes. There is no protection against ingress by water.

The degree of protection of the device front can only be guaranteed if the mounting seal lies flush against the mounting cutout. Read the corresponding information in chapter "Making the mounting cutout (Page 19)".

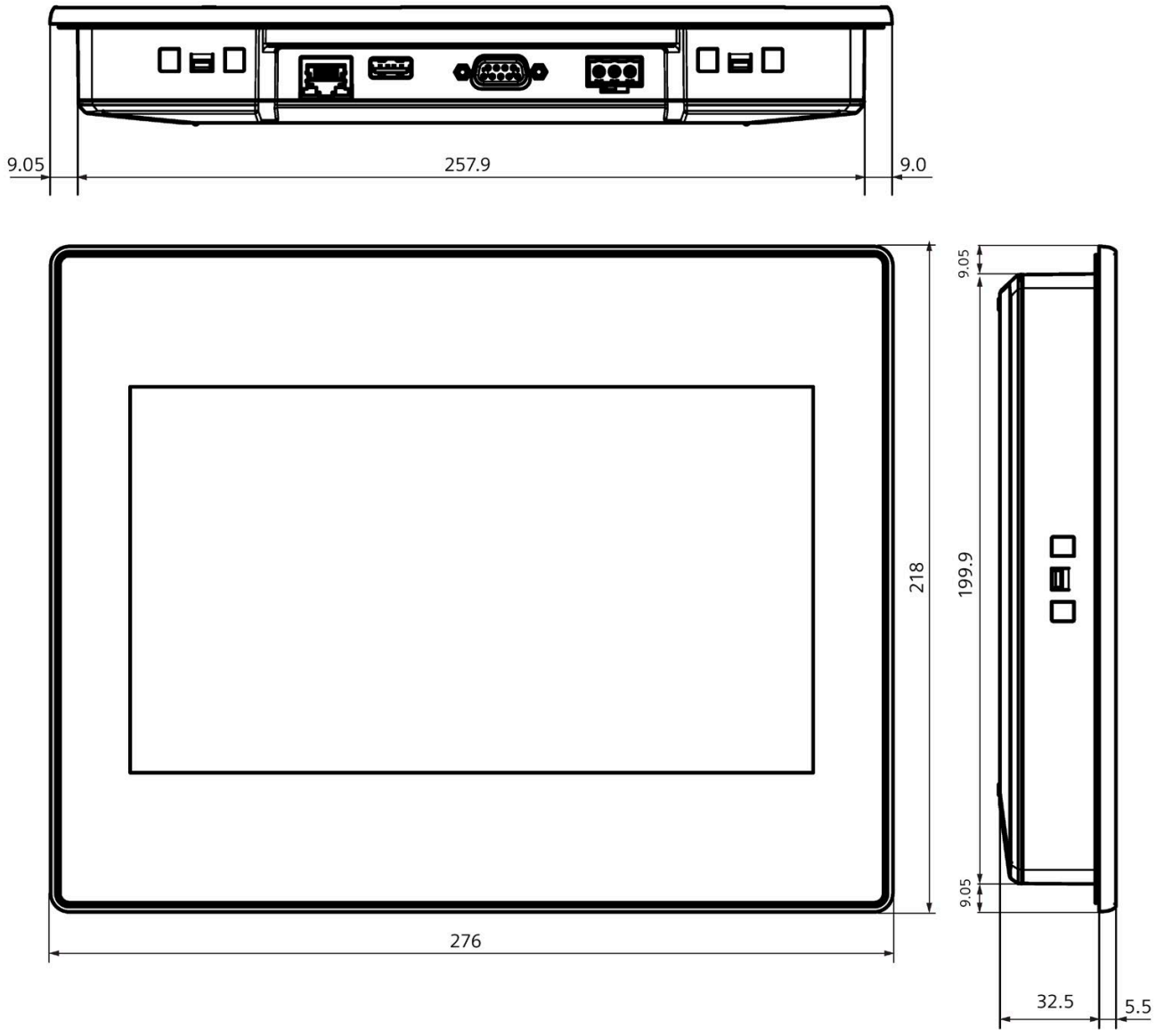
8.6 Dimension drawings

8.6.1 Dimension drawing of Smart 700 IE V4



All dimensions in millimeters

8.6.2 Dimension drawing of Smart 1000 IE V4



All dimensions in millimeters

8.7 Technical data

Weight

	Smart 700 IE V4	Smart 1000 IE V4
Weight without packaging	Approx. 770 g	Approx. 1200 g

Display

	Smart 700 IE V4	Smart 1000 IE V4
Type	LCD TFT	
Active display area	154.1 x 85.9 mm (7")	222.7 x 125.3 mm (10.1")
Resolution	800 x 480 pixels	1024 x 600 pixels
Possible colors	24-bit (16M colors)	
Brightness control	-	
Backlighting Half Brightness Life Time (MTBF [1])	LED 20,000 h	LED 15,000 h
Pixel error class in accordance with EN ISO 9241-307	II	

[1] MTBF: Operating hours after which the maximum brightness is reduced by half compared to the original value. MTBF is increased by using the integrated dimming function, for example, time-controlled via screen saver or centrally via PROFIenergy.

Input device

	Smart 700 IE V4	Smart 1000 IE V4
Type	Touch screen, analog resistive	

Memory

	Smart 700 IE V4	Smart 1000 IE V4
Data memory	256 MBytes	
Program memory	256 MBytes	

Interfaces

	Smart 700 IE V4	Smart 1000 IE V4
1 x RS 422/485	max. 187.5 Kbits/s	
1 x Industrial Ethernet RJ45	10/100 Mbits/s, with auto-crossover	
1 x USB 2.0	max. 500 mA	

Supply voltage

		Smart 700 IE V4	Smart 1000 IE V4
Rated voltage Permitted voltage range		+24 V DC 19.2 to 28.8 V (–20%, +20%)	
Maximum permitted transients		35 V (500 ms)	
Minimum time between two transients		50 s	
Power consumption [1]		4.8 W	5.3 W
Current consumption	typical	Approx. 200 mA	Approx. 230 mA
	Maximum constant current	Approx. 380 mA	Approx. 400 mA
	Inrush current I^2t	Approx. 0.1 A^2s	
Fuse, internal		Electronic	

[1] The power loss generally corresponds to the specified value for power consumption.

Miscellaneous

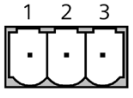
	Smart 700 IE V4	Smart 1000 IE V4
Buffered real-time clock [1], can be synchronized	Yes	
Acoustic feedback	Yes	

[1] Typical buffer time: 6 weeks

8.8 Ports description

8.8.1 DC24V - X80

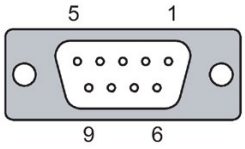
2-pin socket



Pin number	Assignment
1	+24 V DC (L+)
2	GND 24 V (M)
3	FE

8.8.2 PPI / RS422 / RS485 - X2

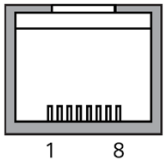
Sub-D socket, 9-pin, with screw lock



Pin	Assignment for the RS 422	Assignment for the RS 485
1	not connected	not connected
2	not connected	not connected
3	TxD+	Data channel B (+)
4	RxD+	RTS
5	GND 5 V, floating	GND 5 V, floating
6	+5 V DC, floating	+5 V DC, floating
7	not connected	not connected
8	TxD–	Data channel A (–)
9	RxD–	NC

8.8.3 Ethernet (LAN) - X1

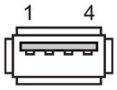
RJ45 socket



Pin	Assignment
1	Tx+
2	Tx–
3	Rx+
4	n. c.
5	n. c.
6	Rx–
7	n. c.
8	n. c.

8.8.4 USB - X60

USB socket



The following table shows the pin assignment of the USB port.

Pin	Assignment
1	+5 V DC, out, max. 500 mA
2	USB-DN
3	USB-DP
4	GND

8.9 Communication with PLCs

Compatible PLCs

The following PLC types can be used with the Smart V4 panels.

PLC type	Supported protocols
SIEMENS S7-200	Ethernet, PPI, MPI
SIEMENS S7-200 CN	Ethernet, PPI, MPI
SIEMENS S7-200 Smart	Ethernet, PPI, MPI
SIEMENS LOGO!	Ethernet
Mitsubishi FX *	Serial point-to-point
Mitsubishi Protocol 4 *	Serial Multi Point
Modicon Modbus PLCs *	Serial point-to-point
Omron CP, CJ *	Serial Multi Point

* Typical PLCs of this PLC type have been successfully tested and approved.

Note

Security: Protecting networks against physical access and possible reads and writes of HMI data

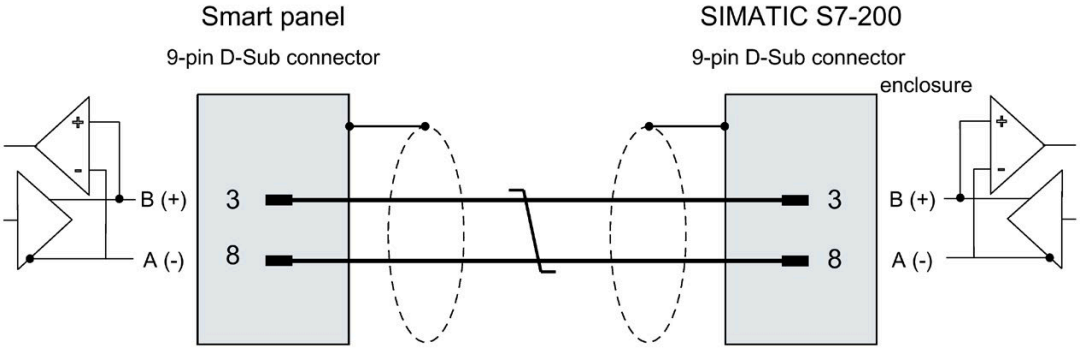
Communication through Modbus RTU, S7 Ethernet, MPI/PPI protocols have no security features. If an attacker can physically access your networks through one of these forms of communication, the attacker can possibly read and write HMI data. Unauthorized access to HMI data can result in defect production and plant stillstand.

You must protect these forms of communication by limiting physical access. For security information and recommendations, refer to Operational Guidelines for Industrial Security (https://new.siemens.com/global/en/products/automation/topic-areas/industrial-security.html).

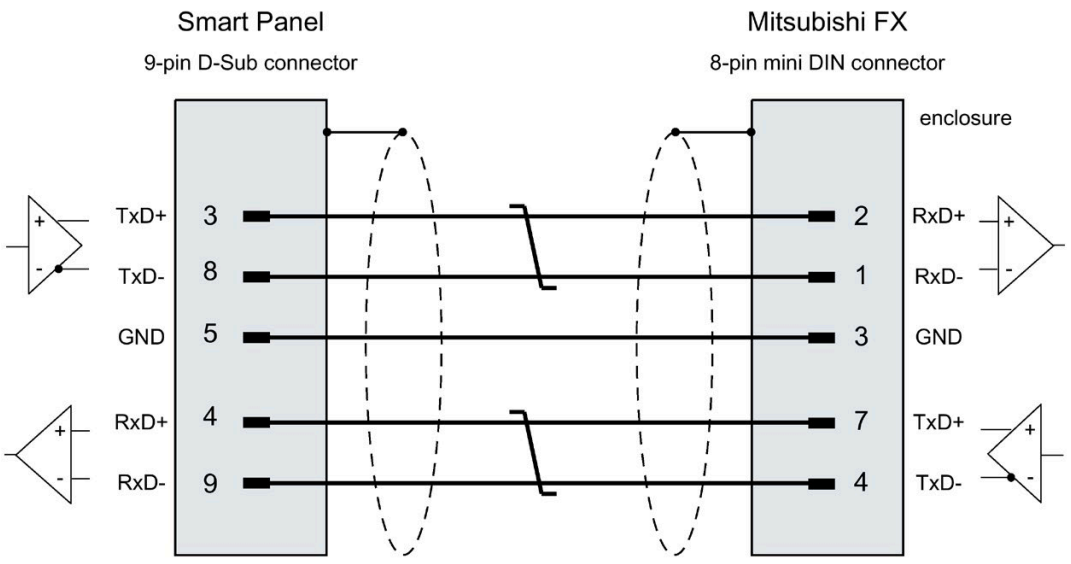
PLC connector schematics

The following adaption is required when connecting a PLC to a Smart Panel through Isolated Serial Port.

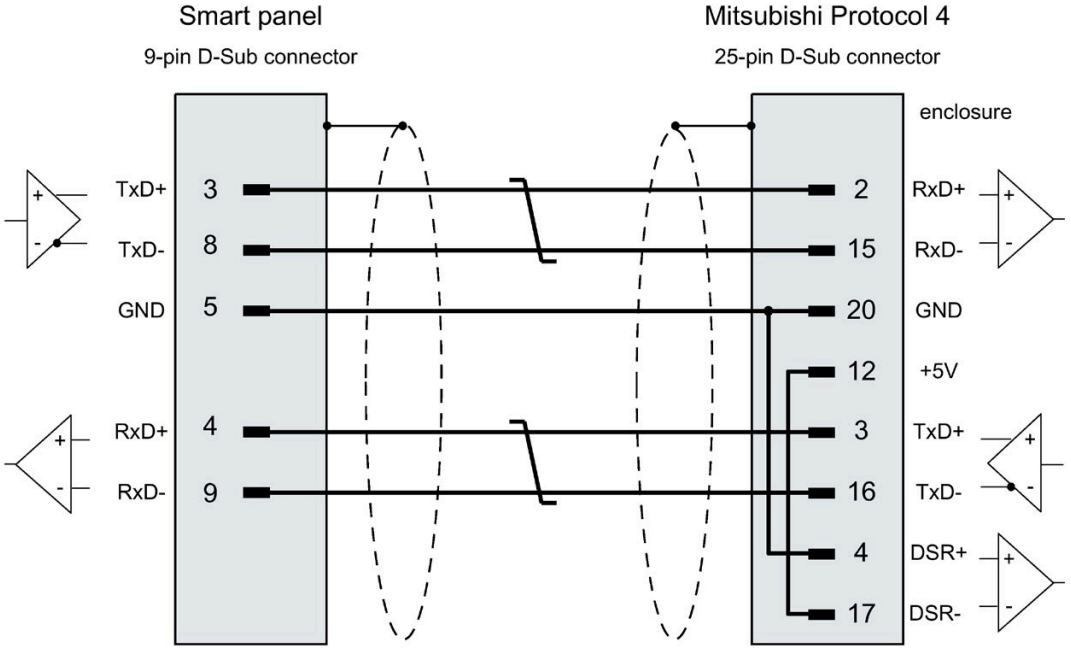
S7-200 connector



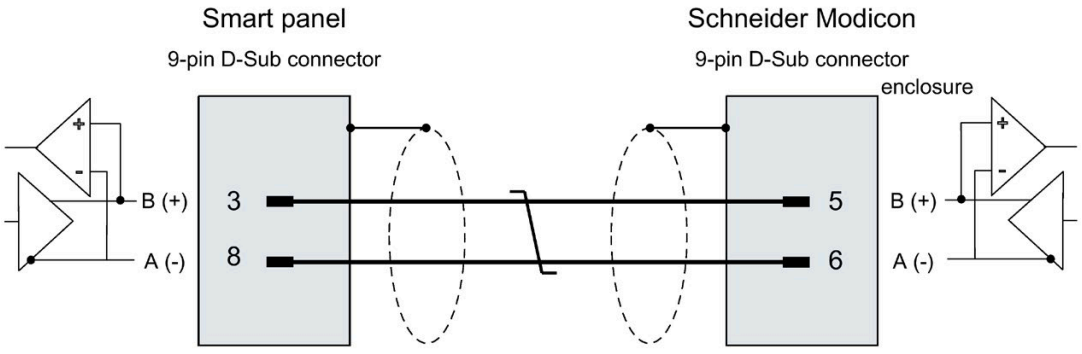
Mitsubishi FX connector



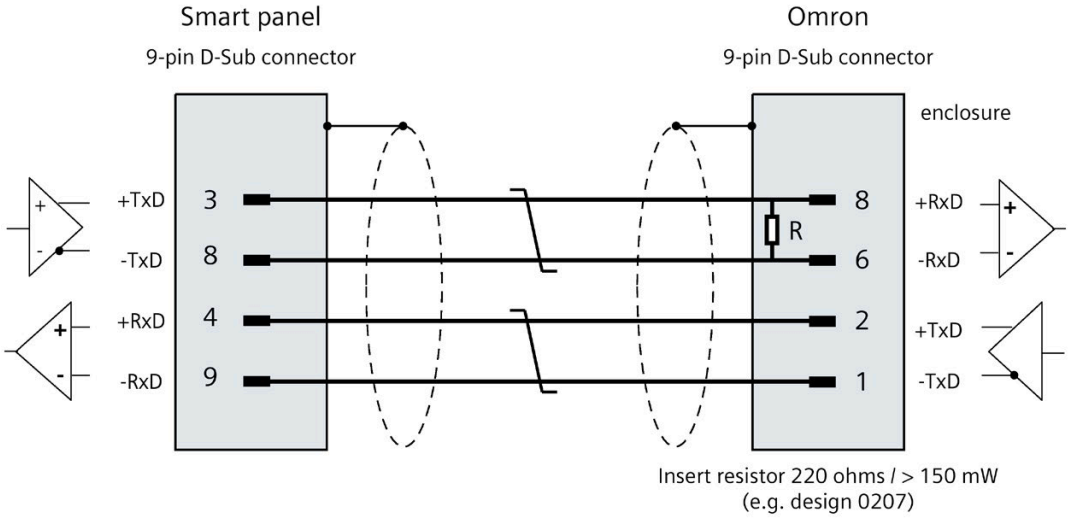
Mitsubishi Protocol 4 connector



Schneider Modicon connector



Omron connector



8.10 Scope of functions with WinCC flexible SMART

The following tables show the objects that can be integrated in a project for a Smart panel. The following tables support you in estimating whether your project is still within the performance features of the HMI device.

The specified maximum values are not additive. We cannot guarantee proper functioning of configurations on devices in which all system limits are exploited.

In addition to the limitations specified, allowances must also be made for restrictions in configuration memory resources.

Tags, values and lists

Object	Specification	Quantity
Tags	Quantity	800
Limit value monitoring	*Input/output*	*Yes*
Linear scaling	*Input/output*	*Yes*
Elements per array	Quantity	100
Text lists	Quantity	200
Graphics lists	Quantity	100

Alarms

Object	Specification	Quantity
Alarms	Number of alarm classes	32
	Number of discrete alarms	400
	Number of analog alarms	20
	Length of the alarm text	80 characters
	Number of tags in an alarm	Max. 8
	Display	*Alarm window, alarm view*
	Acknowledge error alarm individually	*Yes*
	Acknowledge multiple error alarms simultaneously (group acknowledgement)	*16 acknowledgment groups*
	Edit alarm	*Yes*
	Alarm indicator	*Yes*
Alarm buffer	Alarm buffer capacity	512 alarms
	Simultaneously queued alarm events	Max. 64
	View alarm	*Yes*
	Delete alarm buffer	*Yes*

Screens

Object	Specification	Quantity
Screens	Quantity	150
	Fields per screen	100
	Tags per screen	100
	Template	Yes
Objects per screen	Complex objects [1]	5
	Flow block	8
	Recipe view	10
	Trend view	8
	Table view	8
	Diagnostic view	1
	User view	1
	Alarm view	20
	Multiple tags (array elements) [2]	100

[1] Complex objects are user view, table view, trend view, recipe view and alarm view.

[2] This includes array elements included in recipes.

Recipes

The specified values are maximum values and should not be used additive.

Object	Specification	Quantity
Recipes	Quantity	50
	Elements per recipe[1]	100
	Data records per recipe	100
	User data length in KB per data record	32
	Reserved memory for data records in the internal Flash	2560 KB
[1] Each element used in arrays represents a recipe element.		

Logging

Object	Specification	Quantity
Logs	Number of logs	2
	Number of tags per log	40
	Number of log entries [1]	200,000
	Number of segmented circular logs	500
	Logging cycle	1 s

[1] The number of entries for all segmented circular logs is valid for the "segmented circular log" logging method. The product derived from the number of circular logs times the number of data records in this log may not be exceeded.

Flow block

Object	Specification	Quantity
Flow blocks	Number of flow block symbol vertices per screen	2000

Trend views

Object	Specification	Quantity
Trends	Number of trends	30

Table views

Object	Specification	Quantity
Columns	Number of columns	50

Diagnostic views

Object	Specification	Quantity
Diagnostic views	Number of diagnostic views	1

Data transfer

Object	Specification	Quantity
Data transfers	Number of data transfers	32

Text lists and graphics lists

Object	Specification	Quantity
Lists	Number of graphics lists	100
	Number of text lists	200
	Number of entries per text or graphics list	50
	Number of graphic objects	800
	Number of text objects	1500

Safety

Object	Specification	Quantity
Safety	Number of user groups	50
	Number of users	50
	Number of authorizations	32

Infotexts

Object	Specification	Quantity
Infotexts	Length (no. of characters)	320
	For alarms	Yes
	For screens	Yes
	For screen objects (for example, for I/O field, switch, button, invisible button)	Yes

Additional functions

Object	Specification	Quantity
Screen settings	Touch screen calibration	Yes
	Brightness setting	No
Language change	Number of runtime languages	5
Graphic objects	Vector and pixel graphics	Yes

Project

Object	Specification	Quantity
Project file "`*.srt`"	Size	16 MB

Technical Support

A

A.1 Service and support

You can find additional information and support for the products described on the Internet at the following addresses:

- Technical support (https://support.industry.siemens.com/cs/cn/zh/ps)
- Support request form (http://www.ad.siemens.com.cn/service/SR)
- After-sales information system (http://www.ad.siemens.com.cn/service/)
- Your local representative (https://www.industry.siemens.com.cn/home/cn/zh/contact/Pages/Default.aspx)
- Training center (http://www.ad.siemens.com.cn/training/)

A.2 System events

System events on the HMI device provide information about internal states of the HMI device and the PLC.

Note

System events are only indicated if an alarm window was configured. System events are output in the language currently set on your HMI device.

System event parameters

System events may contain encrypted parameters which are relevant to troubleshooting because they provide a reference to the source code of the runtime software. These parameters are output after the text "Error code:".

Description of the system events

A listing of all system alarms for your HMI device is provided in the online help of your configuration software.

Abbreviations

B

CPU	Central Processing Unit
CTS	Clear To Send
DC	Direct Current
DHCP	Dynamic Host Configuration Protocol
DP	Distributed I/O
DSR	Data Set Ready
DTR	Data Terminal Ready
IO	Input and Output
ESD	Electrostatic Sensitive Devices
EMC	Electromagnetic Compatibility
EN	European standard
GND	Ground
HMI	Human Machine Interface
IEC	International Electronic Commission
IP	Internet Protocol
LED	Light Emitting Diode
MPI	Multi Point Interface
MTBF	Mean Time Between Failures
n. c.	Not connected
OP	Operator Panel
PC	Personal Computer
PPI	Point-to-Point Interface (SIMATIC S7)
PELV	Protective Extra Low Voltage
PLC	Programmable Logic Controller
RJ45	Registered Jack Type 45
RTC	Real Time Clock
RTS	Request to send
RxD	Receive Data
SELV	Safety Extra Low Voltage
Sub-D	Subminiature D (plug)
TCP/IP	Transmission Control Protocol/Internet Protocol
TFT	Thin Film Transistor
TxD	Transmit Data
USB	Universal Serial Bus

Glossary

"Transfer" mode

HMI device operating mode for transferring an executable project from the configuration PC to an HMI device.

Configuration PC

A configuring PC is a programming device or PC on which plant projects are created using an engineering software.

Configuration software

The configuration software is used to create projects for process visualization. WinCC flexible Smart is an example of this type of configuration software.

Event

Incoming events trigger defined functions. Events can be configured. Events which can be assigned to a button include "Press" and "Release", for example.

Field

Area reserved in configured screens for the input and output of values.

Flash memory

Flash memory is a non-volatile memory with EEPROM chips that is implemented either as mobile storage medium, or as permanently installed memory module on the motherboard.

Half Brightness Life Time

Time period after which brightness is reduced to 50% of the original value. The specified value depends on the operating temperature.

HMI device

HMI devices are used to operate and monitor machinery and plants. The machine or plant states are visualized on the HMI device by means of graphic objects or signal lamps. The operator controls of the HMI device enable intervention in machine or plant processes and sequences.

HMI device image

The HMI device image is a file that can be transferred from the configuring PC to the HMI device. The HMI device image contains the operating system of the HMI device , including the elements of the Runtime software required for the executable project file.

I/O field

Enables the input or output of values on the HMI device and their transfer to the PLC.

Infotext

A configured infotext provides information about objects within a project. An alarm infotext, for example, can contain information on the cause and troubleshooting of faults.

Loader

The boot loader is used to start the operating system and is started automatically after power on of the HMI device.

Object

An object is a project element such as a screen or an alarm. Objects are used to view or enter texts and values on the HMI device.

Operating element

An operating element is a project component that is used to enter values and trigger functions. An operating element is a button, for example.

Plant

General term referring to machinery, processing centers, systems, plants and processes which are operated and monitored using an HMI device.

PLC

PLC is a general term for devices and systems with which the HMI device communicates, e.g. SIMATIC S7.

PLC job

A PLC job triggers a function at the HMI device.

Process visualization

Denotes visualization of technical processes by means of text and graphic elements. Configured plant screens enable intervention in runtime plant processes by means of data input and output.

Project

A project is the result of a configuration using an engineering software. The project usually contains several screens with embedded system-specific objects, basic settings and alarms. The project is saved in the project file.

There is a difference between an offline project on a configuring PC and an online executable project on an HMI device. A project can be available in more languages on the configuring PC than can be managed on the HMI device. The project on the configuring PC can also be set up for different HMI devices. However, on the HMI device you can only transfer the executable project which has been generated specifically for this HMI device.

ProSave

ProSave provides all functions which are necessary to transfer data between the configuration PC and the HMI device, for example, backup and restoring data or managing license keys and options.

ProSave is installed by default together with WinCC flexible Smart. The standalone version of ProSave can also be used for service purposes on a PC without WinCC flexible Smart installation.

Recipe

A recipe represent a combination of tags that form a fixed data structure. The configured data structure can be assigned data in the configuration software or on the HMI device and is then referred to as a data record. The use of recipes ensures that all data assigned to a data record is transferred synchronously to the PLC.

Symbolic I/O field

Symbolic I/O fields are used for the input and output of values. A field contains a list of default entries from which one can be selected.

System alarms

System alarms are assigned the "System" alarm class. A system alarm reports internal states of the HMI device and of the PLC.

Tags

A tag is a defined memory area that is used to read and write values. Those tags can be accessed from the PLC or using the HMI device. We distinguish between external tags (process tags) and internal tags, depending on whether or not the tag is interconnected with the PLC.

Transfer

Transfer of an executable project from the configuration PC to the HMI device.

WinCC flexible Smart

WinCC flexible Smart is engineering software for configuring Smart panels.

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