VIPA HMI

Touch Panel | 62K-JEE0 | Manual

HB160E_TP | RE_62K-JEE0 | Rev. 11/14

April 2011

art of automation

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- 2004/108/EC Electromagnetic Compatibility Directive
- 2006/95/EC Low Voltage Directive

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Contents

About this manual **1**
Safety information **2**
Chapter 1 Hardware description **1-1**
Safety information for Users 1-2
Properties 1-3
Structure 1-4
Components 1-6
Dimensions 1-10
Technical Data 1-11
Chapter 2 Deployment Touch Panel **2-1**
Installation 2-2
Commissioning 2-4
Connection to a PLC system 2-12
Operating system Windows® Embedded CE 6.0 2-13
Communication via ActiveSync 2-19
Integrated Server 2-21
Access to the network resources 2-28
Firmware update 2-30
Chapter 3 Installation Guidelines **3-1**
Basic rules for the EMC-equitable assembly of installations 3-2
EMC-equitable assembly 3-6
EMC-equitable cabling 3-7
Special precautions providing high noise immunity 3-11
Checklist for the EMC-compliant installation of controllers 3-12

About this Manual

The manual describes the Touch Panel TP 610C from VIPA. Here you find detailed descriptions of the Touch Panel beside a product overview. You get information about structure, project engineering and operation of the Touch panels from VIPA.

Overview

Chapter 1: Hardware description

During this chapter you get hints for deployment of the Touch Panel TP 610C from VIPA.

Besides of a description of the single components of the Touch Panel, you will also find the dimensions that are required for the installation. The chapter closes with the technical data.

Chapter 2: Deployment Touch Panel

This chapter deals with the application of the Touch Panel.

At the beginning of the chapter you get information about the assembly and the connection of the Touch Panel. The main part of the chapter introduces Windows® CE and the various communication options offered by the Touch Panel.

Chapter 3: Installation guidelines

The chapter "Installation Guidelines" gives you information about the interference-free installation of Programmable Logic Controls (PLC) together with a Touch Panel.

Here we describe possible paths how interference can enter the controller, how you ensure the electromagnetic compatibility (EMC) and how to approach shielding and screening issues.

Objective and contents

This manual describes the Touch Panels from VIPA. The manual consists of chapters. Every chapter provides the description of one specific topic.
It describes the installation, project engineering, usage and the technical data.

This manual is part of the documentation package
with order number VIPA HB160E_TP and relevant for:

Product	Order number	as of state:	
		HW	OS
TP 610C	VIPA 62K-JEE0	01	Windows® CE 6.0

Guide to the document

This manual provides the following guides:

- An overall table of contents at the beginning of the manual
- An overview of the topics for every chapter

Availability

The manual is available in:

- printed form, on paper
- in electronic form as PDF-file (Adobe Acrobat Reader)

Description conventions

[Button]	Buttons are put in brackets e.g. [NEXT] or [OK].
[Key]	Key entry are put in brackets e.g. [STRG]+[A].
`Display output`	Display outputs are illustrated as `Courier` e.g. `\flashdisk>`
`Keyboard entry`	Keyboard entries are illustrated as **`Courier bold`** e.g. `\flashdisk> Dir`
Terms	Menus, Display elements, terms are *italics*.

Icons Headings

Important passages in the text are highlighted by following icons and headings:

Danger!
Immediate or likely danger.
Personal injury is possible.

Attention!
Damages to property is likely if these warnings are not heeded.

Note!
Supplementary information and useful tips.

Safety information

Applications conforming with specifications

The Touch Panels are constructed and manufactured for:

- VIPA CPUs 11x, 21x, 31x, 51x and S7-300/400 from Siemens
- communication and process control
- general control and automation applications
- industrial applications
- operation within the environmental conditions specified in the technical data
- installation into a cubicle

Danger!

This device is not certified for applications in

- in explosive environments (EX-zone)

Documentation

The manual must be available to all personnel in the

- project design department
- installation department
- commissioning
- operation

The following conditions must be met before using or commissioning the components described in this manual:

- Modification to the process control system should only be carried out when the system has been disconnected from power!
- Installation and modifications only by properly trained personnel
- The national rules and regulations of the respective country must be satisfied (installation, safety, EMC ...)

Disposal

National rules and regulations apply to the disposal of the unit!

Chapter 1 Hardware description

Overview

During this chapter you get hints for deployment of the Touch Panel TP 610C from VIPA.

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Content

Topic	Page
Chapter 1 Hardware description	**1-1**
Safety information for Users	1-2
Properties	1-3
Structure	1-4
Components	1-6
Dimensions	1-10
Technical Data	1-11

Safety information for Users

Handling of electrostatic sensitive modules

VIPA modules make use of highly integrated components in MOS-technology. These components are extremely sensitive to over-voltages that can occur during electrostatic discharges.

The following symbol is attached to modules that can be destroyed by electrostatic discharges:

The symbol is located on the module, the module rack or on packing material and it indicates the presence of electrostatic sensitive equipment.

It is possible that electrostatic sensitive equipment is destroyed by energies and voltages that are far less than the human threshold of perception. These voltages can occur where persons do not discharge themselves before handling electrostatic sensitive modules and they can damage components thereby, causing the module to become inoperable or unusable. Modules that have been damaged by electrostatic discharges may fail after a temperature change, mechanical shock or changes in the electrical load.

Only the consequent implementation of protection devices and meticulous attention to the applicable rules and regulations for handling the respective equipment can prevent failures of electrostatic sensitive modules.

Shipping of electrostatic sensitive modules

Modules have to be shipped in the original packing material.

Measurements and alterations on electrostatic sensitive modules

When you are conducting measurements on electrostatic sensitive modules you should take the following precautions:

- Floating instruments must be discharged before use.
- Instruments must be grounded.

Modifying electrostatic sensitive modules you should only use soldering irons with grounded tips.

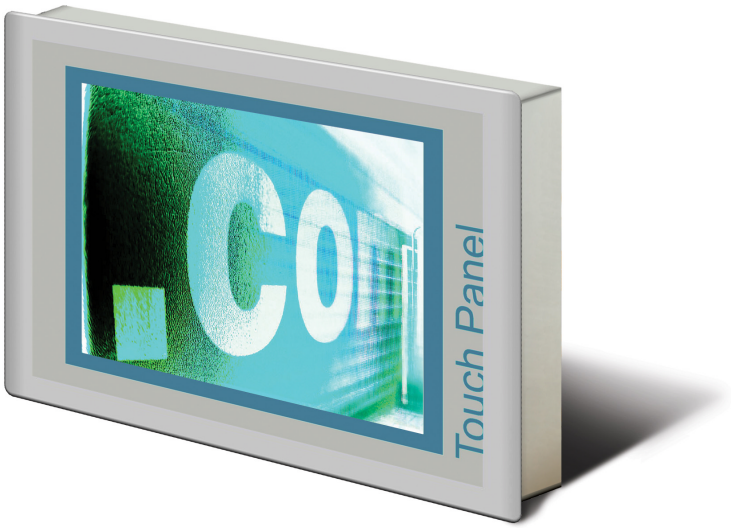
Attention!

Personnel and instruments should be grounded when working on electrostatic sensitive modules.

Properties

General

The Touch Panel allows you to visualize and alter operating states and recent process values of a connected PLC.



TP 610C
62K-JEE0

The VIPA Touch Panel is a compact and modular embedded PC based on Windows® CE. Besides of the extensive Windows® CE functions the Touch Panel offers varied communication possibilities. Here the Touch Panel can simply be configured, controlled and remoted. By including a selectable HMI/SCADA runtime the Touch Panel is particularly suitable for monitoring and controlling of process cycles.

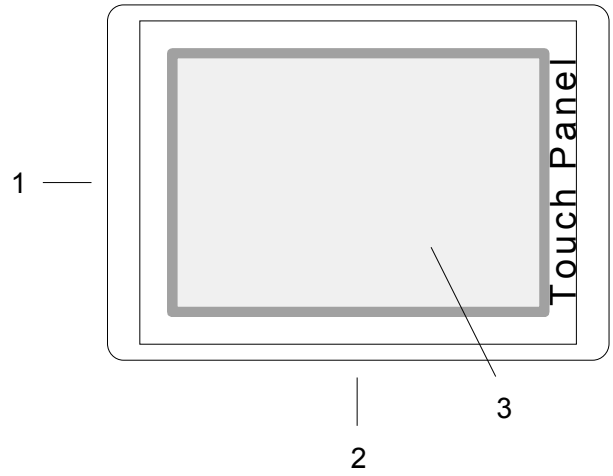
- Windows® Embedded CE 6.0
- Different HMI/SCADA-Runtime selectable
- 800MHz pulse frequency
- Work memory 128Mbyte
  about 1800Mbyte memory for user data on board
- CF-Card II and MMC/SD card slot
- Horizontal and vertical display selectable in 90° steps
- RS232, RS485, RS422, MPI, PROFIBUS DP slave, Ethernet,
  USB-A and USB-B interfaces on board
- Robust aluminium die casting case
- Display resolution 800 x 600 / 600 x 800 (64k colors)
- Battery backed clock
- Resistive touch screen
- Easy mounting via integrated pivoted lever
- Protection class IP65 (frontal)

Order data

Type	Order number	Description
TP 610C	VIPA 62K-JEE0	10.4" SVGA TFT color, MPI/PROFIBUS DP/RS485, RS232, RS422/485, 2xUSB-A, USB-B, 2xEthernet RJ45 (switch)

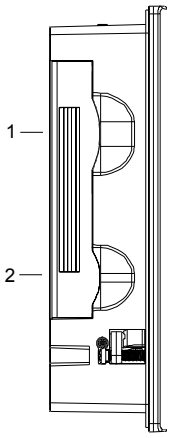
Structure

Front view



[1] Slot for storage medium (CF, SD/MMC)
[2] Connection for interfaces and power supply
[3] Display with touch sensitive area (touch screen)

Side view

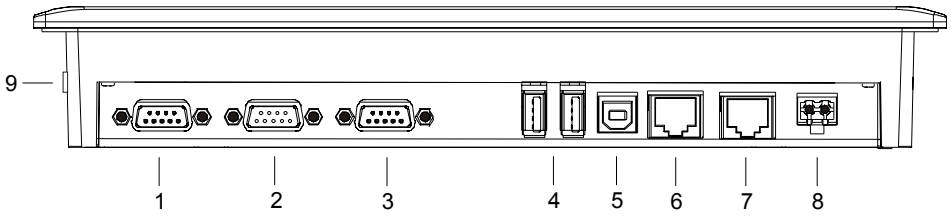


[1] Compact Flash
[2] MMC / SD

Note!
Please only use storage media, which are tested and approved by VIPA GmbH.

Bottom view (Interfaces)

TP 610C 10.4"
62K-JEE0



Components

[1] RS422/485 interface COM 2
[2] RS232 interface COM 1
[3] MPI/PROFIBUS DP/RS485 interface
[4] 2x "Host"-USB-A interface
[5] "Slave"-USB-B interface
[6], [7] RJ45 jack for Ethernet Communication (switch)
[8] Slot for DC 24V voltage supply
[9] Slot for CF/SD/MMC storage medium

Note!
Please regard that the Touch Panel always has to be supplied with external voltage!

Components

Memory management

The following memory systems are available for every Touch Panel:

- 128Mbyte work memory
- 2Gbyte Micro-SD card (ca. 1800Mbyte for user data)
- USB storage media using "Host"-USB-A interface
- Slot for CF (Type II)
- Slot for MMC/SD

Work memory

Every Touch Panel has a work memory with a size of 128Mbyte. The work memory is not buffered and is deleted after shut down. Please regard that also registry entries are stored in the work memory that are set back to default settings after the next re-boot. You may save them permanently by means of the *KuK Tools* (within consignment).

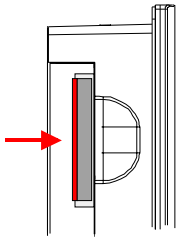
Micro-SD card

As internal permanent storage medium every Touch Panel has a Micro-SD card with a size of 2Gbyte (about 1800Mbyte user data). After the start of Windows® CE this memory is listed as *SDMMC Card* at *My Device*.

USB storage media

The connection of USB sticks and USB drives by use of the "Host"-USB-A interface is supported by the Touch Panel. After connection the storage media is listed as *Hard Disk* at *My Device*.

Slot for CF



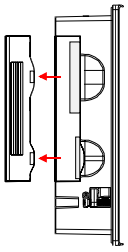
Here you may plug a **C**ompact**F**lash® type II. The card may be plugged and removed during runtime and is immediately listed as *Storage Card* at *My Device*.

Every CompactFlash® storage module has a pulling edge. Hold the CompactFlash in the way that the pulling edge points to the left side. Push the storage module without much power into the slot until the impact. To remove the card touch it at the pulling edge and pull.

Slot for SD/MMC

At this slot you may plug storage modules of the type SD or MMC. The card may be plugged and removed during runtime and is immediately listed as *SDMMC Card2* at *My Device*.
Please take care to plug the according card as shown at the backside of the Touch Panel.

Security flap for memory cards



At the left side of the Touch Panel are the card slots for memory cards. The cards are visibly covered by a security flap and are thus secured from slipping out.

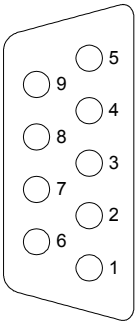
Please take care to pull the security flap back before plugging or pulling a memory card like shown in the illustration and put it back again afterwards.

When plugging, the security flap additionally snaps into position above the plugged memory card.

RS422/485 interface

- Logical states represented by voltage differences between the 4 cores
- Serial bus connection in 4-wire technology using full duplex mode
- Data communications up to a max. distance of 500m
- Data communication rate up to 115.2kBaud

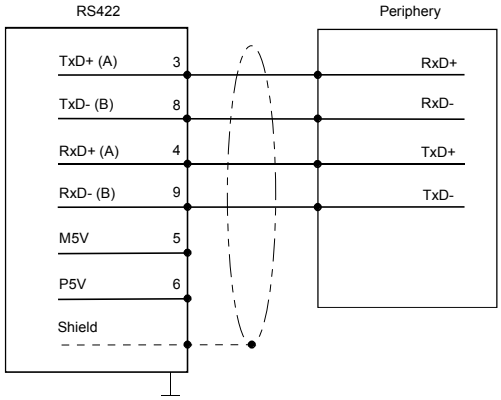
Connection RS422/485



9pin jack

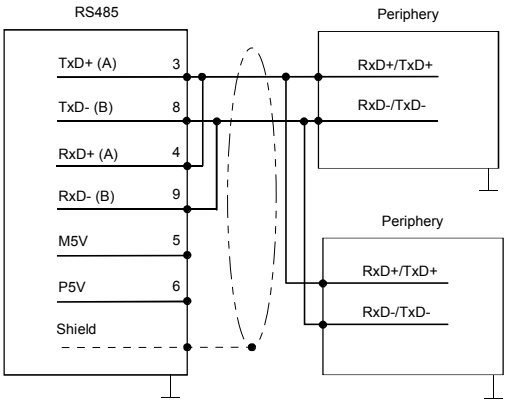
Pin	RS422/485
1	n.c.
2	n.c.
3	TxD+ (Line A)
4	RxD+ (Line A)
5	M5V
6	P5V
7	n.c.
8	TxD- (Line B)
9	RxD- (Line B)

Connection RS422 (isolated)



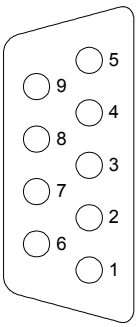
- Serial bus connection in 2-wire technology using half duplex mode

Connection RS485 (isolated)



PROFIBUS DP / MPI interface

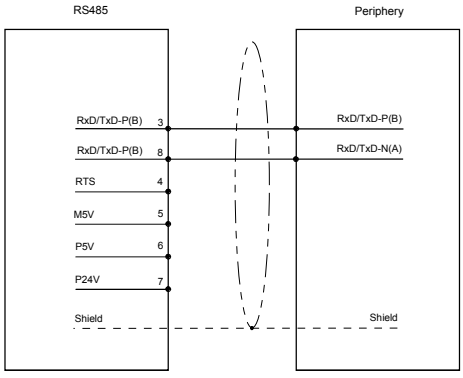
Connection RS485



9pin jack

Pin	RS485
1	n.c.
2	M24V
3	RxD/TxD-P (Line B)
4	RTS
5	M5V
6	P5V
7	P24V
8	RxD/TxD-N (Line A)
9	n.c.

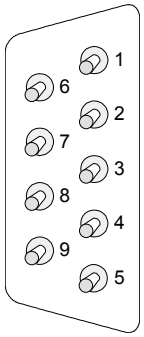
Connection RS485



RS232 interface

- Interface is compatible to the COM interface of a PC
- Logical signals as voltage levels
- Point-to-point links with serial full-duplex transfer in two-wire technology up to 15m distance
- Data transfer rate up to 115.2kBaud

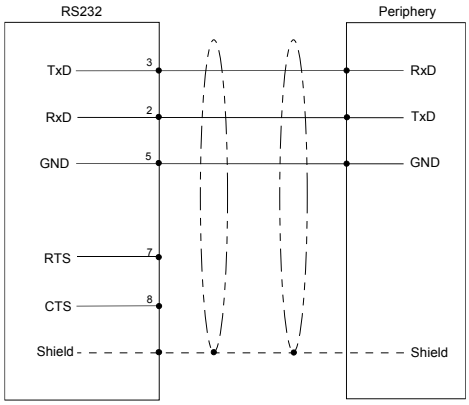
Connection RS232



9pin plug

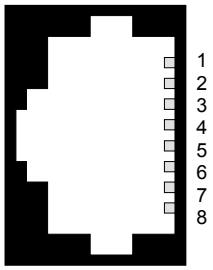
Pin	RS232
1	CD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

Connection RS232



Ethernet connection

An RJ45 jack provides the interface to the twisted pair cable, required for Ethernet. The pin assignment of this jack is as follows:

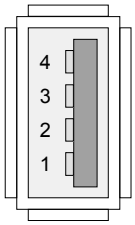


8pin RJ45 jack

Pin	Signal
1	Transmit +
2	Transmit -
3	Receive +
4	-
5	-
6	Receive -
7	-
8	-

"Host"-USB-A

Using the "Host"-USB-A interface mouse, keyboard, USB stick or USB hard discs can be connected.
The pin assignment is as follows:

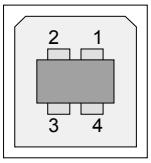


"Host"-USB-A:

Pin	Assignment
1	VCC
2	DM
3	DP
4	GND

"Slave"-USB-B

For project transfer with Microsoft ActiveSync a programming cable can be connected using the "Slave"-USB-B interface.
The pin assignment is as follows:



"Slave"-USB-B:

Pin	Assignment
1	VCC
2	DM
3	DP
4	GND

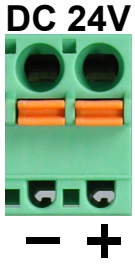
VIPA USB-B Programming cable

The USB-A interface of your PC can be connected to the "Slave"-USB-B interface of your Touch Panel deploying the USB programming cable.

The USB programming cable is delivered by VIPA with order No. VIPA 670-0KB10.

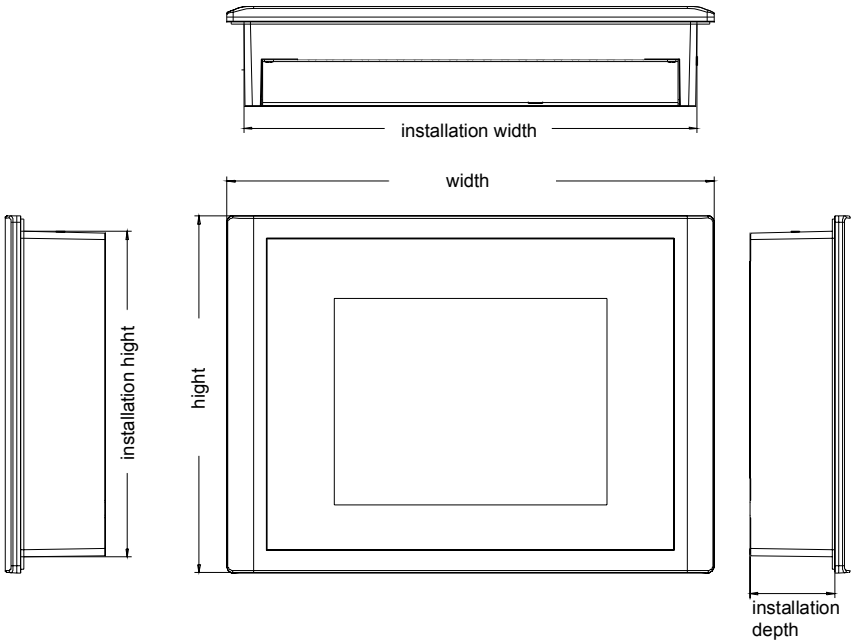
Power supply

The Touch Panel has got an integrated power supply. The power supply has to be provided with DC 24V (20.4 ... 28.8V). For this you find an according DC 24V slot at the bottom side.



The power supply is protected against inverse polarity and overcurrent.

Dimensions



Installation dimensions

For the installation of the Touch Panel in control cabinets and desks the following dimensions are necessary:

10.4"
62K-JEE0

Front panel width	1.5 ... 6mm
Installation cutting (W x H)	287 x 217mm
Front panel (W x H)	304 x 233mm
Back side (W x H x D)	285 x 215 x 45mm
Installation depth	45mm

Note!

The degrees of protection are only guaranteed when the following is observed:

- Material thickness at the mounting cut-out: 1.5 ... 6mm
- The deviation from the plane for the panel cut-out is ≤0.5mm. This condition must be fulfilled for the mounted HMI device
- Permissible surface roughness in the area of the seal: ≤120µm (friction coefficient 120).

Technical Data

Order number	**62K-JEE0**
Type	Touch Panel TP 610C
Display	
Display size (diagonal)	10.4 "
Display size (width)	211.2 mm
Display size (height)	158.4 mm
Resolution	600 x 800 / 800 x 600
Type of display	TFT color (64K colors)
MTBF Backlights (25°C)	50000 h
System properties	
Processor	Xscale 800 MHz
Operating system	Windows CE 6.0
Flash memory	2 GB
RAM	128 MB
Avilable memory (user data)	1800 MB
SD/MMC Slot	✓
CF Card Slot Typ II	✓
Time	
Real-time clock buffered	✓
Clock buffered period (min.)	6 W
Accuracy (max. deviation per day)	10 s
Operating controls	
Touchscreen	resistive
Keyboard	external via USB
Mouse	external via USB
Interfaces	
MPI, PROFIBUS DP	RS485 isolated
MPI, PROFIBUS DP connector	Sub-D, 9-pin, female
CAN	-
CAN connector	-
Serial, COM1	RS232
COM1 connector	Sub-D, 9-pin, male
Serial, COM2	RS422/485 isolated
COM2 connector	Sub-D, 9-pin, female
Number of USB-A interfaces	2
USB-A connector	USB-A (host)
Number of USB-B interfaces	1
USB-B connector	USB-B (device)
Number of ethernet interfaces	2
Ethernet	Ethernet 10/100 MBit
Ethernet connector	RJ45
Integrated ethernet switch	✓
Technical data power supply	
Power supply (rated value)	DC 24 V
Power supply (permitted range)	DC 20.4...28.8 V
Reverse polarity protection	✓
Current consumption (rated value)	0.7 A
Inrush current	-
Power loss	-
Status information, alarms, diagnostics	
Supply voltage display	yes
Mechanical data	
Housing / Protection type	
Material	die-cast aluminum

Order number	**62K-JEE0**
Mounting	via integrated pivoted lever
Protect type front side	IP 65
Protect type back side	IP 20
Dimensions	
Front panel	304 x 233 x 7.5 mm
Rear panel	285 x 215 x 45 mm
Installation cut-out	
Width	287 mm
Height	217 mm
Minimum	1.5 mm
Maximum front panel thickness	6 mm
Weight	3251 g
Environmental conditions	
Operating temperature	0 °C to 50 °C
Storage temperature	-20 °C to 60 °C
Certifications	
UL508 certification	in preparation

Chapter 2 Deployment Touch Panel

Overview

This chapter deals with the application of the Touch Panel.

At the beginning of the chapter you get information about the assembly and the connection of the Touch Panel. The main part of the chapter introduces Windows® CE and the various communication options offered by the Touch Panel.

Content

Topic	Page
Chapter 2 Deployment Touch Panel	**2-1**
Installation	2-2
Commissioning	2-4
Connection to a PLC system	2-12
Operating system Windows® Embedded CE 6.0	2-13
Communication via ActiveSync	2-19
Integrated Server	2-21
Access to the network resources	2-28
Firmware update	2-30

Installation

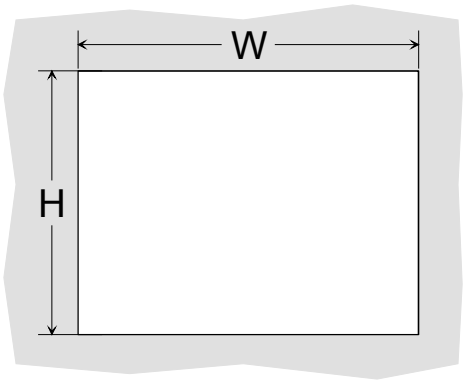
Overview

The Touch Panel is suitable for the installation in operating tables and control cabinet fronts. The installation happens via the backside. The Touch Panel is provided with a patented integrated fixing technique that allows an easy connection with a simple screwdriver.

Due to the fact that the Touch Panel has a plug connector for bus connection and voltage supply, a fast and easy device change is possible.

Installation cutting

For the installation into a operating tableau and control cabinet fronts, the Touch Panel requires the following front plate cutting:

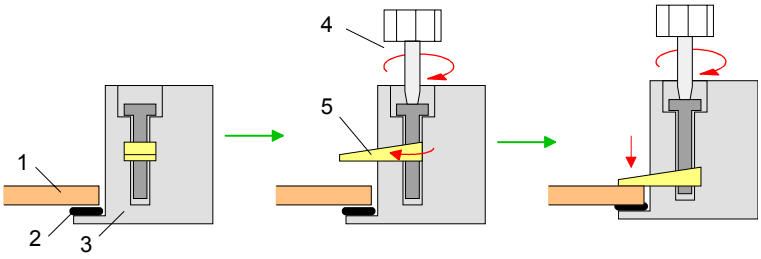


Touch Panel	W x H in mm
62K-JEE0	287 x 217

Installation

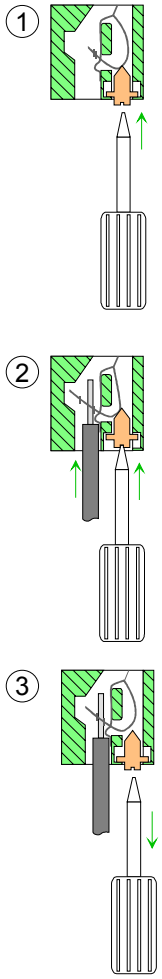
The fixing technique is integrated in the casing of the Touch Panel and accessible via the backside.

For the installation, a small slit screwdriver is required. Push the operator panel [3] from the front side into the front panel cutting [1] until it touches the panel with the seal [2]. Now bolt the lever [5] clockwise with the screwdriver [4] until it rotates to the outside. Further screwing bolts the lever to the front panel until it holds this to the control cabinet front.



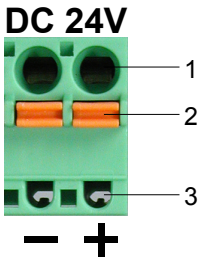
Connect power supply

For the cabling of the DC 24V power supply green plugs with CageClamp technology are deployed. The spring-clip connector technology simplifies the wiring requirements for signaling and power cables. In contrast to screw terminal connections, spring-clip wiring is vibration proof.



Here also you may connect wires with a cross-section of 0.08mm^2 to 2.5mm^2. You can use flexible wires without end case as well as stiff wires.

Fix the conductors to the CageClamps like this:



[1] Round opening for wires
[2] Locking (orange) for screwdriver
[3] Test point for 2mm test tip

The picture on the left side shows the cabling step by step from top view.

- For cabling you push the locking vertical to the inside with a suiting screwdriver and hold the screwdriver in this position.
- Insert the insulation-stripped wire into the round opening. You may use wires with a cross-section from 0.08mm^2 to 2.5mm^2.
- By removing the screwdriver the wire is connected safely with the plug connector via a spring.

Commissioning

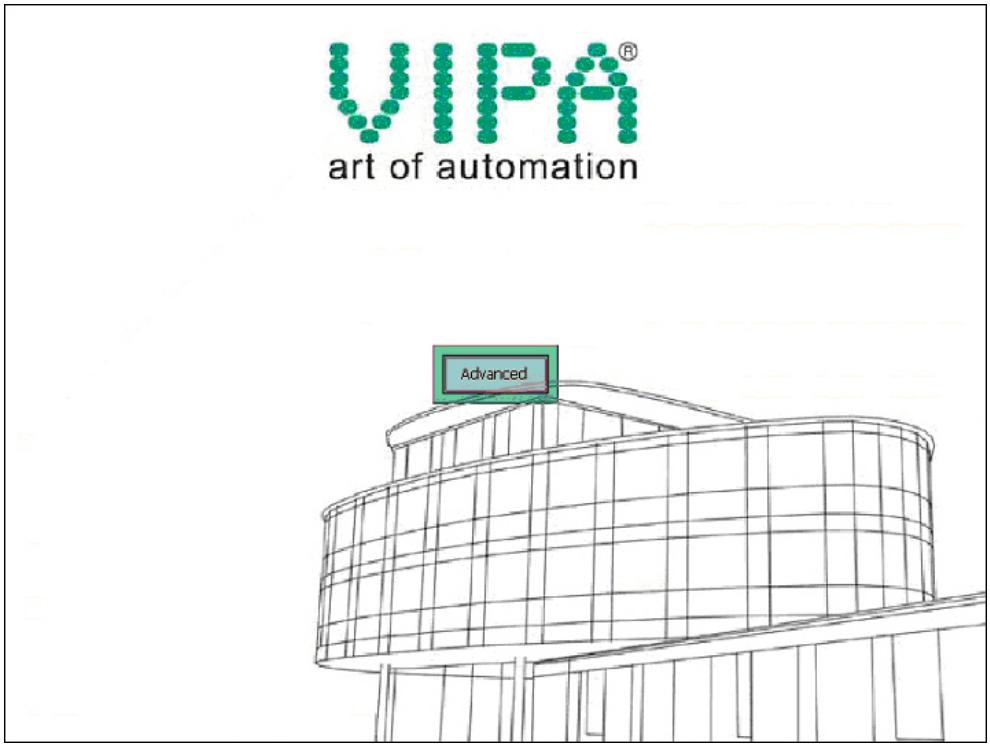
Attention!

- Before commissioning the device must be brought to room temperature.
- At condensation the device must be absolutely dry before connected to power.
- To avoid overheat during operation the device must not be laid open to direct sun light.
- After opening the control cabinet or desk, there are parts with possible dangerous voltage available.
- For all signal connections only screened cables are permitted.
- Signal cables must not be let within the same cable shaft as high voltage cables.

VIPA Startup Manager

As soon as the Touch Panel is provided by power supply the Touch Panel starts with "user area" of the *VIPA Startup Manager*:

User area



Advanced

On delivery the button [Advanced] is shown at the starting screen. Further buttons and their properties may be configured in the *administrator area* with the button [Settings] or freely programmed by means of an XML editor at the file startup.xml in the directory **StartupMngr** > *flashdisk*.

Startup.xml

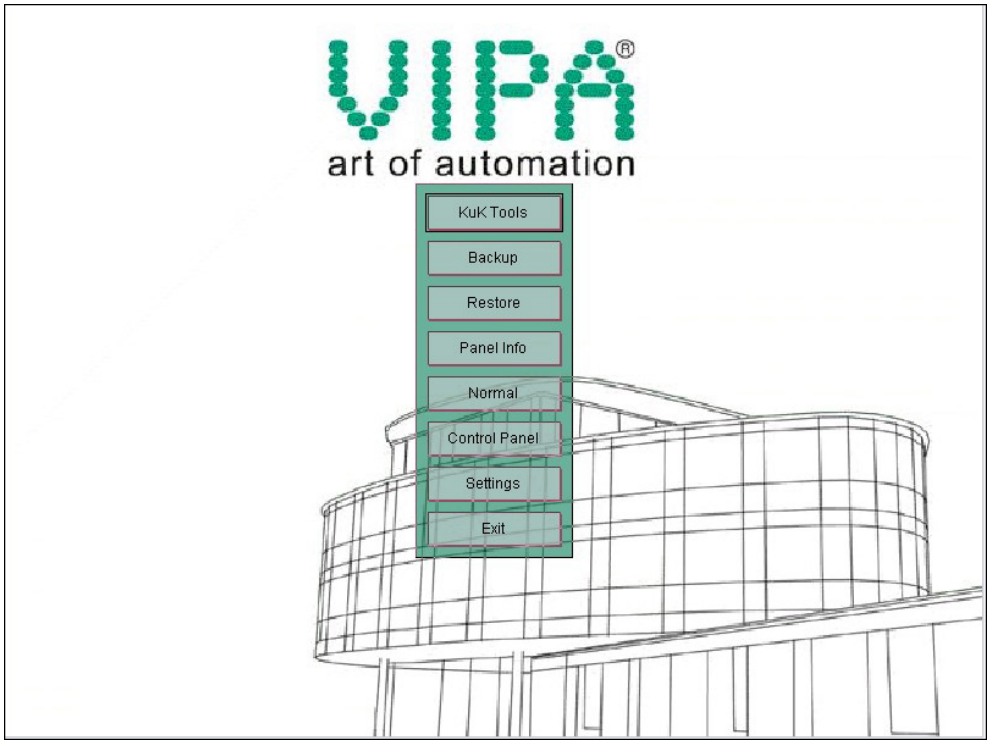
The file startup.xml may be found at **StartupMngr** > *flashdisk*.

By means of an XML editor the *Startup Manager* may be individually adapted.

VIPA Startup-Manager

With clicking to [Advanced] the *administrator area* is opened. On delivery there are the following buttons:

Administrator area



KuK Tools

To permanently store changes within the Registry after PowerOFF - PowerON the program *KuK Tools* is to be used. The program may be executed by clicking to the button [KuK Tools]. To permanently store the registry file click at the button [Store] of "Permanent Registry".

Backup

With [Backup] the files of the flash disk and the Registry settings may be stored.

Restore

The backed up files may be restored by [Restore].

Panel Info

Here you get information about Touch Panel like operating system, images runtime version and tools.

Normal

With this button you may return to the *user area*.

Control Panel

With the button [Control Panel] or with **Start** > *Settings* > *Control Panel* the system settings like brightness and contrast of the display may be preset or the display may be re-calibrated. Here the communication interfaces may also be configured. Further you reach here the TP information: product number, serial number and licenses.

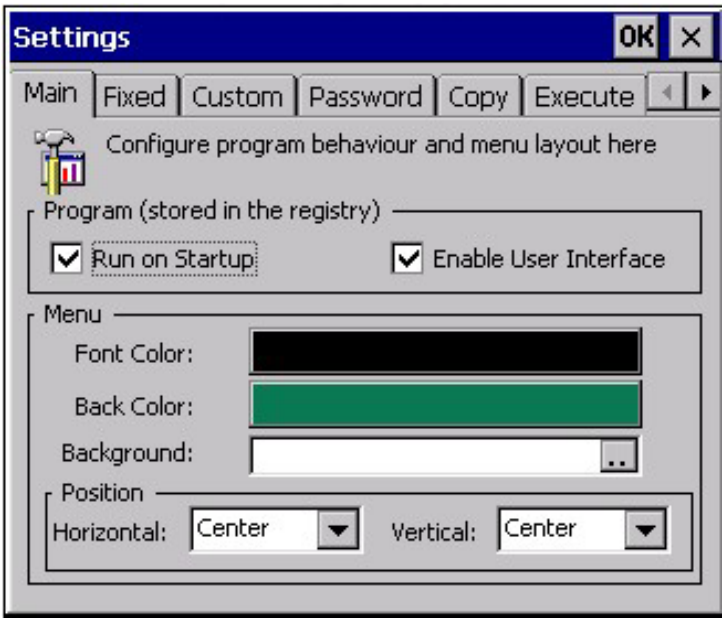
Exit

The *VIPA Startup Manager* is closed by [Exit] and the system returns to the Windows® operating system.

Settings

Buttons may be configured with [Settings]. Here buttons may be added or removed respectively assigned with programs.

Main



Here general settings may be established.

A new background picture may be loaded at "Background ...". With "Font Color" and "Back Color" the color of the button font and of the button may be preset. The position of the buttons may be changed by "Position".

Enabling "Run on Startup" with the system start the functions established at "Settings" are activated.

With disabling "Run on Startup" the Touch Panel starts with the Windows® operating system. The functions preset at "Settings" are ignored.

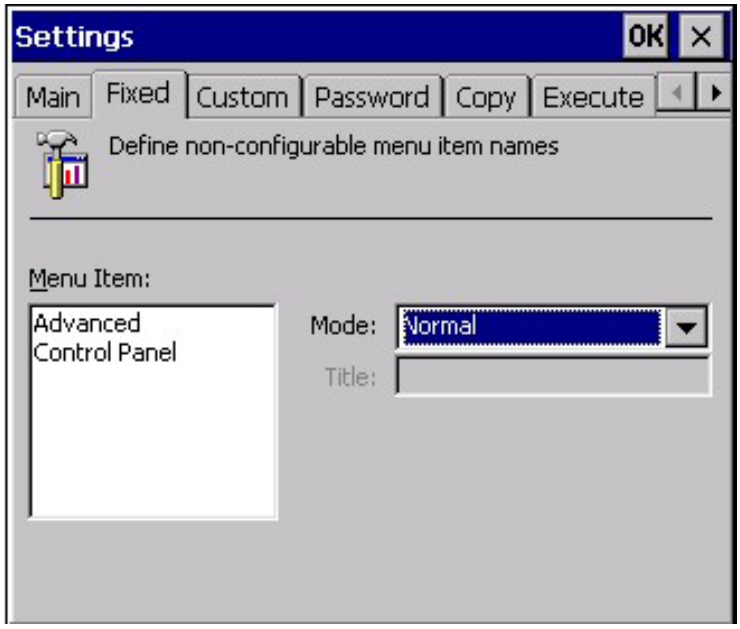
With enabling "Enable User Interface" the Touch Panel starts with the *Startup Manager*, the listed functions of "Copy" and "Execute" are executed and the program marked with "Autostart" is executed.

If "Enable User Interface" is disabled, the Touch Panel starts without *Startup Manager* but in the background the listed functions of "Copy" and "Execute" are executed. Then the system returns to the Windows® operating system. A program marked with "Autostart" is not executed.

Note!

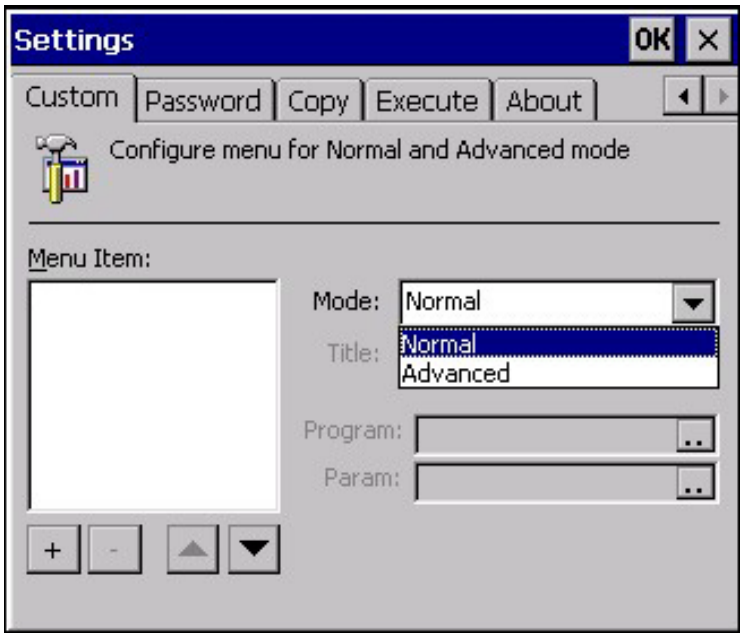
To remain the settings permanently, they have to be saved with **KuK Tools** [Store].

Fixed



Here the buttons are listed, which may not be changed in the *user* respectively *administrator area*.

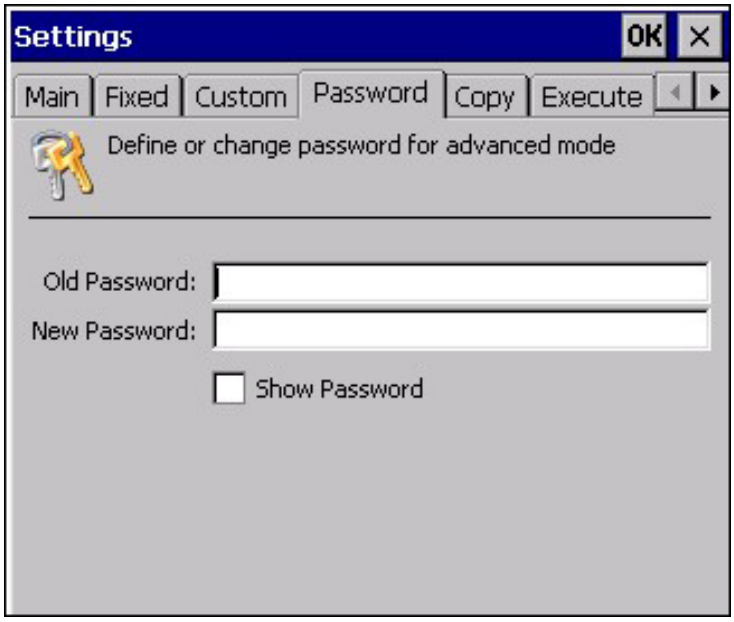
Custom



Here new buttons may be configured and assigned with corresponding programs.

You may choose "Normal" for the *user area* or "Advanced" for the *administrator area*. With [+] a new button may be added. Designate the button and click at [...] to assign the button to a program. The button may be removed with [-].

Password

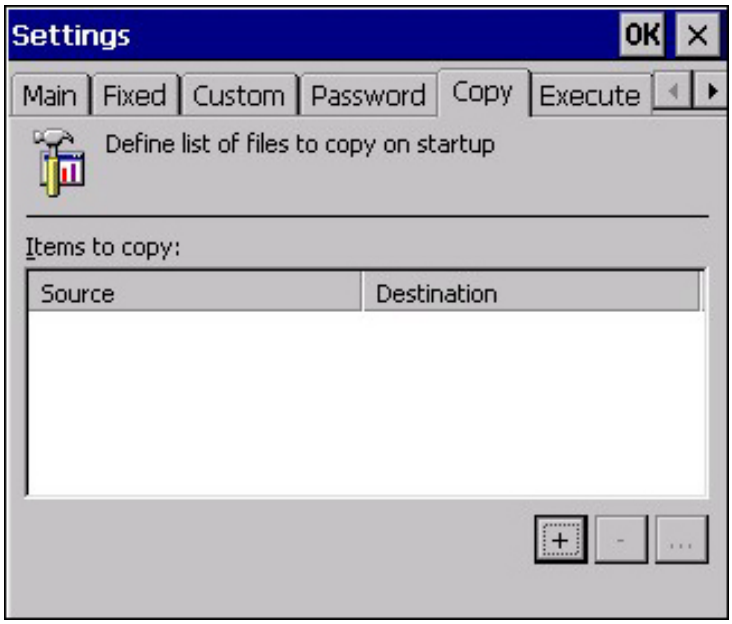


The *administrator area* may be protected by a password. Here you may enter respectively change the password of the *administrator area*.

If you click within the *user area* to the button [Advanced] and a password is defined, you were prompted to enter the password. If there is no password defined, the *administrator area* is opened. On delivery there is no password preset.

If you have forgot you password by enabling the checkbox "Show Password" the password may be displayed.

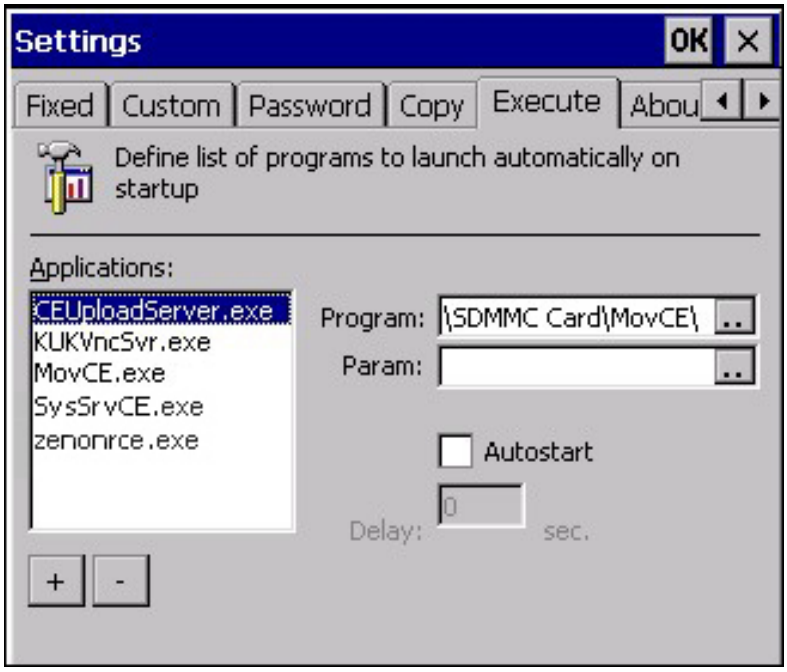
Copy



Here with the startup of the panel files may be copied e.g. from flash disk to Windows®.

The files to be copied are added by [+]. With [-] the corresponding file is removed from the list. With [...] the file may be downloaded.

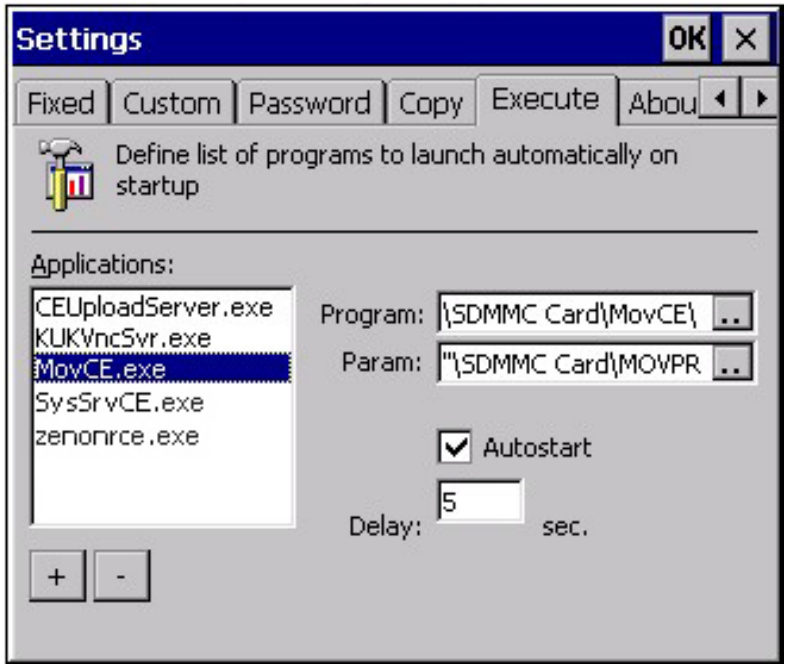
Execute



Here programs may be added, which have to start in the background during startup e.g. VNC server or transport services.

The files to be copied are added by [+]. With [-] the corresponding file is removed from the list. With [...] the file may be downloaded.

With "Autostart" a program from the program list can be selected, which is to be started delayed. For this activate "Autostart" and set at "Delay" a delay time of > 0.



With "Param" a project can be assigned to a selected program with which it is to be started. Before you select a new project a just existing link is to be deleted.

About

Here you may find the current version of the *VIPA Startup-Manager*.

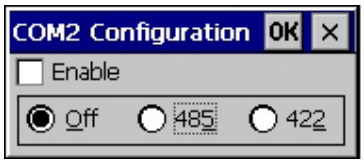
Control Panel

To configure the COM2 interface on the Touch Panel start via the button "Control Panel" the tool "Com2 Configuration".

Configuration COM2 RS422/485

In the opened dialog window you activate the RS485 or the RS422 interface.

Default: off



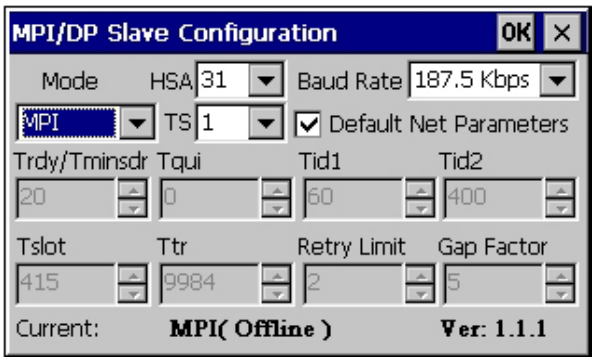
To remain the settings permanently, they have to be saved with **KuK Tools** [Store].
To activate the changes the Touch Panel has to be restarted after configuration.

Configuration MPI/DP slave

To configure the MPI/DP interface on the Touch Panel start via "Control Panel" the tool "MPI/DP Slave Configuration".

Default: MPI - Address 1

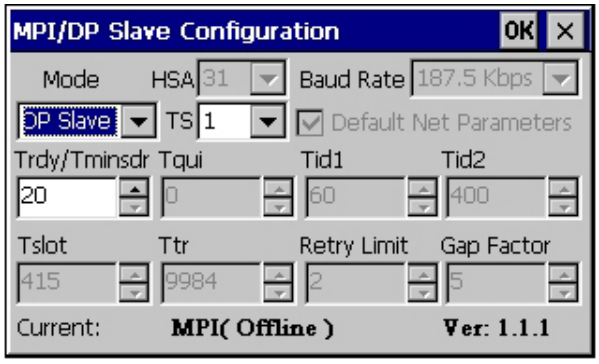
The following settings are only required if not communicate via Movicon or zenon.



Configuration DP slave

Via mode the interface could be set up on "DP Slave".

Note!
It is possible to set up the DP slave with the tool via software, but the hardware of the Touch Panel doesn't support this.
In this case MPI does not work either.



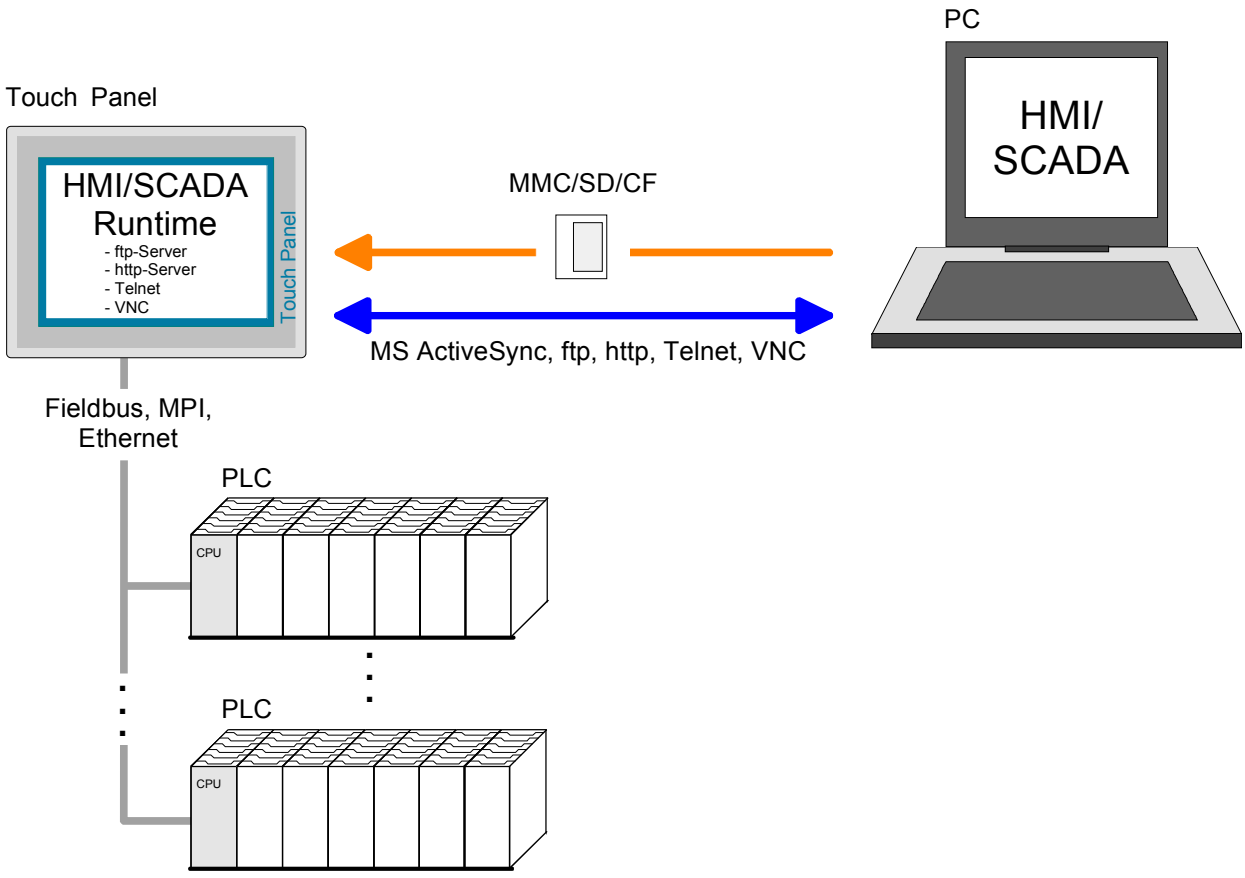
To remain the settings permanently, they have to be saved with **KuK Tools** [Store].
To activate the changes the Touch Panel has to be restarted after configuration.

Connection to a PLC system

For the inclusion into your PLC system several HMI/SCADA project-engineering platforms are at your disposal that has to be installed at an external PC. Here you may create your project, where appropriate simulate it and transfer it to the Touch Panel via a connection that you've entered before. Via the at the Touch Panel pre-installed runtime version of the HMI/SCADA project engineering platforms your project is run able.

By using the according communication driver, the Touch Panel supports connecting options to the PLC via MPI, field bus and Ethernet.

During operation your operating device communicates with the according PLC and reacts to the application courses in the PLC according to the configured processes. Via dialogs configured before, process values may be monitored graphically, altered and evaluated.



Operating system Windows® Embedded CE 6.0

General

The newly developed standard Windows® CE allows devices that are communicating with each other to exchange information with Windows® based devices and to establish connections to the Internet.

Microsoft Windows® CE is a 32bit, open and scalable platform for a multiplicity of communication and data processing devices. The functions like multi-tasking and multi-threading are supported by this operating system.

Windows® Embedded CE 6.0

Windows® Embedded CE 6.0 supports some file viewer and an Internet browser.

Properties

- ftp, http, Telnet and VNC server
- RAS server
- ActiveSync file transfer (USB, RS232)
- RDP (Remote Desktop Protocol)
- Internet Explorer 6
- Registry Editor
- WordPad
- Mouse pointer
- USB keyboard driver
- HP printer driver (COM, Ethernet, USB)
- File viewer for Word, Excel, PowerPoint and PDF
- VIPA Startup Manager

Differences to the standard Windows® operation

Please regard that for the deployment of Windows® CE a thorough knowledge of operating Windows® are assumed. Here are only shown the differences to a "standard" Windows® operating system.

Pen entry

You're operating the Touch Panel by means of a pencil res. with the finger. When touching an area at the touch screen this area is recognized and the program reacts accordingly. The following types of entry are differentiated:

Double click

A double click has to be executed like mouse operation by touching the area at the screen twice. A double click on an object opens res. executes this.

Drag

By tapping on an object and then dragging you may move the object on the screen. If no object is selected, a frame is created by the dragging that selects the touched objects.

Characteristics with Windows® Embedded CE 6.0

In the *Professional Plus* version mouse functions are fully supported. As soon as the touch screen is touched with the pen, a mouse pointer is shown on the desktop at the pen position.

Navigation within the dialog window

The windows may be moved via the head bar. Here you may also find the [OK] button to confirm entries and the [X] button for exiting the dialog.

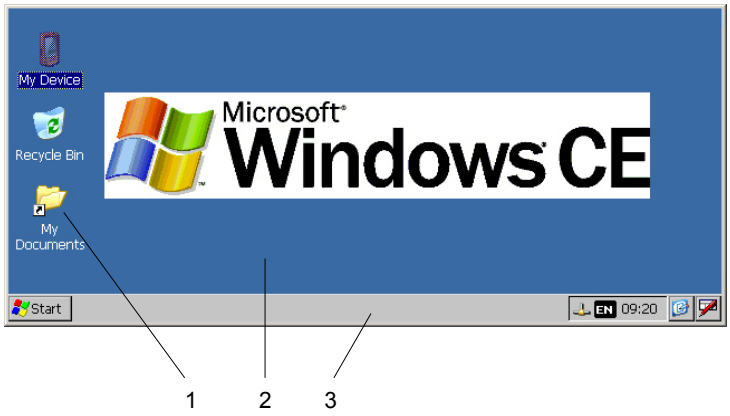
Exit Windows® (shut down)

You may not exit Windows®. By switching the power supply off and on again you may restart Windows®. Before a reboot you should always save your data res. close all running applications to avoid data loss.

Note!

Please regard that changes, which are made are set back after PowerOFF-PowerON and are only stored via [Store] which is to be found at **Start** > *Programs* > *KuK_Tools* > *KuK Tools*.

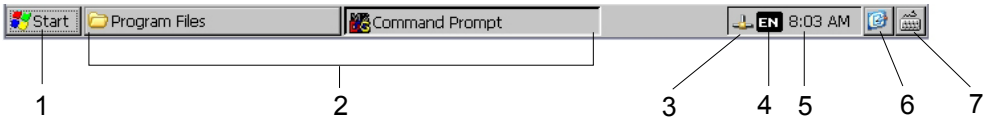
Structure



1	*Icon*	Via icons on the desktop you gain direct access to the application related to the icon.
2	*Desktop*	The desktop is the screen that is shown after login at Windows® CE. It contains e.g. links to the mostly used applications res. system components.
3	*Task bar*	The task bar is part of the desktop. When opening an application, a document or a window, every running object is displayed as button on the task bar. Via this buttons you may easily change between the open windows.

Task bar

Basically the task bar has the following structure:



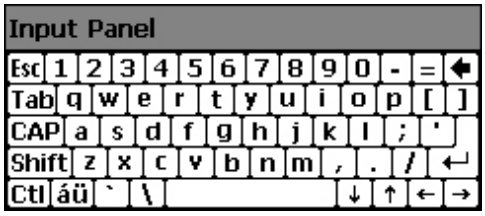
1	*Start button*	This button offers you access to all components of your Touch Panel like e.g. applications, system settings, file browser etc.
2	*Open applications*	For every open application a button is to be found in the task bar. There is no button for minimizing. The switch between the applications is performed via this buttons.
3	*Network connection*	As soon as your Touch Panel is connected via Ethernet you can see here the Ethernet address. If there is no connection via Ethernet, the symbol is displayed crossed out.
4	*Keyboard layout*	If you've connected a keyboard you may choose the requested language layout via this button.
5	*Time*	This area shows the time that you may change via double click.
6	*Show desktop*	All windows are minimized and the desktop is shown.
7	*Software keyboard*	This button displays a keyboard at the screen. "Hide Input Panel" hides the keyboard again.

Software keyboard

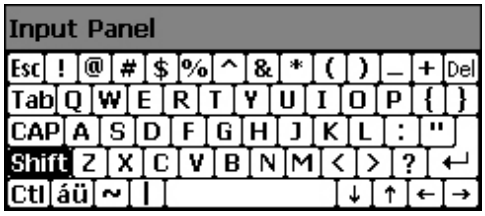
The button allows you to select one of the available software keyboards. At the moment the following standard keyboards are implemented:

Software keyboard *Keyboard*

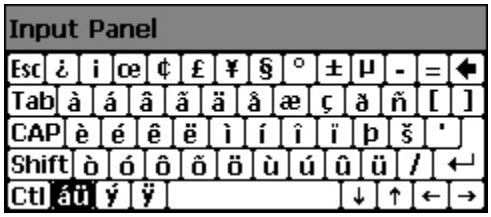
Normal:



At pushed SHIFT key:



At pushed [a´ü] key:

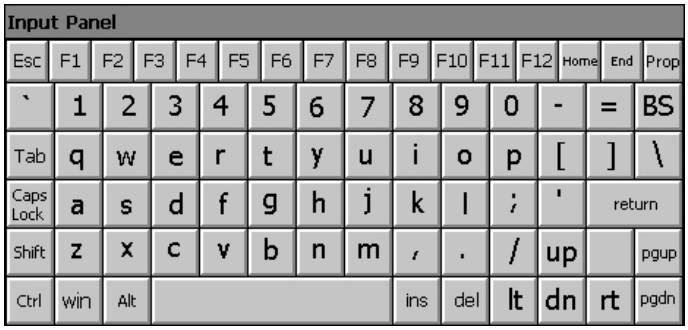


Note!

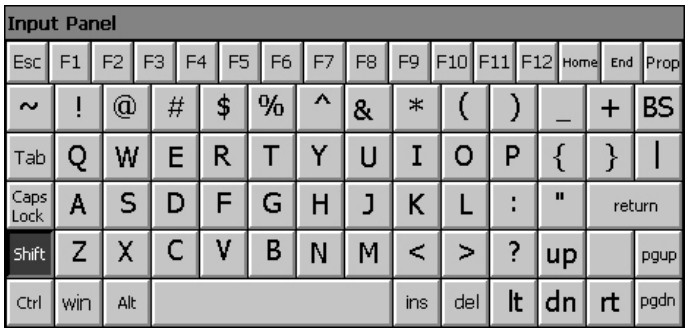
Please regard that the umlauts äöü may exclusively entered via the software keyboard *Keyboard*.

Software keyboard *Large KB*

Normal:



At pushed SHIFT key:



Meaning:

Home Position 1
End End
BS Backspace
up ↑
dn ↓
lt ←
rt →
pgup Page ↑
pgdn Page ↓
ins Insert
del Delete
Tab Tabulator
Shift
Caps/Lock

Hide keyboard

The software keyboard allows you to enter key entries without connecting an external keyboard. As soon as an entry is required the software keyboard is automatically shown.

Hide Input Panel hides the keyboard again.

System setting (Control Panel)

Due to the fact that many components of the *Control Panel* are conform with the s*ystem control* of Windows®, most of the description is here dispensed. The description of the control panel components relevant for operating the Touch Panel is to be found in the following:

Set display

Via **Start** > *Settings* > *Control Panel* > *Display* the dialog windows for the display properties opens. Here you may change the settings for the monitor options.

For example you may adjust the brightness and contrast via the register *Settings*.

Calibrate touch screen

If your touch screen does not always react on a double click or recognizes the position of an entry not precisely, you may call the dialog *Stylus* via **Start** > *Settings* > *Control Panel*.

In the register *Double-Tap* you may use the grid pattern to preset a double click velocity and test this on the symbol below. OK takes over the set value. The calibration of the touch screens happens via the register *Calibration* by following the instructions.

Set Ethernet parameters

The dialog field for pre-setting an Ethernet address is to be found at **Start** > *Settings* > *Network and Dial-up Connections.*

The default setting is address assignment via DHCP.

System properties (System)

Here you receive information about the version of the current Windows® operating system, the memory load and sharing (alterations here are not taken over into the registry) and about the copyright.

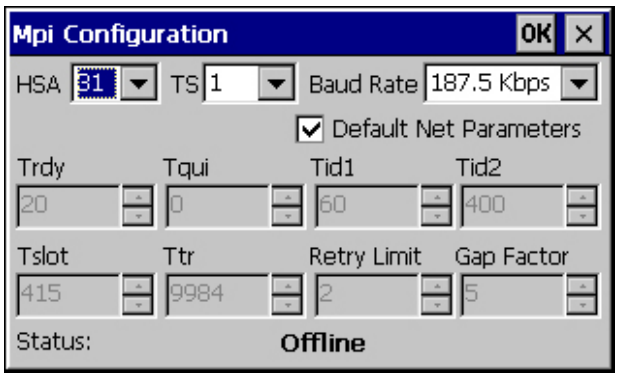
The register *Device Name* allows you to change the device name that is e.g. shown during Ethernet communication.

Note!

Please regard that changes are set back after PowerOFF-PowerON. To store them permanently into the registry file you have to store them explicitly.
For this, call **Start** > *Programs* > *KuK_Tools* > *KuK Tools* [Store].

Set MPI parameters

The dialog window where to configure the integrated MPI interface is to be found at **Start** > *Settings* > Control *Panel* > *MPI Configuration*.



HSA

Here you set the highest MPI address (**h**ighest **s**tation **a**ddress). Within a MPI network the highest MPI address must be identical!

TS

With TS (**t**his **s**tation) you set the local MPI address for the Touch Panel.

Baud Rate

Enter here the transfer velocity of your MPI net. The baud rate has to be identical for every MPI participant within the network. According to the *Baud Rate* the network parameters are set.

Default Net Parameters

It is recommended not to alter the *Default Net Parameters* that are set by the baud rate.

Status

The status of the MPI interface is monitored via *Status* as "Offline", "Online" or "Error".

Note!

Here made changes are also not saved after PowerOFF-PowerON. Save the data permanently in the current registry file via [Store] at **Start** > *Programs* > *KuK_Tools* > *KuK Tools*.

Communication via ActiveSync

Overview

ActiveSync is a communication platform developed by Microsoft especially for mobile computers to synchronize data between a mobile device and a PC via USB. Many developer tools res. SCADA project-engineering tools use ActiveSync for the data transfer.

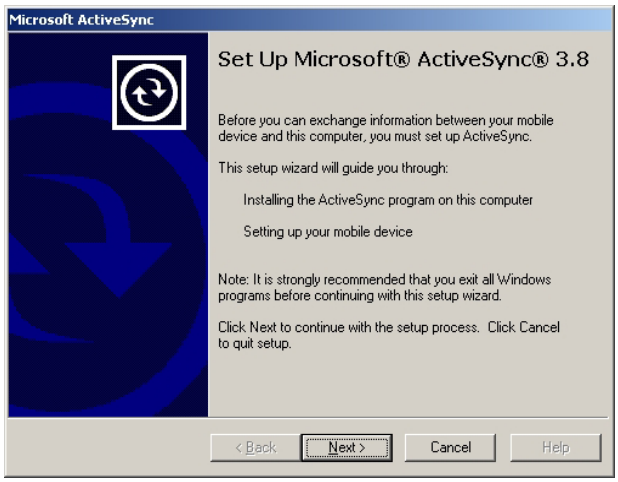
Before you may access the Touch Panel from the PC via ActiveSync you have to install it on the PC.

ActiveSync is freeware and may be downloaded from www.microsoft.de.

Installation

- Download the ActiveSync from the Microsoft website and start the file MSASYNC.EXE.

  The following dialog window appears:

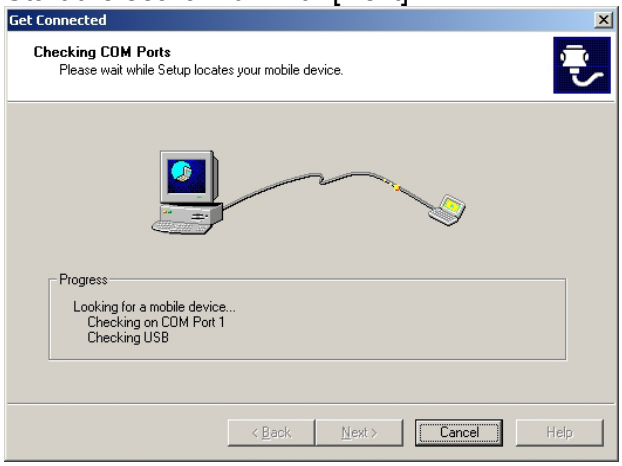


- Start the installation with [Next].
- Choose an installation directory and click on [Next].
  → ActiveSync is installed.

Establish connection

After the installation the dialog window "establish connection" is opened.

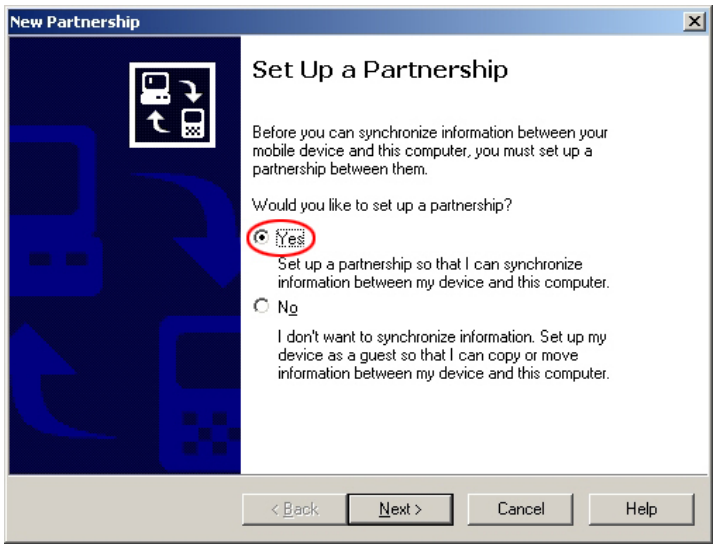
- Start the search run with [Next]:



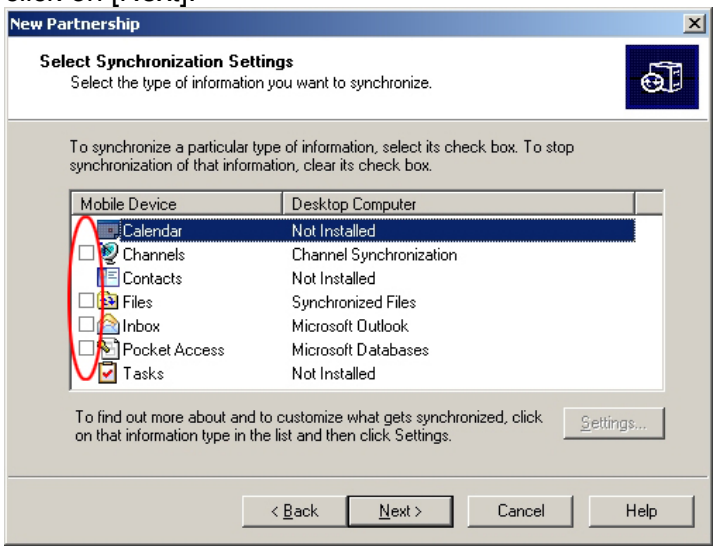
Install partnership for USB communication

Now you may install a "partnership" via an USB connection with the following approach:

- Connect your Touch Panel via the "Device"-USB-B jack to your PC and turn on the Touch Panel. → The USB device (Touch Panel) is recognized and the dialog window "new partnership" opens.



- Choose "yes" for fixing a partnership and push [Next].
- In the now opening window de-activate all synchronization settings and click on [Next]:



- [Finish] establishes the partnership.

Now you may access the Touch Panel with ActiveSync via USB.

Note!

To keep the settings also after power on, you have to store them to the registry with **START** > *Programs* > *KuK_Tools* > *KuK Tools* [Store].

Integrated Server

Login data

The Touch Panel has several integrated server that enable a remote maintenance within a network. Some servers only allow access by means of entering *User name* and *Password*. Per default the following login data are used:

User name: **wince**

Password: **vipatp**

Change password

You must not change the user name. But you may change the password via the registry.

For this, start the editor via **START** > *Programs* > *Registry Editor*. The entry for the password is to be found at:
HKEY_LOCAL_MACHINE/KUKINIT/DefaultPasswd

Please remember to store the changes to the registry via **START** > *Programs* > *KuK Tools* before switching off.

Overview

Per default the following server are integrated:

- ftp server (activated)
- http server (activated)
- Telnet (activated)
- VNC (not activated)

Phrases

Phrases that are used in the description of the server:

Client

A client is an application that uses the service of a server within a network. For example, a web browser is a client because at every call of a website it sends a request to a web server and receives an answer.

Server

A server is an application that waits for the contact request of a client application and exchanges messages with it after contact start. This communication type is called Client-Server communication.

Host

Computer within a network where at least one server is running.

Download

Data transfer Server → Client

Upload

Data transfer Client → Server

ftp server

By means of a ftp server data between client and server can be exchanged. Here you may copy, delete or create files and directories.

Because now a ftp client (Internet Explorer) is integrated in Windows®, this is the easiest method for remote maintenance of the Touch Panel.

Conditions for ftp access

Depending on the ftp client your PC must have the following conditions for a ftp connection. If there are still problems with the ftp access please ask your system administrator.

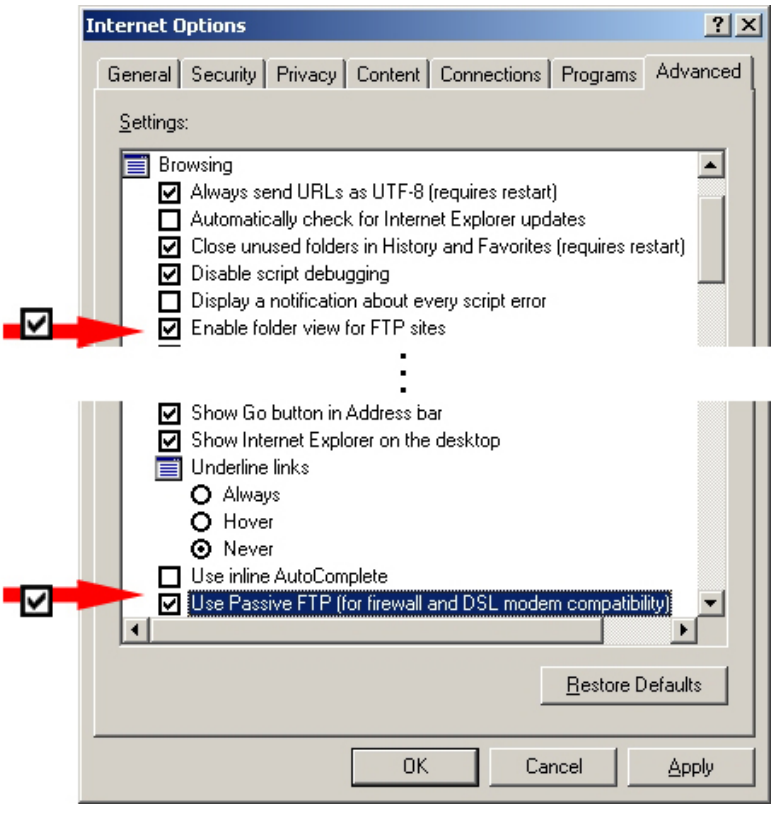
Internet Explorer

- ftp access possible with version 5.5 or higher
- use passive ftp mode
- activate directory view for ftp sites

For the adjustment choose in the Internet Explorer **Options** > *Internet options*, register "extended" in the area "Browsing" and set the following settings:

- activate: "activate directory view for ftp sites"
- activate: "use passive ftp..."

The settings are save when re-starting the Internet Explorer.



Netscape

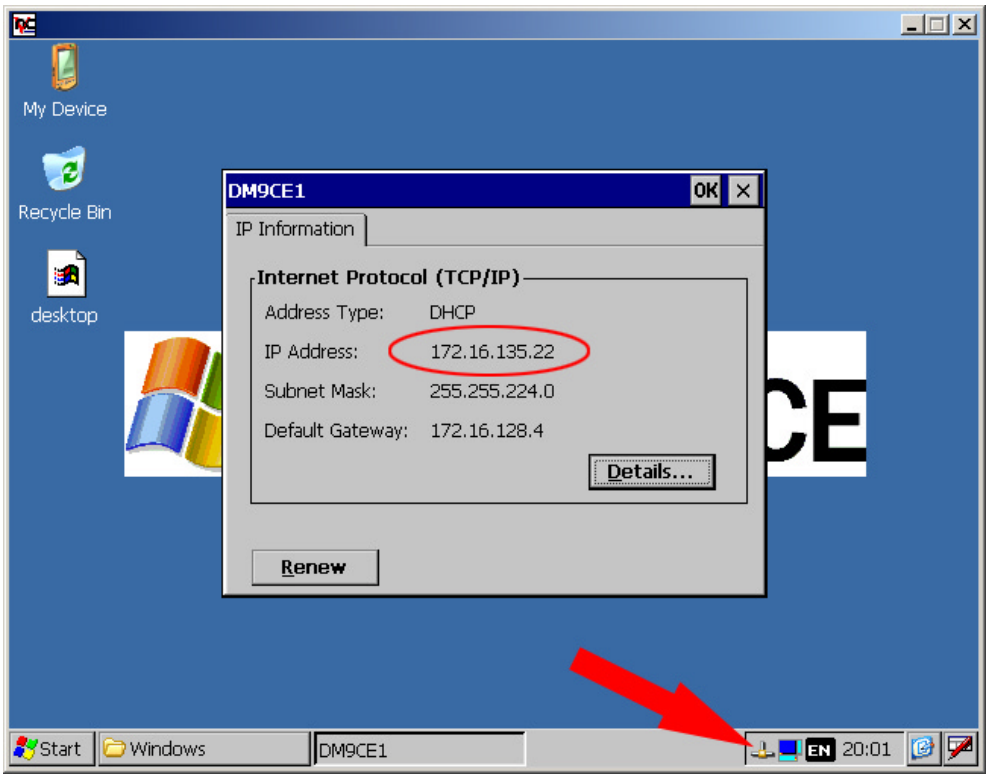
- Ftp access only possible with version 6.0 or higher, you need no other settings.

Establishing a ftp connection

Below is explained, how to establish of a ftp connection between a Windows® based PC (here Windows® 2000) with Internet Explorer as ftp client and your Touch Panel.

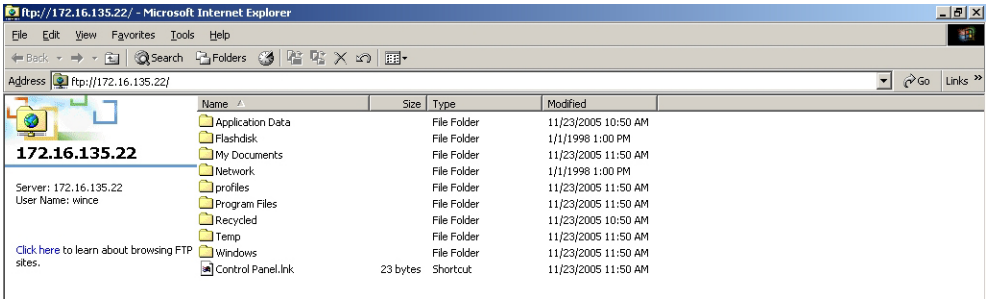
- Connect your Touch Panel with the network where your PC is a member via an Ethernet cable.
- Switch on your Touch Panel.

As soon as your Touch Panel is connected via Ethernet, you may monitor the IP address data via .



- After you've confirmed the pre-settings, start your ftp client and enter the following text into the "address bar":
- `ftp://wince:vipatp@IP-Adresse`

The following window appears:



Here you may execute the requested file operations.

http server

The Touch Panel has an integrated http server (web server) that allows depending on the access the administration of the Touch Panel res. of websites in the Touch Panel. The administrative access to the http server happens via Ethernet from the PC by setting the IP address of the Touch Panel with attached "Admin" type.

Using the websites you may e.g. publish online documentations for a connected PC or go online with applications on the PC.

Web admin

As web admin you have access to all functions that are required for uploading and administrating of websites on the Touch Panel. Additionally you may set the access rights for user and create user groups. More detailed information about creating and administrating of websites on the Touch Panel are available in the online documentation of the web servers.

The login as web admin requires the following steps:

- Start the web browser at your PC and enter the following into the address bar: `IP address/webadmin`
- Enter the following into the authentification:
  User name: **wince**
  Password: **vipatp**

Remember to store your changes permanently in the registry via Start > *Programs* > *KuK Tools* > *KuK Tools* [Store]!

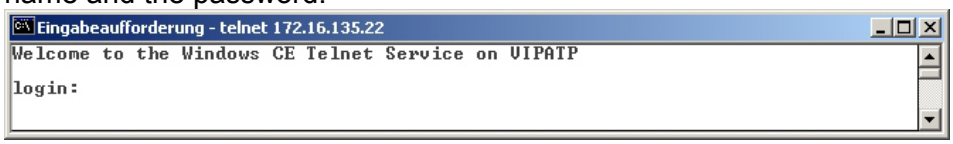
Telnet server

Telnet is a text based client-server protocol on TCP level. Using of a Telnet client like e.g. the "MS-DOS console" in your Windows® operating system you may execute text based all file remote functions at your Touch Panel like copy, delete and create files and directories. You may also start applications. Terminating an application is not possible.

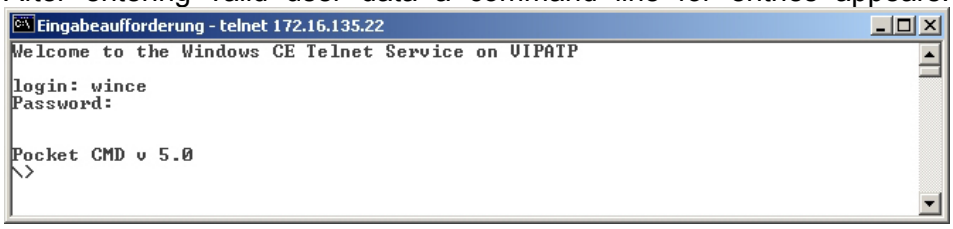
Establishing a Telnet connection

The establishing of a Telnet connection is password protected and has the following approach:

- Start a Telnet client like for example "MS-DOS console" at your PC and enter the following into the address bar:
  `telnet IP address`
  When the connection is established, the Touch Panel asks for the user name and the password.



- Enter the following:
  Login: **wince**
  Password: **vipatp** (entry is hidden)
  After entering valid user data a command line for entries appears:

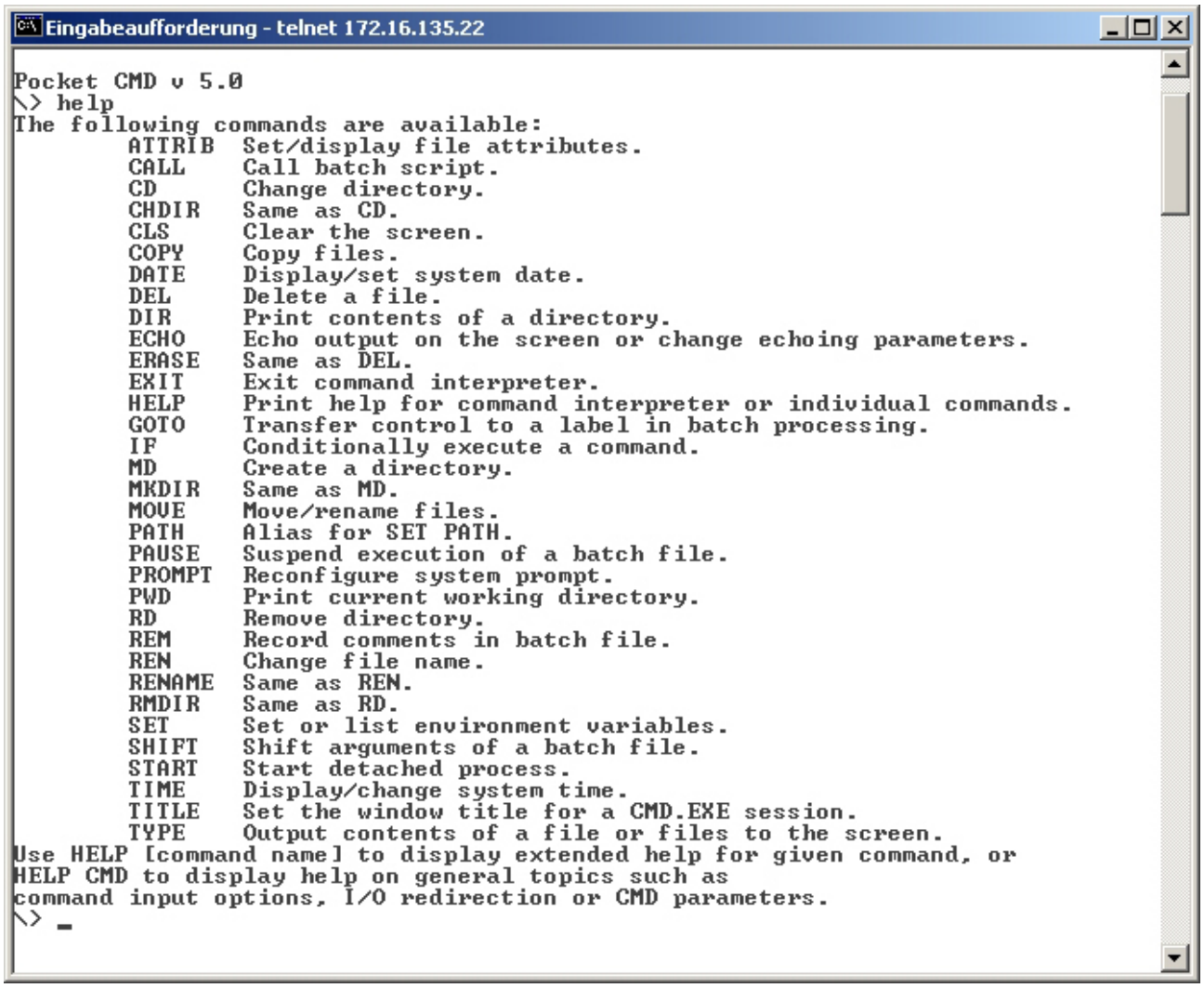


By entering `Exit` res. closing the window you may terminate the Telnet connection at any time.

Commands

After establishment of a Telnet connection the Touch Panel provides you with commands. A list of possible commands with a short description is available via the command `help`.

By beginning with "help" before a command you receive help to this command.



VNC server

The Touch Panel has an integrated VNC server (**v**irtual **n**etwork **c**ontrol) that allows the total control of the Touch Panel with a PC via network. For this, a window displays the current Touch Panel content for remote control. Operation is performed via PC keyboard and mouse. Condition for the VNC communication is, that the VNC server is started on the Touch Panel and a VNC client on the PC. You may download a VNC client as freeware from internet.

Note!

Because you can deactivate all safety attitudes with the VNC server, you should use these exclusively for start-up! For this reason the VNC server is on delivery deactivated.

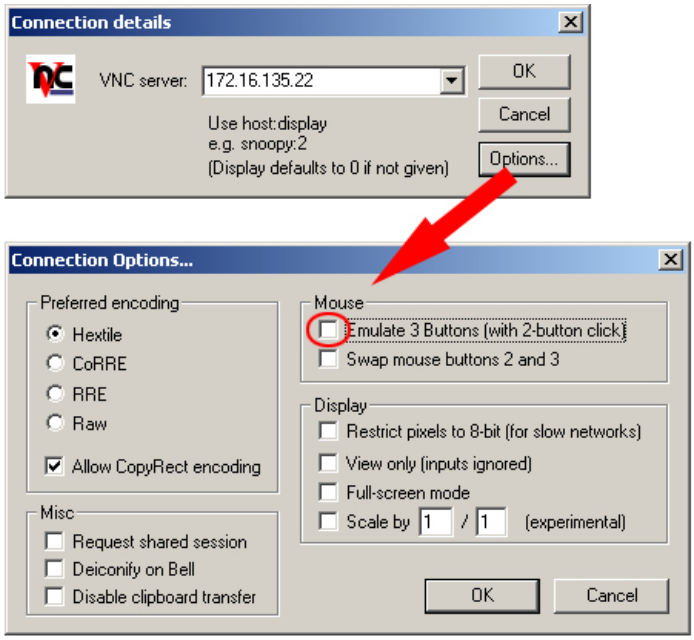
Establishing a VNC connection

The VNC connection establishment has the following approach:

- Click on

and open the "Windows" directory.
- You have to deactivate every option at **View** > *Options* to show the VNC server file.
- Start the VNC server by executing the file winvnc.exe. To show the server has been started the symbol

appears in the task bar. You may also start the VNC server at the Touch Panel via a Telnet connection by entering the command `winvnc` in the command console with an active Telnet connection.
- Now start the VNC client vncviewer.exe on your PC.
- Click on [Options] and deactivate the field "Emulate 3 Buttons..." like shown at *Mouse*.



- Enter the IP address of the Touch Panel at *VNC server*. Click on [OK] and enter the password vipatp. You can change the password over the configuration file, for this execute vncconfig.exe. Now a VNC connection is established and the screen content of the Touch Panel is monitored within a window.

Closing the VNC window terminates the VNC connection, the server keeps running.

Access to the network resources

Overview

The Touch Panel allows you to access shared resources in a Microsoft network like drives and printer. Here you may assign existing public directories or printer in the network to local directories or printer in the Touch Panel.

Condition for this is that you are logged in to the network with your user name and password.

The assignment of a network resource is performed in the Touch Panel via the command console "Command Prompt". Start the command console with **START** > *Programs* > *Command Prompt.*

The access to the network resource is performed with the commands *Net view* and *Net use*.

List released resources

Shared resources of a network PC can be listed by the command: \> **net view *PC-Name***

For example **net view testserver** lists all shared resources of the network PC "test server". To test the physical connection a PING to the IP address of the network PC may be executed if there are problems while contacting the network PC.

```
\> net view testserver
Shared resources on \\testserver:

Share name       Type   Used as          Comment
-------------------------------------------------------------
Archive           Disk   (null)           Process data
KyoEDV           Print  (null)           Kyocera FS-680 Printer
Command completed successfully
\>
```

Connect net drive

The connection of a local name at the Touch Panel with a shared drive of the network PC happens with the following approach:

- Enter the following in the command prompt:
  \> **net use *local_name* *network drive* /user:*User name***
- Enter *user name, password* and where app. *user group.*

After successful login the following message appears:
`Successfully mapped to` *network name*.

The connected network drive is then available on the Touch Panel with the *local name* via *My Device* at *Network.*

Example:

Local_Name: data, network drive: testserver\archive, User name:gast

Entry: \> **net use data \\testserver\archive /user:gast**

The connected network drive is then available via \network\data at the Touch Panel.

Configure network printer

The configuration of a network printer happens with the following approach:

- Enter this command into the command prompt:
  \> **net use *printer name network printer***

  Example:
  Printer name: Printer, network printer: \\testserver\printer
  Entry: \> **net use printer \\testserver\printer**

- Enter *user name, password* and if necessary *user group*.

After the successful login the following message appears
`Successfully mapped to network printer`
The printer may now be accessed as "network\printer".

Test print

For example you may print the content of the current directory using \> **dir > network\printer**.

List network connections

The listing command for all network connections of your Touch Panel is
\> **net use**

```
\> net use
Connected resources:

Status        Local Name             Remote Name
-------------------------------------------------------------------
Connected     data                   \\testserver\archiv
Connected     printer                \\testserver\printer
Command completed successfully
\>
```

Terminate network connections

You may terminate already assigned network resources via
\> **net use local_name /d**
Example: \> **net use data /d** deletes the network connection to the drive "archive" of "test server".

Note!
To save the settings also after power on, you have to store them to the registry with **START** > *Programs* > *KuK_Tools* > *KuK Tools* [Store].

Firmware update

Overview

You may execute a firmware update via SD, CF card or USB stick. The latest firmware versions may be found in the service area at www.vipa.de.

Attention!

When installing a new firmware you have to be extremely careful. Under certain circumstances you may destroy the Touch Panel, for example if the voltage supply is interrupted during transfer or if the firmware file is defective. In this case, please call the VIPA Panel Support! Please note that the firmware to be transferred is not checked by the Touch Panel. Please always use the firmware from the VIPA website for exact this Touch Panel.

Please only use storage media, which are tested and approved by VIPA GmbH.

Proceeding

- Go to www.vipa.de.
- Click at Service / Support > Downloads > Firmware and navigate via "HMI" to the firmware for your Touch Panel.
- Transfer the files to your PC.
- Copy the os file to your storage medium.
- Unzip the zip file with directory structure to your storage medium.
- Switch-on the power supply of your Touch Panel and plug in the external storage medium.
- After the panel start-up navigate to your storage medium and execute the os file. Now will be checked, whether the image is valid for the panel. If it is valid, the update is executed. When the update is finished (after max. 8min.) the panel restarts automatically with the new firmware.
- Perform a re-calibration of the touch screen and save your settings with the KuK Tools via **Start** > *Programs* > *KuK_Tools* > *KuK Tools* [Store]. More concerning the calibration may be found at "System settings" of the Windows® CE description.
- Copy the content of the zip file into the root of the internal SD card of the VIPA panel (\SDMMC Card).

Note!

If the Touch Panel does not start-up after firmware update you should contact the VIPA Panel Support.

Chapter 3 Installation Guidelines

Overview

The chapter "Installation Guidelines" gives you information about the interference-free installation of Programmable Logic Controls (PLC) together with a Touch Panel.

Here we describe possible paths how interference can enter the controller, how you ensure the electromagnetic compatibility (EMC) and how to approach shielding and screening issues.

Content

Topic	Page
Chapter 3 Installation Guidelines	**3-1**
Basic rules for the EMC-equitable assembly of installations	3-2
EMC-equitable assembly	3-6
EMC-equitable cabling	3-7
Special precautions providing high noise immunity	3-11
Checklist for the EMC-compliant installation of controllers	3-12

Basic rules for the EMC-equitable assembly of installations

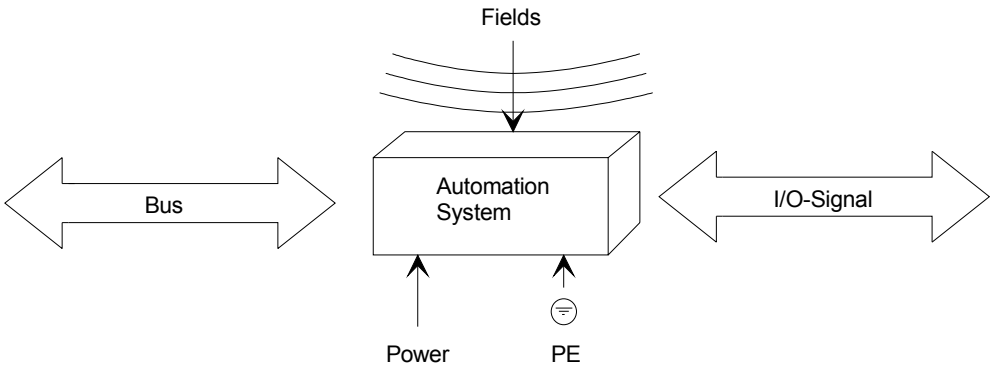
What is EMC?

The term electromagnetic compatibility (EMC) refers to the ability of an electrical device to operate properly in an electromagnetic environment without interference from the environment or without the device causing illegal interference to the environment.

The Operation Panels are developed for applications in harsh industrial environments and complies with EMC requirements to a large degree. In spite of this you should implement an EMC strategy before installing any components, which should include any possible source of interference.

Possible sources for disturbances

Electromagnetic interference can enter your system in many different ways:



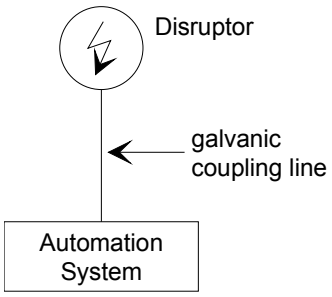
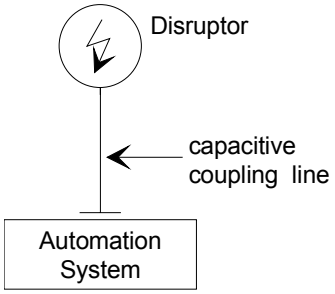
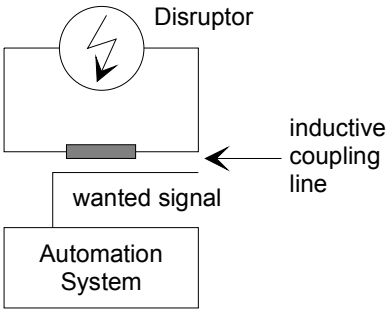
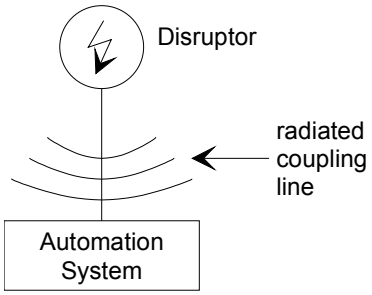
Interference is coupled into your system in different ways, depending in the propagation medium (conducted or not conducted) and the distance to the interference source.

We differentiate between:

- galvanic coupling
- capacitate coupling
- inductive coupling
- radiated power coupling

Coupling mechanisms and interference sources

The following table shows the four different coupling mechanisms, their causes and possible interference sources.

Coupling mechanism	Cause	Typical source
Galvanic coupling 	Galvanic or metallic coupling always occurs, when two current circuits have a common line.	• Pulsed devices (Net influence from transducers and foreign net devices) • Starting motors • Different potential of component cubicles with common current supply • Static discharges
Capacitate coupling 	Capacitate or electric coupling occurs between conductors with different potential. The coupling is proportionate to the temporal change of the voltage.	• Interference through parallel signal lines • Static discharge of the personnel • Contactors
Inductive coupling 	Inductive or magnetic coupling occurs between two current active line loops. The magnetic flows associated with the currents induct interference voltages. The coupling is proportional to the time related change of the current.	• Transducers, motors, electric welding devices • Parallel net cables • Cables with toggled currents • Signal cable with high frequency • Unused coils
Radiate power coupling 	One talks of radiate power coupling, when an electro-magnetic wave meets a line circuit. The hit of the wave inducts currents and voltages.	• Sender in the neighborhood (e.g. walkie-talkie) • Sparking lines (sparking plugs, collector of electric motors, welding devices)

Basic rules for ensuring EMC

In many cases, the adherence to some very elementary rules is sufficient to ensure EMC. For this reason we wish to advise you to heed the following rules:

During the installation of your automation units you should ensure that any inactive metal components are grounded via a proper large-surface earth!

- Interconnect any inactive metal components via low-impedance conductors with a large cross-sectional area.
- Execute screw connections at coated and anodized metal parts either with special contact washer or remove the isolating protective film.
- Install a central connection between the chassis ground and the earthing/protection system.

Ensure that cabling is routed properly during installation!

- Divide the cabling into different cable groups
  (High voltage lines, power supply lines, signal lines, data lines).
- Always install high voltage lines and signal or data lines in separate channels or bundles.
- Install signal and data lines as close as possible to any metallic ground surfaces (e.g. frames, metal rails, sheet metal).

Ensure that the screening of lines is grounded properly!

- Data lines must be screened. The screen has to be laid both-sided.
- Analog lines must be screened. Where low-amplitude signals are transferred it may be advisable to connect the screen on one side of the cable only.
- Attach the screening of cables to the ground rail by means of large-surface connectors located as close as possible to the point of entry. Fix the cables mechanically by means of cable clamps. Route the connected screen to the modules without interruptions, but don't connect the screen again.
- Ensure that the ground rail has a low-impedance connection to the cabinet/cubicle.
- Use only metallic or metallic covers for the plugs of screened data lines.

In critical cases you should implement special EMC measures!

- Connect snubber networks to all inductive loads that are not controlled by special EMC modules.
- Use incandescent lamps for illumination purposes inside cabinets or cubicles, do not use of fluorescent lamps.

Create a single reference potential and ensure that all electrical equipment is grounded wherever possible!

- Ensure that grounding measures are implemented effectively. The controllers are earthend to provide protection and for functional reasons.
- Provide a star-shaped connection between the plant, cabinets/cubicles and the grounding/ protection system. In this way you can avoid ground loops.
- Where potential differences exist, you must install sufficiently large equipotent bonding conductors between the different parts of the plant.

EMC-equitable assembly

Mostly, measures for suppressing interference voltages are only taken, when the control is already in commission and the perfect receive of a wanted signal is disturbed.

Causes for such interference's are in the most cases inadequate reference potentials, coming from mistakes at the device assembly and installation.

Guidelines for assembling and grounding of inactive metal parts

When assembling the devices, you have to ensure the large-surface grounding of the inactive metal parts. A correctly done grounding supports an unambiguous reference potential for the control and reduces the impact of coupled interferences.

Grounding means the conducting connection of all inactive metal parts. The sum of all interconnected inactive parts is called ground.

Inactive parts are all conductive parts electrically separated from all active parts by means of a basic isolation and that may only get voltage in case of an error.

The ground must not adopt dangerous contact voltage even in case of an error. Thus you have to connect the ground with the protected earth conductor. To avoid ground loops, local distant ground constructions (cubicles, construction and machine parts) have to be connected with the protected earth conductor system in star-topology.

Please regard at grounding:

- Connect the inactive metal parts as carefully as the active ones.
- Take care of impedance-low metal-metal-connections, e.g. with large-surface and well conductive contacts.
- If you include coated or anodized metal parts in the grounding, you have to come through the isolating protection layers. For this you may use special contact washers or remove the isolation layer.
- Protect the connection points from corrosion, e.g. with grease.
- Moveable grounding parts (e.g. cubicle doors) have to be connected via flexible ground strips. The ground strips should be short and have a large surface, because the surface is decisive for the diversion of high frequency interferences.

EMC-equitable cabling

Line routing

Content of this section is the line routing of bus, signal and supply lines. Object of the line routing is to suppress the "slurring" at parallel lines.

Line routing inside and outside of cubicles

For an EMC-equitable routing of the lines it is convenient to divide the cables in different groups and install each group itself:

Group A

- screened bus and data lines
- screened analog lines
- unshielded lines for direct voltage ≤ 60V
- unshielded lines for alternating voltage ≤ 25V
- Coaxial cables for monitors

Group B

- unshielded lines for direct voltage >60V and ≤400V
- unshielded lines for alternating voltage >25V and ≤400V

Group C

- unshielded lines for direct and alternating voltage >400V

Group D

- Lines for H1 respectively TCP/IP

Combination of groups

Following the table you may see the conditions for the cabling of the line groups by combining the single groups:

	Group A	Group B	Group C	Group D
Group A	[1]	[2]	[3]	[4]
Group B	[2]	[1]	[3]	[4]
Group C	[3]	[3]	[1]	[4]
Group D	[4]	[4]	[4]	[1]

[1]	The lines may be installed in common bundles or cable trusses.
[2]	The lines have to be installed in different bundles or cable trusses (without min. distance).
[3]	The lines have to be installed in different bundles or cable trusses inside of cubicles and outside of the cubicle but inside the building in separated cable trusses with a min. distance of 10cm.
[4]	The lines have to be installed in different bundles or cable trusses with a min. distance of 50cm.

Line routing outside of buildings

Wherever possible, exterior cabling should be installed on metallic cable trays. A galvanic connection must be provided for joints between cable trays.

You must abide by the applicable lightning protection and grounding regulations when installing exterior cables.

Lightning protection

Attention!

Where cables and signal lines for PLC equipment are installed outside of buildings, the conditions for internal and external lightning protection must be satisfied.

- Exterior lines should either be installed in metallic conduit pipes that is grounded on both ends or in steel-reinforced concrete cable trunks with continuously connected reinforcing.
- Signal lines should be protected against overvoltage by varistors or by lightning arrester filled with rare gas.
- Install these protective elements at the location where the cables enter the building.

Note!

Any lightning protection system must be based on an individual assessment of the entire plant. For questions please contact VIPA GmbH.

Equipotential bonding

Potential differences can occur between different sections when controllers and peripheral equipment are connected by means of non-isolated connections or the screens of screened cables are connected at both ends and grounded on different sections of the plant.

One reason for a potential difference can be that different sections of the plant are powered from different power sources. These potential differences must be reduced by means of equipotential bonding conductors to ensure that the electronic equipment employed on the plant operates properly.

Rules for equipotential bonding

- The lower the impedance of the equipotential bonding conductor, the higher the effectiveness of potential equalization.
- The impedance of the equipotential bonding conductor must not exceed 10% of the impedance of the screen where screened signal lines are connected between the different sections of the plant and the screening is connected to ground/neutral on both sides.
- The cross-sectional area of the equipotential bonding conductor must be calculated to carry the maximum equalization current. The following cross-sections have been successfully employed:
  - $16mm^2$ Cu for equipotential bonding conductors up to 200m
  - $25mm^2$ Cu for equipotential bonding conductors exceeding 200m.
- Use copper or galvanized steel for equipotential bonding conductors. These must be connected to ground/neutral by means of large-surface connections that are protected from corrosion.
- The equipotential bonding conductor should be installed in such a manner that it includes the smallest surface between the bonding conductor and the signal lines.

Screening of lines and cables

Screening is one method commonly used to reduce (attenuate) the interference pick-up from magnetic, electrical or electromagnetic fields.

- Interference on screens is conducted to ground by the conductive connection between the screen and the screening rain/enclosure. To avoid interference from these currents it is very important that the neutral connection is a low-impedance connection.
- You should only use cables that are provided with a braided screen. The degree of screening should be more than 80%.
- Avoid cables with foil-type screens as the foil can be easily damaged by tension and pressure at the point of attachment; this can result in reduced effectiveness of the screening action.
- As a rule you should always ground the screens of cables on both ends. This is the only way in which you can ensure that high frequency interference is attenuated properly.

One-sided grounding of screens

In exceptional cases it may be necessary to ground the screen on one side only. However, this will only attenuate the lowest frequencies. The one-sided grounding of screens may provide advantages when:

- It is not possible to install an equipotential bonding conductor
- Analogue signals (a few mV or µA) must be transmitted
- Foil-type screening (static screening) is employed.

You should always use metallic or metalized covers for serial data lines. Connect the screen of the data line to the cover. Do **not** connect the screen to PIN 1 of the connector!

In case of stationary operations it is recommended that the remove the insulation from the screened cable without cutting the screen and to attach this point to the screening/neutral rail.

Note!

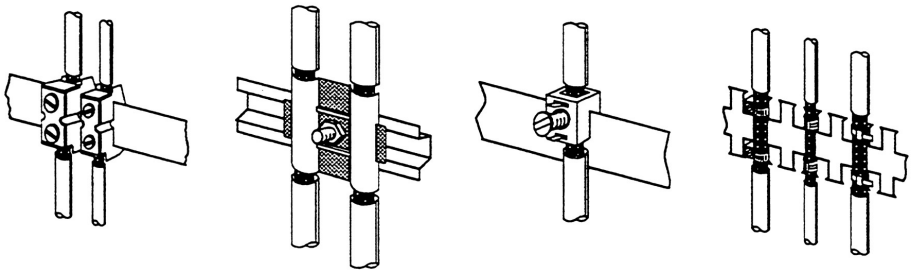
Potential differences can give rise to an equalization current via the screen connected between the two ground connections.

In this case you must install an additional equipotential bonding conductor.

Connecting the screen

Please observe the following points when you handle the screens:

- Use only metallic cable clamps when connecting the screening of cables. These clamps must provide a good electrical contact and a large-surface connection to the screen.
- Attach the screens to the screening rail directly at the point where the cables enter the enclosure.
  The screening conductor must be continued to the module without interruption, however, it must not be connected to the module!



Special precautions providing high noise immunity

Inductors require snubber networks

Inductors controlled by your programmable controller (e.g. contactors and relays) do not normally require additional snubber networks or suppressors as the respective modules have been provided with the required components.

Equipotential bonding

Snubber networks must only be connected to inductors when output circuits can be disabled by means of additional contacts (e.g. relay contacts). In this case the integrated suppressors on the module are also disabled.

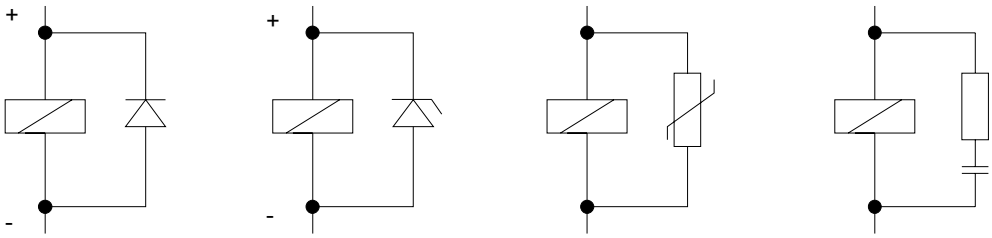
You can connect diodes to suppress back-emc, varistors or RC-networks to the inductors.

Connections of DC-activated inductors

using a diode using a Z-diode

Connections of AC-activated inductors

using a varistor using RC-network



Power outlet for PGs

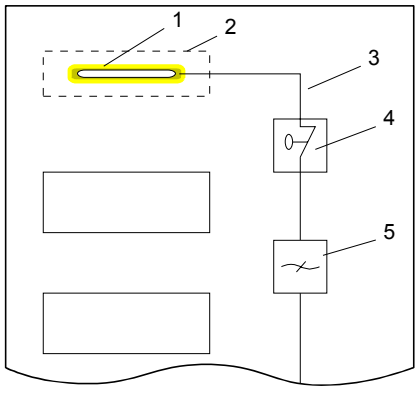
Every cubicle must be provided with a power outlet for the PU. These outlets must be wired to the distribution system, which is also used to connect the neutral conductor for the cubicle.

Cubicle illumination

The cubicle illumination should consist of incandescent lights, e.g. LINESTRA-lamps. Avoid using fluorescent lamps as these lamps can cause interference.

If you can not avoid using fluorescent lamps you should implement the steps outlined in the following figure.

Suppression of fluorescent lamps in cubicles



[1] Fluorescent lamp

[2] Screen above the lamp

[3] Screened cable

[4] Switch with metallic cover

[5] Line filter or screened power cable

Checklist for the EMC-compliant installation of controllers

EMV-measures	Space for Notes
Connection of the inactive parts	
You should take special care to check the connections of: • Module racks • Frames • Screen and protected earth conductor	
Are all the inactive metal parts interconnected by means of large-surface and low-impedance connections?	
Has a proper connection been installed with respect to the ground/protected earth conductor system?	
Has the isolation been removed from varnished and anodized surfaces or have these connections been fitted with special contact washer?	
Have the connection been protected from corrosion, e.g. by means of grease?	
Have doors been grounded by means of grounding straps connected to the body of the cubicle?	
Cable routing	
Cabling divided into groups?	
Power cables (230 ... 400V) and signal lines installed in separate channels or bunches?	
Potential compensating	
When installing the equipment at separate locations, check the installation of the potential compensating line.	
Cable screen	
All covers of plugs are metallic?	
All analog and data lines installed screened?	
Line screens attached to the screening or the protected earth conductor?	
Have the screens been connected by means of large-surface and low-impedance cable clamps?	
Cable screens grounded both-sided where possible?	
Inductors	
Have the coils of contactors controlled by means of contacts been connected to snubber networks?	