COMBICONTROL

C6

Instruction Manual

C6 HMI / C6 HMI LC

Document	Part	Version
20125246	GBR	00

Content

SECTION **1**

Introductory Information

1.1 General notes

a) The information in this manual is subject to change and is in no way binding upon KEB.

b) KEB is not responsible for technical errors or other omissions in the manual, and shall not accept any responsibility deriving from its use.

1.2 Trademarks

a) All brands and product names mentioned in this manual are trademarks of their respective owners.

1.3 Instructions on disposal

IT

- Il simbolo sul prodotto o sulla confezione indica che il prodotto non deve essere considerato come un normale rifiuto domestico, ma deve essere portato nel punto di raccolta appropriato per il riciclaggio di apparecchiature elettriche ed elettroniche. Provvedendo a smaltire questo prodotto in modo appropriato, si contribuisce a evitare potenziali conseguenze negative per l'ambiente e la salute, che potrebbero derivare da uno smaltimento inadeguato del prodotto. Per informazioni più dettagliate sul riciclaggio di questo prodotto, contattare l'ufficio comunale, il servizio locale di smaltimento rifiuti o il fornitore da cui è stato acquistato il prodotto.

EN

- The symbol on the product or in its packaging indicates that this product may not be treated as household waste. Instead it shall be handed over the applicable collection point for the recycling of electrical and electronic equipment. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product. For more detailed information about recycling of this product, please contact your local city office, your household waste disposal service or the supplier where you purchased the product.

FR

- Le symbole sur le produit ou son emballage indique que ce produit ne peut être traitè comme décher ménager. It doit être remis au point de collecte dèdié à cet effect (collect et recyclage du matèriel èlectrique et èlectronique). En procèdant à la mise à la casse règlementaire de l'appareil, nous prèservons l'environnement et notre sécurité, s'assurant ainsi que les dèchets seront traitès dans des conditions appropriées. Pour obtenir plus de dètails sur le recyclage de ce produit, veuillez prendre contact avec les services de votre commune ou le distributeur où vous avez effectué l'achat.

DE

- Das Symbol auf dem Produkt oder seiner Verpackung weist darauf hin, dass dieses Produkt nicht als normaler Haushaltsabfall zu behandeln ist, sondern an einem Sammelpunkt für das Recycling von elektrischen und elektronischen Geräten abgegeben werden muss. Durch ihren Beitrag zum korrekten Entsorgen dieses Produkts schützen Sie die Umwelt und die Gesundheit Ihrer Mitmenschen. Umwelt und Gesundheit werden durch falsches Entsorgen gefährdet. Weitere Informationen über das Recycling dieses Produkts erhalten Sie von Ihrem Rathaus, Ihrer Müllabfuhr oder den Distributoren, in dem Sie das Produkt gekauft haben.

ES

- El simbolo en el producto o en su embalaje indica que este producto no se puede tratar como desperdicios normales del hogar. Este producto se debe entregar al punto de recolección de equipos eléctricos y electrónicos para reciclaje. Al asegurarse de que este producto se deseche correctamente, usted ayudará a evitar posibles consequencias negativas para el ambiente y la salud pública, lo qual podria ocurrir si este producto no se manípula de forma adecuada. Para obtener informaciónes mas detalladas sobre el reciclaje de este producto, póngase en contacto con la adMinistraciòn de su ciudad, con su servicio de desechos del hogar o con el surtidor donde comprò el producto.

PT

- simbolo no produto ou na embalagem indica que este producto não pode ser tratado como lixo doméstico. Em vez disso, deve ser entregueado ao centro de recolha selectiva para a reciclagem de equipamento electrico e electronico. Ao garantir uma eliminação adequada deste produto, ira ajudar a evitar eventuais consequencjas negativas para o meio ambiente e para a saude publica, que, de outra forma, poderiam ser provocadas por un tratamento incorrecto do produto. Para obtener informações mais detalhadas sobre a reciclagem deste produto, contacte os serviços municipalizados locais, o centro de recolha selectiva da sua area de residência ou no distribuidor onde adquirir ou produto.

1.4 Description of safety symbols

Danger	This symbol indicates a danger to life or health of personnel.
Attention	This symbol indicates a danger to the hardware and / or the environment.
Note	This symbol indicates an additional information meant to provide a better understanding.

1.5 Qualified Personnel

a) C6 HMI / C6 HMI LC may be operated only by personnel qualified for the specific task in accordance with the relevant documentation for the specific task, in particular its warning notices and safety instructions.
b) Qualified personnel are those who, based on their training and experience, are able to identify risks and avoid potential hazards when working with these systems.

1.6 Basic knowledge required

a) To understand operating instructions a general knowledge of automation technology is needed.
b) Knowledge of personal computers and the Microsoft operating system is required to understand this user's guide.

1.7 Proper use of the product

a) KEB products may only be used for the applications described in the catalogue and in the technical documentation.
b) If products and components from other manufacturers are used, these must be approved by KEB.
c) Proper transport, assembly, installation, storage, commissioning, operation and maintenance are required to ensure that the product operates safely.
d) The indicated environmental conditions must be observed.
e) The information in this user's manual must be observed.

1.8 Purpose of the user's guide

a) This user's manual contains information based on the requirements defined by DIN EN 62079 for mechanical engineering documentation.
b) These operating instructions are intended for:
    1. Users
    2. Commissioning engineers
    3. Maintenance personnel
c) Pay attention at the information in the chapter "Safety instructions".
d) More information such as operating instructions, examples and reference information, are available in the online help of COMBIVIS studio HMI and COMBIVIS connect.

1.9 The manual is a part of the system

a) This user's guide belongs to C6 HMI / C6 HMI LC and is also required for commissioning.
b) Keep all supplied documentation for the entire service life of C6 HMI / C6 HMI LC.

1.10 Figures

a) This manual contains illustrations of the described devices.
b) Some details of the illustrations may differ from the device provided.

1.11 Scope of the operating instructions

c) The operating instructions apply to the C6 HMI / C6 HMI LC family devices in conjunction with the COMBIVIS studio HMI software. The devices are the following:

C6 HMI	5.7”	Full aluminum front panel
	7.0”W	
	8.4”	
	10.1”W	
	10.4”	
	12.1”	
	12.1”W	
	15.0”	
	15.6”W	
C6 HMI LC	5.7”	Full aluminum front panel
	7.0”W	
	8.4”	
	10.1”W	
	10.4”	
	12.1”	
	12.1”W	
	15.0”	
	15.6”W	

1.12 Safety instructions

1.12.1 Installation according to the instructions

- Commissioning the device is prohibited until it has been absolutely ensured that the system in which the device is to be installed complies with all the applicable EU and international regulation.

1.12.2 Working on the control cabinet

- **Open equipment**
  The device is open equipment. This means that the C6 HMI / C6 HMI LC may only be integrated in housings or cabinets, where it can be operated from the front panel. The cabinet in which C6 HMI / C6 HMI LC is installed may only be accessed with a key or tool and only by trained and authorized personnel.
- **Dangerous voltage**
  Opening the cabinet may expose high voltage parts. Before opening the cabinet always disconnect the power.

1.13 Notes about usage

- C6 HMI / C6 HMI LC is approved for indoor use only.
- C6 HMI / C6 HMI LC may be damaged if operated outdoors.

1.14 Applicable standard

Please refer to section 8 for details about the relevant standards.

SECTION **2**

Description

2.1 Product description

The C6 HMI family is the HMI solution with RISC architecture that allows running COMBIVIS studio HMI and COMBIVIS connect software platforms.
The C6 HMI LC family is the HMI & Control solution that integrates the COMBIVIS studio HMI visualization software and the CONTROL Basic Runtime integrating in one single product both the visualization and the process control part.

Based on ARM Cortex A8 processor and Microsoft Windows Embedded Compact 7 (C7P) operating system, C6 HMI/C6 HMI LC are available in BASIC or ADVANCED version according to COMBIVIS studio HMI runtime installed. The CONTROL Basic Runtime license is of one unique type and enables all the features at ones except for the CONTROL PRO Runtime which is not supported.

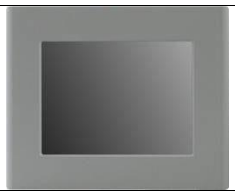
2.2 Key features

KEY FEATURES	C6 HMI	C6 HMI LC
O.S. Microsoft Windows Embedded Compact 7 (C7P) installed on flash memory.	X	X
KEB COMBIVIS studio HMI Runtime	X	X
KEB COMBIVIS connect Runtime	X	X
CONTROL Runtime V3.x CONTROL PRO Runtime NOT supported	-	X
CPU ARM CORTEX A8 architecture	X	X
Multiple mass memories support: • NAND: write security memory used to store O.S. and HMI executables • eMMC: fast access memory used for some applications (e.g. CONTROL Runtime) and user data • SD (socket): removable memory	X	X
Frontal IP 66	X	X
Micro UPS	Option	X

2.3 Package

C6 HMI / C6 HMI LC package consists of:

Table 1 Package

C6 HMI / C6 HMI LC system	
Quick Installation guide	
n.10 Clamps with grub screw (depending on the LCD size)	
n.1 hex key 1.5mm	
n.1 Power supply plug	

2.4 Configuration

The following figures show the various configurations.

2.4.1 C6 HMI/C6 HMI LC (full aluminium front panel)

Figure 1
C6 HMI / C6 HMI LC 5.7”

C6 HMI	4.3”	Full aluminium front panel
	5.7”	
	7.0“W	
	8.4”	
	10.1”W	
	10.4”	
	12.1”	
	12.1”W	
	15.0”	
	15.6”W	

C6 HMI LC	5.7”	Full aluminium front panel
	7.0“W	
	8.4”	
	10.1”W	
	10.4”	
	12.1”	
	12.1”W	
	15.0”	
	15.6”W	

2.5 Front view

2.5.1 Full aluminium front panel

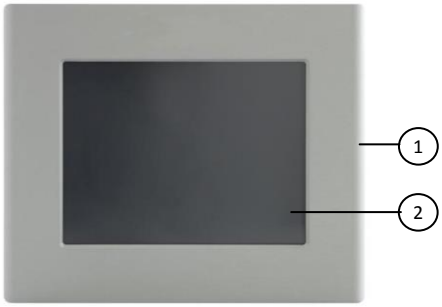


Figure 2
Full aluminium front panel detail

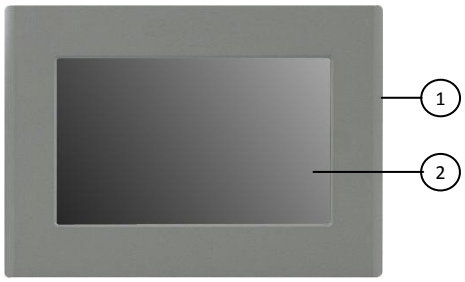
1 Full aluminium front panel
2 Touchscreen-Display

2.5.2 Widescreen

In the C6 HMI / C6 HMI LC family the systems with 5.7", 8.4", 10.4", 12.1", 15.0" display have a 4:3 aspect ratio, whereas the systems with 4.3", 7.0”W, 10.1”W, 12.1”W and 15.6"W display have a aspect ratio of 15:9 or 16:9.
The 7.0" display provides 25% more surface than the smaller 5.7" size.

2.5.2.1 Widescreen full aluminium front panel

Figure 3
Full aluminium front panel detail



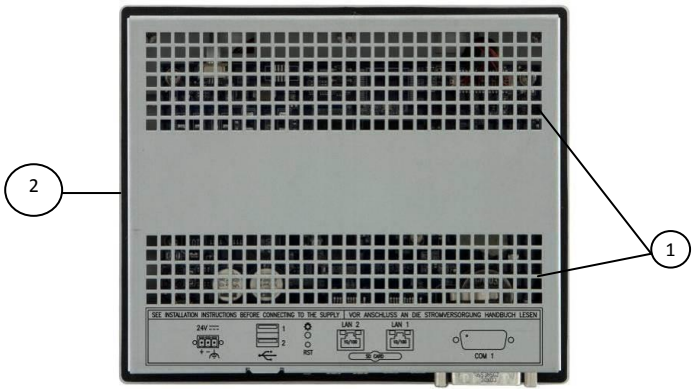
1 Frame
2 Touchscreen-Display

2.6 Rear view

Figure 4
C6 HMI 4.3" rear view

1 Ventilation holes
2 Mounting seal

Figure 5
C6 HMI / C6 HMI LC 5.7" rear view



Note: rear panels may be different depending on display size.

1 Ventilation holes
2 Mounting seal

Figure 6
C6 HMI / C6 HMI LC 7.0" rear view

Note: the user manual refers to HMI 5.7" version. Other versions will be discussed only when necessary.

1 Ventilation holes
2 Mounting seal

Figure 7
C6 HMI / C6 HMI LC 8.4” rear view

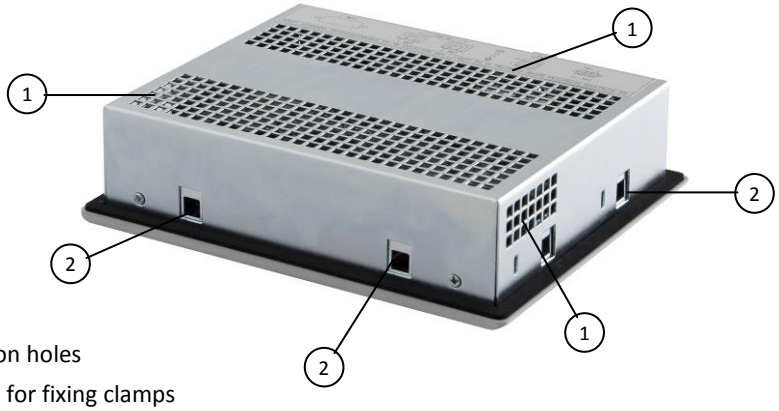
1 Aeration holes
2 Mounting seal

2.7 Side view

Figure 8
C6 HMI 4.3" side view

1 Aeration holes

Figure 9
C6 HMI 4.3" side view

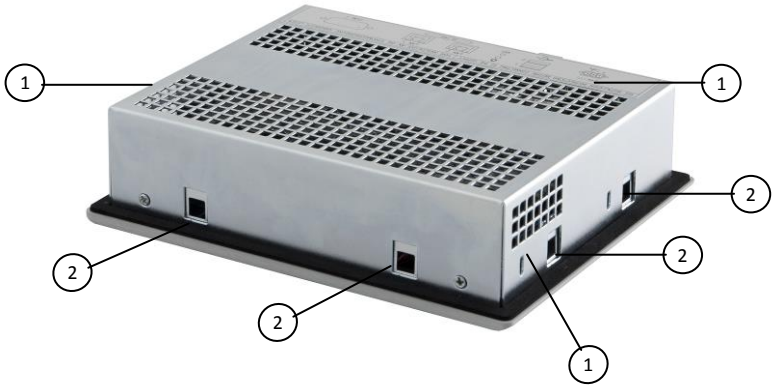


1 Aeration holes
2 Recess for fixing clamps

Figure 10
C6 HMI / C6 HMI LC 5.7" side view

1 Aeration holes
2 Recess for fixing clamps

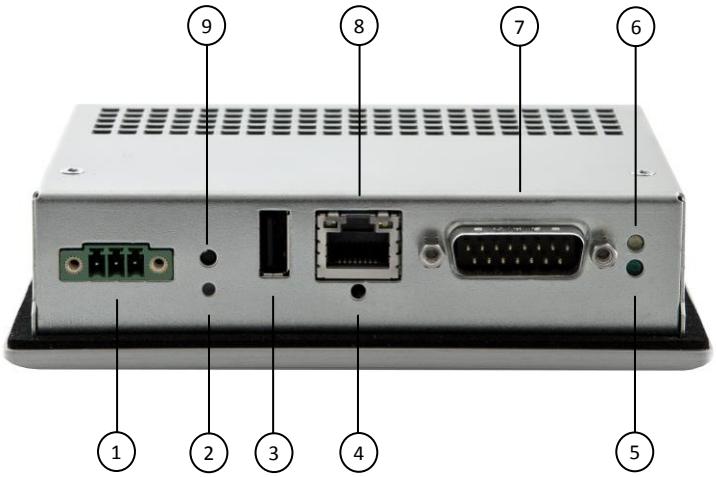
Figure 11
C6 HMI / C6 HMI LC 5.7" side view



1 Aeration holes
2 Recess for fixing clamps

2.8 Connection overview C6 HMI 4.3”

Figure 12
C6 HMI 4.3” connectors

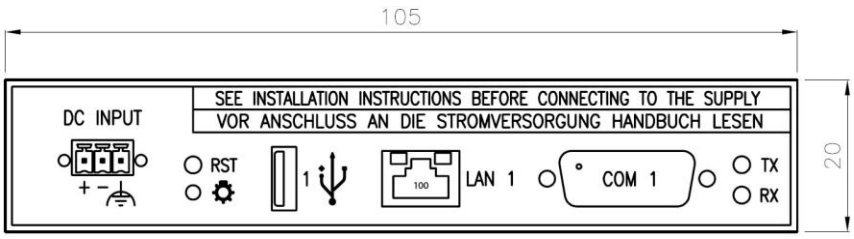


1	DC supply unit	6	COM TX LED
2	Power on LED	7	COM 1 (RS232/422/485/MPI)
3	USB1 (2.0)	8	LAN1 (100 Mbit/s)
4	Buzzer	9	Reset button
5	COM RX LED		

2.8.1 Labels

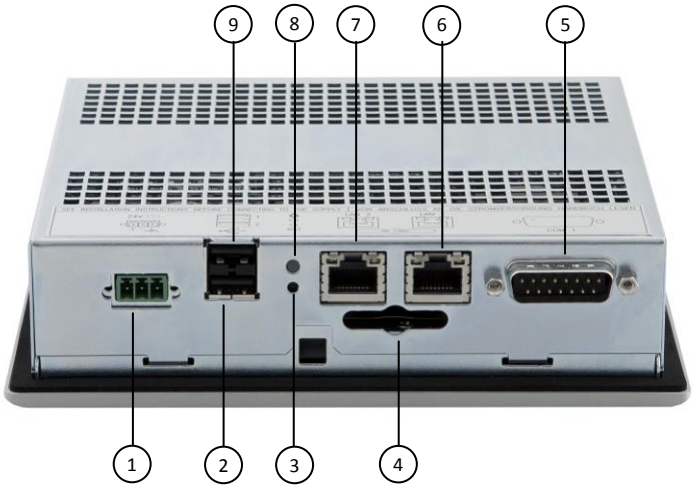
On the rear panel are present the following the connectors label.

Figure 13
C6 HMI / C6 HMI LC connectors label detail



2.9 Connection overview C6 HMI / C6 HMI LC 5.7” and higher

Figure 14
C6 HMI / C6 HMI LC 5.7” connectors

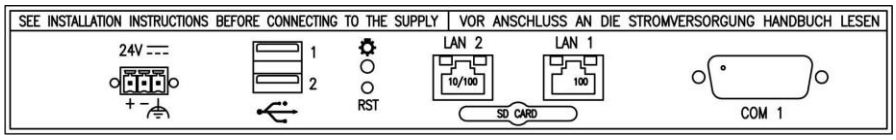


1	Power DC input	6	LAN1 (100 Mbit/s) Fieldbus
2	USB2 (2.0)	7	LAN2 (10/100 Mbit/s) CV connect
3	Reset button	8	Power on LED
4	SD card slot	9	USB1 (2.0)
5	COM 1 (RS232/422/485/MPI)		

2.9.1 Connection Label

On the rear panel are present the following the connectors label.

Figure 15
C6 HMI / C6 HMI LC connectors label detail



2.9.2 Nameplate

Figure 16
C6 HMI / C6 HMI LC label detail

1. Model
2. UL marking
3. CE marking
4. Material number
5. Serial number

2.10 Touchscreen

Table 2
Touchscreen

	Size	Touchscreen	Panel technology
Standard	4.3”	4 - wire	The touchscreen is installed from the back of the front panel. There is a step between the front panel and the touchscreen. The user touches directly the touchscreen.
	5.7”		
	7.0“W		
	8.4”	5 – wire	
	10.1”W		
	10.4”		
	12.1”		
	12.1”W		
	15.0”		
	15.6”W		

2.11 Putting in operation C6 HMI / C6 HMI LC

To put in operation C6 HMI / C6 HMI LC the followings two phases must be done:

● Configuration and creation of the project of C6 HMI / C6 HMI LC.
● Process management.

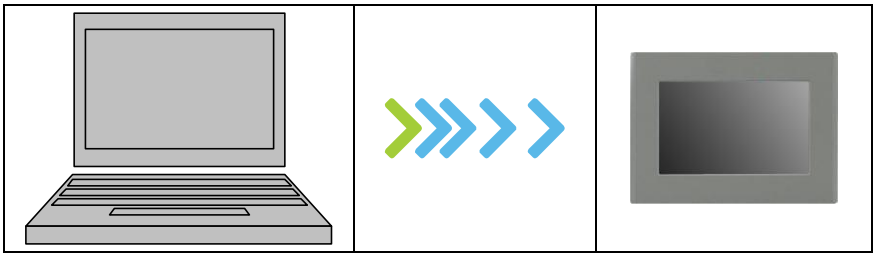
2.11.1 Configuration and project creation

During the configuration phase, you create the user interfaces for operation and monitoring of the technical process by using a PC on which is installed COMBIVIS studio HMI development environment. Configuration also includes:

- Creating the project.
- Saving the project.
- Testing the project.
- Simulating the project.

After compiling the configuration, you load the project into the C6 HMI / C6 HMI LC device.

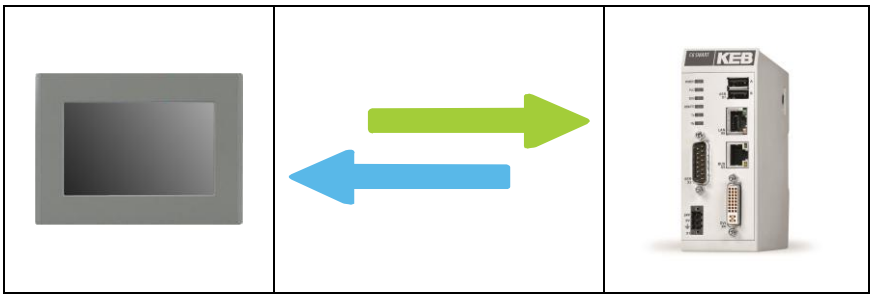
Figure 17
Configuration and project creation



2.11.2 Process management

Process management is a two-way communication between HMI device and PLC.

Figure 18
Process management



2.12 Software options

Table 3
Software options

Function	COMBIVIS studio HMI BASIC for Win CE	COMBIVIS studio HMI ADVANCED for Win CE
RealTime DB	Max. 512 bytes	Max. 4096 bytes
Scaling	Yes	Yes
ODBC Realtime	Yes	Yes
Trace DB	Yes	Yes
Data Structure	Yes	Yes
OPC Client DA	Yes	Yes
Network	Yes	Yes

Table 4
Graphic interface

Graphic Interface		
Vectorial Graphic Editor	Yes	Yes
Support for BMP, GIF, JPG, WMF, EMF	Yes	Yes
Dynamic Animation	Yes	Yes
Symbols Library	Yes	Yes
Import/Export Symbols	Yes	Yes
Public Symbols	Yes	Yes
Power Templates (VBA Symbols)	Yes	Yes
Grid	Yes	Yes
Synapsis	Yes	Yes
Scheduler	Yes	Yes
Editing Menu	Yes	Yes
Style Source Management in Symbols	Yes	Yes
IP Camera Viewer	Yes	Yes
Alias management in Objects	Yes	Yes

Table 5
Alarm log

Alarm Logs	Max. 512 Alarms	Max. 2048 Alarms
Alarms Management	Yes	Yes
Historical Management (XML)	Yes	Yes
Historical Management (ODBC)	Yes	Yes
Alarms Notification (SMS, Email, Voice)	No	Yes
Alarms Area	Yes	Yes
Comments on alarm ACK	Yes	Yes

Table 6
Recipes – Data loggers

Recipes – Data Loggers		
Recipes / Data Logger (XML)	Yes	Yes
Recipes / Data Loggers (ODBC)	Max 2	Yes
Textual Report	Yes	Yes

Table 7
Trends

Trends		
Trend RealTime	Yes	Yes
Historical Trends on file.CSV	Yes	Yes
Historical Trends (linked to DataLogger XML)	Yes	Yes
Historical Trends Database (ODBC)	Yes	Yes
Data Analysis	Yes	Yes

Table 8
Users & Passwords

Users & Passwords		
Use 1024 levels	Yes	Yes
User Groups	Yes	Yes
CFR21	Yes	Yes
Runtime Users	Yes	Yes

Table 9
Dynamic multilanguage

Dynamic Multilanguage	Yes	Yes
Unicode support	Yes	Yes

Table 10
Drivers

Drivers		
Max. number of Driver	2	4
PLC Tag Importer	Yes	Yes

Table 11
Event Object

Event Object	Yes	Yes

Table 12
Scaling Object

Scaling Object	Yes	Yes

Table 13
Scheduler Object

Scheduler Object	Yes	Yes

Table 14
Logics

Logics		
IL Logic (Step5-Step7)	Yes	Yes
VBA Logic (WinWrap Basic)	Yes	Yes
Sinapsis Logic	Yes	Yes

Table 15
Networking

Network	Yes	Yes

Table 16
Child Projects

Child Projects	Yes	Yes

Table 17
Software options

Screen Navigation	Yes	Yes

Table 18
Visual studio source safe 2005 integration

Visual Studio SourceSafe 2005 Integra-tion	Yes	Yes

Table 19
Web Server

Web Server	No	Yes

Table 20
Touch Screen Support

Touch Screen Support	Yes	Yes

Table 21
Cross Reference

Cross Reference	Yes	Yes

Table 22
Debugger

Debugger	Yes	Yes

SECTION **3**

Installation and connection

3.1 Preparation for installation

3.1.1 Select the mounting location

Points to observe when selecting the mounting location:

a) Position C6 HMI / C6 HMI LC to avoid exposure to direct sunlight.
b) Position C6 HMI / C6 HMI LC such that it is ergonomically accessible for the operator.
c) Choose a suitable mounting height.
d) Ensure that the ventilation holes are not covered.

3.1.2 Portrait Mounting

Note:
See chapter **2.3 Packaging**.

- C6 HMI / C6 HMI LC can be mounted in portrait mode; the display can be rotated according to the mounting position using the dedicated utility from the panel control panel.
- From the Start menu, select "Settings" and then "Control Panel"; the display rotation utility is available from "Freescale Display Driver".
- Double click on the icon to get the window from where you can select the desired orientation.
- The selection is immediately applied and does not require to be saved in the registry.

3.2 Checking the package contents

- Check the package content for visible signs of transport damage and for completeness.
- In the case of damaged parts, contact your KEB representative. Do not install parts damaged during shipment.

3.3 Checking the operating conditions

- Read carefully the standards, approvals, EMC parameters and technical specifications for operation of the HMI device. This information is available in the following sections:
  - Certificates and approvals (see section 7).
  - Electromagnetic compatibility (see section 7).
- Check the mechanical and climatic ambient conditions for operation of the HMI device: Ambient conditions (see section 7).
- Follow the instructions for local use of the HMI device: Notes about usage.
- Adhere to the permissible rated voltage and the associated tolerance range:
  - 24V
  - Range: 18÷36 V_{DC}

3.4 Mounting position

The HMI device is suitable for installation in:

- Mounting cabinets
- Control cabinets
- Switchboards
- Consoles

3.4.1 Damage due to overheating

- The operative temperature must be between 0° and 50°C.
- All HMI systems are designed for vertical mounting position.
- An inclined installation reduces the thermal convection by the HMI device and the maximum permissible ambient temperature for operation. Please contact KEB for details.
- The HMI device may otherwise be damaged and its certifications and warranty will be void.

Note:
For installation in control cabinets and in particular, in closed containers, make sure the recommended ambient temperature is maintained.
For further details please refer to section 7 Technical specifications.

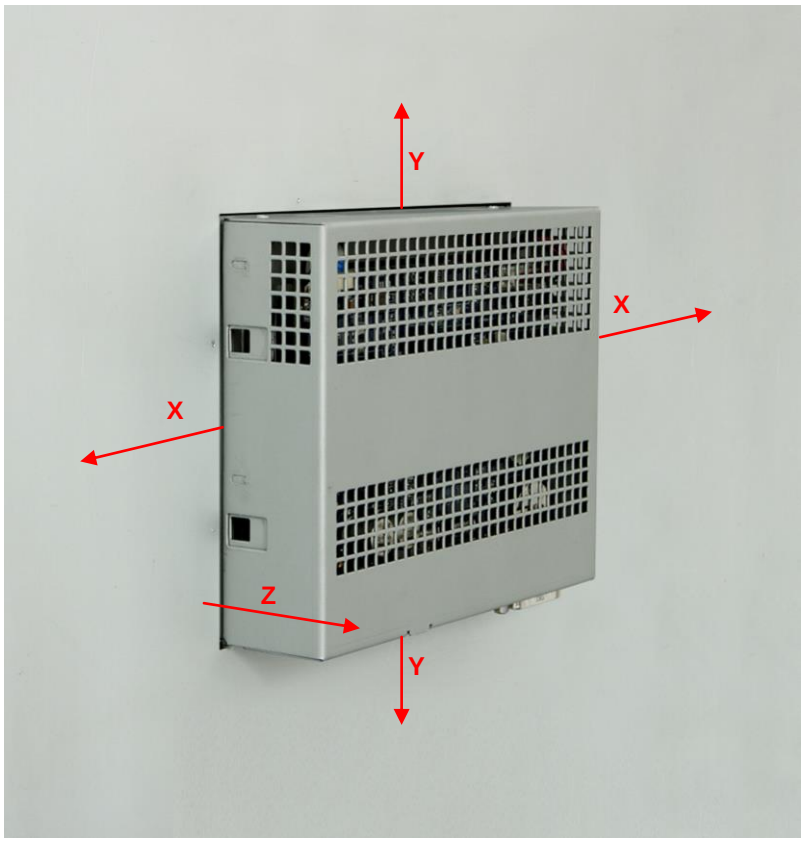
Figure 19
Mounting position

3.5 Checking installation distances

To ensure adequate ventilation it is necessary leaving the following open spaces around the system:

- **X** direction: (min.) 15 mm for each side.
- **Y** direction: (min.) 50 mm for each side.
- **Z** direction: (min.) 10 mm.

Figure 20
Installation distances



3.6 Preparing the mounting cut-out

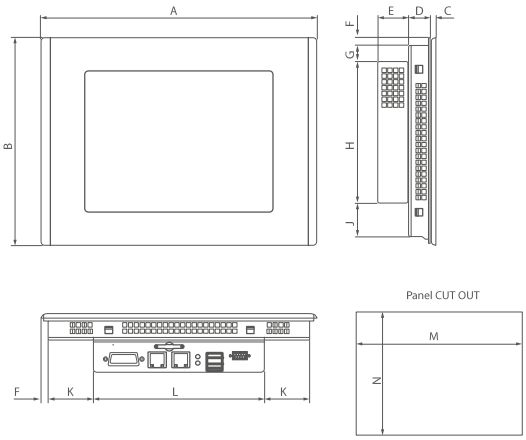
In order to ensure a proper mounting of the system, the material of the mounting cut-out must be sufficiently stable.
To obtain the degree of protection described below, the material of the mounting panel must not deform due to the use of clamps on the operator panel.

3.6.1 Degrees of protection

The degrees of protection of the system are guaranteed only if the following conditions are satisfied:

- Material thickness at the mounting cut-out for IP66 protection: 2 mm to 4 mm.
- Deviations of the plane of the mounting cut-out limits: ≤ 0.5 mm.
  This condition must also be met with installed C6 HMI / C6 HMI LC.
- Allowed surface roughness in the area of the seal: ≤ 120 microns (Rz 120).

3.6.2 Dimensions of the cut-outs

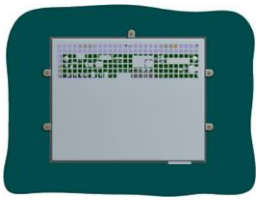
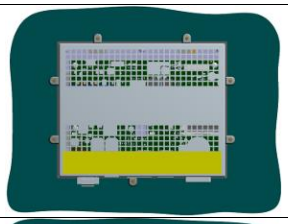
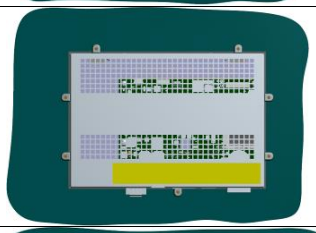
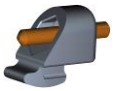
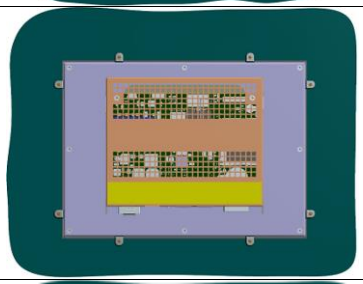
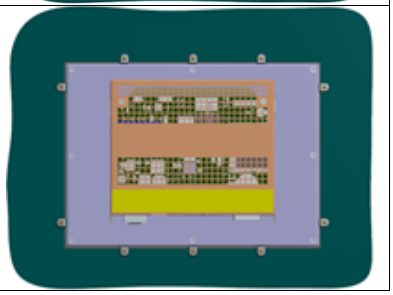


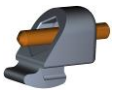
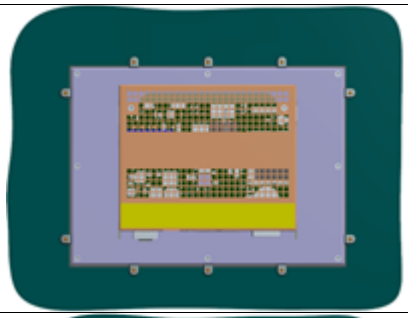
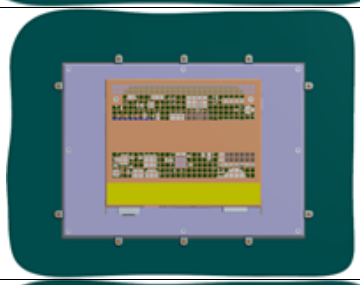
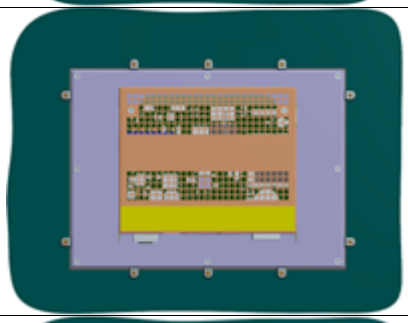
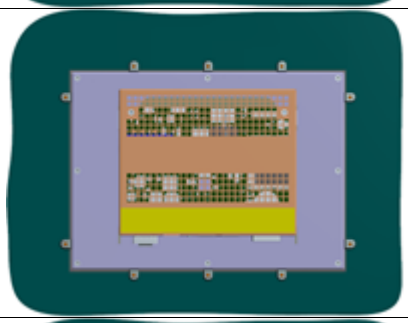
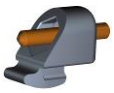
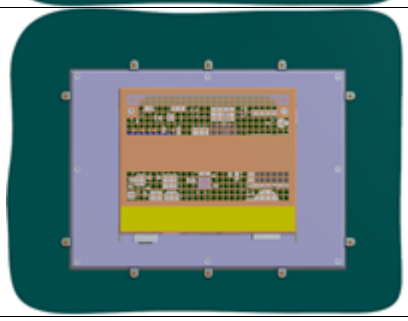
LCD TFT	A	B	C	D	E	F	G	H	I	K	L	M	N	weight (kg)
4.3”	140	95	5	30	-	5	-	84	-	-	128	131	86	0.7
5.7”	175	145	5	40	-	7	-	131	-	-	161	164	134	0.9
7.0”W	215	155	5	40	-	7	-	141	-	-	201	204	144	1.2
8.4”	255	190	5	19.5	29	7.5	15	130	30	42	156	243	179	1.4
10.1”W	293	201,5	5	19.5	29	6.5	15	130	43.5	62	156	285	193.5	1.6
10.4”	295	230	5	19.5	29	7.5	15	130	70	62	156	283	219	1.8
12.1”	325	260	5	19.5	29	7.5	15	130	100	77	156	313	249	2.1
12.1”W	321	222.5	5	19.5	29	6.3	15	130	65	76	156	313	215	2.0
15.0”	390	305	6	19.5	29	7.5	15	130	145	109.5	156	378	294	3.3
15.6”W	420	265	6	19.5	29	7.5	15	130	105	124.5	156	410	255	3.3

3.7 Mounting the device

3.7.1 Position of the mounting clamps

- To obtain the declared degree of frontal protection for the system, it is necessary to respect the positions of the clamps shown below.
- The table below shows the number and the position of the clamps for each C6 HMI / C6 HMI LC size.

System	Clamp	Quantity	Clamp position
C6 HMI / 4.3”		5	
C6 HMI / C6 HMI LC / 5.7”		7	
C6 HMI / C6 HMI LC / 7.0”W		7	
C6 HMI / C6 HMI LC / 8.4”		8	
C6 HMI / C6 HMI LC / 10.1”W		10	

C6 HMI / C6 HMI LC / 10.4”		10	
C6 HMI / C6 HMI LC / 12.1”		10	
C6 HMI / C6 HMI LC / 12.1”W		10	
C6 HMI / C6 HMI LC / 15.0”		10	
C6 HMI / C6 HMI LC / 15.6”W		10	

3.7.2 Tools to tighten the mounting clamps

- 1.5 mm hexagonal key.

3.7.3 Procedure

1. Insert C6 HMI / C6 HMI LC into the mounting cut-out from the front.

Figure 21
Installation

Figure 22
Installation

Figure 23
Installation

2. Insert the fixing clamps into the housings of the device.

Figure 24
Installation

Figure 25
Installation

3. Tighten the fixing clamps with a 1.5 mm hex key.

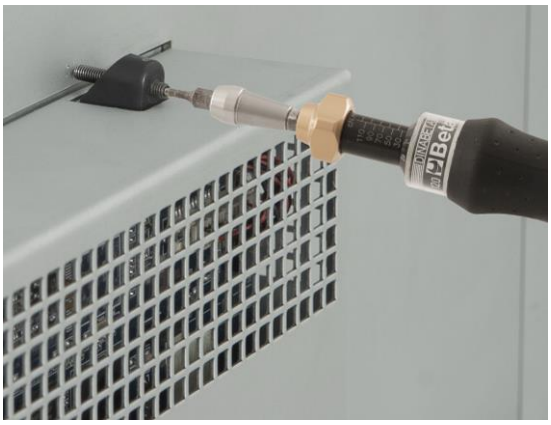


Figure 26
Installation

Note:
adhere to the permissible torque when tightening the threaded pin of the mounting clamp: 0.2 Nm.

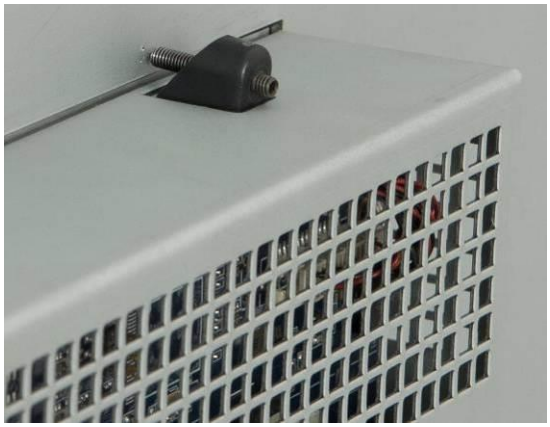


Figure 27
Installation

4. Repeat steps 2 and 3 for all mounting clamps.
5. Check the seal seat.

3.8 Connecting the unit

3.8.1 Information for the connection

- The C6 HMI / C6 HMI LC must be installed in accordance with the data contained in this instruction manual.
- This units are designed for the connection with a "Secondary Circuit Overvoltage Category II".

3.8.2 Power supply connection

The device may only be connected to a 24V power supply ⎓ (max. permissible operating voltage range 18V to 36V) that meets the requirements of a safe extra low voltage (safe extra low voltage - SELV) according to IEC/EN/DIN EN/UL60950-1.

The power supply must meet the requirements of NEC Class2 or LPS in accordance with IEC/EN / DIN EN/UL60950-1.

Connect the unit with a cable cross-section of 0.75 - 1.5 mm^2 (AWG18 to AWG16 suitable for min. 75C°).

- Remove the poles connector plug from the system.
- Connect the positive wire to the positive terminal of the three pole connector.
- Connect the negative wire to the negative terminal of the three pole connector
- Connect the earth ground wire to the ground terminal of the three pole connector

(also refer to the label on the back of the system)

Attention: The system must be powered with a voltage of 24V (18V ÷ 36V).

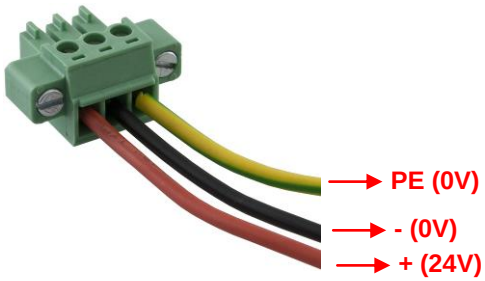


Figure 28
Power supply connection detail

Note:
Value of tightening torque: 0.22 – 0.25 Nm.

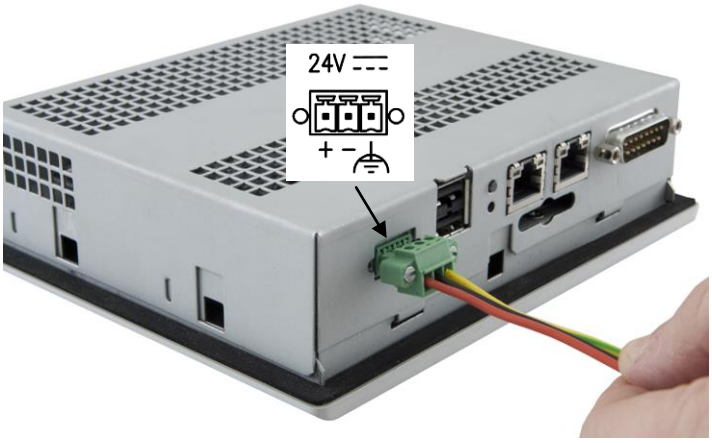


Figure 29
Power supply connection detail

3.8.3 Switching on and testing the device

Connect the power supply cable to C6 HMI / C6 HMI LC. Switch On the power supply. The green led will light.

Figure 30
Power supply connection detail

The display will switch on accordingly, and after few seconds the Windows CE desktop will appear.

3.9 Connecting the configuration PC

You can connect the configuration PC to C6 HMI / C6 HMI LC in several ways:

1) By using a Ethernet cross cable connected by one end to the configuration PC and on the other end to one of two Ethernet ports of C6 HMI / C6 HMI LC.
2) By connecting C6 HMI / C6 HMI LC to a Ethernet switch on which the configuration PC and C6 HMI / C6 HMI LC are both connected.
3) By connecting C6 HMI / C6 HMI LC and the configuration PC to the office LAN.

Please note that C6 HMI / C6 HMI LC comes with DHCP service enabled. That means in case number 3 above it is sufficient to connect the C6 HMI in LAN; the LAN DHCP server automatically assigns an IP address to the C6 HMI / C6 HMI LC.

If no DHCP server is available, assign a static IP address to the C6 HMI / C6 HMI LC which is compatible with the IP address of the configuration computer.

Example: If the PC has the IP address 172.17.17.20, the C6 HMI / C6 HMI LC must be configured with the IP address 172.17.17.182. To configure the IP address on the table:

- Click on Start -> Settings -> "Network and Dial-up Connections

Figure 31
Connecting the configuration PC

- According to the Ethernet port you want to configure, select the port to configure according to the following table:

Table 23
Connecting the configuration PC

LAN-Port of the C6 HMI / C6 HMI LC	LAN connection in the control panel
LAN1	General purpose
LAN2	COMBIVIS connect

- For instance if you need to configure LAN1 double click on FEC1, Click on “Specify an IP address” and write the IP address and default Gateway like in the figure below

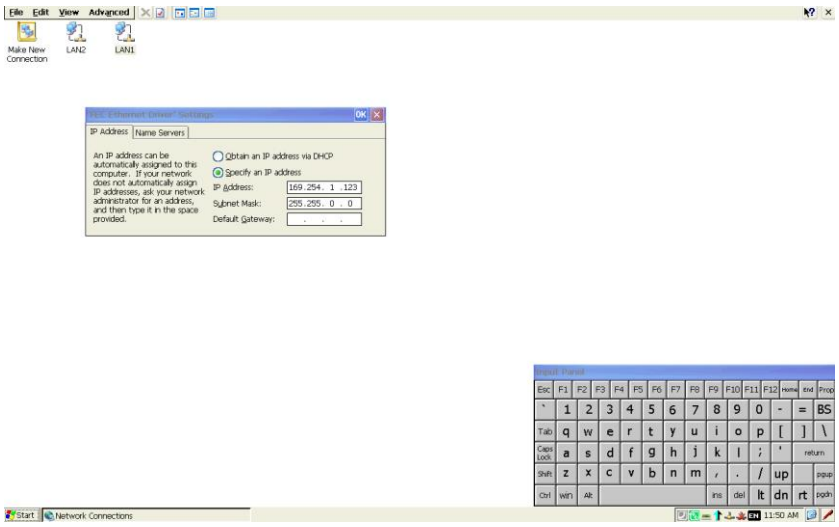


Figure 32
Connecting the configuration PC

- Click on Ok to save the settings
- Click on Start -> Settings -> Control Panel

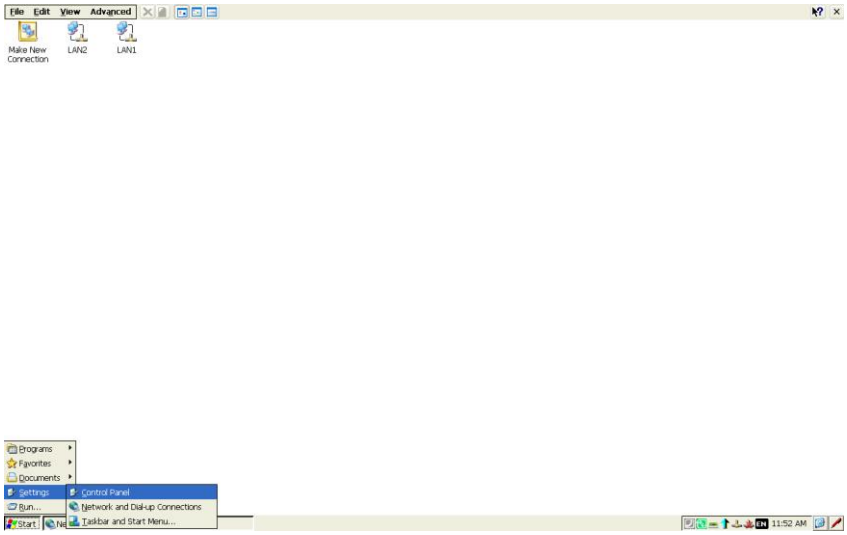


Figure 33
Connecting the configuration PC

- Then double click on “Registry Saver”

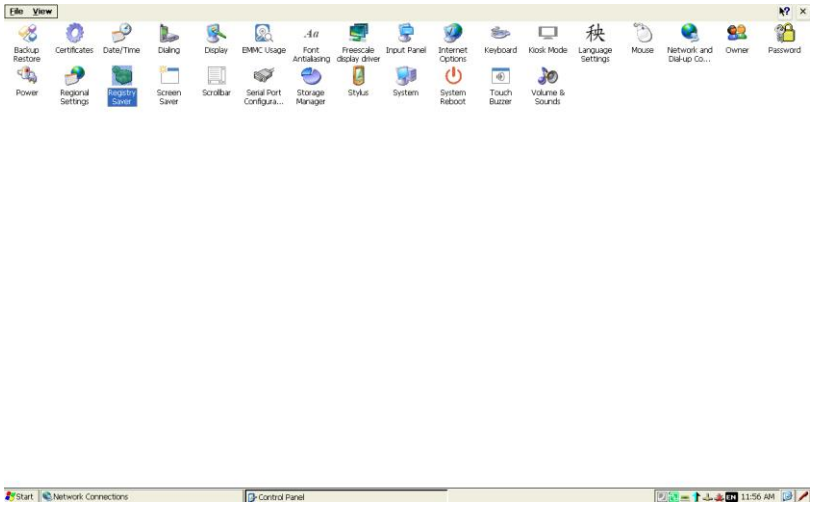


Figure 34
Connecting the configuration PC

- Click on the “Save” button and confirm clicking on “Ok”. This operation will save your setting in a permanent way.

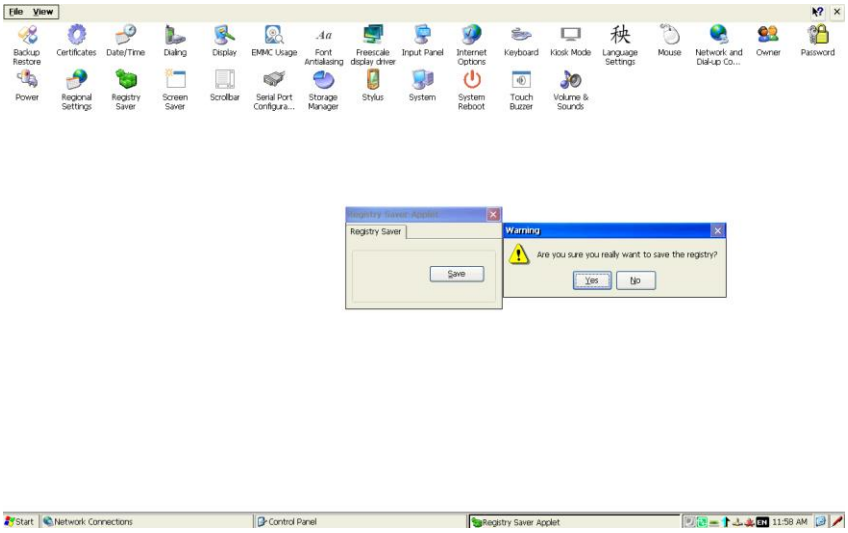


Figure 35
Connecting the configuration PC

3.9.1 Procedure

After the connection between C6 HMI / C6 HMI LC and the configuration PC, to transfer the project into C6 HMI / C6 HMI LC you must:

- Start COMBIVIS studio HMI Developing tool.
- Load the project to transfer.
- Click on the transfer icon (see picture below).

Figure 36
Connecting the configuration PC

The following window will appear:

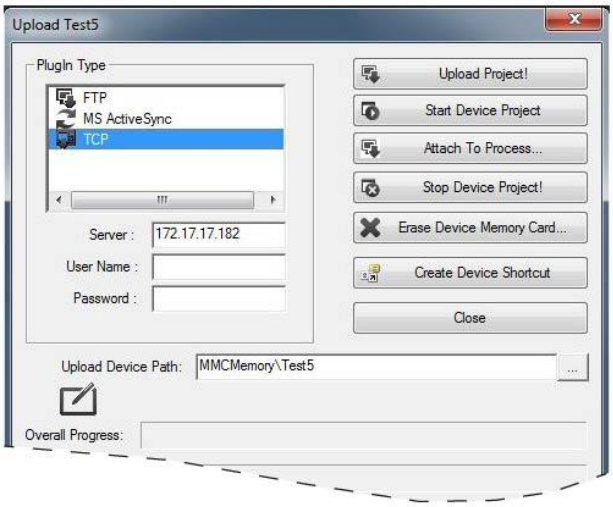


Figure 37
Connecting the configuration PC

Attention: please transfer the project into the MMC Memory or into the SD card. This allows you not to loose its content when C6 HMI / C6 HMI LC will be switched off.
To transfer the project into the MMC Memory, you must specify MMCMemory (like in the example of the picture above).

- Select TCP in the upper left list.
- Write the IP address of C6 HMI / C6 HMI LC
- Choose where to download the project into C6 HMI / C6 HMI LC specifying the “Upload Device Path”.
- To transfer the project to C6 HMI / C6 HMI LC click on the button “Upload Project!”.

There is another possibility to transfer the project to the panel. It is by using an USB key.

- Copy from the configuration PC to the USB Key the folder in which is stored the C6 HMI / C6 HMI LC project.
- Insert the USB Key into C6 HMI / C6 HMI LC.
- Copy the project folder from the USB Key to the MMC memory.

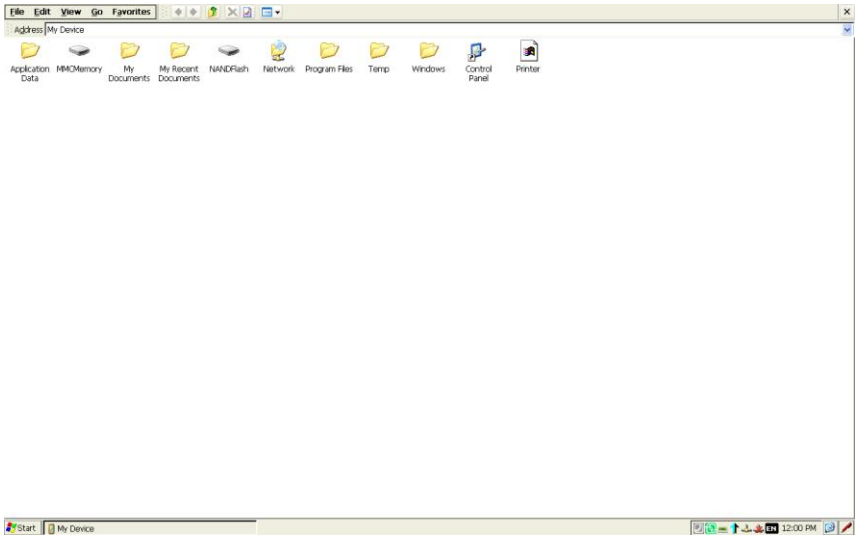
Note: the name of the memory card are according to the following table:

Table 24
Procedure

Memory	Name used by Windows Explorer	Note
NAND	NANDFlash	Used internal memory to store the operating system. It is a read only memory.
MMC	MMCMemory	Memory to store data and executables. Read and Write memory.
SD	SDMemory	Removable Memory. Read and Write memory.
USB Key	Hard Disk	USB key inserted into a USB port of C6 HMI / C6 HMI LC.

In the picture below an example of file Explorer on C6 HMI / C6 HMI LC.

Figure 38
Connecting the configuration PC



SECTION 4

Commissioning the device

4.1 Backup design

The C6 HMI / C6 HMI LC is equipped as standard with two memories: a NAND flash memory and an e-MMC memory card. Purpose of the NAND memory is to store the boot loader (is used during the start-up of the C6 HMI / C6 HMI LC), the operating system and all executable programs. Writing on the NAND memory can be switched on and off with a special program in order to protect the saved data on the NAND memory.
The e-MMC memory cards can be used to store other data such as process data or other executable programs. It is not possible to switch off the writing of MMCs. You can always read and write the eMMC memory. This memory is used to store data which are generated during the operation of the machine or plant and monitored by the C6 HMI / C6 HMI LC.

4.2 Internal memory

The NAND memory, as default is read only. In this manner it is protected against data loss; but the NAND memory can be made writeable.

To make the NAND memory writable, click in the Windows folder of the C6 HMI / C6 HMI LC on MakeNANDWritable (see picture below). By this way, you can store some exe files permanently safe. After the operation you can make the NAND memory “read only” as before.

In order to set the NAND memory to "read only", click in the C6 HMI / C6 HMI LC Windows folder on MakeNANDReadOnly (see picture below).

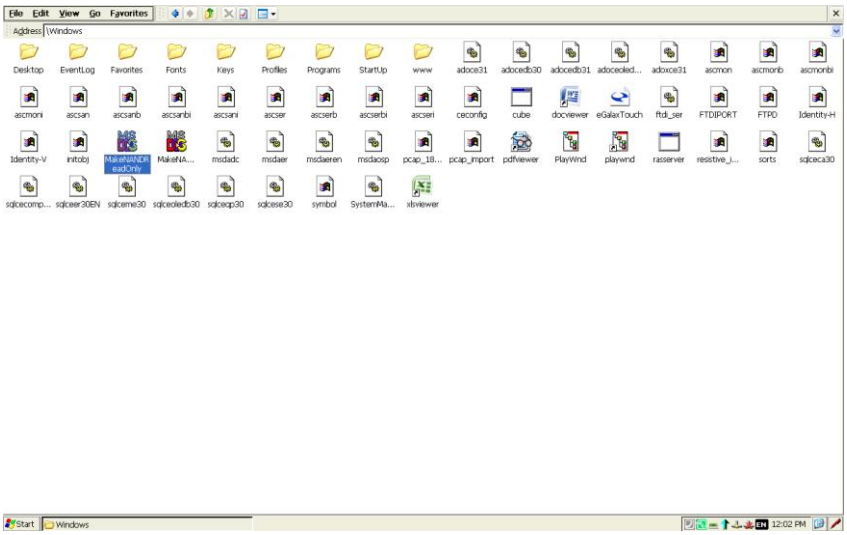


Figure 39
Commissioning the device

4.3 Slot for memory card (from 5.7")

C6 HMI / C6 HMI LC can optionally accommodate an SD/SDHC card slot V. 2.0 (push-push type).

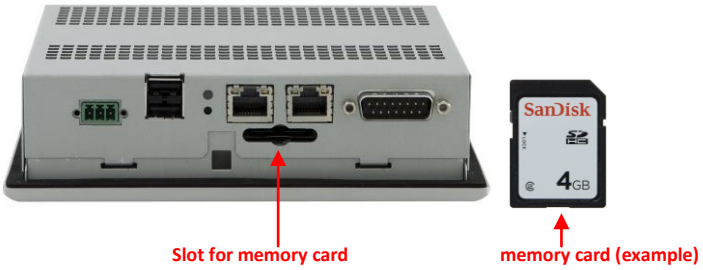


Figure 40
Slot for memory card

4.4 Installation/removal of a memory card

Attention: potential data loss
Do not remove the memory card while data is being accessed.
Data on the memory card is lost if you attempt to remove it while C6 HMI / C6 HMI LC is accessing its data.

- Insert the memory card into the slot as indicated in the figure. Pay attention to the beveled edge.

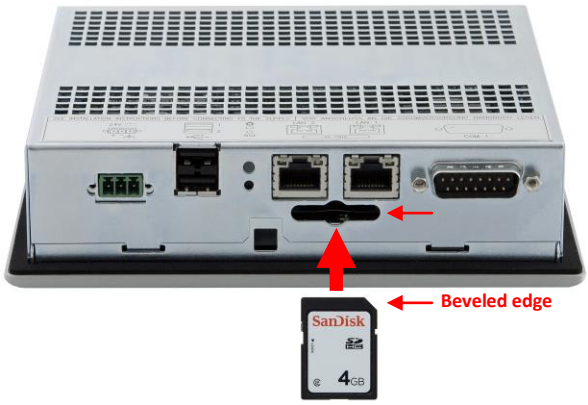


Figure 41
Slot for memory card

Attention: removing the system memory card while the project is running. If you remove memory card while a project is running, the project may stop.

- Push the card all the way.

Figure 42
Slot for memory card

Figure 43
Slot for memory card

- Push the card previously inserted.

Figure 44
Slot for memory card

- Extract the memory card from the slot.

Figure 45
Slot for memory card

SECTION **5**

Commissioning a project

5.1 COMBIVIS studio HMI project

5.1.1 Overview

Configuration phase
A project includes screen, alarms, variables used to represent the real plant of machine. The configuration phase is the creation of the project according to the user needs and interaction between the humans and the machine.

Transferring the project to C6 HMI / C6 HMI LC
You can transfer a project to C6 HMI / C6 HMI LC as follows:
● Transfer from the configuring PC by using an Ethernet connection
● Copy the Project by using a USB key

Process control phase
After the project is transferred, C6 HMI / C6 HMI LC is ready to communicate to one or more PLC and to visualize the screens according to the configured project.
ATTENTION: if you need to communicate with a device connected to the serial port you must configure the serial port. See chapter 5.1.3.

Commissioning and re-commissioning
When you switch on the first time C6 HMI / C6 HMI LC, there is no project inside. At first you need to transfer a project into C6 HMI / C6 HMI LC.
After you download a project, you can retransfer another project or another version of the same project without any special operation, also while the project is running on C6 HMI / C6 HMI LC.

5.1.2 Transfer

The C6 HMI / C6 HMI LC is always ready for accepting the download of a project, even when a project is running. In this way, if The C6 HMI / C6 HMI LC is connected by means of Ethernet to the configuration PC, you are able to download a new project or a new version of the same project even without stopping the project.

5.1.3 Configuration the serial port

If your project need to communicate with a device connected to the serial port, you need to configure the serial port according to the type of serial connection you use for your communication. The following types of communications are supported by the serial port of C6 HMI / C6 HMI LC:

- RS 232
- RS 422
- RS 485

C6 HMI / C6 HMI LC comes as default with the serial port set as RS 232. If you want to change the type of serial communication you must do the following:

Click on Start -> Settings -> Control Panel

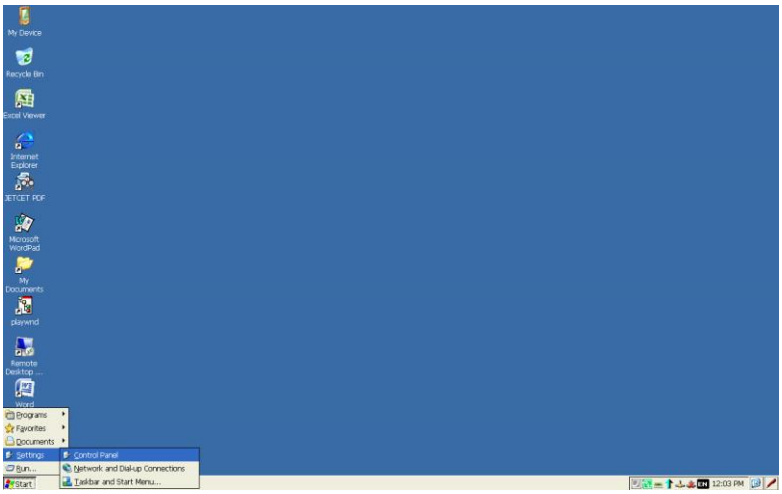


Figure 46
Configuring the serial port

Double click on “Serial Port Configuration”

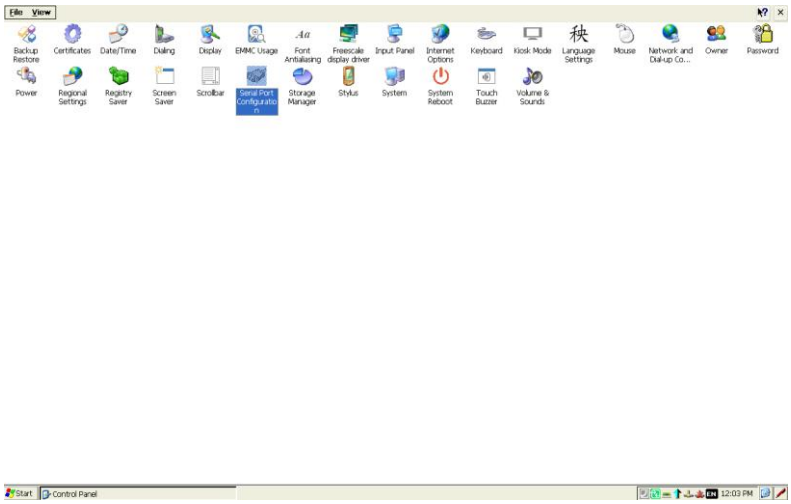


Figure 47
Configuring the serial port

Choose the type of serial communication

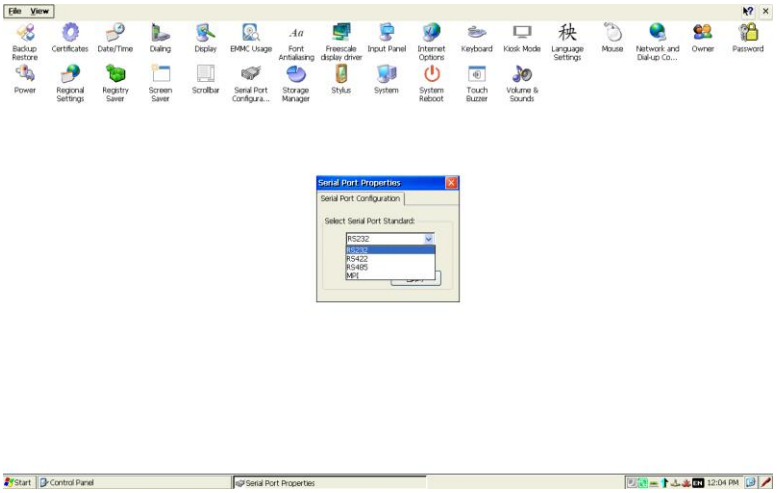
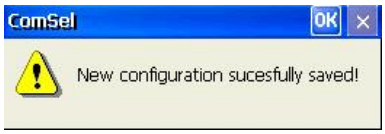


Figure 48
Configuring the serial port

And confirm by pressing the “Apply” button. A warning message will raise, advising to store that new configuration is active and saved a permanent way.

Figure 49
Configuring the serial port



This applet can be used just to check which serial communication mode is active; in this case it is enough to push the “red cross” on the high right side of the panel.

Please note that MPI mode cannot be selected: when this protocol will be used by HMI software all required settings will be applied automatically.

5.1.4 Connecting the serial port

A unique DB15 male connector hosts all serial protocols (please check par. 7.3.1 for pin-out details) so it is necessary to adapt this connection to plant needs; KEB can supply connector adapters as optional parts but user can adapt DB15 connector by himself.

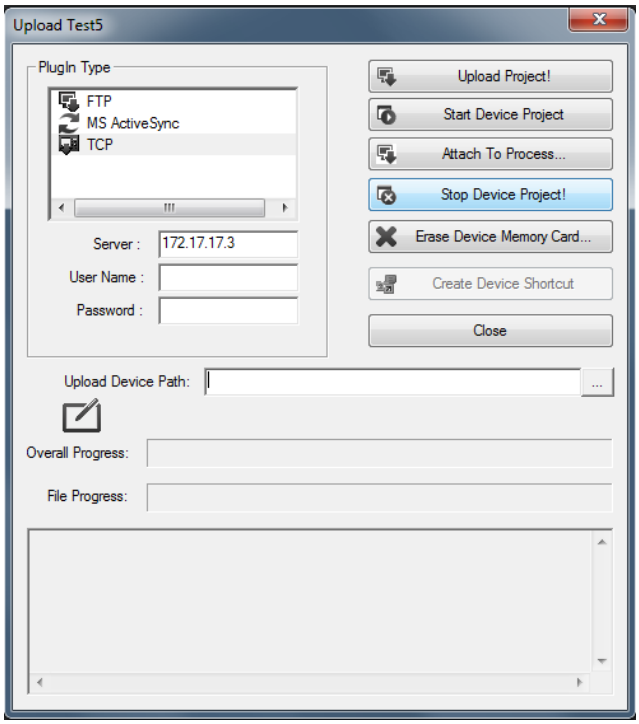
5.1.5 Project administration

The C6 HMI / C6 HMI LC has high-performance tools to manage a running project. With the same mask that is used for the project transfer (see below), you can also:

1. stop the C6 HMI / C6 HMI LC project from the configuration PC
2. start the C6 HMI / C6 HMI LC project from the configuration PC
3. debug the project from the configuration PC
4. Transfer the project from C6 HMI / C6 HMI LC to the configuration PC

5.1.6 Stopping the running project

Picture 50
Stop running project

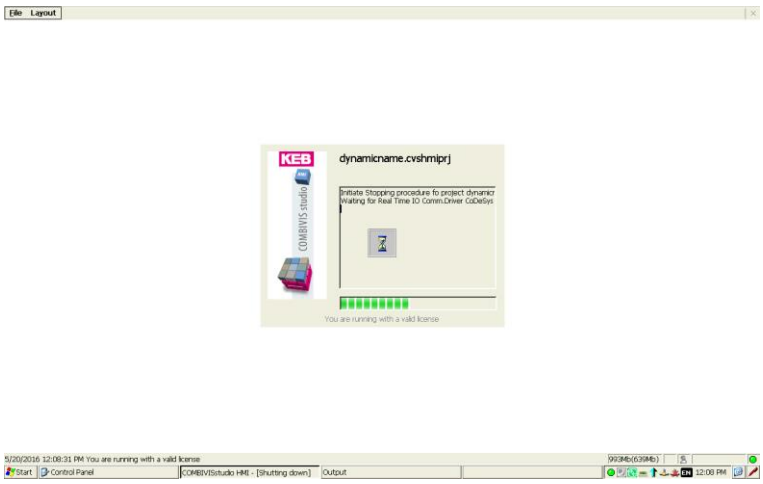


Please follow these steps to stop a running project:

5. Select TCP in the upper left list
6. Insert the IP address of the C6 HMI / C6 HMI LC
7. Click the button “Stop Device Project!”

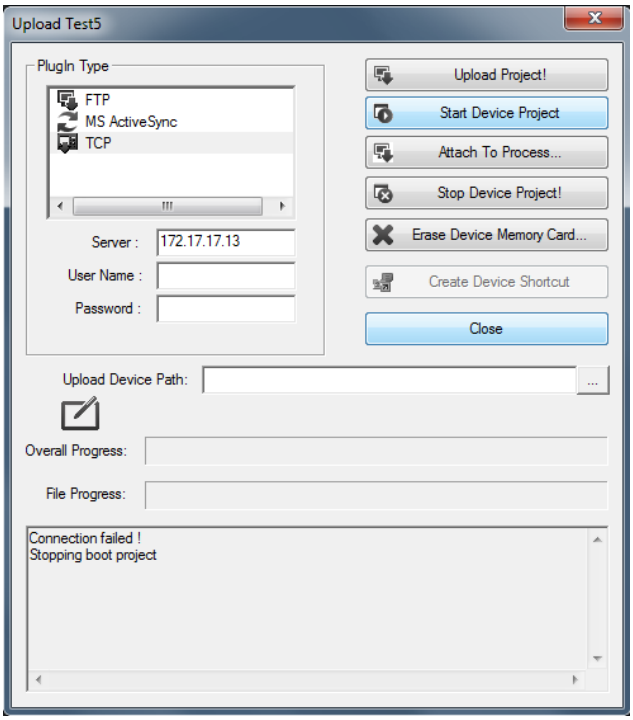
You will see the project in C6 HMI / C6 HMI LC stopping (see below)

Picture 51
Stop running project



5.1.7 Starting the project

Picture 52
Starting the project



To start a project in C6 HMI / C6 HMI LC by using the configuration PC you must:

8. Select TCP in the upper left list
9. Insert the IP address of the C6 HMI / C6 HMI LC
10. Click the button “Start Device Project”

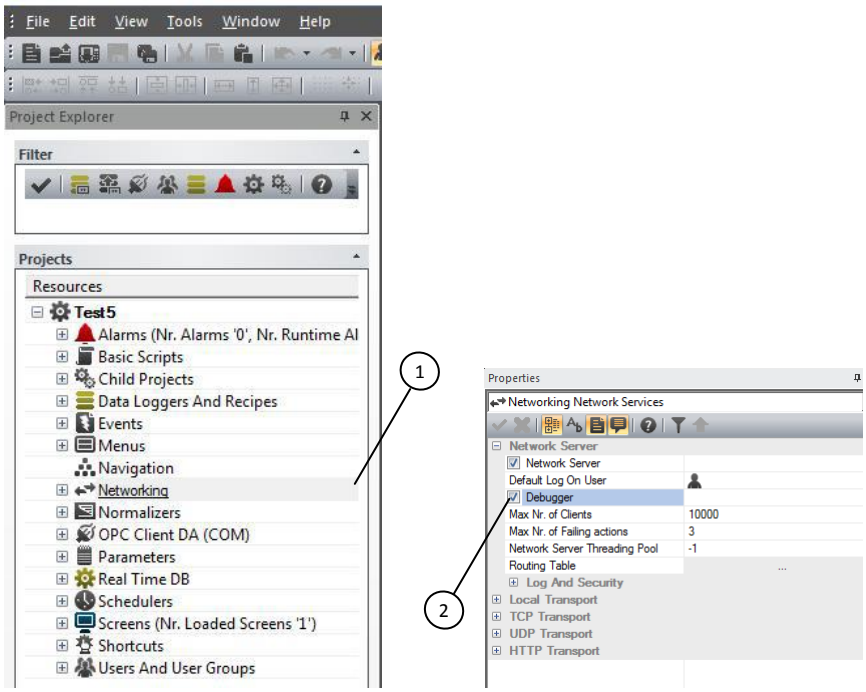
Now you see how the C6 HMI / C6 HMI LC project is starting.

5.1.8 Debugging the project

You can debug the project in C6 HMI / C6 HMI LC by connecting with the configuration PC.
In order to be able to use the debugging functionality you must prepare your project as follows:

1. Select “Networking” in the project explorer window of COMBIVIS studio HMI
2. Enable the property “Debugger” in the Properties window of COMBIVIS studio HMI

Picture 53
Debugging the project



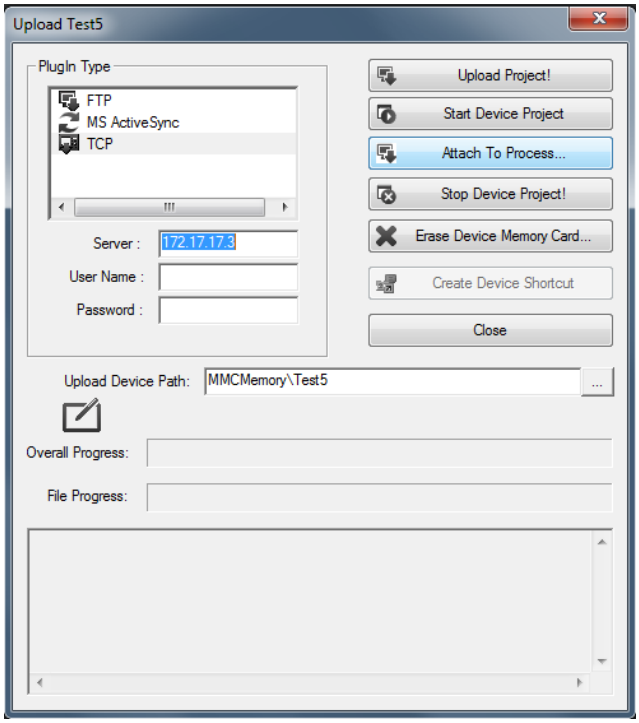
Transfer the project to the C6 HMI / C6 HMI LC and start running.
NOTE: Ensure that the project is running; otherwise you cannot debug it.

In order to debug the running project of the C6 HMI / C6 HMI LC from the configuration PC, follow these steps:

1. Select TCP in the upper left list
2. Insert the IP address of the C6 HMI / C6 HMI LC

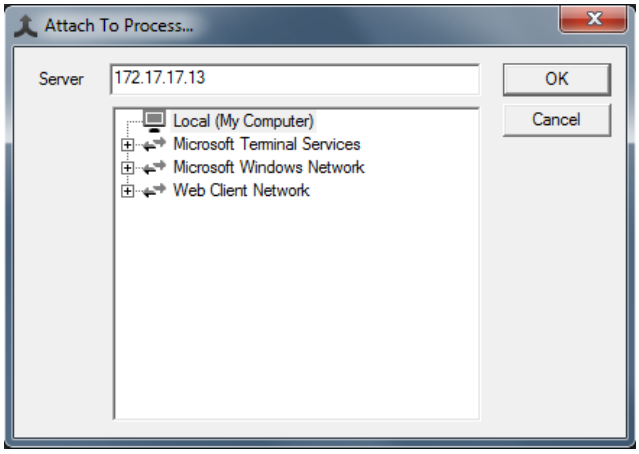
Click the button “Attach To Process…”

Picture 54
Debugging the project



The following window will appear:

Picture 55
Debugging the project



Enter the IP address of the C6 HMI / C6 HMI LC and click "OK". A new window opens that asks for the user and the password

If the project is not protected, just click the "OK" button, otherwise enter the name and password of a project user who has the rights to modify the project.

Now you can see debugging is starting in COMBIVIS studio HMI on the configuration PC. Now you can:

- see the project screens and navigate between them. Please note you see a different screen than that of the C6 HMI / C6 HMI LC and the debugging does not affect normal operation of the C6 HMI / C6 HMI LC project.
- View and change the value of the variables
- Set a breakpoint and debug the Visual Basic scripts running in the project

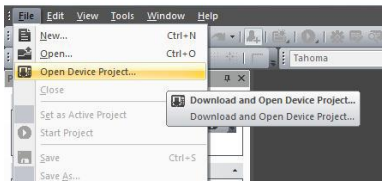
5.1.9 Transfer the project from C6 HMI / C6 HMI LC to the configuration PC

This option allows you to transfer the project from C6 HMI / C6 HMI LC to the configuration PC in order to check or to change and hence transfer again into C6 HMI / C6 HMI LC.

Hint: It is always suggested to protect the project with a password in order to don't allow changes to the project by not authorized users.

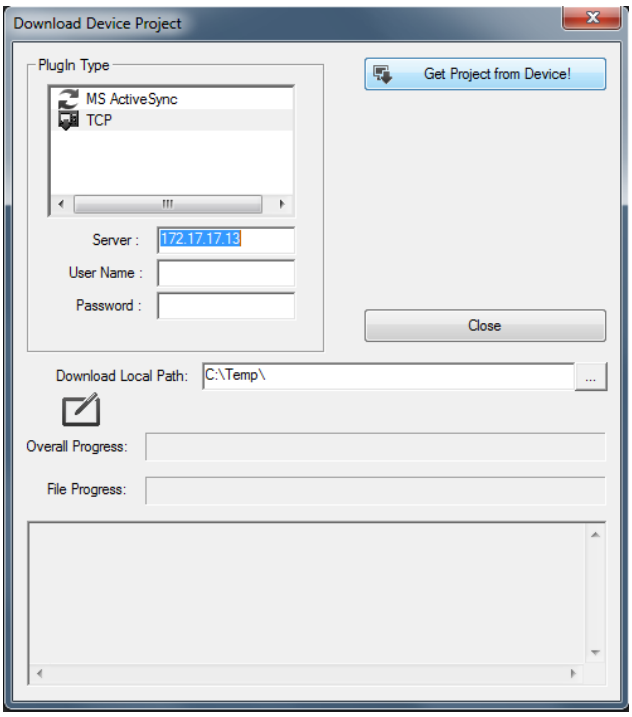
Be sure that the project is not running on C6 HMI/C6 HMI LC, run COMBIVIS studio HMI on the configuration PC, click on the "File" menu and select "Open Device Project…"

Picture 56
Debugging the project



1. Select TCP in the upper left list
2. Write the IP address of the C6 HMI / C6 HMI LC
3. Write the path on which you want to store the project on your configuration PC
4. Click on the button "Get Project from Device!"

Picture 57
Debug the project



After the transfer of the project you will see the project explorer containing the project resources in COMBIVIS studio HMI and you can will able to check, test and change the resources of the project.

5.1.10 Backup and restore

The C6 HMI / C6 HMI LC has tools to backup and restore the contents of its internal memory in order to manage the project and the operating system of C6 HMI / C6 HMI LC. For more information please contact the support center of KEB.

5.1.11 Update the operating system

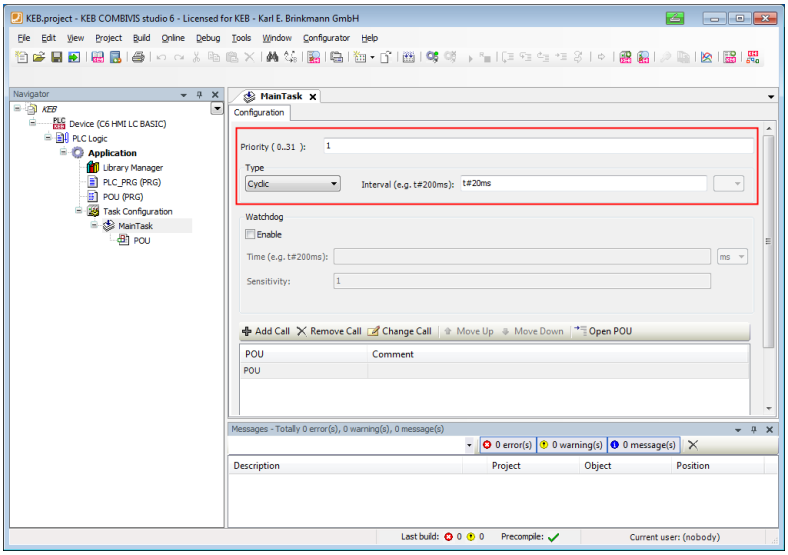
Please contact the Support Center of KEB.

5.2 COMBIVIS studio 6 project

This chapter is valid only for C6 HMI LC systems which are coming with CONTROL Runtime pre-installed directly from production.

5.2.1 C6 HMI LC – Implementation "CONTROL Runtime"

The CONTROL Runtime runs as a thread with "real time" priority.
The execution model is based on the "task" concept; the program execution requires the definition of tasks and the assignment of priority and execution cycle according to the following figure (see below in this manual about how to configure COMBIVIS studio 6 for use with C6 HMI LC system).



Each task is executed at the specified time interval and according to the assigned priority. Only when all the COMBIVIS studio 6 activities are over, the CPU time goes to the other processes, as they are assigned to an inferior priority.

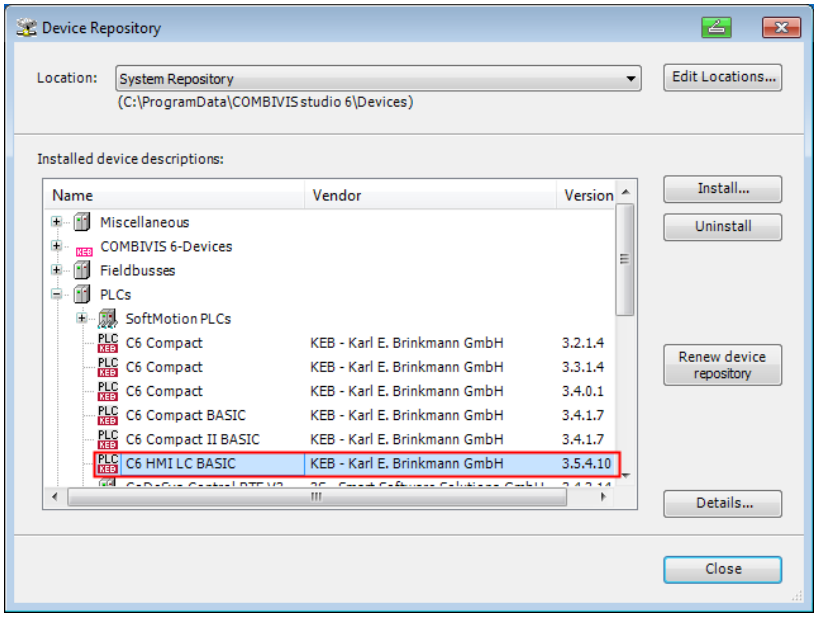
Note: Each task cycle time must be properly assigned according to the general performances required by the Soft PLC itself, by the COMBIVIS studio HMI Runtime, by the COMBIVIS connect Runtime and by any other application or process running in the system. A too short task cycle time may introduce an undesired slowdown in the general reaction of the system. If this is the case, the task cycle time should be properly increased until you reach the proper balancing between performances and reactivity of the whole system.

5.2.2 Preparing the COMBIVIS studio 6 programming environment

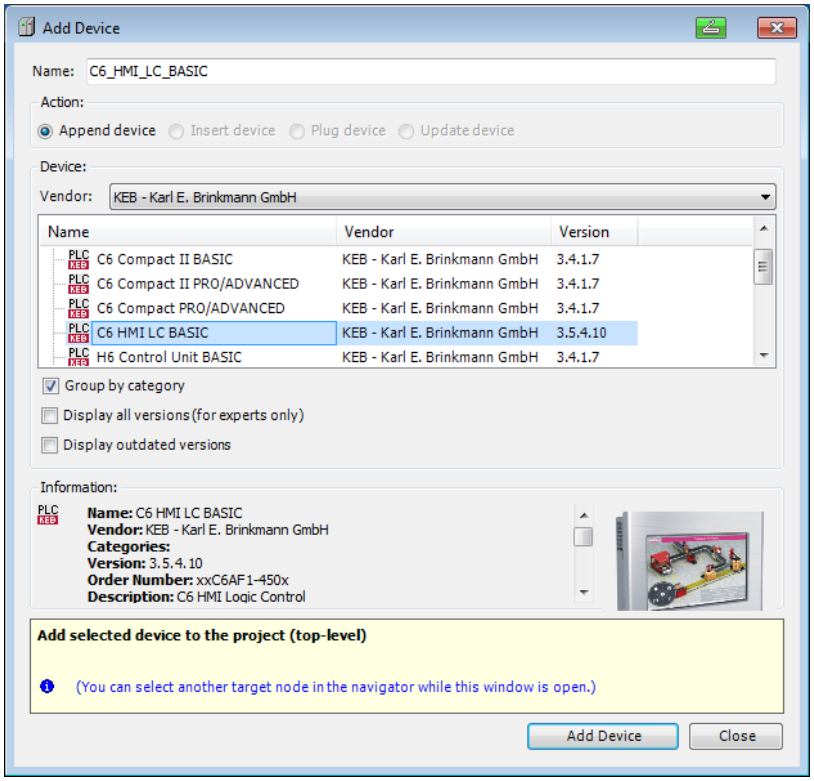
The COMBIVIS studio 6 programming environment must be properly configured in order to support the code compiler for C6 HMI LC systems.
You need COMBIVIS studio 6 version 6.2.1.0_3.5.3.50 or above installed on the PC.

COMBIVIS studio 6 installation can be found in the COMBIVIS studio 6 user manual.

The C6 HMI LC can be shown in the device respository.



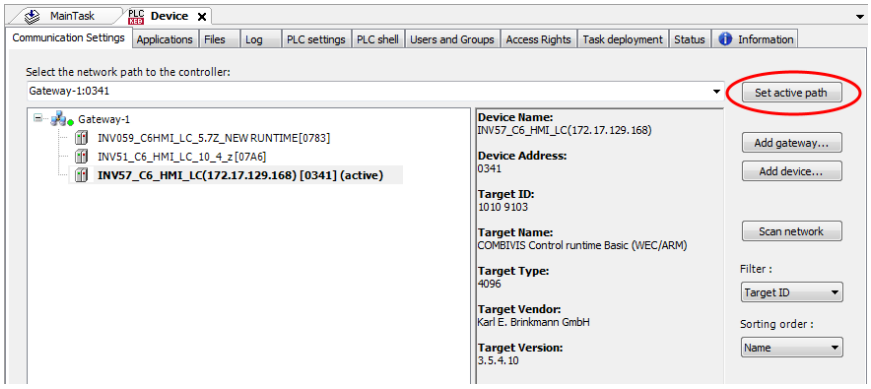
Create now a new project and insert the C6 HMI LC as new Device as shown in the following figure.



5.2.3 Transferring the COMBIVIS studio 6 application to the target system

To transfer a valid COMBIVIS studio 6 application to the Target system, follow these steps:

- Ensure the C6 HMI LC device is connected to the same sub network of the PC where you have running the COMBIVIS studio 6 programming tool (same network mask, e.g. “192.168.1.xx”)
- Double click on the device icon from the COMBIVIS studio 6 project tree; the right part of the workspace will show the “Communication settings” tab contents
- Select the Gateway and click on the button “Scan network” button
- The box will be populated with the list of available CONTROL Runtime
- Click on the one you want to connect too and click then on the “Set active path” button
- Click On-line\Login to start the communication



5.2.4 I/O Fieldbus

The implementation “CONTROL Runtime” for KEB C6 HMI LC systems supports the following I/O fieldbuses:

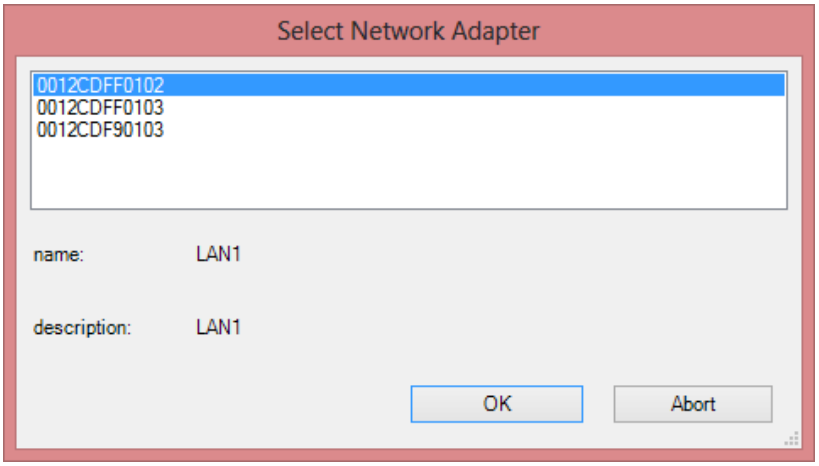
- EtherCAT with NO DC support (distributed clock) on LAN1
- Modbus TCP on LAN1
- Modbus RTU

To insert the I/O master right click on the C6 HMI LC device icon on the project tree, select “Add Device” and select from the “Vendor” list box. The list will be populated with the available master devices. Select the one required by your application in between:

- EtherCAT Master
- Modbus COM (for Modbus based I/O both serial and TCP)

C6 HMI LC systems are featuring two Ethernet interfaces.
The interface that must be used for I/O fieldbus is the one denominated “LAN1”.

Note: At the moment of transferring the PLC application to the target system, COMBIVIS studio 6 will ask to which interface the I/O must be attached. You must specify the MAC address of the “LAN1” interface as shown in the following figure.



Note: Current implementation if affected by a jitter of about +/- 2ms when working with I/O over Ethernet interface.

Note: The Ethernet interface assigned to an I/O Ethernet master (Ethercat or Modbus TCP) is exclusively dedicated to the I/O and must not be used for any other purpose (no programming, no COMBIVIS HMI protocol).

5.2.5 Support for retentive data

C6 HMI LC systems are equipped with a Micro UPS specifically designed to support the data memory retention.
In COMBIVIS studio 6 the retentive variables can retain their value throughout the usual program run period. They are declared as “Retain Variables” or even more stringent as “Persistent Variables”. For each case a separate memory area is used. Please check the COMBIVIS studio 6 manual for any additional detail about retentive data.

The use of the retentive areas does not require any specific configuration except for declaring the variable in the proper area according to the COMBIVIS studio 6 programming manual.

At the moment of a power failure (when the voltage is below the threshold for more than 50ms)
the UPS triggers an event and the system will switch off the display and the USB device connected in order to save energy, and will follow a four step sequence to save data:

1. The panel display and the USB ports are turned off
2. All running IEC tasks are terminated so the retentive areas are consistent
3. The system starts flushing the retentive memory areas to a file which is saved on disk
4. The CONTROL Runtime is terminated

The panel continues to run until the Micro UPS is able to provide power to C6 HMI LC.

Note: To start the backup procedure the super capacitors must be fully charged.

Note: The available retentive memory size is of 64KB for the RETAIN memory type and 64KB for the PERSISTENT memory type.

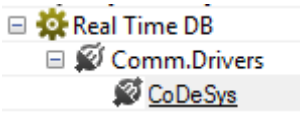
Note: If the power supply returns before the energy inside the Micro UPS is finished, and actually C6 HMI LC has not been switched off, the following operations are carried on:

- The display is switched on
- The USB ports are powered
- CONTROL Runtime behavior can be selected in between 3 possible models:
    a. CONTROL Runtime does not start and no message is returned.
    b. CONTROL Runtime does not start and returns a warning message.
    c. CONTROL Runtime restarts normally (default option).

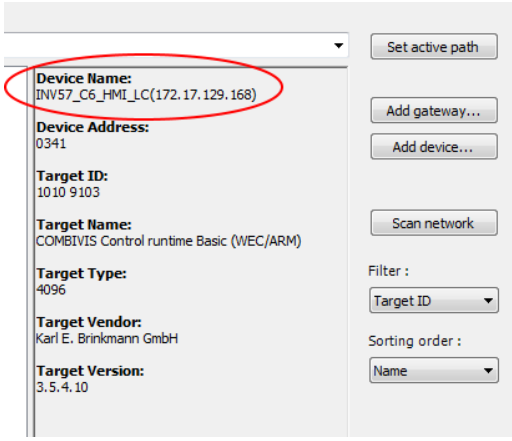
5.2.6 Use in combination with COMBIVIS HMI Runtime

COMBIVIS HMI Runtime can be of course configured to communicate with the CONTROL Runtime.

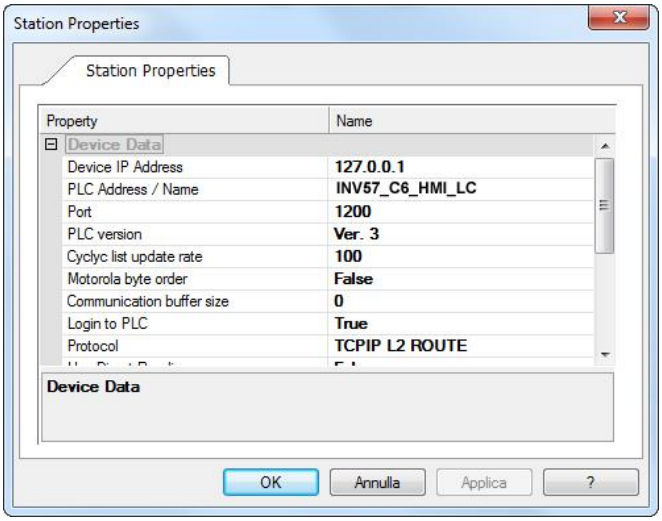
The C6 HMI LC includes the Gateway which is then used as communication interface.
The COMBIVIS studio HMI project must be configured to communicate with a generic CODESYS controller inserting in the “Real Time DB” resource the driver called “CODESYS” as shown in the following figure.



The protocol uses a socket to communicate with the CONTROL Runtime through the Gateway component.
The Station must be configured to connect to “localhost”. The Device name is the one shown by the programming system COMBIVIS studio 6 when connected on-line with the C6 HMI LC device from the “Communication settings” window as shown in the following figure.



The COMBIVIS studio HMI Station Properties will result as following.



The CONTROL Runtime running on a C6 HMI LC device can be reached also from a panel which has been configured to belong to the same sub network.
When having on the same sub network more than one C6 HMI LC system, you need to assign to them different name.

Note: In case the CONTROL Runtime is using Ethernet based I/O, the COMBIVIS studio HMI project must not be configured to use Ethernet protocols. The “LAN” interface is exclusively dedicated to the I/O, while the “WAN” interface is dedicated to the Internet connection for COMBIVIS connect and cannot be used as protocol port.

Note: The COMBIVIS studio HMI project can be configured to communicate with more than one controller; in these cases the system can act as a gateway and transfer data through the different channels. For further information about this feature consult the COMBIVIS studio HMI on-line manual searching for “Variable Commands” and then “Move Value”.

5.2.7 Use in combination with COMBIVIS connect

The C6 HMI LC systems are featuring COMBIVIS connect Runtime as preloaded and pre-configured.
The COMBIVIS connect VPN connection can be naturally used to connect from remote to the CONTROL PLC through the integrated Gateway. Once the VPN is activated, just follow the usual steps to get the on-line connection.
Please see the COMBIVIS connect Control Center on-line manual for further information about how to use the COMBIVIS connect software.

5.2.8 Limitations and Recommendations

In order to get the best balancing between functionalities and performances we strongly suggest to follow some guidelines when designing the applications for COMBIVIS studio 6 and COMBIVIS studio HMI.

- The PLC cycle time must be greater or equal than 10ms; the average jitter has been measured around +/- 2ms
- In general the CPU time reserved to CONTROL Runtime shall not be greater than 25%; this is calculated using the real time required by the PLC Runtime to complete the cycle and the time left free for all the other processes

Note: The maximum CPU time usable for the COMBIVIS studio 6 application is fixed from a system parameter; in case the PLC program gets more than 25% of the CPU time, the CONTROL Runtime will be stopped. The user shall then properly change the PLC task timing in order to respect the limitation.

- The maximum number of bytes exchanged between COMBIVIS studio HMI Runtime and CONTROL Runtime shall not be greater than 1024
- The sampling time specified for data acquisition shall not be less than 15sec
- The scripting shall be carefully used in order to leave enough time to the other tasks to run without impacting too much with the general reaction of the overall system
- If the project has been configured to use the Web Client, you should consider that when an external client is connect you may experience a slowdown of the page change performance of the COMBIVIS studio HMI Runtime
- The “S7-MPI COMx” communication protocol from COMBIVIS studio HMI is not supported.

SECTION 6

Maintenance

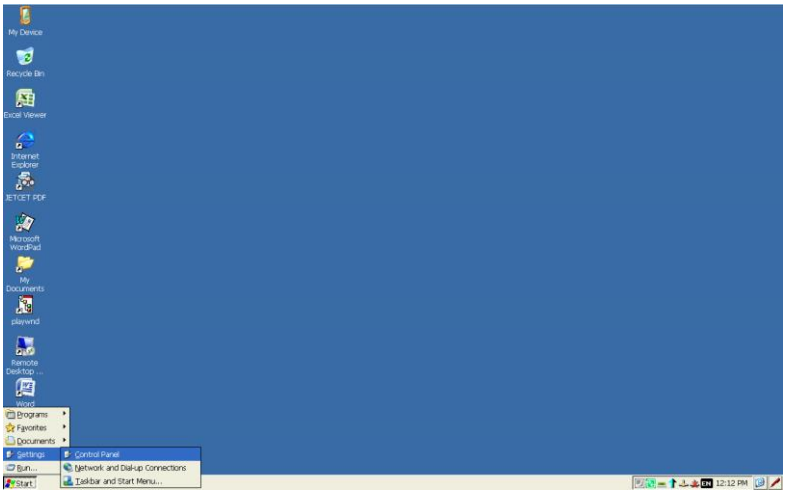
6.1 Calibration of the Touchscreen

C6 HMI / C6 HMI LC is designed to don't require touchscreen calibration, but in some cases, like update of the operating system, you must recalibrate the touch screen.

To calibrate the touch screen:

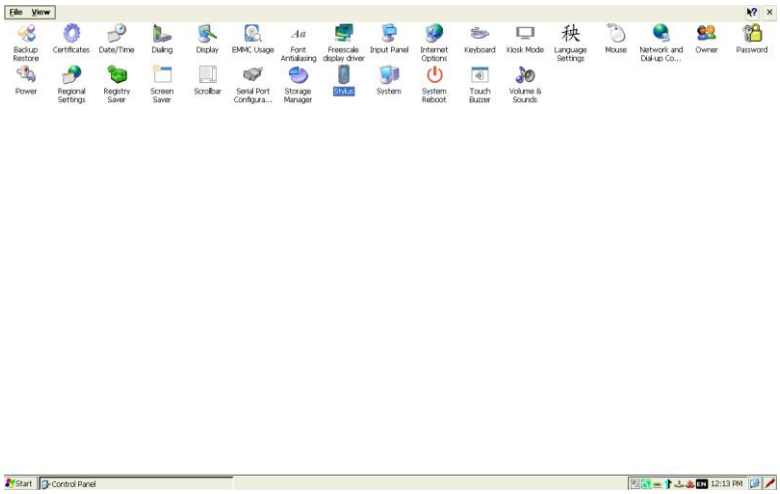
- Go in control panel.

Picture 58
Calibration of the Touchscreen

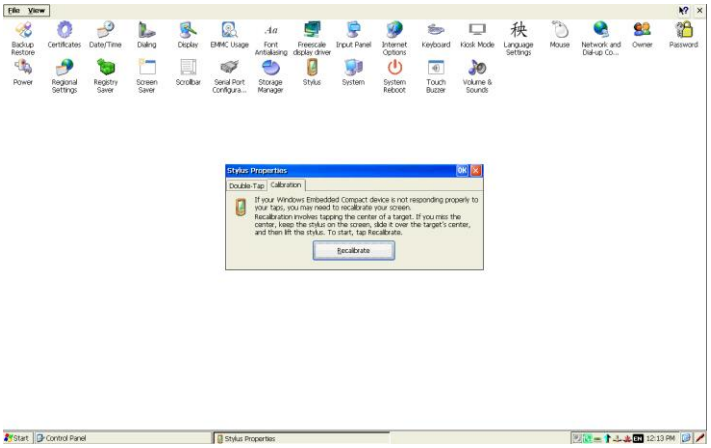


- Open the "Stylus" application.

Picture 59
Calibration of the Touchscreen



The following window will appear.



Picture 60
Calibration of the Touchscreen

- Click on the “Recalibrate” button and follow the instructions.

6.2 Maintaining & cleaning

C6 HMI / C6 HMI LC is designed for maintenance-free operation except for the replacing of the battery backup when necessary. It is recommended to clean the touchscreen with a damp cleaning cloth and a display cleaning solution.

Note: clean the front panel of the system with a soft damp cloth only.

Attention: Do not use detergents, solvents, cleaners or objects that could scratch the surface.

Attention: switch off the power before any cleaning operation.

6.2.1 Procedure

Proceed as follows:

a) Switch off the HMI device or lock the touch screen.
b) Spray the cleaning solution onto a cleaning cloth.
c) Do not spray directly onto the display.
d) Clean the display from the screen edge inwards.

6.2.2 Backup battery replacement (CR2032 3V)

- Remove the two screws as indicated in figure.

Figure 61
Backup battery replacement

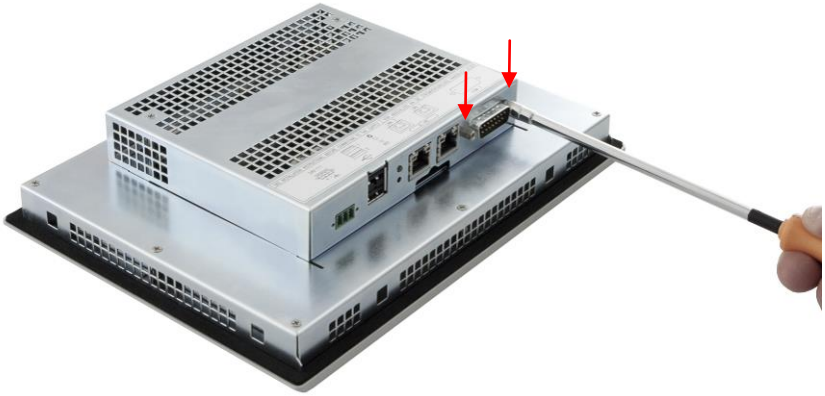
- Remove the two screws as indicated in figure.

Figure 62
Backup battery replacement

The following figures relate to the display models from 8.4“ (inches).

- Remove the two screws as indicated in figure.

Figure 63
Backup battery replacement



- Remove the two screws as indicated in figure.

Figure 64
Backup battery replacement

Figure 65
Backup battery replacement

- Locate the battery position.

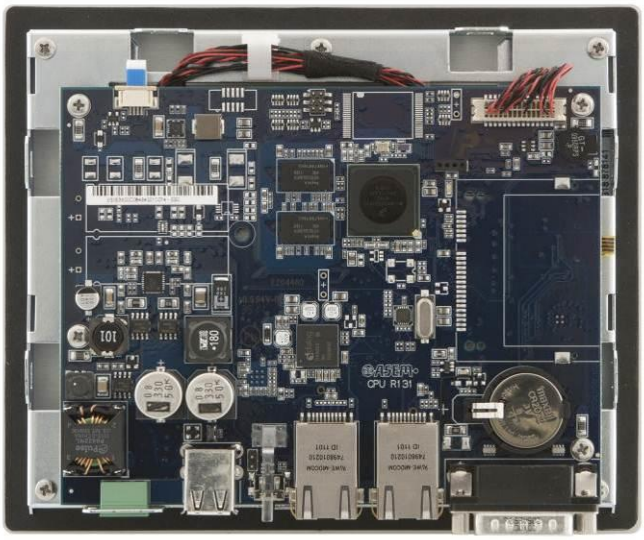


Figure 66
Backup battery replacement

- Remove the battery and replace it with one of the same model (CR2032 3V).

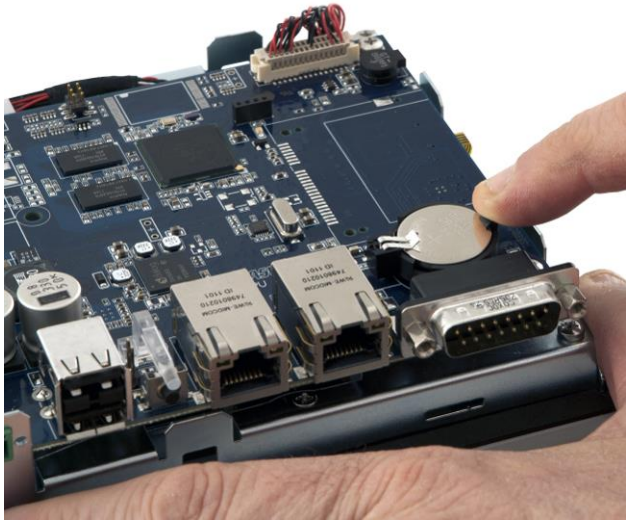


Figure 67
Backup battery replacement

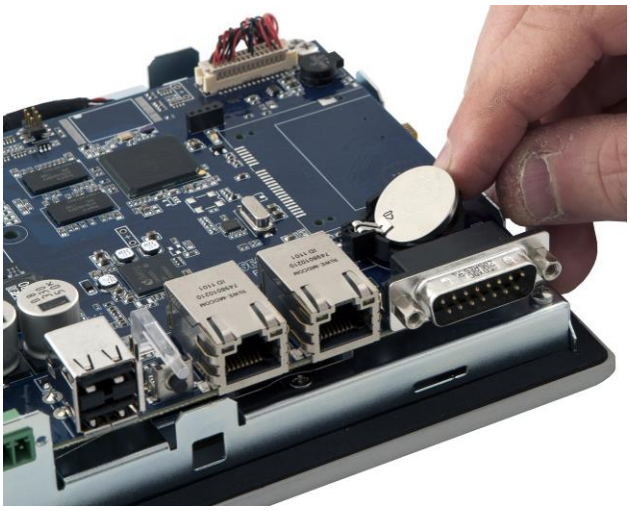


Figure 68
Backup battery replacement

Figure 69
Backup battery detail

6.3 Technical support & repairs

KEB offers wide-ranging, complete after-sales technical support. The staff who deal with this handle questions on the entire range of products skilfully, quickly, and efficiently.
You can phone our staff in the service department, and they will give you complete, prompt advice on how to resolve your problems.

telephone: +49 (0) 5263 401-0
Fax: +49 (0) 5263 401-116
e-mail: combicontrol@keb.de

6.4 Recycling and disposal

C6 HMI / C6 HMI LC can be recycled due to the use of materials with low environmental impact. Contact a certified disposal service company for environmentally sound recycling and disposal of your old devices.

SECTION 7

Technical specifications

7.1 Technical specifications

Table 25
System software characteristics

System software characteristics			
Integrated system software	Operating System	Microsoft Windows Embedded Compact 7 (C7P)	
	HMI	COMBIVIS studio HMI runtimes (Basic, ADVANCED versions)	
	Remote control	COMBIVIS connect runtime	
	Soft PLC	CONTROL Runtime	
COMBIVIS studio HMI characteristics		***BASIC***	***ADVANCED***
	I/O Bytes (tags)	1.024	4.096
	Synoptics	●	●
	Graphic libraries	●	●
	Power Templates	●	●
	Alarms	512	2.048
	Accelerators and menus	●	●
	Touchscreen	●	●
	History Log events	●	●
	Dynamic language change	●	●
	IL Logic (SoftLogic)	●	●
	VBA Multithreading	●	●
	ActiveX- OCX	●	●
	CFR21 Part 11	●	●
	Debugger Online/Remote	●	●
	IP camera	●	●
	Dynamic trends	●	●
	Historical trends, data analysis	●	●
	Recipes	●	●
	OPC DA Client	●	●
	Networking	●	●
	Data Loggers	Max 2	●
	Text Reports	●	●
	Multi drives	Max 2	Max 4
	SMS/E-mails	No	●
	Web-Server	No	2 user
COMBIVIS connect characteristics		***PRO***	
	Remote desktop	●	
	File manager	●	
	Task manager	●	
	Chat	●	
	Screenshot	●	
	VPN with access to remote PC Ethernet subnet	●	
	VPN up to remote PC	●	
	Remoted serial (no MPI)	●	
	API for customer application interface	●	
	Persistence log on runtime operations	●	
	Domain creation, user account and remote PC organisation structure	●	
	Assistance requests reported by runtime	●	
	Automatic connection	●	

Table 26
MAIN FEATURES of CONTROL PLC WinCE/ARM software

MAIN FEATURES of CONTROL PLC WinCE/ARM software		
PLC Programming		COMBIVIS studio 6 Version 6.2.1.0_3.5.3.50
Supported protocols		EtherCAT Master, MODBUS TCP Master, MODBUS RTU Master
Retain variables	Size	64KB RETAIN + 64KB PERSISTENT
	management	Automatic backup of the retain variables on eMMC at every switch-off and/or power supply interruption
Project	Cycle time	≥ 10ms
	Jitter	± 2ms
	CPU occupation	max 25%
	Variable exchanged with PHMI	max suggested 1024
	Datalogging interval	Suggested > 15s
	CONTROL PRO Runtime	No
	S7 MPI COMx	No

Table 27
System-hardware-characteristics

System-hardware-characteristics		
	4.3”	4-wire – analog - resistive
	5.7”	4-wire – analog - resistive
	7.0”	4-wire – analog - resistive
	8.4”	5-wire – analog - resistive
	10.1”W	5-wire – analog - resistive
	10.4”	5-wire – analog - resistive
	12.1”	5-wire – analog - resistive
	12.1”W	5-wire – analog - resistive
	15.0”	5-wire – analog - resistive
	15.6”	5-wire – analog - resistive
Motherboard	Model:	All-in-one, KEB R131
	RTC	Hardware with battery-backup
	Buzzer	Yes
CPU	Processor	ARM Cortex A8 - Freescale i.MX535 - 1 GHz
	Memory bus	400MHz
Graphic	Controller	GPU with integrated LCD controller
System memory	Type / size / socket	1 GB / DDR3-800 / soldered (contact KEB for different memory options)
Serial interfaces	Type	1 x RS232/422/485 (DB15M) software selectable
	Optoisolation	No
Ethernet interfaces	Type	LAN1 100Mbps (RJ45) with Link/Activity leds LAN2 10/100Mbps (RJ45) with Link/Activity leds
USB interfaces	Type	2 x USB 2.0 (rear, TYPE-A, Host Port, switch off single-channel software)
Storage device	Internal / not removable	**NAND-FLASH**: 256 MB (Read Only) for operative systems, COMBIVIS studio HMI and COMBIVIS connect. **eMMC**: 4 GB - 8 bit v. 4.4 compatible (for data and application program)
	External access / removable	SD/SDHC card slot V. 2.0 (push-push Type) (at 4.3” not available)
Battery	Type	Coin (CR2032 3V) removable
	Lifetime	3 years
Buttons, LEDs and keys	Reset button	System
	LEDs	Power / removable disk drive active

Table 28
Electrical characteristics

Electrical characteristics		
Power supply	Type	integrated on PC board, auto ranging
	Input voltage	18÷36 VDC with 3-pin plug
	Protection	Anti-inversion polarity, overvoltage, soldered fuse on the PC board
	Micro UPS	500ms of back up time after 7 years of life at an average temperature of 45°C First load: 6 min Rrearm time: 90 sec
	Power consumption (max.) with USB ports loaded	12.0W@5.7” 13.0W@7,0” 13.5W@8,4” 15.5W @10,4” 19.5W @12.1” (SVGA) 21.5W @15,0” 23.0W @15,6”

These devices are designed to be connected with a "secondary circuit overvoltage category II".

Table 29
Mechanical characteristics

Mechanical characteristics		
Housings	Type	Panel mounting
	Material	Steel, white zinced
Front panel	Construction	Full aluminium-alloy
	Protection	IP66
	Color	-

Table 30
Environment characteristics

Environment characteristics		
Temperature	Operation	0° ÷ +50°C
	Storage	-20° ÷ +60°C
Humidity	Operation/storage	80% (non-condensing)

Table 31
Displays

Displays		
4.3”	LCD size	4.3”
	Resolution	480 x 272
	Colors	16M
	Backlight	Sidelight LED
5.7”	LCD size	5.7”
	Resolution	640 x 480 (VGA)
	Colors	256K
	Backlight	Sidelight LED
7.0”W	LCD size	7” wideband
	Resolution	800 x 480 (WVGA)
	Colors	16M
	Backlight	Sidelight LED
8.4”	LCD size	8.4”
	Resolution	800 x 600 (SVGA)
	Colors	16M
	Backlight	Sidelight LED
10.1”W	LCD size	10.1”
	Resolution	1280x800 (WXGA)
	Colors	16M
	Backlight	Sidelight LED
10.4”	LCD size	10.4”
	Resolution	800 x 600 (SVGA)
	Colors	16M
	Backlight	Sidelight LED
12.1”	LCD size	12.1”
	Resolution	800 x 600 (SVGA)
	Colors	16M
	Backlight	Sidelight LED
12.1”W	LCD size	12.1”
	Resolution	1280x800 (WXGA)
	Colors	16M
	Backlight	Sidelight LED
15.0”	LCD size	15.0”
	Resolution	1024 x 768 (SXGA)
	Colors	16M
	Backlight	Sidelight LED
15.6”W	LCD size	15.6”
	Resolution	1366 x 768 (XGA)
	Colors	16M
	Backlight	Sidelight LED

Table 32
Guarantee and certifications

Guarantee and certifications		
CE	Emission	In accordance with EN 55022 Information technology equipment - radio interferences - max. permissible values and measurement procedures
	Immunity	In accordance with EN 55024 Information technology equipment - noise immunity - max. permissible values and test procedures
	Safety	In accordance with EN 60950-1 – Information technology equipment - Safety - Part 1: General requirements
c UL us LISTED	Programmable controller 4WZ2 E356364	

7.1.1 4.3” Display characteristics

Table 33
4.3” Display characteristics

4.3” Display characteristics	
Dimensions	4.3” (4:3)
Technology	TFT active matrix
Display area	appr. 95.0 (W) x 54.0 (H) mm
Resolution	480 x 272 pixel
Display color	16 M colors
Pixel Pitch	0.198 (W) x 0.198 (H) mm
Brightness	400 cd/m^2 (Note 1)
Horizontal angle (left + right)	130°
Vertical angle (up + down)	90°
Contrast ratio	250:1
Response time (increasing)	40 ms (Type)
Backlight	LED
LED life (Note 2)”	50.000h @ default (Note 3) and max. Tamb

7.1.2 5.7” Display characteristics

Table 34
5.7” Display characteristics

5.7” Display characteristics	
Dimensions	5.7” (4:3)
Technology	TFT active matrix
Display area	115.2 (W) x 86.4 (H) mm
Resolution	640 x 480 pixel
Display color	256 K colors
Pixel Pitch	0.18 (W) x 0.18 (H) mm
Brightness	500 cd/m^2 (Note 1)
Horizontal angle (left + right)	70° + 70°
Vertical angle (up + down)	45° + 55°
Contrast ratio	250:1
Response time (increasing)	50 ms (Type)
Backlight	LED
LED life (Note 2)”	40.000h @ default (Note 3) and max. Tamb

7.1.3 7.0”W Display ,

Table 35
7.0”W Display characteristics

7.0”W Display characteristics	
Dimensions	7” wide (15:9)
Technology	TFT active matrix
Resolution	800 x 480 pixel
Display color	16M colors
Pixel Pitch	0.1905 (W) x 0.1905 (H) mm
Brightness	500 cd/m^2 (Note 1)
Horizontal angle (left + right)	70° + 70°
Vertical angle (up + down)	70° + 60°
Contrast ratio	400:1 (Type)
Response time (increasing)	10 ms
Backlight	LED
LED life (Note 2)”	40.000h @ default (Note 3) and max. Tamb

7.1.4 8.4” Display characteristics

Table 36
8.4” Display characteristics

8.4” Display characteristics	
Dimensions	8.4” (4:3)
Technology	TFT active matrix
Display area	170.4 (W) x 127.8 (H) mm
Resolution	800 x 600 pixel
Display color	16M colors
Pixel Pitch	0.213 (W) x 0.213 (H) mm
Brightness	350 cd/m^2 (Note 1)
Horizontal angle (left + right)	75° + 75°
Vertical angle (up + down)	60° + 70°
Contrast ratio	600:1 (Type)
Response time (increasing)	10 ms (Type)
Backlight	LED
LED life (Note 2)”	50.000h @ default (Note 3) and max. Tamb

7.1.5 10.1”W Display characteristics

Table 37
10.1”W Display characteristics

10.1”W Display characteristics	
Dimensions	10.1”W (16:10)
Technology	TFT active matrix
Display area	216.96 x 135.6
Resolution	1280 x 800 pixel
Display color	16M colors
Pixel Pitch	0.1695 (W) x 0.1695 (H) mm
Brightness	400 cd/m^2
Horizontal angle (left + right)	85°+ 85°
Vertical angle (up + down)	85°+ 85°
Contrast ratio	800:1
Response time (increasing)	25 ms
Backlight	LED
LED life (Note 2)”	100.000h

7.1.6 10.4” Display characteristics

Table 38
10.4” Display characteristics

10.4” Display characteristics	
Dimensions	10.4” (4:3)
Technology	TFT active matrix
Display area	211.2 (W) x 158.4 (H) mm
Resolution	800 x 600 pixel
Display color	16M colors
Pixel Pitch	0.264 (W) x 0.264 (H) mm
Brightness	400 cd/m^2 (Note 1)
Horizontal angle (left + right)	80° + 80°
Vertical angle (up + down)	60°+ 80°
Contrast ratio	700:1 (Type)
Response time (increasing)	20 ms (Type)
Backlight	LED
LED life (Note 2)”	50.000h @ default (Note 3) and max. Tamb

7.1.7 12.1” (SVGA) display characteristics

Table 39
12.1” (SVGA) display characteristics

12.1” Display characteristics	
Dimensions	12.1” (4:3)
Technology	TFT active matrix
Display area	246.0 (W) x 184.5 (H) mm
Resolution	800 x 600 pixel
Display color	16M colors
Pixel Pitch	0.3075 (W) x 0.3075 (H) mm
Brightness	500 cd/m^2 (Note 1)
Horizontal angle (left + right)	80° + 80°
Vertical angle (up + down)	70° + 70°
Contrast ratio	800:1 (Type)
Response time (increasing)	4 ms (Type)
Backlight	LED
LED life (Note 2)”	100.000h @ default (Note 3) and max. Tamb

7.1.8 12.1”W display characteristics

Table 40
12.1”W Display characteristics

12.1”W Display characteristics	
Dimensions	12.1" (16:10)
Technology	TFT active matrix
Display area	261.12 x 163.2
Resolution	1280 x 800 pixel
Display color	16M colors
Pixel Pitch	0.204 (W) x 0.204 (H) mm
Brightness	400 cd/m^2
Horizontal angle (left + right)	88° + 88°
Vertical angle (up + down)	88° + 88°
Contrast ratio	1000:1
Response time (increasing)	25 ms
Backlight	LED
LED life (Note 2)”	50.000 h

7.1.9 15.0” Display characteristics

Table 41
15.0” Display characteristics

15.0” Display characteristics	
Dimensions	15.0” (4:3)
Technology	TFT active matrix
Display area	304.1 (W) x 228.1 (H) mm
Resolution	1024 x 768 pixel
Display color	16M colors
Pixel Pitch	0.297 (W) x 0.297 (H) mm
Brightness	450 cd/m^2 (Note 1)
Horizontal angle (left + right)	80° + 80°
Vertical angle (up + down)	70° + 70°
Contrast ratio	700:1 (Type)
Response time (increasing)	2 ms (Type)
Backlight	LED
LED life (Note 2)”	100.000h @ default (Note 3) and max. Tamb

7.1.10 15.6”W Display characteristics

Table 42
15.6”W Display characteristics

15.6”W display characteristics	
Dimensions	15.6” (16:9)
Technology	TFT active matrix
Display area	344.2 (W) x 193.5 (H) mm
Resolution	1366 x 768 pixels
Display color	16.7M colors
Pixel Pitch	0.252 (W) x 0.252 (H) mm
Luminance	300 cd/m^2 (Note 1)
Horizontal viewing angle (left + right)	85°+85°
Vertical viewing angle (up + down)	80°+80°
Contrast ratio	500:1 (Typ.)
Response time (Rise)	8 ms (Typ.)
Backlight	LED
LED life (Note 2)	50.000h @ default (Note 3) and max Tamb

Note 1 At maximum (100%) brightness setting.

Note 2 After the LED life time, the backlight luminance may be reduced up to the 50% of the initial value.

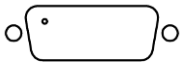
Note 3 The default backlight value is set at 80% of the maximum brightness by the operating system.
Note that the user can modify the backlight brightness, using the related operating system mask.
At 25°C, the above-indicated LED life is also guaranteed at 100% backlight brightness; instead, at higher ambient temperature and 100% backlight brightness, LED life time will decrease.

7.2 Certificates and approvals

Warranty & approvals		
CE	Emission	Conforms to: EN 55022 Information technology equipment – Radio disturbance characteristics EN 61000-3-2 Limits for harmonic current emissions EN 61000-3-3 Limitation of voltage fluctuation flicker EMC Directive 2014/30/EU ex 2004/108/EC
	Immunity	Conforms to: EN 55024 Information technology equipment – Immunity characteristics EN 61000-6-2 Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments EMC Directive 2014/30/EU ex 2004/108/EC
	Safety	Conforms to: EN 60950-1 – Information technology equipment – Safety
RoHS	Conforms to: EN 50581:2012 - Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances RoHs Directive 2011/65/EU	
c UL us LISTED	Industrial Control Equipment, UL508 Process Control Equipment Industrial Products, CAN/CSA C22.2 No. 142-M1987	

7.3 Ports PINOUT

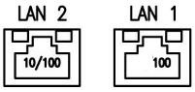
7.3.1 COM1 – DB15M Serial



PIN	Signal	Input/output
1	+5 VDC	OUT
2	Transmission data (RS-232)	OUT
3	Received data (RS-232)	IN
4	Transmit To Send	OUT
5	Clear Tu Send	IN
6	Data set ready	IN
7	Ground	—
8	Data Terminal Ready	OUT
9	Carrier Detect	IN
10	Transmission Data +/Receive Data + (RS-485/RS-422)	Input/output
11	Transmission Data -/Receive Data - (RS-485/RS-422)	I/O
12	Ring Indication (RS-232)	IN
13	Receive Data + (RS-422)	IN
14	Receive Data - (RS-422)	IN
15	N.C.	N.C.

Any polarization or termination resistor is connected to RS422/485 channel so, if required, it has to be provided by the user into the plant connector.

7.3.2 LAN1 – LAN2



PIN	Signal
1	TX+
2	TX-
3	RX+
4	Shield
5	Shield
6	RX-
7	Shield
8	Shield

7.3.3 USB1 / USB2

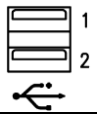


Table 43
USB1 – USB2

PIN	Signal
1	+5 Vcc
2	USB data -
3	USB data +
4	GND

7.4 Technical support & repairs

KEB offers wide-ranging, complete after-sales technical support. The staff who deal with this handle questions on the entire range of products skilfully, quickly, and efficiently.
You can phone our staff in the service department, and they will give you complete, prompt advice on how to resolve your problems.

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Figure overview

Table overview

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