Device Description

PC based HMI-PLC
XV-DVI Panel

02/05 AWB2720-1524GB

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Warning!
Dangerous electrical voltage!

Before commencing the installation

- Disconnect the power supply of the device.
- Ensure that devices cannot be accidentally restarted.
- Verify isolation from the supply.
- Earth and short circuit.
- Cover or enclose neighbouring units that are live.
- Follow the engineering instructions (AWA) of the device concerned.
- Only suitably qualified personnel in accordance with EN 50110-1/-2 (VDE 0105 Part 100) may work on this device/system.
- Before installation and before touching the device ensure that you are free of electrostatic charge.
- The functional earth (FE) must be connected to the protective earth (PE) or to the potential equalisation. The system installer is responsible for implementing this connection.
- Connecting cables and signal lines should be installed so that inductive or capacitive interference does not impair the automation functions.
- Install automation devices and related operating elements in such a way that they are well protected against unintentional operation.
- Suitable safety hardware and software measures should be implemented for the I/O interface so that a line or wire breakage on the signal side does not result in undefined states in the automation devices.
- Ensure a reliable electrical isolation of the low voltage for the 24 volt supply. Only use power supply units complying with IEC 60364-4-41 (VDE 0100 Part 410) or HD 384.4.41 S2.
- Deviations of the mains voltage from the rated value must not exceed the tolerance limits given in the specifications, otherwise this may cause malfunction and dangerous operation.
- Emergency stop devices complying with IEC/EN 60204-1 must be effective in all operating modes of the automation devices. Unlatching the emergency-stop devices must not cause restart.
- Devices that are designed for mounting in housings or control cabinets must only be operated and controlled after they have been installed with the housing closed. Desktop or portable units must only be operated and controlled in enclosed housings.
- Measures should be taken to ensure the proper restart of programs interrupted after a voltage dip or failure. This should not cause dangerous operating states even for a short time. If necessary, emergency-stop devices should be implemented.
- Wherever faults in the automation system may cause damage to persons or property, external measures must be implemented to ensure a safe operating state in the event of a fault or malfunction (for example, by means of separate limit switches, mechanical interlocks etc.).

Proper use

The device must only be used for the applications specified in the device description and only in conjunction with the components recommended by Moeller GmbH.

Warning

Trouble-free and safe operation of the product can only be ensured if the measures relating to proper transport, storage, assembly, installation and careful operation are strictly observed.

The device must not be switched on when it is covered with condensation. When changing its location from cold to warm allow the device to acclimatize to the new conditions before commissioning.

No warranty claims will be recognized for faults arising from the improper handling of the device.

The device should not be used for the implementation of any safety functions relating to the protection of personnel and machinery.

No liability is accepted for claims for damages arising from a failure or functional defect in the device.

All data specified in this document does not represent guaranteed specifications in the legal sense.

Safety instructions for the user

This device description contains the information required for the proper use of the products described therein. Sections 1 to 12 address technically qualified personnel and Section 13 onwards addresses personnel not requiring any technical knowledge.

Qualified personnel in the sense of the safety instructions given in this device description or on the product itself are persons who:

as engineering personnel are either familiar with the safety concepts of automation,

or as operating personnel, are instructed in the use of automation components and are familiar with the contents of this device description relating to the operation of the device,

or as commissioning or service personnel are suitably trained for the repair of automation devices and are authorized to commission circuits and devices/systems in accordance with standard safety engineering principles.

Contents

1 Explanation of symbols

Danger warnings

The following information is for your personal safety and the prevention of damage to the device described or connected devices.

Safety instructions and warnings for the prevention of danger to the life and health of users or service personnel, and for the prevention of damage are highlighted in this document by the following pictograms. “Warning” and “Information” pictograms are shown in this document.

Warnings indicate the following:

Death, serious injury or substantial material damage may occur if the related safety measures are not implemented.

The individual “Warning” pictograms have the following meaning:

Caution! General!
An instruction to be observed in order to ensure protection against hazards and the safe operation of the device. The specified procedure should be observed.

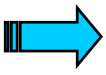
Caution! Electric shock!
Persons may be exposed to dangerous voltages that occur in electrical systems. There is a danger of electric shock if a live part is touched.

Caution! Observe ESD measures!
Electrostatic discharge may destroy electronic components.

Information pictograms indicate the following:

Important information about the product or the relevant section of the document, requiring the particular attention of the reader.

The “Information” pictogram has the following meaning:



Indicates important and instructional information.

2 Introduction

Features of the DVI-Panels

- SCREEN SIZES 6.4” up to 15”
- INFRARED or RESISTIVE TOUCH-TECHNOLOGY
- IP65 FRONT
- DISTANCE TO THE IPC up to 30 m
- FULL DIGITAL VIDEO SIGNALS FOR FLICKERFREE SCREEN OUTPUT

The DVI-Panels fulfill all state of the art requirements for a high end digital signal transfer. They are compatible to the DVI Standard as „Single Channel DVI-D Flat-Panel Monitor“.

The DVI-Panels can be used together with a XCC-601 or in combination with a normal DVI-graphics card in a standard-PC. So it is possile to move the TFT-colour display up to max. 30 meters (depending on the screen resolution) away from the PC.

Thanks to the TFT-display technologie the DVI-Panels have a wide viewing angle and a flickerfree flat screen. It is possible to choose between a service free infrared touch-screen with scratch free safety glass or a seamless resistive touch-screen.

The metal housing with robust frame saves the device during it’s long live in a rugged industrial environment (IP65 at frontside) and is easy in maintenance.

Application range

The DVI-Panels are robust information and input devices, ideal for use in rugged industrial environments directly at the machine.

The devices can be installed in control panels or control desks without any problem.

The DVI-Panels are designed for:

- Visualization and process control
- PLC-Visualization
- Control and automation tasks
- For industrial environments
- for Multi-Media-Systems
- for the use within the specified technical data

The devices are not designed for mobile use.

This device description is a reference for the technical data, installation, terminals, commissioning, operation, and maintenance of all DVI-Panel versions. The designation and function of the connections and signals are the same for all versions.

3 Device versions

The term DVI-Panel stands for the following versions:

DVI-Panel types		
Type designation	Display / Touch	Resolution
XV-DVI-GTR-06-000	6,4” VGA / resisitive	VGA 640x480
XV-DVI-GTR-10-000	10,4“ VGA / resisitive	VGA 640x480
XV-DVI-GTR-12-000	12,1“ SVGA / resisitive	SVGA 800x600
XV-DVI-GTR-15-000	15,0“ XGA / infrared	XGA 1024x768
XV-DVI-GTI-10-000	10,4“ VGA / infrared	VGA 640x480
XV-DVI-GTI-12-000	12,1“ SVGA / infrared	SVGA 800x600
XV-DVI-GTI-15-000	15,0“ XGA / infrared	XGA 1024x768

3.1 SPEZIFICATIONS

XV-DVI-GTR-06-000	Order No.: **272557** 6,4“ TFT Display with resistive-Touch, DVI-Interface, Touch/PowerSupply-connector
XV-DVI-GTR-10-000	Order No: **274065** Same as Order No: 272557 but with **10,4“ TFT display**
XV-DVI-GTR-12-000	Order No: **274066** Same as Order No: 272557 but with **12,1“ TFT display**
XV-DVI-GTR-15-000	Order No: **274067** Same as Order No: 272557 but with **15“ TFT display**
XV-DVI-GTI-10-000	Order No: **274068** Same as Order No: 274065 but with **infrared touch-screen**
XV-DVI-GTI-12-000	Order No: **274069** Same as Order No: 274066 but with **infrared touch-screen**
XV-DVI-GTI-15-000	Order No: **274070** Same as Order No: 274067 but with **infrared touch-screen**

3.2 Accessories

DVI-cable	**XT-DVI-5-01 Order No. 278503** DVI-D to DVI-D Single Link cable length 5m **XT-DVI-10-01 Order No. 278504** DVI-D to DVI-D Single Link cable length 10m **XT-DVI-20-01 Order No. 291460** DVI-D to DVI-D Single Link cable length 20m
PowerSupply/Touch - cable	**XT-232-PT-5-01 Order No. 278501** Cable for power supply and touch length 5m **XT-232-PT-10-01 Order No. 278502** Cable for power supply and touch length 10m **XT-232-PT-20-01 Order No. 291459** Cable for power supply and touch length 20m
PC-Slot-cover plate	**XT-PC-232-PT-01 Order No. 278505** PC-Slot cover plate with connectors for the touch-screen and power supply of the DVI-Panel
RS232 cable	**XT-232-PT-01 Order No. 283470** RS232 cable (connection of PC-COM-Interface and the PC-Slot cover plate touch-screen interface) for use with PC-Slot-cover plate

4 Features

Merkmal			Bemerkung
Display	Graphics	Size	6,4“ / 10,4“ / 12,1“ / 15“
	Type	TFT	256k colours
	Resolution	6.4“ 10.4“ 12.1“ 15.0“	640 x 480 (VGA) 640 x 480 (VGA) 800 x 600 (SVGA) 1024 x 768 (XGA)
Touch-screen	Infrared touch-screen	Resolution 10.4“ 12.1“ 15.0“	 81 x 61 92 x 70 115 x 87
	Resistive touch-screen	Resolution 6,4“ to 15“	12 Bit (0-4096)
Interfaces	DVI	Type	Single Channel DVI-D
	Power supply	Type	24VDC
	Power supply/ Touch-Interface	Type	12VDC RS232

5 Commissioning

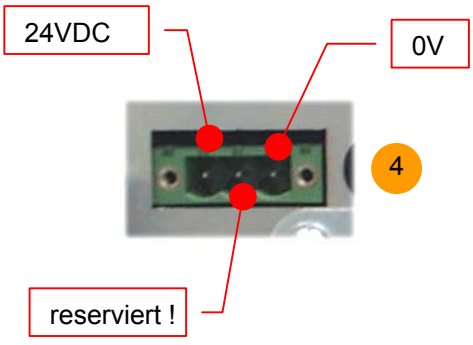
5.1 Overview of connections

Devices with infrared or resistive touch-screen 10.4" - 15"[1]

Devices with resistive touch-screen 6.4"

Nr.	Element	Description
1	Power supply / Touch	➔ Section 5.3
2	Video (DVI)	➔ Section 5.4
3	Diagnostic LEDs	➔ Section 5.8
4	Power supply 24V	➔ Section 5.2
5	Rotary switch	➔ Section 5.5

5.2 Connecting the power supply 24V



The DVI-Panels device belongs to protection class 3. The system power supply must be provided with a 24VDC **SELV** voltage. The power supply is NOT isolated. The GND connection is directly connected to the housing potential. The device is protected with a fuse. A reverse polarity protective device is used to protect the device in the event of reversed poles. Operation, however, is only possible if the connection was made correctly. Connections for the DVI-Panel must comply with specific, local regulations.

The connection must be made as follows:

- The cross-section of the power supply cable must be at least 0.75 mm² and a maximum of 2.5 mm².
- A flexible lead or wire can be used for the connection.
- The current consumptionmust be taken into account when implementing the power supply.
- The functional earth is not compulsory for operation. But it can help to avoid disturbance caused by potential differences.

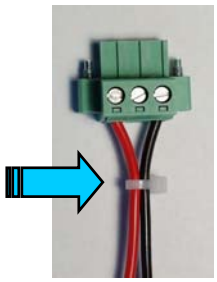
[1] Infrared-Touch devices with revision index 0001 (see type label)

CONNECTING THE POWER SUPPLY (CONTINUED)

3pin Phoenix MSTB2.5/3-GF-5.08, RM 5.08mm, 1776511
(mating Plug connector: WAGO 1777992)

Pin-Nr.	Signal	Description
1	+24VDC	+24VDC power supply
2	-	reserved
3	0V	0V power supply

In the event of reverse connection and simultaneous connection of a further 0V connection, e.g. GND connection of the COM1 interface, the fault current flows via this OV connection. If the housing is not lying well set on the OV potential, the result can be destruction of the device or of the external components!

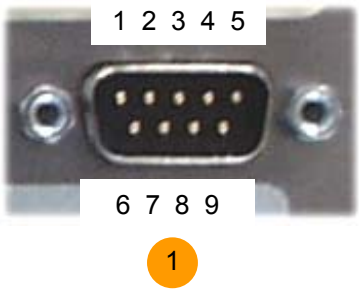


For safety reasons the wires should be fixed together near by the connector.

5.3 CONNECTING THE POWER SUPPLY / TOUCH

The power supply and the touch-screen will be connected other a single cabel with the XCC-601 or with the Touch/PowerSupply-Interface of the PC-Slot cover plate (see accessories) of a standard-PC.

The connector is used for the power supply and the touch-screen interface of the DVI-Panel.
Pay attention to power consumption ➔ Section 12



This interface is not isolated. The GND connection is implemented directly on the housing potential (➔ Section 12).

Cables connected to the PowerSupply/Touch Interface must be laid separately from the low-voltage cables.
The pin assignment corresponds to the PC standard with the following exception:

Pin-Nr.	Signal	Description
1	-	Reserved
2	RXD	Receive signal for the touch-screen
3	TXD	Send signal for the touch-screen
4	-	Reserved
5	GND	
6	-	Reserved
7	-	Reserved
8	-	Reserved
9	12V	12V-Power supply

Pin 9 is used for 12VDC power supply of the DVI-Panel .

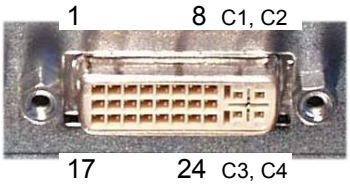
To ensure disturbance-free operation, it is strongly recommended to use the Touch/PowerSupply cables from the original accessories. (see accessories)

The 12V power supply of the DVI-Panel is NOT reverse polarity protected!

5.4 DVI-Interface

The DVI Interface is used to connect the DVI-Panel with a XCC-601 or with a DVI-Interface of a standard PC. For that a standard DVI cable should be used (see accessories).

The Video Interface is compatible to the Single Link DVI-D Standard. For practical reasons a DVI-I connector is used, where the analog inputs pins have no function (not connected).



Pin-Nr	Signal	Description
1	RX2-	TMDS Data 2- Input
2	RX2+	TMDS Data 2+ Input
3	RX2/RX4 shield	TMDS Shield for Data 2 & 4
4	RX4-	Internally not connected
5	RX4+	Internally not connected
6	DDC Clock	Digital Data Channel Clock Input
7	DDC Data	Digital Data Channel Data I/O
8	Analog Vsync	Internally not connected
9	RX1-	TMDS Data 1- Input
10	RX1+	TMDS Data 1+ Input
11	RX1/RX3 shield	TMDS Shield for Data 1 & 3
12	RX3-	Internally not connected
13	RX3+	Internally not connected
14	+5 V	+5V for DDC
15	TTL Ground	
16	HPD	Hot Plug Detect
17	RX0-	TMDS Receive 0-
18	RX0+	TMDS Receive 0+
19	RX0/RX5 shield	TMDS Shield for Data 0 & 5
20	RX5-	Internally not connected
21	RX5+	Internally not connected
22	Clock shield	TMDS Shield for Clock
23	Clock+	TMDS Clock+ Input
24	Clock-	TMDS Clock- Input
C1	Analog Red	Internally not connected
C2	Analog Green	Internally not connected
C3	Analog Blue	Internally not connected
C4	Analog Hsync	Internally not connected
C5	Analog Ground	Internally not connected

To ensure disturbance-free operation, it is strongly recommended to use the Touch/PowerSupply cables from the original accessories. (see accessories)

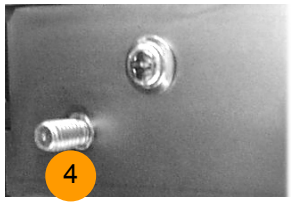
5.5 Rotary switch

To compensate the length of the DVI cable, the DVI-Panel is equiped with a rotary switch.
Normaly the default setting (position '0') is o.k. and the picture on the DVI-Panel is stable. If you encounter flickering pixels with short cables, please switch to a different position towards 'F'

0 is for long cables
↓
F is for short cables

Default is 0

5.6 Functional earth



The functional earth is not compulsory for operation. But it can help to avoid disturbance caused by potential differences. So it is recommended to connect the functional earth of the DVI-Panel.

5.7 Fuse

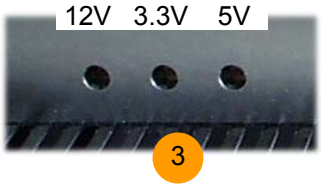
DVI-Panel 10" - 15"

The device is protected with a self repairing fuse internally. If the fuse respond because of an error it is necessary to disconnect the power supply of the DVI-Panel, solve the problem and wait the reset time of the fuse (approx. 1 minute).

DVI-Panel 6.4"

The device is protected with a fuse internally. It is not possible to change the fuse. In case of an error the device must be repaired by the manufacturer.

5.8 Diagnostic-LEDs



The DVI-Panel has three Diagnostic-LEDs, which displays the valid power supply status.

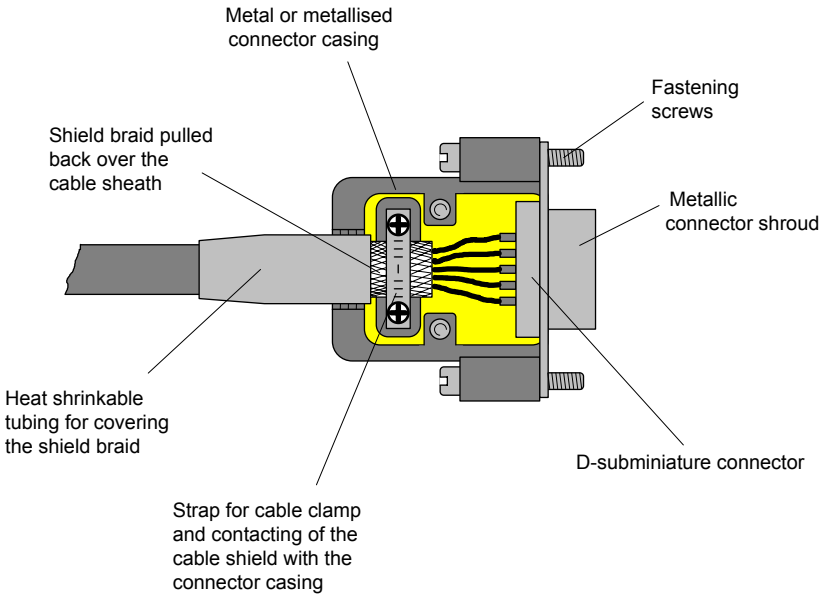
5.9 Preparing the shield connections

The preparation of the data and signal cables is an important factor for the electromagnetic compatibility (EMC) of the DVI-panels, both in terms of interference immunity and emission.

The Touch/PowerSupply interface is connected via D-Subminiature plug connectors in accordance with DIN 41652. Only use metal or metallised connector casings with a cable clamp for strain relief fastened or clamped on the connector. The clamping of the cable shield ensures an optimum contact area and a low impedance connection with the connector casing of the DVI-Panel.

The following procedure is recommended for making the low-impedance connection for the cable shield:

1. Strip the cable.
2. Shorten the exposed shield braid by approx. 3 cm.
3. Turn back the braid over the cable sheath.
4. Use a heat shrinkable tubing or rubber grommet to cover the exposed cable sheath with the folded back shield braid so that 5 to 8 mm of exposed cable shield is left at the sheath end and is cleanly covered at the back.
5. Fit the connector
6. The cable is then fastened at the exposed shield braid and the cable sheath below it directly underneath the cable clamp strap of the



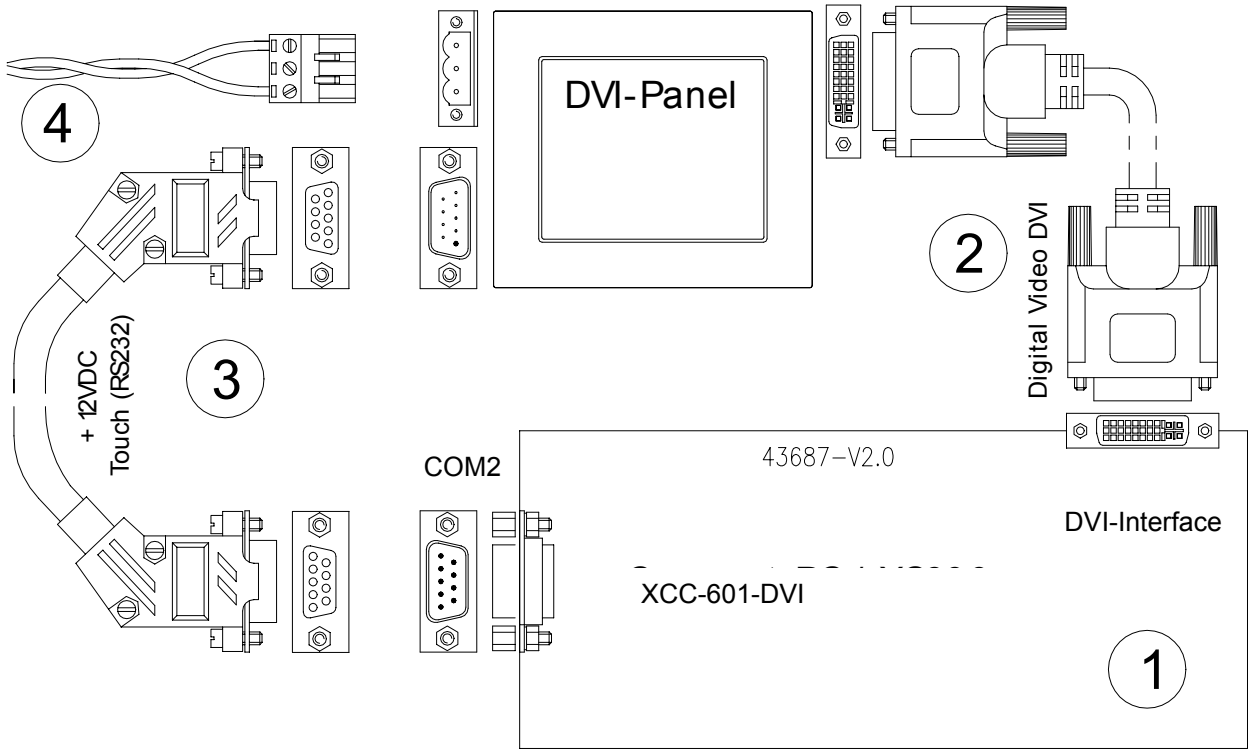
connector casing.

Connection work should be carried out with special care in order to ensure trouble-free operation.
The EMC values stated in the technical data can only be guaranteed if the cables are prepared according to the following specifications.

5.10 Connection to XCC-601

Connect a DVI-Panel to a XCC-601:

① the XCC-601 must have a DVI-interface
② connect DVI-Video-cable between XCC-601 and DVI-Panel
③ connect Touch/PowerSupply cable between XCC-601 (COM2) and DVI-Panel
④ optional power supply cable +24V for long distances



To ensure disturbance-free operation, it is strongly recommended to use cables with shield.

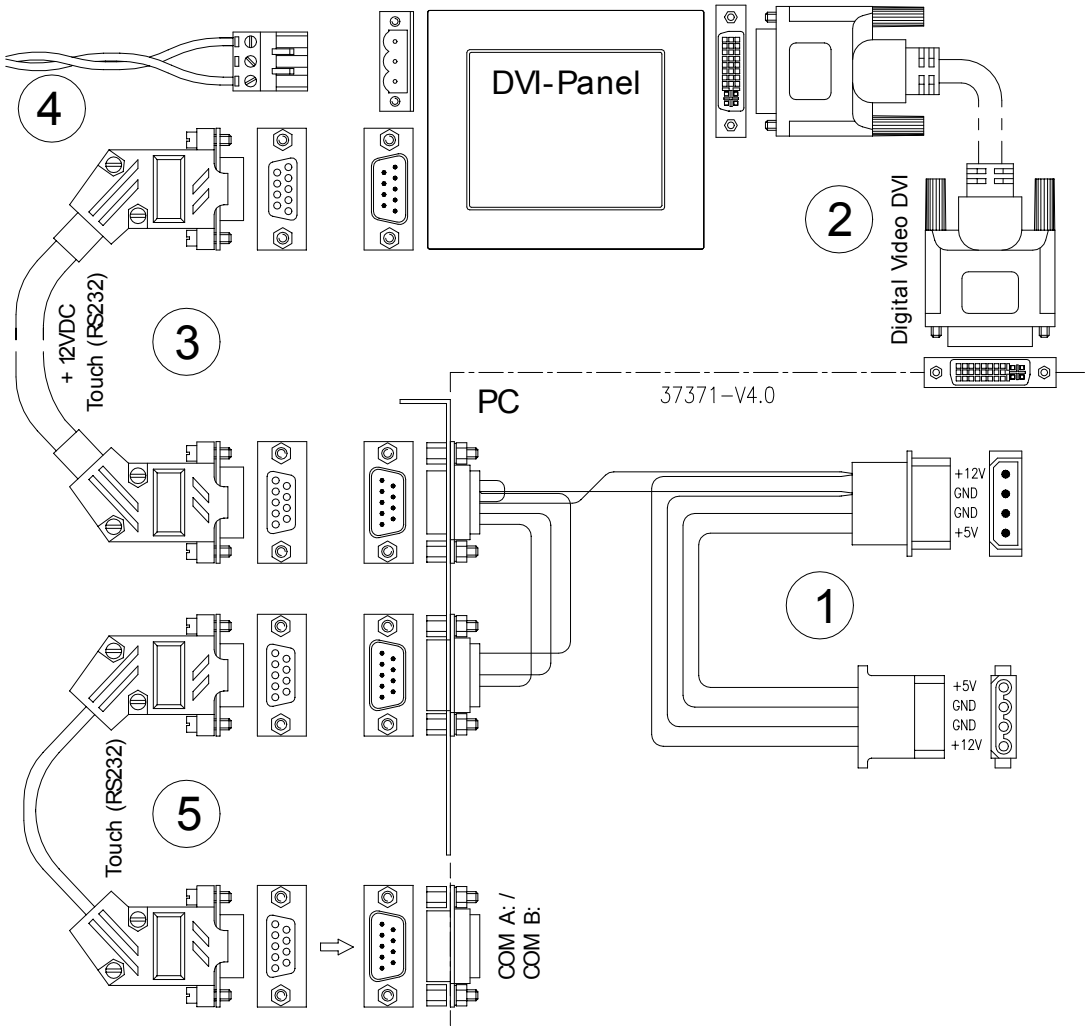
For short distances the power supply is recommended via touch cable.

For distances longer 5m the voltage drop may be to much and the power has to be supplied at the 24V connector. This depends on the power consumtion of the DVI-Panel.

5.11 Connection to a Standard-PC

Connect a DVI-Panel to a standard PC (PC-Slot cover plate is required – see accessories):

① the PC must have a DVI-interface. Open PC and insert PC-Slot cover plate. Connect the power supply.
② connect DVI-Video-cable between graphic card and DVI-Panel
③ connect Touch/PowerSupply cable between PC Slot cover plate and DVI-Panel
④ optional power supply cable +24V for long distances
⑤ connect RS232 cable between RS232 COM port of the PC and PC-Slot cover plate



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For short distances the power supply is recommended via touch cable.

For distances longer 5m the voltage drop may be to much and the power has to be supplied at the 24V connector. This depends on the power consumtion of the DVI-Panel.

5.12 SOFTWARE

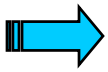
Before operation of the DVI-Panels the following software-drivers must be installed:

XCC-601-DVI
Devices of the XCC series automatically detect the connected DVI-Panel during the first power up cycle and the device will automatically configured (see also XVC/XCC manual).

Standard-PC

- Setup the resolution of the DVI-Panel within BIOS-Setup or follow the instructions of your PC manual
- Install the Video-driver for the used DVI-graphics adapter
- Install the Touch-driver for the Touchscreen. For actual versions see Internet www.moeller.net - Support

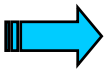
The Touch-drivers for Windows CE/9x/NT/2000 (XP) makes the DVI-Panel compatible to a mouse input device. If the screen is touched anywhere the touch-driver simulates a mouse-click with the left mouse button at this position. There is no support for other mouse-buttons. Application programms can so easily use the touch-screen functionality without changes in the programm.



To get the maximum of touch-screen advantages the application programm should define the touch active fields (e.g. buttons) big enough, so that they can be touched easily.
Also Windows-operation can be done easier if big or extra big fonts are used (see system settings → display → Setup → fonts).

6 Operation

6.1 STARTUP BEHAVIOUR



The following section describes the behaviour when a DVI-Panel is connected to a XCC-601 device or a Standard-PC with DVI-Video-Interface. Note that the XCC-601 has no CRT-Interface which is a difference to a standard PC with DVI-Video-Interface.

- The DVI-D Video cable must be connected to the PC DVI-Interface before switching the power on! The graphics card checks only one time at power-up, if a DVI-Panel or a normal CRT (DVI/VGA Adapter) is connected. Only the corresponding interface will be switched on.
- The DVI-D cabel must not be disconnected after power-up. Disconnection of the DVI-Panel or CRT causes a shut down of the corresponding interface. In case of a reconnection without power-down/power-up-sequence the DVI-Panel or CRT will still be dark.
- On some PCs the entry in a power down mode can cause a timing error for the TFT-flatscreen. (screen loses synchronization). In this case the corresponding power down mode should be disactivated.
  For Compaq PCs e.g. this can be done within the BIOS Set-Up. Follow this steps:
  Power supply → Timeout-values → set Time (in minutes) to „never“ → [F10] → File → Save changes and exit → [F10]
- If the 12V power supply for the DVI-panel is still on after switching of the PC (power supply of DVI-panel not from PC), the backlight will be switched of and the DVI-panel changes into a save power down mode.
- If the DVI-cable will be disconnected during operation, the backlight will be switched of also and the DVI-panel changes into a save power down mode.
- If the PC is configured with a screen refresh rate more than 60Hz or a wrong screen resolution (different to the TFT-display), the backlight will be switched of and the DVI-panel changes into a save power down mode.
- After power up the PC boots the installed operating system. The supported BIOS selftests will be performed.

6.2 BACKLIGHT SETTING

The backlight has two settings low (50%) and high (100%) which can be selected via the touch-driver or within the EPAM visualization software.

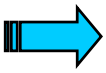
7 Mounting instructions

7.1 General mounting instructions

All DVI-Panel devices are mounted from the front, i.e. in a control panel. They are fastened from the rear with the supplied fixing frame and 4 securing nuts.

All DVI-Panel devices can be operated up to a maximum ambient temperature of 50°C (➔ Section 12). The ambient temperature stated applies to the area in the direct vicinity of the lower connectors, if the device is mounted vertically with unimpeded air convection and a maximum operating height of 2000m above sea level. The cooling slots must always be free in order to ensure the proper cooling of the system.
The device can be mounted in an enclosure if the ambient temperature is taken into consideration. Provide a wall clearance of at least 50 mm on all sides of the housing, so that sufficient air circulation is ensured. A minimum clearance of 75 mm from active elements such as load current supply, transformers etc. must be ensured.

Avoid the exposure of the flat screen to direct sunlight. The radiation from the sun (UV component) reduces the lifespan of the LCD display.



The following must be ensured in order to prevent the device from overheating during operation:

- **The cooling slots must always be free in order to ensure the proper cooling of the system.**
- **Avoid the exposure of the flat screen to direct sunlight.**
- **The mounting angle must not exceed ± 35° from the vertical**

If these conditions cannot be met, the mounting of an external fan is recommended.

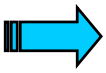
7.2 Mounting in the front panel - General

1. Push the DVI-Panel from the front into the cutout (➔ Section 7.3) of the front panel.

2. The front seal must be level and evenly positioned between the front plate and the front panel.

3. Centering the device in the cutout

4. Secure the device from the rear with the supplied fixing frame. For this use the 4 securing nuts which should be tightened evenly from the rear until the front frame is flush with the front panel all round.



Ensure that the seal is fitted correctly on the front panel. For devices with a round seal the two ends must be at the lower side of the device and should fit together without a gap.
Avoid tightening torques of greater than 0.5 Nm as this could otherwise damage the device.
The thickness of the front panel must not exceed 5 mm.

7.3 Mounting in the front panel – ATEX

All XV-DVI series devices are designed for use in machines and plants which are placed in hazard zone 22.

The XV-DVI series devices fulfill the requirements for machines and plants which are placed in hazard zone 22 only, if they are mounted in enclosures or other devices which fulfill the requirements of ATEX standards.

Especially IP65 requirements must be fulfilled and the surface temperature must not exceed 80°C.

For a save installation, operation and mounting please notice the mounting and type label instructions. (see section 7.2)

7.4 Front panel cutout 6,4“

The device requires a mounting cutout of WxH:
198 +0/-1 mm x 142 +0/-1 mm

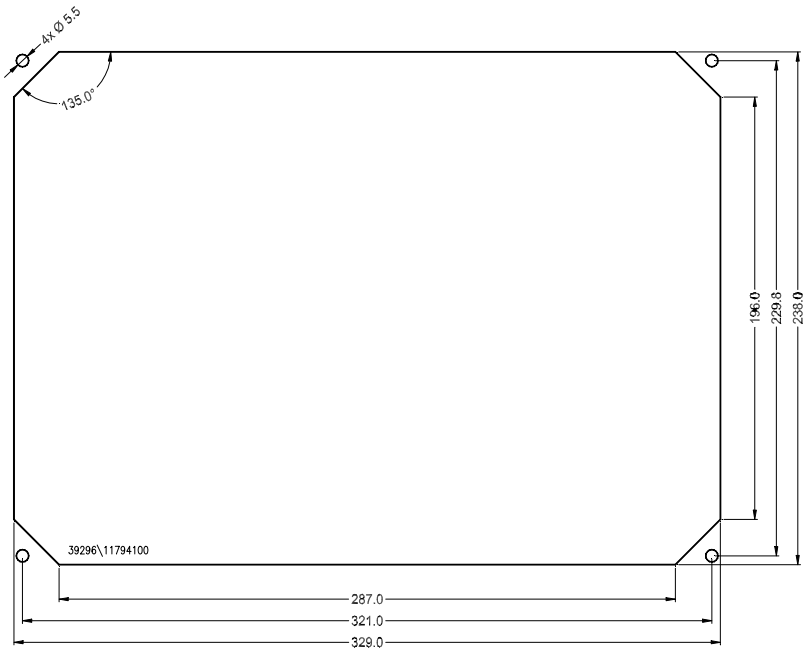
The thickness of the front panel must not exceed 5 mm.

7.5 FRONT PANEL CUTOUT 10,4“

The device requires a mounting cutout of WxH:
329 +0/-1 mm x 238 +0/-1 mm

The thickness of the front panel must not exceed 5 mm.

Recommended Mounting versions for Laser cutout (device centering)

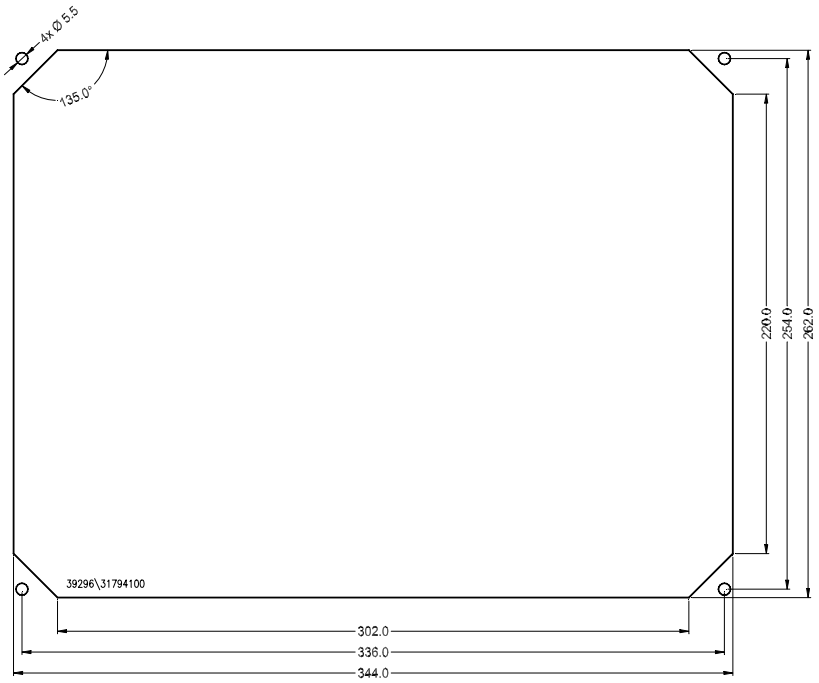


7.6 FRONT PANEL CUTOUT 12,1“

The device requires a mounting cutout of WxH:
344 +0/-1 mm x 262 +0/-1 mm

The thickness of the front panel must not exceed 5 mm.

Recommended Mounting versions for Laser cutout (device centering)

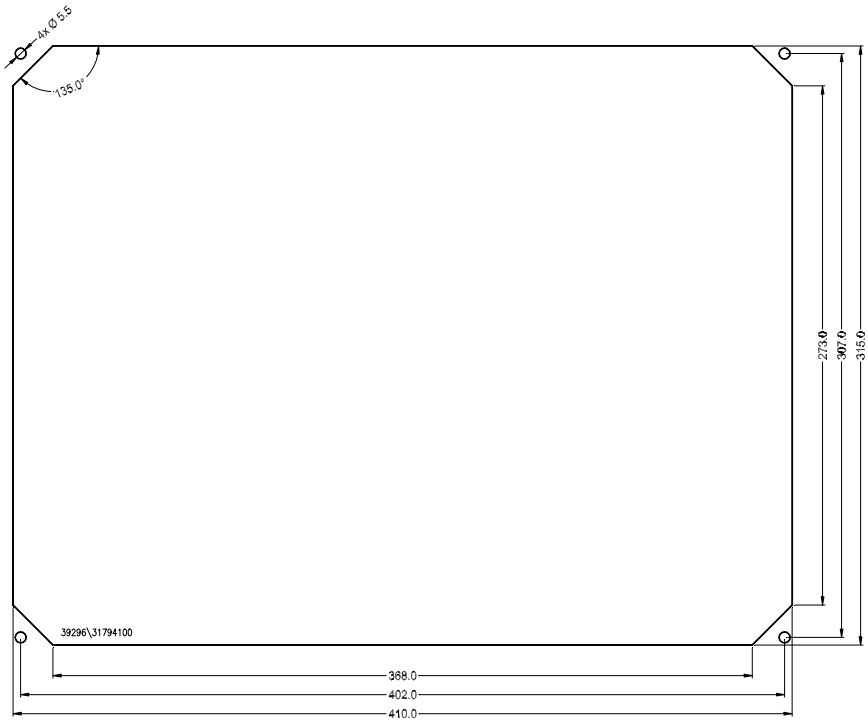


7.7 FRONT PANEL CUTOUT 15“

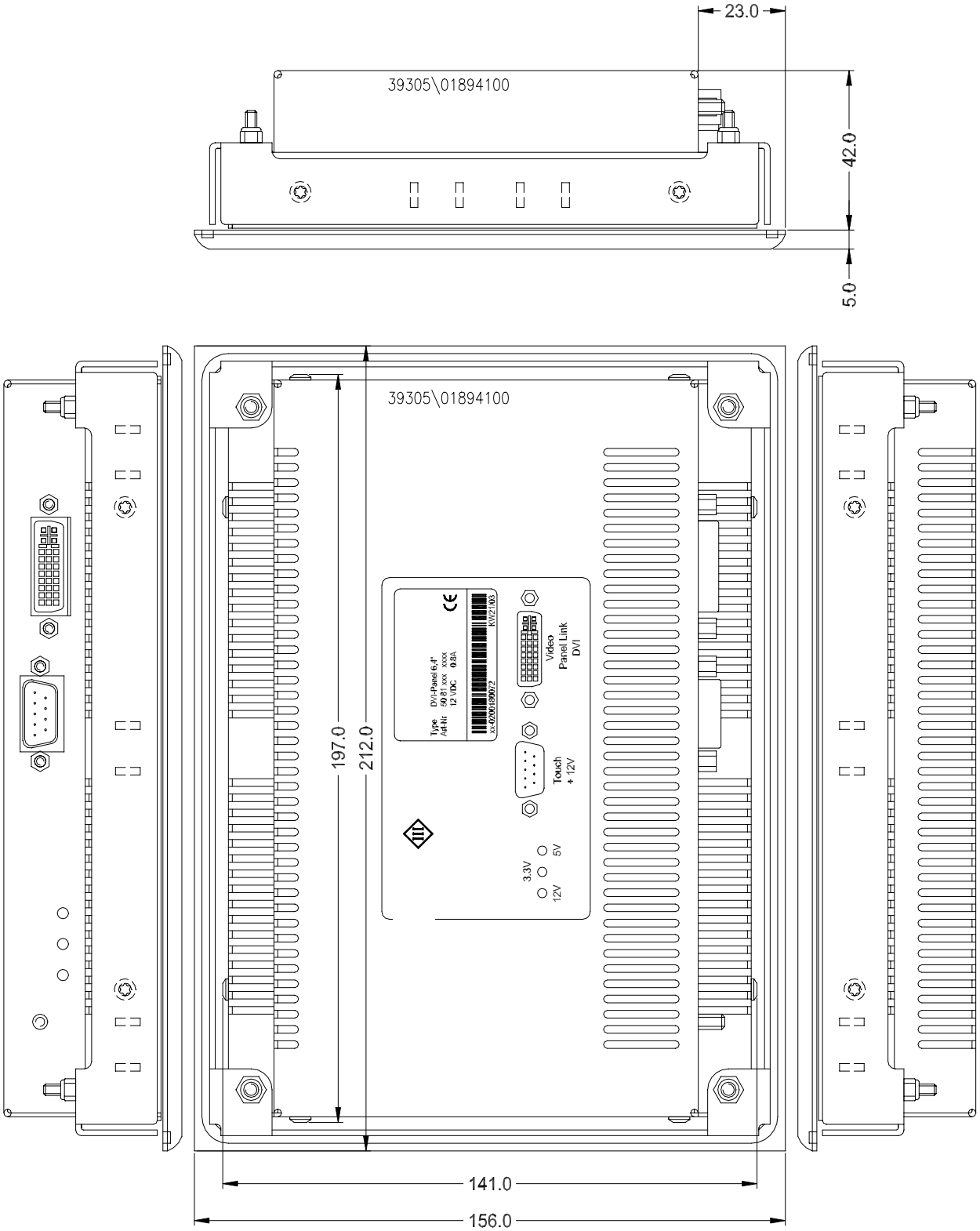
The device requires a mounting cutout of WxH:
410 +0/-1 mm x 315 +0/-1 mm

The thickness of the front panel must not exceed 5 mm.

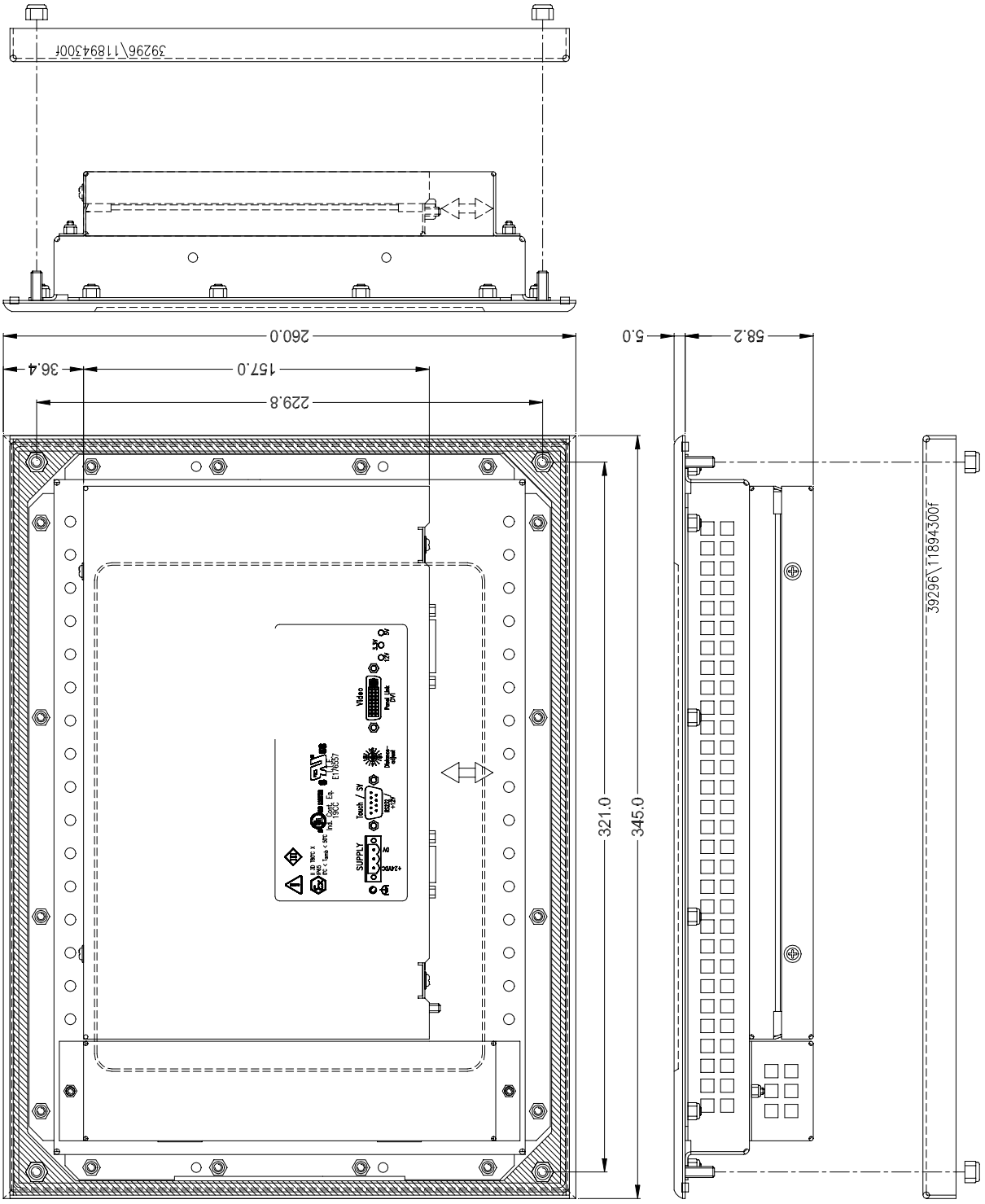
Recommended Mounting versions for Laser cutout (device centering)



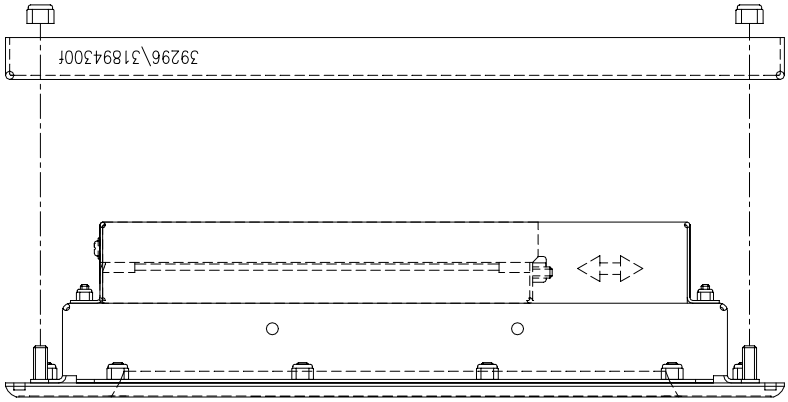
7.8 MECHANICAL DIMENSIONS DVI-PANEL 6.4“

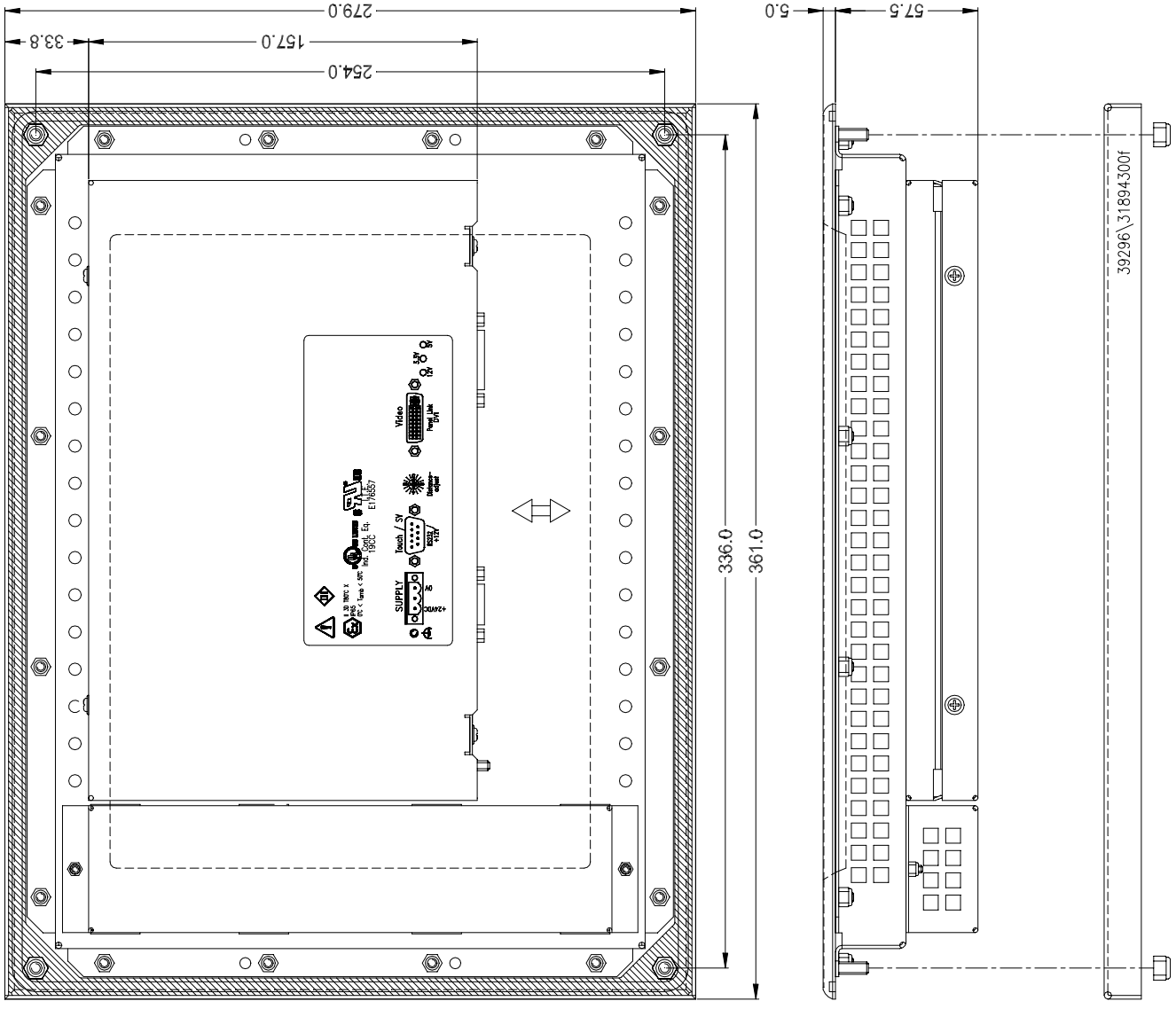


7.9 MECHANICAL DIMENSIONS DVI-PANEL 10.4“

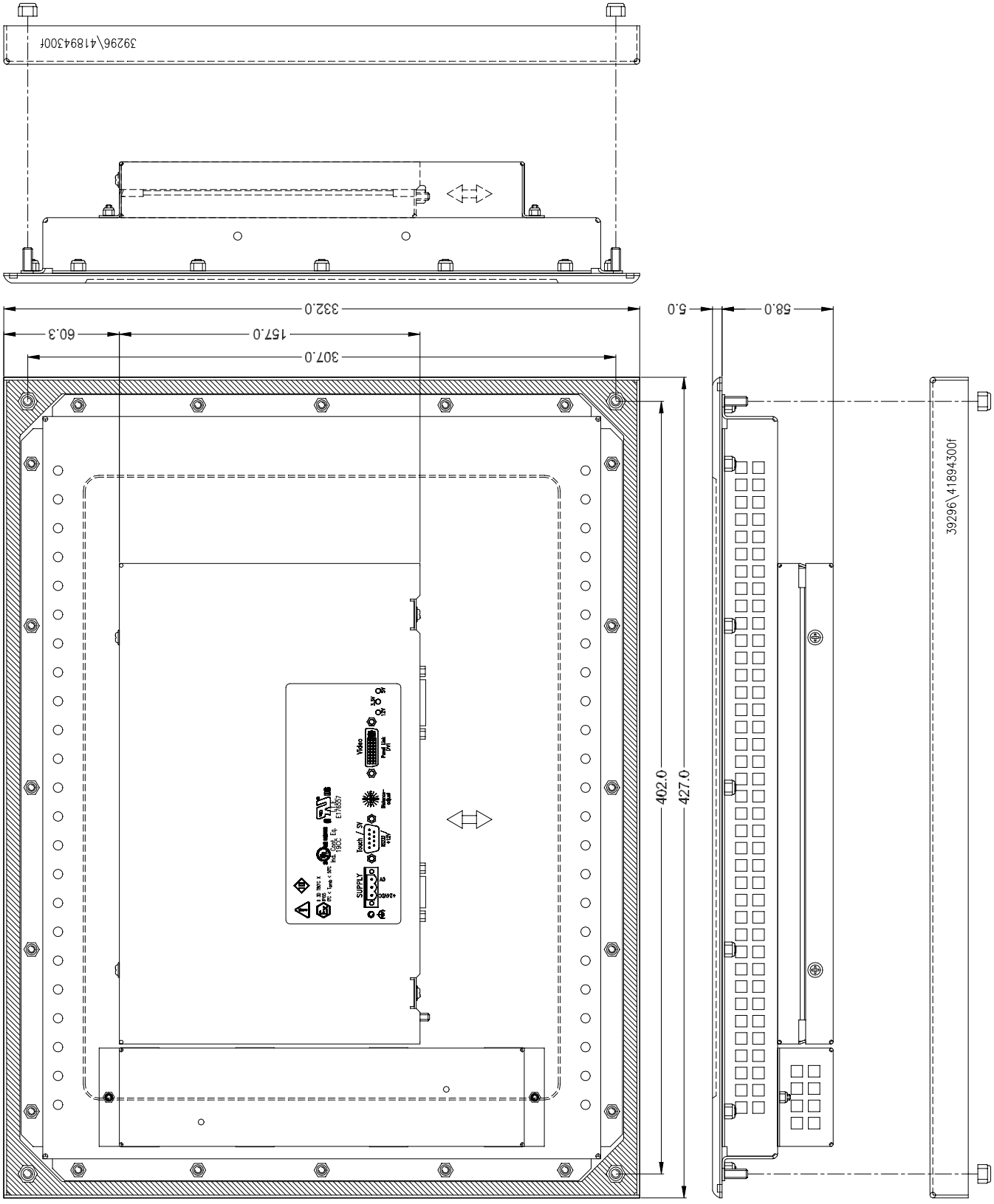


7.10 MECHANICAL DIMENSIONS DVI-PANEL 12.1“





7.11 Mechanical dimensions DVI-Panel 15.0“



8 Notes on the touch-screen

8.1 Basic touch-screen function

Devices with infrared touch-screen
The touch-screen operates on the active light matrix principle in the infrared range. Interrupting this light matrix at any point will initiate an operation if a touch activated screen element was touched (e.g. a button).
A timeout is initiated if the light matrix is interrupted for longer than **approx. 7s** (this timeout can be configured up to max. 15s within the touch-driver)**.** The touch panel then switches to the “non-actuated” state, and further operations cannot be initiated until the initial touch actuation has stopped (e.g. button released) or the touch is actuated again. Several simultaneous touch actuations at different points cannot be evaluated.

Devices with resistive touch-screen

The resistive touch-screen operates on an analog principle. Pressing the touch-screen at any point results in an electrical resistance which is measured and will be calculated into a position by the touch controller. This initiates an operation if a touch activated screen element was touched (e.g. a button).
Because of this function principle the resistive touch-screen has to be calibrated. The first calibration is already done when delivered. A recalibration of the touch-screen is necessary when the touch position is different to the screen, e.g. because of ageing, temperature, etc. The calibration can be activated within an EPAM project (see EPAM manual, Button-Action „Touch_calibrate”). Details see XVC/XCC manual and EPAM-manual.

8.2 Power up function test

If Power up function tests are performed or not depends on the touch-type (infrared or resistiv) and the used PC system (XCC or Standard-PC) and the installed software.

Devices with infrared touch-screen

A power up function test will be performed in combination with XCC-devices with EPAM-Visualization-Software. (Details see XVC/XCC manual and EPAM-manual)

Devices with resistive touch-screen

Because of function principle it is not possible to do a function test on devices with resistive touch-screen.

8.3 Cleaning and maintenance of the touch-screen

Cleaning of infrared touch-screen

For operation ensure that the signal levels of the channels are not so severely reduced or interrupted due to excessive contamination through dirt (➔ Section 8.1).
Clean the black plastic frame at the front of the device front regularly (➔ Section 11) with a damp soft cloth. Ensure that the surface is not scratched or scoured, especially when removing hard deposits and abrasive dust.
Do not expose the front of the device to solvents which may corrode and loosen the plastic frame (frame material: Makrolon 2805, Manufacturer: Bayer AG).

Cleaning of resistive touch-screen

Do not expose the front of the device to solvents which may corrode and loosen the plastic membrane (material: Polyester). Ensure that the surface is not scratched or scoured, especially when removing hard deposits and abrasive dust.

Cleaning should only be carried out with the device switched off! This will ensure that any touching of the screen will not accidentally initiate functions.

Please use a soft cloth to ensure that the surface is not scratched or scoured. Do not use solvents.

9 Display, Backlight, Contrast

9.1 CONTRAST

The DVI-Panels are delivered with TFT displays. This displays require no contrast settings (only necessary for passive LCD displays).

9.2 BACKLIGHT

The backlight has two settings low (50%) and high (100%) which can be selected via touch driver or within the EPAM visualization software.

10 Diagnostics

The following optical and acoustic diagnostic options are available:

Symptom		Possible cause and solution
Signal on power on	-	Acoustic signal: - 2x short ➔ Touch controller OK
Device does not start, screen dark or error messages during startup	-	- Check power supply/fuse faulty - check cable connection (Touch/PowerSupply and DVI-cable) from PC to DVI-Panel (➔ Section 5.3 and 5.4). - check Diagnostic LEDs on DVI-Panel (➔ Section 5.8). - check Display settings of the PCs (BIOS-Setup)
Screen dark or light		Backlight/contrast incorrectly set
Touch-screen not functioning	-	- Hardware faulty (no acoustic signal after power on) - Too many IR channels interrupted ➔ Clean touch-screen (infrared touch-screen only)

11 Maintenance and repair

Cleaning the screen

For trouble-free operation of the IR touch-screen, clean the inner section of the device front (front glass and IR frame) regularly (➔ Section 8.3).

Repairs

Repairs to the DVI-Panels should only be carried out by the manufacturer or Moeller GmbH repair centers. In this case, please contact your local XSystem dealer or the Technical Support at Moeller GmbH. (manufacturer address of DVI-Panel ➔ Section 14)
No liability is accepted for any modifications made to the device that are not described in this document.

Transport

Only the original packaging must be used for transporting the device. The climatic conditions (➔ Section 12) has to be observed.

Storage

The device has to be stored under the conditions specified in Section 12.

It is recommended to store the device at room temperature.

12 Technical Data

Display	6.4“ TFT display	VGA	640 x 480 256k colours
	10.4" TFT display	VGA	640 x 480 256k colours
	12.1" TFT display	SVGA	800 x 600 256k colours
	15.0" TFT display	XGA	1024 x 768 256k colours
Operation	IR-Touch-screen:		
	10.4“	81 x 61	(logical resolution)
	12.1“	93 x 71	(logical resolution)
	15.0“	115 x 87	(logical resolution)
	Resistive-Touch-screen:		
	6.4“, 10.4“, 12.1“, 15.0“	Analog (12Bit)	
Ambient conditions	Operating climate	Class 3K3 EN50178 (extended/reduced) 0..50°C vertical installation 0..40°C tilted installation max. 35° 10...90% rel. air humidity, non-condensing	
	Storage climate	Class 1K4 EN50178 (reduced) -20...60°C, 10...90% rel. air humidity, non-condensing	
	Transport climate	Class 2K3 EN50178 (reduced) -20...60°C, 10...90% rel. air humidity, non-condensing	
	Vibration	<60Hz: 3.5mm EN60068-2-6 >60Hz : 1g EN60068-2-6	
	Shock	15g / 11ms EN60068-2-27	
EMC	EMC interference immunity	Industrial EN 61000-6-2 4kV / 8 kV EN 61000-4-2 10V/m EN 61000-4-3 2kV EN 61000-4-4 0.5kV / 0.5kV EN 61000-4-5 10Vrms EN 61000-4-6	
	Emission	Residential EN 61000-6-3	
Degree of protection	Front	EX II 3D T80°C X, 0°C < T_{amb}<50°C IP 65 (NEMA 12), after EN 60068-2-68 → note section 7.2 and 7.3!	
	Rear	IP 20	
Dimensions	W x H x D 6.4“	212.0mm x 156.0mm x 42.0mm	
	10.4“	345.0mm x 260.0mm x 63.2mm	
	12.1“	361.0mm x 279.0mm x 62.5mm	
	15.0“	427.0mm x 332.0mm x 63.0mm	
Weight	6.4“	approx. 1.2 kg	
	10.4“	approx. 4.2 kg	
	12.1“	approx. 4.7 kg	
	15.0“	approx. 6.1 kg	
System supply	Rated voltage	12 VDC SELV, safety extra low voltage or 24 VDC SELV, safety extra low voltage	
	Voltage range	10.4“/12.1“/15“: 10.8VDC...13.2VDC or : 16VDC...32VDC 6.4“ : 8VDC...32VDC	
	Protection against reverse polarity	10.4“/12.1“/15“: no 6.4“: yes	
	Potential isolation	no 0V- is connected to ground (GND)	
	Current consumption 6.4“	0.5A / 12VDC	
	(typical) 10.4“	0.8A / 12VDC or 0.5A / 24VDC	
	12.1“	0.9A / 12VDC or 0.75A / 24VDC	
	15.0“	1.4A / 12VDC or 1.1A / 24V	
	Power consumption 6.4“	6W	
	(typical) 10.4“	10W	
	12.1“	20W	
	15.0“	23W	
Fuse protection	internally	12V : self repairing fuse 2.5A 24V : fuse 2.5A slow blow 6.4“ : fuse 1A superfast	

Technical Data (Continued)

Distance	Distance to PC	6.4“	Max. 10 m
		10.4“	Max. 30 m
		12.1“	Max. 25 m
		15.0“	Max. 20 m
Noise emission			<70db

13 Disposal

DVI-Panel devices that are no longer used must be disposed of properly or returned to the manufacturer for disposal. (manufacturer's address ➔ Section 14)

Special note:

- LCD units are fitted with fluorescent tubes for the backlight.

  These contain mercury.

Materials:

Housing:	Galvanized sheet steel
Rear:	Aluminium coated
Front frame:	Aluminium, anodised
Membrane:	Polyester PETP
Printed-circuit board:	1. quality
Front:	IR touch-screen: Safety glass, Plastic frame Makrolon 2805 (Manufacturer: Bayer AG)
	Resistive touch-screen: Polyester/glass laminate

14 Conformity and Standards

The DVI-Panels meets the requirements specified by the EU Council Directives for harmonizing the regulations of EU member states relating to electromagnetic compatibility (**89/336/EEC**).
The generic standards below were used to assess the electromagnetic compatibility of the DVI-Panels:

EN 61000-6-3 (Emission)
EN 61000-6-2 (Immunity)

CE

The following standard was used to assess the functionality of the DVI-Panels:

EN 61131-2

The following standard was used to assess the electrical safety of the DVI-Panels:

EN 50178

All DVI-Panel devices are designed for use in machines and plants which are placed in hazard zone 22. (see section Section 7.2 and 7.3)

II 3D T80°C X
IP65
0°C>T_{amb}>50°C

All DVI-Panels are compliant to:
UL 508 - Industrial Control Equipment.

Ind. Cont. Eq.
19CC

Manufacturer	Moeller GmbH
Manufacturer address:	Hein-Moeller-Str. 7-11 D-53115 Bonn Germany

15 Revision history

Revision	Date / Signed	Modifications
1.0	04-04 / Fis	First version for DVI Panels
2.0	06-04 / Fis	P.14: pin assignment corrected, Note 12V not reverse polarity protected P.25-27: Mounting versions for Laser cutout P.39: EMV 2kV P.42: Note Low voltage directive removed
3.0	06-04 / Fis	P.9,11 XGA,SVGA corrected P.39 Dimension 6,4“ corrected
4.0	02-05 / Fis	P.11,13,18,19,39 24VDC-Powersupply P.9 Text „in preparation“ removed (res. DVI-Panel) P.10 new accessory 20m cables P.15 Rotary switch P. 29-31 new mechanical drawings P.40 Distance P.42 UL508 compliance added

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16 Alphabetical index

Alphabetical index