

MITSUBISHI ELECTRIC

E1000-series

Service and Maintenance Manual

MA00758A 2008-09

English

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✉ sales@vicpas.com
☎ +86-15876525394

Service and Maintenance Manual for E1000 Operator Panels

Foreword

This manual contains detailed information about the E1000 series operator panels, including descriptions of various actions that can be carried out in order to maintain or update the operator panel hardware and software.

The manual is intended for persons that should be able to carry out basic maintenance and replace common parts in an E1000-series operator panel.

The manual assumes that the most recent versions of the system program (firmware) and configuration tool are used.


Please see the E-Designer 7 Reference Manual (MA00759X) for a description of the configuration tool and the installation manuals for information regarding installation.

Function-based descriptions are available in the User's Guide (MA00760).

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1 Safety Precautions

Both the installer and the owner and/or operator of the operator panel must read and understand this installation manual.

1.1 UL and cUL Installation

- This equipment is suitable for use in Class I, Division 2, Groups A, B, C and D OR non-hazardous locations only. [Combinations of equipment in your system are subject to investigation by the local Authority Having Jurisdiction at the time of installation.]
- Maximum ambient temperature 40 °C when mounted horizontal or 50 °C when mounted vertical.
- WARNING – EXPLOSION HAZARD – Do not disconnect equipment unless power has been removed or the area is known to be non-hazardous.
- For Canada also AVERTISSEMENT – RISQUE D’EXPLOSION – AVANT DE DECONNECTER L’EQUIPEMENT, COUPER LE COURANT OU S’ASSURER QUE L’EMPLACEMENT EST DESIGNÉ NON DANGEREUX.
- WARNING – EXPLOSION HAZARD - Substitution of components may impair suitability for Class I, Division 2.
- For Canada also AVERTISSEMENT – RISQUE D’EXPLOSION – LA SUBSTITUTION DE COMPOSANTS PEUT RENDRE CE MATERIEL INACCEPTABLE POUR LES EMBLEMES DE CLASSE I, DIVISION 2.
- WARNING – EXPLOSION HAZARD – only UL and cUL approved expansion units are allowed to be connected to the port designated “EXPANSION”. At the moment there are no such units evaluated or allowed.
- WARNING – EXPLOSION HAZARD - Do not replace expansion unit unless power has been switched off or the area is known to be non-hazardous.
- This product contains battery, this must only be changed in an area known to be non-hazardous. Permitted types are shown in the section [Hardware Specification](#).
- For use on a flat surface of a type 4X enclosure indoor use only.
- To make wiring connections to the power supply connector, use an AWG 28-12 cable and a tightening torque of min. 0.5 Nm.

1.2 General

- Read the safety precautions carefully.
- Check the delivery for transportation damage. If damage is found, notify the supplier as soon as possible.
- Do not use the operator panel in an environment with high explosive hazards.
- The supplier is not responsible for modified, altered or reconstructed equipment.
- Use only parts and accessories manufactured according to specifications of the supplier.
- Read the installation and operating instructions carefully before installing, using or repairing the operator panel.
- Never allow fluids, metal filings or wiring debris to enter any openings in the operator panel. This may cause fire or electrical shock.
- Only qualified personnel may operate the operator panel.
- Storing the operator panel where the temperature is lower/higher than recommended in this manual can cause the LCD display liquid to congeal/become isotopic.

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- The LCD display liquid contains a powerful irritant. In case of skin contact, wash immediately with plenty of water. In case of eye contact, hold the eye open, flush with plenty of water and get medical attention.
- The figures in this manual serves an illustrative purpose. Because of the many variables associated with any particular installation, the supplier cannot assume responsibility for actual use based on the figures.
- The supplier neither guarantees that the operator panel is suitable for your particular application, nor assumes responsibility for your product design, installation or operation.

1.3 During Installation

- The operator panel is designed for stationary installation on a plane surface, where the following conditions are fulfilled:
 - no high explosive risks
 - no strong magnetic fields
 - no direct sunlight
 - no large, sudden temperature changes
- Install the product according to the accompanying installation instructions.
- Ground the product according to the accompanying installation instructions.
- Only qualified personnel may install the operator panel.
- Separate the high voltage, signal and supply cables.
- Make sure that the voltage and polarity of the power source is correct before connecting the product to the power outlet.
- Peripheral equipment must be appropriate for the application and location.

1.4 During Use

- Keep the operator panel clean.
- Emergency stop and other safety functions may not be controlled from the operator panel.
- Do not use too much force or sharp objects when touching the keys, touch screen etc.

1.5 Service and Maintenance

- Only qualified personnel should carry out repairs.
- The agreed warranty applies.
- Before carrying out any cleaning or maintenance operations, disconnect the equipment from the electrical supply.
- Clean the display and surrounding front cover with a soft cloth and mild detergent.
- Replacing the battery incorrectly may result in explosion. Only use batteries recommended by the supplier.

1.6 Dismantling and Scrapping

- The operator panel or parts thereof shall be recycled according to local regulations.
- The following components contain substances that might be hazardous to health and the environment: lithium battery, electrolytic capacitor and display.

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2 Introduction





This manual describes how to maintain E1000 series operator panels. The functions available in the configuration tool depend on which operator panel model is used. The manual is divided into the following sections:





- [Safety Precautions](#)
- [Introduction](#)
- [Hardware](#)
- [Software](#)
- [Environmental Aspects](#)

2.1 General

The different operator panels, key pad operated models and touch screen models, are listed in the table below:

Operator Panel	Description	Drawings
E1012 (also referred to as BEPP K10)	160 x 32 pixels display with keypad 	Outline drawing Panel cut-out Text strip
E1022 (also referred to as BEPP K20)	240 x 64 pixels display with keypad 	Outline drawing Panel cut-out Text strip
E1032 (also referred to as BEPP K30)	240 x 64 pixels display with keypad 	Outline drawing Panel cut-out Text strip

Operator Panel	Description	Drawings
E1060 and E1062 (also referred to as BEPP K60)	5.7" display with keypad 	Outline drawing Panel cut-out Text strip
E1070 (also referred to as BEPP 64K)	6.5" display with keypad 	Outline drawing Panel cut-out Text strip
E1100 (also referred to as BEPP 104K)	10.4" display with keypad 	Outline drawing Panel cut-out Text strip
E1041 and E1043 (also referred to as BEPP T40)	3.5" touch screen display 	Outline drawing Panel cut-out

Operator Panel	Description	Drawings
E1061 and E1063 (also referred to as BEPP T60)	5.7" touch screen display 	Outline drawing Panel cut-out
E1071 (also referred to as BEPP 64T)	6.5" touch screen display 	Outline drawing Panel cut-out
E1101 (also referred to as BEPP 104T)	10.4" touch screen display 	Outline drawing Panel cut-out
E1151 (also referred to as BEPP 150T)	15" touch screen display 	Outline drawing Panel cut-out

2.2 Maintenance

Carefully read the instructions before beginning maintenance on the operator panel.

- Only qualified personnel should carry out maintenance.
- The agreed warranty and license agreements apply.
- Any damage to the operator panel caused by personnel invalidates the warranty.
- Before carrying out any cleaning or maintenance operations, disconnect the operator panel from the power supply.
- Clean the display and surrounding front cover with a soft cloth and mild detergent. Recommended cleaning fluids for the display are water and IPA (Isopropyl Alcohol or Hexane).
- Replacing the battery incorrectly may result in explosion. Only use batteries recommended by the supplier.
- A 6-month warranty on all service parts is provided.

Maintenance personnel are permitted to carry out the following actions:

- *Replacing the Rear Cover*
- *Replacing the Battery*
- *Replacing the Backlight*
- *Replacing the Complete Front*

2.3 Service and Repairs

- Only accredited companies are permitted to perform service and repairs.
- If a non-accredited company conducts any kind of service or repair, the agreed warranty will be invalidated.
- If training is required, contact the supplier.
- All maintenance should be performed in a 15-30 °C temperature range.
- Any damage to the operator panel caused by personnel invalidates the warranty.
- Contracts with customers supersede the information in this document.

2.4 Dismantling and Scrapping

- The operator panel, or parts thereof, should be recycled according to local regulations.
- The following components contain substances that might be hazardous to health and the environment: lithium battery, electrolytic capacitor, display.

3 Hardware

This chapter describes how to maintain the E1000 operator panel hardware. The chapter includes general information, hardware tests and certificates, technical data, a hardware replacement guide, and a fault tracing section.

3.1 General Information about Hardware

Before the operator panels are approved for market introduction, they are tested by independent authorities. The E1000 operator panels are examined by several authorities before being approved for market introduction. All operator panels are designed to fulfill CE, UL, and other standards. The quality policy and environmental policy place demands on all suppliers and subcontractors.

3.2 Hardware Tests

The manufacturer performs extensive hardware testing before an operator panel is approved. Some tests are performed by external testing companies, such as the Swedish National Testing and Research Institute.

All operator panels are submitted to testing before leaving the manufacturer.

3.3 Hardware Specification

3.3.1 Keyboard Operated Panels

The tables below presents technical data for the keyboard operated panels.

Parameter	E1012	E1022
Front panel, W x H x D	155 x 114 x 6 mm	155 x 155 x 6 mm
Mounting depth	46.4 mm (146.4 mm including clearance)	
Front panel seal	IP 66	
Rear panel seal	IP 20	
Keyboard material	Membrane switch keyboard with metal domes. Overlay film of Autotex F207 with print on reverse side. 1 million operations.	
Reverse side material	Powder-coated aluminum	
Weight	0.45 kg	0.55 kg
Serial port RS422/RS485	25-pin D-sub contact, chassis-mounted female with standard locking screws 4-40 UNC.	
Serial port RS232C	9-pin D-sub contact, male with standard locking screws 4-40 UNC.	
Ethernet	Connection via Ethernet is made using the Ethernet Expansion Module, mounted on the back of the operator panel.	
Flash memory for application	512 kB	
Real time clock	±20 PPM + error because of ambient temperature and supply voltage. Total maximum error: 1 min/month at 25 °C Temperature coefficient: 0.004 ppm/°C ²	
Rechargeable real time clock battery	MS614S (UL and cUL: SII Micro Parts LTD)	
Power consumption at rated voltage	Normal: 0.1 A Maximum: 0.3 A	
Display	FSTN-LCD 160 x 32 pixels, monochrome transmissive negative. LED backlight lifetime at the ambient temperature of +25 °C >47.000 h	FSTN-LCD 240 x 64 pixels, monochrome transmissive negative. LED backlight lifetime at the ambient temperature of +25 °C >47.000 h
Active area of display, W x H	89.6 x 17.9 mm	90.2 x 24.0 mm
Fuse	Internal DC fuse 1.0 AT, 5x20 mm	
Power supply	+24V DC (20 - 30V DC). Power supply connector. CE: The power supply must conform with the requirements according to IEC 60950 and IEC 61558-2-4. UL and cUL: The power supply must conform with the requirements for class II power supplies.	
Ambient temperature	0 ° to +50 °C	
Storage temperature	-20 ° to +70 °C	
Relative humidity	5 - 85 % non-condensed	

Technical Data	E1032
Front panel, W x H x D	202 x 187 x 6 mm
Mounting depth	57 mm (157 mm including clearance)
Front panel seal	IP 66
Rear panel seal	IP 20
Keyboard material	Membrane switch keyboard with metal domes. Overlay film of Autotex F157 with print on reverse side. 1 million operations.
Reverse side material	Powder-coated aluminum
Weight	0.95 kg
Serial port RS422/RS485	25-pin D-sub contact, chassis-mounted female with standard locking screws 4-40 UNC.
Serial port RS232C	9-pin D-sub contact, male with standard locking screws 4-40 UNC.
Ethernet	Shielded RJ 45
USB	Host type A (USB 1.1), max output current 500 mA
Flash memory for application	12 MB (incl. fonts)
Real time clock	±20 PPM + error because of ambient temperature and supply voltage. Total maximum error: 1 min/month at 25 °C Temperature coefficient: 0.004 ppm/°C ²
Real time clock battery	CR2450 (UL and cUL: Sanyo or Panasonic) Minimum lifetime: 3 years
Power consumption at rated voltage	Normal: 0.15 A Maximum: 0.35 A
Display	FSTN-LCD. 240 x 64 pixels, monochrome transreflective. LED backlight lifetime at the ambient temperature of +25 °C: >35,000 h.
Active area of display, W x H	127.0 x 33.8 mm
Fuse	Internal DC fuse, 2.0 AT, 5 x 20 mm
Power supply	+24V DC (20 - 30V DC). Power supply connector. CE: The power supply must conform with the requirements according to IEC 60950 and IEC 61558-2-4. UL and cUL: The power supply must conform with the requirements for class II power supplies.
Ambient temperature	Vertical installation: 0 ° to +50 °C Horizontal installation: 0 ° to +40 °C
Storage temperature	-20 ° to +70 °C
Relative humidity	5 - 85 % non-condensed

Technical Data	E1060 of hardware version type no 07900 or higher	E1062	E1060
Front panel, W x H x D	275 x 168 x 6 mm		
Mounting depth	57 mm (157 mm including clearance)		
Front panel seal	IP 66		
Rear panel seal	IP 20		
Keyboard material	Membrane switch keyboard with metal domes. Overlay film of Autotex F157 with print on reverse side. 1 million operations.		
Reverse side material	Powder-coated aluminum		
Weight	1.2 kg		
Serial port RS422/RS485	25-pin D-sub contact, chassis-mounted female with standard locking screws 4-40 UNC.		
Serial port RS232C	9-pin D-sub contact, male with standard locking screws 4-40 UNC.		
Ethernet	Shielded RJ 45		
USB	Host type A (USB 1.1), max output current 500 mA		
Flash memory for application	12 MB (incl. fonts)		
Real time clock	±20 PPM + error because of ambient temperature and supply voltage. Total maximum error: 1 min/month at 25 °C Temperature coefficient: 0.004 ppm/°C ²		
Real time clock battery	CR2450 (UL and cUL: Sanyo or Panasonic) Minimum lifetime: 3 years		
Power consumption at rated voltage	Normal: 0.2 A Maximum: 0.4 A		Normal: 0.3 A Maximum: 0.5 A
Display	TFT-LCD. 320 x 240 pixels, 64K colors.	TFT-LCD. 320 x 240 pixels, 16 greyscales.	Transmissive color STN-LCD. 320 x 240 pixels, 64K colors.
	LED backlight lifetime at the ambient temperature of +25 °C: >20,000 h.		CCFL backlight lifetime at the ambient temperature of +25 °C: >75,000 h.
Active area of display, W x H	115.2 x 86.4 mm		
Fuse	Internal DC fuse, 2.0 AT, 5 x 20 mm		
Power supply	+24V DC (20 - 30V DC). Power supply connector. CE: The power supply must conform with the requirements according to IEC 60950 and IEC 61558-2-4. UL and cUL: The power supply must conform with the requirements for class II power supplies.		
Ambient temperature	Vertical installation: 0 ° to +50 °C Horizontal installation: 0 ° to +40 °C		
Storage temperature	-20 ° to +70 °C		
Relative humidity	5 - 85 % non-condensed		

Technical Data	E1070	E1100
Front panel, W x H x D	285 x 177 x 6 mm	382 x 252 x 6 mm
Mounting depth	56 mm (156 mm including clearance)	58 mm (158 mm including clearance)
Front panel seal	IP 66	
Rear panel seal	IP 20	
Keyboard material	Membrane switch keyboard with metal domes. Overlay film of Autotex F157 with print on reverse side. 1 million operations.	
Reverse side material	Powder-coated aluminum	
Weight	1.4 kg	2.5 kg
Serial port RS422/RS485	25-pin D-sub contact, chassis-mounted female with standard locking screws 4-40 UNC.	
Serial port RS232C	9-pin D-sub contact, male with standard locking screws 4-40 UNC.	
Ethernet	Shielded RJ 45	
USB	Host type A (USB 1.1), max output current 500mA Device type B (USB 1.1)	
CF-slot	Compact flash, type I and II	
Flash memory for application	12 MB (incl. fonts)	
Real time clock	±20 PPM + error because of ambient temperature and supply voltage. Total maximum error: 1 min/month at 25 °C Temperature coefficient: 0.004 ppm/°C ²	
Real time clock battery	CR2450 (UL and cUL: Sanyo or Panasonic) Minimum lifetime: 3 years	
Power consumption at rated voltage	Normal: 0.4 A Maximum: 0.9 A	Normal: 0.5 A Maximum: 1.0 A
Display	TFT-LCD. 640 x 480 pixels, 64K color. CCFL backlight lifetime at the ambient temperature of +25 °C: >50,000 h.	TFT-LCD. 800 x 600 pixels, 64K color. CCFL backlight lifetime at the ambient temperature of +25 °C: >50,000 h.
Active area of display, W x H	131.5 x 98.6 mm	211.2 x 158.4 mm
Fuse	Internal DC fuse, 3.15 AT, 5 x 20 mm	
Power supply	+24V DC (20 - 30V DC). Power supply connector. CE: The power supply must conform with the requirements according to IEC 60950 and IEC 61558-2-4. UL and cUL: The power supply must conform with the requirements for class II power supplies.	
Ambient temperature	Vertical installation: 0 ° to +50 °C Horizontal installation: 0 ° to +40 °C	
Storage temperature	-20 ° to +70 °C	
Relative humidity	5 - 85 % non-condensed	

3.3.2 Touch Screen Operated Panels

The tables below presents technical data for the touch screen operated panels.

Technical Data	E1041	E1043
Front panel, W x H x D	155.8 x 119 x 6 mm	
Mounting depth	57 mm (157 mm including clearance)	
Front panel seal	IP 66	
Rear panel seal	IP 20	
Touch screen material	Touch screen: Polyester on glass, 1 million finger touch operations. Overlay: Autotex F157/F207.	
Reverse side material	Powder-coated aluminum	
Weight	0.6 kg	
Serial port RS422/RS485	25-pin D-sub contact, chassis-mounted female with standard locking screws 4-40 UNC.	
Serial port RS232C	9-pin D-sub contact, male with standard locking screws 4-40 UNC.	
Ethernet	Shielded RJ 45	
USB	Host type A (USB 1.1), max output current 500 mA	
Flash memory for application	12 MB (incl. fonts)	
Real time clock	±20 PPM + error because of ambient temperature and supply voltage. Total maximum error: 1 min/month at 25 °C Temperature coefficient: 0.004 ppm/°C ²	
Real time clock battery	CR2450 (UL and cUL: Sanyo or Panasonic) Minimum lifetime: 3 years	
Power consumption at rated voltage	Normal: 0.15 A Maximum: 0.35 A	
Display	TFT-LCD. 320 x 240 pixels, 64K colors. LED backlight lifetime at the ambient temperature of +25 °C: >10,000 h.	TFT-LCD. 320 x 240 pixels, 16 greyscales. LED backlight lifetime at the ambient temperature of +25 °C: >10,000 h.
Active area of display, W x H	70.1 x 52.6 mm	
Fuse	Internal DC fuse, 2.0 AT, 5 x 20 mm	
Power supply	+24V DC (20 - 30V DC). Power supply connector. CE: The power supply must conform with the requirements according to IEC 60950 and IEC 61558-2-4. UL and cUL: The power supply must conform with the requirements for class II power supplies.	
Ambient temperature	Vertical installation: 0 ° to +50 °C Horizontal installation: 0 ° to +40 °C	
Storage temperature	-20 ° to +70 °C	
Relative humidity	5 - 85 % non-condensed	

Technical Data	E1061	E1063	E1061 of hardware version type no 07905 or higher	E1063 of hardware version type no 07915 or higher
Front panel, W x H x D	202 x 152 x 6 mm			
Mounting depth	57 mm (157 mm including clearance) 57 mm (157 mm including clearance)			
Front panel seal	IP 66			
Rear panel seal	IP 20			
Touch screen material	Touch screen: Polyester on glass, 1 million finger touch operations. Overlay: Autotex F157/F207.			
Reverse side material	Powder-coated aluminum			
Weight	0.9 kg			
Serial port RS422/RS485	25-pin D-sub contact, chassis-mounted female with standard locking screws 4-40 UNC.			
Serial port RS232C	9-pin D-sub contact, male with standard locking screws 4-40 UNC.			
Ethernet	Shielded RJ 45			
USB	Host type A (USB 1.1), max output current 500 mA			
Flash memory for application	12 MB (incl. fonts)			
Real time clock	±20 PPM + error because of ambient temperature and supply voltage. Total maximum error: 1 min/month at 25 °C Temperature coefficient: 0.004 ppm/°C ²			
Real time clock battery	CR2450 (UL and cUL: Sanyo or Panasonic) Minimum lifetime: 3 years			
Power consumption at rated voltage	Normal: 0.25 A Maximum: 0.45 A		Normal: 0.2 A Maximum: 0.4 A	
Display	Transmissive color STN-LCD. 320 x 240 pixels. 64K colors	Transmissive monochrome STN-LCD. 320 x 240 pixels	TFT-LCD. 320 x 240 pixels. 64K colors.	TFT-LCD. 320 x 240 pixels. 16 greyscales.
	CCFL backlight lifetime at the ambient temperature of +25 °C: >75,000 h.	CCFL backlight lifetime at the ambient temperature of +25 °C: >58,000 h.	LED backlight lifetime at the ambient temperature of +25 °C: >20,000 h.	
Active area of display, W x H	115.2 x 86.4 mm			
Fuse	Internal DC fuse, 2.0 AT, 5 x 20 mm			
Power supply	+24V DC (20 - 30V DC). Power supply connector. CE: The power supply must conform with the requirements according to IEC 60950 and IEC 61558-2-4. UL and cUL: The power supply must conform with the requirements for class II power supplies.			
Ambient temperature	Vertical installation: 0 ° to +50 °C Horizontal installation: 0 ° to +40 °C			
Storage temperature	-20 ° to +70 °C			
Relative humidity	5 - 85 % non-condensed			

Technical Data	E1070	E1101	E1151
Front panel, W x H x D	219 x 154 x 6 mm	302 x 228 x 6 mm	398 x 304 x 6 mm
Mounting depth	56 mm (156 mm including clearance)	58 mm (158 mm including clearance)	60 mm (160 mm including clearance)
Front panel seal	IP 66		
Rear panel seal	IP 20		
Keyboard material/ Front panel	Touch screen: Polyester on glass, 1 million finger touch operations. Overlay: Autotex F157 or F207.		
Reverse side material	Powder-coated aluminum		
Weight	1.2 kg	2.1 kg	3.7 kg
Serial port RS422/ RS485	25-pin D-sub contact, chassis-mounted female with standard locking screws 4-40 UNC.		
Serial port RS232C	9-pin D-sub contact, male with standard locking screws 4-40 UNC.		
Ethernet	Shielded RJ 45		
USB	Host type A (USB 1.1), max output current 500mA Device type B (USB 1.1)		
CF-slot	Compact flash, type I and II		
Flash memory for application	12 MB (incl. fonts)		
Real time clock	±20 PPM + error because of ambient temperature and supply voltage. Total maximum error: 1 min/month at 25 °C Temperature coefficient: 0.004 ppm/°C ²		
Real time clock battery	CR2450 (UL and cUL: Sanyo or Panasonic) Minimum lifetime: 3 years		
Power consumption at rated voltage	Normal: 0.4 A Maximum: 0.9 A	Normal: 0.5 A Maximum: 1.0 A	Normal: 1.2 A Maximum: 1.7 A
Display	TFT-LCD. 640 x 480 pixels, 64K color. CCFL backlight life-time at the ambient temperature of +25 °C: >50,000 h.	TFT-LCD. 800 x 600 pixels, 64K color. CCFL backlight life-time at the ambient temperature of +25 °C: >50,000 h.	TFT-LCD. 1024 x 768 pixels, 64K color. CCFL backlight life-time at the ambient temperature of +25 °C: >35,000 h.
Active area of display, W x H	131.5 x 98.6 mm	211.2 x 158.4 mm	304.1 x 228.1 mm
Fuse	Internal DC fuse, 3.15 AT, 5 x 20 mm		
Power supply	+24V DC (20 - 30V DC). Power supply connector. CE: The power supply must conform with the requirements according to IEC 60950 and IEC 61558-2-4. UL and cUL: The power supply must conform with the requirements for class II power supplies.		
Ambient temperature	Vertical installation: 0 ° to +50 °C Horizontal installation: 0 ° to +40 °C		
Storage temperature	-20 ° to +70 °C		
Relative humidity	5 - 85 % non-condensed		

3.4 Approvals and Enclosure Classes

Certificate	Descriptions	
CE	Noise tested according to EN61000-6-3 emission and EN61000-6-2 immunity. (Certificate is only for operator panel E1012, E1022, E1032, E1041, E1043, E1060, E1061, E1062 and E1063)	Noise tested according to EN61000-6-4 emission and EN61000-6-2 immunity. (Certificate is only for operator panel E1070, E1100, E1071, E1101 and E1151)
UL, cUL	UL 1604 Class I, Div. 2 (Electrical Equipment for Use in Class I, Division 2 Hazardous (Classified) Locations). UL 508 (Industrial Control Equipment).	
DNV	Environmental test specification for instrumentation and automation equipment: Standard for Certification No. 2.4. Location classes: Temperature A, Humidity B, Vibration A, EMC B, Enclosure C (panel front only).	
Ingress protection	IP 66/NEMA 4X (indoor use only), UL 50 4X (indoor use only).	
Back cover protection degree	IP 20.	
Shock	IEC 60068-2-27 (15 g, 11 ms).	
Germanischer Lloyd	Guidelines for the Performance of Type Approvals, Chapter 2, Edition 2003. (Certificate is only for operator panel E1032, E1100, E1071, E1101 and E1151)	

3.5 Functionality Specification

Function Specification	E1032, E1041, E1043, E1060, E1061, E1062, E1063, E1071, E1070, E1100, E1101 and E1151
Network Abilities (Ethernet/Internet)	E-mail (STMP client) Web server Remote operation Access to controller system Transfer of files (FTP server)
Dual Drivers with Data Exchange	Yes
Passthrough / Transparent Mode	Yes (dependent on driver)
No Protocol Mode	Yes
Multiple Languages	Yes, with up to 10 languages in one project
Standard Windows Fonts (Unicode)	Yes
Data Logger	Yes
Internal Variables	Yes
Historic Trends	Yes
Recipe Management	Yes
Alarm Management	Yes, with up to 16 alarm groups
Time Channels	Yes
I/O Poll Groups	Yes
Security Passwords	Yes, up to 8 levels
Message Libraries	Yes
Macros	Yes
Dynamic Objects	Yes
Report Printouts	Yes
Easy Configuration with E-Designer 7	Yes

Function Specification	E1012 and E1022
Network Abilities (Ethernet/Internet)	Access to controller system - Connection via Ethernet is made using the Ethernet Expansion Module, mounted on the back of the operator panel.
Dual Drivers with Data Exchange	No
Passthrough / Transparent Mode	No
No Protocol Mode	No
Multiple Languages	Yes, with up to 10 languages in one project
Standard Windows Fonts (Unicode)	No
Data Logger	No
Internal Variables	Yes
Historic Trends	No. E1022 supports real time trend. E1012 does not support the trend object at all.
Recipe Management	Yes
Alarm Management	Yes, with one alarm group
Time Channels	Yes
I/O Poll Groups	No
Security Passwords	Yes, up to 8 levels
Message Libraries	Yes
Macros	Yes
Dynamic Objects	Yes
Report Printouts	Yes, via serial printer
Easy Configuration with E-Designer 7	Yes

3.6 Additional Hardware

3.6.1 Memory Card

A Compact Flash memory card can be fitted in E1070, E1100, E1071, E1101 and E1151 for expansion of the project memory.

Note:

When using an internal Compact Flash memory card, no external Compact Flash memory card can be used. An external USB Flash drive can be used for the same functions as an external Compact Flash card.

Compact Flash cards of type I and II are supported by the operator panels. Recommended Compact Flash memory cards are Silicon Systems Silicon Drive and San Disk Industrial Grade Compact Flash cards.

Installation

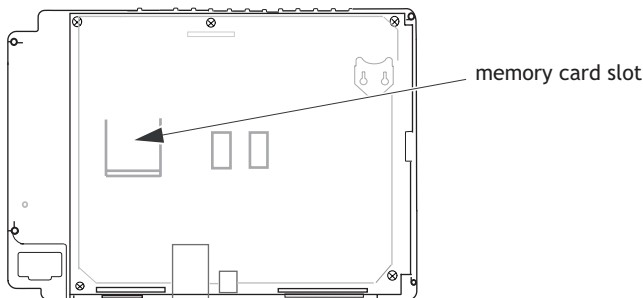
Perform the following steps to install an internal Compact Flash card in the operator panel:

1. Turn off the power to the panel.

Note:

Make sure to use adequate ESD protection.

2. Follow the instructions under [Replacing the Rear Cover](#) to remove the rear cover.
3. Flip the back cover; the CPU board is mounted inside the back cover.
4. Insert the Compact Flash memory card in its slot on the CPU board.



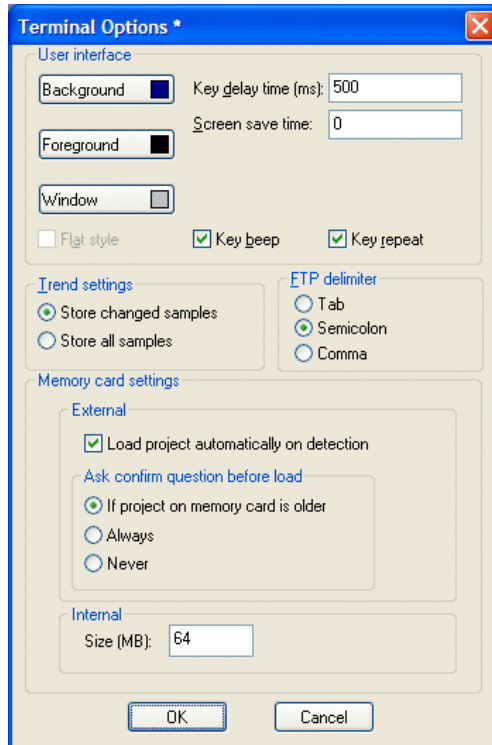
5. Re-attach the back cover to the operator panel.
6. Turn on the power to the operator panel.

When the operator panel starts up, you will be asked if you like to move the files to the internal card; select **YES** to this question.

Settings in E-Designer 7

The size of the internal memory card must be entered in the configuration tool for the operator panel.

1. Select **Setup/Terminal Options**.
2. Enter the size of the internal memory card under **Memory card settings/Internal**.



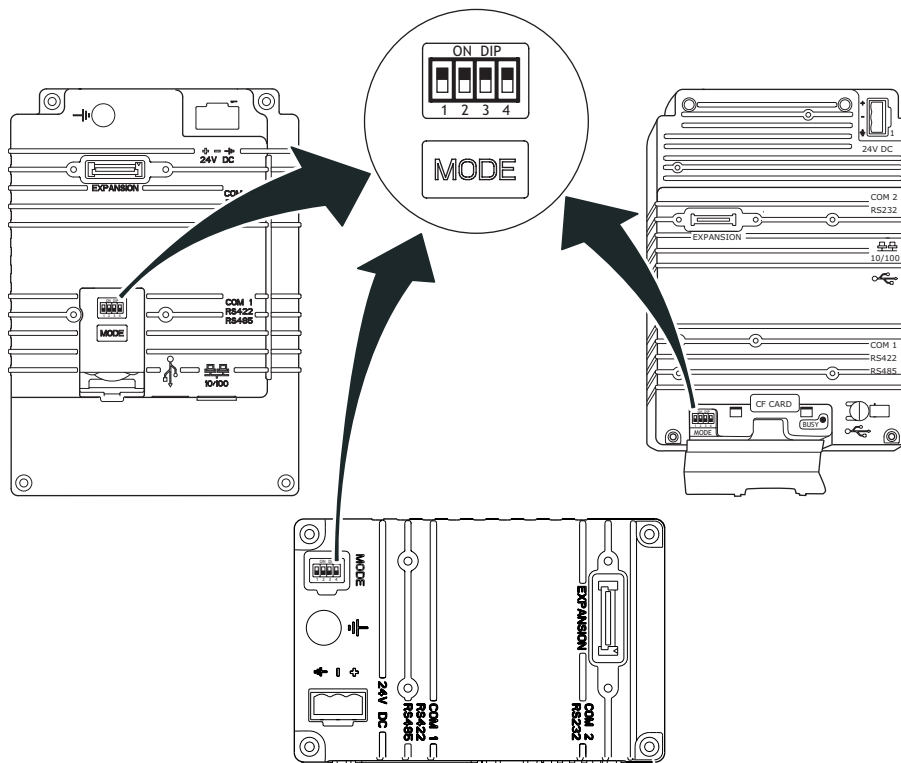
3. Click **OK** to close the dialog.

3.7 Hardware Replacement

This section contains instructions on how to replace operator panel hardware. Only components included in the latest bill of material and spare parts list are allowed. See [Available Spare Parts](#).

3.7.1 Mode Switches

The E1000 operator panels have four mode switches (DIP switches) located on the rear side of the operator panel.



Warning:

The modes below are to be used with caution.

The mode switches have the following functions:

1=ON, 0=OFF

Each letter in “MODE” has a corresponding mode switch

MODE	Description for E1012 and E1022
0000	“Run-mode” - Normal operation.
0010	System Restore, resets the file system. Restores the operator panel to factory settings. Warning! Information can easily accidentally be lost.
0100	Image Load mode (Sysload) allows upgrading of the firmware in the operator panel.
1000	Service Menu mode, the service menu for the system program is shown. Allows the user to set IP configuration, erase the project etc. See section 3.8 Service Menu for details.
1110	Self-Test.

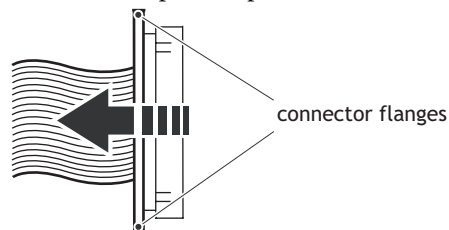
MODE	E1032, E1060, E1070, E1100, E1041, E1043, E1061, E1062, E1063, E1071, E1101 and E1151
0000	"Run-mode" - Boot CE, normal operation.
0010	System Restore, resets the file system and registry, reinstalls the system program (OPsys_bxxx.CAB). Restores the operator panel to factory settings. Warning! Information can easily accidentally be lost.
0100	Image Load mode (Sysload) allows upgrading of the firmware in the operator panel. Note: All files including the file system in the operator panel will be deleted when upgrading with Image Loader.
1000	Service Menu mode, the service menu for the system program is shown. Allows the user to set IP configuration, erase the project, calibrate the touch screen, set the panel in Run/Transfer mode etc. See section 3.8 Service Menu for details.
1100	Not used (Run-mode).
1110	Self-Test.
xxx1	Hard reset (forces the system to reset).

To change mode switches, follow the steps below:

1. Disconnect power from the operator panel.
2. Set the mode switches using a ballpoint pen.
3. Reconnect power to the operator panel.

3.7.2 Cables

Most of the operator panels use the same type of flex cable connectors.



Flex cable connector

To release the flex cables from the connector, gently push the two flanges on the cable connector towards the flex cable.

Note:

The connectors must be unlocked on both sides before removing the cable, otherwise the flex cable may be damaged.

3.7.3 Replacing the Rear Cover

The following is needed:

- A new rear cover.
- A torx T10 screwdriver.

Note:

Make sure you have adequate ESD protection.

E1012, E1022, E1032, E1041, E1043, E1060, E1061, E1062 and E1063

To replace the rear cover you will need a new rear cover, see the [Available Spare Parts](#) section.

Then follow the steps below:

1. Power off the operator panel.
2. Follow the instructions [Replacing the Battery](#) to remove the battery.
3. Remove the rear cover of the operator panel by loosening the 4 torx screws.

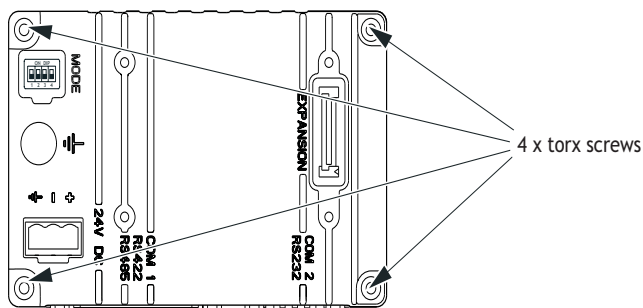


Illustration of E1012 and E1022

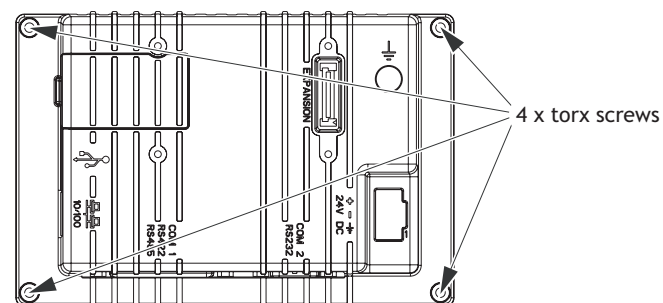


Illustration of E1032

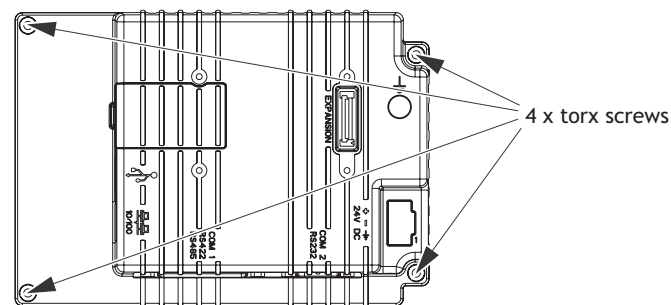


Illustration of E1060/E1061/E1062/E1063

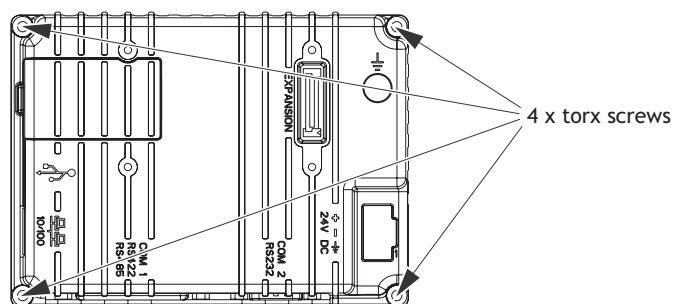


Illustration of E1041/E1043

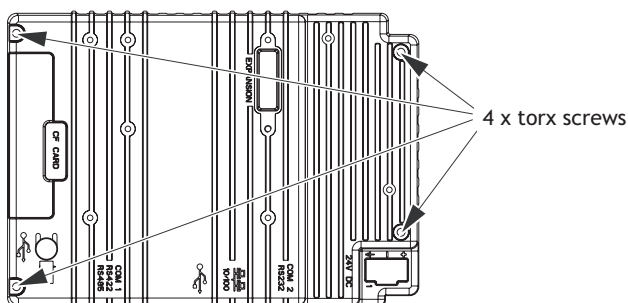
4. Re-assemble with the new rear cover in reverse order.

E1070, E1100, E1071, E1101 and E1151

To replace the rear cover you will need a new rear cover, see the [Available Spare Parts](#) section.

Then follow the steps below:

1. Power off the operator panel.
2. Remove the rear cover of the operator panel by loosening the 4 torx screws.



3. Re-assemble with the new rear cover in reverse order.

3.7.4 Replacing the Display/Display Cable

The following is needed:

- A new display or a new display cable, see [Available Spare Parts](#).
- A torx T10 screwdriver.
- Two plain screwdrivers.

Note:

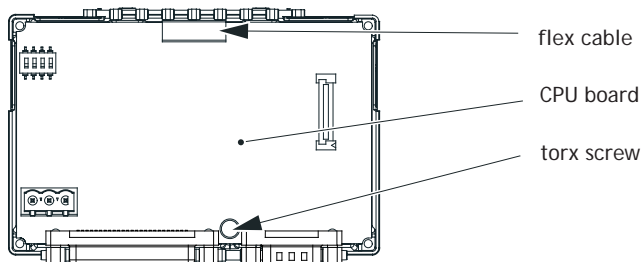
Make sure you have adequate ESD protection.

E1012 and E1022

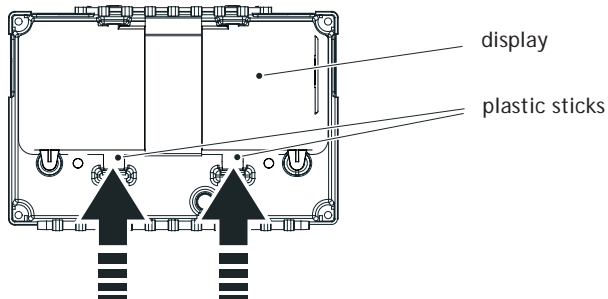
To replace the display you will need a new display including display frame, see the [Available Spare Parts](#) section.

Follow the steps below:

1. Power off the operator panel.
2. Follow the instructions under [Replacing the Rear Cover](#) to remove the rear cover.
3. Unlock the flex cable connector by pressing the connector flanges towards the cable and disconnect the flex cable from the CPU board.
The connector must be unlocked on both sides before removing the cable.



4. Loosen the torx screw as shown in the illustration above to release the CPU board.
Then carefully lift the CPU board.
5. Disconnect the flex cable on the back side of the CPU board and then remove the CPU board.
6. Push the two plastic sticks towards the top of the panel to unlock the display from the aluminum casing.



7. Mount the new display unit.
8. Re-assemble the panel in reverse order.

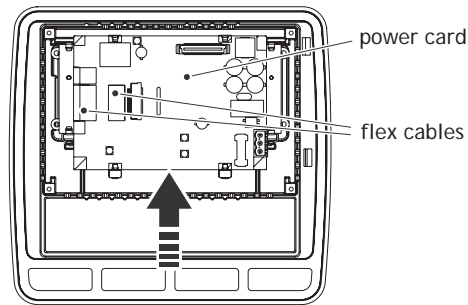
E1032

To replace the display you will need a new display including display frame, see the [Available Spare Parts](#) section.

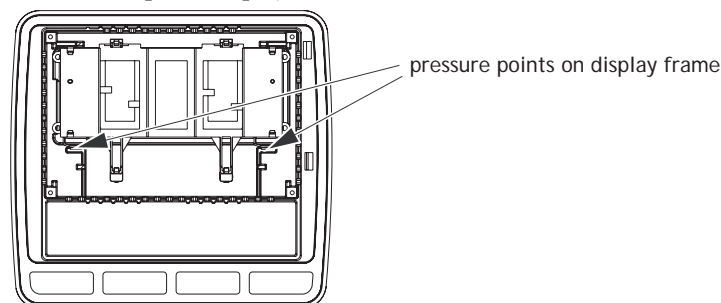
Follow the steps below:

1. Power off the operator panel.
2. Follow the instructions under [Replacing the Rear Cover](#) to remove the rear cover.
3. Unlock the two flex cable connectors by pressing the connector flanges towards the cable and disconnect the flex cables from the power card.

The connectors must be unlocked on both sides before removing the cables.



4. Gently press the power card towards the top of the panel as shown in the illustration above to release the power card from the power card holders. Then tilt the bottom of the card away from you.
5. Disconnect the two flex cables and the plain cable on the back side of the power card and then remove the power card.
6. Insert the two screwdrivers between the display frame and the aluminum casing illustrated below. Press and bend gently on the display frame to unlock the frame and tilt up the display frame.



7. Mount the new display unit.
8. Re-assemble the panel in reverse order.

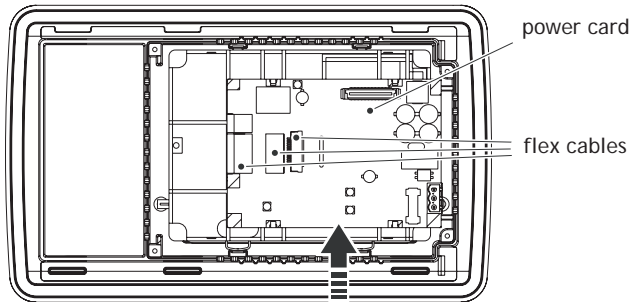
E1060/E1062

To replace the display you will need a new display including display frame, see the [Available Spare Parts](#) section.

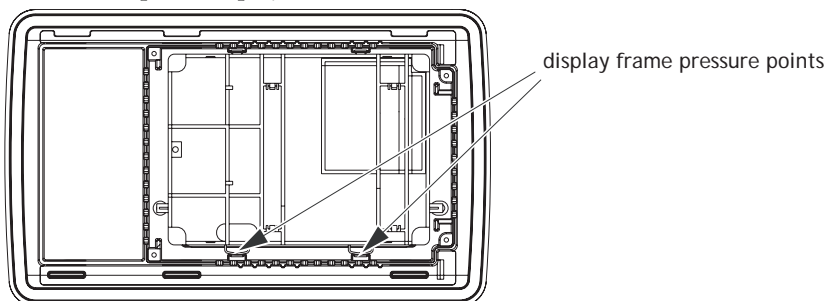
Follow the steps below:

1. Power off the operator panel.
2. Follow the instructions under [Replacing the Rear Cover](#) to remove the rear cover.
3. Unlock the three flex cable connectors by pressing the connector flanges towards the cable and disconnect the flex cables from the power card.

The connectors must be unlocked on both sides before removing the cables.



4. Gently press the power card towards the top of the panel as shown in the illustration above to release the power card from the power card holders. Then tilt the bottom of the card away from you.
5. Disconnect the plain cable on the back side of the power card and remove the power card.
6. Insert the two screwdrivers between the display frame and the aluminum casing illustrated below. Press and bend gently on the display frame to unlock the frame and tilt up the display frame.



7. Mount the new display unit.
8. Re-assemble the panel in reverse order.

E1071/E1070

To replace the display/display cable you will need a new display including plastic frame and display cable, see the *Available Spare Parts* section.

Follow the steps below:

1. Power off the operator panel.
2. Follow the instructions under *Replacing the Rear Cover* to remove the rear cover.
3. Disconnect the two (E1071) or three (E1070) flex cables from the power card, according to the illustration below, and remove the two plastic nuts that holds the power card in place.

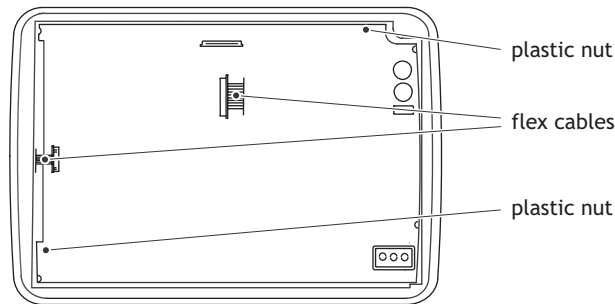


Illustration of E1071 showing the two flex cables

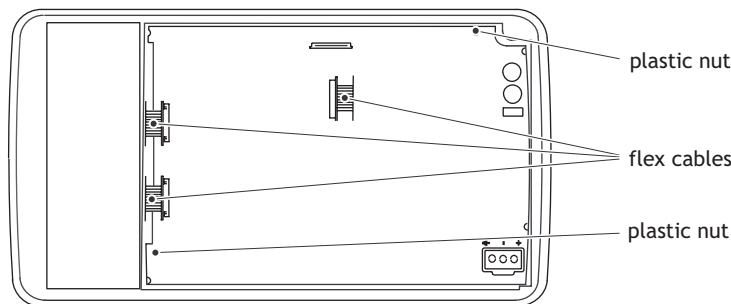
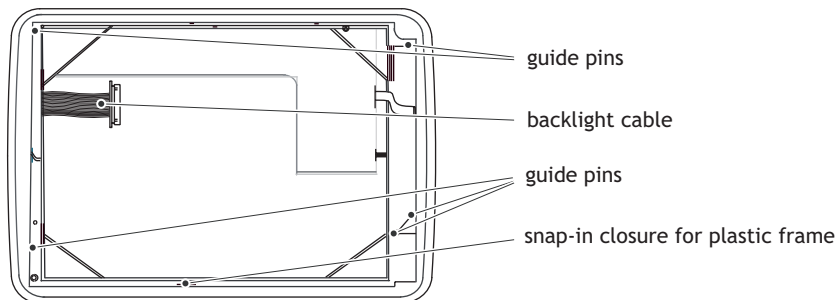


Illustration of E1070 showing three flex cables

4. Lift the power card and gently remove the backlight cable from the rear side.

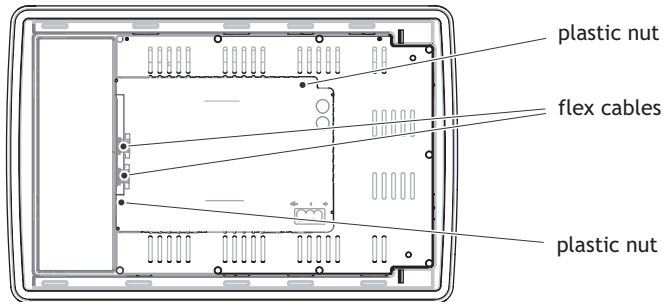


5. Gently loosen the complete plastic frame and display from the front plate. Scrap the display and frame.
6. Mount the new display/display cable and frame and re-assemble the complete operator panel. Make sure the guide pins on the frame are properly fastened in the holes in the front plate.
7. Re-assemble the complete operator panel.

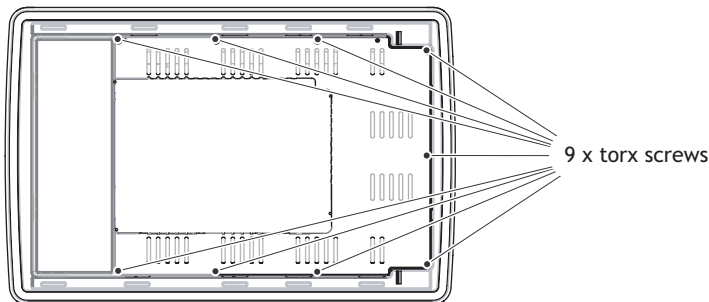
E1100

Follow the steps below to replace the display/display cable of E1100:

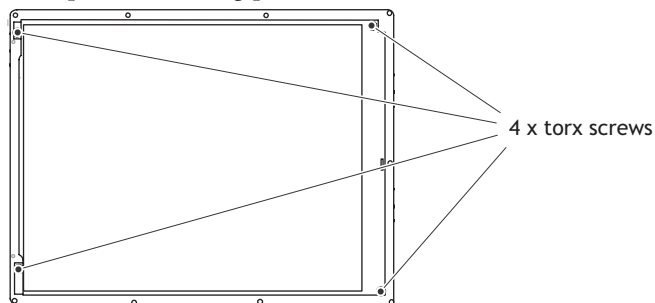
1. Power off the operator panel.
2. Follow the instructions under [Replacing the Rear Cover](#) to remove the rear cover.
3. Disconnect the two flex cables from the power card and remove the two plastic nuts that keep the power card in place.



4. Lift the power card and gently remove the 2 backlight cables and the display cable from the rear side of the power card.
5. Remove the mounting plate (9 torx screws). Gently lift the mounting plate with the display and power card.



6. Flip the mounting plate and unscrew the 4 torx screws.



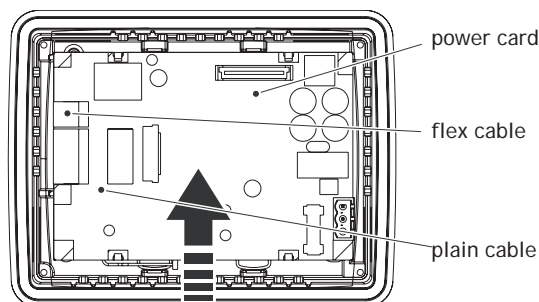
7. Make sure the display cable is attached to the new display before reattaching the mounting plate.
8. Re-assemble the complete operator panel.

E1041/E1043

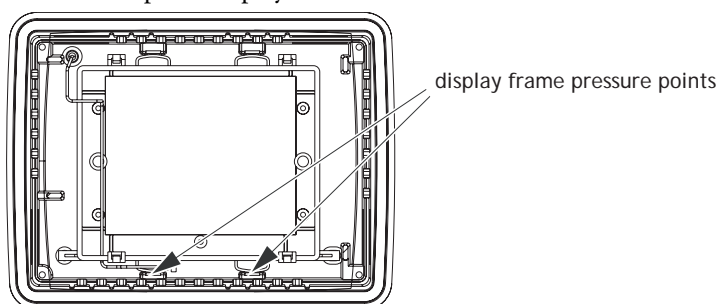
To replace the display you will need a new display including display frame, see the [Available Spare Parts](#) section.

Follow the steps below:

1. Power off the operator panel.
2. Follow the instructions under [Replacing the Rear Cover](#) to remove the rear cover.
3. Unlock the flex cable connector by pressing the connector flanges towards the cable and disconnect the flex cable and the plain cable from the power card.
The connector must be unlocked on both sides before removing the cables.



4. Gently press the power card towards the top of the panel as shown in the illustration above to release the power card from the power card holders.
Then tilt the bottom of the card away from you.
5. Disconnect the flex cable on the back side of the power card and remove the power card.
6. Insert the two screwdrivers between the display frame and the aluminum casing illustrated below. Press and bend gently on the display frame to unlock the frame and tilt up the display frame.



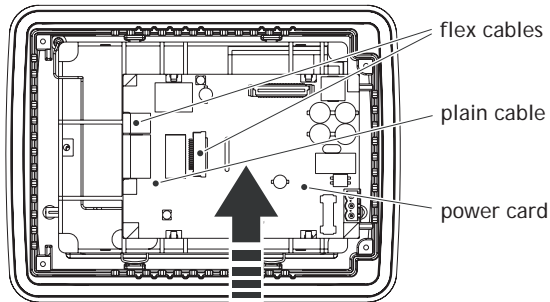
7. Mount the new display unit.
8. Re-assemble the complete operator panel.

E1061/E1063

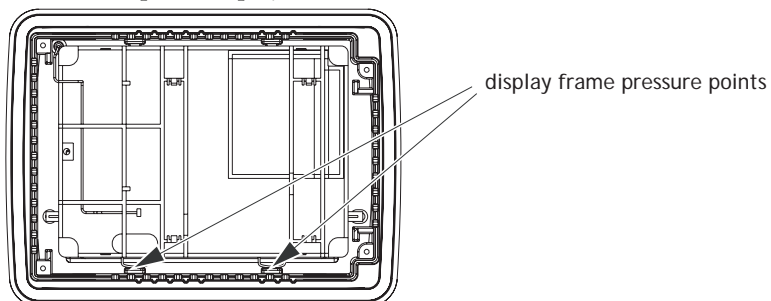
To replace the display you will need a new display including display frame, see the [Available Spare Parts](#) section.

Follow the steps below:

1. Power off the operator panel.
2. Follow the instructions under [Replacing the Rear Cover](#) to remove the rear cover.
3. Unlock the two flex cable connectors by pressing the connector flanges towards the cable and disconnect the flex cables and the plain cable from the power card. The connectors must be unlocked on both sides before removing the cables.



4. Gently press the power card towards the top of the panel as shown in the illustration above to release the power card from the power card holders. Then tilt the bottom of the card away from you.
5. Disconnect the plain cable on the back side of the power card and then remove the power card.
6. Insert the two screwdrivers between the display frame and the aluminum casing illustrated below. Press and bend gently on the display frame to unlock the frame and tilt up the display frame.

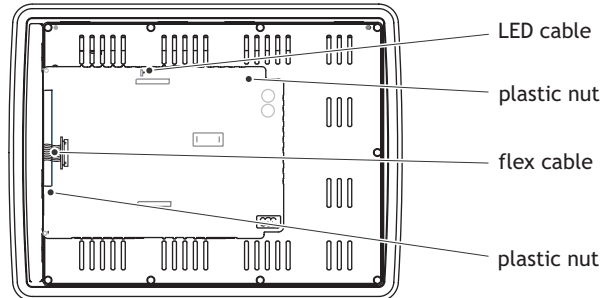


7. Mount the new display unit.
8. Re-assemble the complete operator panel.

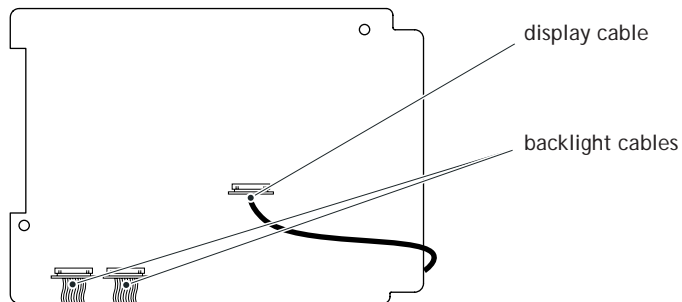
E1101

Follow the steps below to replace the display/display cable of E1101:

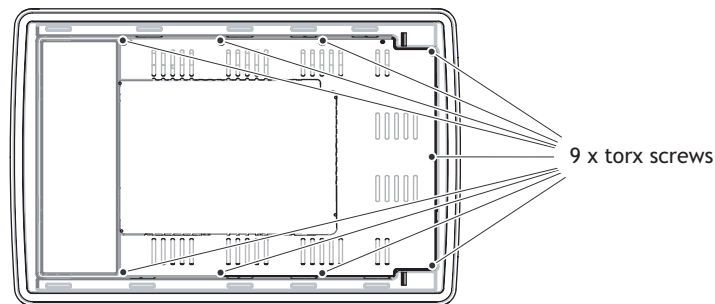
1. Power off the operator panel.
2. Follow the instructions under *Replacing the Rear Cover* to remove the rear cover.
3. Disconnect the flex cable and the cable to the LED on the power card and remove the two plastic nuts that keep the power card in place.



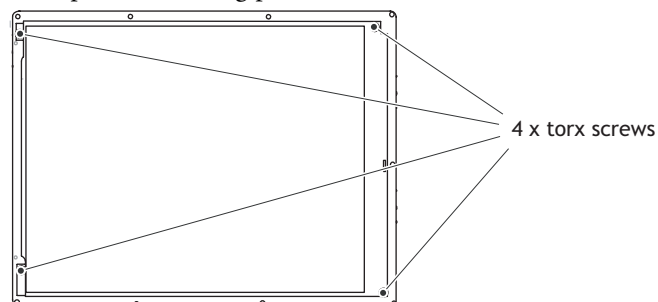
4. Lift up the power card and gently remove the backlight cables and the display cable from the rear side of the power card.



5. Remove the mounting plate (9 torx screws). Gently lift up the mounting plate and the display.



6. Flip the mounting plate and unscrew the 4 torx screws, see figure below.



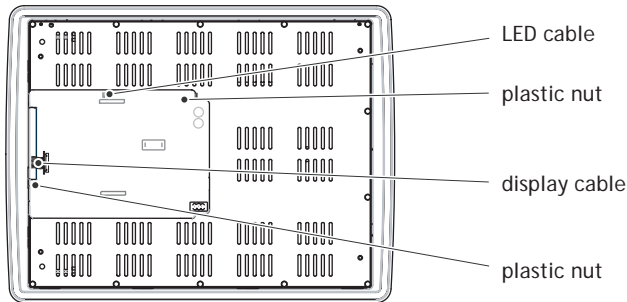
7. Make sure the display cable is attached to the new display before reattaching the mounting plate.
8. Re-assemble the complete operator panel.

Everything for your HMI running

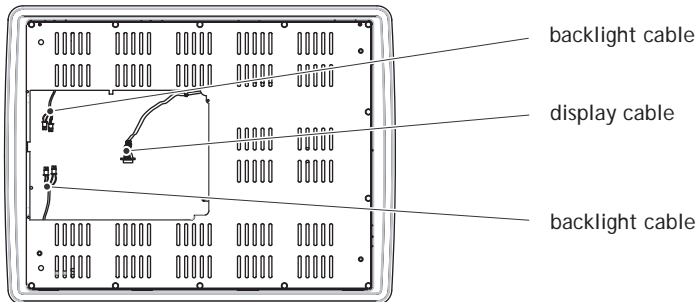
E1151

Follow the steps below to replace the display/display cable of E1151:

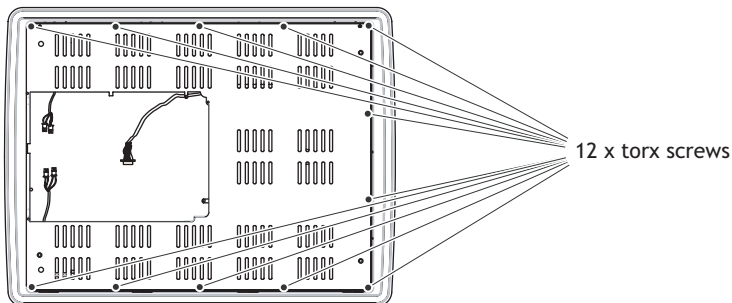
1. Power off the operator panel.
2. Follow the instructions under [Replacing the Rear Cover](#) to remove the rear cover.
3. Disconnect the flex cable and the LED cable from the power card. The connector on the flex cable is a plain connector so just pull the connector out.
4. Remove the two plastic nuts that keep the power card in place.



5. Lift up the power card and gently remove the 4 backlight cables and disconnect the display cable from the power card.

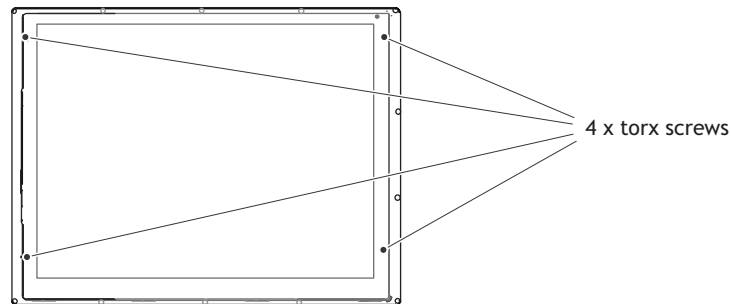


6. Remove the mounting plate (12 torx screws).



7. Gently lift up the mounting plate and the display.

8. Flip the mounting plate and unscrew the 4 torx screws.



Flipped mounting plate display with 4 torx screws

9. Make sure that the display cable is positioned inside the hollow of the adapter plate, intended for the display, before reattaching the mounting plate.
10. Re-assemble the complete operator panel.

3.7.5 Self-test of the Display

To perform a self-test of the display, follow the steps below:

1. Start the operator panel in a self-test mode (see table in the [Mode Switches](#) section).
2. Go to the display test. Verify that the display works.
3. If the screen does not work, try fault tracing, see the [Fault Tracing](#) section.

3.7.6 Calibrate the Touch Screen

To calibrate the touch screen, follow the steps below:

Note:

A USB keyboard and a USB mouse must be connected to the operator panel.

1. Set the MODE switches to the correct positions in order to enter the Service Menu mode (see table in the [Mode Switches](#) section).
2. Switch on the power and follow the instructions.
3. Power off the operator panel.
4. Reset all MODE switches to the OFF position.

3.7.7 Replacing the Complete Front

The following is needed:

- A new front, see the [Available Spare Parts](#) list.
- A torx T10 screwdriver.

Note:

Make sure you have adequate ESD protection.

E1012, E1022, E1032, E1041, E1043, E1060, E1061, E1062 and E1063

Follow the steps below to replace the complete front of the operator panel:

1. Power off the operator panel.
2. Follow the steps 1-6 in the [Replacing the Display/Display Cable](#) instructions for the current panel model.
3. Attach the new front.
4. Re-assemble the unit.

E1070 and E1071

Follow the steps below to replace the complete front of E1070/E1071:

1. Power off the operator panel.
2. Follow the steps 1-3 and step 5 in the [Replacing the Display/Display Cable](#) instruction for E1070/E1071, but in step 3, do not remove the display cable.
3. Attach the new front.
4. Re-assemble the unit.

E1100

Follow the steps below to replace the complete front of E1100:

1. Power off the operator panel.
2. Follow the steps 1-3 and step 5 in the [Replacing the Display/Display Cable](#) instruction for E1100, but in step 3, only disconnect the flex cable (do not remove the power card).
3. Attach the new front.
4. Re-assemble the unit.

E1101

Follow the steps below to replace the complete front of E1101:

1. Power off the operator panel.
2. Follow the steps 1-3 and 5 in the [Replacing the Display/Display Cable](#) instruction for E1101, but in step 3, only disconnect the flex cables and the LED cable (do not remove the power card).
3. Attach the new front.
4. Re-assemble the unit.

E1151

Follow the steps below to replace the complete front of E1151:

1. Power off the operator panel.
2. Follow the steps 1-3 and step 5 in the [Replacing the Display/Display Cable](#) instruction for E1151, but in step 3, only disconnect the flex cable and the LED cable (do not remove the power card).
3. Attach the new front.
4. Re-assemble the unit.

3.7.8 Replacing the Battery

Note:

Make sure you have adequate ESD protection.

Note:

Make sure to make a backup copy of the operator panel project. See the [Software Products](#) section.

E1012 and E1022

These operator panels use a rechargeable battery.

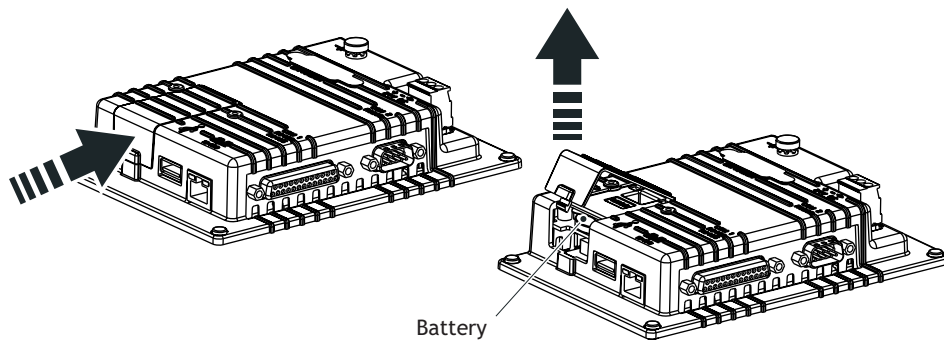
E1032, E1060, E1041, E1043, E1061, E1062 and E1063

The following is needed:

- A new battery, see the [Available Spare Parts](#) list.

Follow the steps below to replace the battery:

1. Power off the operator panel.
2. Open the battery cover.
3. Use a non conductive pair of pliers to extract the battery.



4. Insert the new battery.
5. Re-assemble the battery cover.

Note:

The removed lithium battery should be recycled.

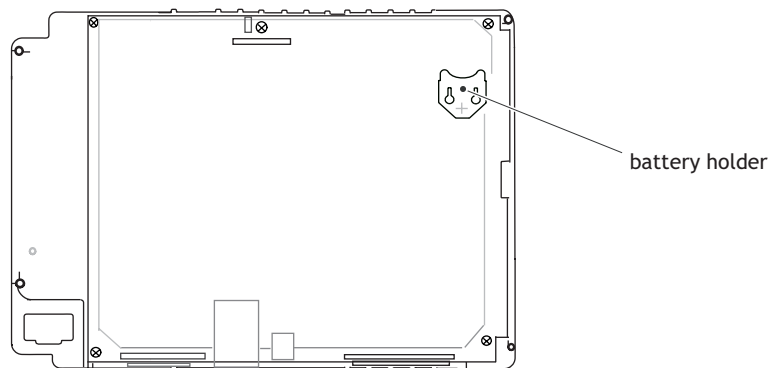
E1070, E1100, E1071, E1101 and E1151

The following is needed:

- A new battery, see the [Available Spare Parts](#) list.
- Glue Gun: Jet-Melt TCQ, manufacturer: 3M
- Melting Glue: 3748 V-O, manufacturer: 3M

Follow the steps below to replace the battery:

1. Power off the operator panel.
2. Follow the instructions under [Replacing the Rear Cover](#) to remove the rear cover.
3. Flip the back cover (the CPU board and the battery are mounted on the rear side of the back cover).



CPU board with battery holder on the rear side of the back cover

4. If the battery is glued with melting glue, remove the glue before carefully removing the battery from the battery holder.
5. Carefully fit the new battery into the battery holder. Make sure the plus sign on the battery is set towards the plus sign on the holder.
6. Glue the battery to the battery holder with melting glue.
7. Re-assemble the operator panel in reverse order.

Note:

The removed lithium battery should be recycled.

3.7.9 Replacing the Backlight

Note:

All lamps in the display must be replaced at the same time.

To following is needed:

- A new backlight, see the [Available Spare Parts](#) list.
 - A torx T10 screwdriver
 - A screwdriver Phillips size 0 or 00 (only for E1151).
-

Note:

Make sure you have adequate ESD protection.

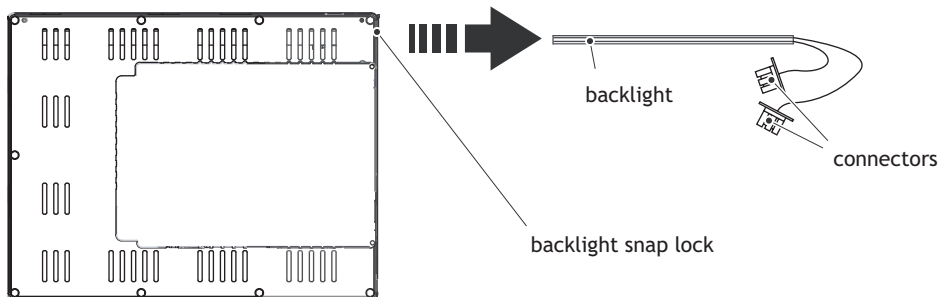
E1012, E1022, E1032, E1041, E1043, E1060, E1061, E1062, E1063, E1070 and E1071

If the backlight is broken on a panel listed above, the entire display must be replaced. To replace the display you will need a new display including plastic frame and display cable, see the [Available Spare Parts](#) section. For information about changing the display See [Replacing the Display/Display Cable](#) section.

E1100

To replace the backlight of E1100, follow the steps 1-5 in section [Replacing the Rear Cover](#) for E1100. Then follow the steps below:

1. Gently move the backlight diagonally in direction from the display center to release the snap-in closure that keeps the backlight in place.
2. Remove the backlight from the display.

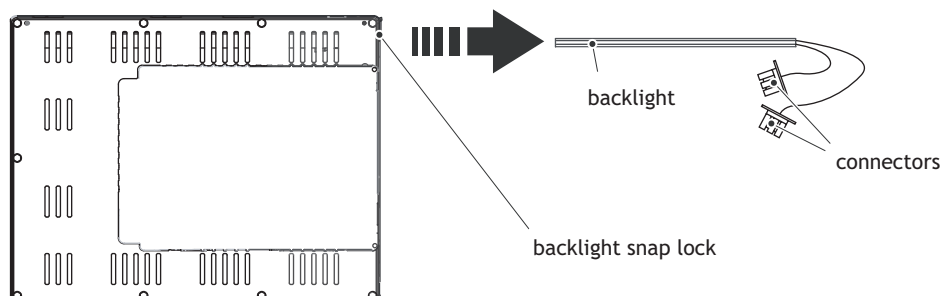


3. Insert the new backlight. Be careful not to pull the cables of the new backlight when inserting it, since pulling the cables will damage the backlight.
4. Re-assemble the complete operator panel.

E1101

To replace the backlight of E1101, follow the steps 1-5 in section [Replacing the Rear Cover](#) for E1101. Then follow the steps below:

1. Gently move the backlight diagonally in direction from the display center to release the snap-in closure that keeps the backlight in place.
2. Remove the backlight from the display.



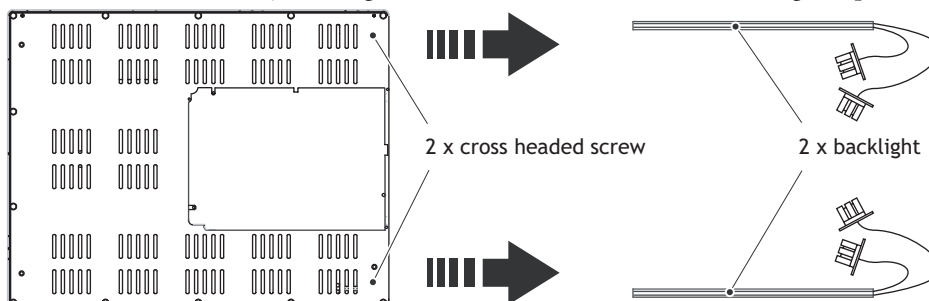
3. Insert the new backlight. Be careful not to pull the cables of the new backlight when inserting it, since pulling the cables will damage the backlight.
4. Re-assemble the complete operator panel.

E1151

To replace the backlight of E1151 you will need two new backlights, see the [Available Spare Parts](#) list.

Follow the steps 1-5 in section [Replacing the Rear Cover](#) for E1151. Then follow the steps below:

1. Remove the two cross-headed screws to the backlight, using the Phillips size 00 screwdriver. This way, backlights can be removed without removing the plate.



2. Remove the backlights.
3. Insert the new backlights. Be careful not to pull the cables of the new backlights when inserting them, since pulling the cables will damage the backlights.
4. Re-assemble the complete operator panel.

3.7.10 Available Spare Parts

The tables below list available spare parts:

Order number	Description - Fronts	Operator Panel
601119009	COMPLETE FRONT Including front cover, glass, keyboard, gaskets and labels	E1012
601119010	COMPLETE FRONT Including front cover, glass, keyboard, gaskets and labels	E1022
601009085	COMPLETE FRONT Including front cover, glass, keyboard, gaskets and labels	E1032
601009089	COMPLETE FRONT Including front cover, touch overlay, gaskets and labels	E1041
601009112	COMPLETE FRONT Including front cover, touch overlay, gaskets and labels	E1043
601009087	COMPLETE FRONT Including front cover, glass, keyboard, gaskets and labels	E1060
601009114	COMPLETE FRONT Including front cover, touch overlay, gaskets and labels	E1061
N/A	COMPLETE FRONT Including front cover, glass, keyboard, gaskets and labels	E1062
601009115	COMPLETE FRONT Including front cover, touch overlay, gaskets and labels	E1063
601009103	COMPLETE FRONT Including front cover, glass, keyboard, gaskets and labels	E1070
601009101	COMPLETE FRONT Including front cover, touch overlay, gaskets and labels	E1071
601009107	COMPLETE FRONT Including front cover, glass, keyboard, gaskets and labels	E1100
601009105	COMPLETE FRONT Including front cover, touch overlay, gaskets and labels	E1101
601009109	COMPLETE FRONT Including front cover, touch overlay, gaskets and labels	E1151

Order number	Description - Displays	Operator Panel
601009156	DISPLAY Including frame and cable	E1012
601009157	DISPLAY Including frame and cable	E1022
601009064	DISPLAY Including frame and cable	E1032

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Order number	Description - Displays	Operator Panel
601009065	DISPLAY Including frame and cable	E1041 and E1043
601009067	DISPLAY Including frame and cable	E1060 and E1061
601009066	DISPLAY Including frame and cable	E1063
N/A	DISPLAY Including frame and cable	E1060* and E1062
N/A	DISPLAY Including frame and cable	E1061** and E1063***
601119004	DISPLAY Including frame and cable	E1070 and E1071
601119014	DISPLAY Including frame and cable	E1100 and E1101
601119017	DISPLAY Including frame and cable	E1151

*applies to E1060 of hardware version type no 07900 or higher

**applies to E1061 of hardware version type no 07905 or higher

***applies to E1063 of hardware version type no 07915 or higher

Order number	Description - Backlights, Display Cables	Operator Panel
N/A	BACKLIGHT Is not replaceable. Change complete display.	E1012, E1022, E1032, E1060, E1070, E1041, E1043, E1061, E1062, E1063 and E1071
601119020	BACKLIGHT	E1100 and E1101
601119019	BACKLIGHT	E1151
601119005	DISPLAY CABLE	E1070 and E1071
601119015	DISPLAY CABLE	E1100 and E1101
601119018	DISPLAY CABLE	E1151

Order number	Description - Power supply	Operator Panel
321099040	POWER CONNECTOR	All operator panels in the E1000-series
601009010	BATTERY, Lithium battery 550mAh CR2450	All operator panels in the E1000-series

*applies to E1060 of hardware version type no 07900 or higher

**applies to E1061 of hardware version type no 07905 or higher

***applies to E1063 of hardware version type no 07915 or higher

Order number	Description - Covers	Operator Panel
601119011	REAR COVER	E1012 and E1022
601009120	REAR COVER	E1032
601009121	REAR COVER	E1041 and E1043
601009122	REAR COVER	E1060, E1061, E1062 and E1063
601009011	REAR COVER	E1070, E1071, E1100, E1101 and E1151
601009123	BATTERY COVER	E1032, E1041, E1043, E1060, E1061, E1062 and E1063

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Order number	Description - Covers	Operator Panel
601009003	CF COVER	E1070, E1071, E1100, E1101 and E1151
601009001	MOUNTING BRACKETS Bracket with mounted M5-screw	All operator panels in the E1000-series

Order number	Description - Touch and key protections	Operator Panel
N/A	KEY PROTECTION SHEET	E1012
N/A	KEY PROTECTION SHEET	E1022
601009080	KEY PROTECTION SHEET	E1032
601009081	TOUCH PROTECTION SHEET	E1041 and E1043
601009083	KEY PROTECTION SHEET	E1060 and E1062
601009082	TOUCH PROTECTION SHEET	E1061 and E1063
601009055	KEY PROTECTION SHEET	E1070
601009024	TOUCH PROTECTION SHEET	E1071
601009056	KEY PROTECTION SHEET	E1100
601009039	TOUCH PROTECTION SHEET	E1101
601009048	TOUCH PROTECTION SHEET	E1151

Order number	Description - Labels	Operator Panel
601009124	LABEL (for expansion port)	E1032, E1041, E1043, E1060, E1061, E1062 and E1063
601009163	FRONT LABEL	E1012
601009164	FRONT LABEL	E1022
601009132	FRONT LABEL	E1032
601009138	FRONT LABEL	E1041
601009137	FRONT LABEL	E1043
601009141	FRONT LABEL	E1060
601009140	FRONT LABEL	E1061
N/A	FRONT LABEL	E1062
601009139	FRONT LABEL	E1063
601009104	FRONT LABEL	E1070
601009102	FRONT LABEL	E1071
601009108	FRONT LABEL	E1100
601009106	FRONT LABEL	E1101
601009110	FRONT LABEL	E1151

Order number	Description - Packing	Operator Panel
601009211	COMPLETE BOX	E1012
601009212	COMPLETE BOX	E1022
601009125	COMPLETE BOX	E1032
601009126	COMPLETE BOX	E1041 and E1043
601009128	COMPLETE BOX	E1060 and E1062
601009127	COMPLETE BOX	E1061 and E1063
601009022	COMPLETE BOX	E1070
601009020	COMPLETE BOX	E1071
601009037	COMPLETE BOX	E1100
601009035	COMPLETE BOX	E1101

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Order number	Description - Packing	Operator Panel
601009046	COMPLETE BOX	E1151

Order number	Description - Test service items	Operator Panel
601009008	TEST PLUG ETHERNET Ethernet RJ45 test connector	All operator panels in the E1000-series
601009006	TEST PLUG RS232 RS232 test connector	All operator panels in the E1000-series
601009007	TEST PLUG RS422/485 RS422/485 test connector	All operator panels in the E1000-series
601009004	TEST PLUG USB H-D USB Host and Device test connector	E1070, E1071, E1100, E1101 and E1151
601009069	TEST PLUG USB H USB Host test connector	All operator panels in the E1000-series

3.8 Service Menu

The Service Menu is accessed by setting the mode switches on the operator panel in mode 1000.

The following options are available in the Service Menu:

3.8.1 Network Settings

Select this option to access the Network Menu.

Network Menu

The options in the Network Menu corresponds to selecting **Settings/Network** in E-Designer and contains the following items:

Menu item	Described in E-Designer reference manual/help file
TCP/IP Settings	18.2 Network Communication through Ethernet
Accounts	18.5 Network Accounts
Services	18.4 Network Services

3.8.2 Erase Project Memory

This option erases the project memory.

3.8.3 Load Project from Memory Card

An empty operator panel can be started with an existing E-Designer project, used in another panel. The project first has to be saved to a Compact Flash memory card or USB memory stick via the function **Save project to memory card** (for example via a function key).

Insert the memory card in the empty panel before boot-up. Then select **Load project from memory card** in the service menu and follow the instructions.

3.8.4 Enter Transfer Mode

Allows entering transfer mode manually, needed to download projects via GSM modem. See section **Transfer via GSM Modem** in E-Designer reference manual/help file for details.

3.8.5 Enter Run Mode

Allows entering run mode manually, needed to download projects via GSM modem. See section **Transfer via GSM Modem** in E-Designer reference manual/help file for details.

3.8.6 Update System Program from Memory Card

Insert a Compact Flash or USB memory stick with a new system program and follow the instructions. The system program can also be updated via the configuration tool for the operator panels.

3.8.7 Calibrate Touch Screen

Follow the instructions on the screen to calibrate the touch screen.

3.9 Hardware Self Test

The self-test program can be used to test aspects of operator panel functionality and the communication ports. To run the test you will need:

- Test plugs; see [Test Plug Drawing](#).
- 24 V DC, min. 3 A.

Follow the steps below to run the self-test program on the operator panel:

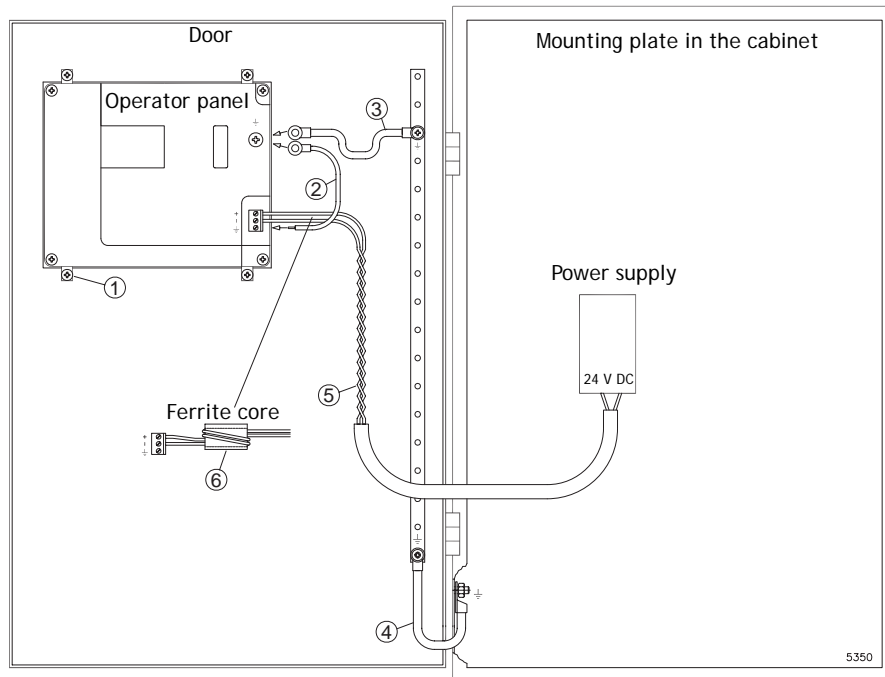
1. Power off the operator panel.
2. Go to the self-test. Set the mode switches to the self-test positions, see the table in the [Mode Switches](#) section.
3. Power on the operator panel and follow the instructions at the bottom of the display.
4. When using the test plugs, make sure all LEDs on the 9-pin and 25-pin D-sub are on.
5. When the self-test is finished, power off the operator panel and set all mode switches to the OFF position.

If an error occurs during the self-test, try to fault trace. See [Fault Tracing](#).

3.10 Additional Installation Tips

When experiencing communication problems in for example noisy environments or when operating close to temperature limits, the following recommendations are to be noticed.

3.10.1 Grounding the Operator Panel

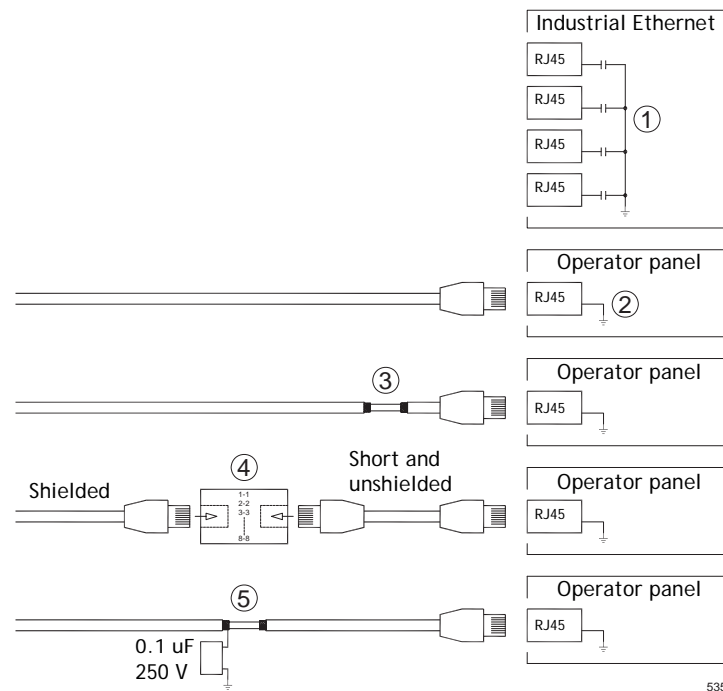


1. The operator panel's mounting clamps do not provide a secure grounding connection between the panel and the device cabinet.
2. Connect a 2.5 mm² wire between the operator panel's quick-connect plinth and the panel chassis.
3. Connect a 6 or 4 mm² wire or grounding braid between the panel's chassis and the closest grounding point on the door.
4. Connect a strong but short grounding braid between the door and the device cabinet.
5. Twist the cables onto the 24 V DC feed.
6. A ferrite core suppresses disturbances to the 24 V feed.
 - 2 turns around the ferrite core provide 4 times the suppression of 1 turn.
 - 3 turns around the ferrite core provide 9 times the suppression of 1 turn.

Remember:

The grounding wires should be short and the conductor should have a large area. A long, thin grounding wire has a very high impedance (resistance) at high frequencies and will not guide disturbances to the ground. Multi-wire conductors are better than single wire conductors with the same area. A braided conductor wire with the same area is even better. The best is a short, thick grounding braid.

3.10.2 Ethernet Connection in the Panel



1. In some industrial units for Ethernet, the RJ45 contact's shield is connected to the chassis via a capacitor.
2. The operator panel's Ethernet shield is directly connected to the chassis.

Check whether the other Ethernet unit has its shield directly grounded or grounded via a capacitor.

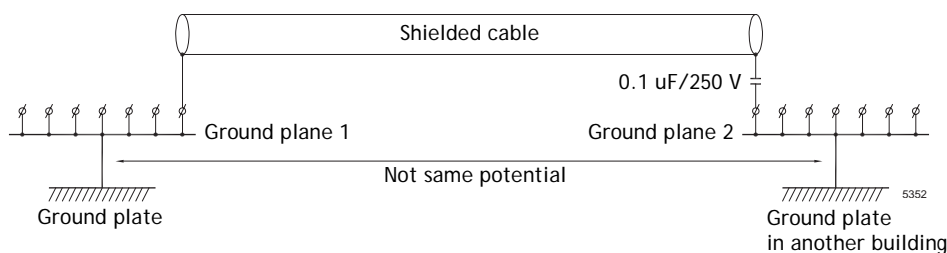
In many cases, connecting the shielded Ethernet cabling to the chassis at both ends is inappropriate. Hum or grounding loops can occur. Unshielded cabling may even result in fewer communication errors.

A good solution may be to use a shielded Ethernet cable, but to connect the shield at one end only.

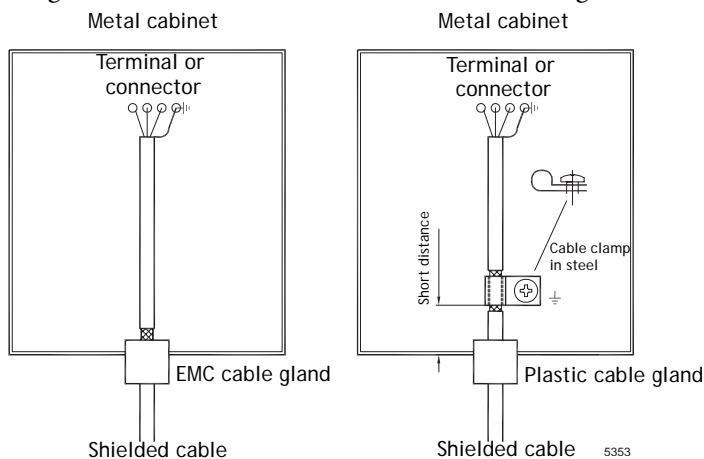
3. One option is to break the shield.
4. A more elegant method is to expand the shielded Ethernet cabling with a piece of unshielded Ethernet cable.
5. You can ground the shield via an external 0.1 uF/250 V plastic capacitor. This will connect the HF transients to the ground.

3.10.3 To Achieve Better EMC Protection

- Initially, use the original cabling from Beijer Electronics primarily.
- Use shielded cables for RS232 communication.
- Use twisted pair and shielded cabling for RS422 and RS485.
- Use the cabling intended for the bus type; Ethernet, Profibus, CC-Link, CAN, Device Net etc.
- Install and connect according to applicable specifications for the relevant bus standard.
- Use shielded cabling for Ethernet, preferably with foil + braided shield.
- D-sub covers should be shielded, and the shield should be connected to the cover 360 ° where the cable comes in.
- Connect the shield at both ends.



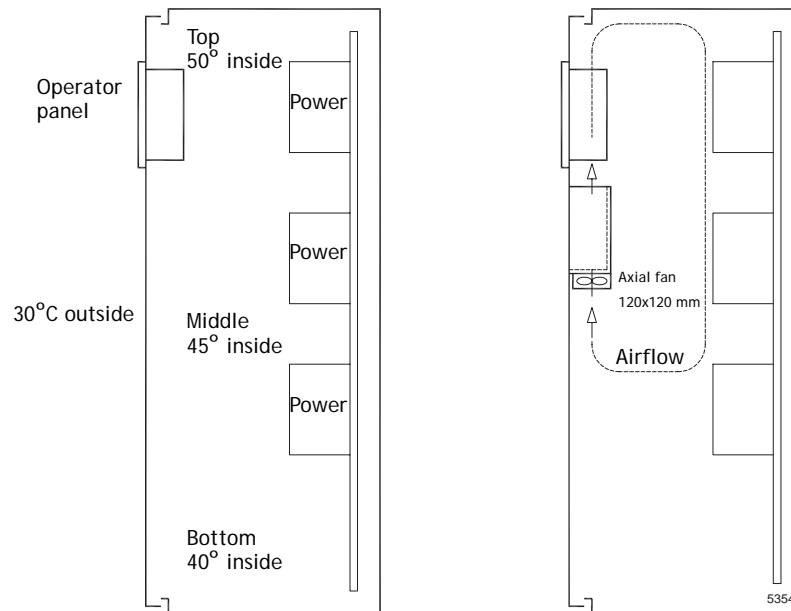
With longer distances, there is a risk that the ground potential may be different. In that case, the shield should only be connected at one end. A good alternative is to connect the other end of the shield to the ground via a 0.1 uF/250 V plastic capacitor. Both ends are then connected to the ground in terms of HF, but only connected to the ground at one end in terms of LF, thus avoiding the 50 Hz grounding loops.



- Use an EMC cable gland or regular plastic cable gland, remove the outer jacket and connect the shield to the installation plate with a 360 ° metal cable clamp.
- Place the 24 V DC and communications cabling in one cable trunk/cable duct and 230/380 V AC in another. If the cables need to be crossed, cross them at 90 ° only. Avoid combining the cabling for stronger 24 V DC outputs with the communication cabling.
- Ferrite cores that are snapped onto the shielded cabling may remove minor disturbances. Large ferrite pieces that are snapped onto unshielded cabling and where the wires go 2-4 times around the cores are approximately 5-25 times more efficient.

3.10.4 Ambient Temperature

The maximum ambient temperature for the operator panel is provided in the specifications. The ambient temperature refers to the temperature in the device cabinet which cools the panel's electronics.



In most cases, the ambient temperature for the operator panel is significantly higher than the device cabinet's ambient temperature.

If the cabinet is tall and there are a number of heat-generating devices, the temperature at the top of the cabinet will be considerably higher than the theoretical temperature increase that would be expected. All electronics are sensitive to heat. The lifespan of an electrolytic capacitor is cut in half with an 8-10 ° increase in temperature. A 15-20 ° temperature increase results in a quarter of the lifespan etc.

Rittal has a good program for estimating the anticipated average temperature in the cabinet as well as a large program for controlling the temperature in the device cabinet.

An enamel-coated steel cabinet has a radiant heat value of 5.5 W/m^2 and degrees C.

Installing a fan inside the cabinet will even out the temperature, while moving air provides considerably better cooling than still air. A suitable fan is a 120 x 120 mm axial fan, available in 24 V DC, 115 and 230 V AC.

Install the fan so that it sits in the cooler area and will blow cold air against the operator panel. If the fan is mounted at the top and sucks air upwards, the fan's ambient temperature will be higher = shorter lifespan.

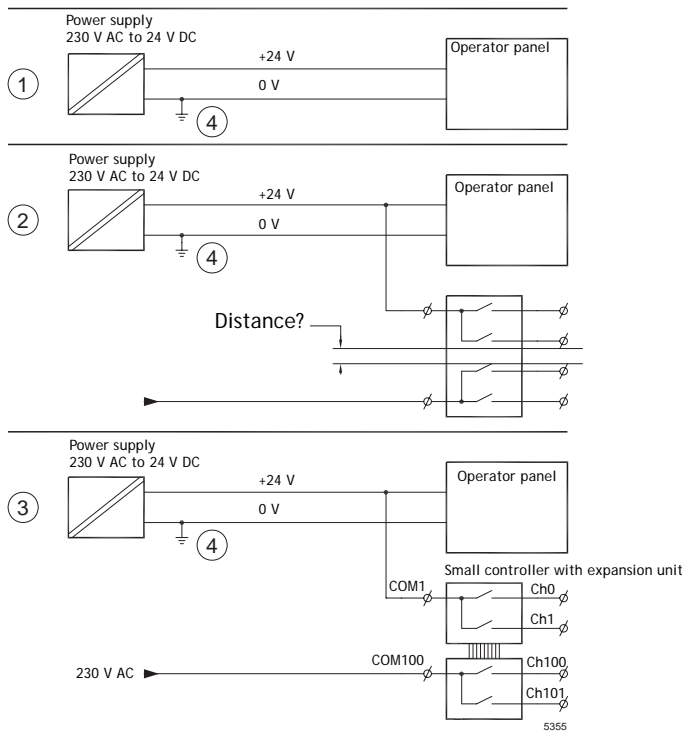
A good fan with a ball-bearing mounting has an expected lifespan of at least 40,000 hours (not a guaranteed lifespan) at 40 °C. This corresponds to at least 4 years of continuous use. If a thermostat is installed, the fan only needs to come on when needed.

Large graphic terminals draw only one fifth of the current when the background lighting is off. The loss effect drops from e.g. 25 W to only 5 W.

The operator panel's loss effect = supply voltage x current. Virtually no power goes to external users and no loss effects due to inputs.

3.10.5 Safety

Most of the operator panels are fed with 24 V DC.



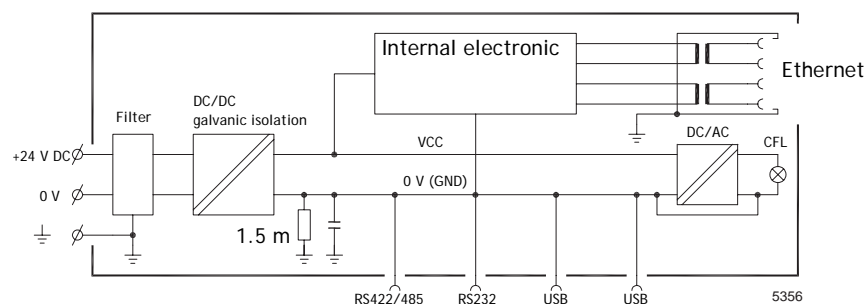
1. If you use a power supply that meets safety standards and only feeds the operator panel, there is no problem.
2. However, if you have a 24 V unit that also feeds other units, there is reason to be cautious.
The operator panel does not have insulation that meets safety requirements in the event of a potential short circuit between 230 V AC and 24 V DC. It is assumed that the 24 V feed is secure, for example, SELV according to EN 60950 (protection against electric shock) and UL 950.

Example:

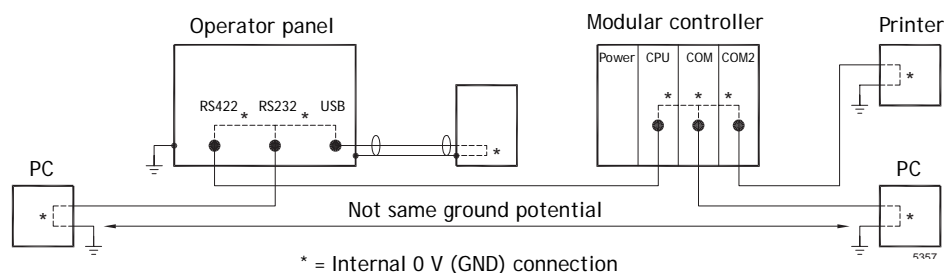
Here is an example that explains why a secure 24 V DC feed can be ruined by mixing 24 V relay contacts with 230 V AC relay contacts in a smaller controller. Check that the “clearances and creepage distances between 24 V DC and 230 V AC fulfill EN 60950 or UL 950”. If not, input a separate 24 V unit into the operator panel.

3. If there is a substantial distance between the relay contacts for 24 V DC and 230 V AC, it is OK to use the same 24 V devices for all feeds.
4. Connect 0 V on the 24 V feed to the ground. This offers three advantages:
 - Safety is increased. The 24 V feed will not be live in the event of a faulty connection or short circuit between 0 V (24 V) and 230 V phase.
 - Transients on the 24 V feed are connected to the ground.
 - No risk that the 24 V feed is at a high level in relationship to the ground. This is not unusual since there is high static electricity.

3.10.6 Galvanic Isolation



The operator panel has galvanic isolation against the 24 V DC feed but no galvanic isolation between the communication ports for RS232, RS422/485 and USB. Only the Ethernet connection has galvanic isolation.



When a PC is connected to the panel, the panel's internal 0 V (GND) will be connected to the protective ground via the PC.

A number of USB devices can have the shield connected together with the protective ground. Here, the panel's 0 V (GND) is connected to the protective ground when, for example, a USB memory stick, keyboard or similar device is plugged in.

If a number of units are connected that have a 0 V and a ground connection, and these are connected to various grounding points, there is a substantial risk of problems. Grounding currents go through communication cables, the rear plate of the controller, and internally in the operator panel, and can cause errors.

Use external units to improve communication and achieve galvanic isolation.

Westermo has good industry-standard insulators that are also insulated from the 24 V DC feed.

Note:

It is very important to make sure that the 24 V feed in the external insulation unit is not connected to one of the communication outlets. If it does not have 100% insulation against the 24 V feed, disturbances and grounding currents from the 0 V on the 24 V side will disrupt communication.

Using this type of unit solves one problem but creates a larger problem!

A substandard installation may work now, but problems may arise when other devices are connected.

3.10.7 Cable and Bus Termination RS485

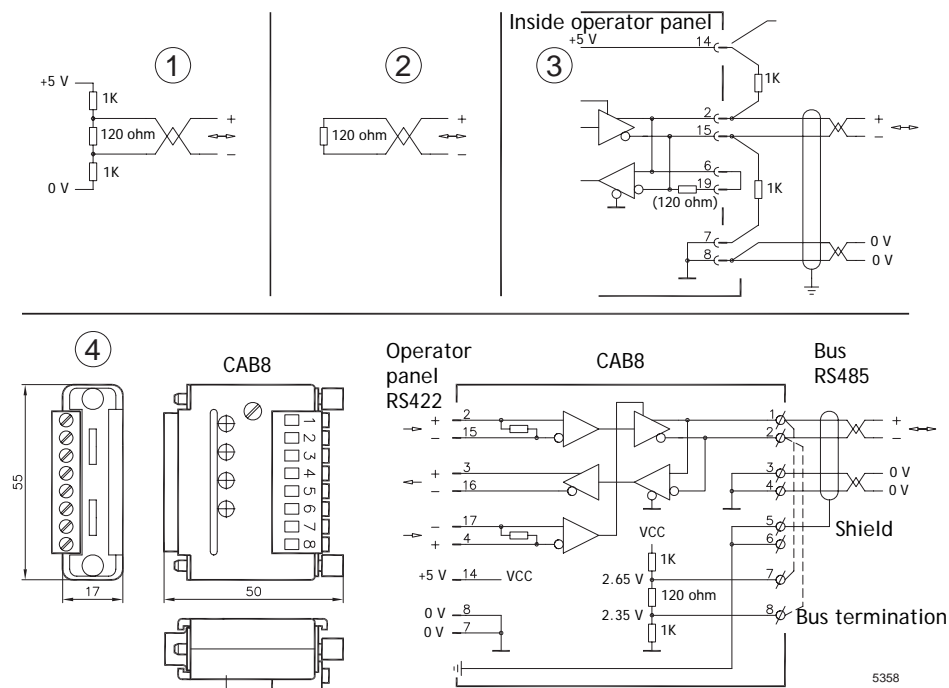
- Use shielded and twisted pair cable.

The pair capacitance may not exceed 52.5 pF/m and area at least 0.25 mm² (AWG 24), if you want to use the maximum transfer distance and maximum transfer speed.

- 0 V, the reference voltage for communication should be included in the cabling. With two-way communication use two pairs; one pair for communication and one pair for 0 V.
- The shield must be grounded at one end. The other end is usually grounded, but with longer distances or when there is a difference in the ground potential, the shield should be connected to the ground via 0.1 uF/250 V plastic capacitor to prevent ground current in the braided shield.
A number of manufacturers recommend that the shield be grounded at each node.

Various manufacturers have different systems for bus termination. The RS485 standard does not describe how the “Fail Safe” function would be carried out, just that the system should be be able to handle the error.

Depending on the recipients’ design, the bus wires may be on the same level or require pull-up or pull-down to ensure that no faulty signals are detected when the bus is in resting mode (all transmitters are disconnected).



1. Some (older) operator panels had pull-up and pull-down resistance except for the actual bus termination at 120 ohm, similar to Westermo and Profibus.
2. Newer panels have another type of recipient, so-called built-in “Fail Safe”, where simple bus termination resistance is sufficient.

If other nodes on the RS485 network require pull-up and pull-down and the operator panel is at one end of the loop, one of the following procedures can be carried out:

3. Connect two 1k/0.25 W resistors in the 25-pole D-sub contact. Set jumper pins 6-19.
4. Use CAB8. It offers the option of bus termination with pull-up/-down. It is also easy to connect the bus cable via the screw terminal block.

3.11 Fault Tracing

You can use the following fault tracing list to fault trace the operator panel. The table below consists of different fault scenarios and steps to follow to trace the fault

Scenario	Fault tracing steps
The operator panel is not working properly. Power LED is off.	<ol style="list-style-type: none"> 1. Is the power voltage correct? 2. Does the power supply deliver enough current? 3. Check the fuse. 4. Check the power card. 5. Is the power card correctly mounted?
The operator panel is not communicating with the controller.	<ol style="list-style-type: none"> 1. Check the communication cable between the units. 2. Check that the operator panel has a controller driver downloaded. 3. Check that the correct controller driver is used. 4. Check the communication ports on the CPU board.
The operator panel is working but the backlight is off.	<ol style="list-style-type: none"> 1. Check the backlight dimming. 2. Check that the backlight is connected to the power card. 3. Replace the backlight according to the Replacing the Backlight section. 4. Check the DC/AC on the power card.
The operator panel is not working, the backlight is off but the power LED is on.	<ol style="list-style-type: none"> 1. Check the backlight dimming. 2. Check the CPU board for burned components. 3. Download new firmware to the operator panel.
The operator panel does not include the latest firmware.	<ol style="list-style-type: none"> 1. Check the versions included with the operator panel. 2. Make sure that a copy of the project is saved to the computer. 3. Download an updated image with the Image Loader and follow the directions.
The operator panel is working, but one or more keys are not working.	<ol style="list-style-type: none"> 1. Check that the flex cables are correctly fitted. 2. Replace the front according to the Replacing the Rear Cover section.
The touch screen is malfunctioning or is not responding at all.	<ol style="list-style-type: none"> 1. Re-calibrate the touch screen according to the Calibrate the Touch Screen section. 2. Check that the flex cable is correctly fitted. 3. Replace the display of the operator panel according to the Replacing the Display/Display Cable section. 4. Check the touch interface on the power card.
Lines in display has wrong color or the display picture is shifted.	<ol style="list-style-type: none"> 1. Check if the display has a wide vertical or horizontal area across the display. It should be at least 2-3 cm wide with a grey or black color. See Replacing the Rear Cover for instructions on how to correct this. 2. Make sure the display cable is correctly fitted. 3. Make sure the display cable is not folded or damaged in any way. Replace the display cable according to the Replacing the Display/Display Cable section.
The operator panel will not restart after changing a component.	<ol style="list-style-type: none"> 1. Remove and insert the battery again. (This is only valid for panels with an external battery cover.)
Low battery/ No battery	<ol style="list-style-type: none"> 1. Check that the battery is correctly fitted in its holder. 2. If low battery/no battery voltage, replace the battery according to the Replacing the Battery section.

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4 Software

This chapter describes how to maintain and update the software in the E1000 operator panels. The chapter includes a general description of the operator panel software and instructions about how to upgrade the software and load projects and system programs.

4.1 General Information about Software

The software required to run and maintain the operator panels is found on the software CD. It is also available through your local distributor.

The software is tested by the manufacturer's own testing department before market introduction is approved. The test procedure is closely integrated with the development process. The test group works in close concert with the developers and is ISEB Certified for Software Testing.

4.1.1 Software Products

The following software products are used:

– *E-Designer 7*

E-Designer 7 is used for creating application projects for E1000 operator panels and their accessories.

– *Remote Access Viewer*

Remote Access Viewer is a program for remote access and control of E1000 operator panels.

It is possible to access, reflect and control an E1000 operator panel from a PC using the VNC client program Remote Access Viewer (freeware) together with the built-in VNC server (Remote Access function) in the operator panel.

– *System Program*

The operator panel is delivered with a system program (operating system) pre-stored in the operator panel memory.

The configuration tool E-Designer 7 is used to download system programs to the operator panel.

– *Image Loader*

The firmware (the software in the operator panel) for E1032, E1041, E1043, E1060, E1061, E1062, E1063, E1071, E1070, E1100, E1101 and E1151 consist of three parts at delivery:

1. E-Boot, the program that starts up the operator panel and Windows CE.
2. Windows CE .net 4.20, the operating system for the operator panel.
3. OPsys, the system program in the operator panel that contains the HMI functionality.

E1012 and E1022 use the operating system Green Hills Velocity.

E-Designer 7 can be used to update one part of the firmware, the system program Ophys_b*.cab, to the operator panel.

See the *System Program* section.

4.2 Update Software

When an update is available, an e-mail is sent to the distributors. The software is also available on the manufacturer's web site.

The update should be installed by qualified personnel. When updating an operator panel it is important to ensure that the power is not interrupted during the transfer.

4.2.1 E-Designer 7

E-Designer 7 is not a freeware product. To update this software, an accredited E1000 operator panel dealer must be contacted.

4.2.2 Remote Access Viewer

This software is included on the E-Designer 7 software CD.

4.2.3 Image Loader

An upgrade of the complete software package is sometimes needed to take advantage of new functionality. The complete software package consists of the EBOOT, the Windows CE operating system and the system program. The upgrade is done by running the Image Loader executable file, Bxxx_uml.exe. The Image Loader application will help and guide you through the upgrade.

When the upgrade is finished, the operator panel will receive the default IP address 192.168.1.1. Follow the instructions on the screen after startup to change the IP address.

The "Update Operator Terminal System Program" function in E-Designer 7 shall not be used when the Image Loader application is used to upgrade the operator panel.

Note:

ALL existing data, including the file system and the project application files, in the operator panel will be deleted (overwritten) by the Image Loader application

Note:

The Image Loader software is only intended for customers and partners that have an operator panel. No other distribution is allowed.

For E1012 and E1022, see section [Downloading the System Program in E1012 and E1022](#).

4.2.4 System Program

The system program can be replaced, that is, updated to a newer version, in one of two ways: *Via PC* or *Via External Memory Card*. See section *Downloading the System Program in E1012 and E1022* for E1012 and E1022.

Via PC

The configuration tool E-Designer 7 is used to download system programs via a PC to the operator panel. The transfer can be made via the serial port or over Ethernet. The serial cable should be a CAB30 cable and the Ethernet cable should be a crossed CAT5 cable.

Transferring the system program to the operator panel via a PC requires the following:

- PC with the configuration tool installed.
- Transfer cable between the PC and the operator panel.
- File with new system program (OPSys_b*.cab).

The transfer is made using the following steps:

By Serial Port

1. Connect the cable between the PC and operator panel.
2. Open a project or create a new project with the desired operator panel type.
3. Select **Transfer/Update Operator Terminal System Program**.
4. Select the OPSys_b*.cab file.

No settings are required in the operator panel.

Over Ethernet

1. Connect the cable between the PC and operator panel.
2. Set the operator panel to **Service menu mode** (see the *Mode Switches* section).
3. Enter a valid IP address for the operator panel.
4. Set the operator panel back to **Run-mode** (see the *Mode Switches* section).
5. Open a project or create a new project with the desired operator panel type.
6. Select **Transfer/Update Operator Terminal System Program**.
7. Select the OPSys_b*.cab file.
8. Select **Settings/Use TCP/IP transfer**.
9. Enter the operator panel's IP address.

Via External Memory Card

Transferring the system program to the operator panel via an external memory card requires the following:

- File with new system program (OPSys_b*.cab).
- Compact Flash memory card (only in E1070, E1100, E1071, E1101 and E1151) or USB Flash drive.

The transfer is made using the following steps:

1. Save the system program file (OPSys_b*.cab) in the root of the external Compact Flash memory card or USB Flash drive.
2. Place the memory card in the operator panel, or connect the USB Flash drive, and start the operator panel to update the system program automatically.

Note:

When updating an operator panel it is important to ensure that the power is not interrupted during the transfer.

Downloading the System Program in E1012 and E1022

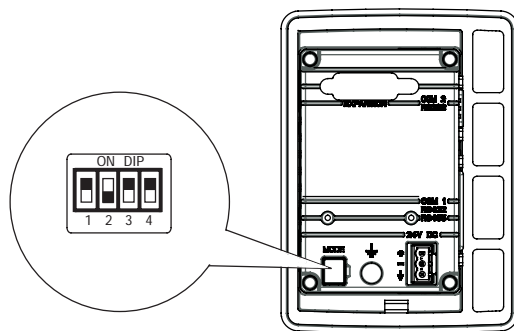
An Image Loader is used to download system programs to the operator panel via a PC. The Image Loader is available from the website. The transfer is made via the serial port using a CAB30 cable.

Updating of the system program to the operator panel requires the following:

- PC with Image Loader application.
- CAB30 cable.

Transfers Are Made in the Following Steps:

1. Run the Image Loader exe-file by double-clicking on it. Follow the instructions; also described in the following steps:
2. Connect the cable between the PC and the operator panel.
3. Disconnect the power to the operator panel.
4. Set the panel in Image Load mode by setting mode switch number 2 in the ON position according to the illustration below.



5. Reconnect power.
6. All operator panels connected to the COM-ports on the PC and currently set in Image Load mode will be available for selection from a drop down list. Select which operator panel to upgrade by selecting its MAC address (hex).
7. Click **Upgrade**.
8. When the upgrade is finished, disconnect power from the operator panel.
9. Change mode switch number 2 back in OFF position.
10. Reconnect power to the operator panel.

Everything for your HMI running

5 Environmental Aspects

This chapter includes information about the environmental impact of E1000 operator panels.

More information can be found on the manufacturer's web site.

5.1 General Environmental Aspects

The manufacturer's activities meet internal requirements as well as those of the SS-EN ISO 9001:2000 and SS-EN ISO 14001:2004 international standards.

5.2 Environmental Impact of the Operator Panels

5.2.1 Mechanical Components

The aluminum and stainless steel used in the mechanical components are judged to be non-environmentally hazardous. The expanded rubber packing for the front and the expanded polyethylene packing for the display contain an adhesive that is not classified as environmentally hazardous.

Screws may have undergone the following surface treatments: Bright nickel-plating or bright zinc-plating. The membrane keyboard is made of polyester with silver wiring. On some models the keyboard contains LEDs.

Display frames and CF covers are made of halogen-free plastic, PC/ABS.

5.2.2 Electronics

Circuit board

Note:
All operator panels are RoHS compliant.

The electronics are complex and almost all elements of the periodic table are represented.

Display

There is a separate circuit board for the display. The liquid crystals in the display are cyclohexane compounds. The fluorescent tube contains mercury and lead solder.

Batteries

The operator panel contains a button cell lithium battery.

The battery is not classified as environmentally hazardous by the Swedish Battery Ordinance (1997:645).

5.3 Recycling

The operator panels consist largely of aluminum. It is a great advantage in terms of both resources and the environment if it can be recycled. Make sure that operator panels taken out of service are sent to facilities for electronic scrap.

The manufacturer's electronic waste is recycled by Stena Technoworld AB. Aluminum front/rear casings and other covers can be removed and recycled. Plastic display frames and CF covers must be recycled as hard plastic. The circuit board contains many valuable metals and should therefore be recycled.

Remove the lithium battery. Electrolytic capacitors and displays are currently not classified as hazardous waste, but may be harmful to health and the environment.

The electrolytic capacitors should be handled as per Handbook 2001:7 (NFS) and displays as per NFS 2001:8.

The fluorescent tube must be handled as hazardous waste.

The packaging is made from wood fiber and should be recycled. The large printed label on the front, however, must first be removed as it is made of PVC vinyl. The label and the plastic bag for the brackets are recycled as soft plastic.

The manufacturer is a member of the REPA register. The protective film on the front is recycled as soft plastic. When the operator panel is no longer useful it can be returned to the manufacturer for environmentally responsible recycling. Contact the company for further information.

5.4 Environmental Impact Report

An operator panel impacts the environment through its function, i.e., controlling industrial equipment. The energy and the scrapped parts that can be saved with efficient management mean that the operator panel contributes to reduced environmental impact.

Listed below are examples of how you can reduce environmental impact during operator panel use.

- Switch the system off when not in use.
- Use green electricity.
- Use energy-saving options, e.g. turn off the backlight to both save energy and reduce wear on the fluorescent tube.
- If possible, reduce the backlight brightness to reduce energy consumption and increase fluorescent tube service life.

Supply the operator panel with 24 V DC. If the input voltage is lower, the loss effect increases. Ensure that the operator panel, battery, and packaging are recycled in an environmentally responsible manner.

MITSUBISHI ELECTRIC

Mitsubishi Electric Automation, Inc.
500 Corporate Woods Parkway
Vernon Hills, IL 60061, USA

Mitsubishi Electric Europe B.V.
Gothaer Strasse 8
D-40880 Ratingen, Germany

Everything for your HMI running



Touch.Keypad.Display
✉ sales@vicpas.com
📞 +86-15876525394