BeiJer

E L E C T R O N I C S

EXTER™-series Operator Terminals

Service and Maintenance Manual

English

Service and Maintenance Manual for EXTER Operator Terminals

Foreword

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

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

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

Please see the Information Designer Reference Manual (MA00749B) 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 (MA00750A).

Contents

1   Safety Precautions

The person responsible for maintenance of the operator terminal must read and understand the installation manual and the safety precautions.

– Only qualified personnel may install, operate or maintain the operator terminal.

– Avoid exposing the operator terminal to the following:

  – strong magnetic fields

  – direct sunlight

  – large, sudden temperature changes

  – high humidity (>85%)

  – high explosive risks

– Never allow fluids, lose metal filings, or wiring debris to enter the operator terminal. They may cause fire or electric shocks.

– Storing the operator terminal where the temperature is lower or higher than recommended in this manual can cause the display liquid (in LCD) to congeal or become isotopic.

– The display liquid (in LCD) 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 seek medical attention.

– The supplier is not responsible for modified, altered, or reconstructed operator terminal.

– Only use parts and accessories manufactured according to the supplier's specifications.

– Make sure the service area has good ESD protection.

– During operation, the CCFL and DC/AC inverter sections are live with high voltages that can cause electric shock.

– Only use current-limited power supplies during service. The current should never exceed the rated maximum current.

– Never apply a voltage outside the specified input voltage range. This can cause permanent damage and deteriorate EMC protection.

– Make sure the correct versions of the documentation and service instructions are used during service or maintenance.

– Only upgrade hardware if such instructions are found in the service manual or if sanctioned by the supplier.

– Replacing the battery incorrectly may result in explosion. Only use batteries recommended by the supplier.

2   Introduction

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

–   *Safety Precautions*

–   *Introduction*

–   *Hardware*

–   *Software*

–   *Environmental Aspects*

2.1   General

The HMI range offers four different sized keypad-operated models and five touch screen models. The different operator terminals are listed in the table below:

Operator Terminal	Description	Drawings
EXTER K30 (also referred to as BEPP K30)	240 x 64 pixels, display with keypad	*Outline drawing* *Panel cut-out* *Text strip*
EXTER K60c (also referred to as BEPP K60)	5.7" display with keypad	*Outline drawing* *Panel cut-out* *Text strip*

Operator Terminal	Description	Drawings
EXTER K70 (also referred to as BEPP 64K)	6.5" display with keypad	*Outline drawing* *Panel cut-out* *Text strip*
EXTER K100 (also referred to as BEPP 104K)	10.4" display with keypad	*Outline drawing* *Panel cut-out* *Text strip*
EXTER T40/ EXTER T40m (also referred to as BEPP T40)	3.5" touch screen display	*Outline drawing* *Panel cut-out*
EXTER T60c/ EXTER T60m (also referred to as BEPP T60)	5.7" touch screen display	*Outline drawing* *Panel cut-out*

Operator Terminal	Description	Drawings
EXTER T70 (also referred to as BEPP 64T)	6.5" touch screen display	*Outline drawing* *Panel cut-out*
EXTER T100 (also referred to as BEPP 104T)	10.4" touch screen display	*Outline drawing* *Panel cut-out*
EXTER T150 (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 terminal.

– Only qualified personnel should carry out maintenance.

– The agreed warranty and license agreements apply.

– Any damage to the operator terminal caused by personnel invalidates the warranty.

– Before carrying out any cleaning or maintenance operations, disconnect the operator terminal 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.
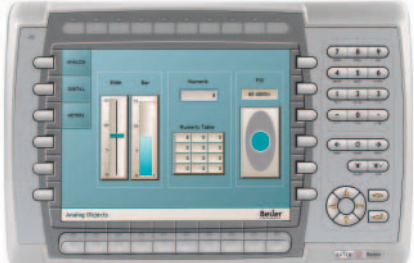
Maintenance personnel are permitted to carry out the following actions:

– *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 terminal caused by personnel invalidates the warranty.

– Contracts with customers supersede the information in this document.

2.4   Dismantling and Scrapping

– The operator terminal, 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.

2.5   Contact and Support

If you want to report a fault or have a question about the operator terminals, please contact your local supplier or fill out the form on the web site.

1. Enter the web site: *www.hmi.beijerelectronics.com* and select **Support**.

2. Select **Contact Form** in the menu. Make sure to provide information about type number, serial number, environment and an installation description.

The form will be sent to the manufacturer's help desk and they will answer your question or register your improvement/fault.

To ensure quick resolution, provide as many details as possible in your report. Include the date and time when the problem occurred, a description of what you were trying to do, the detailed steps you took that led up to the problem, and details about any error messages received.

3 Hardware

This chapter describes how to maintain the EXTER operator terminal 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 terminals are approved for market introduction, they are tested by independent authorities. The EXTER operator terminals are examined by several authorities before being approved for market introduction. All operator terminals 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 terminal is approved. Some tests are performed by external testing companies, such as the Swedish National Testing and Research Institute.

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

3.3 Hardware Specification

3.3.1 Keyboard Operated Terminals
The tables below presents technical data for the keyboard operated terminals.

Technical Data	EXTER K30m	EXTER K60c
Front panel, W x H x D	202 x 187 x 6 mm	275 x 168 x 6 mm
Mounting depth	56.9 mm (156.9 mm incl. clearance)	57.3 mm (157.3 mm incl. clearance)
Keypad material	Membrane switch keypad with metal domes. Overlay film of Autotex F157 with print on reverse side. 1 million operations.	
Reverse side material	Powder-coated aluminum	
Weight	0.875 kg	1.11 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 10/100 Mbit/s	
USB	Host type A, max output current 500 mA.	
Processor	312 MHz RISC CPU (Intel XScale).	
Memory flash	32 MB (Intel StrataFlash). Application memory: 12 MB (incl. fonts)	
Memory RAM	64 MB	
Memory Expansion	None	
Buzzer	Yes	

Technical Data	EXTER K30m	EXTER K60c
Real time clock	±20 PPM + error because of ambient temperature and supply voltage. Total max error: 1 min/month at 25 °C. Minimum life of the real time clock battery: 3 years. Temperature coefficient: 0.004 ppm/°C^2	
Power consumption at rated voltage	Normal: 0.15 A Max.: 0.35 A	Normal: 0.3 A Max.: 0.5 A
Display	FSTN-LCD, 240 x 64 pixels, monochrome.	CSTN-LCD, 320 x 240 pixels, 64K color.
Display backlight	CCFL backlight lifetime at the ambient temp. of +25 ˚C:	
	>50,000 h	>60,000 h
	With dimming	
Active area of display, W x H	127.0 x 33.8 mm	115.2 x 86.4 mm
Fuse	Internal DC fuse, 3.15 AT, 5 x 20 mm	
Power supply	+24 V DC (20 - 30 V DC). 3-pin jack connection block. CE: The power supply must conform with the requirements for SELV or PELV according to IEC 950 or IEC 742. UL: 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	EXTER K70	EXTER K100
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 incl. clearance)	58 mm (158 mm incl. clearance)
Keypad material	Membrane switch keypad with metal domes. Overlay film of Autotex F157 with print on reverse side. 1 million operations.	
Reverse side material	Powder-coated aluminum	
Weight	1.3 kg	2.3 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 10/100 mbit/sec.	
USB	Host type A, max output current 500 mA. Device type B.	
Processor	416 MHz RISC CPU (Intel XScale).	
Memory flash	32 MB (Intel StrataFlash). Application memory: 12 MB (incl. fonts).	
Memory RAM	64 MB	
Memory Expansion	Compact Flash slot (CF slot type I and II) available for adding optional cards for expansion of memory, data back-up, data storage and transfer of data and projects.	
Buzzer	Yes	
Real time clock	±20 PPM + error because of ambient temperature and supply voltage. Total max error: 1 min/month at 25 °C. Minimum life of the real time clock battery: 3 years. Temperature coefficient: 0.004 ppm/°C^2.	
Power consumption at rated voltage	Normal: 0.4 A Max.: 0.9 A	Normal: 0.5 A Max.: 1.0 A
Display	TFT-LCD, 640 x 480 pixels, 64K color.	TFT-LCD, 800 x 600 pixels, 64K color.
Display backlight	CCFL backlight lifetime at the ambient temp. of +25 °C:	
	50,000 h	50,000 h
	With dimming	
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	+24 V DC (20 - 30 V DC). 3-pin jack connection block. CE: The power supply must conform with the requirements for SELV or PELV according to IEC 950 or IEC 742. UL: 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 Terminals

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

Technical Data	EXTER T40/T40m	EXTER T60c/T60m
Front panel, W x H x D	155.8 x 119 x 6 mm	201 x 152 x 6 mm
Mounting depth	56.8 mm (156.8 mm incl. clearance)	56.8 mm (156.8 mm incl. clearance)
Keypad material	Touch screen: Polyester on glass, 1 million finger touch operations. Overlay: Autotex F207.	
Reverse side material	Powder-coated aluminum	
Weight	0.56 kg	0.87 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 10/100 mbit/sec.	
USB	Host type A, max output current 500 mA.	
Processor	312 MHz RISC CPU (Intel XScale).	
Memory flash	32 MB (Intel StrataFlash). Application memory: 12 MB (incl. fonts).	
Memory RAM	64 MB	
Memory Expansion	None	
Buzzer	Yes	
Real time clock	±20 PPM + error because of ambient temperature and supply voltage. Total max error: 1 min/month at 25 °C. Minimum life of the real time clock battery: 3 years. Temperature coefficient: 0.004 ppm/°C^2.	
Power consumption at rated voltage	Normal: 0.15 A Max.: 0.35 A	Normal: 0.4 A Max.: 0.9 A
Display	TFT-LCD, 320 x 240 pixels EXTER T40 64K color EXTER T40m, 16 grey scales	CSTN-LCD EXTER T60c FSTN-LCD EXTER T60m 320 x 240 pixels
Display backlight	CCFL backlight lifetime at the ambient temp. of +25 °C:	
	>50,000 h	>45,000 h
	With dimming	
Active area of display, W x H	70.1 x 52.6 mm	115.2 x 86.4 mm
Fuse	Internal DC fuse, 3.15 AT, 5 x 20 mm.	
Power supply	+24 V DC (20 - 30 V DC). 3-pin jack connection block. CE: The power supply must conform with the requirements for SELV or PELV according to IEC 950 or IEC 742. UL: 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	EXTER T70	EXTER T100	EXTER T150
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	55 mm (155 mm incl. clearance)	58 mm (158 mm incl. clearance)	60 mm (160 mm incl. clearance)
Keypad material	Touch screen: Polyester on glass, 1 million finger touch operations. Overlay: Autotex F207.		
Reverse side material	Powder-coated aluminum		
Weight	1.1 kg	2.0 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 10/100 mbit/sec.		
USB	Host type A, max output current 500 mA. Device type B.		
Processor	416 MHz RISC CPU (Intel XScale).		
Memory flash	32 MB (Intel StrataFlash). Application memory: 12 MB (incl. fonts).		
Memory RAM	64 MB		
Memory Expansion	Compact Flash slot (CF slot type I and II) available for adding optional cards for expansion of memory, data back-up, data storage and transfer of data and projects.		
Buzzer	Yes		
Real time clock	±20 PPM + error because of ambient temperature and supply voltage. Total max error: 1 min/month at 25 °C. Minimum life of the real time clock battery: 3 years. Temperature coefficient: 0.004 ppm/°C^2.		
Power consumption at rated voltage	Normal: 0.4 A Max.: 0.9 A	Normal: 0.5 A Max.: 1.0 A	Normal: 1.2 A Max.: 1.7 A
Display	TFT-LCD 640 x 480 pixels, 64K color.	TFT-LCD 800 x 600 pixels, 64K color.	TFT-LCD 1024 x 768 pixels, 64K color.
Display backlight	CCFL backlight lifetime at the ambient temp. of +25 °C:		
	50,000 h	50,000 h	35,000 h
	With dimming		
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	+24 V DC (20 - 30 V DC). 3-pin jack connection block. CE: The power supply must conform with the requirements for SELV or PELV according to IEC 950 or IEC 742. UL: 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

	EXTER K30m, EXTER K60c EXTER T40/T40m EXTER T60c/T60m	EXTER K70, EXTER K100 EXTER T70, EXTER T100 and EXTER T150
CE	EMC directive 89/336/EEC article 4. The operator terminal conforms with the essential protection requirements in article 4 of the directive 89/336/EEC.	
	Noise tested according to EN61000-6-3 emission and EN61000-6-2 immunity.	Noise tested according to EN61000-6-4 emission and EN61000-6-2 immunity.
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). UL 50 (Indoor use).	
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), UL 50 4X (indoor).	
Back cover protection degree	IP 20.	
Shock	IEC 60068-2-27 (15 g, 11 ms).	

3.5 Functionality Specification

Function Specification	All operator terminals in the EXTER-series
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 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 Information Designer	Yes

3.6   Additional Hardware

3.6.1   Memory Card

A Compact Flash memory card can be fitted in the EXTER operator terminals EXTER K70, EXTER K100, EXTER T70, EXTER T100 and EXTER T150 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 terminals. 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 terminal:

1. Turn off the power to the terminal.

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.


memory card slot
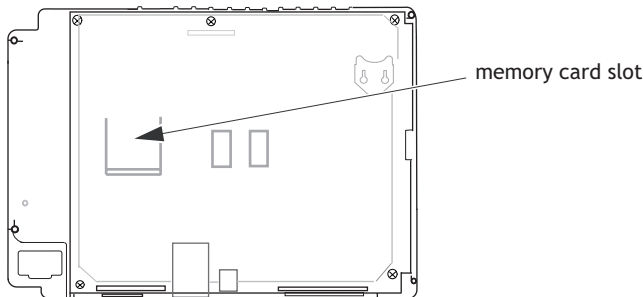
5. Re-attach the back cover to the operator terminal.

6. Turn on the power to the operator terminal.

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

Settings in Information Designer
The size of the internal memory card must be entered in the configuration tool for the operator terminal.

1. Select **Setup/Terminal Options**.

2. Enter the size of the internal memory card under
   **Memory card settings/Internal**.
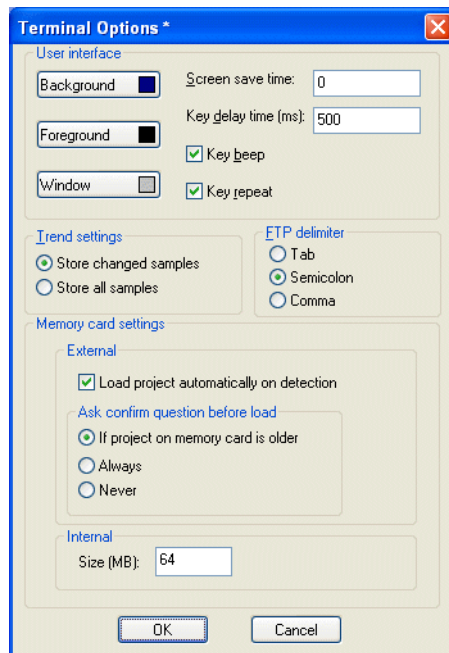
3. Click **OK** to close the dialog.

3.7   Hardware Replacement

This section contains instructions on how to replace operator terminal 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 EXTER operator terminals have four mode switches (DIP switches) located on the rear side of the operator terminal.
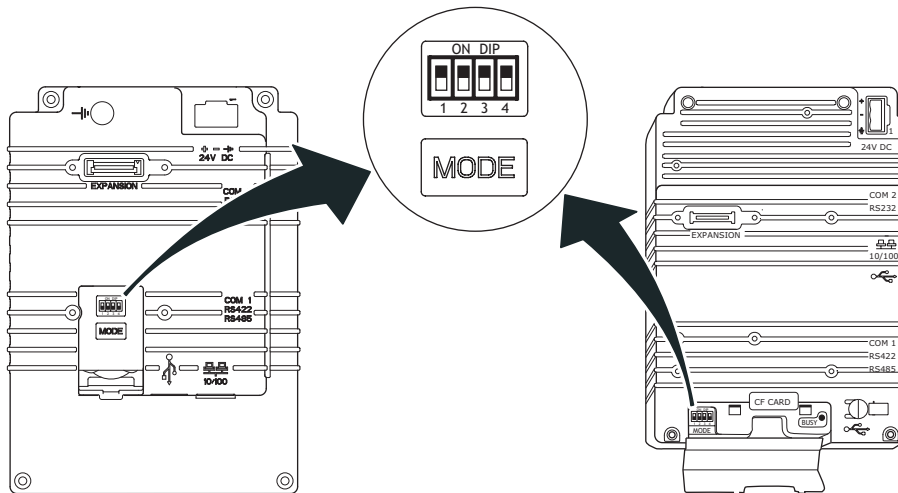
Warning:
The modes below are to be used with caution.

The mode switches have the following functions:

1=ON, 0=OFF
Each letter in "MODE" has a corresponding mode switch

MODE	Description
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 terminal to factory settings. **Warning!** Information can easily accidently be lost.
0100	Image Load mode (Sysload) allows upgrading of the complete software package in the operator terminal. **Note:** All files including the file system in the operator terminal will be deleted when upgrading with Image Loader.
1000	User Menu mode, the user menu for the system program is shown. Allows the user to set IP configuration, erase the project and calibrate the touch screen.
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 terminal.

2. Set the mode switches using a ballpoint pen.

3. Reconnect power to the operator terminal.

3.7.2   Cables

Most of the operator terminals in the series use the same type of flex cable connectors.
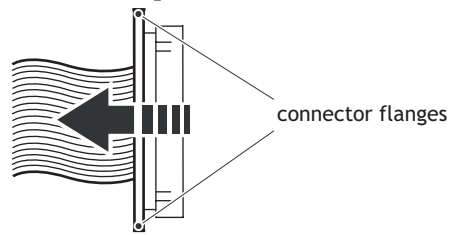
Flex cable connector

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.

EXTER K30m, EXTER K60c, EXTER T40/T40m and EXTER T60c/T60m
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 terminal.

2. Follow the instructions *Replacing the Battery* to remove the battery.

3. Remove the rear cover of the operator terminal by loosening the 4 torx screws.
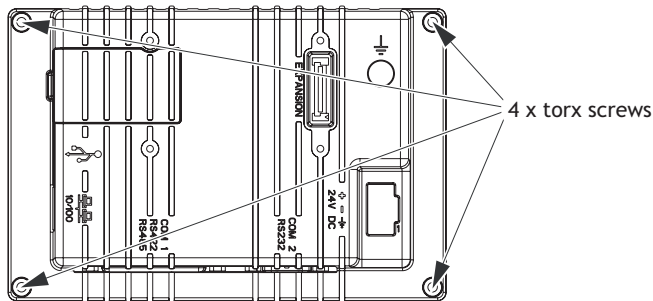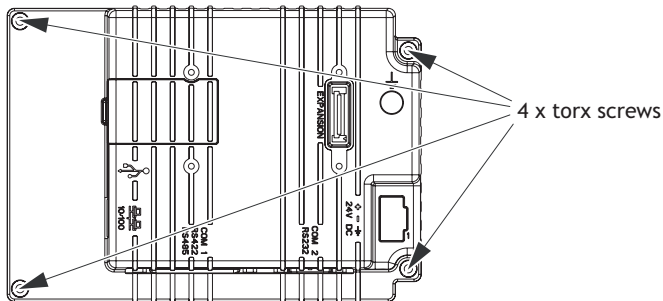

Illustration of EXTER K30m

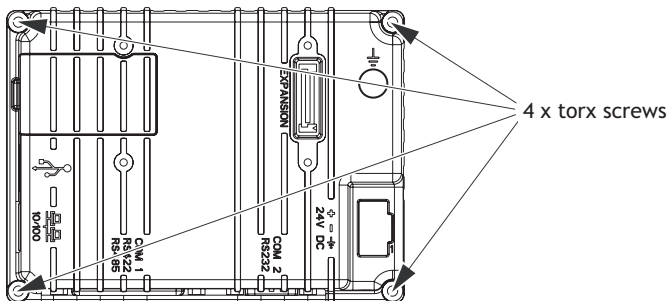
Illustration of EXTER K60c and EXTER T60c/T60m

*Illustration of EXTER T40/T40m*

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

EXTER K70, EXTER K100, EXTER T70, EXTER T100 and EXTER T150

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 terminal.

2. Remove the rear cover of the operator terminal by loosening the 4 torx screws.

4 x torx screws
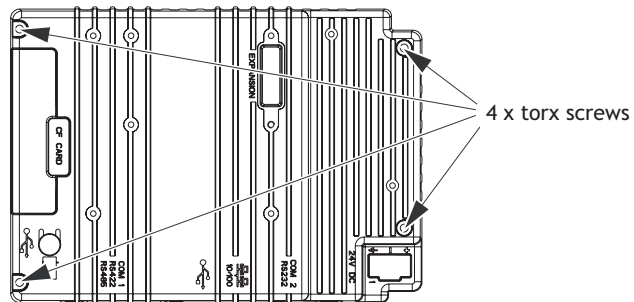
3. Re-assemble with the new rear cover in reverse order.

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.
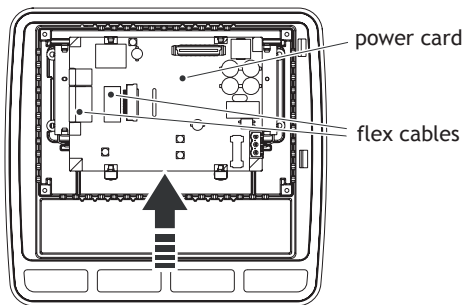
– Two plain screwdrivers.

Note:
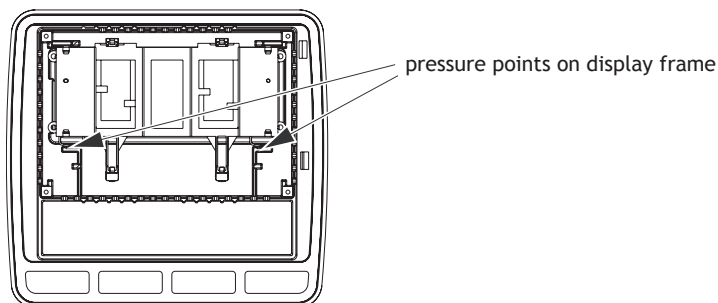Make sure you have adequate ESD protection.

EXTER K30m

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 terminal.

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.

power card

flex cables

4. Gently press the power card towards the top of the terminal 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.
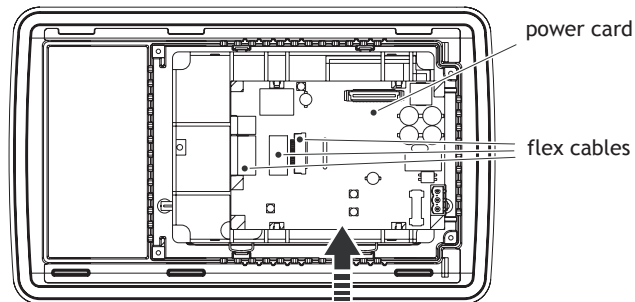

pressure points on display frame

7. Mount the new display unit.

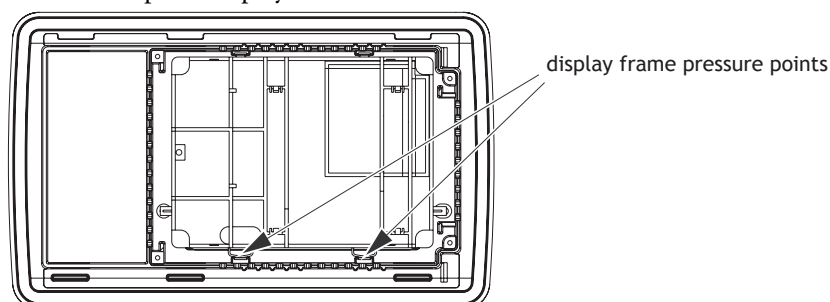8. Re-assemble the terminal in reverse order.

EXTER K60c

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 terminal.

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 terminal 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.
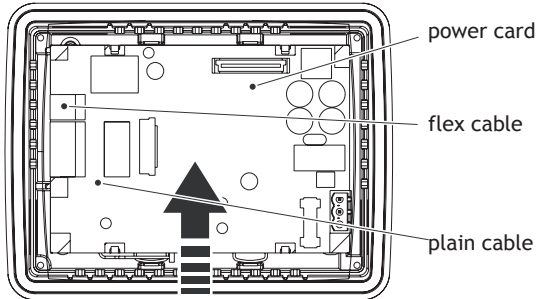

7. Mount the new display unit.

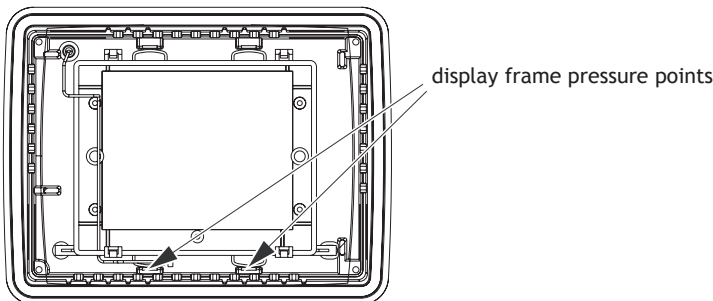8. Re-assemble the terminal in reverse order.

EXTER T40/T40m

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 terminal.

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.

power card

flex cable

plain cable

4. Gently press the power card towards the top of the terminal 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.
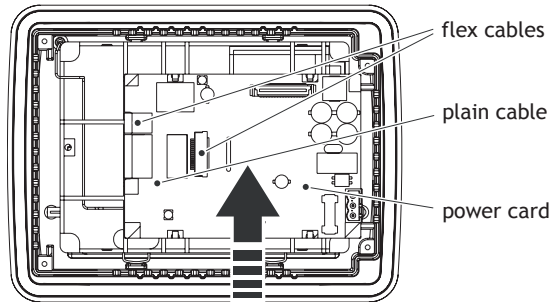

display frame pressure points

7. Mount the new display unit.

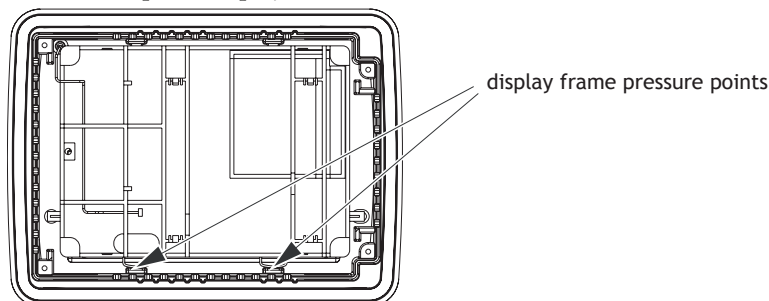8. Re-assemble the complete operator terminal.

EXTER T60c/T60m

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 terminal.

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.

flex cables

plain cable

power card

4. Gently press the power card towards the top of the terminal 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.

display frame pressure points

7. Mount the new display unit.

8. Re-assemble the complete operator terminal.

EXTER K70 and T70

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 terminal.

2. Follow the instructions under *Replacing the Rear Cover* to remove the rear cover.

3. Disconnect the two (EXTER T70) or three (EXTER K70) flex cables from the power card, according to the illustration below, and remove the two plastic nuts that holds the power card in place.
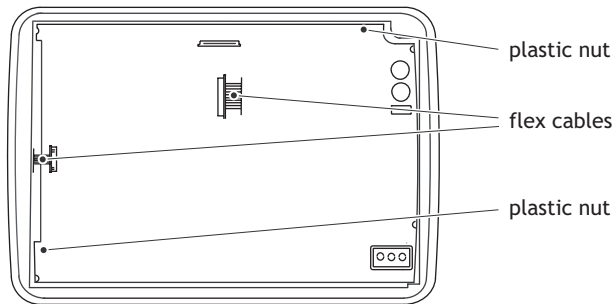

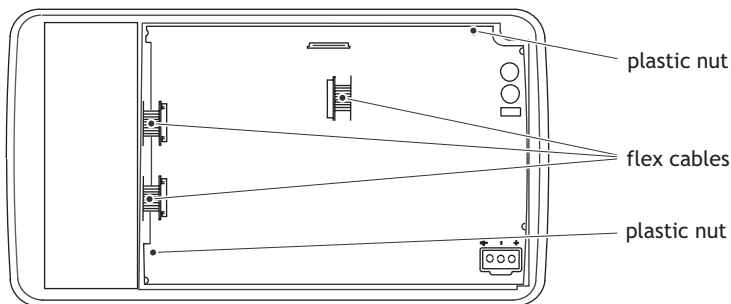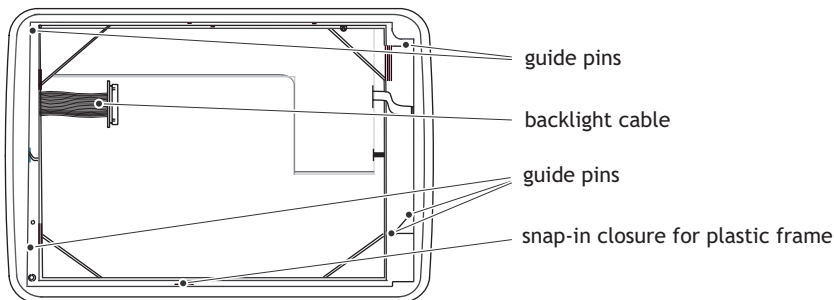*Illustration of EXTER T70 showing the two flex cables*

Illustration of EXTER K70 showing three flex cables

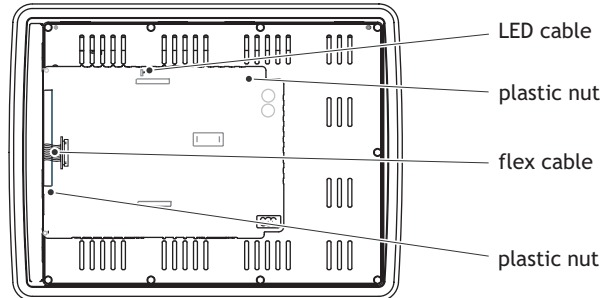4. Lift the power card and gently remove the backlight cable from the rear side.

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 terminal. Make sure the guide pins on the frame are properly fastened in the holes in the front plate.

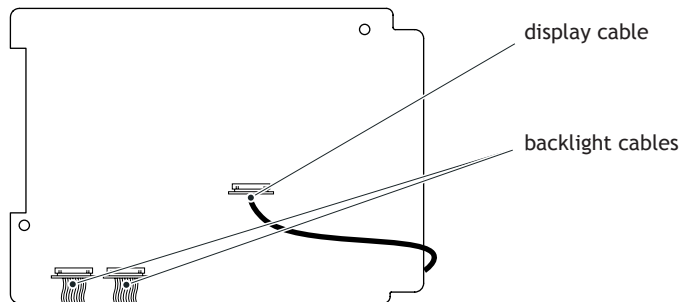7. Re-assemble the complete operator terminal.

EXTER T100

Follow the steps below to replace the display/display cable of EXTER T100:

1. Power off the operator terminal.

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 terminal.

EXTER K100

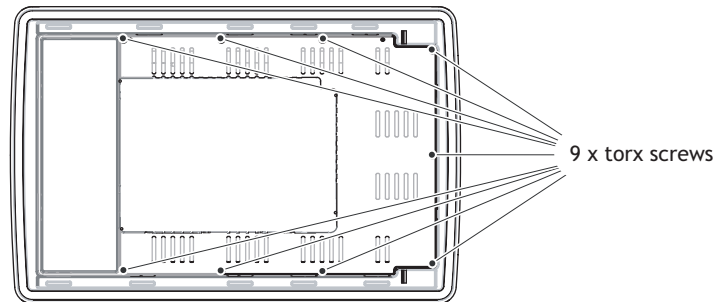Follow the steps below to replace the display/display cable of EXTER K100:

1. Power off the operator terminal.

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.
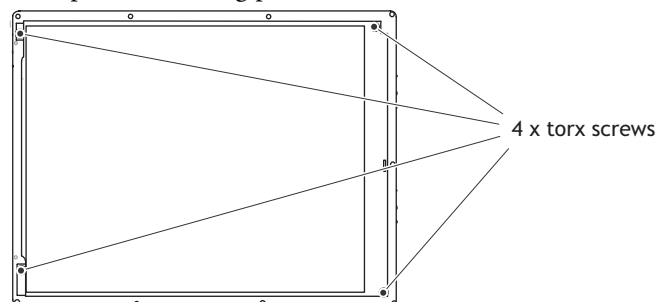

4. Lift the power card and gently remove the 2 backlight cables and the display cable from the rear side of the power card.

5. Remove the mounting plate (9 torx screws). Gently lift the mounting plate with the display and power card.

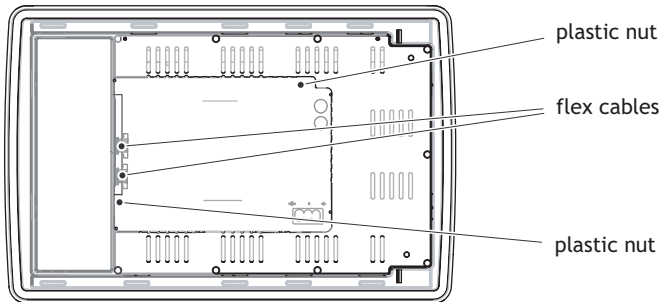6. Flip the mounting plate and unscrew the 4 torx screws.

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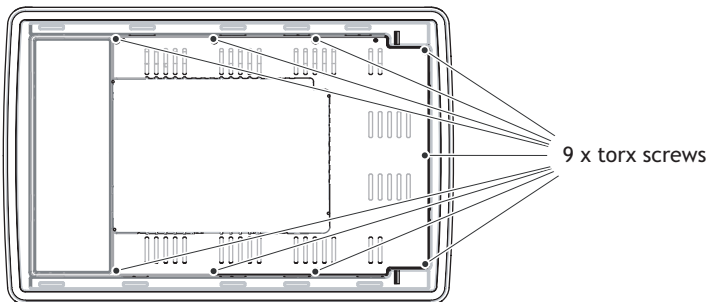
8. Re-assemble the complete operator terminal.

EXTER T150

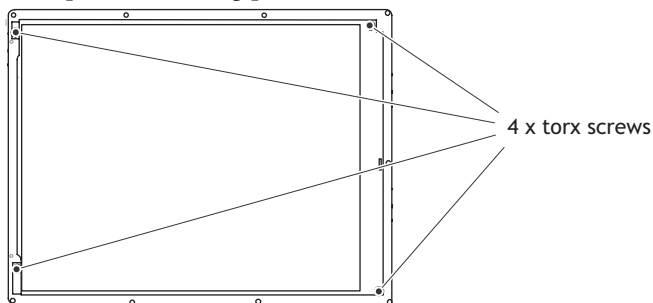Follow the steps below to replace the display/display cable of EXTER T150:

1. Power off the operator terminal.

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.

LED cable

plastic nut

display cable

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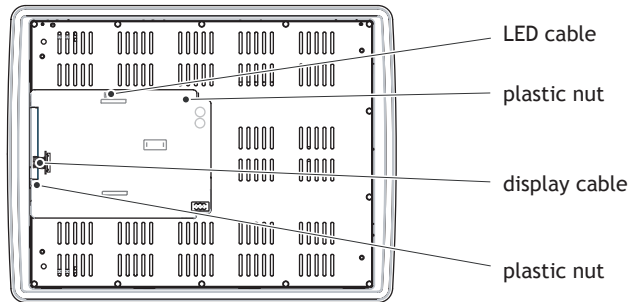
5. Lift up the power card and gently remove the 4 backlight cables and disconnect the display cable from the power card.

backlight cable

display cable

backlight cable
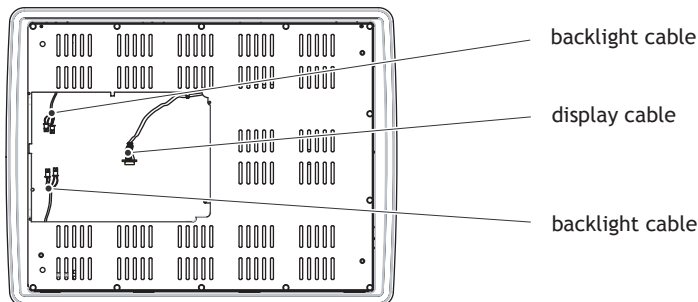
6. Remove the mounting plate (12 torx screws).
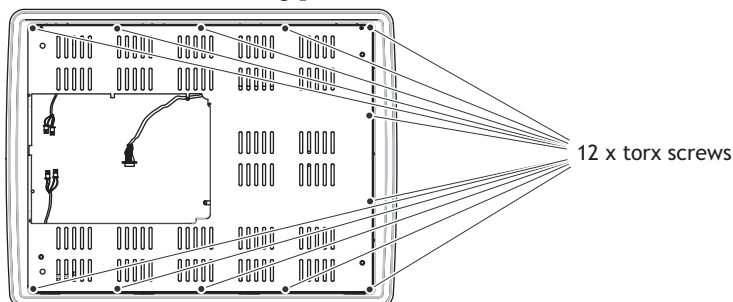
12 x torx screws

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

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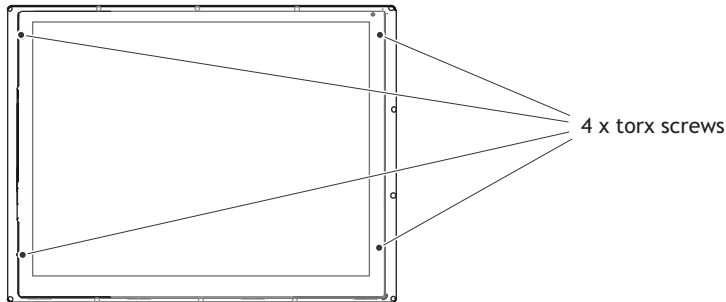
4 x torx screws

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 terminal.

3.7.5 Self-test of the Display

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

1. Start the operator terminal 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 terminal.

1. Set the MODE switches to the correct positions in order to enter the User Menu mode (see table in the *Mode Switches* section).

2. Switch on the power and follow the instructions.

3. Power off the operating terminal.

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.

EXTER K30m, EXTER K60c, EXTER T40/T40m and EXTER T60c/T60m
Follow the steps below to replace the complete front of the operator terminal:

1. Power off the operator terminal.

2. Follow the steps 1-6 in the *Replacing the Display/Display Cable* instructions for the current version of terminal.

3. Attach the new front.

4. Re-assemble the unit.

EXTER T70 and EXTER K70
Follow the steps below to replace the complete front of EXTER T70/EXTER K70:

1. Power off the operator terminal.

2. Follow the steps 1-3 and step 5 in the *Replacing the Display/Display Cable* instruction for EXTER T70/EXTER K70, but in step 3, do not remove the display cable.

3. Attach the new front.

4. Re-assemble the unit.

EXTER T100
Follow the steps below to replace the complete front of EXTER T100:

1. Power off the operator terminal.

2. Follow the steps 1-3 and 5 in the *Replacing the Display/Display Cable* instruction for EXTER T100, 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.

EXTER K100
Follow the steps below to replace the complete front of EXTER K100:

1. Power off the operator terminal.

2. Follow the steps 1-3 and step 5 in the *Replacing the Display/Display Cable* instruction for EXTER K100, 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.

EXTER T150

Follow the steps below to replace the complete front of EXTER T150:

1. Power off the operator terminal.

2. Follow the steps 1-3 and step 5 in the *Replacing the Display/Display Cable* instruction for EXTER T150, 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

The following is needed:

– A new battery, see the *Available Spare Parts* list.

Note:
Make sure you have adequate ESD protection.

Note:
Make sure to make a backup copy of the operator terminal project. See the *Software Products* section.

EXTER K30m, EXTER K60c, EXTER T40/T40m and EXTER T60c/T60m

1. Power off the operator terminal.

2. Open the battery cover.

3. Use a non conductive pair of pliers to extract the battery

battery

4. Insert the new battery.

5. Re-assemble the battery cover.

Note:
The removed lithium battery should be recycled.

EXTER K70, EXTER K100, EXTER T70, EXTER T100 and EXTER T150
The following is needed:

– A new battery, see the *Available Spare Parts* list.

– Glue Gun: Jet-Melt TCQ, manufacturer: 3M

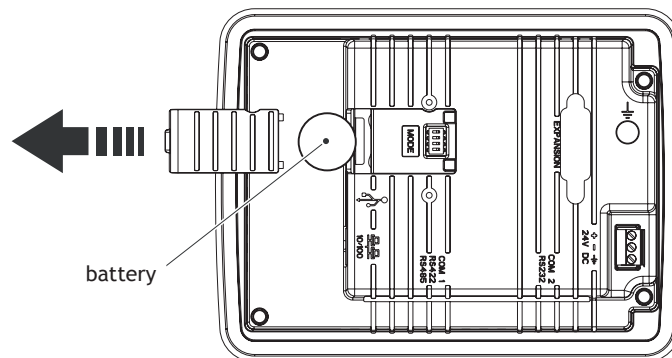– Melting Glue: 3748 V-O, manufacturer: 3M

Note:
Make sure you have adequate ESD protection.

Note:
Make sure to make a backup copy of the operator terminal project. See the *Software Products* section.

1. Power off the operator terminal.

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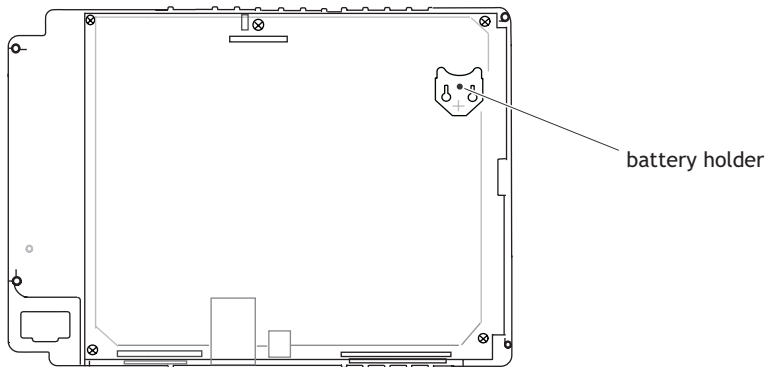
CPU board with battery holder on the rear side of the back cover

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 terminal 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 EXTER T150).

Note:
Make sure you have adequate ESD protection.

EXTER K30m, EXTER K60c, EXTER T40/T40m, EXTER T60c/T60m and EXTER K70/T70

If the backlight is broken on a terminal 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 on how to change the display See *Replacing the Display/Display Cable* section.

EXTER T100

To replace the backlight of EXTER T100, follow the steps 1-5 in section *Replacing the Rear Cover* for EXTER T100. 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.
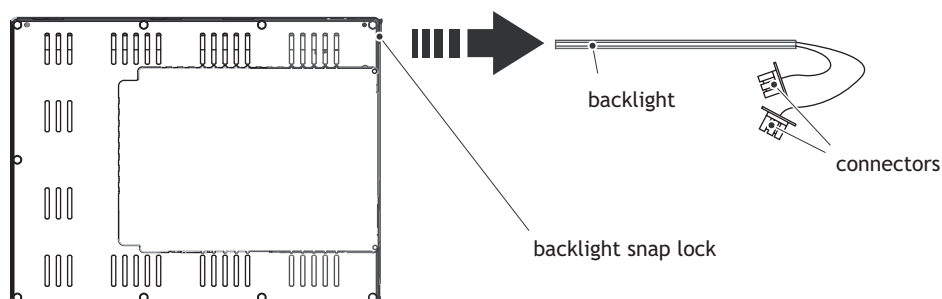
3. Insert the new backlight. Be careful not to pull the cables of the new backlight when inserting it, since pulling the cables will damage the backlight.

4. Re-assemble the complete operator terminal.

EXTER K100

To replace the backlight of EXTER K100, follow the steps 1-5 in section *Replacing the Rear Cover* for EXTER K100. 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.
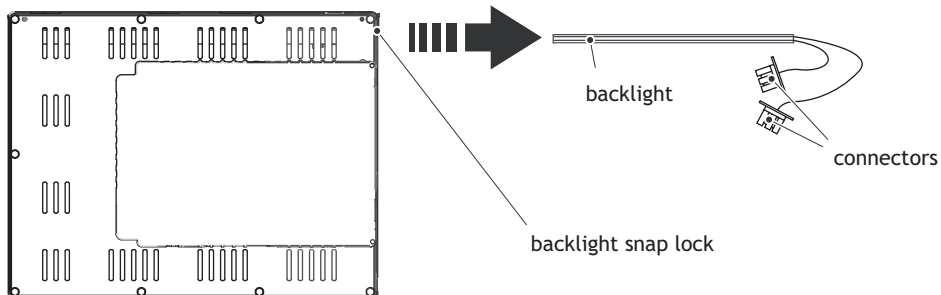
2. Remove the backlight from the display.

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 terminal.

EXTER T150

To replace the backlight of EXTER T150 you will need two new backlights, see the *Available Spare Parts* list.

Follow the steps 1-5 in section *Replacing the Rear Cover* for EXTER T150. 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.
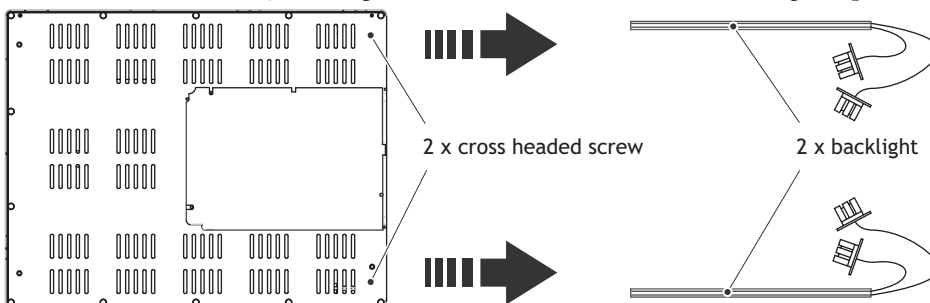

2. Remove the backlights.

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 terminal.

3.7.10 Available Spare Parts

The table below lists available spare parts:

Order number	Description	Operator Terminal
601009030	ADAPTION PLATE, S-05082	EXTER K100
601009029	ADAPTION PLATE, S-05108	EXTER T100
601009043	ADAPTION PLATE, S-05138	EXTER T150
601009049	BACKLIGHT (Samsung 15" SVGA, top and bottom)	EXTER T150
601009050	BACKLIGHT (Sharp LQ104V1DG21)	EXTER T100 and EXTER K100
601009123	BATTERY COVER	EXTER K30m, EXTER K60, EXTER T40 and EXTER T60
601009010	BATTERY, 550mAh, Lithium battery CR2450	All operator terminals in the EXTER-series
601009001	Bracket with mounted screw Drawing 05014, 05016, 05017	All operator terminals in the EXTER-series
601009003	CF-COVER S-05018	EXTER K70, EXTER K100, EXTER T70, EXTER T100, EXTER T150
601009038	COLOR LABEL For upper side of box S-05177	EXTER K100
601009036	COLOR LABEL For upper side of box S-05178	EXTER T100
601009047	COLOR LABEL For upper side of box, S-05176	EXTER T150
601009023	COLOR LABEL For upper side of box, S-05179	EXTER K70
601009021	COLOR LABEL For upper side of box, S-05180	EXTER T70
601009035	COMPL. EMBALLAGE	EXTER T100
601009037	COMPL. EMBALLAGE	EXTER K100
601009046	COMPL. EMBALLAGE	EXTER T150
601009022	COMPL.EMBALLAGE	EXTER K70
601009020	COMPL.EMBALLAGE	EXTER T70
601009125	COMPLETE BOX	EXTER K30m
601009126	COMPLETE BOX	EXTER T40
601009127	COMPLETE BOX	EXTER T60
601009128	COMPLETE BOX	EXTER K60
601009018	COMPLETE FRONT incl. front cover, glass, keyboard, gaskets and labels	EXTER K70
601009033	COMPLETE FRONT incl. front cover, glass, keyboard, gaskets and labels	EXTER K100
601009084	COMPLETE FRONT incl. front cover, glass, keyboard, gaskets and labels	EXTER K30m

Order number	Description	Operator Terminal
601009086	COMPLETE FRONT incl. front cover, glass, keyboard, gaskets and labels	EXTER K60c
601009016	COMPLETE FRONT incl. front cover, touch, overlay, gaskets and labels	EXTER T70
601009088	COMPLETE FRONT incl. front cover, touch, overlay, gaskets and labels	EXTER T40
601009113	COMPLETE FRONT incl. front cover, touch, overlay, gaskets and labels	EXTER T60
601009031	COMPLETE FRONT incl. front cover, touch, overlay, LED, gaskets and labels	EXTER T100
601009044	COMPLETE FRONT incl. front cover, touch, overlay, LED, gaskets and labels	EXTER T150
601009064	DISPLAY (incl. frame)	EXTER K30m
601009065	DISPLAY (incl. frame)	EXTER T40 and EXTER T40m
601009066	DISPLAY (incl. frame)	EXTER T60m
601009067	DISPLAY (incl. frame)	EXTER T60c and EXTER K60c
601009028	DISPLAY CABLE K-05121	EXTER T100 and EXTER K100
601009042	DISPLAY CABLE K-05150	EXTER T150
601009015	DISPLAY CABLE, incl ferrite	EXTER T70 and EXTER K70
601009002	DISPLAY FRAME For Toshiba Drawing 05054	EXTER K70
601009014	DISPLAY TFT, incl frame and cable 6,5" VGA	EXTER T70 and EXTER K70
601009041	DISPLAY TFT, Samsung 15" SVGA	EXTER T150
601009027	DISPLAY TFT Sharp 10,4" SVGA	EXTER T100 and EXTER K100
601009132	FRONT LABEL	EXTER K30m
601009135	FRONT LABEL	EXTER K60
601009133	FRONT LABEL	EXTER T40
601009134	FRONT LABEL	EXTER T60
601009017	FRONT LABEL S-06012	EXTER T70
601009019	FRONT LABEL S-06022	EXTER K70
601009032	FRONT LABEL S-06032	EXTER T100
601009034	FRONT LABEL S-06042	EXTER K100
601009045	FRONT LABEL, S-06052	EXTER T150
601009124	LABEL (for expansion port)	EXTER K30m, EXTER K60, EXTER T40 and EXTER T60
321099040	POWER CONNECTOR	All operator terminals in the EXTER-series
601009120	REAR COVER	EXTER K30m

Order number	Description	Operator Terminal
601009121	REAR COVER	EXTER T40
601009122	REAR COVER	EXTER T60 and EXTER K60
601009011	REAR COVER S-05015	EXTER K70, EXTER K100, EXTER T70, EXTER T100, EXTER T150
601009008	TEST PLUG ETHERNET	All operator terminals in the EXTER-series
601009006	TEST PLUG RS232	All operator terminals in the EXTER-series
601009007	TEST PLUG RS422/485	All operator terminals in the EXTER-series
601009004	TEST PLUG USB	EXTER K70, EXTER K100, EXTER T70, EXTER T100, EXTER T150

3.8   Hardware Self Test

The self-test program can be used to test aspects of operator terminal 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 terminal:

1. Power off the operator terminal.

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 terminal 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-subs are on.

5. When the self-test is finished, power off the operator terminal and set all mode switches to the OFF position.

If an error occurs during the self-test, try to fault trace. See *Fault Tracing*.

3.9   Fault Tracing

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

Scenario	Fault tracing steps
The operator terminal is not working properly. Power LED is off.	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 terminal is not communicating with the controller.	1. Check the communication cable between the units. 2. Check that the operator terminal 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 terminal is working but the back-light is off.	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 terminal is not working, the back-light is off but the power LED is on.	1. Check the backlight dimming. 2. Check the CPU board for burned components. 3. Download new firmware to the operator terminal.
The operator terminal does not include the lat-est firmware.	1. Check the versions included with the operator terminal. 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 terminal is working, but one or more keys are not work-ing.	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 mal-functioning or is not responding at all.	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 terminal 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 dis-play picture is shifted.	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 Dis-play/Display Cable* section.
The operator terminal will not restart after changing a component.	1. Remove and insert the battery again. (This is only valid for terminals with an external battery cover.)
Low battery/ No battery	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.

4   Software

This chapter describes how to maintain and update the software in the EXTER operator terminals. The chapter includes a general description of the operator terminal 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 terminals 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:

– *Information Designer*

Information Designer is used for creating application projects for EXTER operator terminals and their accessories.

– *Remote Access Viewer*

Remote Access Viewer is a program for remote access and control of EXTER operator terminals.

It is possible to access, reflect and control an EXTER operator terminal 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 terminal.

– *System Program*

The operator terminal is delivered with a system program (operating system) pre-stored in the operator terminal memory.
The configuration tool Information Designer is used to download system programs to the operator terminal.

– *Image Loader*

The firmware (the software in the operator terminal) consists of three parts at delivery:

1. E-Boot, the program that starts up the operator terminal and Windows CE.

2. Windows CE Professional, the operating system for the operator terminal.

3. OPsys, the system program in the operator terminal that contains the HMI functionality.

Information Designer can be used to update one part of the firmware, the system program Opsys_b*.cab, to the operator terminal.
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 terminal it is important to ensure that the power is not interrupted during the transfer.

4.2.1   Information Designer

Information Designer is not a freeware product. A demo version can be found on the web site. To update this software, an accredited EXTER operator terminal dealer must be contacted.

4.2.2   Remote Access Viewer

To update this program, go to *www.hmi.beijerelectronics.com* and select **Support/ Downloads/FTP** in the menu. Run the .exe file and follow the instructions.

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_iml.exe. The Image Loader application will help and guide you through the upgrade.

When the upgrade is finished, the operator terminal 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 Information Designer shall not be used when the Image Loader application is used to upgrade the operator terminal.

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

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

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*.

Via PC

The configuration tool *Information Designer* is used to download system programs via a PC to the operator terminal. 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 terminal via a PC requires the following:

– PC with the configuration tool installed.

– Transfer cable between the PC and the operator terminal.

– 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 terminal.

2. Open a project or create a new project with the desired operator terminal type.

3. Select **Transfer/Update Operator Terminal System Program**.

No settings are required in the operator terminal.

Over Ethernet

1. Connect the cable between the PC and operator terminal.

2. Set the operator terminal to **User Menu mode** (see the *Mode Switches* section).

3. Enter a valid IP address for the operator terminal.

4. Set the operator terminal back to **Run-mode** (see the *Mode Switches* section).

5. Open a project or create a new project with the desired operator terminal type.

6. Select **Transfer/Update Operator Terminal System Program**.

7. Select **Settings/Use TCP/IP transfer**.

Via External Memory Card

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

– File with new system program (OPSys_b*.cab).

– Compact Flash memory card (only in EXTER K70, EXTER K100, EXTER T70, EXTER T100 and EXTER T150) 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 terminal, or connect the USB Flash drive, and start the operator terminal to update the system program automatically.

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

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5   Environmental Aspects

This chapter includes information about the environmental impact of EXTER operator terminals.
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 9001:1994 and SS-EN ISO 14001:1996 international standards.

5.2   Environmental Impact of the Operator Terminals

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
The circuit board is largely surface mounted, which means less use of solder compared with through-hole mounting.

The solder material consists mainly of tin (approximately 63%) and lead (approximately 27%). There may be traces of other substances such as copper and silver. The tin solder is analyzed regularly. The plastic in the printed circuit board contains the flame-retardant Tetrabromobisphenol-A (TBPA, brominated). There is no polybrominated diphenyl ether (PBDE)

Note:
All operator terminals produced after July 1, 2006 will be 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 terminal contains a button cell lithium battery (Li/MnO2).
The battery is not classified as environmentally hazardous by the Swedish Battery Ordinance (1997:645).

5.3   Recycling

The operator terminals 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 terminals 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 terminal 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 terminal 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 terminal contributes to reduced environmental impact.

Listed below are examples of how you can reduce environmental impact during operator terminal 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 terminal with 24 V DC. If the input voltage is lower, the loss effect increases. Ensure that the operator terminal, battery, and packaging are recycled in an environmentally responsible manner.

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