



# HE-QX751

## 1 INTRODUCTION

QX751 provides...

- Powerful Standard Features in one unit including
  - ✓ Controller
  - ✓ Network
  - ✓ I/O
  - ✓ Operator Interface
  - ✓ Highly Visual Display Screen
- Optional Back Pack adds comprehensive I/O and communication capabilities.

**Table 1 – Features**

Standard Features on QX751				Features on Back Pack (BP) Options	
QX Base Model	Network	Screen Type	Standard QX Features	HE-BP41	HE-BP43
HE-QX751	On-Board Ethernet 100Base T	15" TFT XGA 16 bit color	CompactFlash 3 Serial Ports Ethernet USB B (Version 1.1)	FOX CsCAN Up to 2 Plastic SmartStack Modules (for additional I/O)	FOX CsCAN Up to 4 Plastic SmartStack Modules (for additional I/O) High Speed I/O
<b>Other Products Commonly Used with Color QX (Back Pack Options Required)</b>					
<b>Plastic SmartStack Modules</b>		Provide a wide variety of I/O options for the QX. Require little space and are easy to install.			
<b>Fiber Optic Extension System (FOX)</b>		Extends a high-speed QX backplane enabling SmartStack I/O Modules to be mounted several meters from the QX. The FOX, also, significantly increases the number of SmartStack I/O modules supported by one QX.			
<b>SmartStix Modules</b>		Is a family of remote I/O products for the QX.			

If using a Back Pack Option (BP41 or BP43), refer to the following specifications.

**Table 3 – Back Pack Specifications**

	BP41	BP43
<b>I/O Interfaces</b>	Plastic SmartStack I/O – 2 modules maximum Fiber Optic Expansion (FOX) I/O – 5 bases maximum CsCAN Network Port – 252 SmartStix I/O maximum	Plastic SmartStack I/O – 4 modules maximum Fiber Optic Expansion (FOX) I/O – 5 bases maximum CsCAN Network Port – 252 SmartStix I/O maximum
<b>Built-in High Speed Counter / PWM</b>	No	Yes - >1MHz max TTL or 24vdc level
<b>Built-in PWM Outputs</b>	No	Yes TTL or 24vdc level
<b>LEDs</b>	3 LEDs (CAN, FIBER OK and OK)	3 LEDs (CAN, FIBER OK and OK)
<b>Temperature &amp; Humidity</b>	32 - 122°F (0 - 50°C), 5 to 95% Non-condensing	
<b>UL</b>	Please refer to Compliance Table located at <a href="http://www.heapg.com/Support/compliance.htm">http://www.heapg.com/Support/compliance.htm</a>	
<b>CE</b>		

## 2 SPECIFICATIONS / PRODUCT DESCRIPTIONS

**Table 2 - QX Base Specifications**

Base Models	QX751 (15-inch) (XGA)
<b>Display Type (LCD with backlight)</b>	1024 x 768 TFT
<b>Display Size</b>	15"
<b>Display Screen Dimensions</b>	12"W x 9"H (304 x 228 mm)
<b>Display Memory</b>	8 Mbytes
<b>User Keys</b>	7 configurable keys + System Key
<b>Screens Supported</b>	1,023 screens (300 objects per screen)
<b>Number of Colors</b>	32768
<b>Primary Power</b>	<b>Voltage:</b> 24 VDC (+/-10%) <b>Steady State Current:</b> 1.66 A @ 24 VDC <b>Inrush Current:</b> (30 A @ 24 VDC) For 1 ms
<b>QX751 Dimensions (without Back Pack option or SmartStack I/O attached). See Panel Cut-outs and Dimensions for complete details (page 2).</b>	
<b>Height</b>	12.31" (312.7 mm)
<b>Width</b>	15.07" (382.7 mm)
<b>Mounting Depth</b>	3.19" (81.1 mm)
<b>Serial Ports</b>	3 RS-232 / RS-485 Ports. Software Selectable.
<b>Network Options</b>	On-board Ethernet 100BaseT
<b>Control Memory</b>	256K Ladder Memory plus 32KB Register Space
<b>Control Scan Rate</b>	0.2ms / K Ladder Logic (typical)
<b>Portable Memory</b>	Compact FLASH (CF) slot CF card LED – indicates CF card is inserted.
<b>Temperature &amp; Humidity</b>	32 - 122°F (0 - 50°C), 5 to 95% Non-condensing
<b>UL</b>	Please refer to Compliance Table located at <a href="http://www.heapg.com/Support/compliance.htm">http://www.heapg.com/Support/compliance.htm</a>
<b>CE</b>	

**3 INSTALLATION**

**Note:** Prior to mounting, observe requirements for the panel layout design and adequate clearances in the **QX Hardware Manual** (MAN0890). A handy checklist is provided in the *Installation* chapter.

**3.1 Installation Procedures**

**a. QX Base Installation**

1. Per specifications of the QX751 model you are using, carefully prepare the panel cutout. Make sure the corners of the cutout are square and free from burrs. (Locate the panel cut-outs and dimensions as shown in this document.)
2. Cut the host panel.
3. Insert the QX751 (base unit only) through the panel cutout from the front. The gasket material needs to lie between the host panel and the QX751.

**Caution: Do not force the QX into the panel cutout. An incorrectly sized panel cutout damages the QX screen.**

4. Install and tighten the mounting clips (provided with the QX751) until the gasket material forms a tight seal.

**Caution: Do not over-tighten. Over-tightening damages the case.**

5. If used, install the Back Pack (BP) option. (Refer to **Item b** in this section for details.)

**Note:** QX units are shipped with firmware that requires a Backpack for proper bootup to complete. If a Backpack is not to be used, a QX firmware update from Cscape must be performed for proper operation.

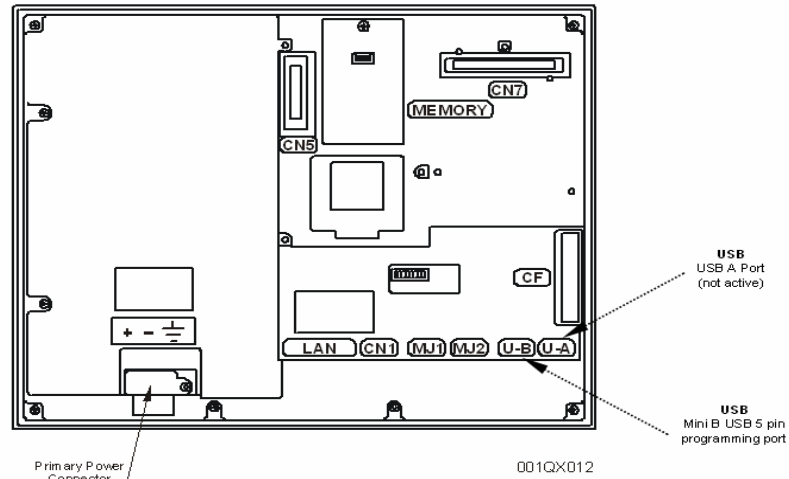
6. Connect cables as needed such as communications, programming, power and fiber optic cables to the QX ports using the provided connectors.
7. As a final step before using, carefully remove the protective, plastic sheet from the front of the unit. The protective, transparent sheet is used to protect the display window.
8. Begin configuration procedures for the QX.

**b. Back Pack (BP) Installation**

1. Remove the clear plastic label on the unit.
2. Push the BP into place on the QX Base.
3. Insert and tighten the 3 screws.

**Caution: Do not over-tighten. Over-tightening damages the case.**

**3.3 QX Base Ports and Connectors**



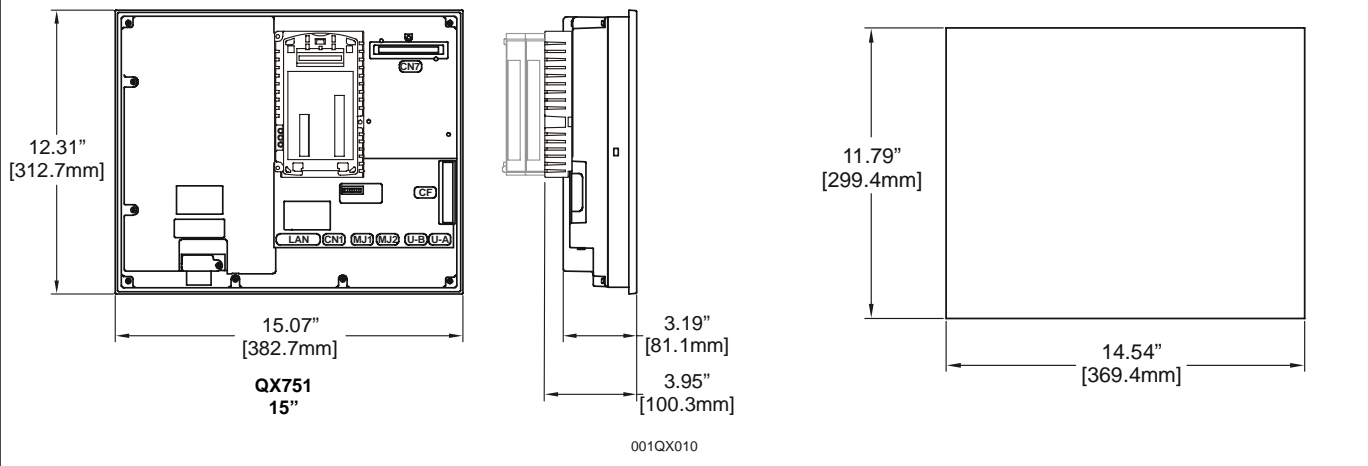
**Figure 2 – QX Base Ports and Connectors**

**3.2 Panel Cut-Out and Dimensions — QX751 (15-inch)**

The QX base has power, network, programming, USB-A and USB-B ports. Three RS-232 and RS-485 ports are available.


USB-A Port – Not Active

USB-B Port – Programming Port



**Figure 1 – Panel Cut-out and Dimensions (15-inch)**

3.3.1 Primary Power Port / Grounding

Table 4 – Primary Power Port Pins	
Signal Pin	Description
V+	Input power supply voltage
V-	Input power supply ground
	Frame Ground
Power LED	The front panel has a Power LED which illuminates when the unit is ON

Note: Power Supply Voltage Range is from 24VDC ±10%.

3.3.2 RS-232 Port / RS-485 Port

There are a variety of ways to connect to the RS-232 and RS-485 ports. You can use two modular jacks (MJ1 and MJ2) or the 25-pin Dsub connector (CN1).

Table 5 – Ports and Functions (Port 1, 2, and 3)			
Functions	Port 1 (MJ1)	Port 2 (MJ2)	Port 3 (CN1)
RS-232	✓	✓	✓
RS-485	✓	✓	✓
Hardware Handshaking			✓
Programming	✓		
Ladder Function Controlled	✓	✓	✓
Modem	✓*	✓*	✓

\* Not supported by Cscape Modem Function Blocks

a. Port 1 (MJ1) / Port 2 (MJ2) Modular Jacks

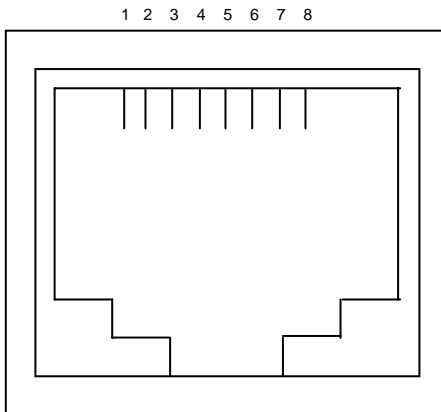


Table 6 – Port 1 (MJ1) / Port 2 (MJ2) Pins	
Pin	Signal
1	+SD/RD
2	-SD/RD
3	+5V
4	+5V
5	0V
6	0V
7	RXD
8	TXD
Output power supply: Max. 150mA	

Figure 3 – Close-up of Port 1 (MJ1) / Port 2 (MJ2) (RS-232 and RS-485)

b. Port 3 (CN1) Connector

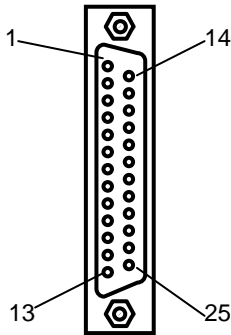


Table 7 – Port 3 (CN1) Pins			
Pin #	Signal	Pin #	Signal
1	FG	14	+RTS
2	TXD	15	Not Used
3	RXD	16	Not Used
4	RTS	17	-RTS
5	CTS	18	-CTS
6	Not Used	19	+CTS
7	SG	20	Not Used
8	Not Used	21	Not Used
9	+5V	22	Not Used
10	0V	23	Not Used
11	Not Used	24	+RD
12	+SD	25	-RD
13	-SD		

Figure 4 – Port 3 (CN1) RS-232 / RS-485 Connector

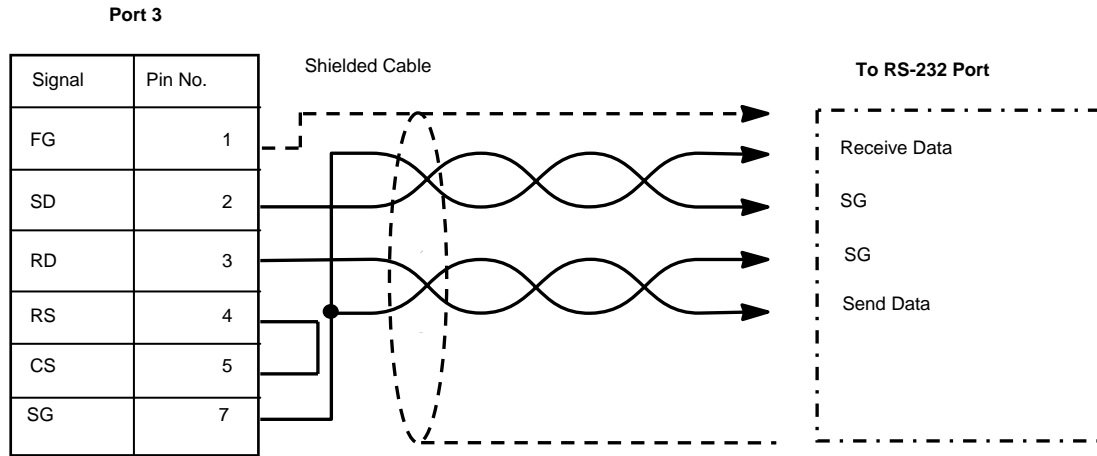


Figure 5 – Port 3 (CN1) RS-232 Port

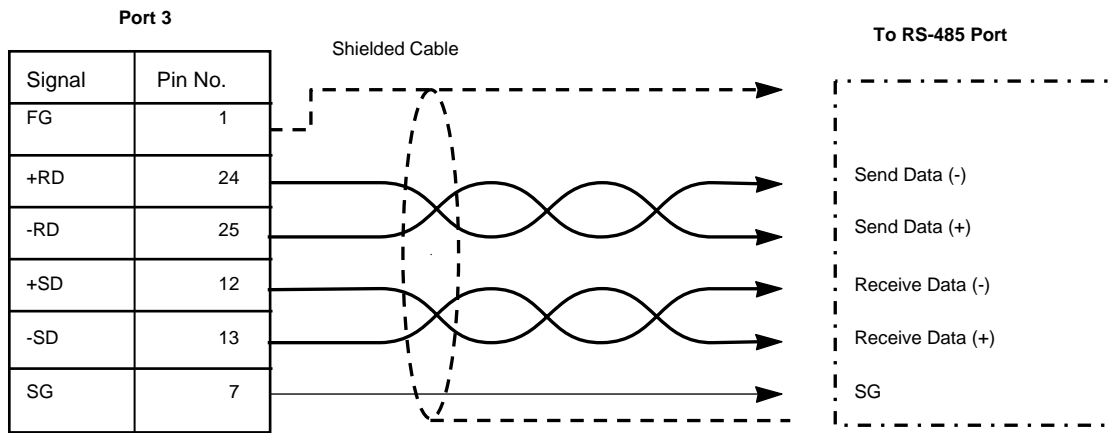


Figure 6 – Port 3 (CN1) RS-485 Port

**3.3.3 DIP-Switch**

The DIP switch is used for setting the terminating resistance of the RS-485 signal line at the CN1, MJ1, or MJ2 connector.

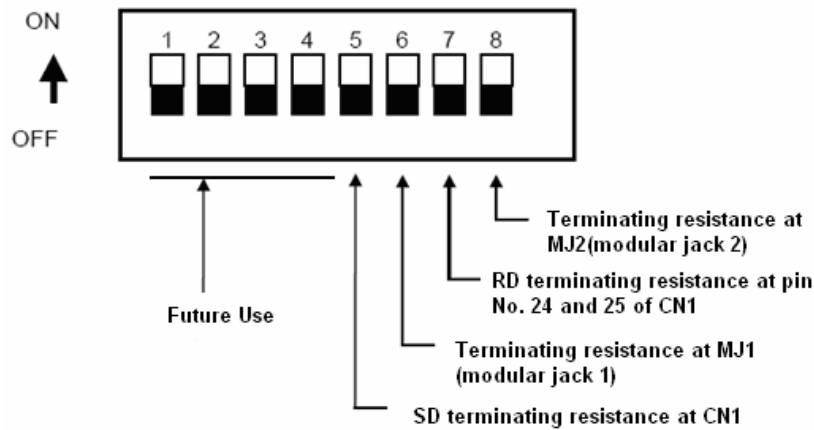


Figure 7 – DIP Switch

- (1) Set DIPSW 8 to ON position when termination is required on MJ2.
- (2) Set DIPSW 7 at the terminating station of the QX751 units to the ON position when connecting PLCs through RS-422/485.
- (3) Set DIPSW 6 to ON position when termination is required on MJ1.
- (4) Set DIPSW 5 to the ON position to add a terminating signal to SD when connecting through RS-422/485.
- (5) DIPSW 1, 2, 3 and 4 are for future use, keep these in OFF position.

### 3.4 Back Pack (BP) Connectors and Ports

Side views of the BP are shown to indicate the locations of its connectors and ports.

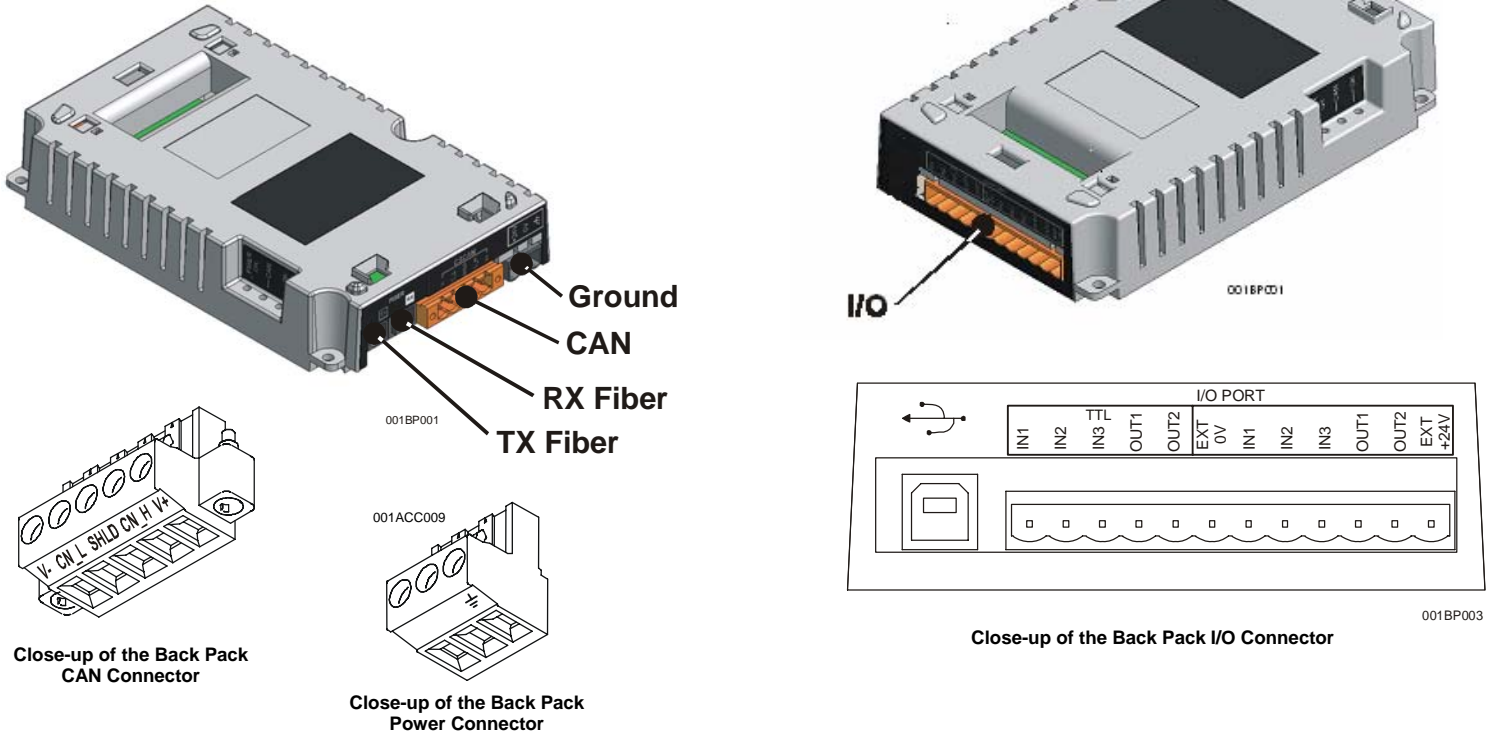


Figure 8 – QX Back Pack Connectors and Ports (Side Views)

Table 8 – Power Port Pins		
Pin	Signal	Description
1	NC	No Connect
2	NC	No Connect
3		Frame Ground

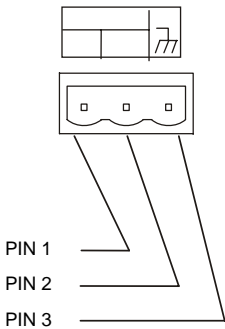


Figure 9 – QX Back Pack Power Port

**Note:** For best results and immunity, please connect Frame Ground to Pin 3 of the Power Port.

Table 9 – I/O Port Pins (HSC) (Orange Connector)			
Pin	Signal	Description	
1	TTL In1	HSC 1 / 5 V Input 1	(See Note*)
2	TTL In2	HSC 2 / 5 V Input 2	(See Note*)
3	TTL In3	HSC 3 / 5 V Input 3	(See Note*)
4	TTL Out1	HSC 1 / 5 V Output 1	(See Note*)
5	TTL Out2	HSC 2 / 5 V Output 2	(See Note*)
6	0 V	Ground	(For best performance, use separate supply and isolated ground.)
7	In1	HSC 1 / 24 V Input 1	(See Note*)
8	In2	HSC 2 / 24 V Input 2	(See Note*)
9	In3	HSC 3 / 24 V Input 3	(See Note*)
10	Out1	HSC 1 / 24V Output 1 / PWM 1	
11	Out2	HSC 2 / 24V Output 2 / PWM 2	
12	+24 V	Power for Outputs	

**Note\*** - Depending on the output of the application, use 5 V (e.g., TTL In1) or 24 V (e.g., In1) *per channel*.

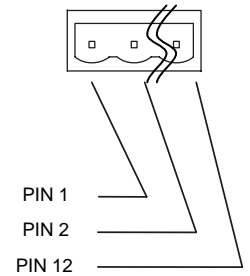


Figure 10 – QX Back Pack I/O Port

### 3.5 CAN Network Port and Wiring (QX Back Pack)

See the latest edition of Horner's **CAN Networks Manual** (MAN0799) by referring to the website location listed in the **Technical Support** section in this document.

**Note:** To optimize CAN network reliability in electrically noisy environments, the V-CAN Ground needs to be isolated from the primary input power supply ground.

## 4 Safety

When found on the product, the following symbols specify:



**Warning:** Electrical Shock Hazard.



**Warning:** Consult user documentation.

This equipment is suitable for use in Class I, Division 2, Groups A, B, C and D or Non-hazardous locations only

**WARNING – EXPLOSION HAZARD** – Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.

**AVERTISSEMENT - RISQUE D'EXPLOSION** - AVANT DE DECONNECTOR L'EQUIPMENT, COUPER LE COURANT OU S'ASSURER QUE L'EMPLACEMENT EST DESIGNE NON DANGEREUX.

**WARNING:** To avoid the risk of electric shock or burns, always connect the safety (or earth) ground before making any other connections.

**WARNING:** To reduce the risk of fire, electrical shock, or physical injury it is strongly recommended to fuse the voltage measurement inputs. Be sure to locate fuses as close to the source as possible.

**WARNING:** Replace fuse with the same type and rating to provide protection against risk of fire and shock hazards.

**WARNING:** In the event of repeated failure, do not replace the fuse again as a repeated failure indicates a defective condition that will not clear by replacing the fuse.

**WARNING – EXPLOSION HAZARD** – Substitution of components may impair suitability for Class I, Division 2

**AVERTISSEMENT - RISQUE D'EXPLOSION** - LA SUBSTITUTION DE COMPOSANTS PEUT RENDRE CE MATERIAL INACCEPTABLE POUR LES EMBLEMES DE CLASSE 1, DIVISION 2.

**WARNING** - The USB parts are for operational maintenance only. Do not leave permanently connected unless area is known to be non-hazardous.

**WARNING – EXPLOSION HAZARD** - BATTERIES MUST ONLY BE CHANGED IN AN AREA KNOWN TO BE NON-HAZARDOUS

**AVERTISSEMENT - RISQUE D'EXPLOSION** - AFIN D'EVITER TOUT RISQUE D'EXPLOSION, S'ASSURER QUE L'EMPLACEMENT EST DESIGNE NON DANGEREUX AVANT DE CHANGER LA BATTERIE

**WARNING** - Battery May Explode If Mistreated. Do Not Recharge, Disassemble or Dispose Of In Fire

**WARNING:** Only qualified electrical personnel familiar with the construction and operation of this equipment and the hazards involved should install, adjust, operate, or service this equipment. Read and understand this manual and other applicable manuals in their entirety before proceeding. Failure to observe this precaution could result in severe bodily injury or loss of life.

For detailed installation and a handy checklist that covers panel box layout requirements and minimum clearances, refer to the hardware manual of QX751 (MAN0890) you are using. (See the **Additional References** section in this document.)

- All applicable codes and standards need to be followed in the installation of this product.
- For I/O wiring (discrete), use the following wire type or equivalent: Belden 9918, 18 AWG or larger.

Adhere to the following safety precautions whenever any type of connection is made to the module.

- Connect the green safety (earth) ground first before making any other connections.
- When connecting to electric circuits or pulse-initiating equipment, open their related breakers. Do not make connections to live power lines.
- Make connections to the module first; then connect to the circuit to be monitored.
- Route power wires in a safe manner in accordance with good practice and local codes.
- Wear proper personal protective equipment including safety glasses and insulated gloves when making connections to power circuits.
- Ensure hands, shoes, and floor are dry before making any connection to a power line.
- Make sure the unit is turned OFF before making connection to terminals. Make sure all circuits are de-energized before making connections.
- Before each use, inspect all cables for breaks or cracks in the insulation. Replace immediately if defective.

## 5 Additional References

The following information serves as a *general* listing of Horner controller products and other references of interest and their corresponding manuals numbers. Visit our website listed in the **Technical Support** section to obtain user documentation and updates.

**Note:** This list is not intended for users to determine which products are appropriate for their application; controller products differ in the features that they support. If assistance is required, see the **Technical Support** section in this document.

Controller	Manual Number
XLE Series (e.g., HE-XExxx)	MAN0805
QX Series (e.g., HE-QXxxx)	MAN0798
NX Series (e.g., HE-NXxxx)	MAN0781
LX Series (e.g., LX-xxx; also covers RCS116)	MAN0755
Color Touch OCS (e.g., OCSxxx)	MAN0465
OCS (Operator Control Station) (e.g., OCS1xx / 2xx; Graphic OCS250)	MAN0227
Remote Control Station (e.g., RCS2x0)	
MiniOCS (e.g., HE500OCSxxx, HE500RCSxxx)	MAN0305
Other Useful References	
CAN Networks	MAN0799
Cscape Programming and Reference	MAN0313
Wiring Accessories and Spare Parts Manual	MAN0347
QX 451/551/651	MAN0797

## 6 Technical Support

For assistance and manual updates, contact Technical Support at the following locations:

**North America:**  
 (317) 916-4274  
<http://www.heapg.com>  
 email: [techsppt@heapg.com](mailto:techsppt@heapg.com)

**Europe:**  
 (+) 353-21-4321-266  
<http://www.horner-apg.com>  
 email: [techsupport@homerirl.ie](mailto:techsupport@homerirl.ie)

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