



Fiber Optic Extension System HE-FOX12 / HE-FOX30

Products Specifications and Installation Data

For detailed installation, configuration and other information, refer to the hardware manual of the controller you are using. See the **Additional References** section in this document.

1 INTRODUCTION

The SmartStack Fiber Optic Extension System (FOX) Base extends a high-speed OCS backplane enabling SmartStack I/O Modules to be mounted several meters from the OCS. The FOX, also, significantly increases the number of SmartStack I/O modules supported by one OCS Series controller. This document covers the following FOX models:

Table 1 - FOX Models	
HE-FOX12	Fiber Optic Extension Hub with 1 pair of <i>plastic</i> fiber transceivers <u>and</u> 2 pairs of <i>glass</i> fiber transceivers.
HE-FOX30	Fiber Optic Extension Hub with 3 pairs of <i>plastic</i> fiber transceivers.
Note: Plastic fiber cables are affordably priced, but they allow limited distance between drops. Glass fiber cables provide much greater distance at increased cost.	

2 SPECIFICATIONS

Table 2 - FOX12 / FOX30		
	Glass Fiber	Plastic Fiber
Maximum number of remote drops (total number of hubs and Bases)	5	
Maximum number of cable drops to any specific hub or Base	3 (See Section Six for Example Setups)	
Maximum length of Fiber Optic cable (per drop)	1640.42 feet (500 Meters)	32.8 feet (10 Meters)
Base ID#	Each Base or Hub must have a unique Base ID #. NX, QX(w/BP): 2-6; all other OCS/RCSs with FOX capability :1-5	
Type of Fiber Optic Cable	62.5 micron multi-mode ST connectors	EIAJ RC-5720 (RC)
Primary Power	9-30VDC @ 400mA maximum	
Power Draw	9-30VDC @ 400mA maximum	
Dimensions	Small Footprint	Low Profile
Height	6.368 [1.61.75 mm]	4.447 [112.94 mm]
Width	1.234 [31.35 mm]	6.368 [161.75 mm]
Thickness	4.447 [112.94 mm]	1.234 [31.5 mm]
Operating Temperature	32 - 140°F (0 - 60°C)	
Humidity	5% to 95% non-condensing	
UL	Please refer to Compliance Table located at http://www.heapg.com/Support/compliance.htm	
CE		

3 INSTALLATION

3.1 Mounting Orientation

The FOX12 / FOX30 are mounted on one or two din rails depending upon the orientation of the setup. The mounting clips of the FOX12 / FOX30 need to be properly oriented to ensure a good connection so that the FOX does not slide off the din-rail and also so that the FOX front panel is easily read. Up to four SmartStack Modules can be installed per FOX12 / FOX30. The FOX12 / FOX30 are installed inside a panel box.

Caution: Do not install more than four SmartStack Modules per OCS/RCS/FOX. Improper operation or damage to the OCS/RCS/FOX and SmartStack Modules could result.



Figure 1 –FOX12/FOX30 Low Profile Orientation

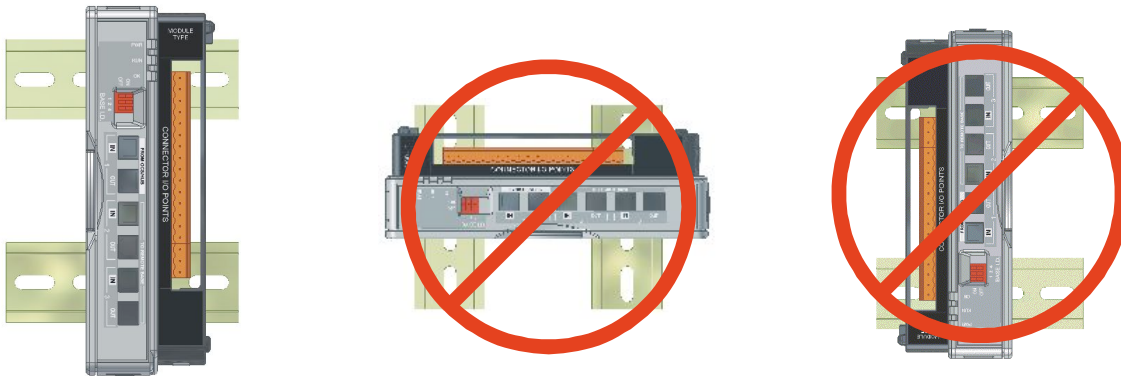


Figure 2 –FOX12/FOX30 Small Footprint Orientation

3.2 Mounting Instructions

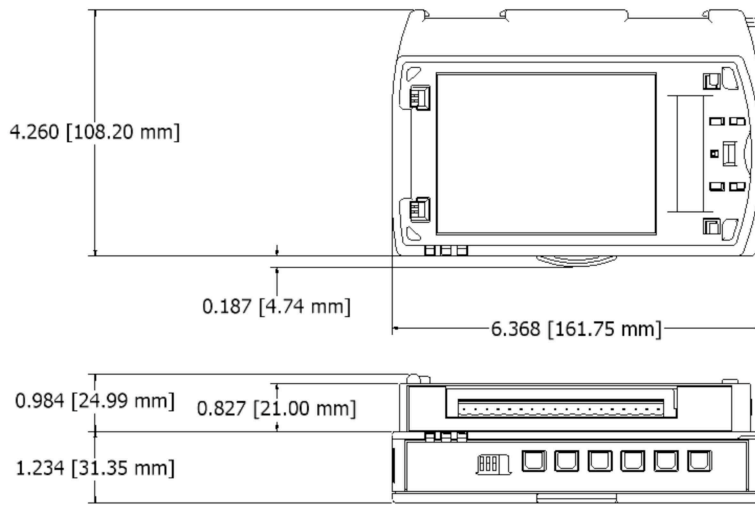


Figure 3 – FOX12 / FOX 30 Dimensions

1. Read the Installation Chapter in the hardware manual of the controller you are using prior to mounting the FOX12 / FOX30. Observe requirements for the panel layout design and adequate clearances. A checklist is provided for your convenience in the hardware manual. (See the **Additional References** section in this document.)
2. Determine length of DIN-Rail needed. (Refer to **Figure 3**.)
3. Attach the FOX to the DIN Rail – Low Profile Mounting Procedure

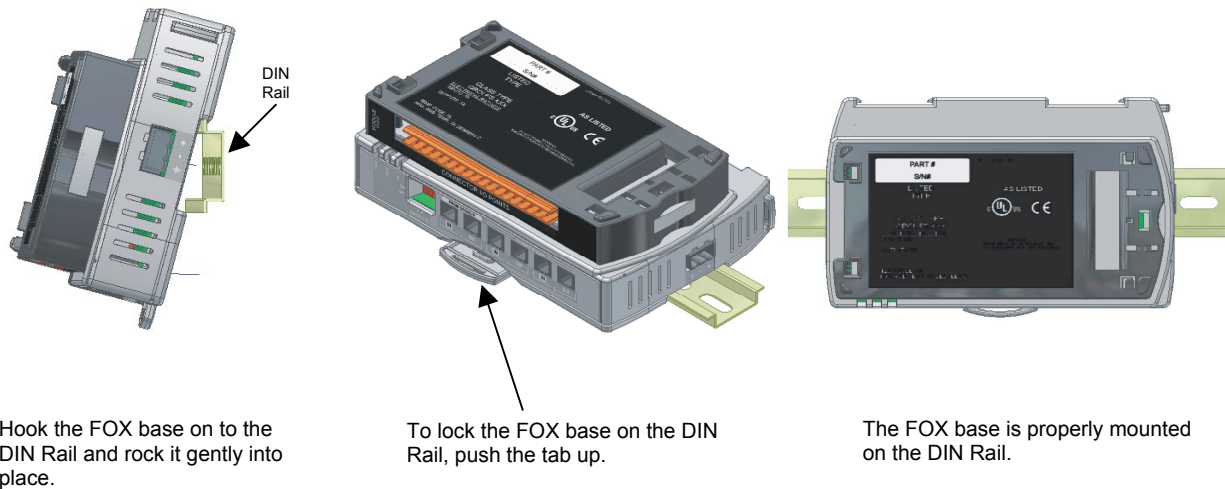


Figure 4 – Low Profile Mounting of FOX12/FOX30 on DIN Rail

FOX12/FOX30 Small Footprint Mounting Procedure

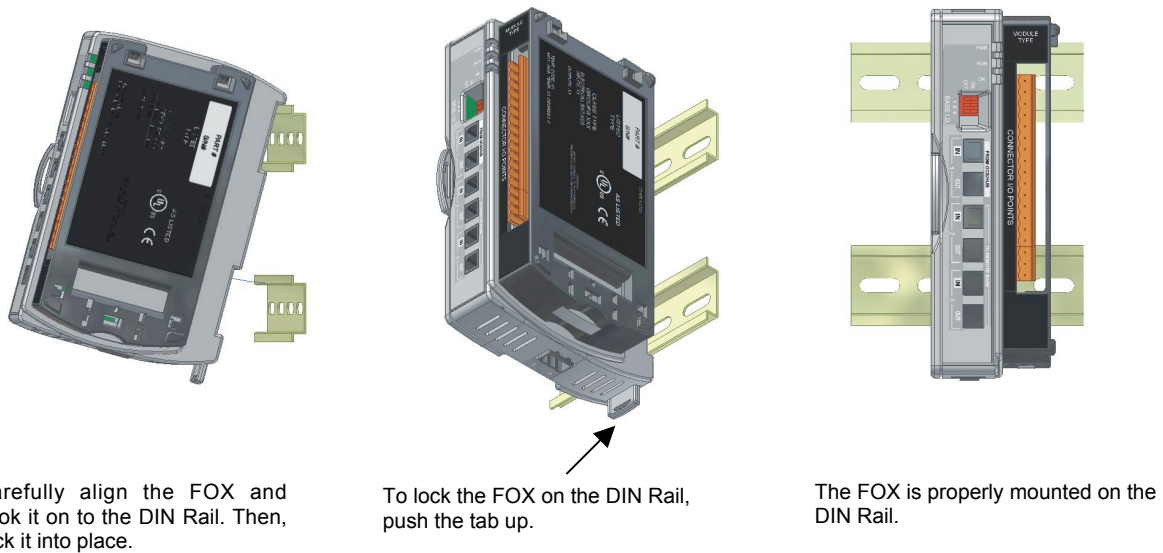


Figure 5 – Small Footprint mounting FOX12/FOX30 on a DIN Rail

3.3 Fiber Optic Cable Installation

Important considerations for installing the FOX include the following guidelines:

- a. To ensure reliable communication between the FOX Base and OCS/RCS module, high quality cables need to be installed. See Table 2 for fiber cable part numbers.
- b. For plastic fiber connections, the maximum fiber optic cable distance is 10 meters between drops.
- c. For glass fiber connections, the maximum fiber optic cable distance is 5000 feet between drops.
- d. During installment of the fiber optic cable, all direction changes need to adhere to a **Minimum Bend Radius**, which varies based on the type of fiber cable being used. For GLASS fiber cables, the minimum bend radius is 2.00" (50.8mm). For PLASTIC fiber cables, the minimum bend radius is 1.00" (25.4mm).

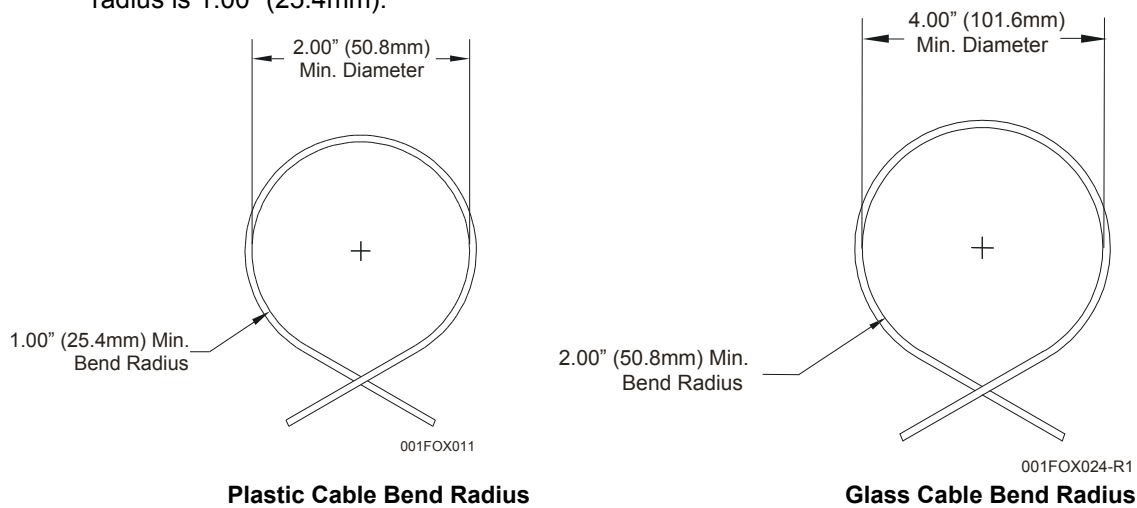


Figure 6 – Fiber Optic Cable Bend Radius

4 PORTS, CONNECTORS, AND SWITCHES

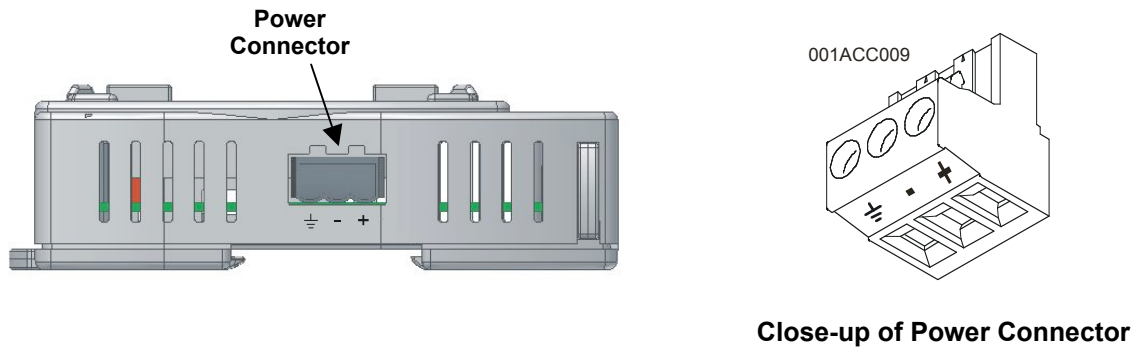


Figure 7 – FOX12 / FOX30 Power Connector

Note: Power Supply Voltage Range is from 10-30 VDC.

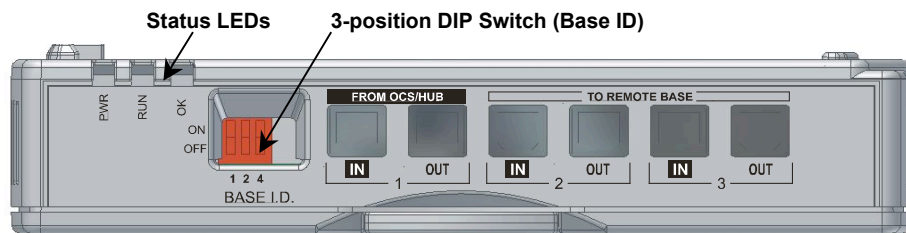


Figure 8 – Plastic Fiber Model FOX30

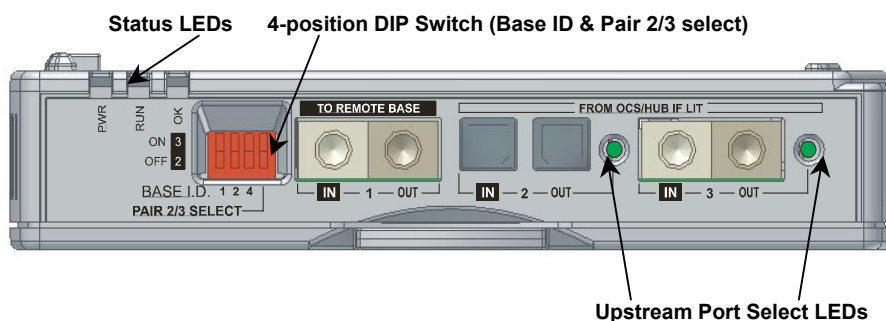


Figure 9 – Glass Fiber Model FOX12 FOX

Upstream Fiber Port - From OCS/Hub

Each FOX Base has exactly one port which connects “upstream” to the OCS either through a direct connection or through another FOX Base. In the FOX30, the upstream port is always Port 1. In the FOX12, the upstream port is selectable between Port 2 (Plastic fiber) or Port 3 (Glass fiber). The FOX12 contains a 4th dip switch position which is used to select between Port 2 and 3. An LED located next to the selected port will illuminate to provide confirmation of the switch setting.

Downstream Fiber Ports - To Remote Base

Each FOX Base has exactly two ports which may connect “downstream” to other FOX Bases. In the FOX30, Ports 2 & 3 are always downstream ports. In the FOX12, Port 1 is always a downstream port. The FOX12’s second downstream port is the port NOT selected as the upstream port, either Port 2 or Port 3.

Table 3 - Status LEDs (for FOX12 & FOX30)	
OK	ON indicates that the FOX fiber input cable is properly connected and is receiving a carrier.
PWR	ON indicates the FOX is receiving power.
RUN	<ul style="list-style-type: none"> • OFF indicates OCS is in IDLE/STOP mode or no power to the FOX or one of the fiber cables are detached or there is a configuration mismatch. • Flashing indicates DO / IO mode or RUN with no ladder program. • ON indicates ladder code running.

Table 4 - Port Select LEDs (for FOX12 only)	
2	ON indicates Plastic Fiber Port 2 is configured as the Upstream port, as selected by the Pair 2/3 Select dip switch. OFF indicates Port 2 is a Downstream port.
3	ON indicates Glass Fiber Port 3 is configured as the Upstream port, as selected by the Pair 2/3 Select dip switch. OFF indicates Port 3 is a Downstream port.

Table 5 - Fiber Optic Cables Part Numbers		
Feet (Meters)	Plastic fiber	Glass fiber
3.3 ft. (1 m)	HE800CBF001	Available commercially manufactured to a wide variety of cable lengths.
6.6 ft. (2 m)	HE800CBF002	
16.4 ft. (5 m)	HE800CBF005	
32.8 ft. (10 m)	HE800CBF010	
Field Terminated to Custom Length	not recommended	Field Termination kits commercially available

5 BASE ID SWITCHES

Each FOX needs a unique Base ID. (Refer to Figure 9 for location of Base ID Switches.) Set Base ID switches using the following table.

Table 6 – Base ID Switches (for FOX12 & FOX30) ON = 1 OFF = 0			
Base ID	Switch Label		
	4	2	1
(0) Illegal	0	0	0
1**	0	0	1
2	0	1	0
3	0	1	1
4	1	0	0
5	1	0	1
6*	1	1	0
7	Reserved		

*Only available on NX and QX with Backpack

**Illegal on NX and QX with Backpack

Table 7 – Pair 2/3 Select Switch (FOX12 only)	
Selected Upstream Pair	Switch Label
Port 2	OFF (2)
Port 3	ON (3)

The 4th switch on the FOX12 (not present on the FOX30) is used to configure which port will be connected to the OCS or “upstream” hub. With this switch in the UP position (ON), the 3rd fiber pair on the extreme right side will be the upstream port (as indicated by the LED next to the transceivers). With this switch in the DOWN position (OFF), the center pair (plastic) will be connected upstream, and the LED next to those transceivers will be illuminated.

The port that is **not** selected is configured as a downstream port.

6 EXAMPLE SETUPS

Note: The following examples depict how to connect the FOX30 and also apply to the FOX12.

The port on the FOX30 marked “FROM OCS/HUB” must always be connected either directly to an OCS controller, or to a FOX Base port marked “TO REMOTE BASE”. This is referred to as the “upstream” port on the Base.

The upstream port on the FOX12 module is configurable using dip switch #4. See section 5 for details.

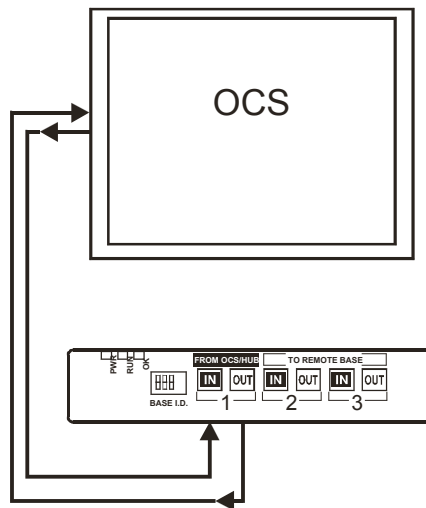


Figure 10 – Single FOX30 Connection

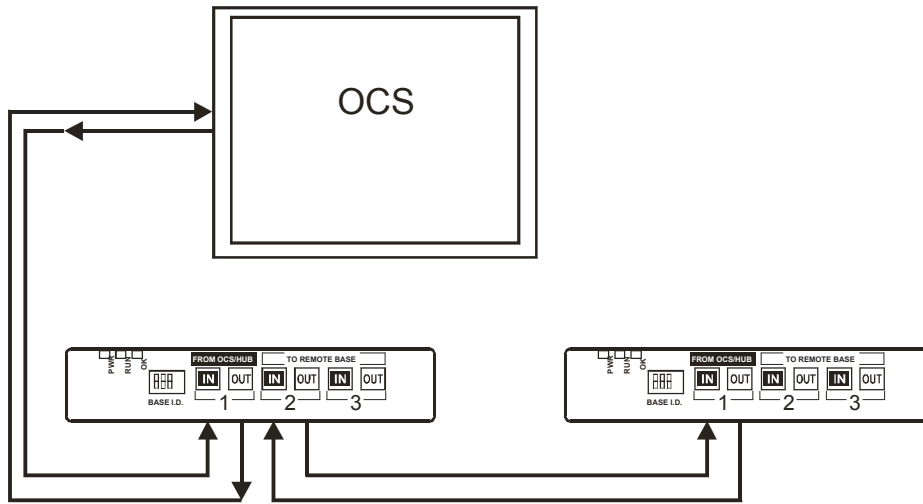


Figure 11- FOX30 Multiple Connections

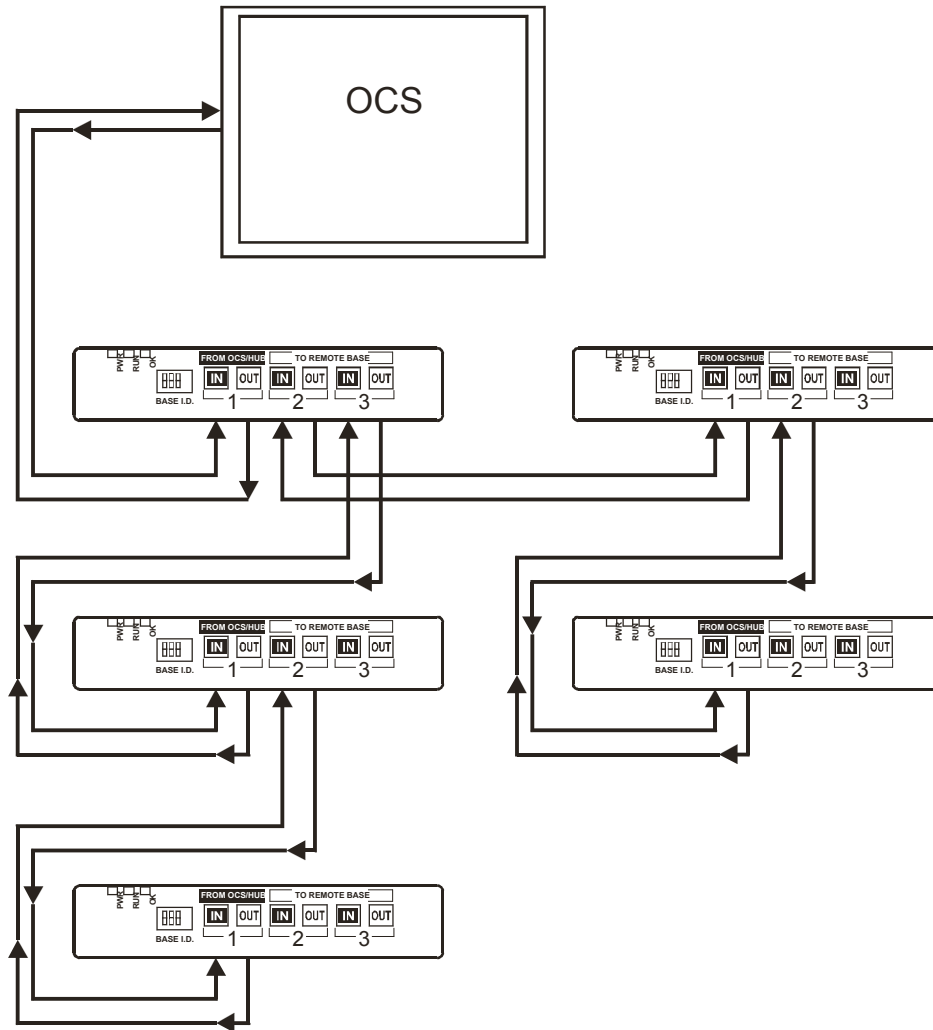
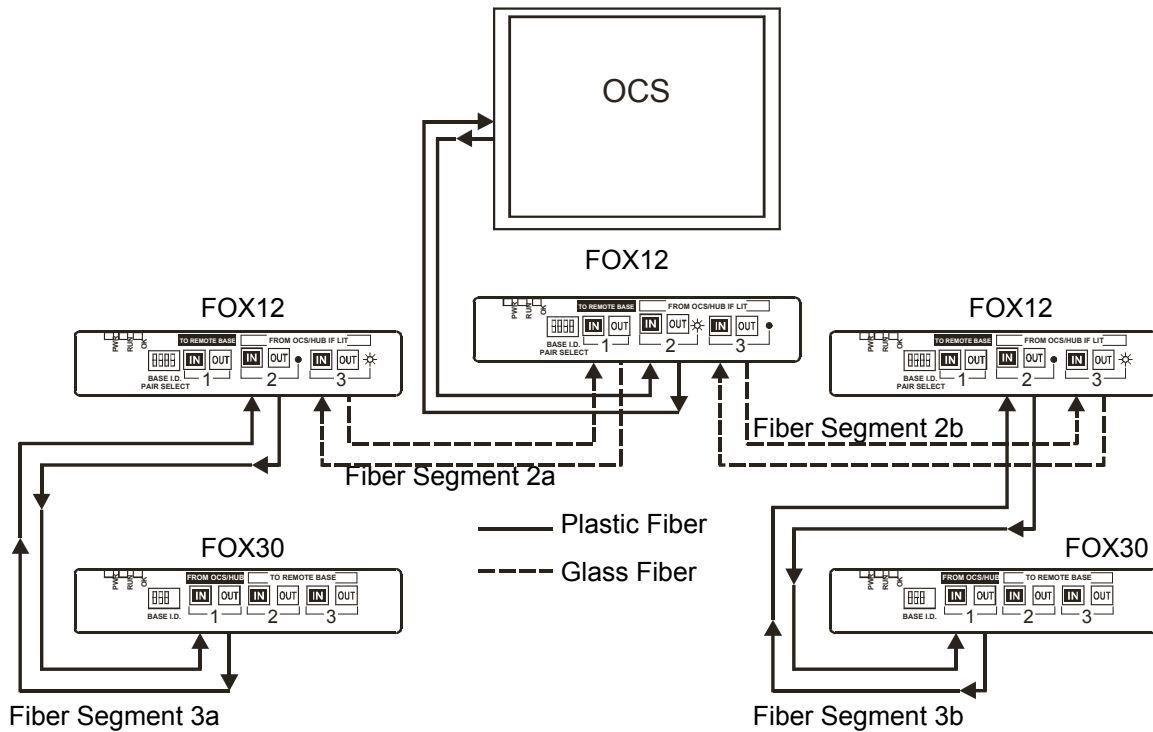


Figure 12 – FOX30 Maximum Connections



**Figure 13 – Example of How to Connect FOX12s to FOX30s
Multiple Remote Bases – Mixed Glass and Plastic**

It is important to note that all FOX Bases must be within 3 fiber segments of the OCS controller. The Bases at the bottom of the picture above illustrate this limitation.

7 SAFETY

Warning: Remove power from the unit or FOX12/FOX30 and any peripheral equipment connected to this local system before adding or replacing this or any module.

When found on the product, the following symbols specify:



Warning: Consult user documentation.



Warning: Electrical Shock Hazard.

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: 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 the controller you are using. (See the **Additional References** section in this document.)

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

- All applicable codes and standards need to be followed in the installation of this product.
- 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.

8 ADDITIONAL REFERENCES

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

Note: This list is <u>not</u> 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
QX Series (e.g., HE-QXxxx)	MAN0798
NX Series (e.g., HE-NXxxx)	MAN0781
Color Touch OCS (e.g., OCSxxx)	MAN0465
OCS (Operator Control Station) (e.g., OCS1xx / 2xx; Graphic OCS250)	MAN0227
Remote Control Station (e.g., RCS2x0)	
Other Useful References	
CAN Networks	MAN0799
Cscape Programming and Reference	MAN0313
Wiring Accessories and Spare Parts Manual	MAN0347
DeviceNet™ Implementation	SUP0326
Wiring Accessories and Spare Parts Manual	MAN0347

9 TECHNICAL SUPPORT

For assistance and manual up-dates, contact Technical Support at the following locations:

North America:

(317) 916-4274

www.heapg.com

Europe:

(+) 353-21-4321-266

www.horner-apg.com