

# Seekirk

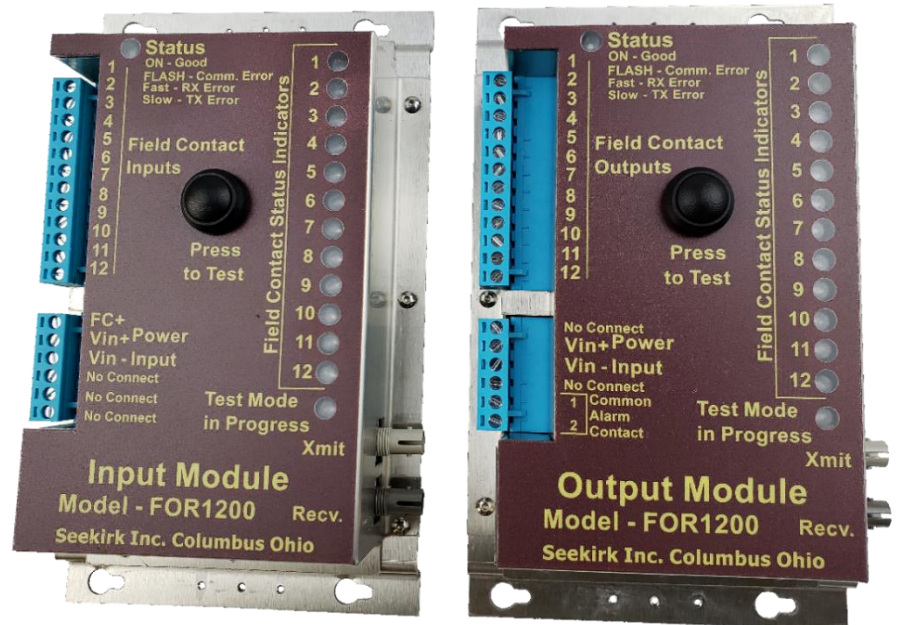
## *Model FOR1200 - A Fiber-Optic Coupled Field Contact Repeater*

### Applications:

For usage within transformers, switchgear, breakers and/or within any processing equipment or control room applications. Industries include electric generation, transmission distribution, gas, and water utilities.

### Features:

The Seekirk model FOR1200 is a field contact repeater, whereby the status of the field contacts presented at the input module's "**Field Contact Input**" is transmitted via fiber-optic cable to the output module and this status is then reflected at the corresponding "**Field Contact Outputs**" relay contacts. The use of fiber-optic cable allows a means to reduce both internal and external cabinet wiring installation cost and time. The insulating properties of the fiber-optic cable improves site safety by eliminating voltage potentials as well as providing immunity to both electrical and electromagnetic (e.g., lighting) interference.



- ▶ Easy installation and no device setup are required.
- ▶ Both of the FOR1200 modules provide a visual indication ("**Field Contact Status Indicators**" LEDs) of the current state of the field contact input status.
- ▶ Fast 10 ms (max.) response time from a change of input contact status to the detection of change of the output status contact.
- ▶ Employs Cycle Redundancy Check (CRC) and communications handshaking procedures to insure error free data transfers between the FOR1200 Input and Output modules.
- ▶ In the event a disruption to the fiber-optic connection occurs, an alarm will be indicated both by the visual status indicator ("**Status**" LED) on both modules and a change in state of the fail-safe relay of the output module. In the disruption event the visual status indicator ("**Status**" LED) will indicate which fiber-optic cable the disruption occurred.
- ▶ Device mounting is accomplished either by panel (standard) or DIN rail adapters.
- ▶ Quick connect/disconnect of field wiring utilizing Eurostyle connectors.
- ▶ "**Press to Test**" button allows for a complete functional test of both modules.

## Unpacking and Handling

Immediately upon receipt of the unit, the packing list should be examined to assure that the unit received corresponds with the system ordered as well as inspecting for any parts shortage. Examine the unit for any physical damage, paying particular attention to the following:

- 1) Examine the enclosure for any concealed damages. Painted surfaces should be free of marks and scratches.
- 2) Ensure all terminal barrier strips screws are properly secured.
- 3) Ensure all plug-in components such as relays and printed circuit boards are properly seated.
- 4) Ensure the unit is free of all restraining (i.e. tape) and loose packing material before power is applied.

If any evidence of physical damage due to improper handling by the carrier is noted, then, if possible, save both the shipping box and packing material for use in returning the unit back to the factory and then notify the carrier on how to file a claim. Seekirk Inc. should be notified as to the specific equipment and the nature and extent of damage. Include as much information as possible, such as your purchase order number, Seekirk's internal SOR number, model number, and serial number. Such information should appear on the packing list. Any claim for shortage, defects, or errors in shipment must be made in writing within **10 days of receipt**.

## Product Warranty

Seekirk, Inc. warrants that the apparatus delivered will be of kind and quality described in the order of contract. In connection with the apparatus sold, Seekirk agrees to correct any defect(s) in workmanship or material, which may develop under proper or normal use during the period of one year from the date of shipment, by repair or by replacements of the defective part(s), freight paid by customer both ways; and such correction shall constitute a fulfillment of all Seekirk liabilities in respect to said apparatus. In no event shall Seekirk be liable for consequential damages.

## Proprietary Notice

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## Technical Support

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## Electrical and Mechanical Specifications

### AC Power:

**Voltage input range-** 120 or 240 VAC.

### DC Power:

**Voltage input range-** 24, 48/125 or 250 VDC.

### Power Rating:

**Output Module Power Rating -** Max. 4.0 watts @ input voltage.

**Input Module Power Rating -** Max. 2.6 watts @ input voltage.

### Field Contact Input:

**Input voltage range-** 24 to 125VDC or 120VAC.

**Optocoupler rating-** Minimum of 2500 VAC Withstand Test Insulation.

**FC+ Protection** – 250ma@240VAC/DC Polymeric PTC Resettable Fuse <sup>[1]</sup>

### Output Module Relay Ratings:

**Max. switching voltage -** 125VDC/277VAC

**Max. switching current** – 5 amp.

**Rated current load -** 5 amp at 30 VDC/250 VAC.

**Relay type -** SPST.

**Wetted Relay Contact Protection** – 750ma@240VAC/DC Polymeric PTC Resettable Fuse <sup>[1]</sup>

### Mechanical:

#### **Mounting and Enclosures –**

Dimensions (H x W x D) – 4.40 in. x 7.52 in. x 1.79 in.  
(11.18 cm x 19.10 cm x 4.55 cm)

Enclosure – 18/22-gauge stainless steel

#### **Weight:**

Input Module – 1.23lb (0.558 kg)

Output Module – 1.29lb (0.584kg)

**DIN Rail Adapters** – Phoenix Contact USA 10 - 1201578

#### **Connections – Input/Output/Power**

Connector Type - Eurostyle Plug-in.

Rating Per Connector – 300volt/16 amp.

Wire Gauge - #12-28 AWG.

#### **Connections – Fiber-Optic Cable**

Connector Type – ST

Fiber Size - multi-mode 62.5/125µm@3.2dB/km

### Fiber-Optic Specifications:

**Maximum Link Distance** (Theoretical) – 2.5Km (1.55 Mi.)

**LED Wavelength** – 850nm

**Transmitter (LED)** – IEC 825-1 (AEL) Class 1 (Eye Safe)

**Output Power** – -16.0dBm (-40°C to +85°C)

-12.0dBm (Typ. +25°C)

**Receiver Sensitivity** – -24.0dBm (-40°C to +85°C)

-25.4dBm (Typ. +25°C)

**Optical Power Budget** – 15.0dB (Typ. +25°C)

**Baud Rate** – 115.2k

### Operating Temperature and Humidity Range:

**Standard Range:** -40°F to 185°F (-40°C to +85°C).

0-90% RH, non-condensing.

### **Note:**

- 1) The resettable polymeric fuse increases in resistance as temperature increases due to increased current flow and is designed to limit unsafe currents while allowing a constant level of safe current. The resettable polymeric fuse resistance will "reset" automatically when the overcurrent fault is removed, and the fuse's internal temperature returns to a safe level.

## Input Module Terminal Wiring Hookup Layout Information

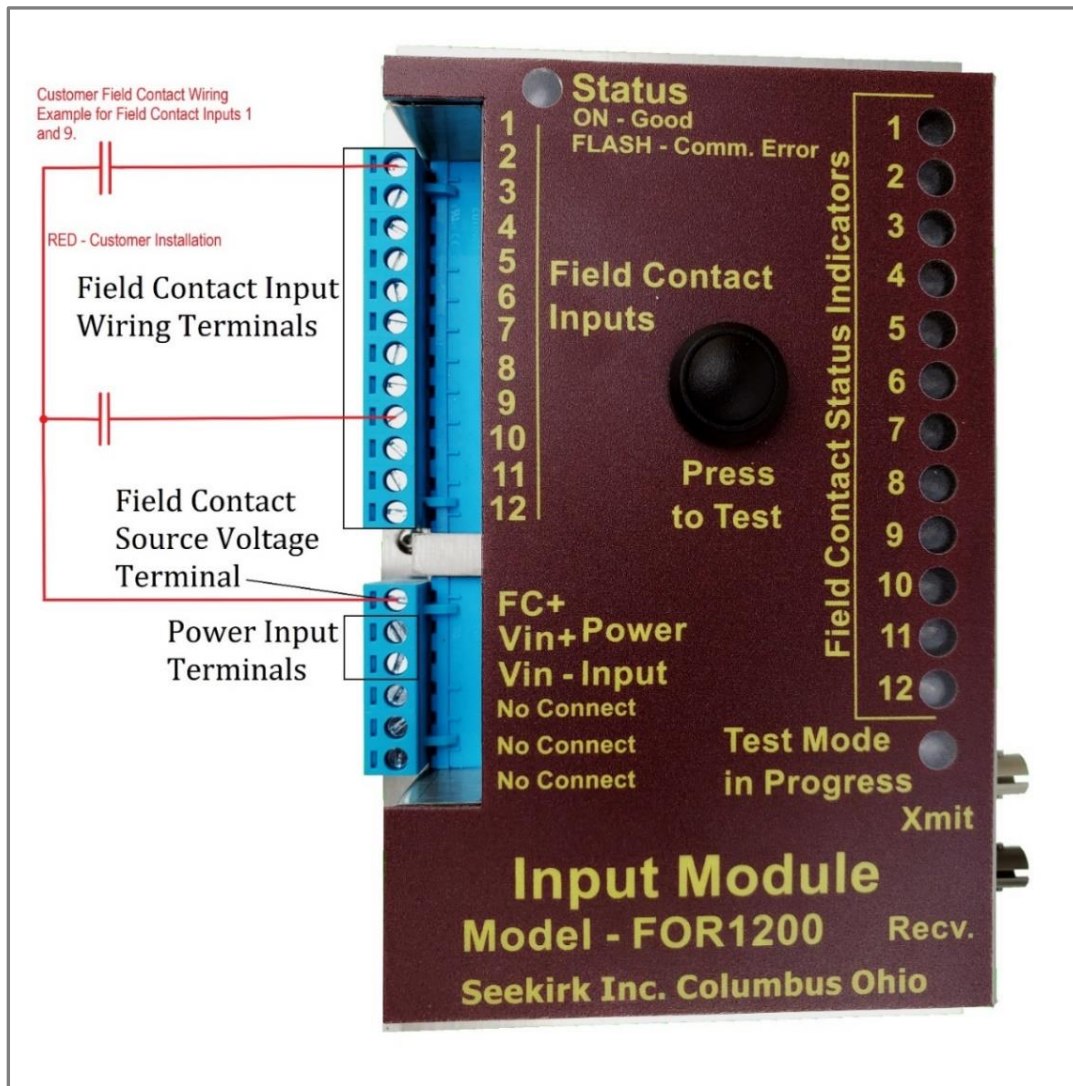


Figure 1 – Input Module

Figure 1 provides an example of the customer wiring of the field contacts to the FOR1200 Input Module. The FOR1200 provides the source voltage “FC+” for the customer’s field contact devices and is required to insure proper operation of the FOR1200 Input Module. The “FC+” incorporates an internal 250ma@240VAC/DC self-resettable overcurrent protection device to prevent any accidental overcurrent damage to the customer’s field contact device as well as the FOR1200.

The “Field Contact Status Indicators” on both FOR1200 modules will **illuminate** to the corresponding “closed” field contact input and is **not illuminated** to the corresponding “open” field contact input.

AC or DC input power for the FOR1200 Input Module is connected to the terminals labeled “Vin+” and “Vin-” of the “Power Input”.



## Output Module Terminal Wiring Hookup Layout Information

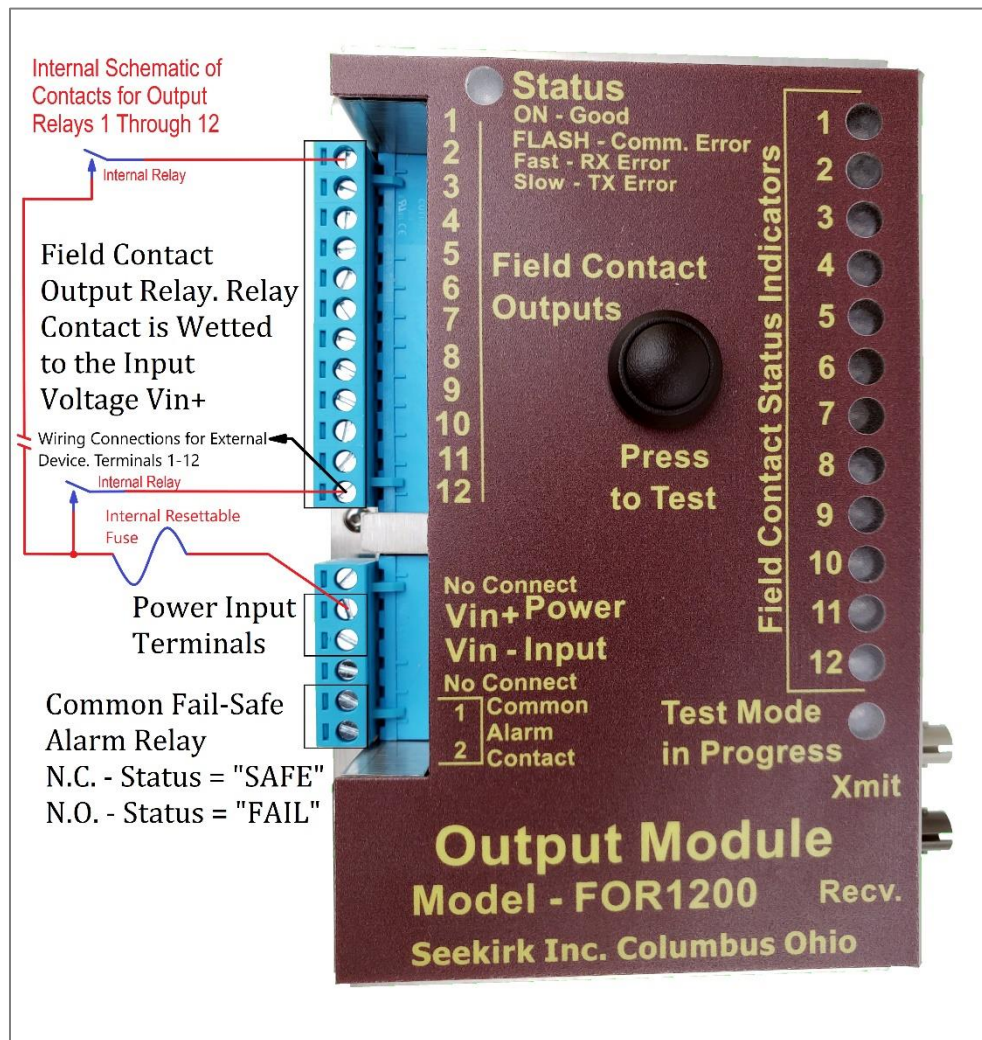


Figure 2 – Output Module

Figure 2 provides a circuit diagram of the internal wetted relay contacts for the “**Field Contact Outputs**” terminals. The wetting voltage is internally connected to the “**Power Input**” “**Vin+**” terminal and the wetted relay contacts are protected by a 750ma@240VAC/DC self-resettable overcurrent protection device.

The “**Field Contact Outputs**” terminals 1 through 12 provide connections for wiring to such external devices as SCADAs, relays, or other customer specific devices.

A “**Common Fail-Safe Alarm Relay**” is a set of dry contacts which are “**Normally Closed**” during normal operations indicating a system “**Safe**” status. In the event of a loss of power, disruptions to the fiber-optic connection or a device failure the contacts will “**open**” to indicate a system “**Fail**” status.

AC or DC input power for the FOR1200 Output Module is connected to the terminals labeled “**Vin+**” and “**Vin-**” of the “**Power Input**”.

## Fiber-Optic Cable Connection

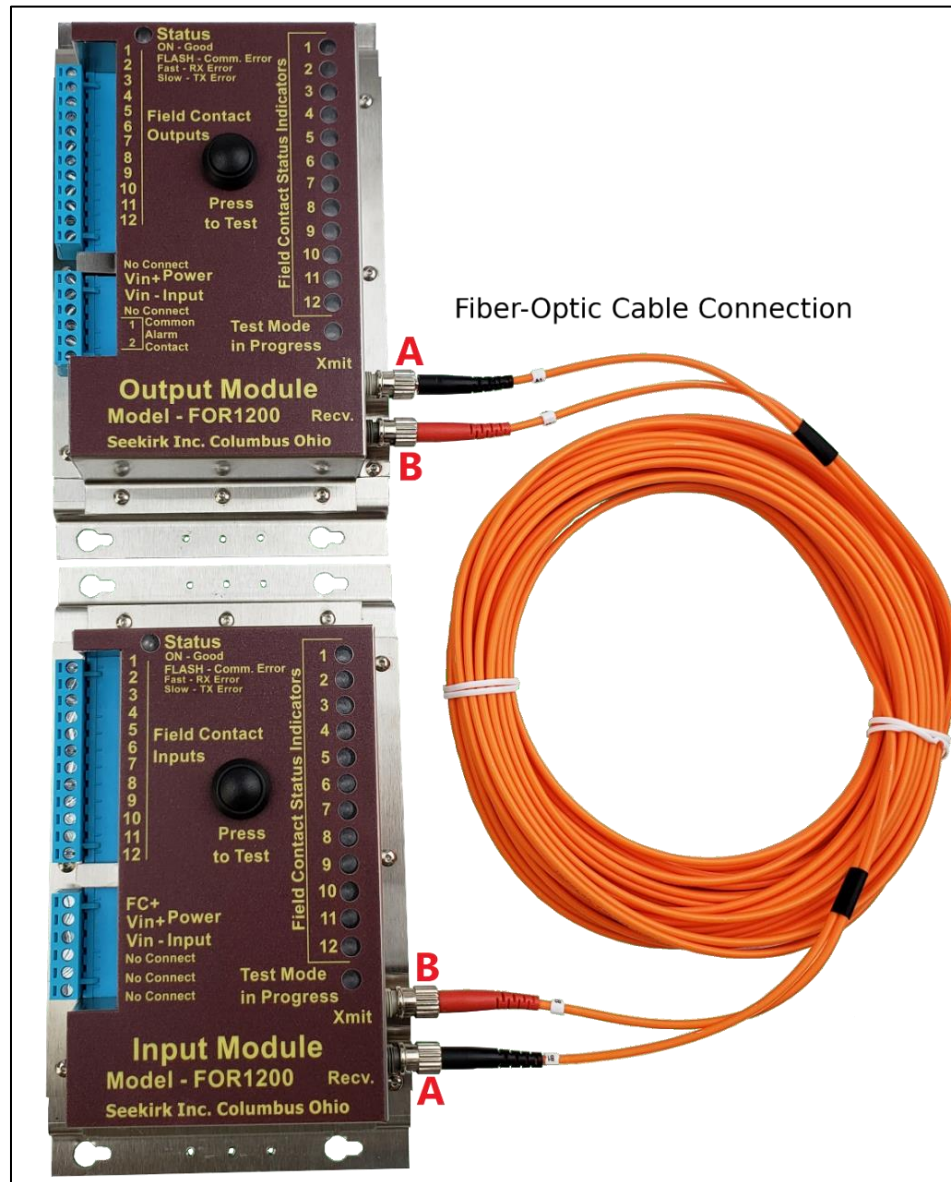


Figure 3 – Fiber-Optic Cabling

Figure 3 show the fiber-optic cabling connections between the FOR1200 Input and Output modules. From figure 3, the fiber-optic cable is connected from “A” the “Recv” port of the FOR1200 Input Module to “A” the “Xmit” port of the FOR1200 Output Module and the “Xmit” port “B” of the FOR1200 Input Module is connected to the “Recv” port “B” of the FOR1200 Output Module.

The fiber-optic cable is a **multi-mode 62.5/125µm fiber** with type “ST” connectors. The maximum length of the fiber-optic cable is 2.5Km (1.55 Miles). It should be noted that the fiber-optic length is dependent on additions of in-line splices, bends, or other system losses.

## Calculate Fiber-Optic Cable Length

**Fiber-Optic Cable Length (Km) = [(Optical Power Budget (8.0dB)) – (Link Loss (dB))] / [Max. Fiber Attenuation Coefficient/km (3.2dB/Km)]**

**Optical Power Budget = [(Min. TX Power (-16.0dBm)) – (RX Sensitivity (-24.0dBm))]**

The values used to calculate the **Optical Power Budget** are based on the values for the full temperature range of -40°C to +85°C.

**Link Loss (dB) = [Splice Loss(dB) x Number of Splices] + [Connector Loss(dB) x Number of Connectors] + [LED Aging Effect (1.5dB)] + [Safety Margin (2.0dB)]**

The **Safety Margin** sets aside 2.0dB - 3.0dB to compensate for fiber cable aging and repair work. For estimation purpose; **Splice Loss/Splice** – 0.1dB and **Connector Loss/Connector** – 0.75dB.

Helpful reference information regarding fiber-optics can be found at “**The Fiber Optics Association, Inc.**” <https://www.thefoa.org/>

## “Press to Test” Mode

Pressing the “**Press to Test**” button on either the FOR1200 Input or the Output module will initiate testing of all “**Field Contact Inputs**” opto-coupler inputs, “**Field Contact Status Indicators**” LED on both modules, “**Field Contact Output**” relays, and fiber-optic communications between modules.

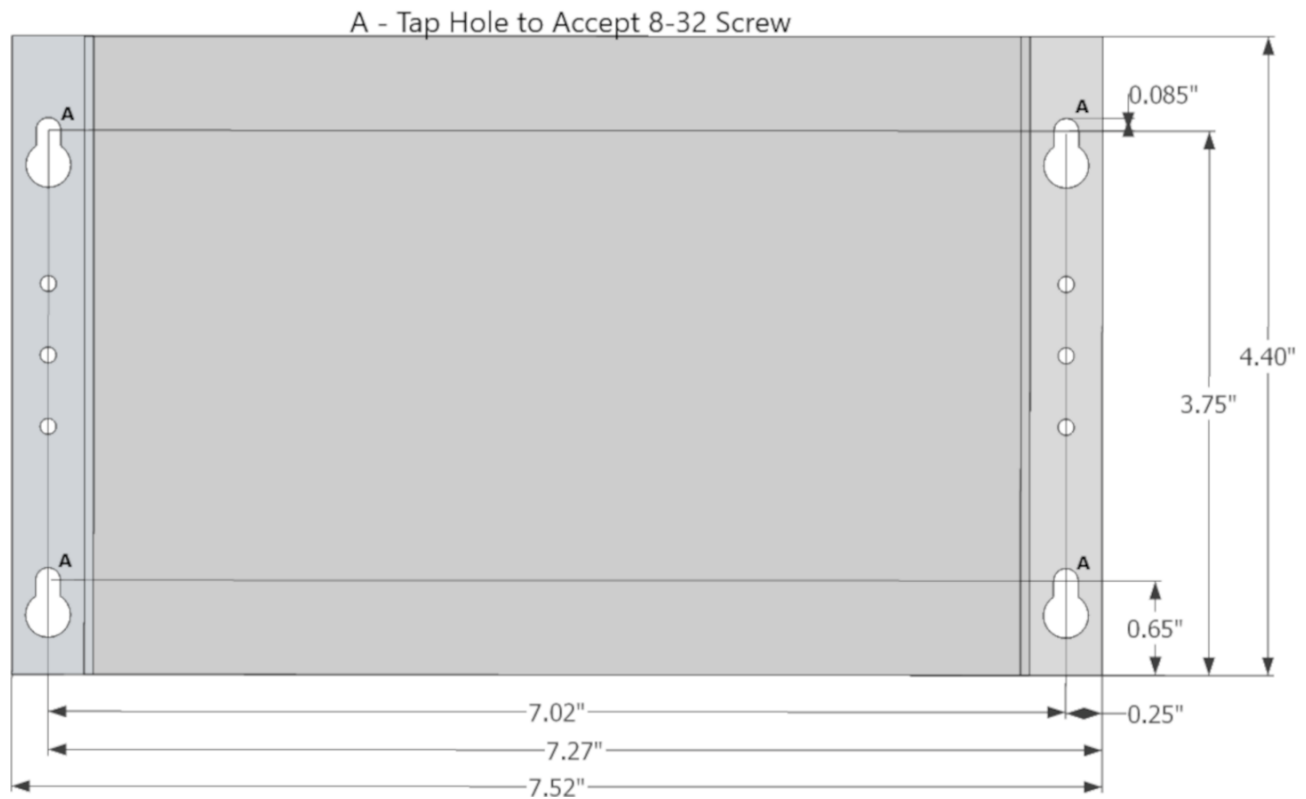
## “Status” Indicator

Both FOR1200 modules have a system “**Status**” LED indicator which reflects the current status of the fiber-optic communications, and electrical power. If the “**Status**” indicator is a steady “on” then the FOR1200 is operationally ready.

In the event of a fiber-optic cabling disruption, the “**Status**” indicator will indicate whether the disruption occurred on either the “**Xmit**” or “**Recv**” fiber-optic cable. If the “**Status**” indicator is flashing, then a disruption in the fiber-optic communication has been detected. A “**slow**” flash will indicate the disruption occurred at the “**Xmit**” cable whereas a “**fast**” flash will indicate the disruption occurred at the “**Recv**” cable. As noted in the “Output Module Terminal Wiring Hookup Layout Information” section, if a disruption in the fiber-optic communication is detected, the contacts of “**Common Fail-Safe Alarm Relay**” of the FOR1200 Output module will “open” to indicate a system “Fail” status.

For example, if the fiber-optic cable connected to the “Recv” port of the FOR1200 Output module is disrupted then the “Status” indicator will “fast” flash whereas the FOR1200 Input module the “Status” indicator will “Slow” flash which is “Xmit” port of the Input module.

## Drill Holes Locations for Panel Mounting





## Ordering and Specifying Information:

### Note:

- 1) The **Model Number** shown below always includes the “**PAIR**” of modules consisting of an **Input** and an **Output Module**. The **initial** ordering **requires** the “**PAIR**”.
- 2) If it is necessary to replace or alter either the **Input** or **Output Module** individually, then refer to the original **Model Number** or specify a completely new, alternate **Model Number** from the selections below. Please specify whether it is an **Input** or an **Output Module** for this order.

