

# Installation Instructions for the 50FY Series Hall Effect Door Interrupt System, EN954 Category III



## **⚠ WARNING**

### **IMPROPER INSTALLATION**

- This product is designed to conform to the technical requirements of EN954 Category III and ANSI B11.19-1990. To ensure compliance with these requirements, 50FY41 sensors **MUST** be used with the FYQLA1-140R-3 logic amplifier.
- Consult with local safety agency and its requirements when designing a machine control link, interface and all control elements that affect safety.
- Strictly adhere to all installation instructions.

**Failure to comply with these instructions could result in death or serious injury.**

## **GENERAL**

The 50FY Series Hall Effect Door Interrupt System is a non-contact, magnetic actuation system consisting of three devices: a sensor, a magnetic actuator and a logic amplifier.

The sensor contains two Hall Effect integrated circuits that are connected independently. Both circuits must turn on simultaneously to produce an output.

The magnet actuator has a keyed magnetic field that must match the sensor to operate correctly. When exposed to this keyed magnetic field and properly aligned, the sensor responds with an output.

The logic amplifier contains a logic input circuit card and controls a relay output. The input circuit will accept up to six sensors. When all of the connected sensors are actuated, the logic circuit will close the relay contacts. If any of the connected sensors are turned off, the logic circuit will open the relay contacts.

## **INSTALLATION INSTRUCTIONS**

**Step 1 - Mount and align 50FY sensor as follows:**

## **⚠ WARNING**

### **IMPROPER ALIGNMENT**

Ensure the alignment of the sensor and magnetic actuator face each other and are aligned for proper operation. A 10 mm (0.39 in) separation distance will cause an OFF condition, regardless of offset distance.

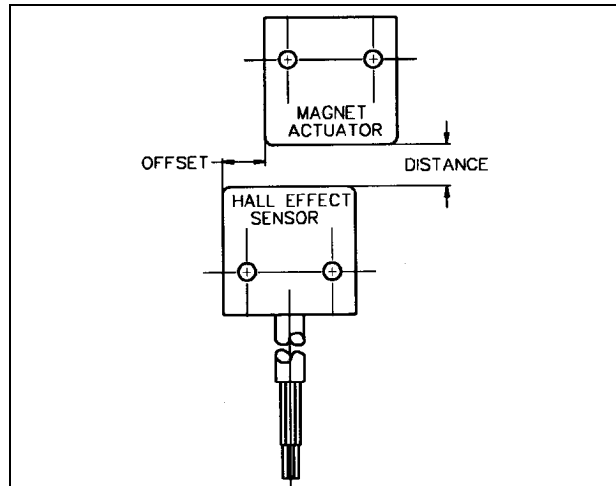
**Failure to comply with these instructions could result in death or serious injury.**

- Mount and align the sensor and magnetic actuator (see Mounting Dimensions, Nominal Sensing Distance, and Offset vs. Distance) within the allowable offset.

## **NOMINAL SENSING DISTANCE mm (in)**

<b>Offset</b>	<b>Distance</b>
Zero	2,5 (0.100)
3,8 (0.150)	1,3 (0.050)
7,5 (0.300)	Zero

## **OFFSET VS DISTANCE**



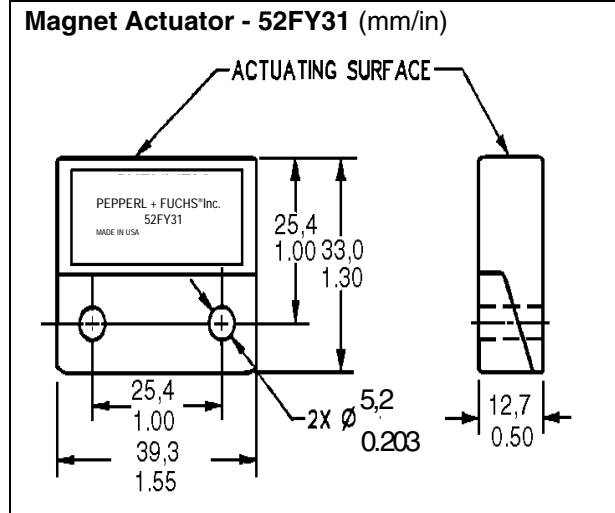
# 50FY Series

**Step 2 - Mount FYQLA1 logic amplifier as follows:**

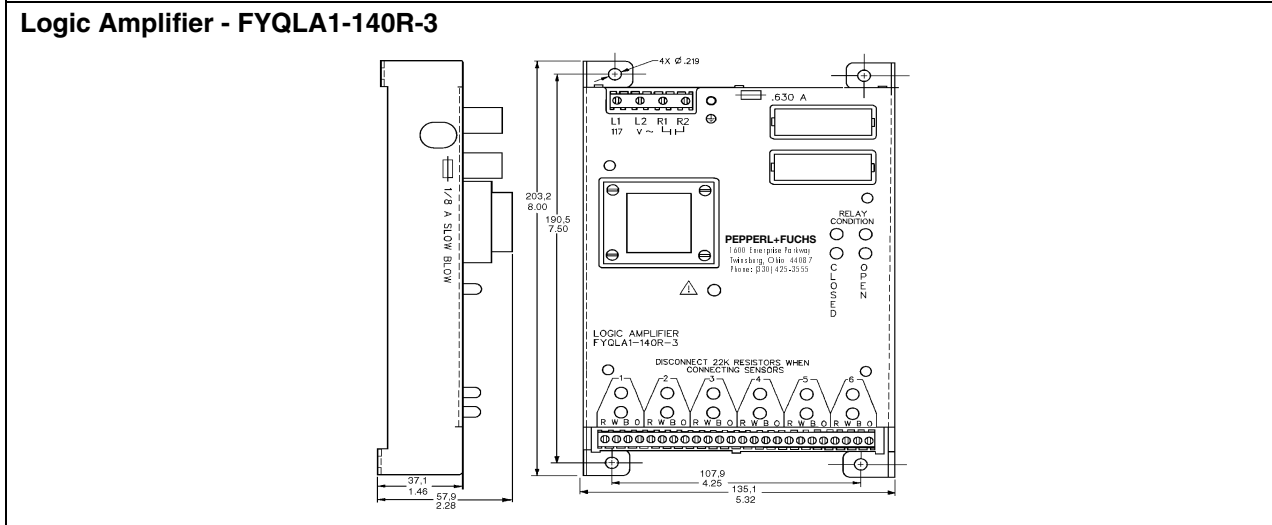
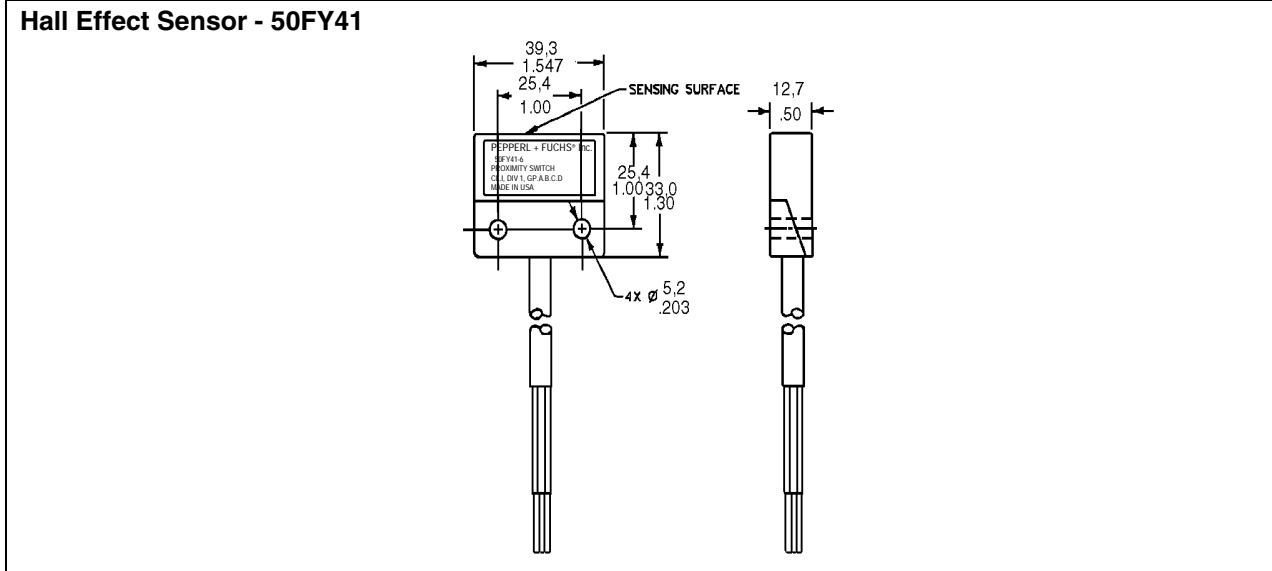
**CAUTION**  
**LOGIC AMPLIFIER DAMAGE**  
 To prevent damage to the logic amplifier, it must be installed in a NEMA sealed enclosure as specified by EN60730-2-1.  
**Failure to comply with these instructions will result in product damage.**

- Mount the amplifier (see Mounting Dimensions) in a NEMA sealed enclosure as required.

**MOUNTING DIMENSIONS - for reference only**



**MOUNTING DIMENSIONS - for reference only (mm/in)**



# 50FY Series

**Step 3 - Wire sensors to logic amplifier as follows:**

## NOTICE

- Old component versions (amplifier, FYQLA-140R-1 and sensor, 50FY40) cannot be ordered. However, for maintenance purposes, the new components (amplifier, FYQLA-140R-3 and sensor, 50FY41) may be used in an old installation (see installation warning).
- The 52FY30 magnet actuators will work with 50FY41 sensors, however, the sensing distance will increase.

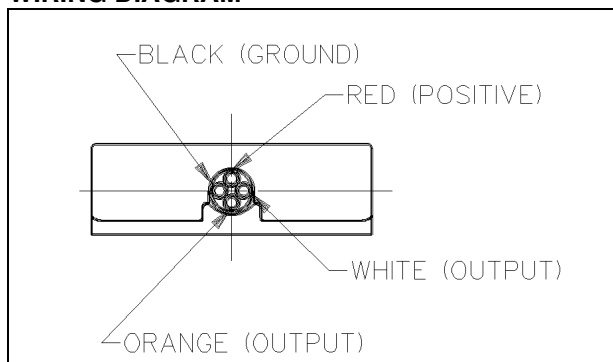
### a. 50FY41 sensor (new) with FYQLA1-140R-3 amplifier (new)

- Connect each sensor (see Wiring Diagram) via its four leads as a set to the logic amplifier as follows:

FYQLA1-140R-3 (new)	50FY41 (new)
R (positive)	RED - positive
W (normally open, sourcing)	WHITE - output
B (negative)	BLACK - ground
O (normally open, sinking)	ORANGE - output

- To secure power and sensor leads, torque connector screws 0,56 Nm (5.0 in.-lb.).

## WIRING DIAGRAM



- If less than six sensors are connected to the logic amplifier, install two 22 K  $\Omega$  resistors across each unused logic amplifier terminal set as follows:

Logic Amplifier Terminals	Resistor*
R - W	22 K $\Omega$ resistor
B - O	22 K $\Omega$ resistor

\*The resistors are necessary for the proper operation of the logic amplifier. Ten 22 K  $\Omega$  resistors are supplied with each 50FY Series system.

## **▲ WARNING**

### IMPROPER INSTALLATION

- This product is designed to conform to the technical requirements of EN954 Category III and ANSI B11.19-1990. To ensure compliance with these requirements, 50FY41 sensors **MUST** be used with the FYQLA1-140R-3 logic amplifier.
  - Strictly adhere to all installation instructions.
- Failure to comply with these instructions could result in death or serious injury.**

### b. 50FY41 sensor (new) with FYQLA1-140R-1 amplifier (old)

- Cut and remove the ORANGE sensor leadwire.
- Connect the RED, WHITE and BLACK sensor leadwires to the logic amplifier terminals as follows:

FYQLA1-140R-1 (old)	50FY41 (new)
R (positive)	RED - positive
W (normally open, sourcing)	WHITE - output
B (negative)	BLACK - ground
	ORANGE REMOVED

- To secure power and sensor leads, torque connector screws 0,56 Nm (5.0 in.-lb.).

### c. 50FY40 sensor (old) with FYQLA1-140R-3 amplifier (new)

- Connect the RED, WHITE and BLACK sensor leadwires to the logic amplifier as follows:

FYQLA1-140R-3 (new)	50FY40 (old)
R (positive)	RED - positive
W (normally open, sourcing)	WHITE - output
B (negative)	BLACK - ground
O (normally open, sinking)	NO ORANGE LEAD

- Install one 22 K  $\Omega$  resistor between the BLACK and ORANGE logic amplifier terminals.
- To secure power and sensor leads, torque connector screws 0,56 Nm (5.0 in.-lb.).

### Special instructions related to 50FY40 sensors used with FYQLA1-140R-3 amplifier

If the door is open more than one second and power to the amplifier is ON, the ATTENTION INDICATOR LED will flash. To return to a green condition, close the door(s), shut amplifier power OFF and wait until the ATTENTION INDICATOR LED is completely OFF, then turn the amplifier power ON (power on reset).

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## CAUTION

Input voltages greater than 128 VAC require a transformer to bring the L1-L2 voltage between 100 VAC and 128 VAC.

### Step 4 - Wire logic amplifier as follows:

- Connect 100 to 128 VAC to logic amplifier terminals L1 and L2.
- Connect load to logic amplifier relay contact terminals R1 and R2.

### Step 5 - Perform troubleshooting procedure as required: (see logic amplifier indicators)

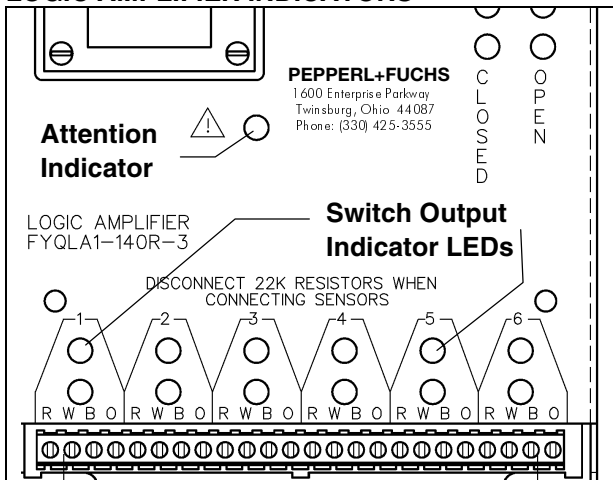
## WARNING

### IMPROPER SYSTEM PERFORMANCE

If the red ATTENTION INDICATOR LED, located on the logic amplifier is flashing, DO NOT OPERATE.

Failure to comply with these instructions could result in death or serious injury.

### LOGIC AMPLIFIER INDICATORS



1. If the 50FY Series system appears to be operational, but the red ATTENTION INDICATOR LED is flashing, do the following:
  - Ensure the sensors are wired to the logic amplifier correctly.
  - Ensure the 22 K  $\Omega$  resistors are installed in their proper locations on the logic amplifier.
  - Manually actuate sensors and ensure the corresponding red SWITCH OUTPUT LEDs above the logic amplifier terminal turn off.
  - Ensure sensors and magnet actuators are aligned and within specified sensing distance.
  - Shut amplifier power OFF and wait until the ATTENTION INDICATOR LED is completely OFF, then turn the amplifier power ON (power on reset).

- If the red ATTENTION INDICATOR LED is still flashing, disconnect the logic amplifier and call Pepperl+Fuchs (1-330-425-3555).
2. If the 50FY Series system is not operating and the red ATTENTION INDICATOR LED is not illuminated, do the following:
  - Ensure the installed fuses are rated properly and not blown (0.630A and 1/8A slow blow).
  - Ensure the sensors and logic amplifier are wired correctly.
  - Ensure the 22 K  $\Omega$  resistors are installed in their proper locations on the logic amplifier.
  - Ensure the sensors and magnet actuators are aligned and within specified sensing distance.
  - Remove and restore power (power on reset).
  - If the 50FY Series system is still OFF, disconnect the logic amplifier and return to Pepperl+Fuchs.

### Step 6 - Perform functional check as follows: (see logic amplifier indicators)

1. If the 50FY Series is operating and the red ATTENTION INDICATOR LED is not illuminated, do the following:
  - If any or all of the sensors are not actuated, observe the corresponding red SWITCH OUTPUT LEDs above the logic amplifier terminals for each sensor are illuminated. Also observe the red RELAY CONDITION OPEN LEDs are illuminated (logic amplifier contacts are open).
  - Actuate each sensor and observe the corresponding red SWITCH OUTPUT LED turns off.
  - If all twelve of the red SWITCH OUTPUT LEDs are off (all sensors are actuated), observe the red RELAY CONDITION OPEN LEDs are NOT illuminated. Also observe the green RELAY CONDITION CLOSED LEDs are illuminated (logic amplifier contacts are closed).
  - If the 50FY Series system performs as indicated above (step 3), the system is operating correctly.

# 50FY Series

## SPECIFICATIONS

### FYQLA1-140R-3 Logic Amplifier

Input voltage	100 - 128 VAC, 50-60 Hz
Power dissipation	3.0 VA max.
Temperature range	-40 to +70°C (-40 to +158°F)
Output relay	Contact rating: 5 A @ 120 VAC Action: single pole, single throw, N.O.; Positive guided safety relay; Dual relays connected in series, single output; Electrical life: 100,000 operations @ full load
*Sealing	Logic amplifier must be in a NEMA sealed enclosure.

### 50FY41 Hall Effect Sensor

Voltage	10 - 12 VDC
Load current (internally restricted)	0.50 mA max.
Current consumption	20 mA
Temperature range	-40 to +85°C (-40 to +185°F)
Sealing	NEMA 1, 3, 4, 6P, 12, 13 and **washdown test  Units are resistant to repeated washdown with caustic solution, steam cleaning, food, juices and pulp.

**\*Sealing:** Enclosures are based on the broad definitions outlined in NEMA standards. Therefore, the customer must determine that a particular enclosure is adequate when exposed to a specific condition in an application. Except as otherwise noted, all references to products relative to NEMA enclosure types are based on Pepperl+Fuchs evaluation only.

**\*\*Washdown Test:** These units are subject to a test specification for a high pressure (1200 psi), high temperature (140°F) chemical washdown. This test simulates cleaning procedures used by food and beverage processing plants which are more severe than standard NEMA 4 hosedown. A description of the washdown specification is available upon request.

## NOTICE

This product conforms to the technical requirements of EN60730-2-1 as applicable to an Electronic Incorporated (for Class I equipment) sensing control with Type 2 and 2B action for continuous operation in normal pollution standards.

# 50FY Series

## SALES AND SERVICE

For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact a nearby sales office or call:

### TELEPHONE

+ (33) 60 92 13 13 France  
+ (49) 6 21 8 10 09-0 Germany  
+ (44) (0) 161 6 33 64 31 England  
+ (65) 7 79 90 91 Singapore  
1-330-425-3555 USA

### FAX

+ (33) 60 92 13 25 France  
+ (49) 6 21 8 10 09-99 Germany  
+ (65) 8 73 16 37 Singapore  
1-330-405-4710 USA

### INTERNET

<http://www.am.pepperl-fuchs.com>  
[info@us.pepperl-fuchs.com](mailto:info@us.pepperl-fuchs.com)

## ORDER GUIDE

Catalog Listing	Description
50FY41-6	Sensor, 2 meters (6 ft) leadwires, normally open (NO)
50FY41-12	Sensor, 4 meters (12 ft) leadwires
50FY41-50	Sensor, 15 meters (50 ft) leadwires
52FY31	Magnet actuator
FYQLA1-140R-3	Logic amplifier, one to six sensor interface



**USA Headquarters**  
**Pepperl+Fuchs, Inc.**  
1600 Enterprise Parkway  
Twinsburg, OH 44087

**World Headquarters**  
**Pepperl+Fuchs - Germany**  
Konigsberger Allee 87  
68307 Mannheim GERMANY

**Asia-Pacific Headquarters**  
**Pepperl+Fuchs – Singapore**  
P+F Building  
18 Ayer Rajah Crescent  
Singapore 139942