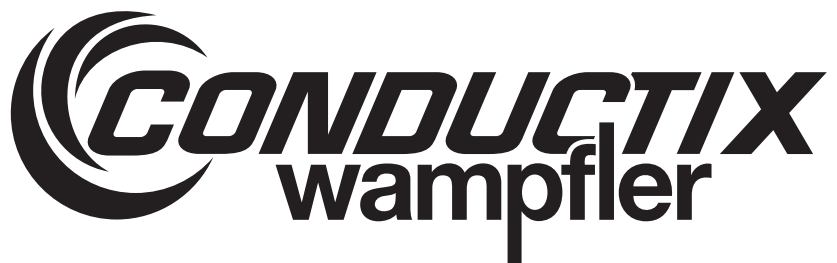
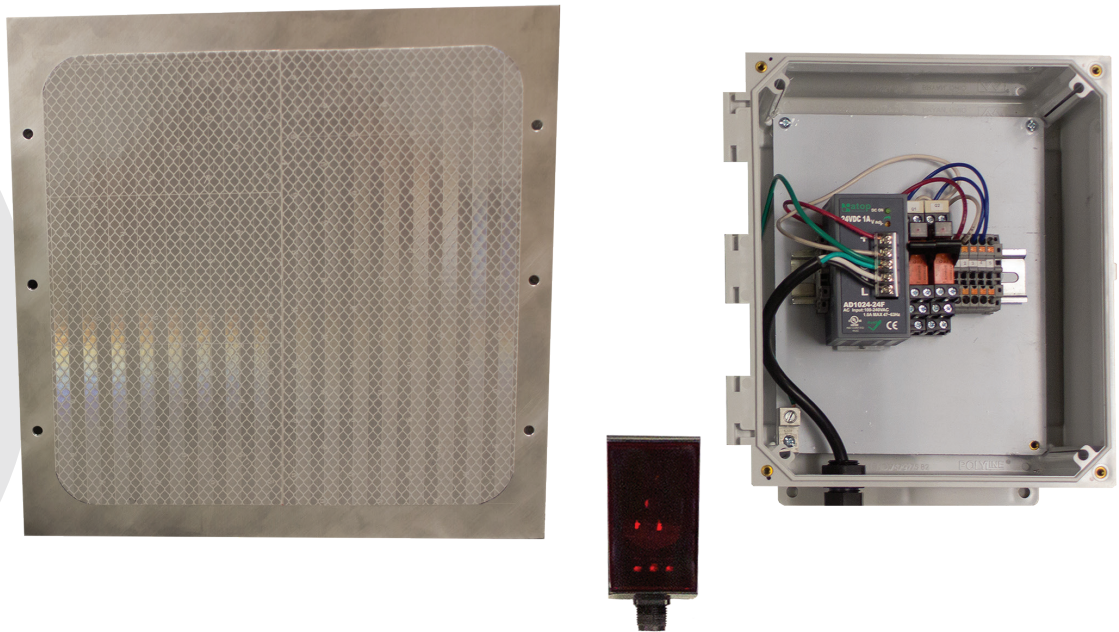


BridgeGuard Plus™

Installation, Operation & Maintenance Manual



CONDUCTIX INCORPORATED

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SECTION 1 - SAFETY

1.0 Safety Information Responsibility

- 1.0.1 All owner, operator, and maintenance personnel must read and understand all manuals associated with this product before installation, operation, or maintenance.
- 1.0.2 The manual provides information on the recommended installation, operation, and maintenance of this product. Failure to read and follow the information provided could cause harm to yourself or others and/or cause product damage. No one should install, operate, or attempt maintenance of this product prior to familiarizing themselves with the information in this manual.

1.1 Safety Messages

The following safety messages are used in this manual to alert you to specific and important safety related information.

CAUTION

CAUTION indicates unsafe actions or situations that have the potential to cause injury, and/or minor equipment or property damage.

DANGER

DANGER indicates hazards that have the potential to cause severe personal injury or death.

WARNING

WARNING indicates unsafe actions or situations that have the potential to cause severe injury, death, and/or major equipment or property damage.

NOTE

NOTE is used to alert you to installation, operation, programming, or maintenance information that is important, but not hazard related.

1.2 Limitation of Liability

- 1.2.1 All data and information in this mounting instructions have been compiled in compliance with the applicable standards and regulations, best practice and our many years of experience and knowledge.
- 1.2.2 The manufacturer accepts no liability for damages resulting from:
- Failure to comply with this document
 - Improper use
 - Use by untrained personnel
 - Unauthorized modifications
 - Technical changes
 - Use of unauthorized replacement parts and accessories
 - The actual scope of delivery may differ from the explanations and descriptions provided here if the model in question is a special one, if additional equipped has been ordered or due to recent technical changes.
- 1.2.3 The obligations agreed upon in the delivery agreement and our General Terms and Conditions of business apply, as do the delivery conditions of the manufacturer and the legal regulations applicable at the time the contract was concluded.
- 1.2.4 All products are subject to technical modifications in the context of improvement of function and further development.

SECTION 1 - SAFETY

1.3. Personnel Requirements-Qualifications

WARNING

Inadequately trained persons are at risk of injury!

Improper use can result in serious personal injury or material damage. All activities must only be performed by qualified personnel.

1.3.1 Only persons who can be expected to perform their work reliably are acceptable personnel. People whose reactions are impaired by drugs, alcohol or medications, for example, are not authorized.

1.3.2 When selecting personnel, follow all age- and occupation-specific guidelines applicable at the location of use.

1.3.3 The following qualifications are specified in the operating instructions for certain fields of activity.

1.3.4 Trained personnel and operators

- Will have participated in a training session, given by the owner, on the tasks assigned to them and the potential hazards in case of improper conduct.
- The owner of the machine or system must document that the appropriate training has taken place.

1.3.5 Specialist personnel

- Will consist of persons capable of performing assigned tasks and independently identifying and avoiding potential hazards based on their specialist training, knowledge and experience as well as their knowledge of the applicable regulations. Persons are deemed to be technically qualified if they have successfully completed training as a master electrician, apprentice electrician, electrical engineer or electrical technician. Persons are also considered technically qualified if they have been employed in an appropriate capacity for several years, receiving theoretical and practical training in that line, and their knowledge and skills have been tested by a specialist in the appropriate field of training.
- The machine or system owner must document that the appropriate certificates or other proofs of qualification have been or are being provided.

1.4 Personnel Requirements-Unauthorized Personnel

WARNING

Danger due to unauthorized personnel!

Unauthorized persons who do not meet the requirements described here are not acquainted with the dangers in the working area. Keep unauthorized personnel away from the working area. In case of doubt, address the person and direct them away from the working area. Stop working, as long as unauthorized persons are in the working area.

SECTION 1 - SAFETY

1.5 Personnel Requirements-Training

1.5.1 Before commissioning the equipment, personnel must be trained by the owner. Log the implementation of training for better traceability.

Example of a training log:

Date	Name	Training Type	Training Instructor	Signature
11/5/2019	John Doe	First safety training for personnel	Dave Miller	

1.6 Personal Protective Equipment

1.6.1 For every task, always use:

Safety helmet: For protection against falling or flying parts and materials.

Protective gloves: For the protection of hands against friction, scrapes, puncture or deeper wounds, as well as against contact with hot surfaces.

Protective work clothing: Primarily for protection against entrapment by moving machine parts. Work clothing must be close fitting with a low resistance to tearing; it must have close-fitting sleeves and no protruding parts.

Protective footwear: For protection against heavy falling parts and slipping on slippery floors.

For special tasks, specific protective equipment is required when executing particular tasks:

Safety eye wear: For eye protection against harmful influences such as strong light, chemicals, dust, splinters or weather effects.

Hearing protection: For protection against loud noises and to prevent acoustic trauma.

Breathing mask (FFP-3 - according to country-specific requirements): For protection against materials, particles, and organisms. In this case, for protection against the dust produced by the abrasion of carbon brushes and the PVC insulation of the conductor rail.

SECTION 2 - PRODUCT DISPOSAL

2.0 Product Disposal and Recycling

2.0.1 Once the product has reached its end of life it must be disassembled and disposed of in accordance with local and regional environmental requirements.

2.0.2 In the absence of a return and disposal agreement, disassembled components must be recycled as follows:

- All metallic parts must be sorted and recycled by material type
- All plastic components must be sorted and recycled by material type
- All other components are to be disposed of in accordance with their material composition. Take care with items identified as Substances of Concern.

2.0.3 Local authorities or special disposal companies can provide information about environmentally appropriate disposal.

SECTION 3 - OVERVIEW

3.0 General Product Overview

3.0.1 BridgeGuard Plus prevents crane to crane or crane to structure collision during operation, either from human error or from system malfunction.

3.1 Specifications

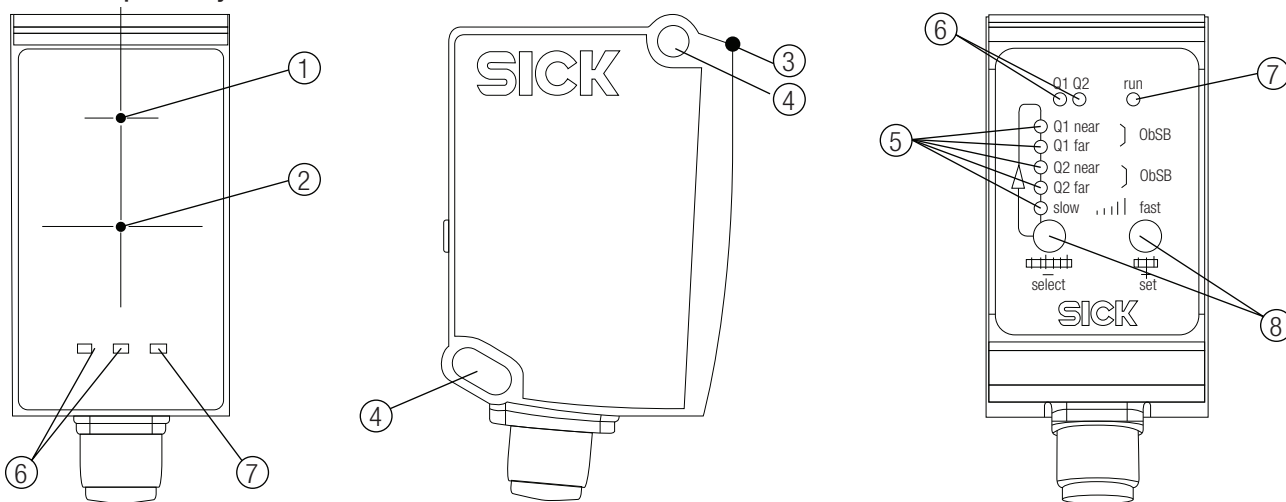
- 3-115 foot range
- High Definition Distance Measurement Technology
- Precise time-of-flight measurement
- Visible Laser Red Light
- IP 67 rated for indoor and outdoor use
- 100-240 V AC voltage supply
- Switching Output: Relay
- Relay output max voltage: 240 V AC
- Rated Max Current: 6 A
- Laser Class 1
- Compliant with IEC 60068-2-6:2007
- Each system includes sensor equipped with bracket and 32 ft of cable, and a 12" x 12" reflector
- Optional control panel enclosure for mounting outside and existing control panel.

SECTION 3 - OVERVIEW

3.2 Structure

CAUTION

- The original equipment manufacturer must assure that the system is properly configured. Safety is ultimately the responsibility of the user.



3.2.1 Overall features of BridgeGuard Plus can be seen below. See **Figure 3-1**.

- Figure 3-1**
- | | |
|---------------------------|--------------------------|
| 1. Optical Axis, Sender | 5. LEDs, Teach-In |
| 2. Optical Axis, Receiver | 6. LEDs, Status Q1/Q2 |
| 3. Zero Level | 7. LED, Status Indicator |
| 4. Mounting Hole M4 | 8. Control Elements |

3.3 Status Indicator Lights

3.3.1 The sensor box for BridgeGuard Plus features status indicator LEDs that provide information on the supply voltage activity, signal strength, and output activity. See **Table 3-1**.

Status	Color	Description
Indicator LED 1	Green	Operating voltage indicator
Indicator LED 1	Yellow	Switching output indicator
Indicator LED 2	Yellow	Switching output indicator

Table 3-1

SECTION 3 - OVERVIEW

3.4 Function

3.4.1 Q1 and Q2 are used as switching outputs, the following modes are available.

- Window (Wnd)
- Object between Sensor and Background (ObSB)

3.4.2 To Unlock Sensor

1. Push and hold the Select button for 3-4 seconds to enter TEACH MODE. The top LED (Q1 NEAR) will light up.
2. Press the Select button. This will cycle through the Q1 and Q2 relays.
3. To set up the sensor speed cycle to SLOW. There are 5 speeds, and the LED will blink 1-5 times according to the selected speed. Push the SET button until the proper speed setting is achieved.
4. To close out of the sensors function, press and hold SELECT for 5 seconds. Also, not operating the sensor for 5 minutes will lock in functions.

3.4.4 Object between Sensor and Background (ObSB) program

1. Remove all objects between the sensor and the background.
2. Push and hold SELECT button for 3-4 seconds to enter TEACH MODE. The top LED (Q1 NEAR) will light up.
3. Push the SELECT button two more times so the Q1 NEAR and Q1 FAR LEDs are both lit.
4. Push the SET button. The Q1 and Q2 LEDs will flash twice, then the Q2 LED stays lit. This means the background is set. When an object is placed in the path of the sensor, the relay goes from a "0" state (inactive, red light) to a "1" state (active, green light). When the object is removed from the path of the sensor, relay goes from a "1" state (active, green light) to a "0" (inactive, red light).
5. To close out of the sensors function, press and hold SELECT for 5 seconds. Also, not operating the sensor for 5 minutes will lock in functions.

3.4.3 Window (Wnd) program

1. Push and hold SELECT button for 3-4 seconds to enter TEACH MODE. The top LED (Q1 NEAR) will light up.
2. Place the object and the minimum detection distance to the sensor. Press SET and the distance between the object and the sensor is saved as a switch point. The LEDs for Q1 and Q2 will flash in sync twice. When the minimum detection distance is reached, the relay goes from a "1" state (active, green light) to a "0" state (inactive, red light) to a "1" state (active, green light) and triggers the SLOW feature.
3. Push the SELECT button to switch to Q2 FAR. Place the object at the maximum detection distance to the sensor. Press SET and distance between the object and the sensor is saved as a switch point. The LEDs for Q1 and Q2 will flash twice. When the maximum detection distance is reached, the relay goes from a "0" state (inactive, red light) to a "1" state (active, green light) and triggers the SLOW feature.
4. To close out of the sensor's function, press and hold SELECT for 5 seconds. Also, not operating the sensor for 5 minutes will lock-in functions.

SECTION 4 - INSTALLATION

4.0. Reflector Mounting

NOTE:

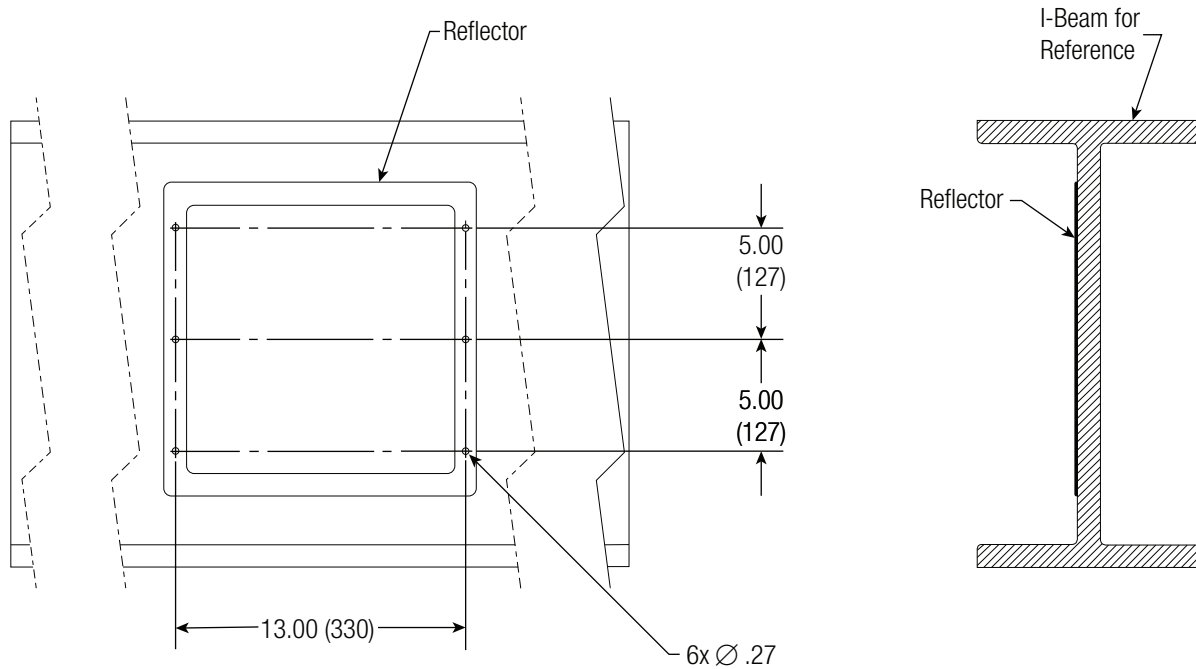
- Reflector plate come with 6 pre-drilled holes for mounting See **Figure 4-1**
- A minimum of 4 fasteners should be used to mount reflector to I-Beam web

4.0.1 Mount reflector to the I-Beam using appropriate hardware. See **Figure 4-1**

NOTE:

- A spacer must be used between the I-Beam's web and the reflector back plates.
- A lock washer must be used to prevent loosening.
- The plate can be mounted to other surfaces using the same holes, the beam is only an example.

Figure 4-1



SECTION 4 - INSTALLATION

4.1 Sensor Mounting

1. Mount sensor in desired location and make adjustments appropriate to your specific assembly. See Figure 7-2.

WARNING

- Maximum sensor trigger distance should be no more than 115 feet.

NOTE:

- The sensor can be mounted to the flange of the beam or other alternative surfaces.

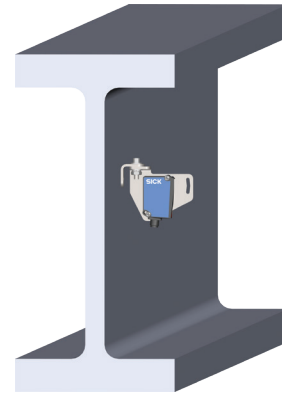


Figure 4-2

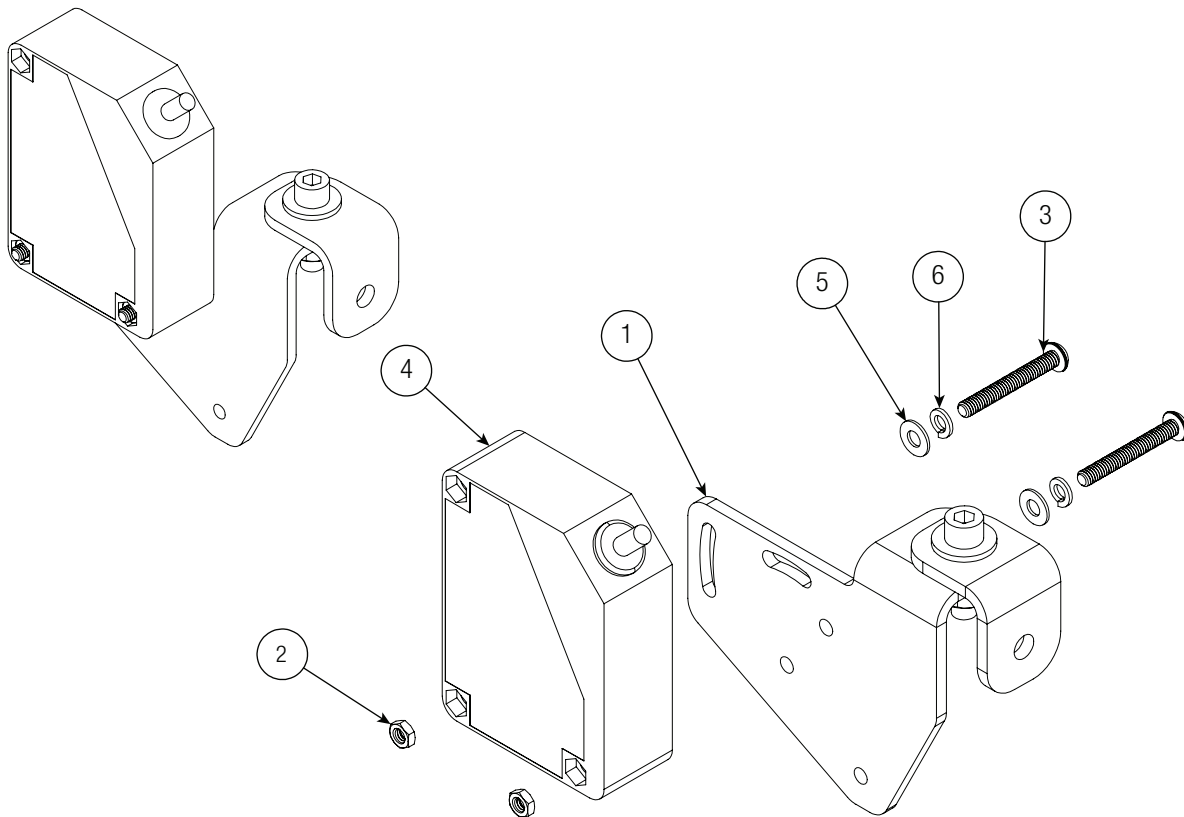


Figure 4-3

Number	Description	Quantity
6	Washer 8 Screw LK SST	2
5	Washer 8 Flat SST	2
4	Sensor	1
3	Screw 8-32 x 1-1/4 SST PHP	2
2	Nut Hex 8-32 Narrow SST	2
1	Bracket Assembly	1

SECTION 4 - INSTALLATION

4.2 Sensor Targeting

4.2.1 Included below is a general sensor target installation, your specific installation may vary. See **Figure 4-4**

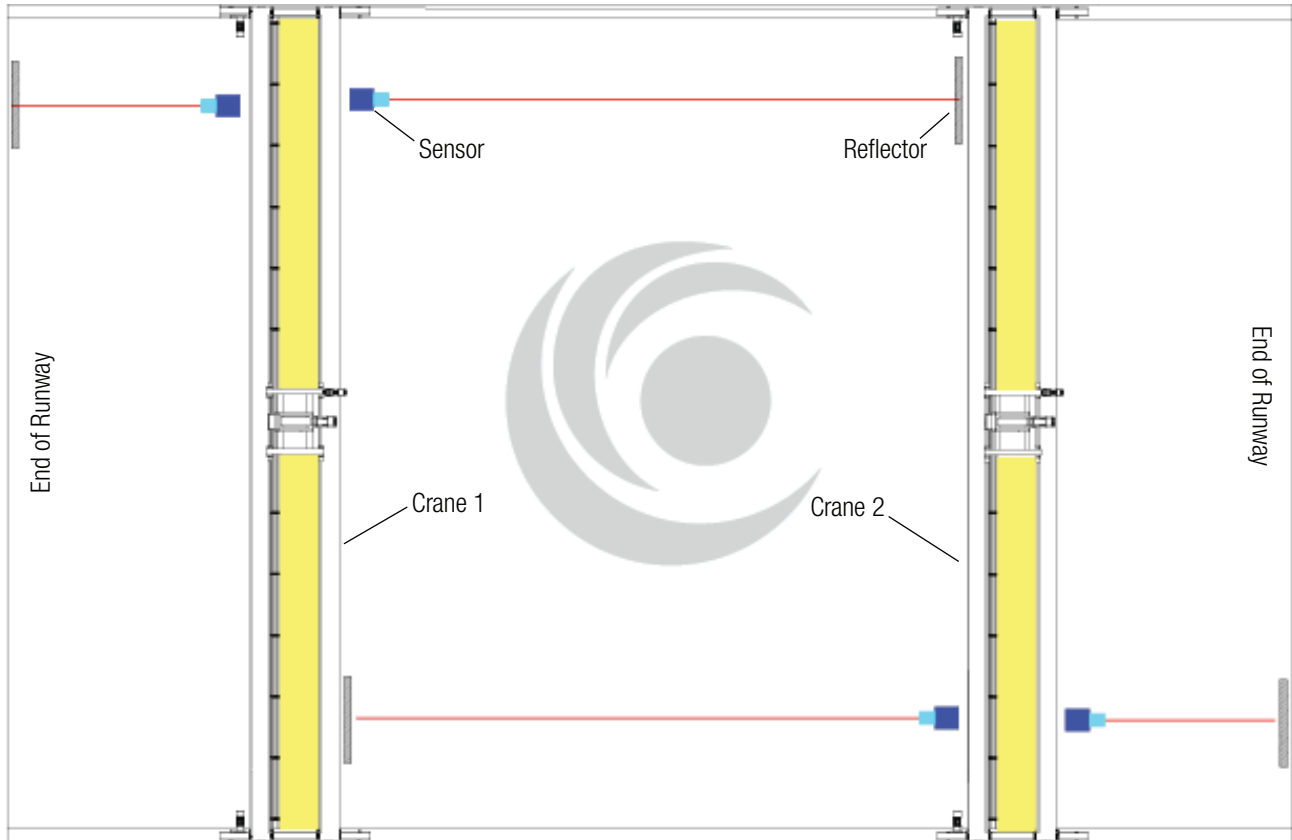


Figure 4-4

SECTION 4 - INSTALLATION

4.3 Controller

4.3.1 Below is the controller wiring diagram for reference if experiencing issues. See **Figure 4-5**

NOTE:

- All dashed lines represent wiring that is field installed.

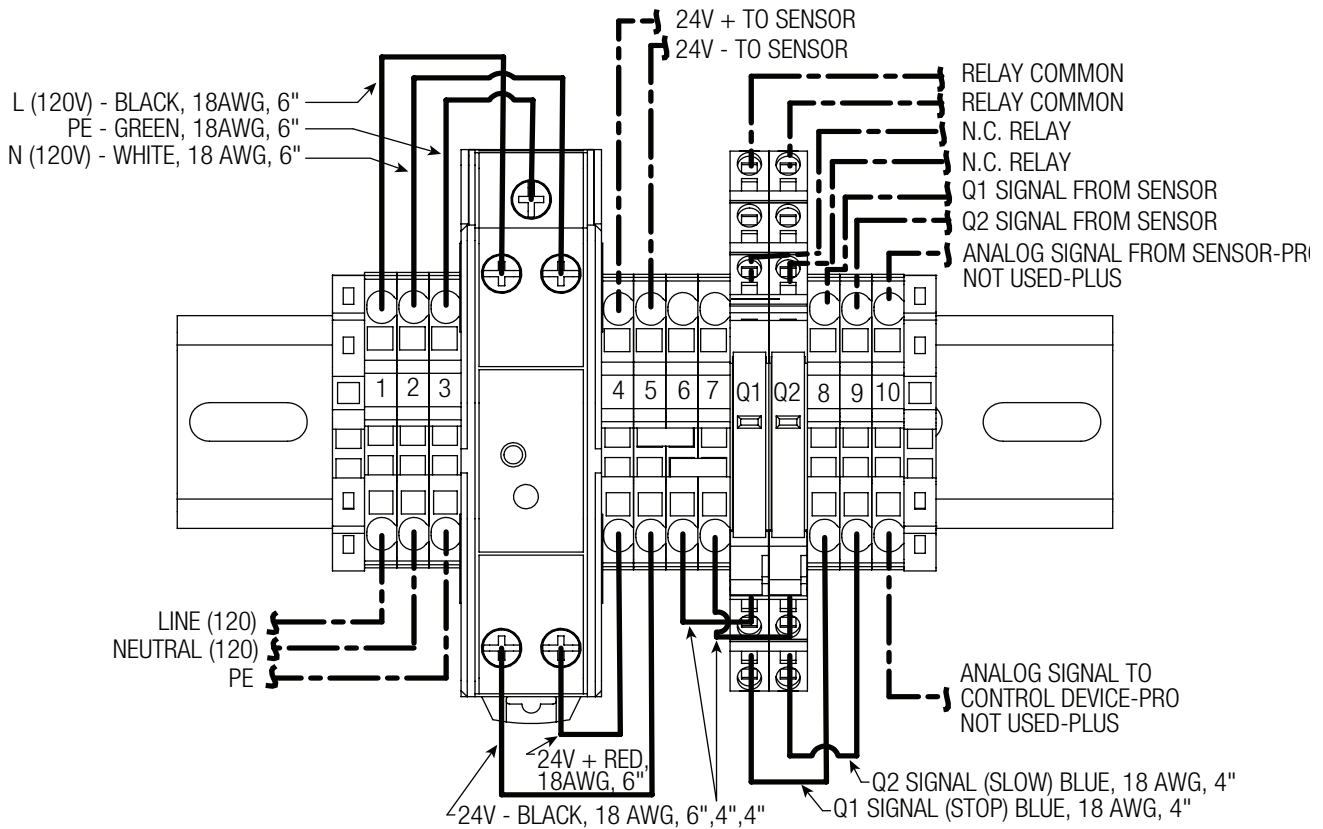


Figure 4-5

4.4 Electrical Installation

4.4.1 Sensor Cable Wiring

4.4.1.1 Use the Sensor Cable Wiring Table for sensor cable installation. See **Table 4-1**.

Terminal	Wire Color	Description
4	Brown	+24VDC
5-7	Blue	-24VDC
8	Black	Q1 PNP Out
9	White	Q2 PNP Out
10	Gray	Teach Input

Table 4-1

SECTION 4 - INSTALLATION

4.5 Sensor Calibration

4.5.1 STOP and SLOWDOWN Distance Detection Settings

4.5.1.1 Make sure that the sensor and the reflector are properly mounted and make sure the visible laser light can be seen on the reflector before setting range detection.

4.5.1.2 Setting the range detection distances will require movement of the crane to the desired STOP and SLOWDOWN distances.

4.5.2 Setting up STOP distance detection

1. With the sensor mounted to the crane, move crane to the STOP distance point.
2. Press and hold (it will take approximately 5 seconds) the “SELECT” pushbutton until “Q1 Near” LED turns ON.
3. Press “SET” pushbutton; “Q1” and “Q2” LEDs should flash twice simultaneously indicating that the setup was successful. If “Q1” and “Q2” LED’s do NOT flash, repeat this step.
4. Press and hold “SELECT” pushbutton for at least 6 seconds to exit setting up STOP distance setup mode. “Q1” and “RUN” LEDs should stay on with the crane at the STOP distance.

4.5.3 Setting up SLOWDOWN distance detection

1. With the sensor mounted to the crane, move crane to the SLOWDOWN distance point.
2. Press and hold (it will take approximately 5 seconds) the “SELECT” pushbutton until “Q1 Near” LED turns ON.
3. Press select until “Q2 Near” LED light turns ON (Hint: press “SELECT” 3 times).
4. Press “SET” pushbutton “Q1” and “Q2” LEDs should flash twice simultaneously indicating that the setup was successful. If “Q1” and “Q2” LED’s do NOT flash, repeat this step.
5. Press and hold the “SELECT” pushbutton for at least 6 seconds to exit setting up SLOWDOWN distance setup mode. “Q2” and “RUN” LEDs should stay on with the crane at the SLOWDOWN distance.
6. Move the crane back and forth a couple of times to verify relays are triggering at the correct distances.

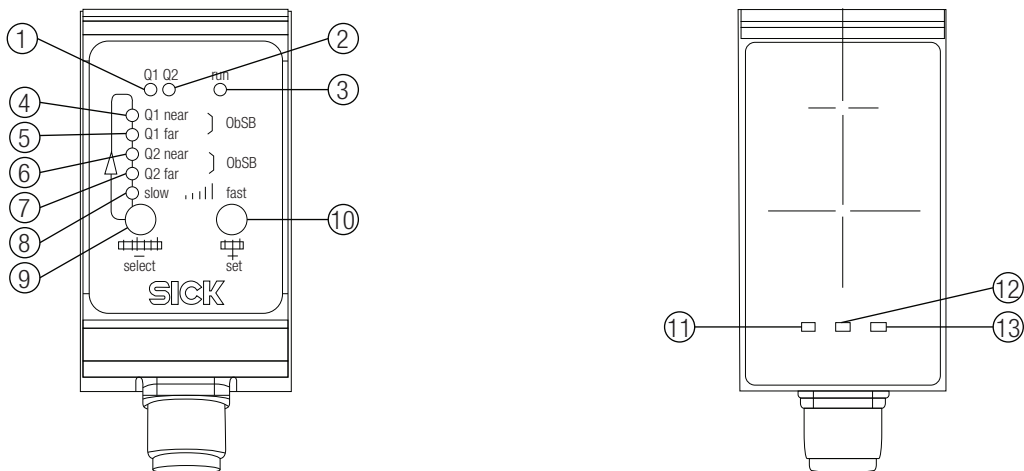


Figure 4-6

- | | | |
|----------------------------|----------------------------|--------------------------------------|
| 1. Q1 Indicator Light | 6. Q2 near Indicator Light | 11. Q1 Indicator Light |
| 2. Q2 Indicator Light | 7. Q2 far Indicator Light | 12. Q2 Indicator Light |
| 3. Run Indicator Light | 8. Slow Indicator Light | 13. Run light/Status Indicator Light |
| 4. Q1 near Indicator Light | 9. Select Push Button | |
| 5. Q1 far Indicator Light | 10. Set Push Button | |

SECTION 5 - MAINTENANCE

5.0 Mechanical Maintenance

5.0.1 Reflector

- Ensure the reflector is clean and clear of dirt and debris at all times.

5.0.2 Sensor

- Ensure the sensor is clean and clear of dirt and debris at all times.
- Ensure sensor target path is clear of obstructions.

5.1 Electrical Maintenance

WARNING

- **Equipment damage due to improper cleaning!**
- **Never use cleaning agents containing aggressive substance**
- **Never use pointed objects for cleaning**

Interval	Maintenance Work	To be Performed by
Cleaning interval depends on ambient conditions and climate	Clean housing	Specialist
Every 3 months depending on the application conditions with regard to shock and vibration	Check the screw connection and plug connections	Specialist

Table 5-1

NOTE:

- **Compressed air should be used to clean**

SECTION 6 - TROUBLESHOOTING

6.0 Potential issues and solutions are shown below. Contact the factory for additional support. See **Table 14-1**.

Issue	Potential Cause	Solution
Loss of signals	Electrical Connections	Inspect the electrical connections to the sensors and to the control box.
Unable to read output signals	Electric Connection	Inspect the connection to terminal blocks in control box and to the sensor.
	Laser is not on reflector plate	Realign sensor and reflector plate
Sensor not working even when plugged in	Sensor-target misalignment	Check to see if sensor is working by holding the reflector close to the sensor.
	Sensor-target misalignment	If the sensor is working check sensor-target alignment and make adjustments.

Table 6-1

NOTES

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