

## OVERLOAD PROTECTION SYSTEM (OPS) INSTALLATION, OPERATION, AND MAINTENANCE INSTRUCTIONS



Read this manual carefully, making full use of its explanations and instructions. The "Know How" of safe, continuous, trouble-free operation depends on the degree of your understanding of the system and your willingness to keep all components in proper operating condition. Pay particular attention to all NOTES, CAUTIONS, and WARNINGS to avoid the risk of personal injury or property damage. It is important to understand that these NOTES, CAUTIONS, and WARNINGS are not exhaustive. Nexen cannot possibly know or evaluate all conceivable methods in which service may be performed, or the possible hazardous consequences of each method. Accordingly, anyone who uses a procedure that is not recommended by Nexen must first satisfy themselves that neither their safety or the safety of the product will be jeopardized by the service method selected.

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## INTRODUCTION

The Nexen Overload Protection System (OPS) protects Nexen friction clutches from damage by detecting plate slippage during excessive loading conditions. An OPS will detect slippage between the input and output plates and disengage the clutch automatically. Although the OPS controller can detect plate slippage, it does not control the amount of torque transmitted by the clutch. Torque transmitted by the clutch is a function of the clutch used and the air pressure supplied.

The OPS controller is offered with a NEMA-12 enclosure or as a chassis-mount for installations in cabinets, consoles, or enclosures. This controller is intended to be mounted remote from the clutch and near operator work stations. Lighted

push buttons provide for at-a-glance status of the clutch's condition and for its manual engagement and disengagement.

Used with the Nexen's OPS equipped FMCE family, the OPS provides for easy connection between the controller and clutch. One cable plugged into the clutch is all that is required to connect the two components.

The OPS controller can be powered from +12VDC, 115VAC or 230VAC in order to work within a variety of industrial environments. Furthermore, the OPS controller can operate external alarms or indicators to provide status information to other remote panels or controllers.

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## SAFETY PRECAUTIONS

### **DANGER**

The "Activate Controller" push button does not disconnect the power source from the OPS controller. If the controller is supplied with 115 or 230VAC, this supply must be disconnected at its source before opening the enclosure cover or servicing the printed circuit board. Failure to do so can result in severe injury or death.

Before working on a Nexen OPS equipped clutch, deactivate the OPS controller by using the "Activate Controller" push button.

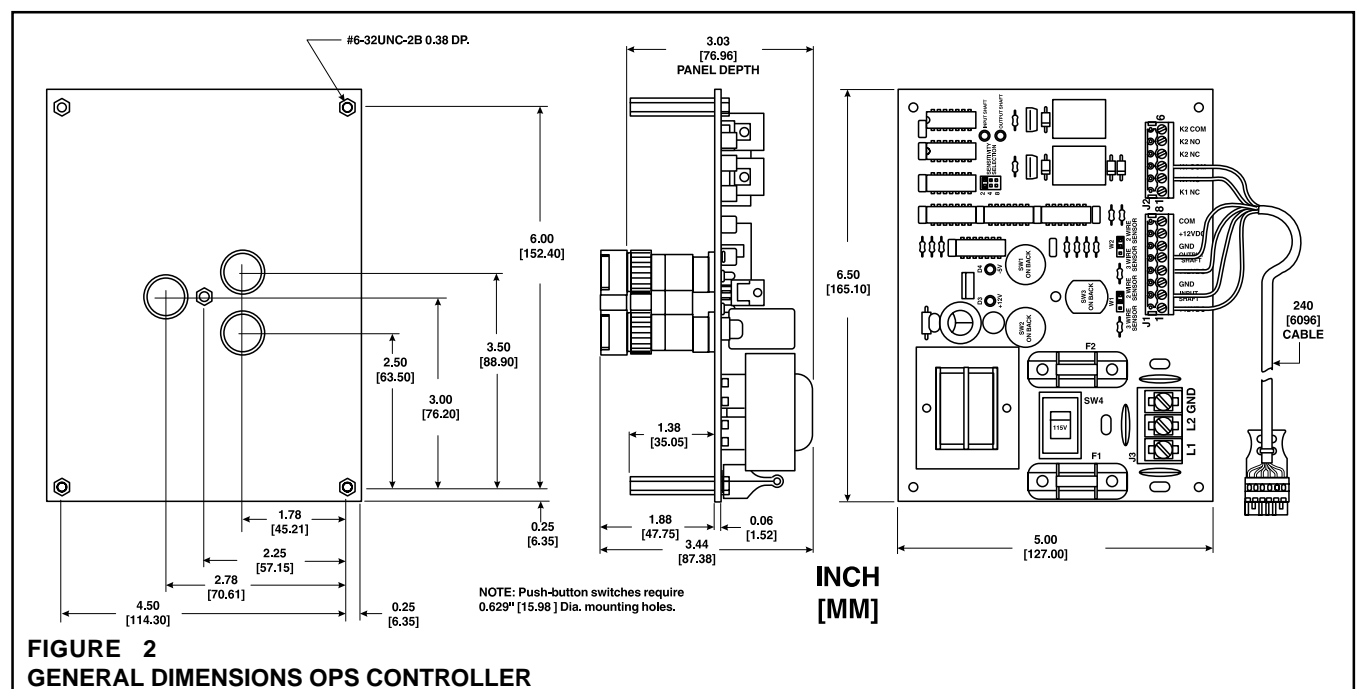
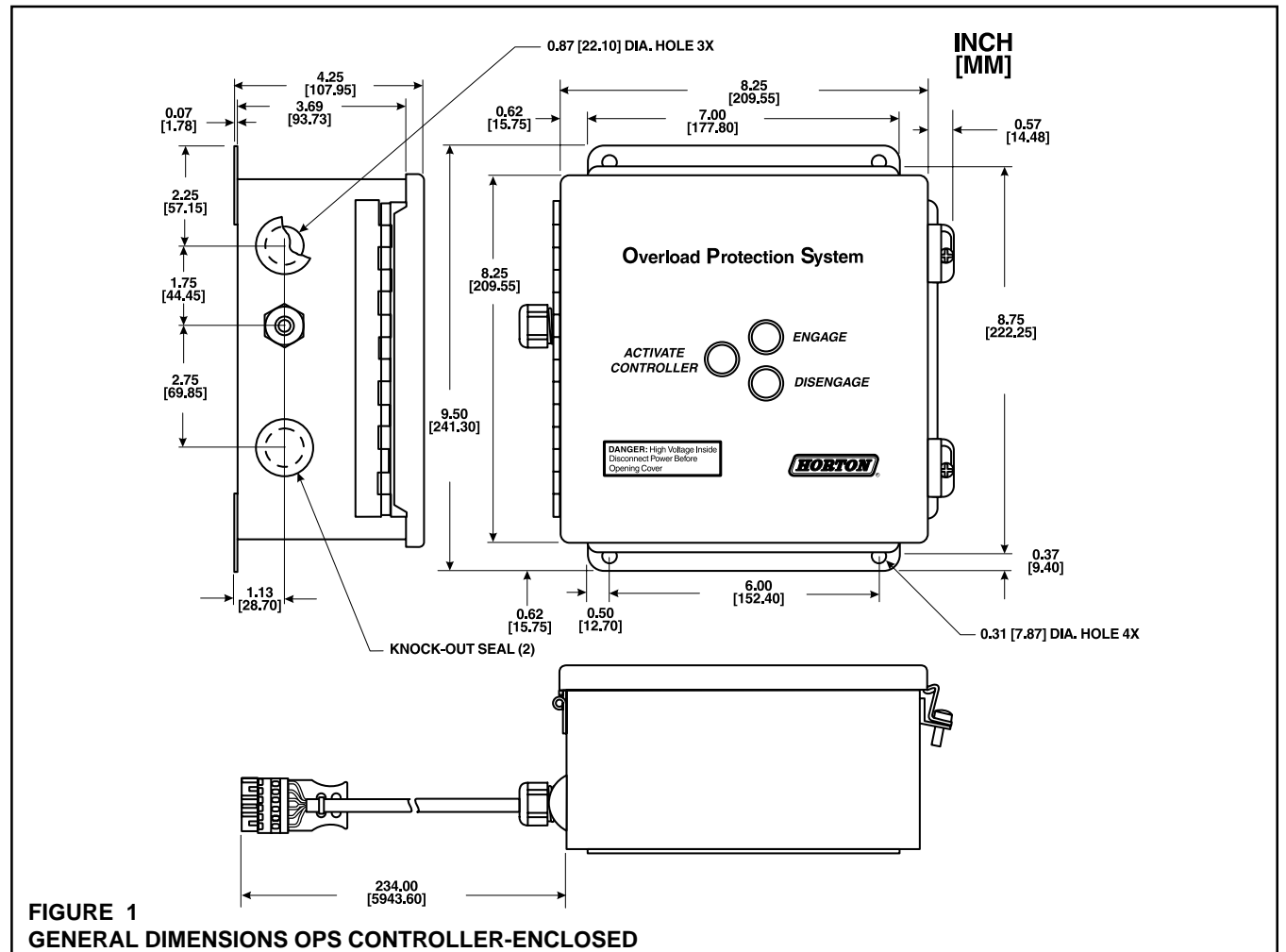
If a lockout/tagout is required, lockout/tagout the input power source (+12VDC or 115/230VAC) for the OPS controller.

# INSTALLATION

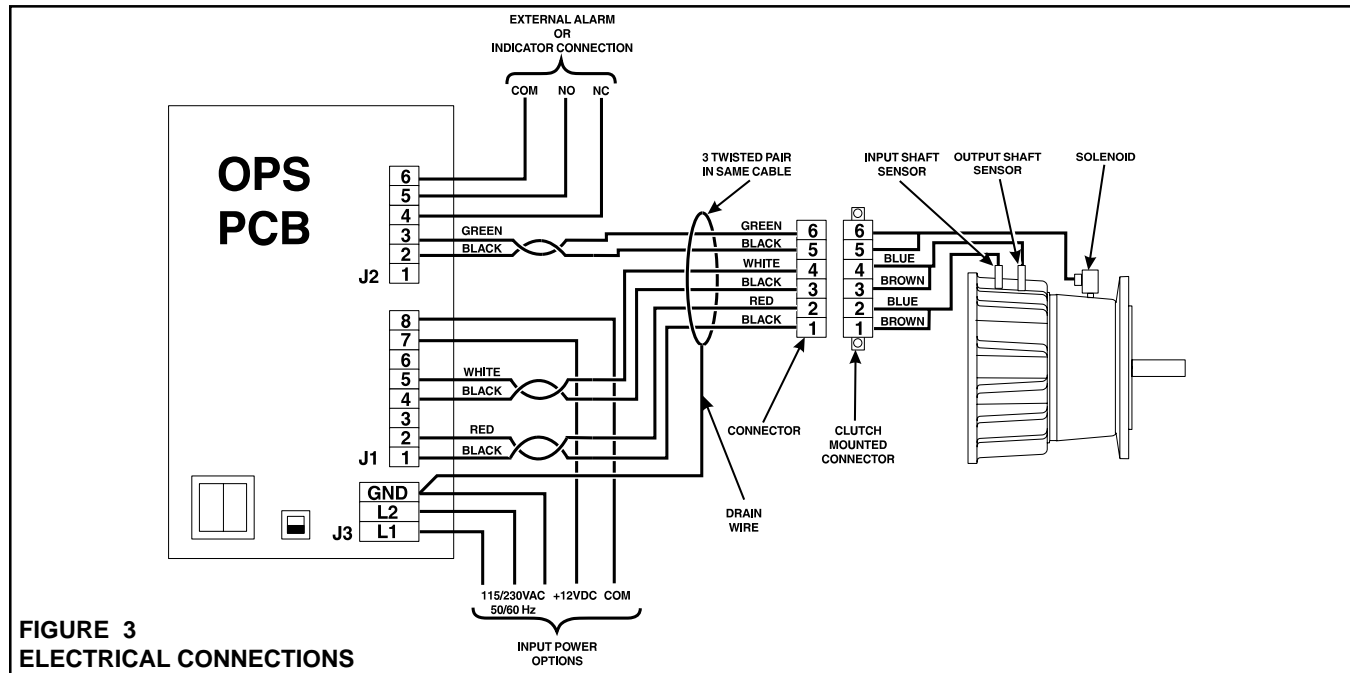
## NOTE

Mount the OPS controller in a dry, dust, shock, and vibration free area with an ambient temperature greater than 32° F [0° C] but less than 122° F [50° C].

Refer to Figures 1 and 2 for the OPS controller general dimensions.



## ELECTRICAL CONNECTIONS



**FIGURE 3**  
**ELECTRICAL CONNECTIONS**

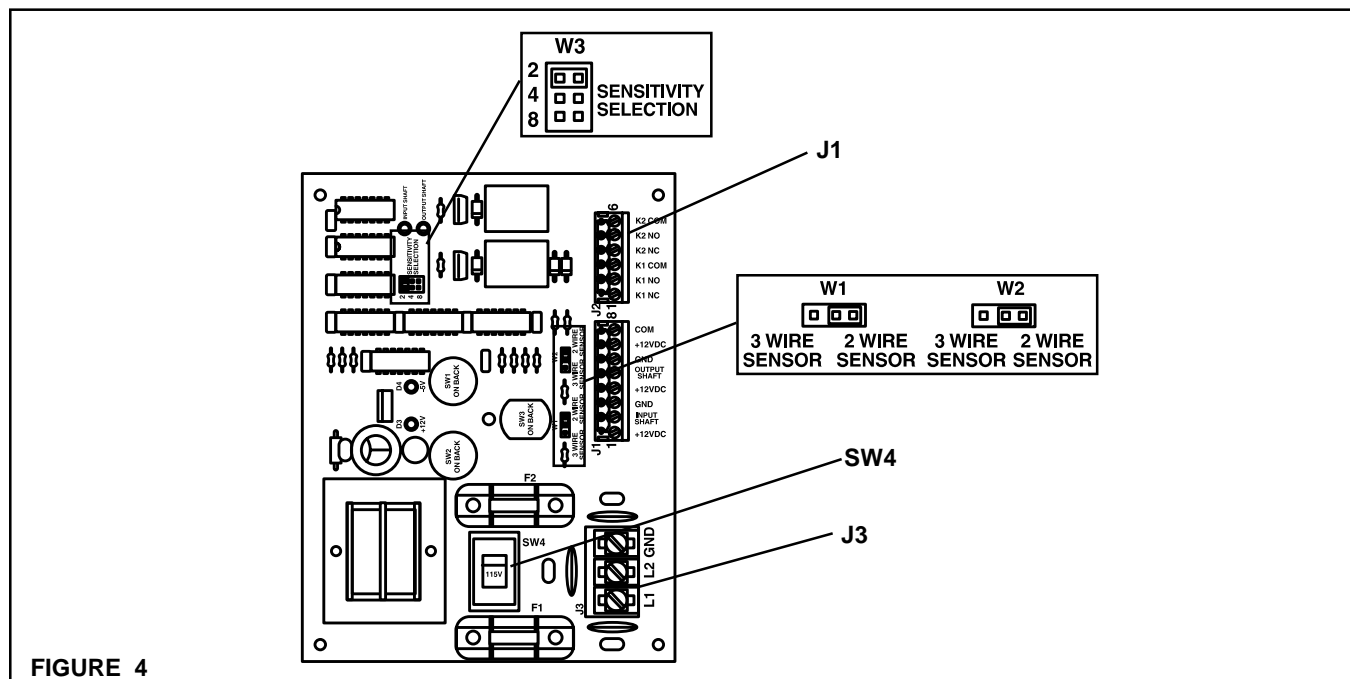
## OPS SETUP

### DANGER

Disconnect AC voltage service power to the OPS controller before opening the cover (See Figure 4).

### WARNING

Set the voltage selector switch SW4 to the proper voltage before powering the OPS controller (See Figure 4).



**FIGURE 4**

## OPS SETUP

1. Connect AC voltage service (115 or 230VAC) to terminal block **J3** or the +12VDC voltage service to Terminals **7** and **8** of terminal block **J1** (See Figure 4).

### NOTE

**Step 2 is not necessary if the +12VDC option is used; otherwise, proceed with Step 3.**

2. Slide voltage selector switch **SW4** to select proper voltage (115 or 230VAC) (See Figure 4).
3. Set jumpers **W1** and **W2** to select **2 WIRE SENSOR** (See Figure 4).

The **2 WIRE SENSOR** setting is for use with NAMUR type proximity sensors such as the ones used in Nexen's

OPS equipped clutches. The **3 WIRE SENSOR** setting is for use with sinking current output type proximity sensors and is not used with Nexen's OPS equipped clutches.

4. Set jumper **W3** to select the desired sensitivity (See Figure 4).

Sensitivity selection allows some control over how much slip occurs before the clutch disengages. It is recommended to start with the setting at **2** which is the most sensitive. If nuisance disengagements occur, try setting the sensitivity to **4** or **8**. Larger numbers allow more slip.

## EXTERNAL ALARM OR INDICATOR CONNECTION

The OPS controller has relay (K2) available to operate external alarms or indicators. K2 is a single pole double throw relay, (See Figure 3 for connection information and SPECIFICATIONS for contact rating). K2 is able to complete or break an AC or DC circuit but it can not source power to an external device. When using the enclosed version of the OPS controller, route the external alarm or indicator's wires or cable through the top knock-out holes and secure to housing with customer supplied wire clamp (See Figures 5 and 6).

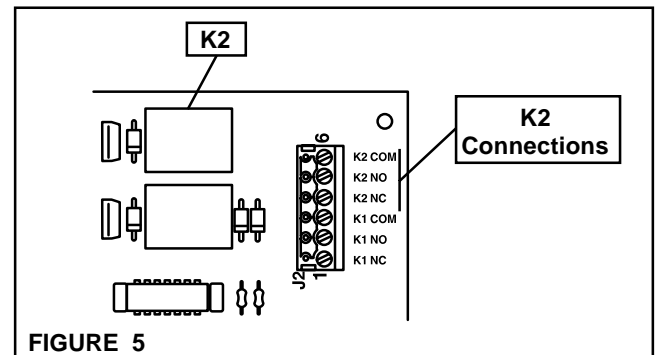


FIGURE 5

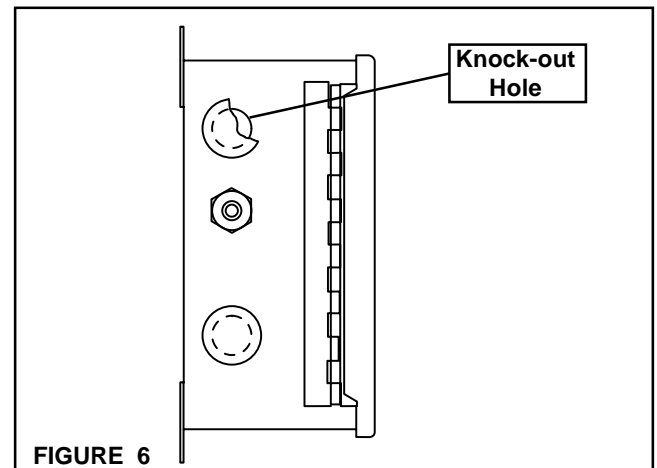


FIGURE 6

## OPERATION

### DANGER

The “Activate Controller” push button does not disconnect the power source from the OPS controller. If the controller is supplied with 115 or 230VAC, this supply must be disconnected at its source before opening the enclosure cover or servicing the printed circuit board. Failure to do so can result in severe injury or death.

Before working on a Nexen OPS equipped clutch, deactivate the OPS controller by using the “Activate Controller” push button.

If a lockout/tagout is required, lockout/tagout the input power source (+12VDC or 115/230VAC) for the OPS controller.

1. Press the **Activate Controller** push-button (See Figure 7). Verify the push-button remains depressed and built-in indicator lights up. This supplies DC power to the control logic and sensors.
2. Press the **Engage** push-button to engage the clutch (See Figure 7). Verify the push-button returns from being depressed and its built-in indicator lights up. When this push-button is depressed, the K1 relay will energize and engage the clutch while the K2 relay deenergizes. A four second delay will occur before the OPS controller begins checking for slip. This delay allows time for the clutch to engage the load and prevents nuisance tripping at startup.
3. Press the **Disengage** push-button to disengage the clutch (See Figure 7). Verify push-button returns from being depressed and its built-in indicator lights up. When this push-button is depressed, the K1 relay will deenergize and disengage the clutch while the K2 relay will energize. K2 can be used for an external alarm or indicator. Anytime a slip is detected, the OPS controller will automatically perform the same function as depressing the **Disengage** push-button.
4. Press the **Activate Controller** push-button while it is depressed to turn off the OPS controller's logic circuits and sensors. Verify push-button returns from being depressed and all indicator lights turn off.

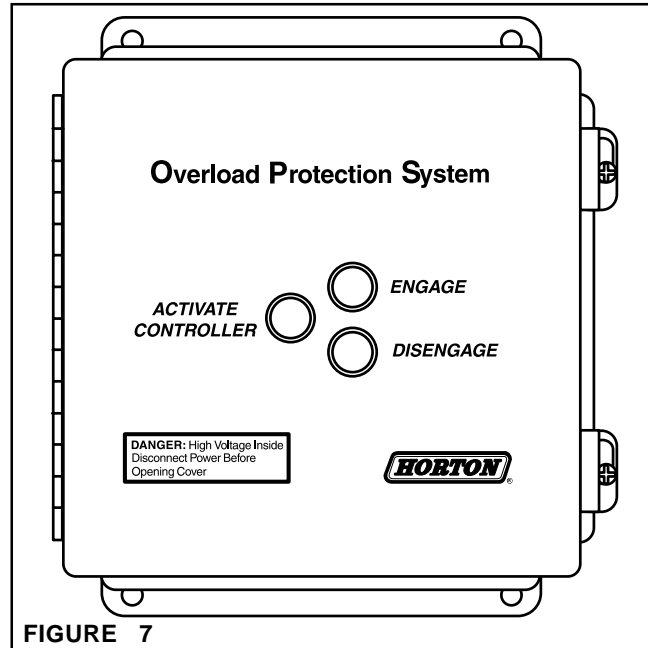


FIGURE 7

# TROUBLESHOOTING

## DANGER

Some items in the following troubleshooting table require the cover of the OPS controller to be opened with the input power on. Only an electrician qualified to work with high voltage conditions should perform these tests requiring the cover to be open and the power to be on since voltages of 115VAC and 230VAC may be present, depending on the input power option used.

PROBLEM	WHAT TO CHECK:	WHAT TO DO:
"Activate Controller" push-button is pressed but its indicator light does not come on.	Power to the OPS.	Make sure the power is turned on at the source.
	Blown Fuses (F1 and F2).	With the power off, open the enclosure cover and remove Fuses F1 and F2. Examine and replace any blown fuses. If the fuses blow again, a short exists on the primary side of the power supply transformer requiring replacement of the OPS printed circuit board.
	Power supply LEDs (+12VDC and +5VDC) are on or off.	With the power on, open the enclosure cover and note the status of the green LEDs on the printed circuit board. If the LEDs are on, replace the Activate Controller push-button. If the LEDs are off and fuses F1 and F2 are not blown and the power to the OPS is present at the appropriate Terminals (Terminal block J3 for 115 or 230VAC and Terminals 7 and 8 of Terminal block J1 for +12VDC), the OPS power supply is faulty and the OPS printed circuit board must be replaced.
After pressing the "Engage" push-button, the indicator does not turn on and the clutch does not engage.	Power to the OPS.	Make sure the power is turned on at the source.
	Blown Fuses (F1 and F2).	With the power off, open the enclosure cover and remove Fuses F1 and F2. Examine and replace any blown fuses. If the fuses blow again, a short exists on the primary side of the power supply transformer requiring replacement the OPS printed circuit board.
	Power supply LEDs (+12VDC and +5VDC) are on or off.	With the power on, open the enclosure cover and note the status of the green LEDs on the printed circuit board. If the LEDs are on, replace the Activate Controller push-button. If the LEDs are off and fuses F1 and F2 are not blown and the power to the OPS is present at the appropriate Terminals (Terminal block J3 for 115 or 230VAC and Terminals 7 and 8 of Terminal block J1 for +12VDC); then, the OPS power supply is faulty and the OPS printed circuit board must be replaced.
	Relay K1 operation.	With the power on, open the enclosure cover. Using a voltmeter, measure the voltage across the terminals of J2 marked K1 COM (-) and K1 NO (+). When the OPS is disengaged, the voltmeter should read 0VDC. When the OPS is engaged, the voltmeter should read 12VDC. If this voltage does not change and the OPS power supply's green LEDs are on, relay K1 is faulty and the OPS printed circuit board must be replaced.
After pressing the "Engage" push-button, the indicator turns on but the clutch does not engage.	Air pressure to the clutch.	Measure the air pressure at the clutch and take appropriate action.
	Engage signal is reaching the air valve solenoid at the clutch.	Measure the voltage at terminals 5 and 6 of the clutch's electrical connector. There should be 12VDC across these terminals when the OPS is engaged. If voltage is present, the air valve solenoid is faulty and must be replaced. Since the "Engage" push-button's indicator is tied to the N.O. contact of K1 and this indicator is working properly, it can be assumed the relay is working properly. Furthermore, it can be assumed the output signal to the air valve solenoid is present at the terminal K1 NO on the OPS printed circuit board because the indicator light works. Turn the supply power to the OPS off and open the cover to the enclosure. Using an ohmmeter, check the continuity from the K1 COM terminal of J2 to terminal 6 of the clutch's electrical connector. Repeat for K1 NO terminal of J2 and terminal 5 of the clutches electrical connector. Replace the cable if continuity is faulty for either connection.
Pressing the "Disengage" push-button fails to disengage the clutch.	The "Disengage" push-button's indicator remains off after depressing the push-button.	The "Disengage" push-button's indicator is tied to the N.C. contact of K1. If this indicator remains off while pressing the "Disengage" push-button and the "Engage" push-button indicator remains on, K1 is not operating properly. The OPS printed circuit board is faulty and must be replaced.
	Engage signal is working properly at the clutch's electrical connector.	Measure the voltage across terminals 5 (+) and 6 (-) of the clutch's electrical connector. When the OPS is disengaged, the voltmeter should read 0VDC. When the OPS is engaged, the voltmeter should read 12VDC. If the measured voltages indicate the engage signal is functioning properly, the air solenoid valve on the clutch must be replaced.

Continued on Page 8

Continued from Page 7 Clutch disengages during non-overload conditions.	Clutch size for the load.	Check clutch sizing to transmit required torque. Contact Horton Air Champfi Technical Support (1-800-776-1AIR) for assistance.
	Air pressure to the clutch.	Measure air pressure at the clutch while engaged to verify it can transmit the required torque. Contact Horton Air Champfi Technical Support (1-800-776-1AIR) for assistance.
	Power supply to the OPS controller is not being interrupted.	Measure the voltage to the OPS controller for adequacy and non-interruption.
	Sensor selection jumpers W1 and W2 are properly set.	Set jumpers W1 and W2 on the OPS printed circuit board to the 2 Wire Sensor position.
	Electrical connections at the OPS controller and clutch are tight.	Check all connections for tightness at the clutch's electrical connector and the OPS controller's printed circuit board.
	Air valve at the clutch is working properly.	Examine the air valve on the clutch. Replace air valve if leaking.
	Sensors in the clutch are functioning properly.	Check the input and output shaft sensor's yellow LEDs on the OPS printed circuit board to see if they blink while the clutch is engaged and turning very slowly. If the clutch turns too quickly, the LEDs will appear continuously on but actually are blinking very fast. If both yellow LEDs are blinking, suspect one of the previous problems. If none or one yellow LED is blinking, a problem exists with one or both of the input signals. Measure the voltage between terminals 1 (+) and 3 (-) and between terminals 4 (+) and 6 (-) of J1. The supply voltage to the sensors should be 12VDC or greater. Monitor the sensor signals between terminals 2 (+) and 3 (-) and between 5 (+) and 6 (-) of J1. While the clutch is engaged, jog the clutch and note the voltages at these two places after the clutch stops. After several repetitions, the voltages at these two places should vary between two states, 7.5VDC and 1.0VDC, depending on whether a sensor sees a target or not after the clutch stops. If a problem exists with this signal at connector J1, monitor the same signals at the clutch's electrical connector. This time measure the supply voltage to the sensor between terminals 1 (+) and 6 (-) and between terminals 3 (+) and 6 (-). Again the voltage should be 12VDC or greater. Check the continuity in each line of the signal cable. If a problem is detected in the cable, replace the cable. Monitor the sensor signals at the clutch electrical connector terminals 2 (+) and 6 (-) and at terminals 4 (+) and 6 (-) as done previously. If a problem exists with the sensor supply voltage or signals, suspect a problem with the signal cable. Check the continuity of each line in the signal cable and replace the signal cable if a problem is exists. If no problem exists with the signal cable but the sensor signals are not correct at the clutch's electrical connector, the sensors are problematic. Read the maintenance manual for the clutch and follow sensor adjustment instructions. If readjusting the sensor(s) does not correct the problem, replace the sensor(s).



## SPECIFICATIONS

SPECIFICATIONS	OPS-ENCLOSED VERSION	OPS-CHASSIS VERSION
Product Number	964404	964403
Input Power Options	+12VDC @ 800 mA 115VAC @ 110 mA 230VAC @ 57 mA	+12VDC @ 800 mA 115VAC @ 110 mA 230VAC @ 57 mA
Dimensions	8.25 In. [209.55 mm] x 8.25 In. [209.55 mm] x 4.25 In. [107.95 mm] Box (add 0.625 In. [15.88 mm] top and bottom for mounting Flange).	6.50 In. [165.10 mm] x 5.00 In. [127.00 mm] x 3.29 In. [83.57 mm] panel mounted printed circuit board. Requires 3.03 In. [76.96 mm] of panel depth.
Inputs	Inductive proximity sensors: npn, open collector, current sinking, or NAMUR.	Inductive proximity sensors: npn, open collector, current sinking, or NAMUR.
Outputs	Relay: 28VDC, 115/230VAC @ 2 Amps. K1: +12VDC @ .6 Amps power available, used to operate clutch solenoid. K2: available for auxiliary use. No power available.	Relay: 28VDC, 115/230VAC @ 2 Amps. K1: +12VDC @ .6 Amps power available, used to operate clutch solenoid. K2: available for auxiliary use. No power available.

## **WARRANTY**

Nexen Group, Inc. (Nexen) warrants its product(s) [the Product(s)] will be free from defects in materials and workmanship under normal use and service conditions for a period of 12 months from the date of shipment. NO OTHER WARRANTIES, WHETHER EXPRESS, IMPLIED, OR STATUTORY, INCLUDING WITHOUT LIMITATION WARRANTIES OF MERCHANTABILITY, OR OF FITNESS FOR A PARTICULAR PURPOSE, ARE GIVEN, AND ALL SUCH OTHER WARRANTIES ARE HEREBY EXPRESSLY DISCLAIMED.

### **Conditions**

This warranty applies only if: (a) the Product has been installed, used, and maintained in accordance with any applicable Nexen installation or maintenance manual for the Product; (b) the alleged defect is not attributable to normal wear and tear; (c) the Product has not been altered, misused, or used for purposes other than those for which it was intended; and (d) the claimant has complied with the warranty claim procedures set out below in Warranty Claim Procedures.

### **Exclusive Remedy**

The sole and exclusive remedy for a breach of this warrant shall be, at Nexen's sole election, repair or replacement with new, serviceably used or reconditioned Product, or issuance of a credit in the amount of the current Nexen discounted price for the Product.

### **Limitation of Damages**

In no event shall Nexen be liable for any consequential, indirect, incidental, or special damages of any nature whatsoever, including without limitation, lost profits arising from the sale or use of the Products.

### **Warranty Claim Procedures**

To make a claim under this warranty, the claimant must give written notice of the alleged defect to Nexen and deliver the Product to Nexen within one year of the date on which the alleged defect first became apparent.

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