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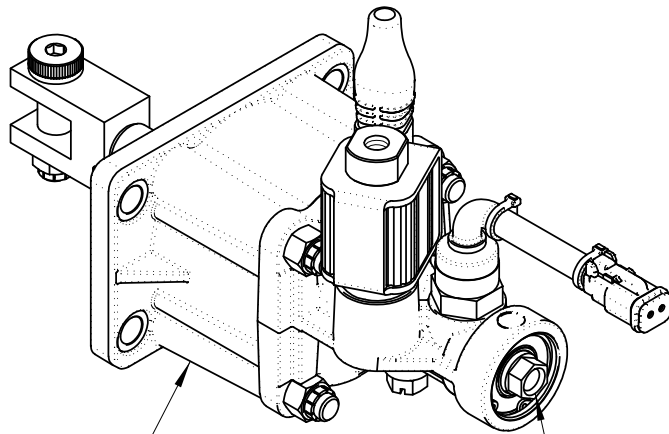
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**Read through the installation instructions carefully before installing your Waterous Shift Unit.**

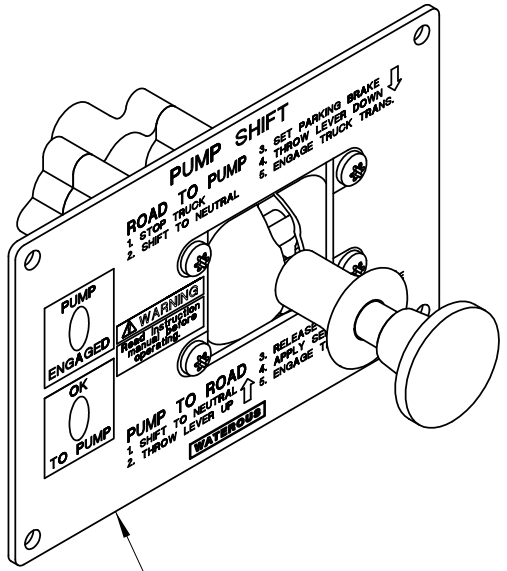
NOTE: Instructions subject to change without notice

## Component Identification

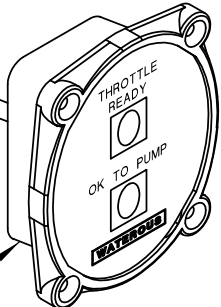
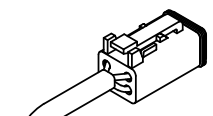
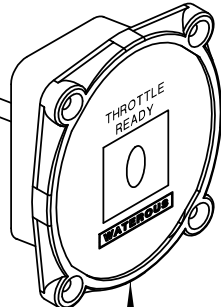
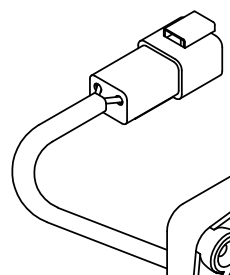


SHIFT UNIT  
INSTALLED ON PUMP  
TRANSMISSION OR PTO

OPTIONAL  
MANUAL OVERRIDE  
CONNECTION



IN-CAB PANEL  
SHIPPED LOOSE



SINGLE OR DUAL LIGHT  
THROTTLE READY PANEL  
SHIPPED LOOSE

IL4364

### PNEUMATIC OPERATION

# Introduction

This instruction covers the installation of shift units on Waterous fire pump transmissions and power take-off (PTO) units. Before proceeding with the installation of the shift unit, read the following instructions carefully.

## Safety Information



Read through and communicate safety information to the end user of this Waterous Fire Pump, Transmission or Power Take-Off (PTO) Unit.

### OEM Installation Warnings

#### **WARNING**

**Unexpected Truck Movement. May result in serious personal injury or death.**

##### ***Fire Pump Applications***

Failure to properly install the pump shift control and pump shift indicator system in the apparatus or failure to incorporate in the Pump Operator's Panel Engine Speed Interlock System may result in unexpected truck movement which may result in serious personal injury or death.

##### ***Power Take-Off (PTO) Applications***

Failure to properly install the PTO shift control and PTO shift indicator system in the apparatus or failure to incorporate in the PTO Operator's Panel Speed Control or Automatic Engine Speed Control system may result in unexpected truck movement which may result in serious personal injury or death.

#### **WARNING**

**Inability to Pump Water. May result in serious personal injury or death.**

##### ***Fire Pump Applications***

Failure to properly install the pump shift control and pump shift indicator system in the apparatus or failure to incorporate in the Pump Operator's Panel Engine Speed Interlock System may result in the inability to pump water which may result in serious personal injury or death.

# Pneumatic Shift Unit Installation

## Important Notice

### Engine Speed Control Interlock System

#### Fire Pump Applications:

The pump transmission shift control and pump shift indicator system must be installed in the apparatus in accordance with NFPA 1901 *Standard for Automotive Fire Apparatus* and incorporated in the Pump Operator's Panel Engine Speed Control Interlock System (ESCIS).

#### Power Take-Off (PTO) Applications:

For apparatus with electronically controlled engines and automatic chassis engines, an interlock system must be provided to prevent advancement of the engine speed at the PTO operator's panel or by an automatic speed control system unless the following conditions are satisfied:

- Parking brake is engaged
- PTO is engaged, and
- Chassis transmission is in PTO gear

## ⚠ WARNING

**Unexpected Truck Movement. May result in serious personal injury or death.**

#### Fire Pump Applications

Failure to properly install the pump shift control and pump shift indicator system in the apparatus or failure to incorporate in the Pump Operator's Panel Engine Speed Interlock System may result in unexpected truck movement which may result in serious personal injury or death.

#### Power Take-Off (PTO) Applications

Failure to properly install the PTO shift control and PTO shift indicator system in the apparatus or failure to incorporate in the PTO Operator's Panel Speed Control or Automatic Engine Speed Control system may result in unexpected truck movement which may result in serious personal injury or death.

## ⚠ WARNING

**Inability to Pump Water. May result in serious personal injury or death.**

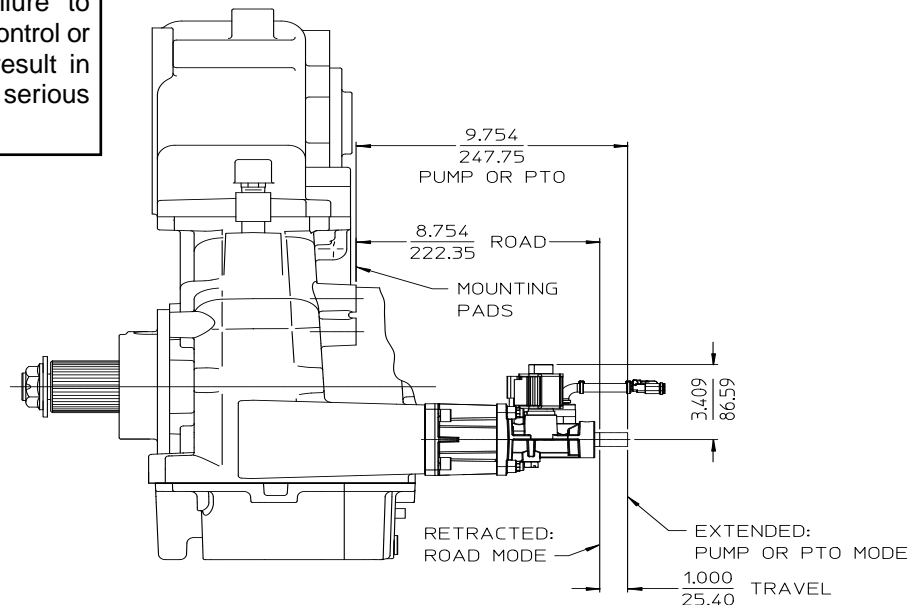
#### Fire Pump Applications

Failure to properly install the pump shift control and pump shift indicator system in the apparatus or failure to incorporate in the Pump Operator's Panel Engine Speed Interlock System may result in the inability to pump water which may result in serious personal injury or death.

1. Route the OEM supplied shift wiring harness to the desired mounting location. Secure the wiring to prevent chaffing or damage due to vibration (see Pages 7 & 8).
2. Install In-cab and "Throttle Ready" panels (see Pages 5 & 6).
3. Connect panel wiring to OEM supplied wiring harness (see Pages 7 & 8).
4. Install air lines between in-cab panel and shift unit.
  - a. Requires 80 to 120 psi operating air pressure and a minimum air capacity of 5 cubic inches.
  - b. 1/4 in. or 3/8 in. SAE J844 air brake hoses recommended for air lines (see Page 11).
5. If desired, a manual override control can be installed to be used in the event of a loss of air pressure (see Page 12 and 13).

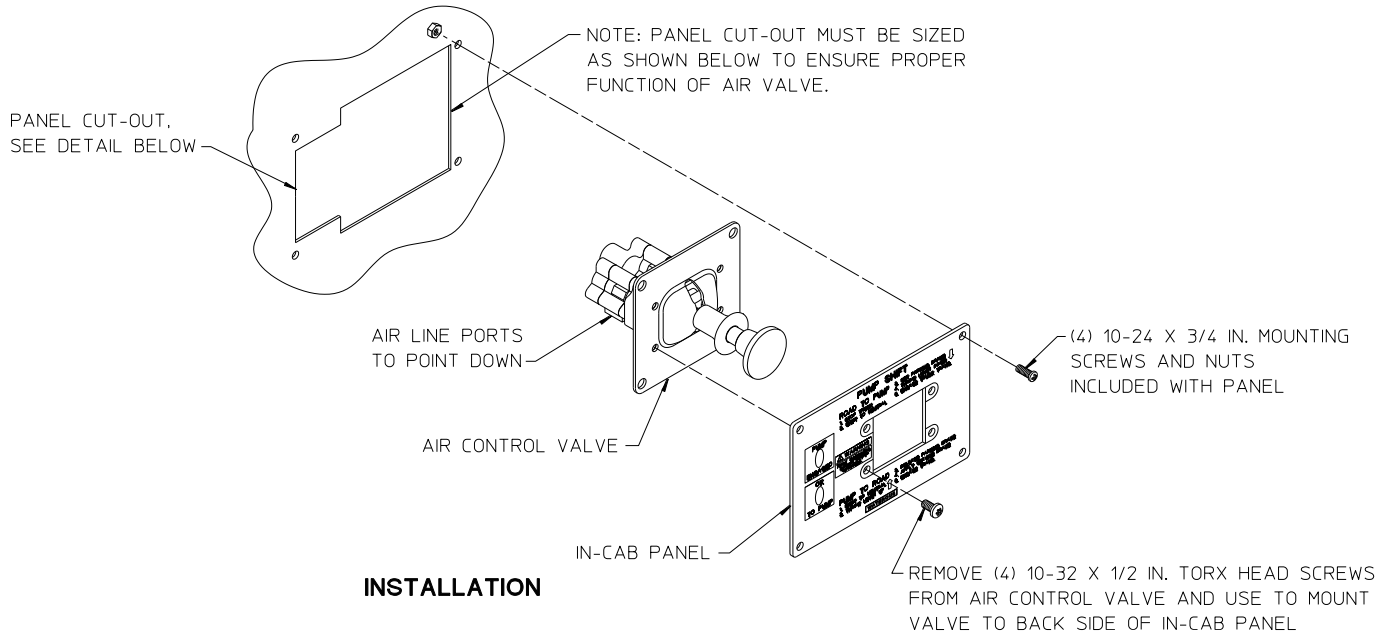
#### Clearance Required for Maintenance:

3.000 in. / 76.20 mm open space must be provided behind the shift unit to allow for removal of shift unit. See diagram below.

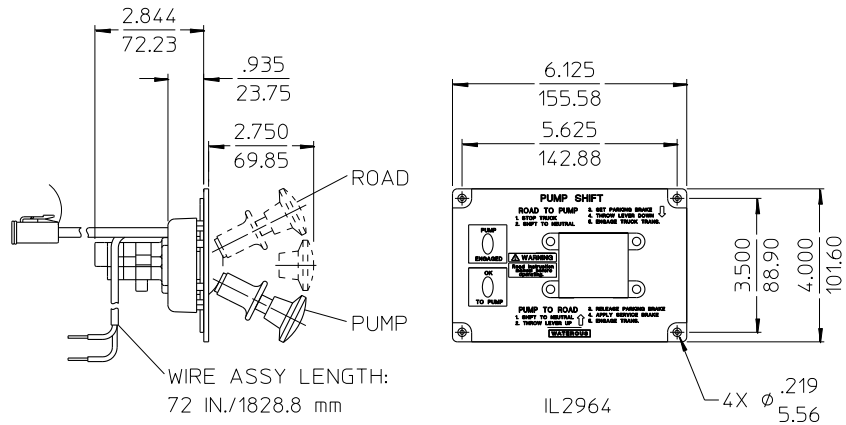


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# Installation – In-Cab Panel



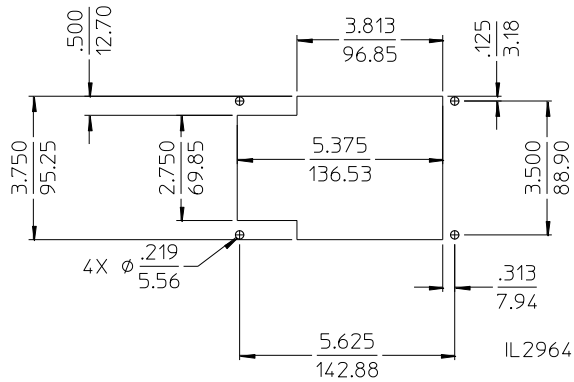
## INSTALLATION



## DIMENSIONS

ALL DIMENSIONS SHOWN AS INCH/MILLIMETER

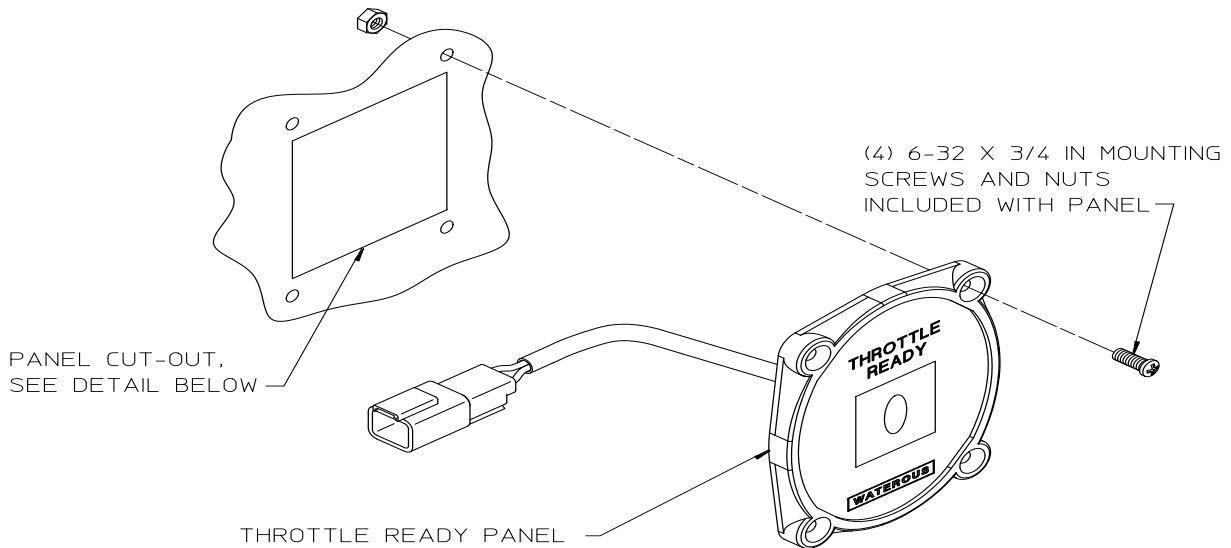
( $\frac{\text{INCH}}{\text{MILLIMETER}}$ )



## PANEL CUT-OUT

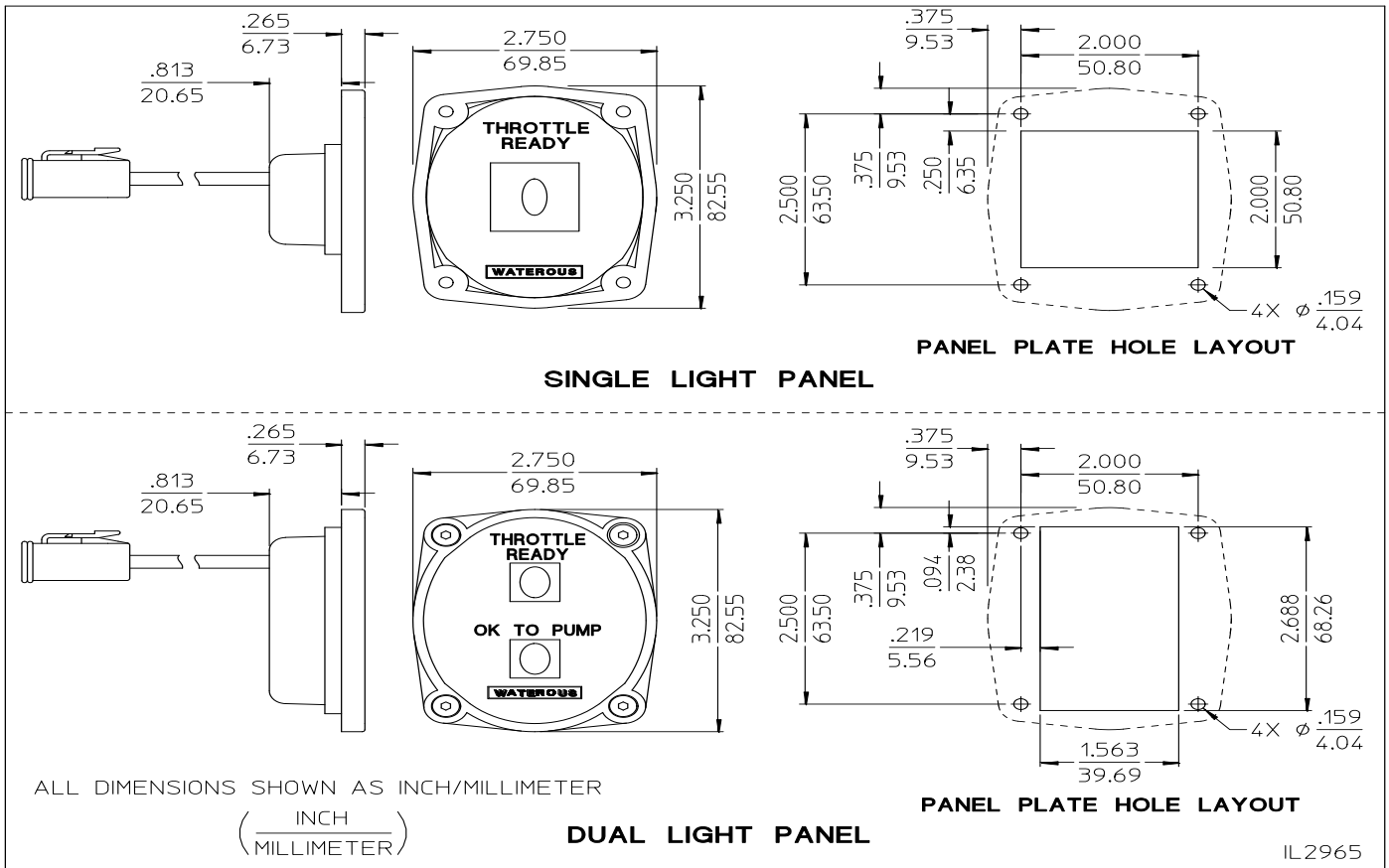
# Installation – Throttle ready Panel

On Operator's Panel)



## INSTALLATION

IL2965



# Wiring Connections – Shift Unit and In-Cab Panel

(See next page for Throttle Ready Panel)

Interlock Solenoid on Shift Unit		
Female Deutsch DT04-2P Receptacle Mates with Male Deutsch Plug DT06-2S		
Wire		Function
Contact	Size	
1	AWG 18	12 or 24 VDC from ECSIS
2	AWG 18	Output to ESCIS

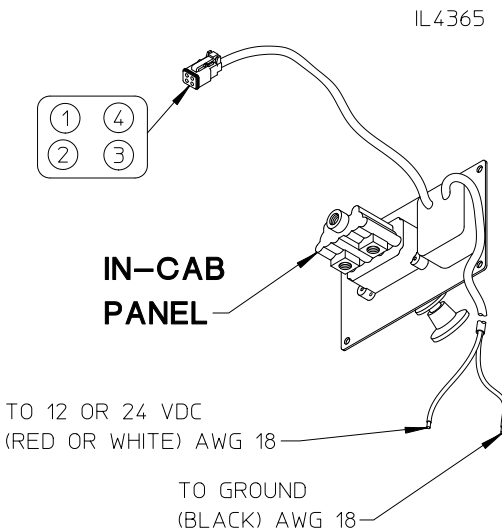
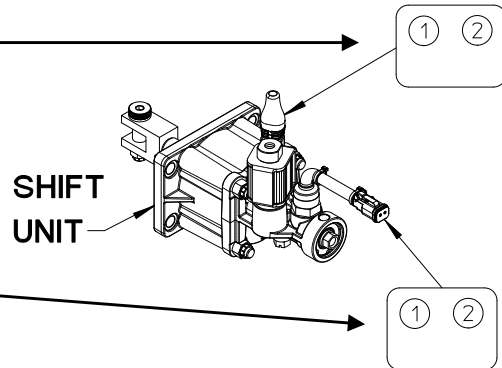
Switch on Shift Unit		
Male Deutsch DT06-2S Plug Mates with Female Deutsch DT04-2P Receptacle		
Wire		Function
Contact	Size	
1	AWG 18	12 or 24 VDC from ECSIS
2	AWG 18	Ground

In-Cab Panel		
Male Deutsch DT06-4S Plug Mates with Female Deutsch DT04-4P Receptacle		
Wire		Function
Contact	Size	
1	AWG 18	To Green LED "Pump or PTO Engaged" (See Note 3)
2	AWG 18	To Green LED "OK to Pump" (See Note 3)
3	AWG18	From 12 or 24 VDC (See Note 2)
4	AWG18	From 12 or 24 VDC (See Note 2)

**Engine Speed Control  
Interlock System (ESCIS)  
Provided by the Truck  
Manufacturer**

**Allison 3000 and 4000  
Product Family Automatic  
Transmissions  
(See Note 1)**

----- Dashed lines indicate wiring not  
furnished by Waterous



**NOTES:**

1. For installations with Allison 3000 and 4000 Product Family Automatic Chassis Transmissions with 4<sup>th</sup> Generation Controls:
  - Allison announced that transmissions shipped after June 27, 2008 with MY09 software include enhancements that improve engagement and disengagement of split-shaft (pump) transmissions (Reference Allison Watch #373, dated October, 2008).
  - In order to ensure that these enhancements are invoked, the pump/PTO engagement switch provided on the Waterous split-shaft transmission must be incorporated into both the Engine Speed Control Interlock System (ESCIS) control circuit and the **Allison Fire Truck Pump Mode Input Function J1** control circuit or **Allison Pump Mode Input Function AJ1** control circuit for other PTO applications.
2. These 12 or 24 VDC power connections provided for potential optional use by truck manufacturer in ESCIS design.
3. Each LED draws 20mA. Size wires accordingly.

# Wiring Connections – Throttle Ready Panel

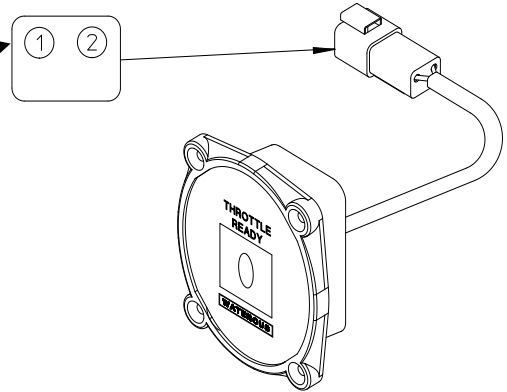
Single Light Panel		
Female Deutsch DT04-2P Receptacle Mates with Male Deutsch DT06-2S Plug		
Wire		Function
Contact	Size	
1	AWG 18	To Green LED "Throttle Ready" (See Note 2)
2	AWG 18	Ground

Dual Light Panel		
Male Deutsch DT06-4S Plug Mates with Female Deutsch DT04-4P Receptacle		
Wire		Function
Contact	Size	
1	AWG 18	To Green LED "Throttle Ready" (See Note 2)
2	AWG 18	To Green LED "OK to Pump" (See Note 2)
3	AWG18	Ground
4	AWG18	Not Used

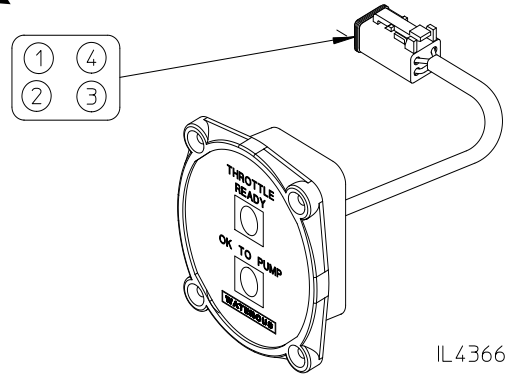
**Engine Speed Control  
Interlock System (ESCIS)  
Provided by the Truck  
Manufacturer**

**Allison 3000 and 4000  
Product Family  
Automatic Transmissions  
(See Note 1)**

----- Dashed lines indicate wiring not furnished by Waterous



SINGLE LIGHT PANEL



DUAL LIGHT PANEL

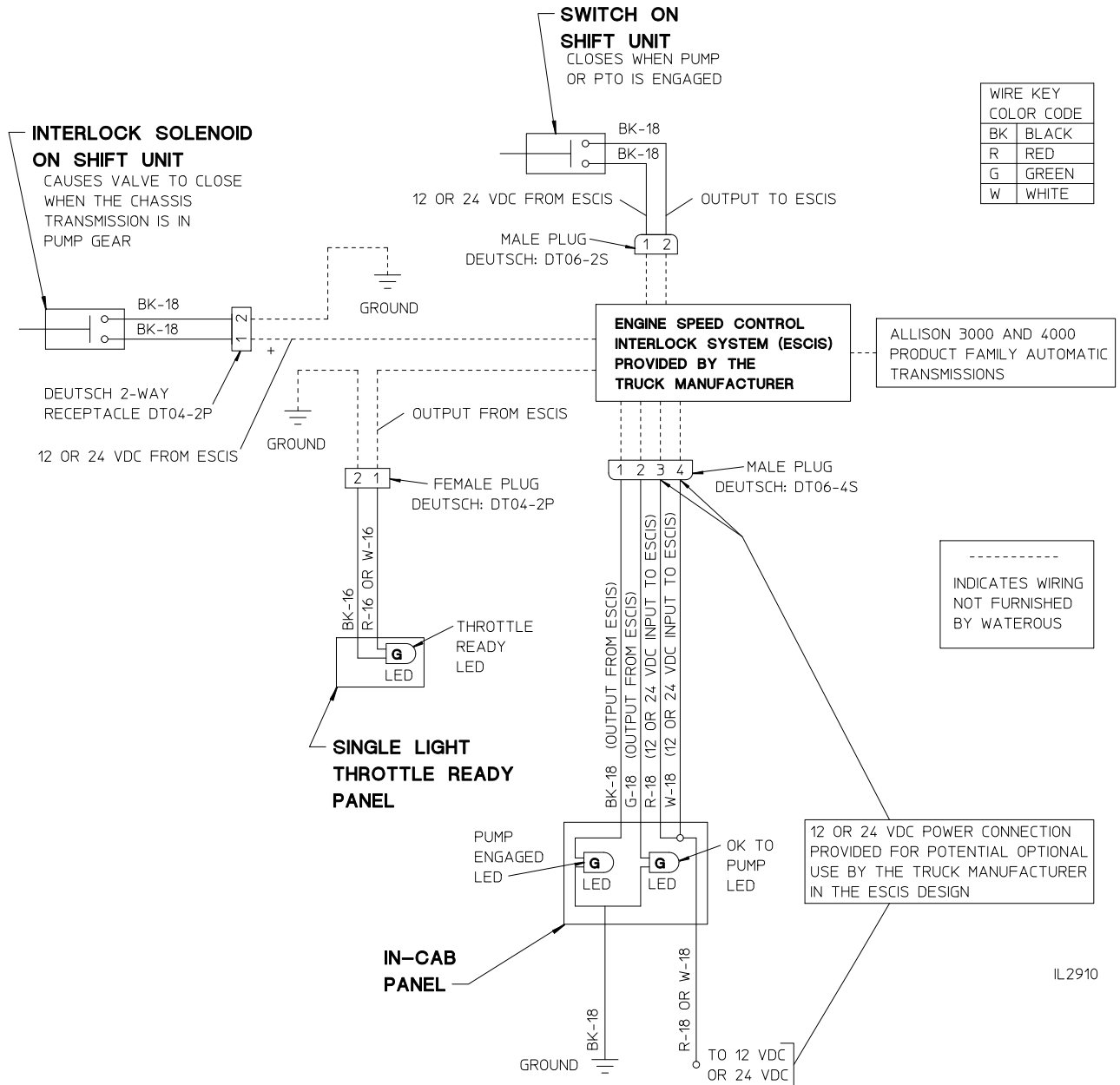
IL4366

**NOTES:**

1. For installations with Allison 3000 and 4000 Product Family Automatic Chassis Transmissions with 4<sup>th</sup> Generation Controls:
  - Allison announced that transmissions shipped after June 27, 2008 with MY09 software include enhancements that improve engagement and disengagement of split-shaft (pump) transmissions (Reference Allison Watch #373, dated October, 2008).
  - In order to ensure that these enhancements are invoked, the pump/PTO engagement switch provided on the Waterous split-shaft transmission must be incorporated into both the Engine Speed Control Interlock System (ESCIS) control circuit and the **Allison Fire Truck Pump Mode Input Function J1** control circuit or **Allison Pump Mode Input Function AJ1** control circuit for other PTO applications.
2. Each LED draws 20mA. Size wires accordingly.



# Wiring Schematic – Single Light Operator’s Panel

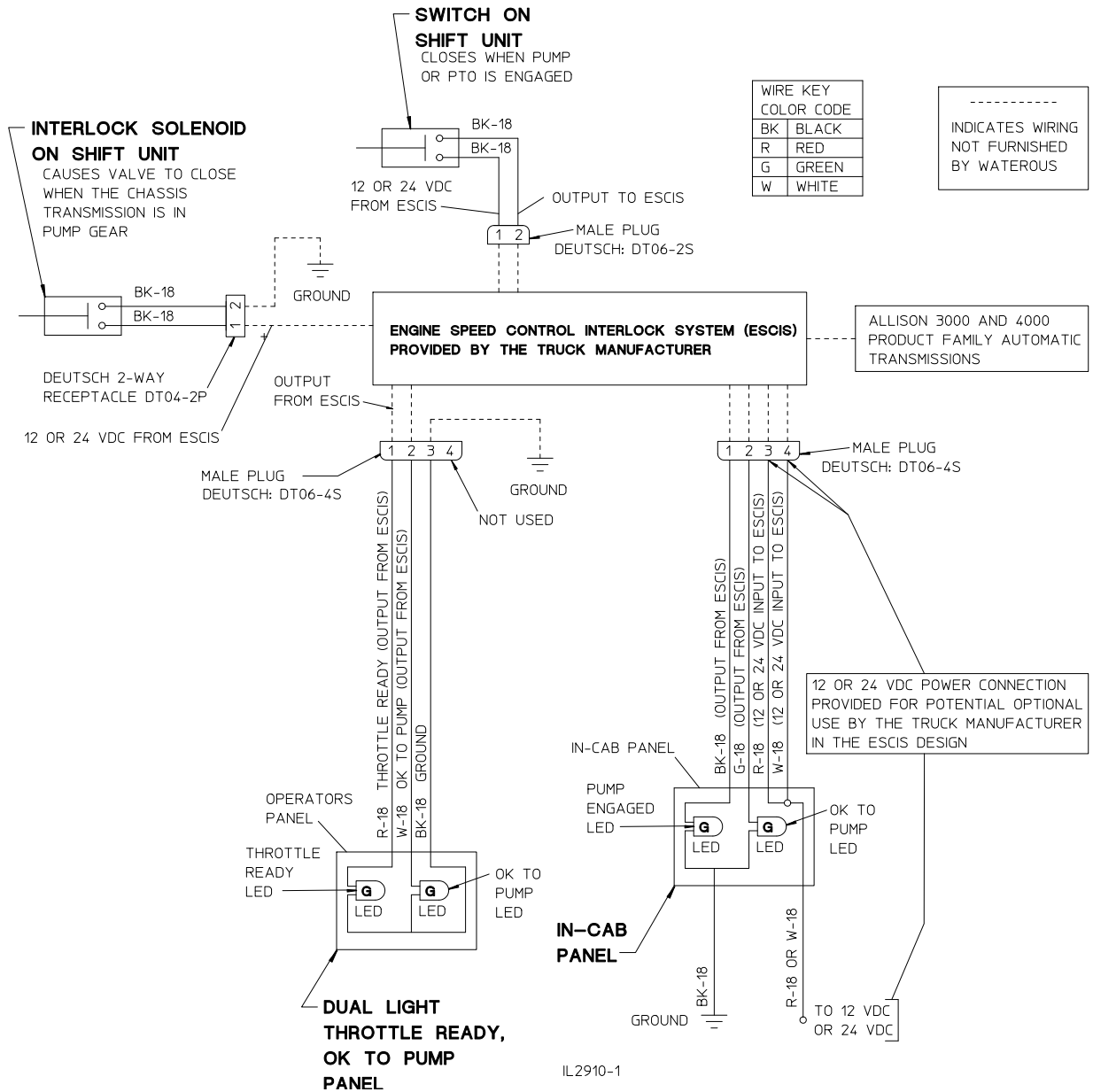


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**NOTES:**

1. Number following color code is the wire size (AWG.) (I.E. BK-16 is a black 16 AWG wire).
2. ESCIS - Engine Speed Control Interlock System.

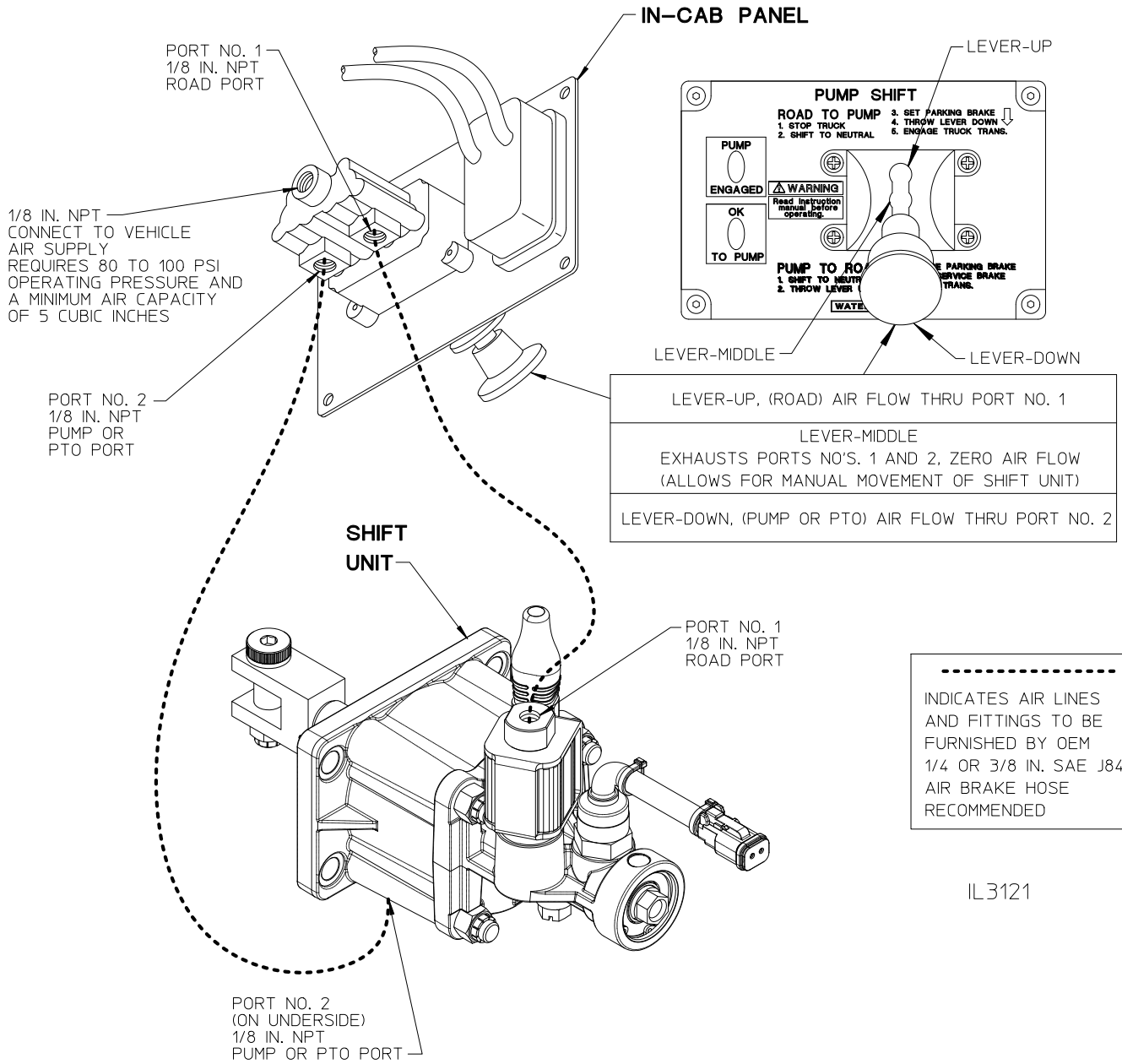
# Wiring Schematic – Dual Light Operator’s Panel



**NOTES:**

1. Number following color code is the wire size (AWG.) (I.E. BK-16 is a black 16 AWG wire).
2. ESCIS - Engine Speed Control Interlock System.

# Air Line Connections



IL3121

# Manual Override

## Optional Manual Override

If desired, manual override controls can be installed so that in the event of a malfunction, the pump transmission or PTO can be operated from the cab, control panel or other location.

To override the pneumatic shift, the air valve must be placed in the center position to exhaust the air pressure. After air pressure is exhausted, the transmission can be manually shifted with the use of a rod or cable.

### CAUTION

The use of a manual override control must maintain full functional capabilities of the pump or PTO shaft indicator system and the pump or PTO Operator's Panel Engine Speed Control Interlock System (ESCIS).

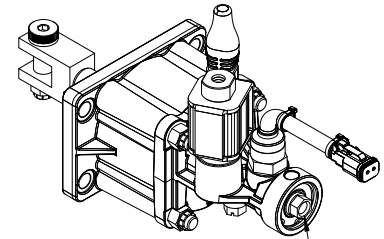
## Connection of Override Cable or Linkage

### CAUTION

Provisions should be made to lock linkage or cable in PUMP/PTO mode once shift is completed manually.

Install linkage or cable so that a maximum force applied to the shift unit will not exceed 100 lbs.

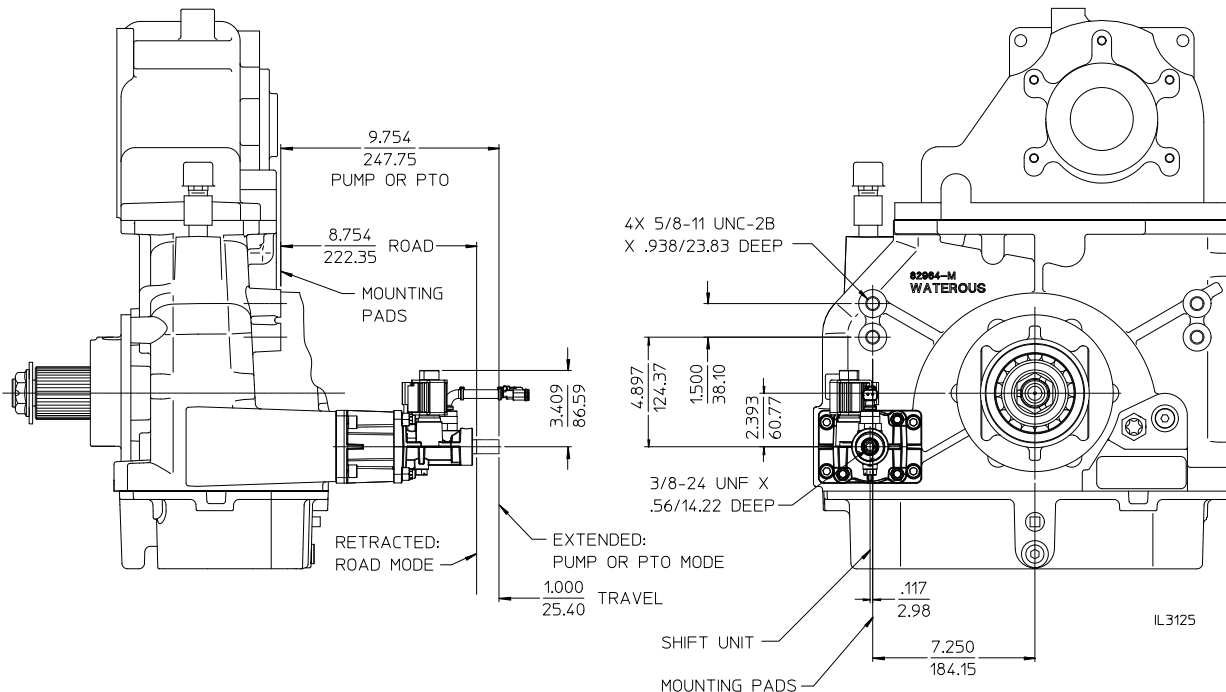
During normal shift operation with air pressure, the override rod or cable will move. The drag on the rod or cable should be minimized, 10 lb max. drag is recommended.



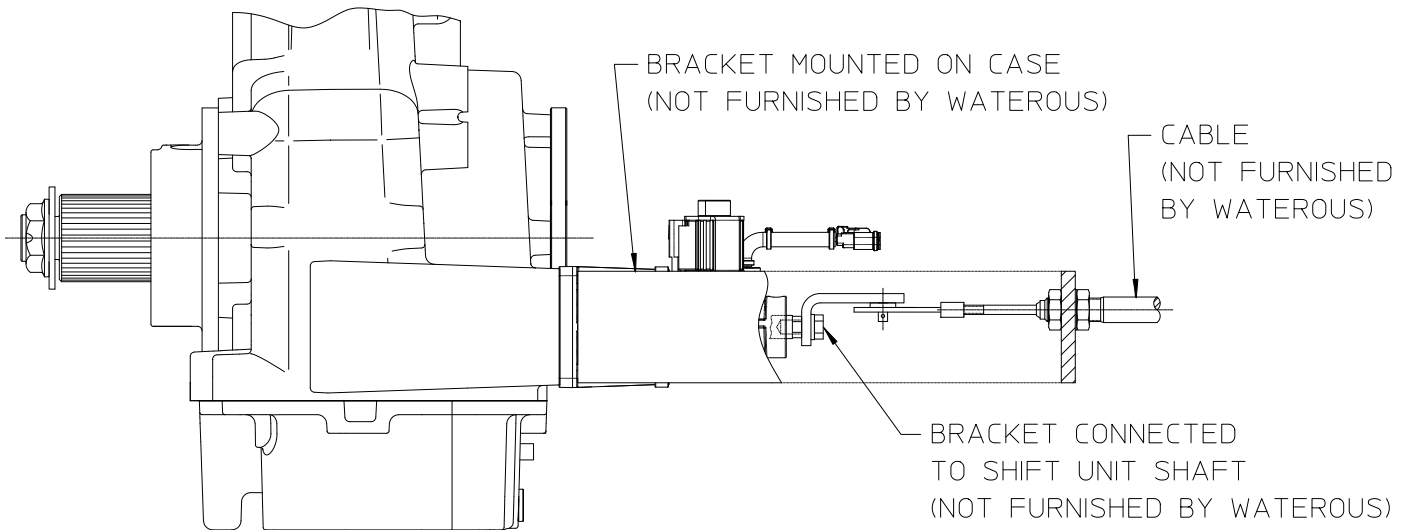
IL3490

3/8-24 UNF X .56 IN. (MIN) DEEP TAP IN END OF SHAFT MAY BE USED TO ATTACH OVERRIDE CABLE OR LINKAGE

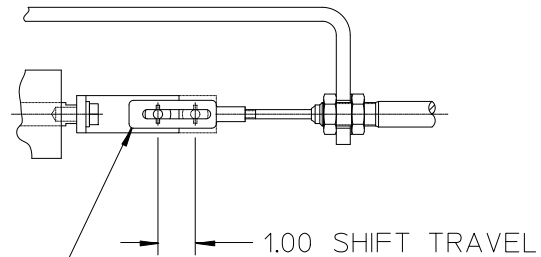
## Override Bracket Connection Points



# Optional Manual Override



IL3330



USE OF A SLIP JOINT IS RECOMMENDED SO THAT PNEUMATIC SHIFTING DOES NOT CAUSE CABLE MOVEMENT. SLIP JOINT SHOULD ALLOW FOR 1 IN./25.4 mm TRAVEL OF SHIFT UNIT SHAFT. THE MANUAL OVERRIDE AXIS SHOULD BE IN LINE WITH THE SHIFT UNIT SHAFT AXIS SO THAT A SIDE LOAD IS NOT APPLIED TO THE SHIFT UNIT SHAFT.

## BOTTOM VIEW