

# Pneumatic Shift

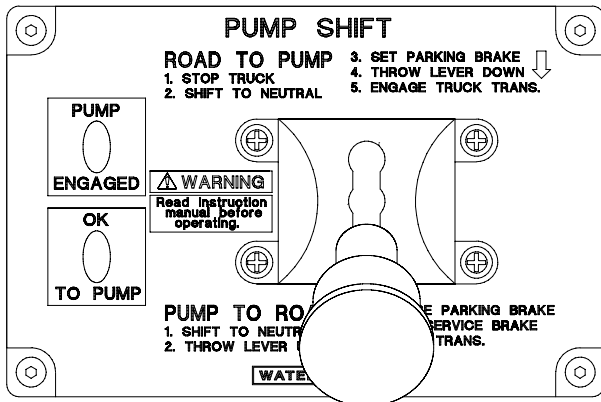
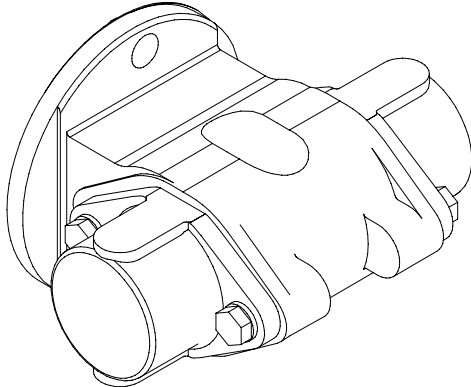
As used on Y and C10 Transmissions  
and TY and TC10 Series PTO's

# Installation Instructions

Form No.	Section	Issue Date	Rev. Date
F-1031	3029	04/02/09	02/01/10

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Instructions subject to change without notice.

# 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.

# 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.

## 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**

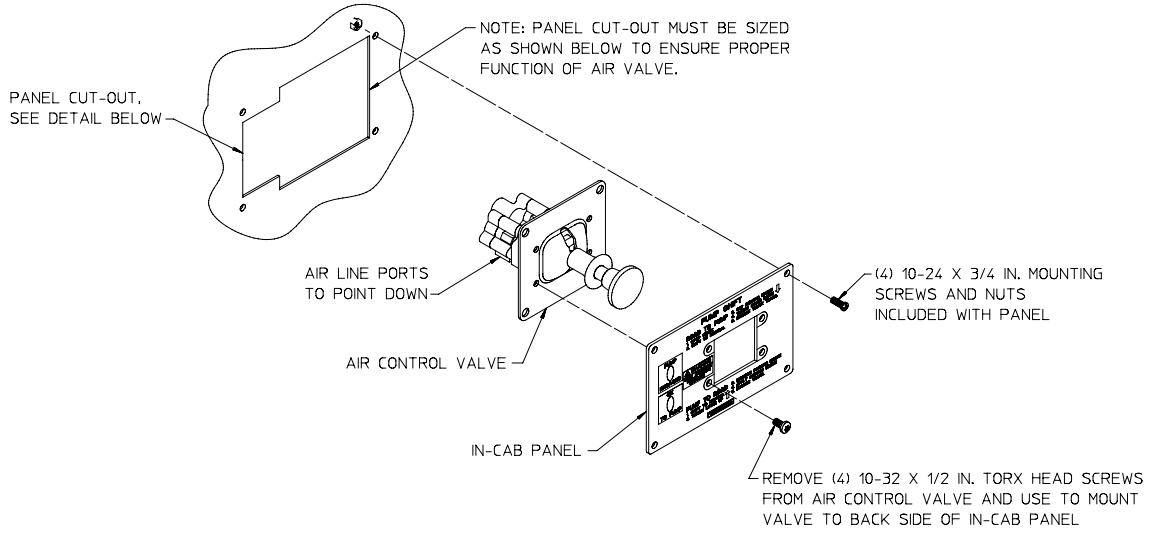
Failure to properly install the pump shift control and pump shift indicator system in the apparatus or failure to incorporate in the Pump Operator's Panel Engine Speed Interlock System may result in the inability to pump water which may result in serious personal injury or death.

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 5 & 6).
2. Install In-cab and "Throttle Ready" panels (see Pages 3 & 4).
3. Connect panel wiring to OEM supplied wiring harness (see Pages 5 & 6).
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 4 cubic inches.
  - b.. 1/4 in. or 3/8 in. SAE J844 air brake hoses recommended for air lines (see Page 7).
5. If desired, a manual override control can be installed to be used in the event of a loss of air pressure (see Page 8).

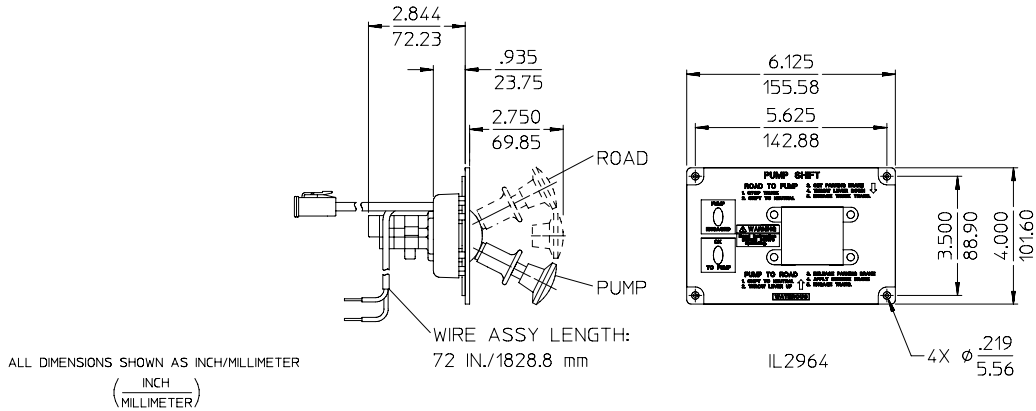
# Panel Plate Dimensions and Panel Cut-outs

## In-Cab Panel

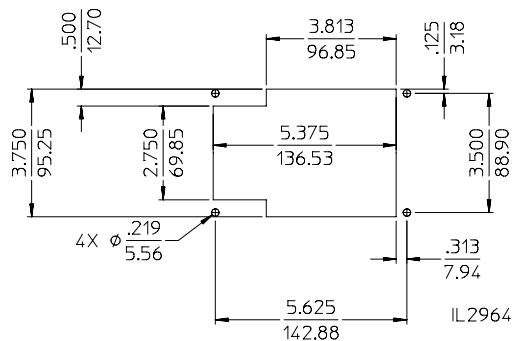
### Installation



### Plate Dimensions



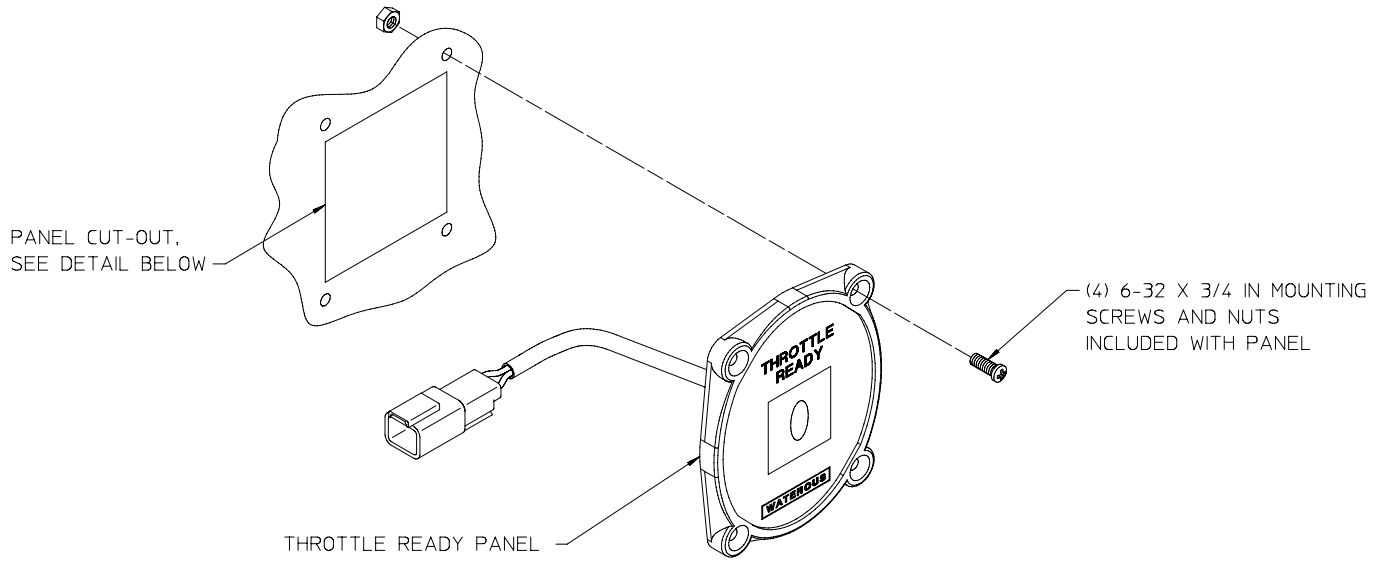
### Panel Cut-Out



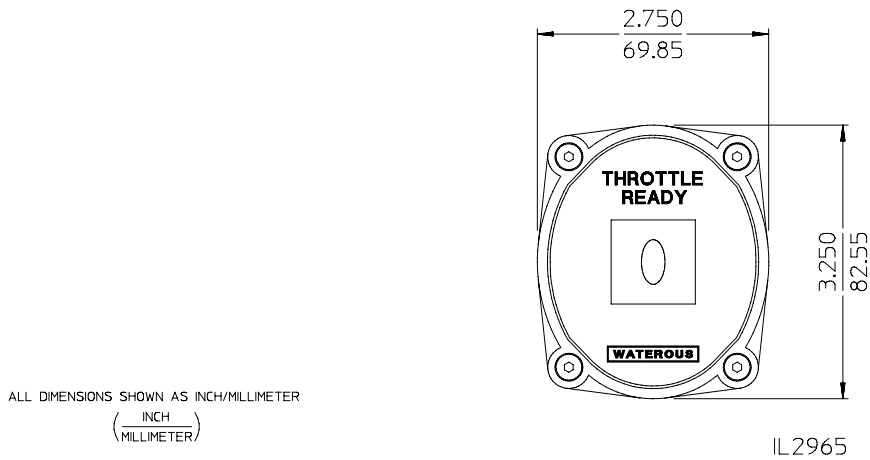
# Panel Plate Dimensions and Panel Cut-outs

## Throttle Ready Operator's Panel

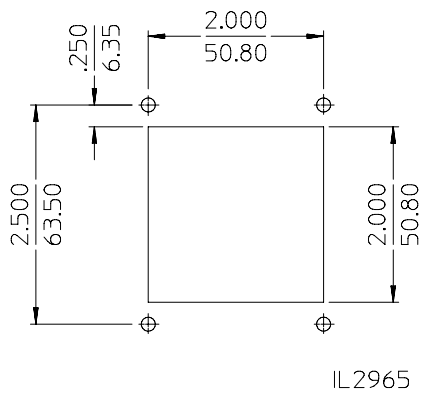
### Installation



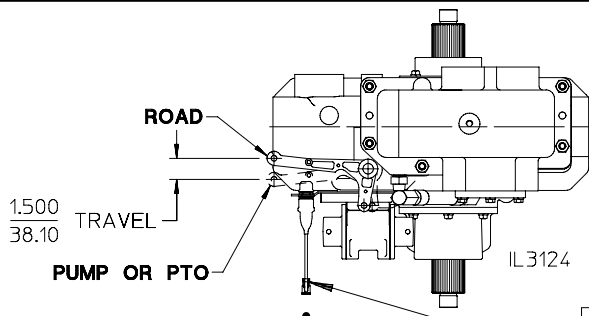
### Plate Dimensions



### Panel Cut-Out



# Shift Components and Wiring



**Shift Unit on Transmission or PTO**

Male Deutsch Plug DT06-2S  
(Mates with Female Deutsch DT04-2P Plug)

Wire		Function
Color	Wire Size	
White	AWG 18	12 or 24 VDC from ESCIS
Black	AWG 18	Output to ESCIS

**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.

**Male Deutsch Plug DT06-2S**  
(Mates with Female Deutsch DT04-2P Plug)

Contact	Wire Size	Function
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	AWG 18	From 12 or 24 VDC (See Note 2)
4	AWG 18	From 12 or 24 VDC (See Note 2)

To 12 or 24 VDC (Red or White) AWG 18 (See Note 2)

To Ground (Black) AWG 18

**Female Deutsch Plug DT04-2P**  
(Mates with Male Deutsch DT06-2S)

Contact	Wire Size		Function
	Color	Size	
1	Red or White	AWG 18	To Green LED "Pump or PTO Engaged" (See Note 3)
2	Black	AWG 18	To Ground

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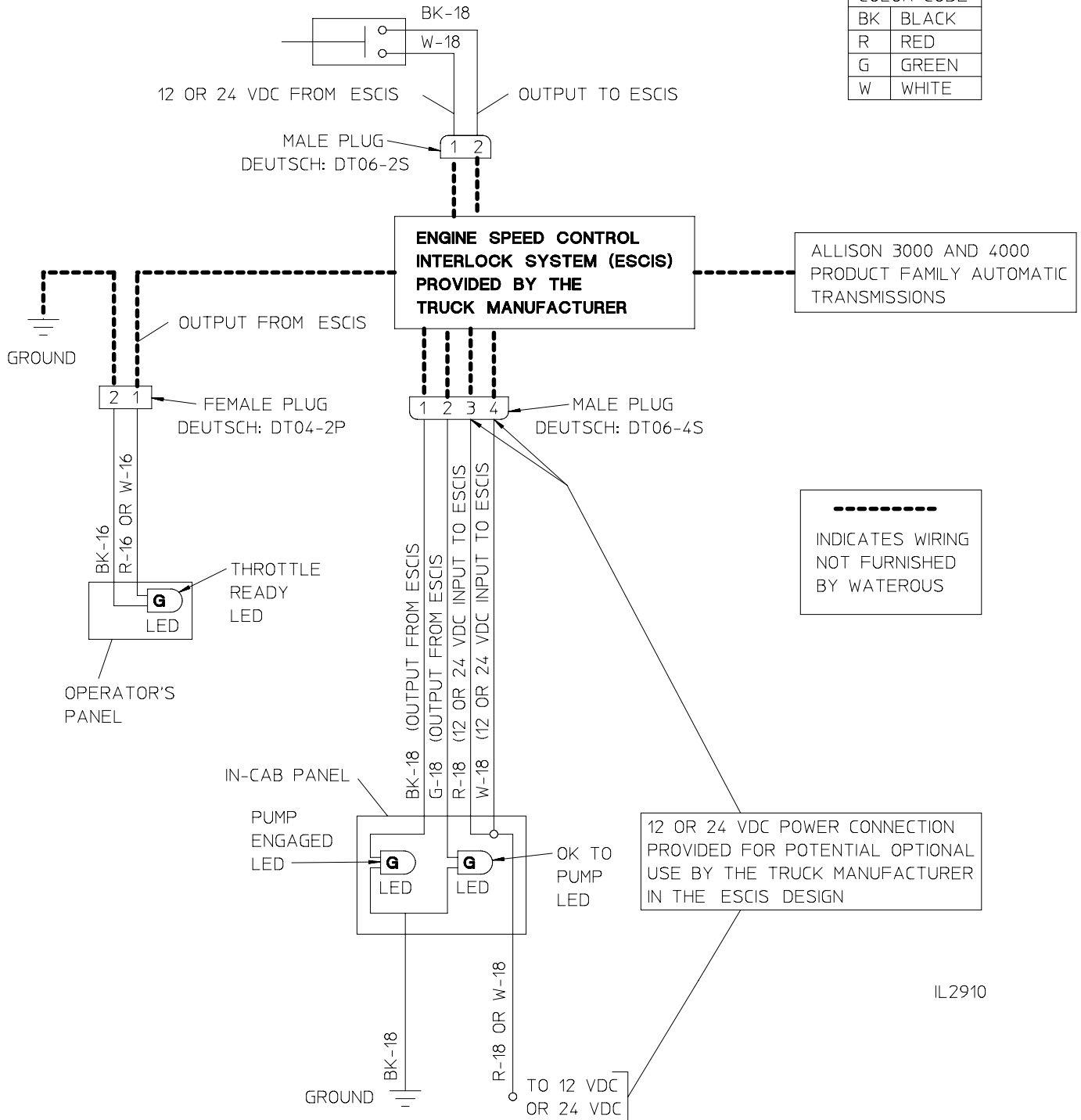
**NOTES:**

- For installations with Allison 3000 and 4000 Product Family Automatic Chassis Transmissions with 4th 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.
- These 12 or 24 VDC power connections provided for potential optional use by truck manufacturer in ESCIS design.
- Each LED draws 20mA. Size wires accordingly.

# Wiring Schematic

SWITCH ON PUMP TRANSMISSION OR PTO SHIFT UNIT  
(CLOSES WHEN PUMP OR PTO IS ENGAGED)

WIRE KEY COLOR CODE	
BK	BLACK
R	RED
G	GREEN
W	WHITE

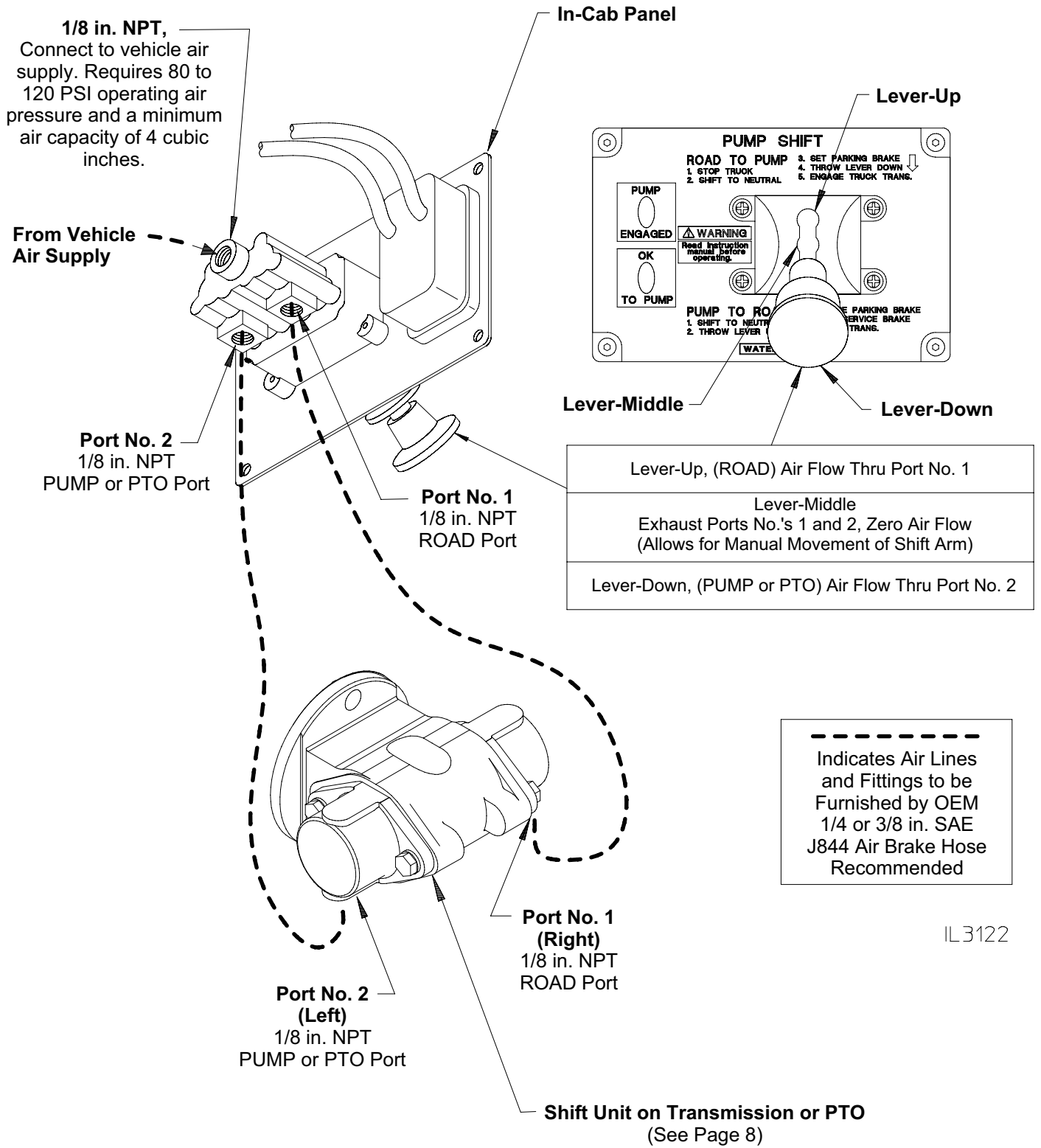


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**NOTES:**

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.

# Air Line Connection



IL3122



## 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.

**NOTE: The use of a manual override control must maintain full functional capability of the pump or PTO shift indicator system and the Pump or PTO Operator's Panel Engine Speed Control Interlock System (ESCIS).**

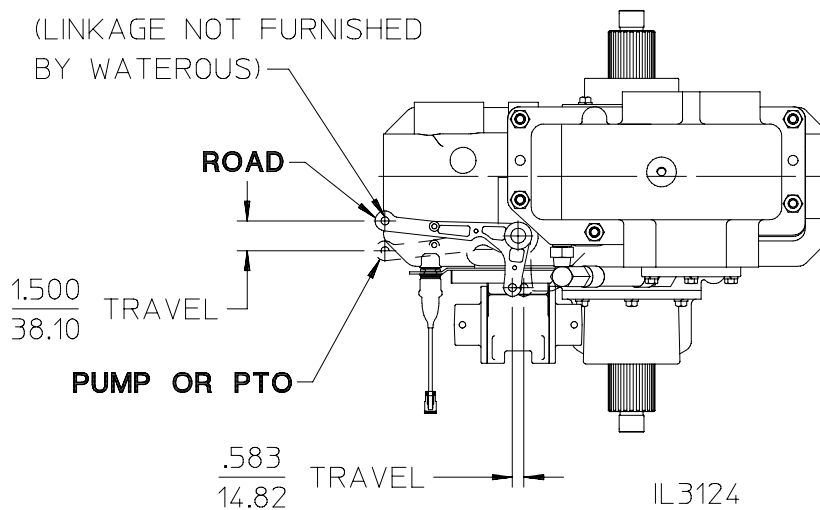
To override the pneumatic shift, the air valve must be placed in the center position to exhaust the air pressure. After air pressure is exhausted, the transmission can be manually shifted with the use of a rod or cable (see Manual Override figure below).

1. Determine locations for the control rod handles on the control panel or other location. Be sure no obstructions interfere with rod operation. Drill holes and install rubber grommets (if desired).
2. Install the manual shift rod between the control panel and the shift arm on the transmission. Connect the rod to the shift arm with a 3/8 inch ball joint or similar device which will permit the rod to swivel freely on the arm.
3. Install shift linkage so that the maximum force applied to the long arm of shift lever will not exceed 300 pounds / 136 kg.

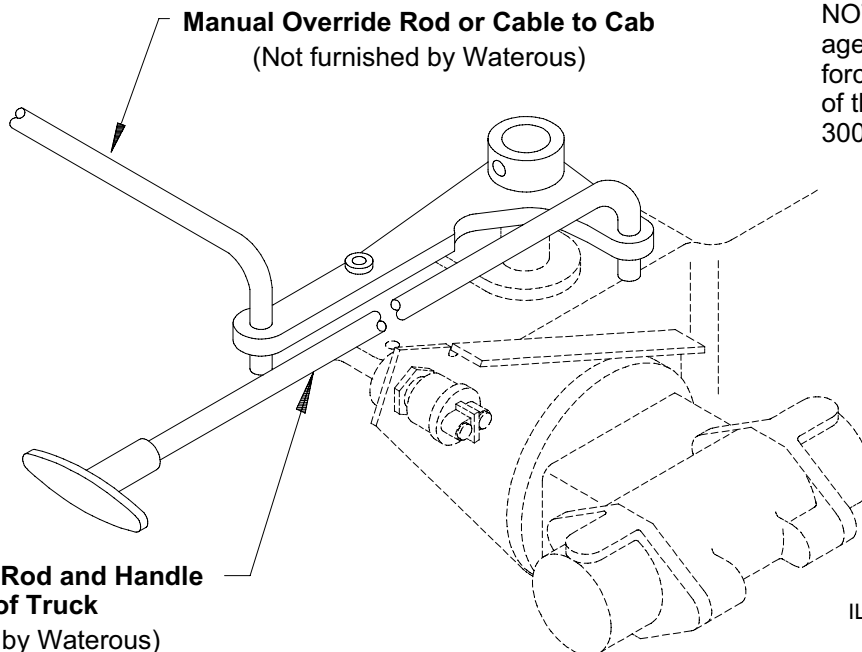
**NOTE: The rod will move during pneumatic shift operation; therefore, reduce drag on the rod.**

### Hole Size for Manual Override Linkage

2X Ø.406 FOR MANUAL  
OVERRIDE LINKAGE  
(LINKAGE NOT FURNISHED  
BY WATEROUS)



### Manual Override



**NOTE: Install override linkage so that the maximum force applied to the long arm of the lever will not exceed 300 lbs (135 kg)**