

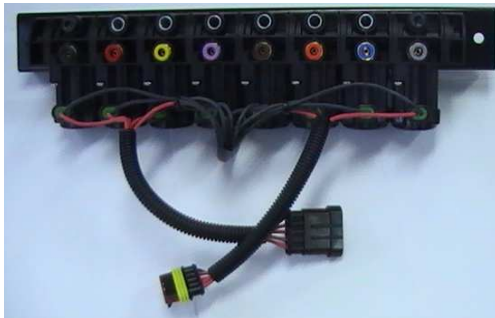


# **TCU CK159**

CONTROL UNIT



DISTRIBUTION VALVES



INSTALLATION INSTRUCTIONS  
AND OWNER'S MANUAL



PO Box 890 SEVEN HILLS NSW 1730 ABN 90 000 598 354

## 1. OVERVIEW:

The CK159 Tipper Control Unit from David Brown Engineering & Hydraulics is the next generation of truly intelligent control for truck and trailer combinations.

The system consists of three parts:

A hand held “in-cab” pendant control

Commands are entered via a soft-touch keypad on this unit.

An “in-cab” mount control unit.

This unit processes commands from the pendant and operates the solenoid bank

A remote mounted solenoid valve bank

This solenoid valve bank is activated by the pendant and operates the tipping system

The system is “intelligent” and will operate a series of solenoids via a proprietary microprocessor in the control unit. This system requires the use of air piloted hydraulic equipment.

The CK159 will operate all vehicles for tipping up to, and including, a truck and dog combination. The system uses one pendant only and simply makes some functions redundant should a single tipping operation be required.

This system is designed to replace conventional pneumatic controls and offers the opportunity for greater flexibility in installation, mounting, functionality and operation.

David Brown Engineering and Hydraulics Pty Ltd is proud of this advance in technology and hopes that you gain many years of trouble free operation from your CK159. Studying this manual will enhance your ability to use the system to it's fullest extent.



## 2. MOUNTING INSTRUCTIONS

### I. POSITION

We recommend that the solenoid bank be mounted on the chassis in a sheltered location where it will not be damaged by rocks or road debris. **IMPORTANT: THE CONTROL UNIT MUST BE MOUNTED INSIDE THE CAB**

### II. MOUNTING

Having selected an appropriate position for the solenoid bank, either fabricate a suitable bracket for mounting or direct mount to the chassis.

**IMPORTANT: VALVE EXHAUST TO POINT DOWN AS SHOWN**

The control box unit must be mounted inside cab with the self drilling screws supplied.

### III. CONNECTING AIR LINES

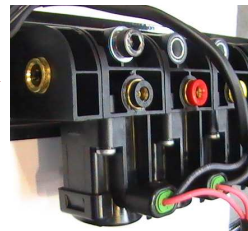
**IMPORTANT: TO AVOID SOLENOID VALVE FAILURE DUE TO CONTAMINATION, AN INLINE AIR FILTER BEFORE THE EQUIPMENT IS HIGHLY RECOMMENDED. FILTERS SHOULD ALSO BE USED ON ANY LINES THAT CAN BE DISCONNECTED AND ALLOW THE INGRESS OF DIRT (IE TRAILER TURN TABLE AND TAIL GATE). (SEE PAGE 11)**

No air lines need be run into the truck cab. All lines should be plumbed to the solenoid bank according to the legend in sheet 12

If a diverter valve is used, connect the diverter pilot to the trailer raise port.

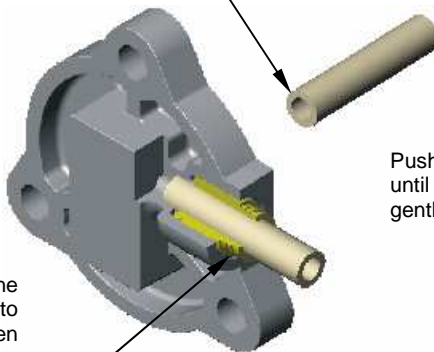
In this instance, the trailer lower solenoid is not used.

Inlet (3/8" DIA)



Tube Preparation: Cut tube cleanly and squarely using a tube cutter or sharp knife. Avoid using pliers or side cutters as they deform and crease the tube and may cause air leaks.

Exhaust



Push tube fully into fitting until it stops. Then give it a gentle tug to set the collets.

To remove tube, push the outer ring inwards to release the collets then pull the tube from the fitting

## IV. ELECTRICALS

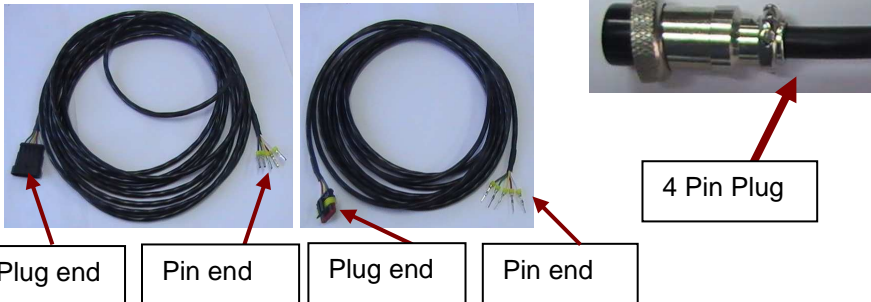
The connective wires from the Control Box are terminated at one end to two M/F 5 Pin plugs and at the other end to 2 wires: *Red* and *Black* (*positive and negative power supply*) and a 4 pin plug.

The control box is supplied with two leads (7 meters long) with 5 pin M/F Plugs crimped on to them at one end and crimped pins at other end.

Drill hole in cab for the two leads that will be used to connect the control box to the solenoid bank. (Refer pages 5 & 6 for more information)

Push both 7m cables through the hole and connect to the control box and the solenoid bank.

The connection to the solenoid bank is simple; connect **one end (pulg end)** of **each** of the two 7m long leads to the male and female plugs at the Solenoid bank, then connect the **other end (crimped pin end)** of **each** of the two 7m leads to the male and female plugs (refer page 5 & 6 for connection).



The signal harness has A 4pin connector plug connected to the pendant control.

- Connect the plug to the compatible plug on one end of the CK159 control box.
- Connect positive conductor (*Red from power cable*) to a 12V supply
- For 24V supply connect through the voltage converter as shown on page 2.
- This power connection should be through the ignition switch so that the unit is powered only when the ignition is on.
- Connect the negative conductor (*Black*) to the negative side of the battery or a good earthing point with a direct connection to the battery.

The system is now operational and should be tested for correct function.

## CK158 &CK159 Connecting Leads 1

This cable is supplied with only one Plug fitted so as to assist with the installation of the cable into the truck cab. This means a smaller hole will be needed to feed the cable through.

After, and **ONLY AFTER**, you have routed the cables in a satisfactory position; fit the second Plug as shown below.



Locking tab on  
Pin to the bottom.

- 1 –White
- 2 –Red
- 3 –Yellow
- 4 –Green
- 5 –Brown

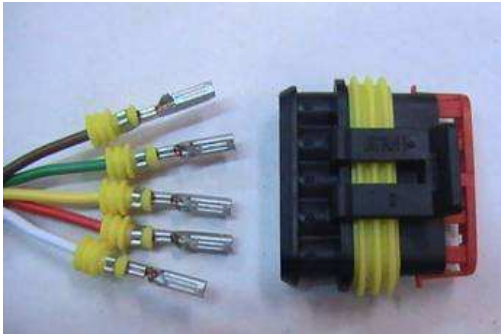


- Before inserting the Pins, spray a little Silicone Spray onto the ends of the pin holes in the plug.
- Then, carefully insert the Pins in the order shown; each until you hear a “click”, then pull back on the wire to make sure the Pin is securely fixed.
- When all 5 Pins are securely inserted, engage the Secondary Lock (Red Plate), as per instructions on page 7.

## CK158 &CK159 Connecting Leads 2

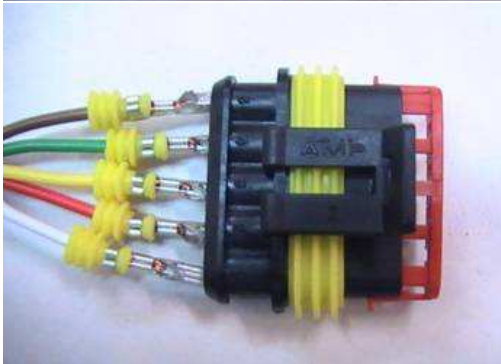
This cable is supplied with only one Plug fitted so as to assist with the installation of the cable into the truck cab. This means a smaller hole will be needed to feed the cable through.

After, and **ONLY AFTER**, you have routed the cables in a satisfactory position; fit the second Plug as shown below.



Locking tab on Contact Tab to the top.

- 5 -Brown
- 4 -Green
- 3 -Yellow
- 2 -Red
- 1 -White



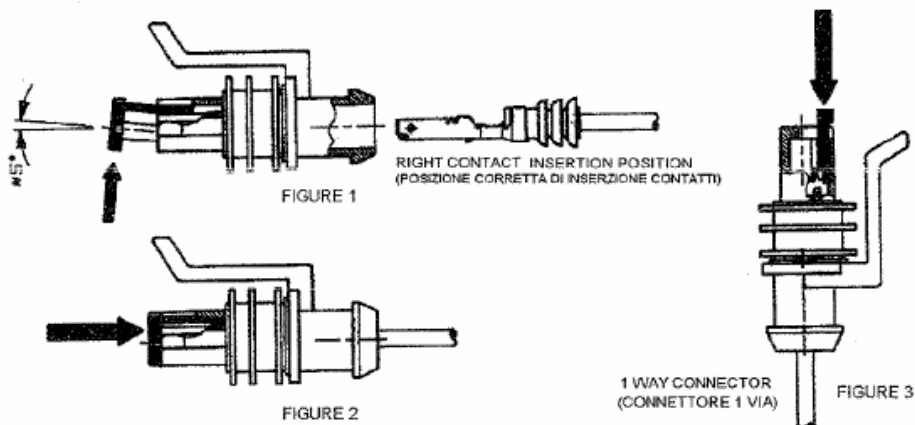
- Before inserting the tabs, spray a little Silicone Spray onto the ends of the holes in the plug.
- Then, carefully insert the tabs in the order shown; each until you hear a “click”, then pull back on the wire to make sure the tab is securely fixed.
- When all 5 tabs are securely inserted, engage the Secondary Lock (Red Plate), as per instructions on page 7.

# Tyco Electronics AMP Italia S.p.A.

## AMP SUPERSEAL 1.5 Series Connectors

### INSTRUCTIONS FOR PROPER USAGE OF SECONDARY LOCK (ISTRUZIONI PER L'USO DEL SECONDARY LOCK)

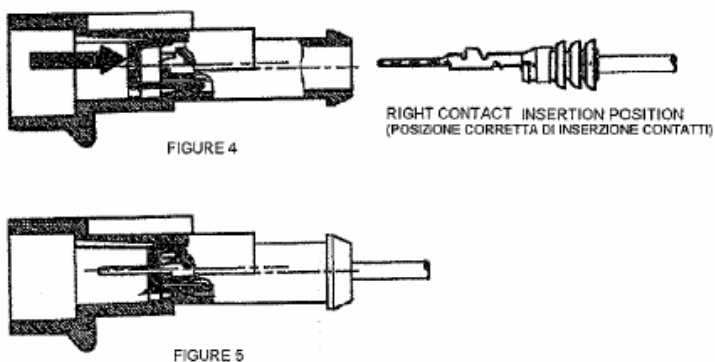
#### PLUG CONNECTORS (CONNETTORI PORTAFEMMINE)



#### 2 TO 6 WAYS CONNECTORS (CONNETTORI DA 2 A 6 VIE)

AFTER CONTACTS LOCKING, SLIGHTLY TILT THE SECONDARY LOCK (ABOUT 5°) LIKE SHOWN IN FIGURE 1. THEN PUSH IT (FIGURE 2) UNTIL IT IS LOCKED. FOR 1 WAY CONNECTOR, PUSH WITHOUT TILTING (FIGURE 3). (DOPO L'INSERZIONE DEI CONTATTI, RUOTARE LEGGERMENTE IL SECONDARY LOCK (CIRCA 5°) COME INDICATO IN FIGURA 1, QUINDI SPINGERLO (FIG. 2) SINO A SCATTO AVVENUTO. PER I CONNETTORI A 1 VIA E' SUFFICIENTE SPINGERE (FIG. 3))

#### CAP CONNECTORS (CONNETTORI PORTAMASCHI)



AFTER CONTACTS LOCKING, PUSH THE SECONDARY LOCK BY USING THE PROPER TOOL P/N 785061-1 FOR 1-3-5 WAYS AND P/N 785061-2 FOR 2-4-6 WAYS, UNTIL IT IS LOCKED (FIG. 5)  
(DOPO L'INSERZIONE DEI CONTATTI, SPINGERE IL SECONDARY LOCK MEDIANTE L'APPOSITO ATTREZZO P/N 785061-1 PER 1-3-5 VIE E P/N 785061-2 PER 2-4-6 VIE SINO A SCATTO AVVENUTO (FIG. 5))

### 3. GENERAL OPERATION

- The preferred operating characteristics of the CK159 control box and processor can be selected by changing the DIP switch setting inside the pendant control unit. This selects a 'protocol' for system operation. These protocols are outlined in section 5.
- Because static electrical discharges can destroy sensitive electronic components, we recommend the correct protocol be set at the time of purchase. There are no user-serviceable parts inside the pendant controller
- ***It is strongly recommended that a POWAUTO trained installer sets operating protocols and they not be altered except by a trained installer.***
- The system will start at "sleep mode" or will return to this mode after 5 minutes without operation.
- In sleep mode, the green ready LED flashes once every 2 seconds.
- No operation is possible of the CK159 when in sleep mode.
- The system is 'woken up' by pressing the truck raise and truck lower keys simultaneously.
- The system indicates that it is "ready" by the LED flashing at a faster rate.
- When the system is woken up and is in operating mode, the green ready LED is constantly illuminated.
- For automatic or computer auto select gearboxes, with the brakes applied, select drive or 1<sup>st</sup> gear before engaging the PTO, then return to neutral to operate the hydraulics.
- **To engage the PTO:**
  - ❖ Depress the clutch pedal
  - ❖ Engage a forward gear to stop the countershaft rotation
  - ❖ Engage the PTO by pressing the PTO button on the pendant control (the PTO LED should illuminate)
  - ❖ Put the transmission back into neutral
  - ❖ Slowly release the clutch pedal.
- **To disengage the PTO:**

Depress the clutch pedal, press the PTO button on the pendant and the LED and PTO will go off.

**IMPORTANT: FAILURE TO FOLLOW THE ABOVE PROCEDURE MAY CAUSE DAMAGE TO YOUR PTO AND TRANSMISSION**

## GENERAL OPERATION (cont.)

- Unless you have a hotshift PTO, always engage the PTO when the vehicle is stationary.
- The use of the pendant control is intuitive and the functions performed are indicated on the soft-touch buttons.
- The actual operation of each function will be dependant on the protocol selected (See section 5).
- The system will automatically put itself back into sleep mode if no keys are pressed for 5 minutes. This feature can be disabled by changing the position of DIP switch 7
- The two 'tailgate release' switches and trailer 'lock' switch are all latching switches, meaning that once operated, they remain on until they are operated a second time to turn them off. When operated, the LED for the function will be illuminated.
- Depending on the protocol selected the hoist 'raise' and 'lower' switches can be latching or momentary switches. Momentary switches operate the function only while the switch is pressed.
- To raise or lower a hoist, operate the appropriate switch for the truck or trailer. Operating either the 'raise' or 'lower' switch on the same hoist a second time, will stop the raise or lower function and put the hydraulic valve into the 'hold' position.
- Some protocols will automatically turn the PTO off when either the truck hoist or trailer hoist is lowered.
- Some protocols will allow 15 seconds for the hoist raise function, then will automatically put the valve to the 'hold' position. If the hoist is required to continue to raise, the raise button must be operated again and the hoist will raise for another 15 seconds, or until the raise or lower buttons are operated again to stop the hoist.
- The system can be put back to sleep by pressing the truck lower and trailer lower keys at the same time when all other functions are off.

## 4. ERRORS AND WARNINGS

- Please note: If all the pendant controller LED's are flashing once per second the system has detected an error. In error mode all solenoids in the control box are forced off. To restart the system, remove power or turn off, and turn back on again. The system may require servicing by a qualified person if the system enters error mode.
- This is an open loop system. There is no feedback or monitoring by the micro-controller of the solenoids or actions of the air or hydraulics systems. It is therefore not possible for the system to determine that a solenoid is stuck, or a wiring fault is causing an unexpected action.
- Deliberate tampering with control box or amendments to the dip switches without approval by an authorised distributor or David Brown Engineering and Hydraulics Pty Ltd personnel will render all warranties void and negate any consequential loss suffered by any party.
- This unit is subject to David Brown Engineering and Hydraulics Pty Ltd normal commercial warranty. A copy of the warranty can be obtained by contacting your local *Powauto* distributor or by writing to David Brown Engineering and Hydraulics Pty Ltd at PO Box 890 Seven Hills NSW 1730 Australia.
- Every effort has been made to ensure trouble-free operation of this unit but no liability is accepted for lost time resulting from failure of equipment regardless of the cause of this failure.

### Return line filter detail:

Return line filters to be installed for trailer turn table lock and trailer tail gate air lines to capture any dirt ingress into the air control system during trailer connect / disconnect

Filter should be installed as close to the solenoid valve as possible as shown below

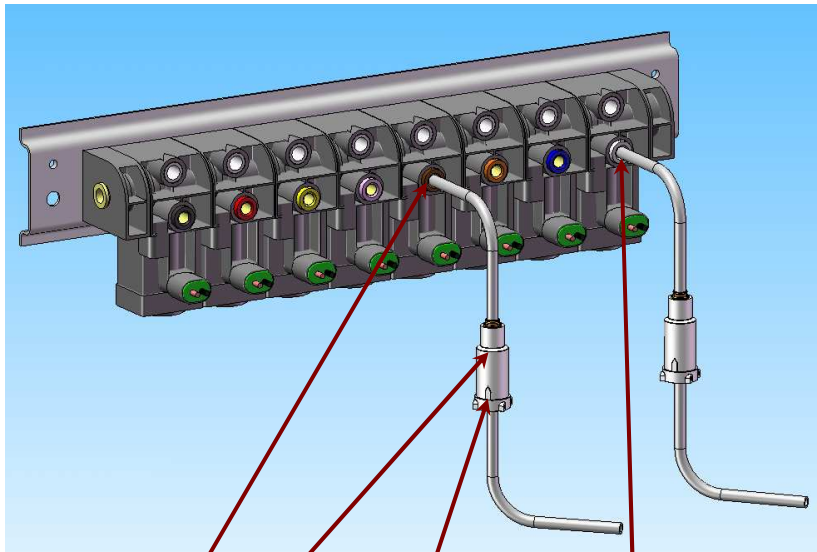


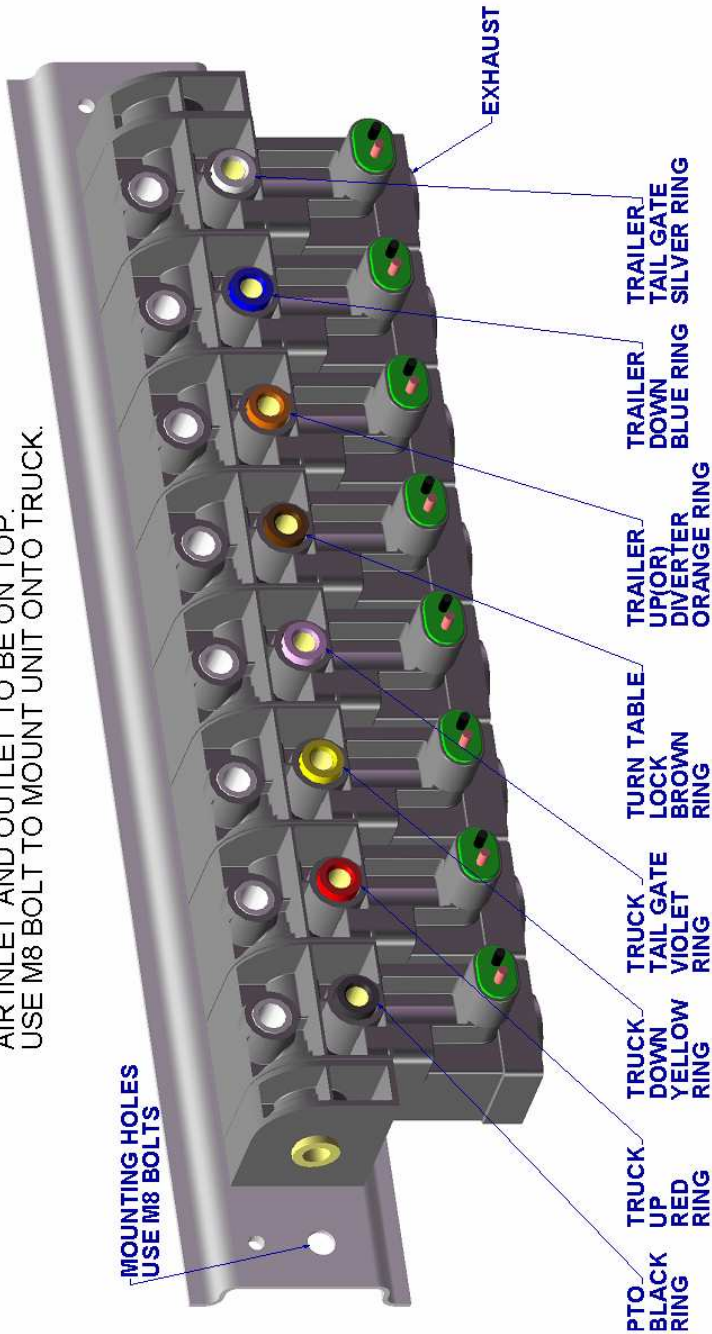
Table Lock  
Brown ring

Filter

Trailer Tail Gate  
Silver ring

Important direction of flow as shown (Arrow towards valve)

ENSURE VALVE ASSEMBLY IS MOUNTED AS SHOWN.  
 WIRE END TO FACE DOWN (SO THAT EXHAUST IS DOWN).  
 AIR INLET AND OUTLET TO BE ON TOP.  
 USE M8 BOLT TO MOUNT UNIT ONTO TRUCK.



## 5. PROTOCOLS FOR USE WITH A 2-SPOOL VALVE

#	Dip Switch Setting 8765 4321	PTO, Lock, Release	Raise, Lower	Other Feature
0	0000 0000	Latching	Momentary	
1	0000 0001	Latching	Latching	<ul style="list-style-type: none"> <li>• Raise / lower stops function for corresponding truck or trailer</li> </ul>
2	0000 0010	Latching	Latching	<ul style="list-style-type: none"> <li>• Timed hoist raise</li> <li>• Raise / lower stops function for corresponding truck or trailer</li> </ul>
3	0000 0011	Latching	Latching	<ul style="list-style-type: none"> <li>• Timed hoist raise</li> <li>• Raise / lower stops function for corresponding truck or trailer</li> <li>• Auto PTO off truck lower</li> </ul>
4	0000 0100	Latching	Latching	<ul style="list-style-type: none"> <li>• Timed hoist raise</li> <li>• Raise / lower stops function for corresponding truck or trailer</li> <li>• Auto PTO off truck and trailer lower</li> </ul>
5	0000 0101	Latching	Latching	<ul style="list-style-type: none"> <li>• Raise / lower stops function for corresponding truck or trailer</li> <li>• Auto PTO off truck lower</li> </ul>
6	0000 0110	Latching	Latching	<ul style="list-style-type: none"> <li>• Raise / lower stops function for corresponding truck or trailer</li> <li>• Auto PTO off truck and trailer lower</li> </ul>

## PROTOCOLS FOR USE WITH A DIVERTER VALVE

128	1000 0000	Latching	Momentary	<ul style="list-style-type: none"> <li>• Uses divert valve for trailer</li> </ul>
129	1000 0001	Latching	Latching	<ul style="list-style-type: none"> <li>• Any raise / lower stops function</li> </ul>
130	1000 0010	Latching	Latching	<ul style="list-style-type: none"> <li>• Timed raise (15 seconds)</li> <li>• Any raise / lower stops function</li> </ul>
131	1000 0011	Latching	Latching	<ul style="list-style-type: none"> <li>• Timed raise</li> <li>• Any raise / lower stops function</li> <li>• Auto PTO off truck lower</li> </ul>
133	1000 0110	Latching	Latching	<ul style="list-style-type: none"> <li>• Any raise / lower stops function</li> <li>• Auto PTO off truck lower</li> </ul>

- Diverter Valve protocols use the trailer raise valve to drive the diverter valve. The Trailer lower valve is not used. The diverter valve is energised for 500 milliseconds before the raise of lower valve is energised. Similarly the divert valve is allowed 500 milliseconds to de-energise before truck raise or lower is allowed
- Changing the position of DIP switch 7 to 'ON' position enables the feature that places the unit in sleep mode after 5 minutes of inactivity.



Notes: