
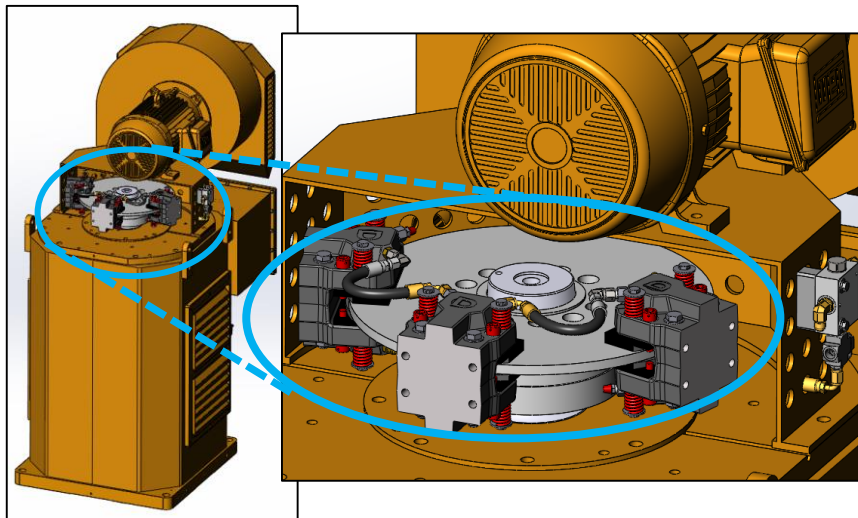


<b>Safety Bulletin</b>			 Tesco Corporation 5616 – 80th Avenue SE Calgary, Alberta, Canada T2C 4N5 Tel: 1-877-TESCO-77 (North America) Tel: 1 (713) 359-7195 (AMSS 24-hour support) Tel: 1 (713) 359-7295 (International) Email: <a href="mailto:bulletins@tescocorp.com">bulletins@tescocorp.com</a> <a href="http://www.tescocorp.com">www.tescocorp.com</a> <a href="http://www.tescoparts.com">www.tescoparts.com</a>
<b>No: SB092</b>	<b>Rev: 1</b>	<b>Date: June 16, 2015</b>	
<b>Possible Fire Hazard on ESI Brake Calipers</b>			
<input type="checkbox"/> Internal Use Only <input checked="" type="checkbox"/> External Use		<input checked="" type="checkbox"/> Mandatory <input type="checkbox"/> Recommended	

**NOTE:** All numbers in parentheses are Tesco part numbers unless otherwise noted.

**BACKGROUND INFORMATION:**

In separate incidents, two Tesco 500TON ESI Top Drives recently experienced a small fire at the top of the ESI main drive motor. In each case, the fire was isolated, contained and extinguished quickly, and damage was limited mainly to the brake calipers and other nearby components including the disc brake and hydraulic hoses. There were no reported injuries to rig personnel. One of the top drives had been operating for two years in the field without prior incident. The other top drive was in the field and operating for two months when the incident occurred.



**Figure 1: View of brake calipers and disc brake, and pilot-operated check valve of the ESI main motor**

During normal operation, whenever the disc brake is activated the directional valve on the manifold will open for 10 seconds, allowing hydraulic pressure to the brake calipers. Hydraulic pressure on the brake calipers is held by a pilot-operated check valve. Through a timer in the electrical circuit, the directional valve will open every 60 seconds to 8 minutes (depending on the version of PLC code shipped with various ESI units) for 10 seconds to re-pressurize the brake calipers.

After further investigation into the incidents, it was determined that the return line pressure in the manifold was higher than normal, which likely resulted in the disc brake unexpectedly engaging the brake calipers during top drive rotation. This pressure passed through the pilot-operated check valve, causing the disc brake to become energized. During drilling operation, ongoing friction between the disc brake and brake calipers generated heat. This, along with hydraulic oil leaking, may have caused the small, isolated fire to break out.

Version	Date (D/M/Y)	ECN	Description of changes
Rev 0	30/01/2015	258-0004	Initial release of document
Rev 1	16/06/2015	258-0003	Add brake upgrade kit numbers

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**AFFECTED PRODUCTS:**

Tesco 500/750TON ESI 1350HP and 500TON ESI 1000HP Top Drives.

**ACTION REQUIRED:**

For ESI Top Drives currently operating in the field, Tesco advises that customers do not function the disc brake at the same time as another auxiliary function; this may allow for a set of conditions where the disc brake may be on (activated) and the operator may not be aware. Tesco also recommends running a brake dump routine until the PLC code or the return line has been upgraded. The following interim solution should be implemented:

- The current PLC program includes a disc brake release code. Set the BRAKE switch on the driller’s panel to ‘OFF’ and the QUILL switch to ‘FWD’ or ‘REV’ so that the top drive is in drilling mode.
- The “release brake” procedure will be functional for ten seconds every eight minutes, ensuring that the pressure in the brake circuit is kept relatively low.

For all ESI Top Drive builds, Tesco is making available a disc brake upgrade kit intended to prevent the high return line from passing through the pilot-operated check valve and getting into the disc brake’s circuit. The kit includes a disc brake manifold for easy installation. A pressure transducer will also be installed in the disc brake circuit to monitor the disc brake’s pressure.

For ESI-1350 top drive units, a complete kit will be required (5050333). For ESI-1000 top drive units (5050393), the PLC module and a pressure transducer will be required:

Tesco Part #	Description	Top Drive Model
5050333	Kit, Upgrade, Brake, Hydac w/o Sequence Valves, ESI 1350	ESI-1350
5050393	Kit, Upgrade, Brake System, ATOS, ESI 1000	ESI-1000

For both kits, a new PLC program will be required. The PLC code will be modified so that the yellow BRAKE “CLOSED” indicator light will illuminate once the brake is activated, or when the BRAKE switch is set to ‘OFF’ but the pressure in the brake circuit is higher than the disc brake minimum engage pressure. This will allow the operator to electronically monitor the disc brake circuit pressure at all times.

If customers are using their own return line, Tesco recommends a 1-1/4” ID drain from top drive to hydraulic tank for optimum performance. If they are using their own PLC code, customers are encouraged to add an inline sensor to monitor circuit pressure and to modify their PLC code accordingly. Customers using existing Tesco PLC code and return line should upgrade the line with either of the following kits:

Tesco Part #	Description	Top Drive Model
5050749	Kit, Upgrade, Tesco, Hose Reel, ESI, 1-1/4" (Hydac)	ESI-1000/1350
5050750	Kit, Upgrade, Tesco, Hose Reel, ESI, 1 1/4" (ATOS)	

For general maintenance of the brake calipers, refer to “Chapter 2: Maintenance and Service Schedules” of the ESI Maintenance Guide (5012166):

- Inspect the brake calipers at least once every operating week for worn pads, leaks and damaged disc brakes.
- Conduct a daily visual inspection of hydraulic hoses for cracks and oil leaks.