Nexteligence Newsletter

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Welcome to the Nexteligence Newsletter!

Welcome to the twelfth edition of the Nexteligence Newsletter. We look forward to continuing to provide the latest news in the Nexteligence training community.

Bypassing The Problem

Filter Bypass - what it is and how to reset it

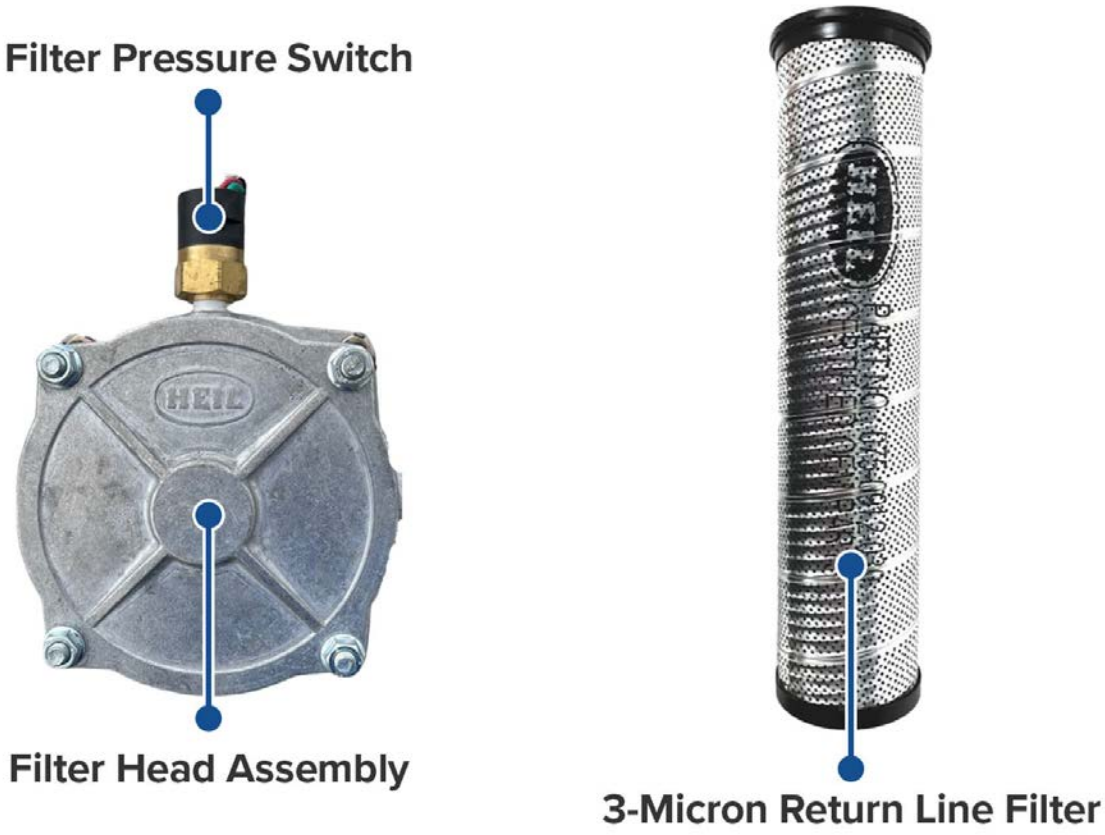
What does it mean for the hydraulic system to be in filter bypass? What causes filter bypass? How can we diagnose and repair this situation? These are the questions we will cover in this month's Nexteligence Newsletter.

What causes the hydraulic system to go into filter bypass?

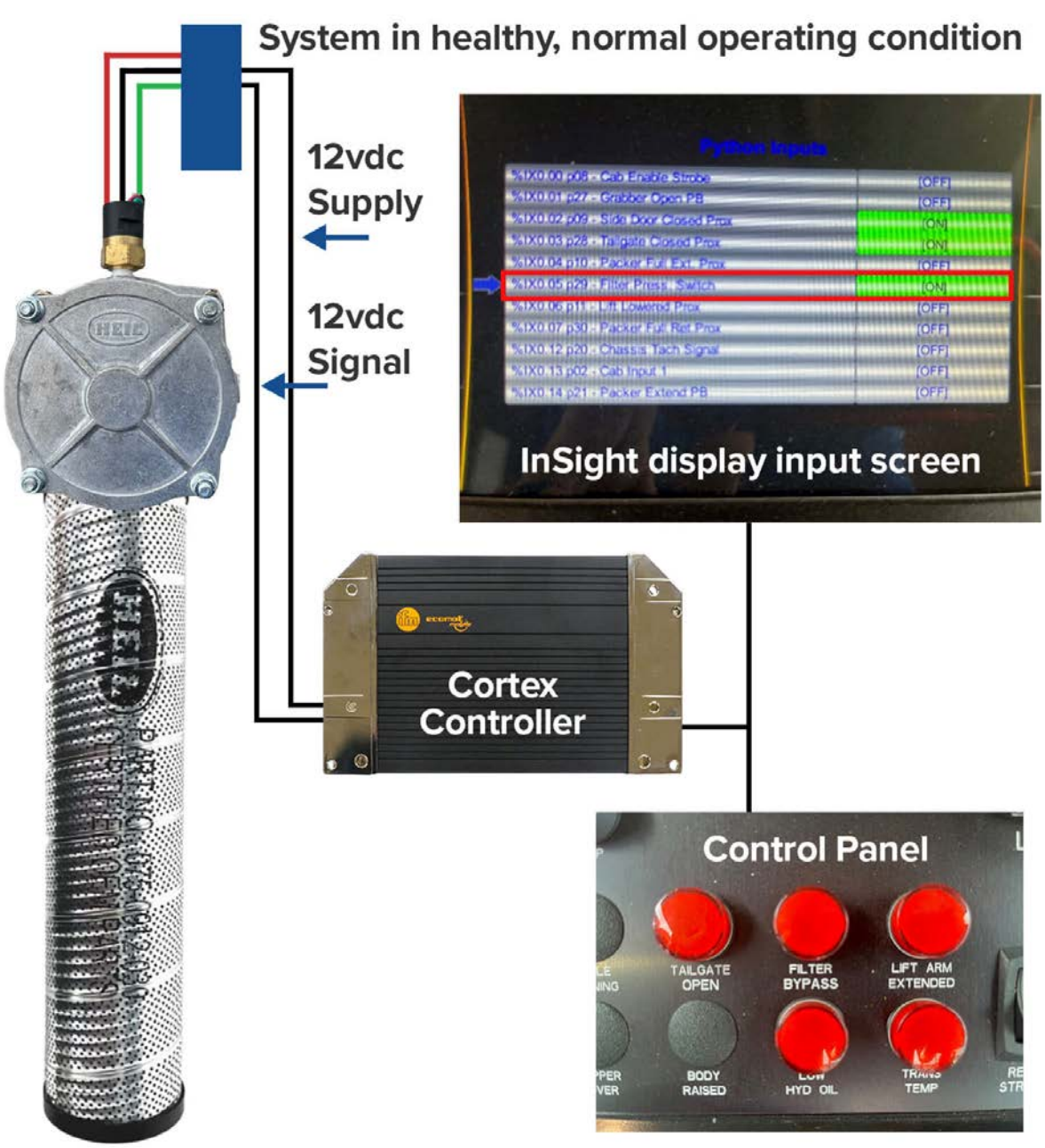
The hydraulic system uses a filter pressure monitor or "switch" that is

located in the filter head assembly of the hydraulic oil reservoir or oil tank to monitor the contamination level of the hydraulic return line filter. It monitors the hydraulic system by taking a pressure reading inside the filter. When this pressure reaches 32 psi, the switch opens and notifies the system that the filter is contaminated, and the Cortex controller starts counting the time that the filter pressure switch has been open or “off” on the input screen. Once 6 hours of “off” time has been reached, the Cortex controller turns on the filter bypass light on the control panel.

There is also a 35 psi check valve in the filter. When the filter is contaminated enough to create 35 psi, the check valve opens, allowing the return oil returning to the oil tank to now “bypass” the filter and return straight through the filter and into the oil tank. We set the pressure switch at 32 psi and the filter check valve at 35 psi to give an early warning of contamination before hydraulic component damage occurs. When this happens, the filter should be changed immediately to prevent hydraulic component damage. If the situation is not corrected, after 6 hours of being in filter bypass, the pump will shut down and will only operate for 3 minutes at a time after the power has been cycled.



The filter pressure switch utilizes a 12-volt DC supply voltage from the Cortex Controller and sends this voltage through the normally closed contacts in the filter pressure switch. When the switch sees the 32 psi of pressure from a contaminated filter, the contacts open, alerting the Cortex Controller that there is a bypass condition. We can see this condition on the control panel filter bypass indicator light as well as on the input screen of the InSight Display. If you are unfamiliar with inputs and outputs from the Cortex Controller, please review the December 2022 edition of the Nexteligence Newsletter.



The filter monitor connector will have three wires, and the body side connector will only utilize the two wires for supply voltage and return signal voltage back to the Cortex Controller. Body-side connector wire colors may vary depending on the unit type.

BLK= Common or 12vdc supply from Cortex Controller
RED = Normally open contact that is not used
GREEN = Normally closed contact that is the signal wire back to the Cortex Controller.

When in filter bypass, the switch opens, and the voltage signal is lost to the Cortex controller. At this point, the Cortex controller starts a timer, and if the filter is not changed to restore the signal to the controller, the controller starts a 6-hour countdown timer. At the end of 6 hours, we shut the pump down and turn on the filter bypass indicator light on the control panel. The operator now has to cycle the power and restart the pump but is only allowed to run the pump for an additional 3 minutes before restarting again. This protects the hydraulic system as well as makes sure the operator communicates to the technician that the filter is contaminated and needs to be replaced.

How do we diagnose and repair this condition?

Under normal operating conditions, the steps for correcting a filter bypass status are to:
Verify the system is in bypass by checking the bypass hours in the InSight Display and the absence of the filter pressure switch in the InSight Display.
If you know it is time for a filter change, replace the 3-micron return line filter. If you suspect the filter is not contaminated, skip to the diagnostics described below. Once the filter pressure switch input has been restored, continue with step number 3.

1. Verify that the input for the Filter Press Switch is now back on.
2. Start the truck and verify on the input screen that the Engine RPMs are detected by the system. The truck must be running.
3. Confirm the System Power switch is up in its operating state.
4. The Cortex controller must now see 15 minutes of continuous operation. We accomplish this by starting the pump and allowing it to run for three minutes and stop. Once it has run the three minutes, we cycle the key switch and restart the pump five times to get our 15 minutes of continuous pump operation. Again, verify the System Power switch is in its operating state each time you restart the pump.

Diagnosing the filter pressure switch

What does it mean when I change the filter, and the filter pressure switch input does not come back on?
You could have a contaminated switch. The pressure switch could be faulty, or there could be a broken wire in the body harness not allowing the 12vdc signal to make it to the switch or through the switch into the signal wire to the Cortex controller.
As technicians know, we would perform the simplest, quickest, cheapest diagnosis possible. We would start again by cleaning the switch, reinstalling it, and checking the InSight display for the input for the filter pressure switch. If we have not restored the signal, we will move to the next step of checking the body harness wiring. You can place a jumper wire into the body harness, and if you get the input for the filter pressure switch back to the InSight display, you have now confirmed a bad pressure switch. If you have no signal, check for 12vdc on one of the wires. If you do not have voltage on one of the body wires, you could have a blown fuse or a broken wire. Check fuses and the harness for rodent or mechanical damage. Repair and re-check. If the voltage is present in the harness, the signal wire could be damaged in the same manner we just described. Perform the repair and recheck the signal.

If you perform these procedures, tests, and checks, you will succeed in diagnosing and repairing the filter bypass condition, saving you and your operators' downtime with the unit.

Would you like to know more about filter bypass and related issues? Good news! We teach that in our Nexteligence MAT classes. You can get in-depth training by contacting us to register for a Nexteligence MAT class at: Nexteligence@doveresg.com

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