

ADVANCED PID TROUBLESHOOTING

August 29, 2016

A KEY POINT

If the drive is telling you something via a Fault, then the problem is probably not the drive.

The drive is recognizing a fault and telling you to go look at something else.

OVER CURRENT

Trigger (Why drive tripped)	Possible Causes	Solution
The drive is behaving like an ammeter and telling you that it is drawing greater than the programmed SFA after initial motor start. It can also be considered that the drive is acting like a circuit breaker.	Shorted motor wires - line to line	Check line to line resistance (Ohms) and confirm they match motor specifications. (Rx1 scale)
	Shorted motor wires - line to ground	Damaged wire insulation. Check motor wire insulation with a megger. Recommend a meter that can read values 2,000,000 Ohms or more.

OVER VOLTAGE

Trigger (Why drive tripped)	Possible Causes	Solution
The drive sensed more than the specified upper limit of 265V input.	High line voltage.	Use a Volt meter to measure line to line (L1 to L2) and line to ground (L1 to ground and L2 to ground).

UNDER VOLTAGE

Trigger (Why drive tripped)	Possible Causes	Solution
Most common cause is loss of power to the drive.	Power loss - breaker tripped or the drive was powered down.	Restore power to the drive.
The installation is not allowing the proper amount of power to reach the drive.	Undersized breaker	Verify correct breaker is used based on the Pentek Intellidrive Owner's Manual.
	Undersized wire from service to drive (supply side).	Verify correct wire is used based on the Pentek Intellidrive Owner's Manual.
	Loose or poor connection on either side of the wire between the service and the drive.	Verify that all connections are tight and properly made.
The drive sensed less than the specified lower limit of 190V input.	Low line voltage.	Use a Volt meter to measure line to line (L1 to L2) and line to ground (L1 to ground and L2 to ground).

CANNOT START MOTOR

Trigger (Why drive tripped)	Possible Causes	Solution
The drive exceeded rated SFA before reaching the 30Hz minimum speed.	Bound pump.	Pull pump check for debris in pump.
	Locked motor rotor.	Pull pump check for locked rotor.

DRY RUN

Trigger (Why drive tripped)	Possible Causes	Solution
<p>Default setting: If the pressure in the system drops below 10psi for 15 seconds, the drive faults.</p> <p>NOTE: Dry Run is based solely on the ability of the drive to maintain pressure. It is not based on Amps.</p>	Over pumping the well.	Check water level in the well.
	<p>Operation at open discharge so the transducer does not see the required 10psi of back pressure.</p>	<p>To operate continuously at open discharge, go to Dry Run menu and lower Sensitivity (detection pressure). Setting to 0 essentially turns Dry Run off.</p>
		<p>To operate intermittently at open discharge, go to Dry Run menu and set Detection Time up to the maximum of 10:00 minutes.</p>
		<p>Restrict flow (close valve) to create 10 psi of back pressure.</p>
	<p>When switching zones during irrigation, if lateral lines are not full, the pump may not fill the line in the 15 second default time setting resulting in a Dry Run fault.</p>	<p>Go to Dry Run menu and extend Detection Time as needed (10:00 max).</p>
<p>Broken pipe.</p>	<p>Check piping for leaks.</p>	

GROUND FAULT

Trigger (Why drive tripped)	Possible Causes	Solution
	Ground wire shorted to motor phase	Damaged insulation. Check motor wire insulation with a megger. Recommend a meter that can read values 2,000,000 Ohms or more.
	Long motor cable length	Motor cable length more than 1000 ft is not recommended.

SYSTEM NOT GROUNDED

Trigger (Why drive tripped)	Possible Causes	Solution
The drive (not the motor) is not properly grounded to the service supply.	The drive itself does not have a good ground connection.	Check ground from drive to service supply. Verify that the service supply is grounded as well.
	Step-down transformer use from 460V to 230V.	See manufacturer of the transformer for these details.
	Using a generator.	See manufacturer of generator for these details.

OPEN TRANSDUCER

Trigger (Why drive tripped)	Possible Causes	Solution
The drive is not receiving an adequate signal from the transducer.	Open Connection in the transducer circuit.	Check connections at the drive and at the transducer.
		Check wire for damage.
		Verify Red wire is connected to AI+ and Black wire is connected to AI-.
	24V power supply shorted.	Check for damaged to transducer cable or other I/O cable.
		Check for proper wiring of I/O. See Owner's Manual for proper wiring diagram.
	24V power supply failure.	Check for 24VDC using a DC volt meter at the transducer cable connector. May also check at AI+ and AI-.
	Failed Transducer.	Replace transducer.

SHORTED TRANSDUCER

Trigger (Why drive tripped)	Possible Causes	Solution
The drive is sensing a short on the transducer circuit or seeing an intermittent high value at AI-.	Short in transducer wires	Check for shorted transducer wire or damaged insulation.
	A waterlogged tank may create excessive pressure at start up (aka water hammer) and the drive may read this as a shorted transducer.	Check air charge in tank. If no tank is in the system, add one.
	Failed Transducer.	Replace transducer.

OVER TEMPERATURE

Trigger (Why drive tripped)	Possible Causes	Solution
The drive is sensing that the internal temperature is higher than the drive rating.	Excessive heat in the drive.	Shade from direct sunlight.
		Hook up external fan and run via the drive's Output Relay.
	Debris build up on heat sink.	Make sure that the heat sink is not obstructed.
	Fan is not working	Make sure the fan is not obstructed.
	Improper ventilation.	Verify that the drive has proper ventilation per the Owner's Manual.
Check that vents are not obstructed.		

EXCESSIVE RUNTIME

Trigger (Why drive tripped)	Possible Causes	Solution
The drive ran continuously (did not enter Sleep Mode) for longer than the Ex Runtime Hours setting.	Leak in the system.	Check for leaks in pipe system.
Disabled by default in the drive. If Enabled, the drive faults when it runs for longer than the Ex Runtime Hours setting.	Application calls for long run times	Disable Excessive Runtime Fault.
		Extend Excessive Runtime Hours limitation.

INTERNAL FAULT

Trigger (Why drive tripped)	Possible Causes	Solution
The drive has detected a problem within the drive circuitry itself.	The drive has detected a problem.	Reset fault or power cycle the drive. Try to operate pump. If fault continues, the drive may need replacement.

HARDWARE FAULT

Trigger (Why drive tripped)	Possible Causes	Solution
The drive has detected a problem within the drive hardware itself.	The drive has detected a problem.	Reset fault or power cycle the drive. Try to operate pump. If fault continues, the drive may need replacement.

EXTERNAL FAULT

Trigger (Why drive tripped)	Possible Causes	Solution
A device hooked up to the I/O of the drive has changed from open to closed and completes the circuit at I1 or I2.	The external device was activated and closed.	Check external device.

LOW AMPS

Trigger (Why drive tripped)	Possible Causes	Solution
There is less than 0.5 amps on one or more of the motor leads.	Broken wires.	Check for continuity.
	For 2-Wire motors, the motor leads may not be hooked up correctly.	Verify that the connections are to terminals "Y" and "B" load side wiring terminal block.
	Loose connection.	Verify all connections are tight. Check for continuity.
	Open motor winding.	Check line to line resistance for continuity.
	Open thermal overload in the motor.	1-phase motor Wait 20 minutes then restart pump.

WARNING LED FLASHING

Trigger (Why drive tripped)	Possible Causes	Solution
When amber light is flashing, the Ground Detection feature has been disabled.	The Ground Detection feature has been manually disabled.	See System Not Grounded fault description.

JAM WARNING

Trigger (Why drive tripped)	Possible Causes	Solution
Debris in pump stopping motor from turning (locked rotor).	Debris in pump stopping motor from turning (locked rotor).	Drive tries to free debris in pump by reversing or pulsing motor.

OVER PRESSURE WARNING

Trigger (Why drive tripped)	Possible Causes	Solution
<p>When the pressure at the transducer reaches the Overpressure setting, the drive displays Overpressure and waits 1 minute. After 1 minute, the drive then checks to see if the pressure has dropped below the Overpressure setting. If it is below, the drive restarts. If not, it checks again in another minute. This continues until the actual system pressure drops below the Overpressure setting.</p>	No tank in system so you can get water hammer.	Add an appropriate tank.
	Waterlogged tank so you can get water hammer.	Replace the tank.
	Tank too small for system capacity so you can get water hammer.	Add an appropriate tank.
	Transducer located too far before the tank.	Relocate transducer to location after the tank and in the flow of water.
	Minimum motor frequency (Hz) set too high. This causes the system to build pressure when demand stops.	Return minimum frequency setting to 30Hz. For 80Hz system, set minimum frequency (Hz) at a point that still allows pressure to build while in line fill mode.

OVER PRESSURE WARNING – Con't

Trigger (Why drive tripped)	Possible Causes	Solution
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	Water treatment installed between transducer and tank. As flow through the water treatment decreases, the tank is isolated and you can get water hammer.	Locate transducer and tank before all water treatment.
	Pump is oversized for the application. System builds pressure even when running at 30Hz.	Replace with properly sized pump or consider 80Hz system.
	Check valve located between tank and transducer. This allows pressure to build up from thermal expansion of hot water heater.	Remove or relocate check valve.