

# Tech Alert 8260902

## INSTRUCT X4

### Ride-through Feature

#### Revision History

Rev	Effective Date	Description
01	19-Jan-2026	First release

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## ISSUE

### Sys ON (x4) Power Unstable Guard Event Overview

An X4 event is logged when the controller reboots due to one of two conditions monitored by the watchdog chip:

- Low Power Condition:**  
 If the supply voltage drops below a safe threshold, the watchdog triggers a reset to prevent unpredictable operation. Running below minimum voltage can cause erratic behavior or malfunction.
- Unresponsive Controller:**  
 If the controller fails to reset the watchdog within the expected time typically due to software exceptions or excessive electrical noise, the watchdog assumes the system is unresponsive and initiates a reboot.

In either case, the controller logs an X4 event upon the next power-up to indicate a watchdog-triggered reset. Log example below.

<input type="checkbox"/>	11 Jul, 2025 23:11:45	PIC Status Live current leakage not set [ was ot
<input type="checkbox"/>	11 Jul, 2025 23:11:45	PIC Downhole Tool Alarm cleared after 0 s
<input type="checkbox"/>	12 Jul, 2025 00:18:52	Sys ON (x4) Power Unstable Guard
<input type="checkbox"/>	12 Jul, 2025 00:18:57	Switched to Auto-Start mode
<input type="checkbox"/>	12 Jul, 2025 00:18:58	PIC Tool Type XT [ was not read ]
<input type="checkbox"/>	12 Jul, 2025 00:18:58	PIC Intake Pressure Low Alarm activated 0 psi

### VSD Internal Trip ‘Port 6 Adapter’ or VSD Communication

Occasionally, the Instruct loses communication with the VSD (observed in E30/E21, ES7, and E20P series). Logs show no indication of power loss or other logical reasons for the communication drop.

<input type="checkbox"/>	17 Jun, 2025 07:20:54	PIC Tool Type not read [ was Ultralite 12.5 ]
<input type="checkbox"/>	17 Jun, 2025 07:20:58	Motor Current Underload Alarm activated.0 A
<input type="checkbox"/>	17 Jun, 2025 07:20:58	VSD Internal Trip 'Port 6 Adapter'
<input type="checkbox"/>	17 Jun, 2025 07:20:58	VSD TRIP Alarm activated
<input type="checkbox"/>	17 Jun, 2025 07:20:58	Drive stopped because of the VSD TRIP Alarm
<input type="checkbox"/>	17 Jun, 2025 07:20:58	Drive locked out
<input type="checkbox"/>	17 Jun, 2025 07:20:58	Drive stopped
<input type="checkbox"/>	17 Jun, 2025 07:20:58	Motor Current Underload Alarm cleared.0 A after 1
<input type="checkbox"/>	17 Jun, 2025 07:20:59	VSD TRIP Alarm cleared after 1 s
<input type="checkbox"/>	17 Jun, 2025 07:20:59	VSD Initializing Alarm activated
<input type="checkbox"/>	17 Jun, 2025 07:21:05	PIC to Instruct Communications Alarm cleared after
<input type="checkbox"/>	17 Jun, 2025 07:21:05	PIC Status Live boot tes [ was no communication
<input type="checkbox"/>	17 Jun, 2025 07:21:08	VSD Initializing Alarm cleared after 9 s
<input type="checkbox"/>	17 Jun, 2025 07:21:27	PIC Status Live initializing [ was boot tes ]

## SOLUTION

- Disable VSD communication fault alarms to avoid false trips.
- Hardwire a mechanism to trip the VSD only in true, unrecoverable situations.
- Use an Analog Output (AO) from the Instruct's IO or PA card to continuously activate a hardware watchdog monitor. Install this hardware in series with an ESD to replace the VSD communication fault.

### Operation Details:

- If the AO heartbeat stops for more than 100 seconds, the watchdog will trip the VSD through the ESD.
- If the Instruct crashes, it reboots within 85 seconds and should re-establish communication.
- The IO card resumes heartbeat within 85 seconds of reboot.
- If communication is not restored, the watchdog NO contact will trip the VSD.
- Relay holds the contact closed for 100 seconds from the last heartbeat.
- During reboot, the VSD maintains speed based on the last known target or min/max limits (if in feedback mode).

Below is a sample of the log entry when such a case occurs:

<input type="checkbox"/>	13 Nov, 2025 23:06:19	Drive started
<input type="checkbox"/>	13 Nov, 2025 23:06:31	Instruct firmware version 2.130r001
<input type="checkbox"/>	13 Nov, 2025 23:06:33	Display card Starting
<input type="checkbox"/>	13 Nov, 2025 23:07:16	System power down ←
<input type="checkbox"/>	13 Nov, 2025 23:08:21	Sys ON (x8) Power On Boot
<input type="checkbox"/>	13 Nov, 2025 23:08:26	Switched to Manual-Start mode
<input type="checkbox"/>	13 Nov, 2025 23:08:26	Drive locked out
<input type="checkbox"/>	13 Nov, 2025 23:08:27	VSD Communications Alarm activated
<input type="checkbox"/>	13 Nov, 2025 23:08:49	VSD Communications Alarm cleared after 22 s ←
<input type="checkbox"/>	13 Nov, 2025 23:08:49	VSD Info 16.002
<input type="checkbox"/>	13 Nov, 2025 23:08:49	VSD Info Allen-Bradley
<input type="checkbox"/>	13 Nov, 2025 23:08:49	VSD Info PowerFlex 755
<input type="checkbox"/>	13 Nov, 2025 23:08:49	VSD Initializing Alarm activated
<input type="checkbox"/>	13 Nov, 2025 23:08:49	VSD IO Module Checking...
<input type="checkbox"/>	13 Nov, 2025 23:08:49	VSD IO Module DPI Slot 5
<input type="checkbox"/>	13 Nov, 2025 23:08:52	Survived Crash Successfully 620 [ was 619 ]
<input type="checkbox"/>	13 Nov, 2025 23:08:52	VSD Resume Running ←
<input type="checkbox"/>	13 Nov, 2025 23:08:55	VSD Initializing Alarm cleared after 6 s
<input type="checkbox"/>	13 Nov, 2025 23:08:55	Drive started ←

In the example above, the VSD was running, system was powered down (by removing power to the Instruct and reapplying it), the Instruct rebooted, established communication with the VSD, incremented the counter for survived crashes, and declared VSD resume running.

**Note:** During recovery (up to 100 seconds), the controller cannot take action. After full boot, any active alarm will trigger shutdown if configured.

**Firmware Requirement:**

Instruct firmware 2.130r07 or higher supports the Analog Output Watchdog function. Refer to [InTouch 6145281 for Instruct Firmware](#)

**Required Kit:**

SE-100335 – Instruct X4 Fault Ride-through Update 24VDC

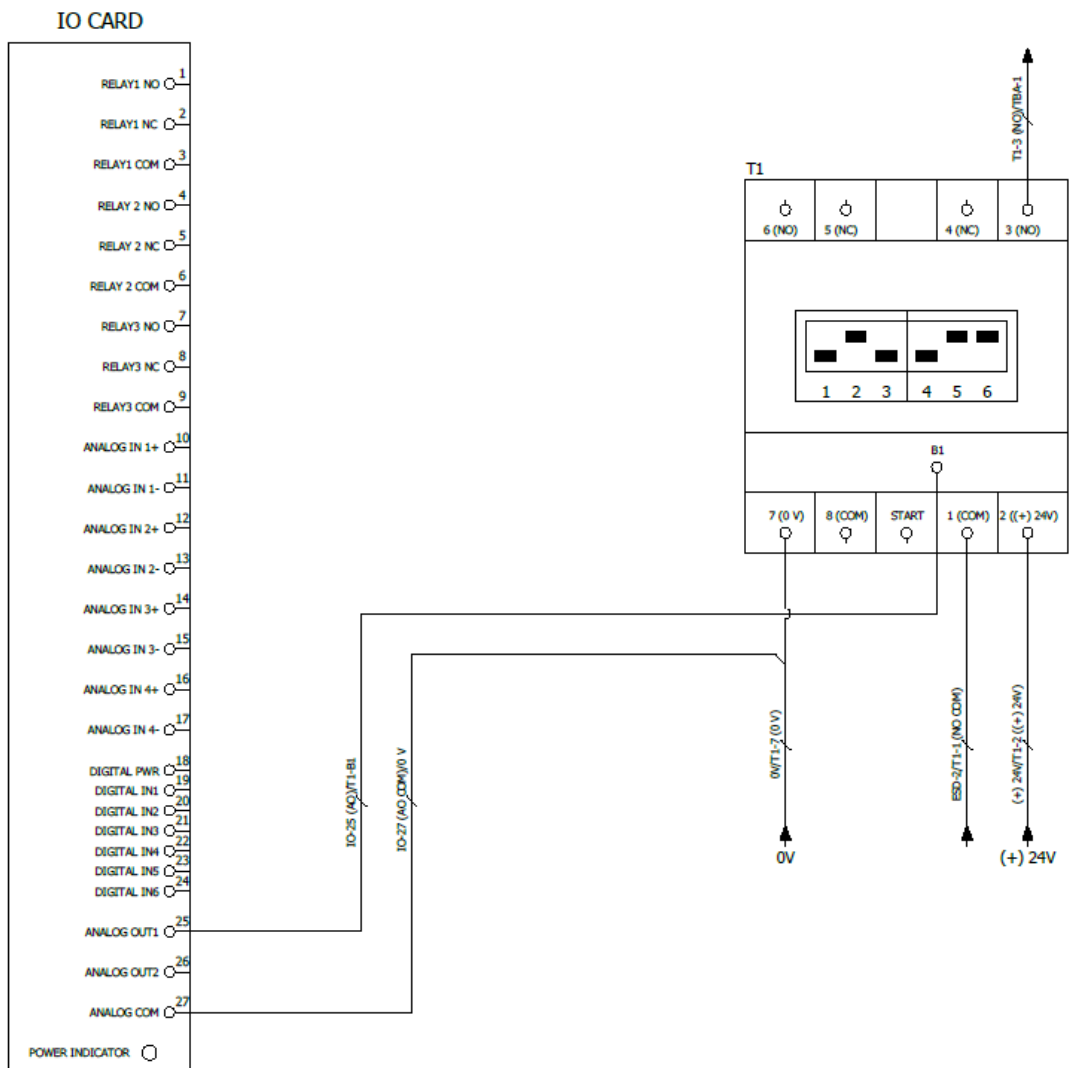
CAT	PN	Desc	Qty
700-HT3	700-HT3 A	Plug In Tube-Based Multi Timer Relay	1
700-HN204	700-HN204 A	8 Pin Guarded Tube Based Relay Socket	1
700-HAX2Z24	700-HAX2Z24 D	GP Tube Base Relay (24VDC)	1

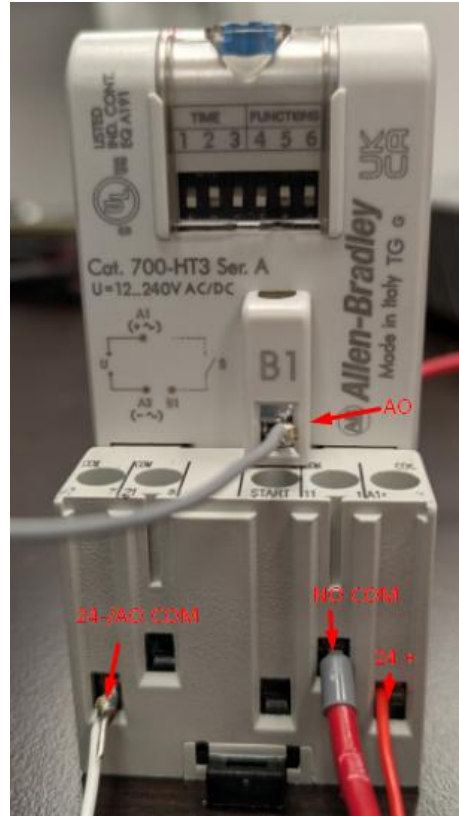
A 24VDC power supply is required for the timer and relay. If unavailable, order one of the recommended power supplies.

PN-107554	Power Supply, 100-240VAC Input/ 24-48VDC Output, 60W
1606-XLP100E-2 A	Power Supply, 2Ph 380 - 480V AC Input Voltage, 24-28V DC Output, 100W

## WIRING AND CONFIGURATION

1. Install the kit per below schematic.





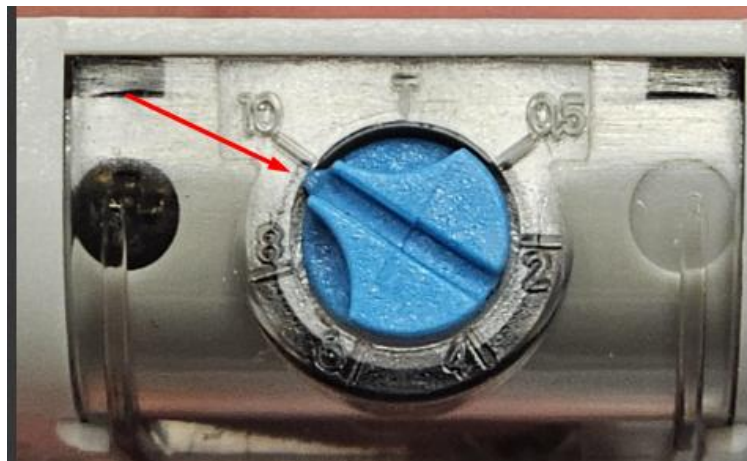
- Set the dip switches for time and function. For time, it needs to be set to 100s and function 8, signal On and Signal Off Watchdog Monitor.



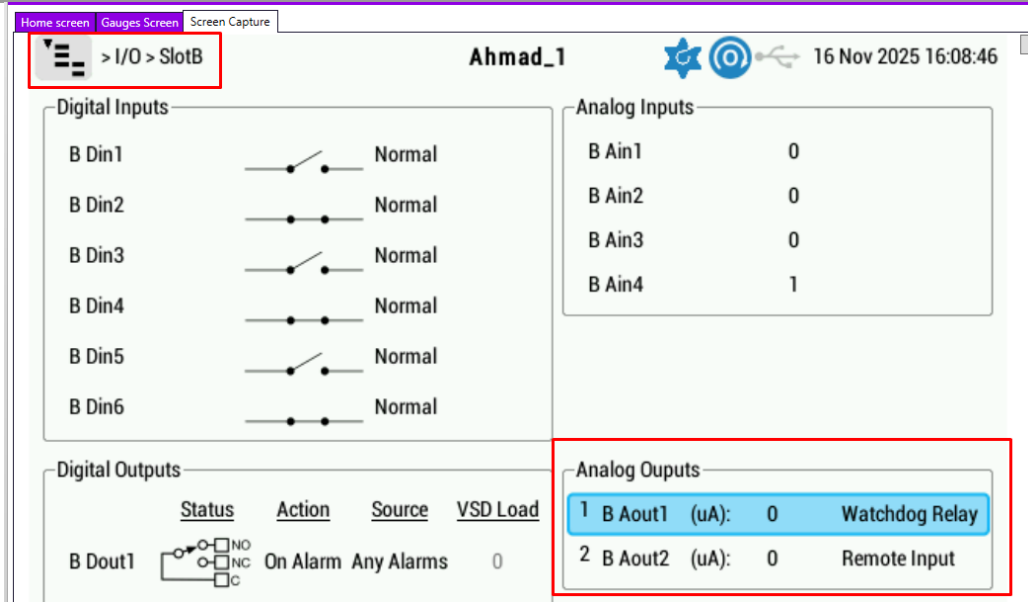
<p><b>8. Signal On and Signal Off Watchdog Monitor</b></p>	<p>Apply power (U) to timer. When the signal (S) is closed, the relay contacts (R) energize immediately and the time delay (t) begins. If the signal is opened before the time delay is complete, the relay remains energized and the time delay is reset. When the time delay is completed, the contacts return to their shelf state. If the signal is opened after the time delay is complete, the relay contacts energize immediately and the same time delay begins. Continuous cycling of the signal at a rate that is faster than the time delay causes the relay contacts to remain energized. Contacts return to their shelf state when power is removed.</p>	
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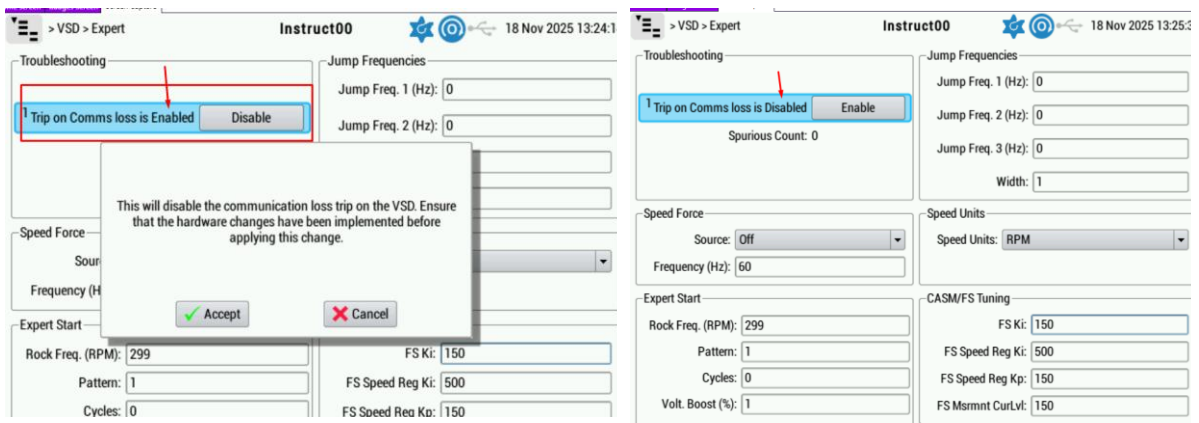
3. Configure the timer dial to its max as per picture below.



4. Configure the Analog output with a function as "Watchdog Relay"



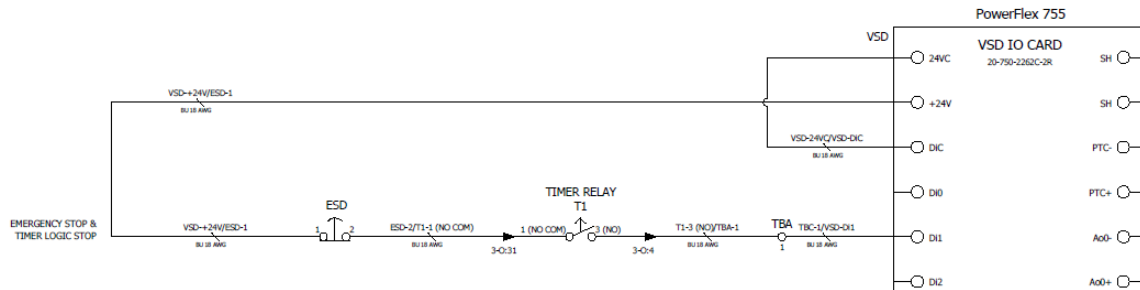
5. Disable VSD Comm Alarm under VSD → Expert. Confirm that the retrofit kit has been installed by accepting the popup window. The text will indicate when the comms are “disabled” as seen below.



### E30 WIRING

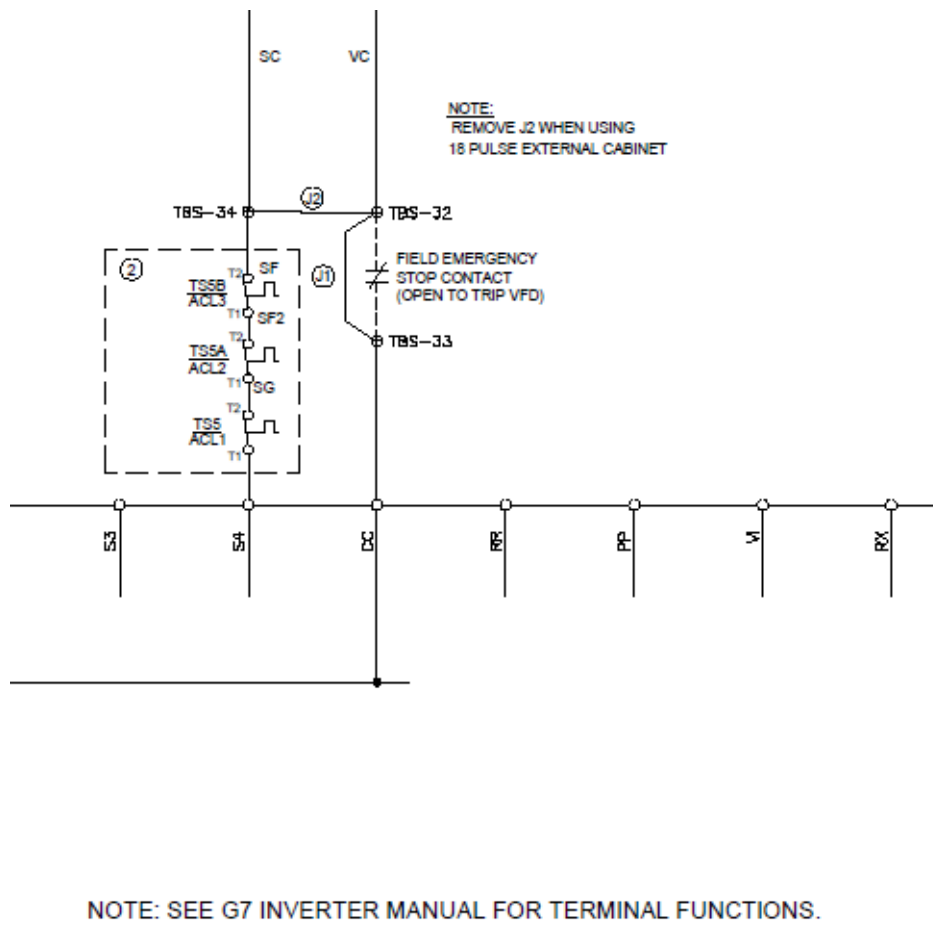
On E30 installations, wire the NO from the relay in series with S4 to CC on the terminal board.

#### 755 20-750-2262C-2R I/O LOGIC FOR TIMER



### ES7 WIRING

On ES7 installations, wire the NO from the relay in series with S4 to CC on the terminal board.



## E20P WIRING

On E20P installations, wire the NO from the relay in series with XSTO Safe torque off terminal 1 and 4

XSTO Safe torque off		
1	OUT	Safe torque off.
2	SGND	
3	IN1	Both circuits must be closed for the drive to start.
4	IN2	

## VALIDATION

To ensure correct configuration and wiring:

1. Run the VSD under no-load condition.
2. Disconnect the communication cable and start a timer.
3. After ~100 seconds, the watchdog NO contact should open, tripping the VSD.
4. If the VSD does not trip, troubleshoot wiring/configuration.
5. If successful, reconnect the communication cable and recommission the well.