



Tornado F-5



Motor Backspin Detect Relay And Probe
For F-5 Motor Controller



Tornado F-5 Motor Backspin Detection Relay And Probe

Revision 8.1

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GPS updates



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Specification

Relay Unit

- Size: (w x h x d) 5.125" x 5.25"(4.25") x 2.00" (Height excluding base plate)
- Weight: 1.6 pounds
- NEMA Rating: NEMA 1
- Power: Derives power through the communication link, or externally powered by 120VAC for stand-alone operation.
- Auxiliary output contacts, NO and NC
- High Voltage (HV) Probe input connection for interface to HV Probe.
- Communications: Two connectors for using RS/485 protocols (RJ45 type connectors). This is connected to any of the RJ45 type connectors on the unit system modules.
- RX and TX LEDs for indicating transmit and receive on the communication link.
- Blue LED for an indication that the motor is currently spinning.



High Voltage Probe Unit

- Size: (w x h x d) 8.75"(7.75") x 4.625" x 2.375" (Width excluding base plate)
- Weight: 3.7 pounds
- NEMA Rating: NEMA 1
- Low Voltage Connection: One Phoenix connector for interface to the Backspin Relay.
- High Voltage connection: Three high voltage wires for connection to the motor T-leads, up to 5kVAC.



Overview

Safety Warnings

Read and follow all Warnings, Precautions, Notes, and Instructions included in this document.

- A Warning identifies an immediate hazard that exists that poses some probability of causing death or serious injury.
- A Caution identifies potential conditions and actions that have the possibility of death or severe injury.
- A Note identifies the need for general safety practices which, if violated, could cause injury to personnel or damage to equipment.



Warning

High voltages are exposed during operation. Do not touch exposed surfaces during test.

Caution

Verify wiring connections prior to applying power to the system. Damage to the equipment could result from incorrect connections.

Note

Inspect system ground and bonds prior to power application. Shock hazard could exist if proper ground is not maintained.

Motor Control Unit



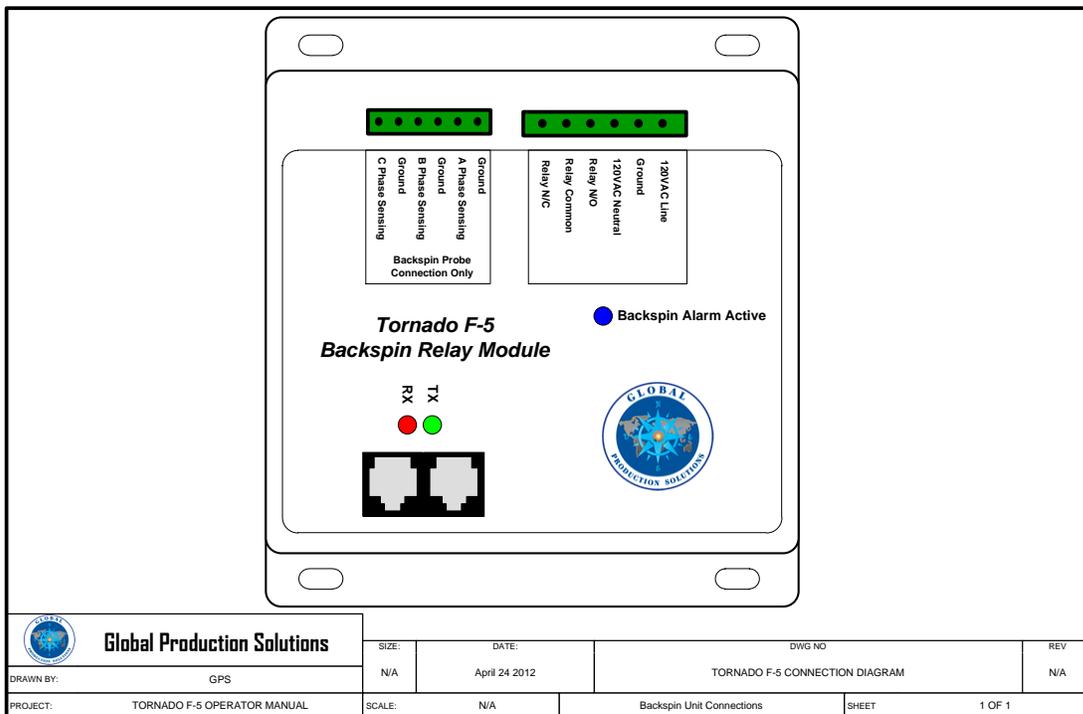
Warning

The High Voltage Probe unit is connected directly to the high voltage output of the main contactor, which can be up to 5000 Volts. These High Voltages may be present during operation and set-up, and should be considered hazardous.



Introduction

The Backspin Relay and HV Probe is an optional part of the Motor Controller system. The backspin equipment is generally used in electric submersible pump applications in the oilfield or water well applications where detection of the backward spin of the pump is desired. When the motor is shutdown or turned off, the existing fluid in the production tubing causes the pump/motor to turn backwards as the fluid is falling back into the well. If the motor is started while this backspin is happening, this could cause damage to the equipment. The Backspin Relay can detect this backspin and prevent the manual or automatic starting of the pump until the back spinning has stopped.





Installation and Wiring

**Warning**

The HV Probe unit is connected directly to the high voltage output of the main contactor, which can be up to 5000 Volts. These High Voltages may be present during operation and set-up, and should be considered hazardous.

High Voltage Probe

The High voltage probe has two sets of connections. The high voltage connection consists of three high voltage wires that are connected directly to the output of the 3-phase voltage of the contactor or motor leads. This HV connection is rated up to 5000 volts AC. A small cable fitted with a connector is used to connect the probe to the backspin relay unit. Mounting holes on the probe allow the probe to be mounted to the inside of the switchboard panel.

Backspin Relay

The backspin relay is connected to the Motor Controller system via the provided patch cord with the RJ-45 type connectors. All parts of the controller units are tied together in a daisy chain fashion using these patch cords. Each module on the controller units are equipped with two receptacles for the RJ-45 connectors to allow this to be done easily. This provides communication to the controller in order for the controller to prevent starting when backspin is in motion.

A connector on the backspin relay marked "Backspin Probe Connection Only" is where the matching connector is plugged in from the HV probe.

A third connector on the backspin relay is used for external connection and/or stand-alone operation of the backspin detection. For stand alone operation, the 120VAC power, neutral, and ground pins must be connected to an external power source. External devices for detection of the backspin can use the relay common, relay NC, and relay NO pins. When the motor is turning, the contacts will switch. This is not a standard configuration.

There is one each of RX and TX LEDs for indicating transmit and receive status on the communication link. One blue LED lights to indicate motor spin, which will blink at the frequency of the motor spin whether it is running or in backspin.

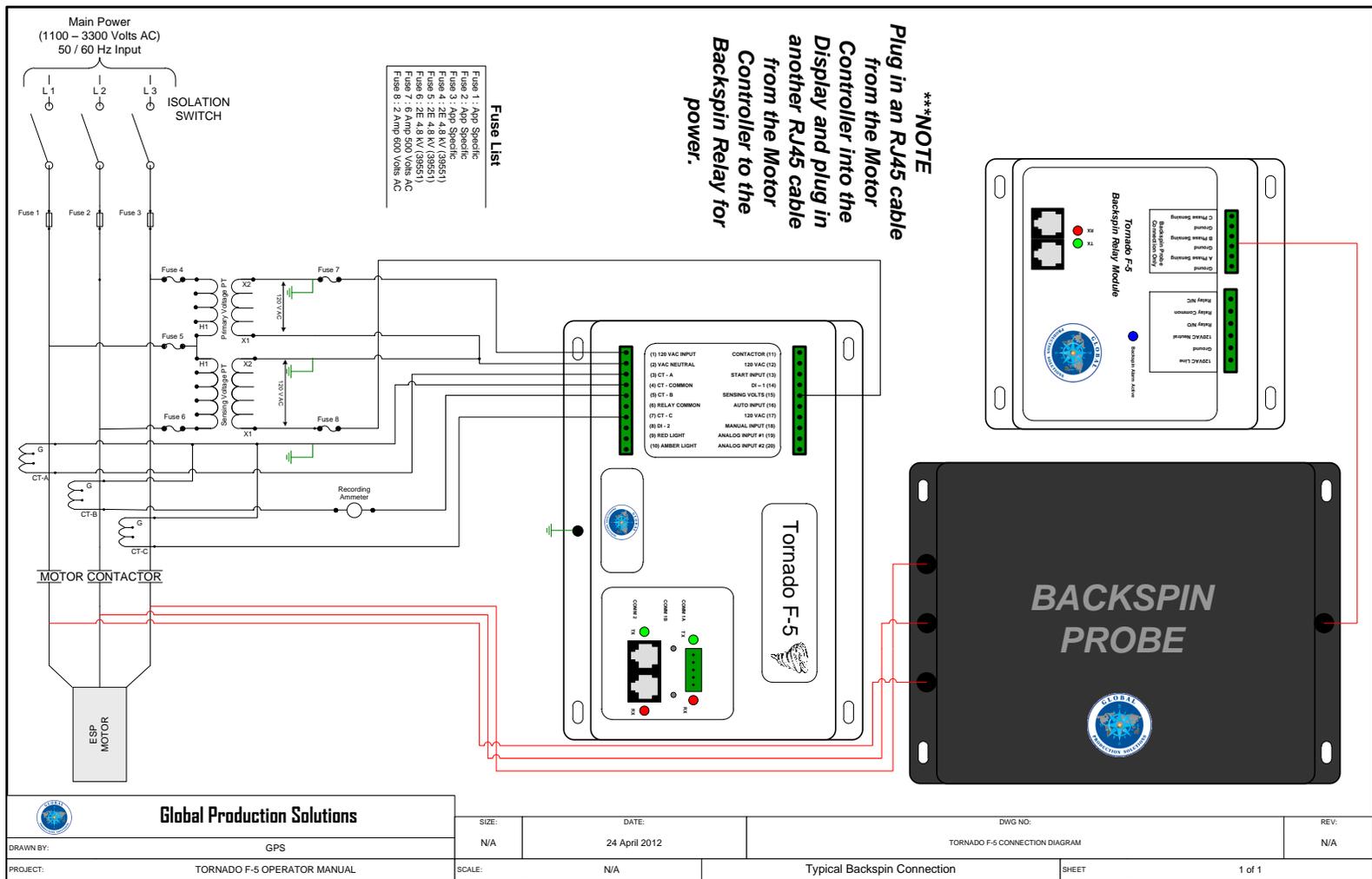


Figure1. Typical Connection of the Backspin Probe

Backspin Detection Setup

The backspin detection is setup using the motor controller display parameters. Under the Fault Activations Menu, the Backspin Enable parameter is set to yes if backspin detection is desired.

Once the backspin has been detected, after a motor stop command or shutdown fault, the Motor Controller Display will show direction CBA/ABC and RPM in HZ this is held in the controller memory until updated approx every 2 sec, or until the backspin relay detects that the motor has stopped turning and lockout is cleared. This means if communication between motor controller and backspin relay is lost it will not reset the backspin speed or direction and you will be unable to clear lockout without changing the backspin Fault Activation Menu Enable to NO.



Stand Alone Backspin Setup

The backspin relay system can be used to prevent starting pumps while spinning, using the 120VAC input, the backspin relay output, and a motor controllers Digital or aux input and an N/C contact on the contactor. The Backspin relay output changes state only while backspin is present the N/O becomes closed and the N/C becomes open. Using the N/O and common contacts and going thru the N/C contacts on the contactor into the digital/aux input to the motor controller, this will allow the unit to start and run if the digital input/aux is set to N/C to shut down. Once the contactor is pulled the backspin alarm becomes active but the signal will not go thru the N/C contacts of the contactor until a shut down occurs, then the backspin alarm will remain closed until the spin stops.

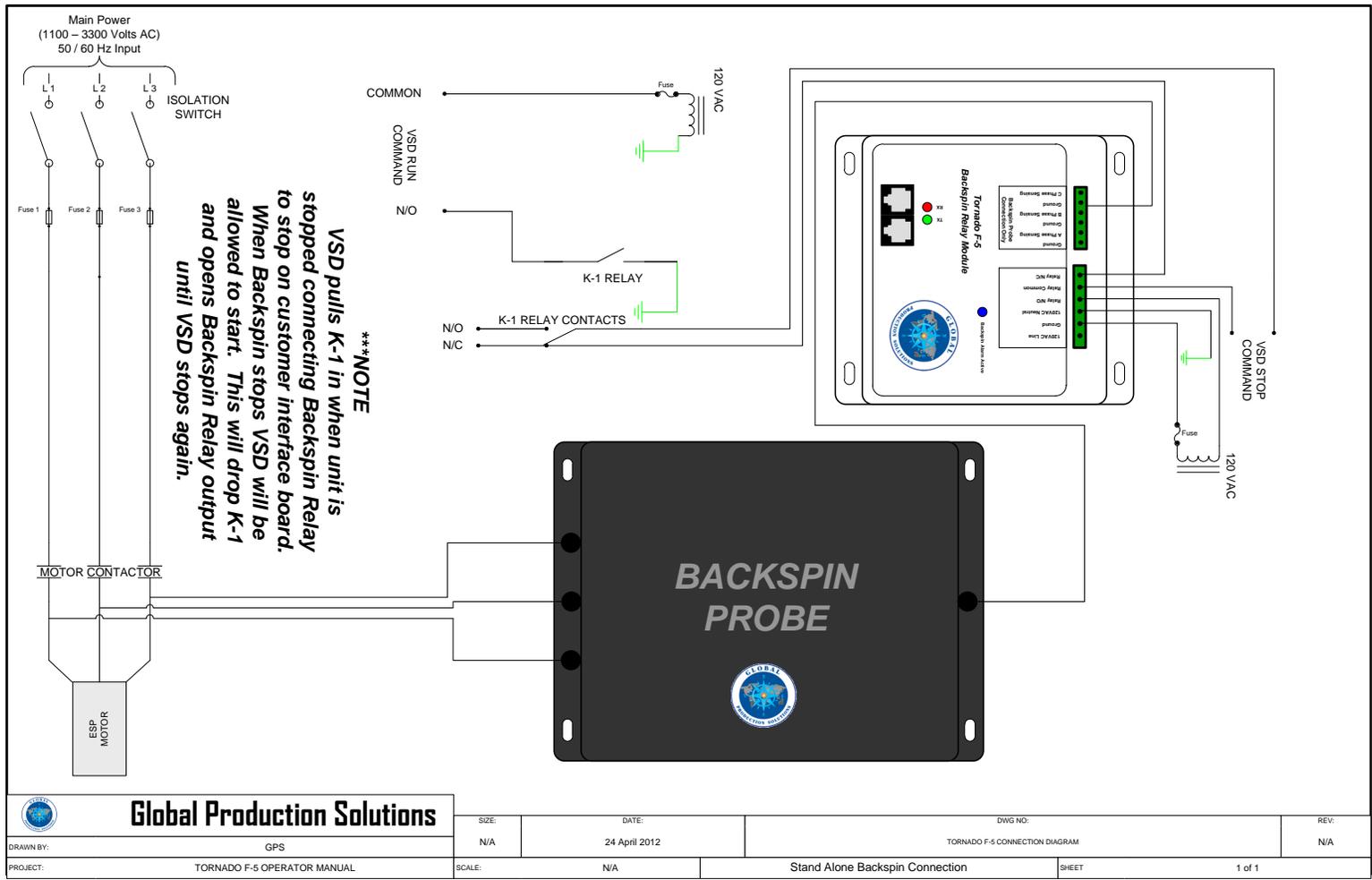


Figure 2. Typical Connection: Stand-Alone Backspin Probe Option

Product Warranty

Warranty coverage:

Global Production Solutions (“GPS”) warrants GPS manufactured products (“Product”) to be free of workmanship and material defects for a period of eighteen (18) months from the date of shipment to Buyer or twelve (12) months from the date of installation.

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