

Service Bulletin

Instructions for ATEX Approved Drives in Group II Category (2) G D Applications with ATEX Approved Motors

General

This document provides information on operation of an ATEX Approved drive and ATEX approved motor. The motor is located in a defined hazardous environment, while the drive is not. A protective system is required to stop current flow to the motor when an over temperature condition has been sensed in the motor. When sensed, the drive will go into a fault stop condition.

The drive is manufactured under the guidelines of the ATEX directive 94/9/EC. These Drives are in Group II Category (2) GD Applications with ATEX Approved Motors. Certification of the drive for the ATEX group and category on its nameplate requires installation, operation, and maintenance according to this document and to the requirements found in the User Manual and appropriate Motor Instruction Manual(s).



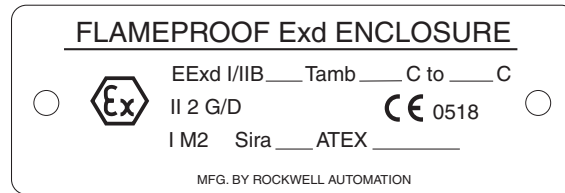
ATTENTION: Operation of this ATEX certified drive with an ATEX certified motor that is located in a hazardous environment requires additional installation, operation, and maintenance procedures beyond those stated in the standard user manual. Equipment damage and/or personal injury may result if all additional instructions in this document are not observed

Motor Requirements

- The motor must be manufactured under the guidelines of the ATEX directive 94/9/EC. It must be installed, operated, and maintained per the motor manufacturer supplied instructions.
- Only motors with nameplates marked for use on an inverter power source, and labeled for specific hazardous areas, may be used in hazardous areas on inverter (variable frequency) power.
- When the motor is indicated for ATEX Group II Category 2 for use in gas environments (Category 2G) the motor must be of flameproof construction, EEx d (according to EN50018) or Ex d (according to EN60079-1 or IEC60079-1). Group II motors are marked with a temperature or a temperature code.
- When the motor is indicated for ATEX Group II Category 2 for use in dust environments (Category 2D) the motor must be protected by an enclosure (according to EN50281-1-1 or according to IEC61241-1: Ex tD). Group II motors are marked with a temperature.

- The motor over temperature signal supplied to the drive must be a normally closed contact (open during over temperature condition) compatible with the drive's digital (logic) input circuitry. If multiple sensors are required in the motor, the connection at the drive must be the resultant of all required contacts wired in series. Note that the drives are available with either 24V DC or 115V AC input circuitry. Refer to the drive User Manual for details.
- Refer to all product markings for additional cautions that may apply.
- Typical motor markings are contained on a motor certification nameplate similar to [Figure 1](#).

Figure 1 Sample Motor Nameplate

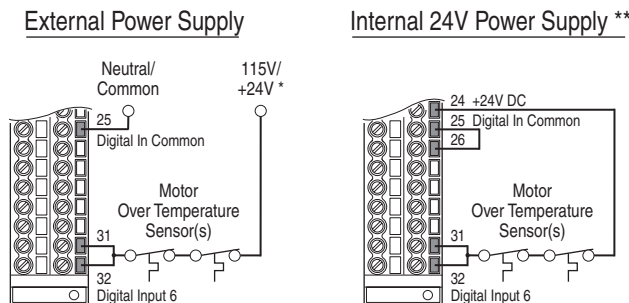


Drive Wiring

Important: ATEX certification of this drive requires that 2 separate digital (logic) inputs be configured to monitor a normally closed over temperature contact (or multiple contacts wired in series) presented to the drive from the motor.

The first input must be “Digital Input6/Hardware Enable” (terminal 32). The second can be any other unused digital input between 1 and 5. Note that all inputs are typically supplied in a “default” configuration to a function such as Start and Stop. This may influence the input selected by the user for this function. The following examples will assume Digital Input 5 (terminal 31) is being used as the additional required input. The 2 input terminals must be wired in “parallel” (jumper is acceptable) so each is monitoring the over temperature contacts. Digital signal inputs are wired with respect to the digital input common. Refer to the drive User Manual regarding setup for either internal or external 24V DC or external 115V AC logic power, depending on the type that is supplied in your drive. Motor supplied contacts must have ratings compatible with the drive's input circuit ratings and applied voltage level.

Figure 2 Wiring Example



* Voltage is Board Dependent

** Not available with 115V I/O

Drive Configuration

Both of the digital inputs required to monitor for motor over temperature must be configured correctly to assure that the drive will shut down independent of drive software operation, and be put into a fault condition that will require a fault reset before the drive can be restarted.

Hardware

Digital Input 6 must be configured as a Hardware Enable. This is accomplished by removing Jumper J10 from the Main Control Board in the I/O Control Cassette. Refer to the instructions in the I/O wiring section of the Installation/Wiring Chapter in the drive User Manual.

Firmware

- The functionality of Digital Input 5 is determined by parameter 365 [Digital In5 Sel]. (If a different digital input “x” is selected, refer to the corresponding [Digital In “x” Sel] parameter.) This parameter must be set to a value of “3” to configure this input as an “Aux Fault.” When this digital input is opened, the drive will immediately shut down in a fault condition and require a fault reset before the drive can be restarted.
- Opening Digital Input 6 when configured as a Hardware Enable will interrupt IGBT gate firing directly. Additionally, Digital Input 6 will put the drive into a normal “not-enabled” shutdown condition. It is configured by parameter 366 [Digital In6 Sel]. This parameter must be set to a value of “1” to configure this input as an “Enable.” When Digital Input 6 is opened, the gate firing will be interrupted and the drive will go into a “not-enabled” shutdown condition. Because the additional digital Input (typically Digital Input 5) must be wired to open simultaneously and be configured to put the drive into a fault condition, the drive will not restart if a new start command is given until the fault is reset.

Start-Up & Periodic Drive Testing Requirement

The integrity of both the Hardware Enable input (Digital Input 6) and the additional Aux Fault input must be maintained and verified periodically to meet certification requirements. The interval must be determined by the requirements of the application, but not be greater than one year. In addition to any requirements to check the integrity of the over temperature device(s) and the wiring of the over temperature contact closure to the drive terminals, the drive circuitry itself requires testing. This must be done during a maintenance period when the motor environment is not hazardous and all necessary precautions have been taken to repeatedly start and stop the drive and motor safely.

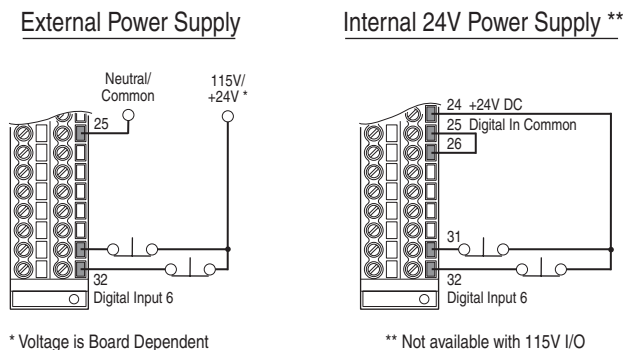


ATTENTION: Power must be applied to the drive to perform the following procedure. Some of the voltages present are at incoming line potential. To avoid electric shock hazard or damage to equipment, only qualified service personnel should perform the following procedure. Thoroughly read and understand the procedure before beginning. If an event does not occur while performing this procedure, **Do Not Proceed**. **Remove Power** including user supplied control voltages. User supplied voltages may exist even when main AC power is not applied to then drive. Correct the malfunction before continuing.

Preparation

1. Disconnect all power from the drive including control power, if supplied.
2. Disconnect the motor from the driven load if necessary, to run this test.
3. Disconnect the motor over temperature contact connections from the drive. This includes both Digital Input 6 (terminal 32) and the additional required input (typically Digital Input 5, terminal 31). Remove the jumper between the two inputs if one is in place.
4. Connect a means to open and close a N.C. contact between Digital Input 6 (terminal 32) and input common. Connect a separate means to open and close a N.C. contact between the additional input (typically Digital Input 5, terminal 31) and input common (see [Figure 3](#)). The switching devices (pushbutton, relay, etc.) must have contacts rated for either the 24V DC or 115V AC input circuit, whichever was supplied with the drive.

Figure 3 Example Test Circuit



5. Be sure both sets of test contacts are closed. Assure all control connections are properly made to the drive. Reapply power to the drive including external control power, if supplied.

Test

6. Perform any necessary parameter adjustments and start the drive. Confirm that the drive stops and starts normally, then start and slowly accelerate the motor.
7. Open Digital Input 6. The drive should stop and the motor coast to rest. The HIM/OIM should indicate that the drive is “Not Enabled.”
8. Close Digital Input 6. The drive should not start but the HIM/OIM should indicate that the drive is “Stopped.”

Important: The drive should not start when closing Digital Input 6 even if a maintained start command is present and had not been removed when the drive stopped.

9. Provide the command to restart the drive. In the case of a maintained start, remove and reapply the start command. In either case the drive should run normally.
10. With the motor running, open Digital Input 5. The drive should stop and the motor coast to rest. The HIM/OIM should indicate that the drive is in an “Auxiliary Input” fault condition.
11. Close Digital Input 5. The drive should not start and the HIM/OIM will continue to indicate an “Auxiliary Input” fault condition.
12. Provide the command to restart the drive. In the case of a maintained start, remove and reapply the start command. In either case the drive should remain stopped and in a fault condition.
13. Provide a Fault Reset command to the drive. The drive fault should clear. The drive should not start even if a maintained start is applied when the fault is reset.
14. Provide the command to restart the drive. In the case of a maintained start, remove and reapply the start command. In either case the drive should run normally.
15. Stop the drive, and disconnect all power from the drive including external control power.
16. Disconnect the test switching devices from the two digital inputs.
17. Determine a way to interrupt the continuity of the over temperature circuit when it is reconnected to the motor.
18. Properly reconnect the motor over temperature contact connection to the drive and include the test mechanism to interrupt the over temperature circuit’s continuity. This includes both Digital Input 6 (terminal 32) and the additional required digital input. Reconnect the jumper between the two inputs if one had been in place.
19. Reconnect power to the drive including external control power.
20. Start drive and confirm that it is operating properly.

- 21.** Interrupt the continuity of the over temperature circuit connected to the drive. The drive should stop and the motor coast to rest. The HIM/OIM should indicate that the drive is in an Auxiliary Input fault condition.
- 22.** Remake continuity of the over temperature circuit connected to the drive's digital inputs. The drive should remain stopped and in an Auxiliary Input fault condition.
- 23.** Provide the command to restart the drive. In the case of a maintained start, remove and reapply the start command. The drive should remain stopped and in an Auxiliary Input fault condition.
- 24.** Provide a fault reset command to the drive. The drive fault should clear but the drive should not restart.
- 25.** Provide the command to restart the drive. The drive should run normally.
- 26.** Stop the drive and disconnect all power including external control power.
- 27.** Remove the test mechanism, reconnect original wires and verify all wiring.
- 28.** Reconnect the motor to the load if it had been previously disconnected.
- 29.** Check for proper operation.

Notes:



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