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ALLEN-BRADLEY

Allen-Bradley Gray Encoder (12-24 VDC) Input Module

(Cat. No. 1771-DL)

Product Data



Description

The Gray Encoder (12-24 VDC) Input Module converts an 8-bit Gray code from an absolute encoder to an 8-bit binary number for input to an Allen-Bradley programmable controller.

The module also has a 120 VAC zero-speed triac switch which is on while the Gray encoder is in motion. The switch turns off after a selectable delay when the module detects that motion has stopped. You can use this switch as a safety interlock to open the drive circuit after motion stops or if the encoder should fail.

The Allen-Bradley 8-bit Gray Encoder (Bulletin 845A-SJZ3DN6DW is compatible with this encoder module.

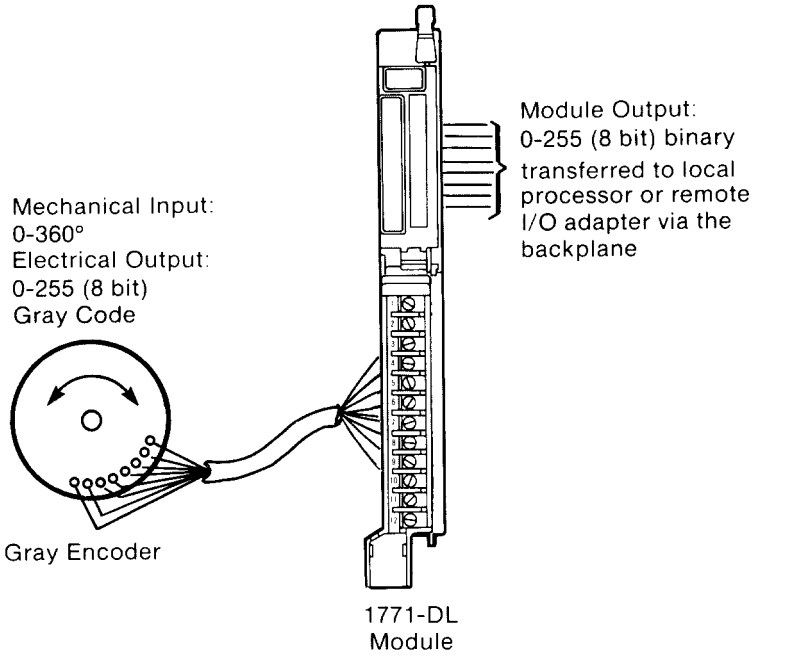
The encoder module is shipped with wiring arm (cat. no. 1771-WB).

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Module Inputs

The module receives its inputs from an encoder that detects rotational position, 0-360°, and converts position values to a corresponding 8-bit Gray code, 0-255. The encoder transmits coded position values to the module over a multiconductor cable (figure 1).

Figure 1
Block Diagram of Encoder and Module



Module Outputs

The module converts 8-bit Gray code to 8-bit binary, and places these values on the backplane of the I/O chassis. The processor or remote I/O adapter reads these values in the same manner it reads data from a discrete I/O module. Values are read into the processor's input image table word address corresponding to the module's location in the I/O chassis: upper byte for slot 1, lower byte for slot 0.

Zero Speed Switch

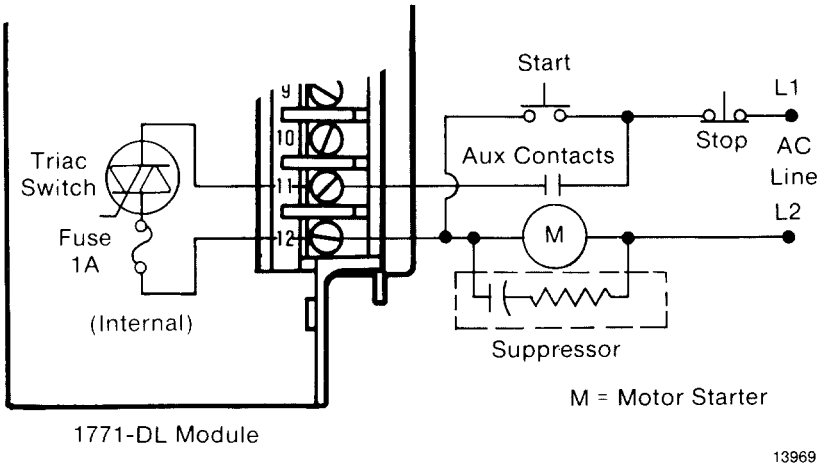
The encoder module has a zero-speed triac switch (between terminals 11 and 12) which remains on until the module detects that motion has stopped.

An adjustable time delay opens the switch after a delay. You adjust the delay time between 0.3 and 6.0 seconds using the trim pot located under the zero-speed indicator on the front of the module: counter-clockwise for shorter delay, clockwise for longer delay. It is factory set for 6.0 seconds.

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The switch is rated at 0.5 A at 120 VAC, 47-63 Hz. Use this switch only to open a “sealed-in” circuit (figure 2) such as for a motor starter. Do not use to initiate a “sealed-in” circuit.

Figure 2
Zero Speed Switch Circuit



You may need additional surge suppression to protect the triac switch from the motor starter. A load with large inductive characteristics can generate voltage transients which exceed the switch’s internal surge current rating. Since switching frequency and load impedance vary with application, we cannot specify a particular suppressor for your motor starter. The table below offers some suggestions for selecting a suppressor.

When the Load Is a	Use the Following A-B Suppressor
Motor Starter Bulletin 509	599-K04
Motor Starter Bulletin 709	1410-N10
Relay Bulletin 700N	700N5 700N9
General Purpose:	Electro Cube RG 1676-14

The module has a 1 A fuse located on the circuit board inside the module. This fuse is in series with the triac switch, and will blow if the maximum surge current exceeds 2 A for 10 ms.

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Electrostatic Damage

Under some conditions, electrostatic discharge can degrade performance or damage the module. If you observe the following precautions you can guard against electrostatic damage.

- Touch a grounded object to discharge yourself before handling the module.
- Do not touch the backplane connector or connector pins.
- When replacing the fuse, do not touch other circuit components inside the module. If available, use a static-safe work station.

Replacing the Fuse

Replace the fuse as follows:

- Remove cover by unscrewing four corner screws.
- Remove the circuit board and turn it over.
- Locate the fuse on the lower side, and replace.
- Re-assemble in reverse order.

Status Indicators

The front panel of the encoder module contains nine red LED status indicators.

The top indicator lights when the zero-speed triac switch is ON. Each of the remaining eight indicators corresponds to a single Gray code bit, and lights when the logic state of the bit is OFF.

Backplane Power

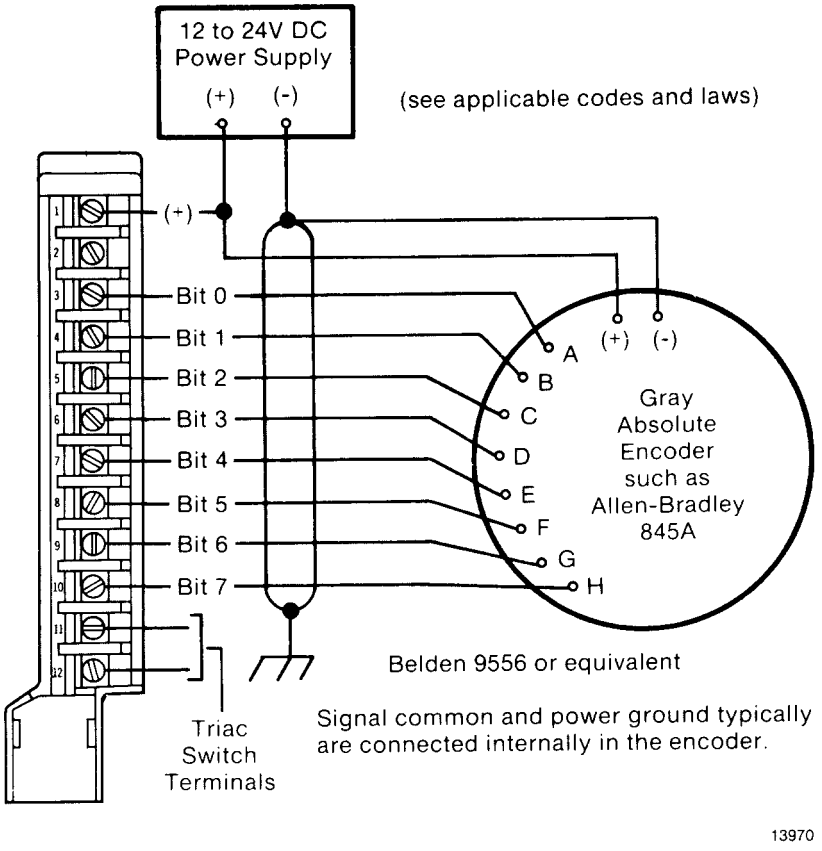
The encoder module requires 120 mA from the I/O chassis power supply. Total this amount with the current requirements of other modules in the chassis to guard against overloading the backplane and backplane power supply.

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Customer Power Supply

The module also requires a 12 to 24 VDC power supply which you connect to the wiring arm and absolute encoder (figure 3). The encoder driving circuit sinks 15 mA at 24 VDC or 6 mA at 12 VDC per Gray code input. Multiply this by eight for each encoder powered by this supply. Some absolute encoders may require an additional 5 VDC supply.

Figure 3
Wiring Diagram



Wiring

Use Belden 9556 multiconductor shielded cable (or equivalent) to connect the encoder to the module's wiring arm (figure 3). Ground the cable at one end, only. We recommend that you ground it at an I/O chassis mounting stud. Wrap the drain wire and shield together and connect both to the mounting stud. Limit the cable length to 50 feet.

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WARNING: Remove power from the 1771 I/O chassis backplane and wiring arm before removing or installing an I/O module.

- Failure to remove power from the backplane or wiring arm could cause module damage, degradation of performance, or injury.
- Failure to remove power from the backplane could cause injury or equipment damage due to possible unexpected operation.

Keying

Plastic keying bands are shipped with each I/O chassis. These bands help ensure that only a selected type of module can be placed in a particular module slot. They also help to align the module with the backplane connector.

Each module is slotted at its rear edge. The position of the keying bands on the upper backplane connector must correspond to these slots to allow insertion of the module. For the 1771-DL Gray Encoder Module, position the keying bands as follows:

Between 4 and 6

Between 24 and 26

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Specifications

Input

- one 8-bit Absolute Gray Encoder

Digital Resolution

- 1 part in 256

High-true Logic

- from a 7406, 7407, or equivalent TTL circuit with an open collector output
- module sources current to user device

Logic State

- logic 1: 10-27 VDC
- logic 0 : 0-2 VDC

Input Sourcing Current

- 6 mA per bit at 10 VDC
- 15 mA per bit at 27 VDC

Input Filter Time Delay

- 1 millisecond (max.)

Backplane Current

- 120 mA at 5 VDC

Zero-Speed Triac Switch

- output voltage:
  120 VAC (92-138 VAC, 47-63 Hz)
- output time delay:
  adjustable from 0.3 to 6.0 seconds
  (factory set at 6 seconds)
- continuous output current:
  0.5 A (max.)
- maximum surge current:
  2 A for 10 ms
- minimum load current:
  50 mA
- “ON state” voltage drop:
  2V at 100 mA load current
- “OFF state” leakage current:
  5 mA (max.)
- output fuse:
  8 AG, 1 A normal blow

Environmental Conditions

- operating temperature:
  0 to 60° C (32 to 140° F)
- storage temperature:
  –40 to 85° C (–40 to 185° F)
- relative humidity:
  5 to 95% (without condensation)

Keying Band Positions

- between 4 and 6
- between 24 and 26

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