

Encoder Receiver Option

HA388867 Issue 4
Technical Manual

aerospace
climate control
electromechanical
filtration
fluid & gas handling
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Encoder Receiver Option

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HA388867 Issue 4

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Safety Information



WARNING!

During commissioning, remove the fuses (or trip the circuit breaker) on your 3-phase supply.
Make sure the power is OFF, and that it cannot be switched on accidentally whilst you are working.

REFER TO YOUR MAIN PRODUCT MANUAL FOR SPECIFIC SAFETY INFORMATION ABOUT THE DEVICE YOU ARE CONTROLLING

IMPORTANT: Please read this information BEFORE installing the equipment.

Intended Users

This manual is to be made available to all persons who are required to install, configure or service equipment described herein, or any other associated operation.

The information given is intended to highlight safety issues, EMC considerations, and to enable the user to obtain maximum benefit from the equipment.

Application Area

The equipment described is intended for industrial motor speed control.

Personnel

Installation, operation and maintenance of the equipment should be carried out by qualified personnel. A qualified person is someone who is technically competent and familiar with all safety information and established safety practices; with the installation process, operation and maintenance of this equipment; and with all the hazards involved.

Safety

All control and signal terminals are SELV, i.e. protected by double insulation.

EMC

In a domestic environment this product may cause radio interference in which case the user may be required to take adequate counter-measures.

This equipment contains electrostatic discharge (ESD) sensitive parts. Observe static control precautions when handling, installing and servicing this product.

Safety Information



CAUTION!

At any time, there may be a loss of motor control and separate/independent application measures should be taken to ensure that such loss of motor control cannot present a safety hazard.

RISK ASSESSMENT

Under fault conditions, power loss or unintended operating conditions, the drive may not operate as intended. In particular:

- Stored energy might not discharge to safe levels as quickly as suggested, and can still be present even though the drive appears to be switched off
- The motor's direction of rotation might not be controlled
- The motor speed might not be controlled
- The motor might be energised

A drive is a component within a drive system that may influence its operation or effects under a fault condition. Consideration must be given to:

- Stored energy
- Supply disconnects
- Sequencing logic
- Unintended operation

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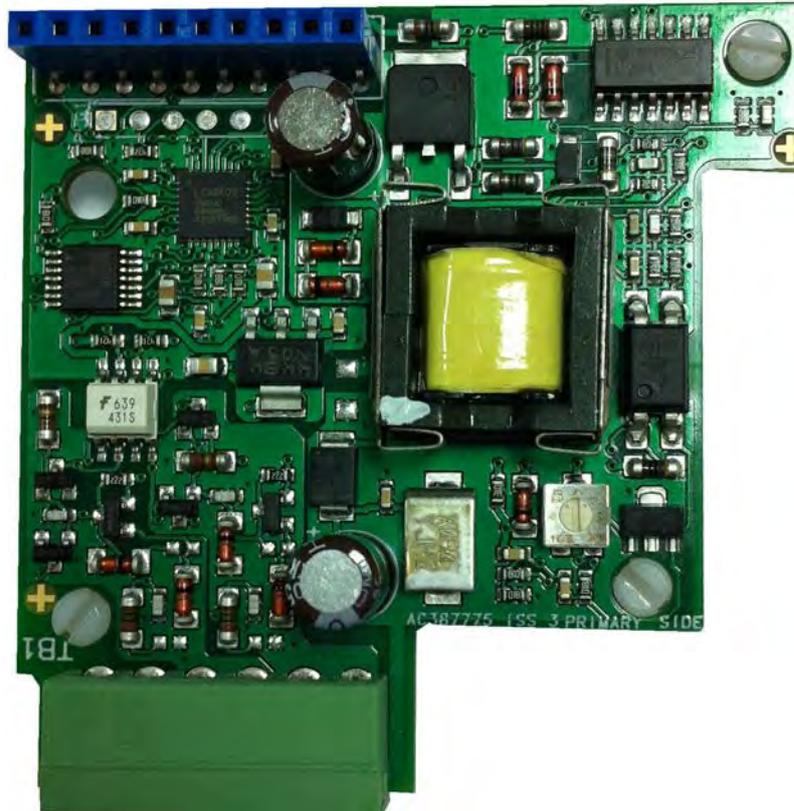
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ENCODER RECEIVER OPTION

Description



The Encoder Receiver Option allows incremental encoders to be connected directly to the motor controller to provide highly accurate speed feedback measurement. It mounts directly to the Main Control Board by means of three support stand-offs and a 10-pin interface connector built in to the board. A convenient board-mounted plug-in terminal block is provided for field connections.

Advantages

The Encoder Receiver Option board offers the following advantages:

- Contains two optically isolated differential inputs for channels A and B
- Decoding logic to interface the encoder to the control board
- Supplies fixed or customer-adjustable voltage, isolated encoder power supply

Used On

This option can be used on:

- 590 and 590P Series DC Controllers

Available Options

The Encoder Receiver is available in the following options:

| Part Number | Description |
|--------------|--------------------------------------|
| AH387775U001 | Encoder Receiver Customer Calibrated |
| AH387775U005 | 5V Encoder Receiver Option PCB |
| AH387775U012 | 12V Encoder Receiver Option PCB |
| AH387775U015 | 15V Encoder Receiver Option PCB |
| AH387775U024 | 24V Encoder Receiver Option PCB |

Note: An adjustment potentiometer sets the supply voltage and may be calibrated for various voltages. Refer to the Application Notes, page 6. When used with Parker SSD Drives Encoder, AH387775U015 must be used.

Specifications

| | |
|------------------------------------|---|
| Maximum Input Frequency | 100kHz per channel |
| Receiver Input Current | < 10mA per channel |
| Input Format | Two differential channels in quadrature |
| Minimum Differential Input Voltage | 2.5V |
| Maximum Differential Input Voltage | 30V |
| Encoder Supply Capacity | 2W maximum |
| Terminal Wire Size (maximum) | 16 AWG |
| Terminal Tightening Torque | Minimum 0.22Nm (1.9 pound-inches) Recommended 0.4Nm (3.5 pound-inches) |

Recommended Spare Parts

Keep one Encoder Receiver board that matches the most commonly used supply voltage for spare parts. It can be modified for use at other supply voltages as shown in the Application Notes section.

Installing the Encoder Receiver Option

WARNING!

Disconnect all sources of power before attempting installation. Injury or death could result from unintended actuation of controlled equipment.

Caution

This option contains ESD (Electrostatic Discharge) sensitive parts. Observe static control precautions when handling, installing and servicing this option.

590 Installation

1. Unwrap and handle the option board using correct static safety procedures.
2. Lift the lower cover of the controller door into the open and locked position.
3. Align the 10-pin connector on the option board with the controller pins on the left of the controller door board.
4. Carefully push the option board on to the pins. All three white support stand-offs should engage the controller door board.
5. Refer to the motor controller Product Manual for software selection and scaling of the feedback option.

590P Installation

1. Unwrap and handle the option board using correct static safety procedures.
2. Loosen the two screws that retain the terminal cover, and remove the cover.
3. Align the 10-pin connector on the option board with the controller pins in the left-hand option bay of the controller housing.
4. Carefully push the option board onto the pins. All three white support pins should engage the controller housing.
5. Refer to the motor controller Product Manual for software selection and scaling of the feedback option.



Figure 1 Encoder Receiver Option 590 Mounting

Adjusting the Customer Calibrated Option AH387775U001

The Encoder Receiver Option can be ordered for standard supply voltages of 5, 12, 15 and 24V dc. For applications requiring different voltages, the Customer Calibrated option (AH387775U001) can be purchased and the following procedure used to adjust the output voltage setting.

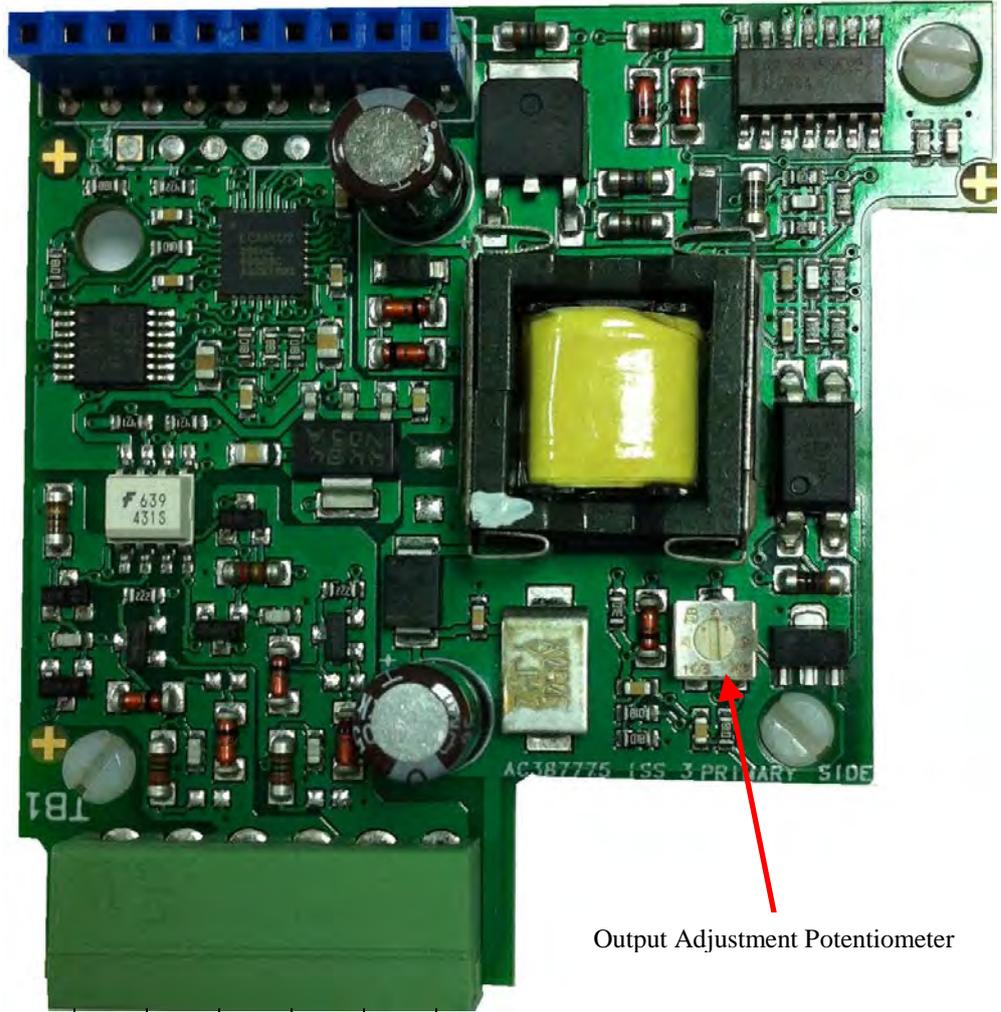
1. Install the Encoder Receiver Option card on the drive. Do NOT connect it to the encoder yet.
2. Power-up the drive.
3. Measure the voltage between terminals E1 and E2. This voltage can range from 5V to 30V dc.
4. Adjust the adjustment potentiometer until the desired output voltage is reached. Turning the adjustment potentiometer clockwise increases the output voltage.
5. Connect the encoder and re-check the voltage at the encoder terminals.

Note: *If the voltage drops by more than one volt, check the encoder wiring for excessive loading. Adjusting the adjustment potentiometer to compensate for an excessive line voltage drop is not recommended.*

Figure 2 shows the terminal designations and the location of the adjustment potentiometer. In cases where the encoder receiver card or the motor controller cannot supply enough power for the encoder, use an external power supply. The supply should be isolated from ground, that is neither the 0V dc nor the +V dc should be connected to ground.

All wiring to the Encoder Receiver Option board should be in screened cable. Cable with an overall screen or a screen over each individual pair may be used. Connection to earth should be made at the receiver end ONLY if possible, and should be in a star configuration. Take special care wiring the encoders to the option board due to the low level of the signals.

Encoders with Complementary Outputs



Output Adjustment Potentiometer

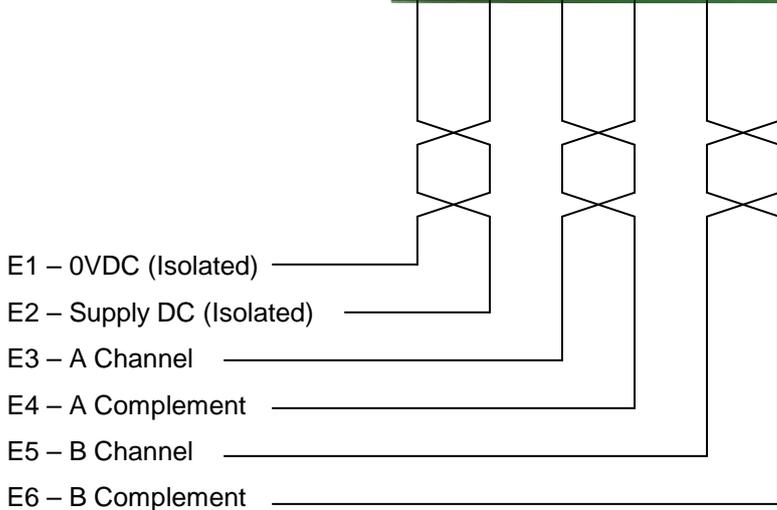


Figure 2 Terminal Designations

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Single-Ended Encoders

Note that differential encoders are recommended due to their better noise immunity.

When using single-ended encoders:

1. Connect the A and B channels to terminals to E3 and E5 as shown above.
2. Connect terminals E4 (A complement) and E6 (B complement) to E1 (0V dc)

Recommended cable (3 pairs individually screened):

Belden equivalent 8777

Parker SSD Drives Part Number CM052666

Parker SSD Drives Encoder Connection

| Function | MS Connector Pin | Receiver Terminal |
|-----------------------|------------------|-------------------|
| Channel A | A | 3 |
| Channel A Complement | G | 4 |
| Channel B | B | 5 |
| Channel B Complement | H | 6 |
| Marker | C | |
| Marker Complement | I | |
| Vcc Supply | D | 2 |
| Vcc Sensor (not used) | E | |
| 0V | F | 1 |
| 0V Sensor (not used) | - | |
| Cable Screen | | |

Parker SSD Drives Approved Encoders

| | | |
|----------------------|--------------------------------|--------------------------|
| Recommended Encoder | Litton: | G71SCLDBI1000-531-15EA |
| Alternative Encoders | Parker SSD Drives Part Number: | DD385536U010 (1000 line) |
| | Heidenhain: | ROD 534.1013 |
| | Avtron: | M945 1 R 1000 B C 15 |

Parker SSD Drives Recommended Encoder Specification

Mechanical Specification

| | |
|-------------------------|---|
| Dimensions | Figure 2 : Outline Drawing of Encoder with Adaptor Flange |
| Weight | Approximately 650g |
| Starting Torque (25°C) | 0.007Nm maximum |
| Slewing Speed (maximum) | 6000 rpm |
| Shaft Loading - Axial | 110N |
| Shaft Loading - Radial | 130N |
| Rotor Inertia | $3.6 \times 10^6 \text{Nm/s}^2$ |

Environmental Characteristics

| | |
|-----------------------|------------------------|
| Operating Temperature | 0°C to +70° |
| Storage Temperature | -25°C to +80°C |
| Humidity | up to 98% RH |
| Protection | IP64 |
| Shock | 20G, for 11ms duration |
| Vibration | 10G, 5-2000Hz |

Materials Used

| | |
|--------------|---------------------------------------|
| Mainframe | Aluminium |
| Housing | Cast Aluminium |
| Shaft | Anti-magnetic stainless steel |
| Bearing | ABEC5 |
| Light Source | GaAl As Infrared light emitting diode |

Electrical Specification

| | |
|---------------------------------|--------------------------------------|
| Supply Voltage | 8 - 15V dc |
| Current Consumption | 180mA maximum |
| Frequency Range | 300kHz |
| Lines per Rev | 1000, see Note |
| Output Format | 15V differential with 90° Quadrature |
| Maximum Load per Output Channel | 50mA |
| Maximum Period Distortion | 45° |
| Maximum Quadrature Distortion | 45° |
| Maximum Rise/Fall Time at 10V | 150ns |

Note: *Litton Encoders are available in other accuracies such as 500 lines/rev or 2000 lines/rev to suit the application.*

Electrical Connection

Electrical connections are made to the encoder via a 10-way MS radial connector. Plug and socket provided.

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