Encoder Receiver Option

Technical Manual

HA388867 Issue 3

WARRANTY

Parker SSD Drives warrants the goods against defects in design, materials and workmanship for the period of 12 months from the date of delivery on the terms detailed in Parker SSD Drives Standard Conditions of Sale IA058393C.

Parker SSD Drives reserves the right to change the content and product specification without notice.

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.

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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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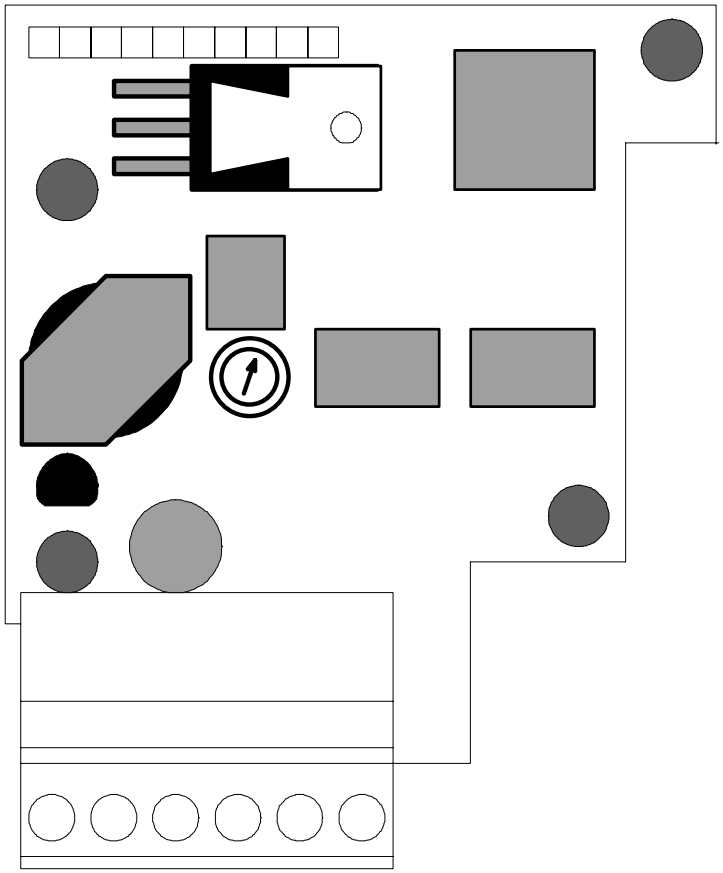
ENCODER RECEIVER OPTION

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 four 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 or channels A and B
- Decoding logic to interface the encoder to the microprocessor
- Supplies fixed voltage, isolated encoder power supply

Used On

This option can be used on:

- 590 Series DC Controllers
- 584S/584SV Series PWM AC 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: *The adjustment potentiometer sets the supply voltage and may be calibrated for various voltages. Refer to the Application Notes, page 5. When used with Parker SSD Drives Encoder, AH387775U015 must be used.*

Specifications

Maximum Pulse Rate	100kHz
Receiver Current	10mA per channel
Input Format	Two differential channels in quadrature
Minimum Differential Input Voltage	3.5V
Encoder Supply	2W maximum
Motor Controller DC Power Supply Loading	1.4 x output power
Terminal Wire Size (maximum)	16 AWG
Terminal Tightening Torque	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 four 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.

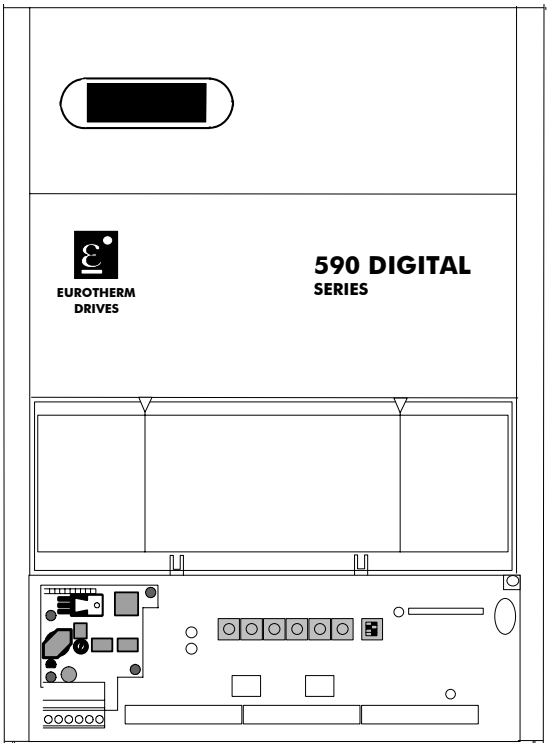


Figure 1 Encoder Receiver Option 590 Mounting (fitted similarly to 584S/584SV)

584S Installation

1. Unwrap and handle the option board using correct static safety procedures.
2. Remove the lower terminal cover.
3. Remove the self-tap screw on the left hand edge using a No. 2 pozi screw driver.
4. Slide the front aluminium cover down.
5. Align the 10-pin connector on the option board with the controller pins on the left of the controller door board.
6. Carefully push the option board on to the pins. All four white support stand-offs should engage the controller door board.
7. Refer to the motor controller Product Manual for software selection and scaling of the feedback option.

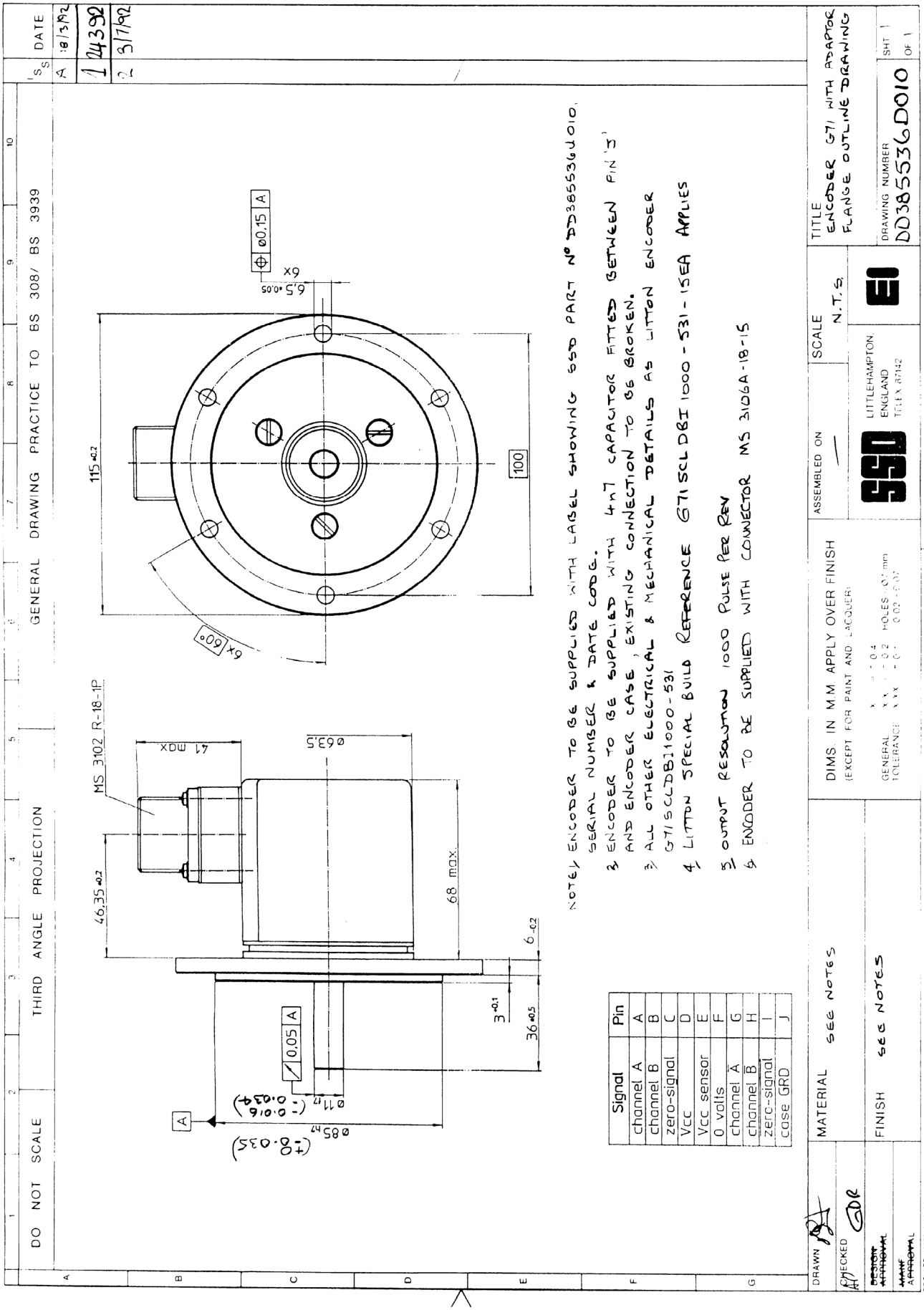


Figure 2 Outline Drawing of Encoder with Adaptor Flange

Application Notes

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 24V dc.
4. Adjust the adjustment potentiometer until the desired output voltage is reached.
5. Connect the encoder and re-check the voltage at the encoder terminals.

Note: *If the voltage drops 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 3 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 always be made at the receiver end ONLY, 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

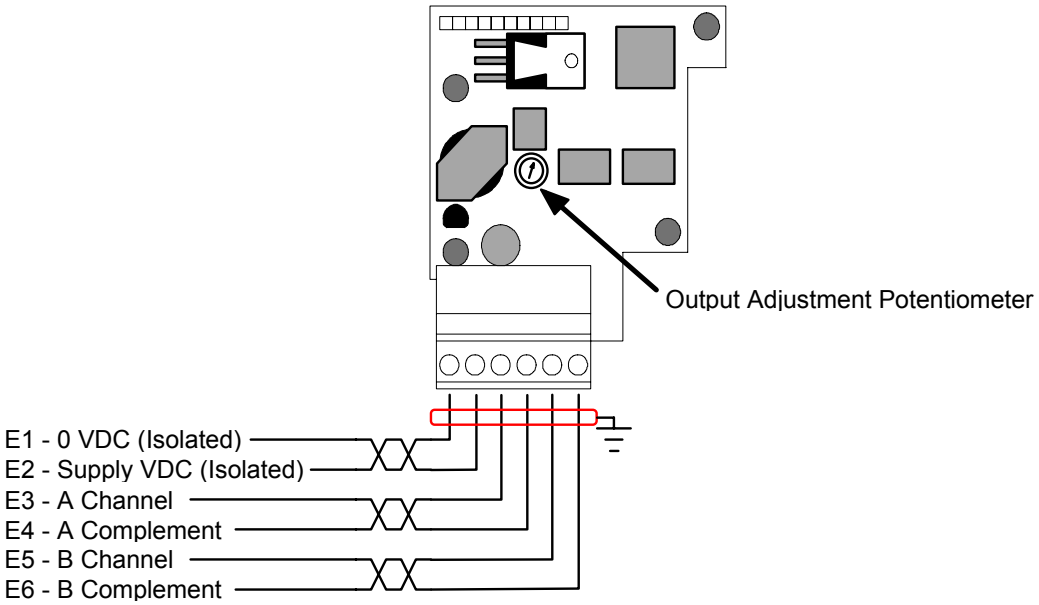


Figure 3 Terminal Designations

Single-Ended Encoders

When using single-ended encoders:

1. Connect the A and B channels to terminals to E3 and E5 as shown above.
2. Jumper 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
	Parker SSD Drives Part Number:	DD385536U010 (1000 line)
Alternative Encoders	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	$3.6 \times 10^{6} Nm/s^{2}$

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	GaA1 As Infrared light emitting diode

Electrical Specification

Supply Voltage	8 - 15V dc
Current Compensation	180mA maximum
Frequency Range	3000kHz
Lines per Rev	1000, see Note
Output Format	15V differential with 90° Quadrature and zero index, 88C30 Line Driver
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.

ISS.	MODIFICATION	ECN No.	DATE	DRAWN	CHK'D
1	Initial issue of HA388867	9532	22.12.94	FEP	GDR
2	New manual layout applied	13110	10.09.98	CM	GDR
3	Company name change	19591	04/07/07	CM	GDR

FIRST USED ON	MODIFICATION RECORD Encoder Receiver Option	
Parker	DRAWING NUMBER ZZ388867	SHT. 1 OF 1

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