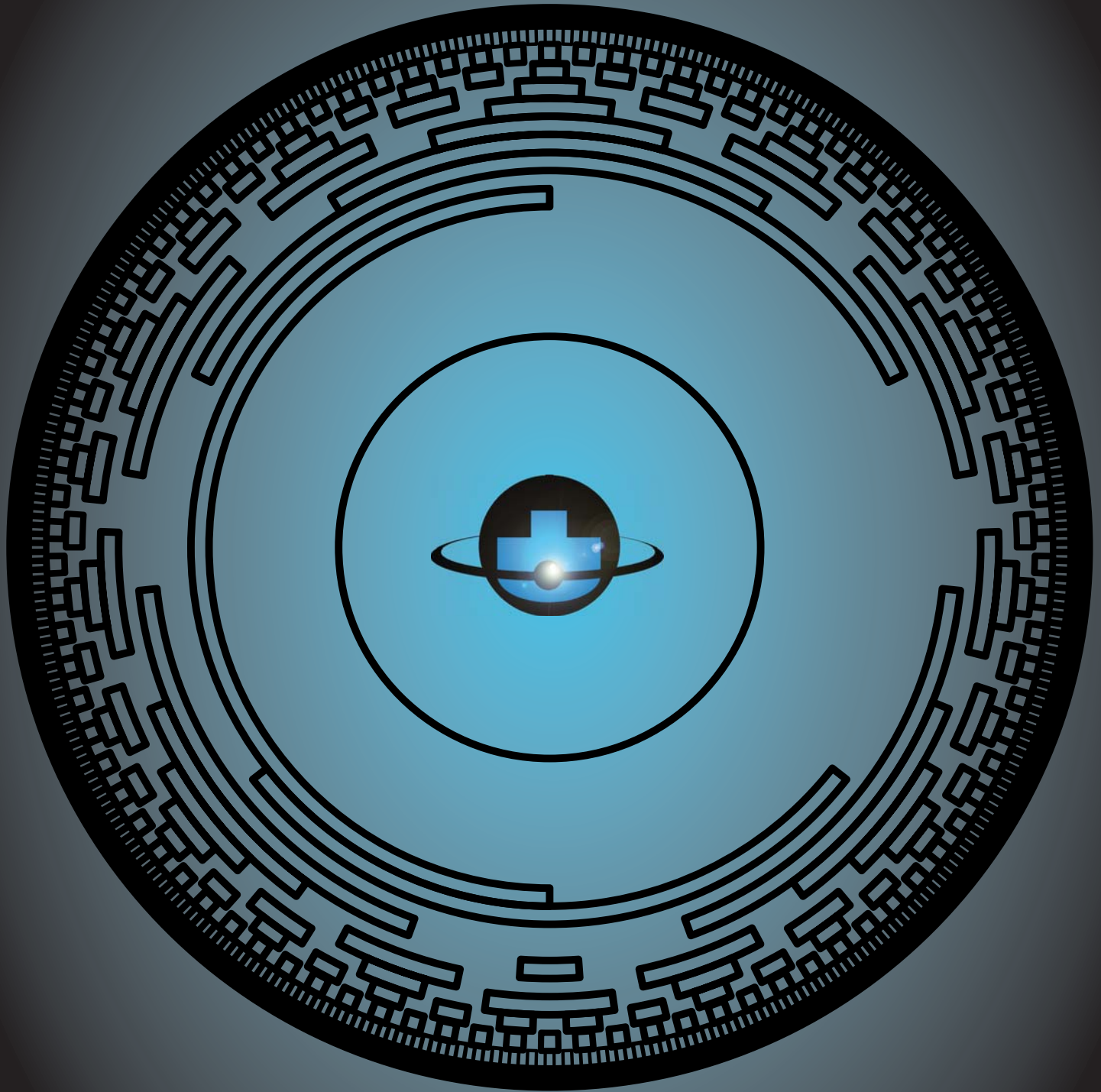


BRITISH
ENCODER
PRODUCTS COMPANY



The Worldwide Source of
OPTICAL SHAFT ENCODERS

Issue 12 - Revision D

British Encoder Products

Contents and Contact Information



BRITISH
ENCODER
PRODUCTS COMPANY



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Group Websites

European Division

www.encoder.co.uk

American Division

www.encoder.com

Asian Division

www.asiaencoder.com

Manufacturing Partner

www.jencoder.com

Communications & Contact Information

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Normal Business Hours:

Monday Through Thursday 08:00 - 13:00 and 13:30 - 16:30

&

Friday 08:00 - 12:00 and 12:30 - 14:00

Warranty, Terms and Policy



Three Year Warranty.

BECo warrants their products to be free from defects in material and workmanship for a period of three years from the date of shipment. This warranty does not apply to any product which has been subject to misuse, negligence, or accidental damage, or if the unit has been subjected to any unauthorized modification. This applies to new products only. There is no provision for warranty on O.E.M. Encoder repairs.

Satisfaction of this warranty, consistent with other provisions herein, will be limited to the replacement, or repair or modification of, or issuance of a credit for, the goods involved, at BECo's option, only after the return of such goods and subsequent inspection confirming validation of warranty, and with consent in accordance with the return policy and with shipping charges prepaid. Goods may only be returned for a credit by BECo's agreement in writing. There will be a re-stocking charge equal to 50% of the price paid on the original invoice - modified, or special-build items, are excluded.

This warranty is in lieu of all other warranties whether expressed, implied or statutory including implied warranties of merchantability or fitness.

Terms and Conditions

General

BECo and Customer agree that the terms and conditions identified in this document shall govern exclusively the sale by BECo of all hardware and services (collectively referred to as "Goods") within the United Kingdom. No addition or any modification to any of the terms and conditions as they appear in this document shall be binding upon BECo unless in writing and signed by an authorised representative of BECo.

Terms

Terms to customers with satisfactory credit are nett thirty (30) days from day of invoice. A 1.5% monthly service charge (18% annually) will be added to accounts not paid within 30 days from date of invoice at the discretion of BECo.

Shipment

All prices quoted (including repairs, parts, and goods sold separately) are EX-WORKS. Any shortages should be notified in writing within 7 days of receipt of goods, otherwise we can accept no responsibility.

Packing

All shipping prices listed provide for standard packing for domestic shipping in accordance with BECo's standard specifications. If special packaging is required for domestic shipment or for export shipment, refer to factory for additional charges.

Title and Responsibility

Title to hardware shall remain with BECo as security only and until full payment is received. Risk of loss or damage shall pass to customer upon shipment from our Wrexham factory.

Penalty Clauses

No contracts or quotations showing penalty clause for failure to meet shipment are acceptable to BECo.

Product Changes

Changes in design and improvements in manufacture are constantly being made by BECo whenever the company believes that the product will be improved. No obligations to incorporate these changes in units prior to the change will be assumed.

Shipping Weights and Dimensions

Published weights are careful estimates but are not warranted. Dimensions shown in catalogue are approximate.

Quotations

All written quotations automatically expire unless accepted within sixty (60) days from the date quoted. Verbal quotations expire on the same day that they are made.

Taxes

The customer shall pay all excise or similar taxes to the appropriate agency where and when applicable.

Delay

BECo shall not be liable for damage as a result of any delay due to any cause beyond BECo's reasonable control including, without limitation, act of God, act of war, riot, delay in transportation or inability to obtain necessary labour, materials, or manufacturing facilities. In the event of any such delay, the date of delivery shall be extended for a period equal to a time lost by reason of delay.

Limitation of Liability

In no event shall BECo be liable for consequential or incidental damages or any expense incurred by the customer attributed to any product sold hereunder.

E.&O.E.

Returns Policy

BECo's returns policy is quite clear: no product returns will be accepted unless accompanied by a return material authorisation (rma) number, issued by the sales or technical teams. Should you need to return any item, for inspection, repair, or any other reason, please contact this office in order to obtain your unique RMA reference number, so that the processing of your returned item may be properly monitored and progressed. In the case of items incorrectly specified by the hard-copy purchase order, we may in some cases (dependent upon our evaluation of the possibility of a future sales requirement) allow a maximum credit of up to 50% of the original unit net invoiced price.

Repair Policy

We have increased our repair capacity, and now offer a wider range of repair possibilities, with very short lead times.

- 1) Priority is given to warranty repairs. These are free of charge with UK return shipping charges paid, providing that the reason for failure is not found to be application related, and can be positively identified as a BECo quality issue. Warranty repairs should be completed within five working days.
- 2) All inspections, (of products manufactured either by "British Encoder", or any other manufacturer), will be subject to a standard charge, and the cost of return shipping, (details available from the Sales Office). Should a repair be agreed, this inspection charge will be waived, and the appropriate repair charge, and return shipping charges, will be applied. Inspections and repair evaluations should normally be completed within ten working days.
- 3) BECo non-warranty repairs are subject to standard charges and the cost of return shipping, (details available from the Sales Office). Non warranty repairs should normally be completed within ten working days.
- 4) OEM repairs, (i.e. encoder NOT of our own manufacture), are subject to standard charges, and the cost of return shipping, (details available from the Sales Office), OEM repairs should normally be completed within ten working days.
- 5) We now offer a priority repair service, for which a surcharge, (of 50% over the normal repair charge, per unit), will apply. This service is subject to the condition of our receipt of the suspect device, together with a confirmed purchase order, by no later than 10:00 HRS of the first working day. This facility may be withdrawn in the event of unexpected production demands, or by the occurrence of factors beyond our control.
- 6) Any returns should be accompanied by a valid RMA number, (Return Material Authorisation), which will be issued by the Sales Office, and which should be signed, giving us authority to proceed with any inspection or repair.
- 7) Any returns, (other than BECo Warranty Repairs), for which we do not receive specific instruction and a valid purchase order, will only be retained for a maximum of 30 days. Should we not receive specific instructions within the 30-day period, any material in our possession will be considered as being unwanted, and will be scrapped.

Model 121 Auto-Aligning Modular



Features

- Simple, Hassle Free Mounting
- Accepts Larger Shafts up to 15 mm
- Up to 12 Pole Commutation Available
- 0° to 100° C Operating Temperature Available
- Patented Design - #6,608,300B2
- Includes New IP50 Dust Seal Kit

AT LAST! A reliable modular encoder that requires no calibration, gapping, or special tools to install! We have taken the performance of modular encoders to a new level with the Model 121 Auto-Aligning Modular Encoder. This new and innovative design provides simple, reliable, hassle free installation. Simply tighten the shaft clamp, install the mounting screws, and you're done!

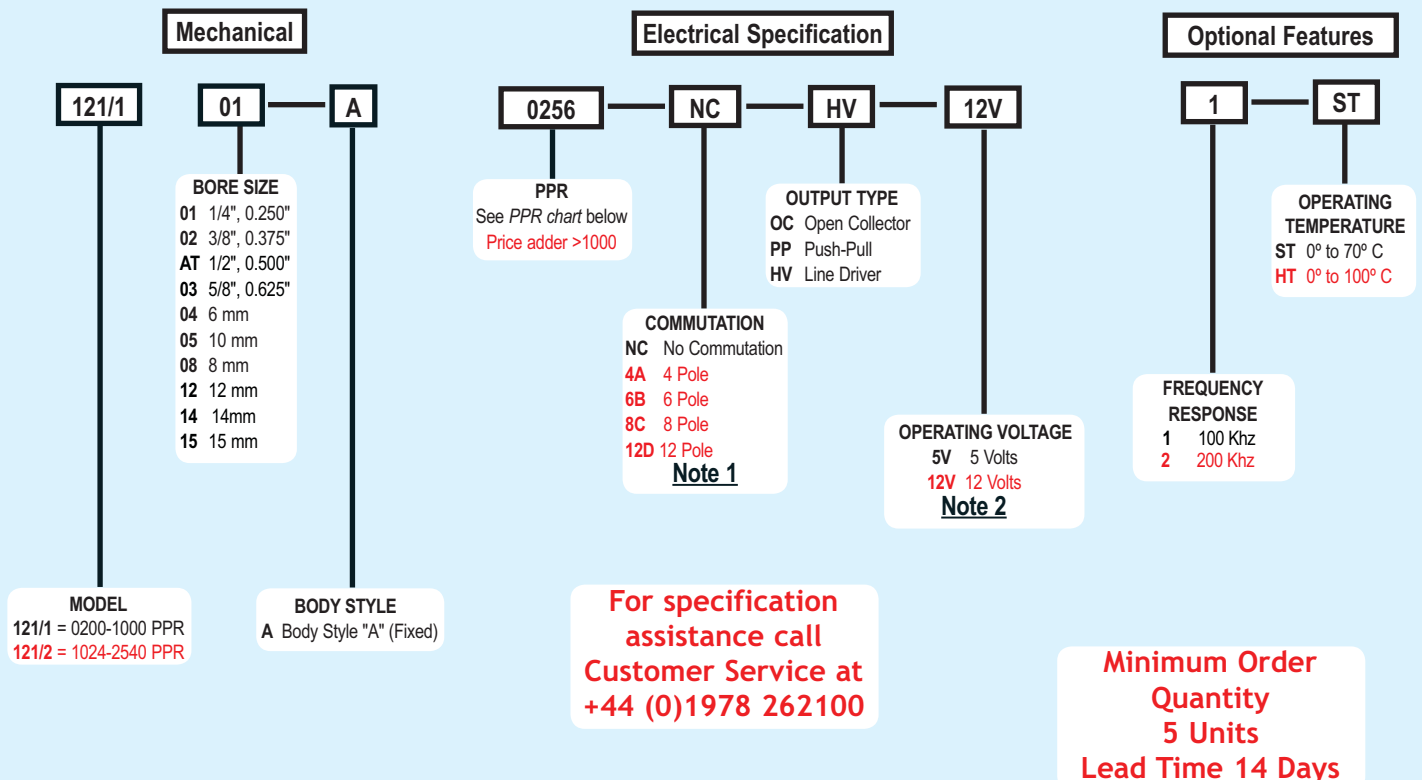
The Model 121 incorporates the latest Optical ASIC technology for greatly enhanced performance. Common problems with other modular encoder designs are warping and deflection, caused by their extensive use of plastic, both of which are virtually eliminated by the Model 121's all metal construction. For brushless servo motor applications, the Model 121 can be specified with three commutation tracks to provide motor feedback. The optional 100° C temperature capability allows servo motors to operate at higher power outputs and duty cycles.

Common Applications

Servo Motor Control, Robotics, Speciality Assembly Machines, Digital Plotters, High Power Motors

Model 121 Ordering Guide

Red type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.



Model 121 PPR Options

0200	0250	0254	0256	0300	0360	0500
0512	0600	0720	0800	0840	1000	1024
1200	1250	1800	2000*	2048*	2500*	2540*

*Contact Customer service for application analysis

New PPR values are periodically added to those listed. Contact Customer Service to determine all currently available values. Special disk resolutions are available upon request and may be subject to a one-time NRE fee.

NOTES:

- 1 Not available in all configurations. Contact Customer Service for availability.
- 2 Please note - Fixed operating voltages, please specify

Model 121 Auto-Aligning Modular



Model 121 Specifications

Electrical

Input Voltage.....5 Vcc $\pm 10\%$ Fixed Voltage
 12 Vcc $\pm 10\%$ Fixed Voltage

Input Current.....100 mA maximum with no output load

Output FormatIncremental- Two square waves in quadrature with channel A leading B for clockwise shaft rotation, as viewed from the mounting face.
 Index optional

Output TypesOpen Collector- 20 mA per channel max
 Push-Pull- 20 mA per channel max
 Line Driver- 20 mA max per channel (Meets RS 422 at 5 VDC supply)

IndexOnce per revolution gated to channel A.
 Contact Customer Service for additional gating options.

Freq. Response.....100 kHz standard, 200 kHz,
 Symmetry180° ($\pm 18^\circ$) electrical at 100 kHz
 Quad. Phasing.....90° ($\pm 22.5^\circ$) electrical at 100 kHz
 Min. Edge Sep.....67.5° electrical at 100 kHz
 Accuracy.....Within 0.1° mechanical from one cycle to any other cycle, or 6 arc minutes

CommutationOptional- three 120° electrical phase tracks for commutation feedback. (4, 6, 8, or 12 poles. Others available upon request)

Comm. Accuracy1° mechanical

Mechanical

Max. Shaft Speed.....Determined by maximum frequency response
 Bore Size6mm through 15mm
 Bore ToleranceH7 bore fit for g6 shaft Class LC5

User Shaft Tolerance

Radial Runout.....0.05mm max
 Axial End Play..... ± 0.40 for PPR ≤ 512
 ± 0.250 for PPR 513 to 1250
 ± 0.125 for PPR > 1250

Max. Acceleration..... 5×10^5 rad/sec²

Electrical Conn0.5 Metre cable (foil and braid shield, 24 AWG conductors non-commutated, 28 AWG commutated)

Housing.....All Metal Aluminum and Zinc Alloy

Mounting.....Two screws on a 46mm PCD. (M3 maximum screw size)

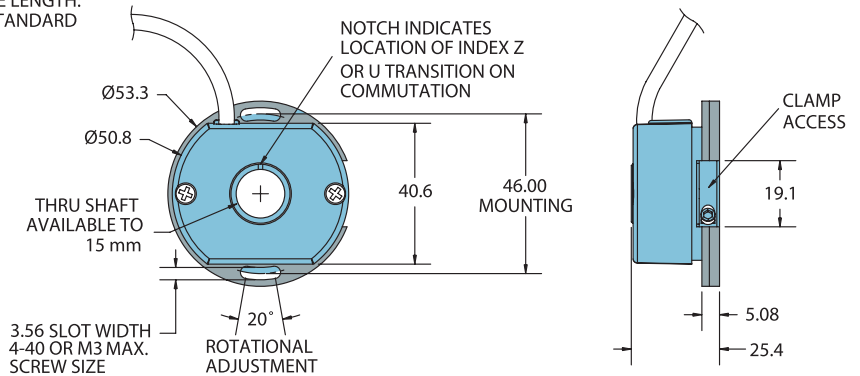
Weight.....150 gms typical

Environmental

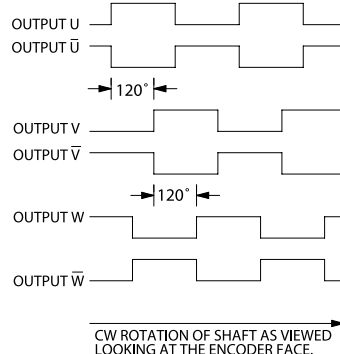
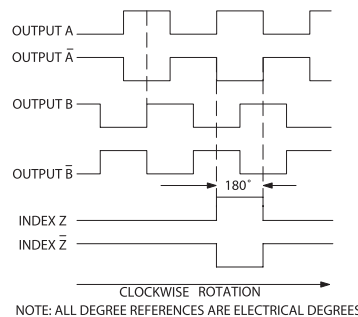
Operating Temp.....0° to 70° C for standard models
 0° to 100° C for high temperature option
 Storage Temp.....-25° to +100° C
 Humidity.....98% RH non-condensing
 Vibration.....10 g @ 58 to 500 Hz
 Shock.....50 g @ 11 ms duration

Model 121 Auto-Aligning Modular

CABLE LENGTH:
2 M STANDARD



Waveform Diagrams



Wiring Table

Function	Cable Wire Color
Com	Black
+Vcc	White
A	Brown
A'	Yellow
B	Red
B'	Green
Z	Orange
Z'	Blue
U	Violet
U'	Gray
V	Pink
V'	Tan or Turq
W	Red/Green
W'	Red/Yellow
Shield	Bare

Model 15T Thru-Bore, or Model 15H Hollow Bore (Blind)



Features

- Very High Performance Economical Encoder
- Low Profile 25.4 mm Height and 38 mm Diameter
- Thru-Bore sizes up to 10 mm
- Simple, Innovative Flex Mounting System (Global Mounting Standards)
- Up To 12 Pole Commutation Optional (for brush less motor control)

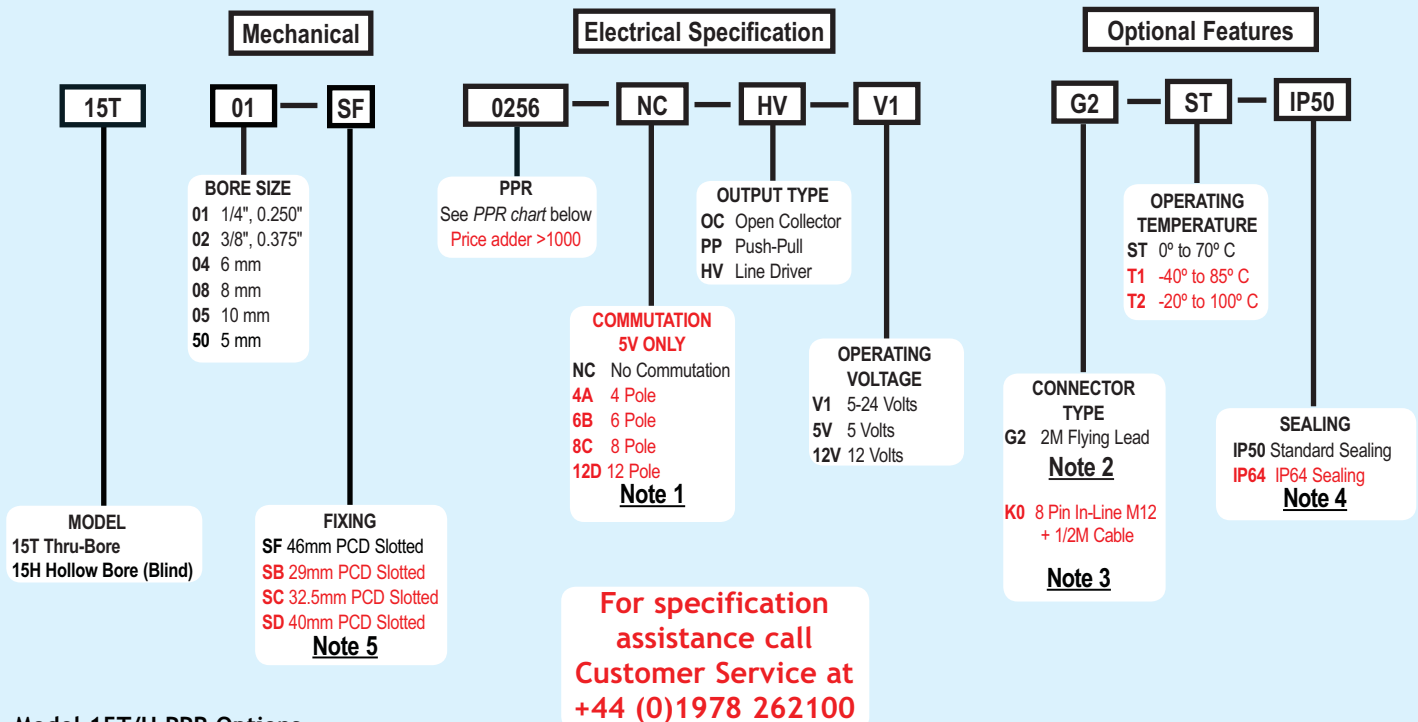
The Model 15T or 15H offer a high performance feedback solution in a low profile package. Unlike modular or kit encoders, the Model 15 utilizes an integral bearing set, and an innovative flexible mounting system which is much more tolerant to axial misalignment or radial shaft run-out. The slotted flex mounts provide 20 or 30 degrees of rotational adjustment for commutation or index pulse timing. Installation is quick and easy! For brushless servo motor applications, three 120° electrical phase tracks can provide up to 12 pole commutation feedback. The optional 100° C temperature options allow servo motors to operate at higher power outputs and duty cycles. The Model 15 provides stable and reliable operation and is an excellent replacement for other manufacturer's modular encoders where a high performance solution is desired.

Common Applications

Servo Motor Control, Robotics, Speciality Assembly Machines, Digital Plotters, High Power Motors

Model 15T/H Ordering Guide

Red type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.



Model 15T/H PPR Options

0001 thru 0189*	0200	0250	0256
0300	0315	0360	0400
0512	0580	0600	0800
1024	1200	1250	1500
2000	2048	2500	2540
3600	4000	4096	5000
8192	10000		6000

*Contact Customer Service For Availability

New PPR values are periodically added to those listed. Contact Customer Service to determine all currently available values. Special disc resolutions are available upon request and may be subject to a one-time NRE fee.

NOTES:

- 1 Not available in all configurations. **Only available with 5V Input Voltage. 12D Only available with 80 PPR.** Contact Customer Service for availability.
- 2 For non-standard cable lengths contact sales for availability and cost.
- 3 8 Pin Not available with commutation
- 4 Increased starting torque with IP64 selection.
- 5 This mount requires button head screws and a modified Hex wrench. Order appropriate Installation Kit listed under Specifications.

Model 15T Thru-Bore, or Model 15H Hollow Bore (Blind)



Model 15T/H Specifications

Electrical

Input Voltage 4.75 to 28 VCC max for temperatures up to 85° C
 4.75 to 24 VCC for temperatures between 85° to 100° C
5V Only for Commutation Encoder.
 Input Current 100 mA max (65 mA typical) with no output load
 Output Format Incremental- Two square waves in quadrature with channel A leading B for clockwise shaft rotation, as viewed from the encoder mounting face. See *Waveform Diagrams* below.
 Output Types Open Collector- 20 mA max per channel
 Push-Pull- 20 mA max per channel
 Line Driver- 20 mA max per channel (Meets RS 422 at 5 VCC supply)
 Index Once per revolution.
 190 to 2540 PPR: Gated to output A
 1 to 189 PPR: Ungated
 See *Waveform Diagrams* below.
 Freq. Response 200 kHz standard (up to 1MHz)
 Noise Immunity Tested to BS EN61000-6-2; BS EN50081-2; BS EN61000-4-2; BS EN61000-4-3; BS EN61000-4-6; BS EN500811
 Symmetry 180° (±18°) electrical
 Quad. Phasing 90° (±22.5°) electrical
 Min. Edge Sep 67.5° electrical
 Accuracy Within 0.017° mechanical or 1 arc-minute from true position. (for PPR>189)
 Commutation Up to 12 pole. Contact Customer Service for availability.
 Comm. Accuracy 1° mechanical

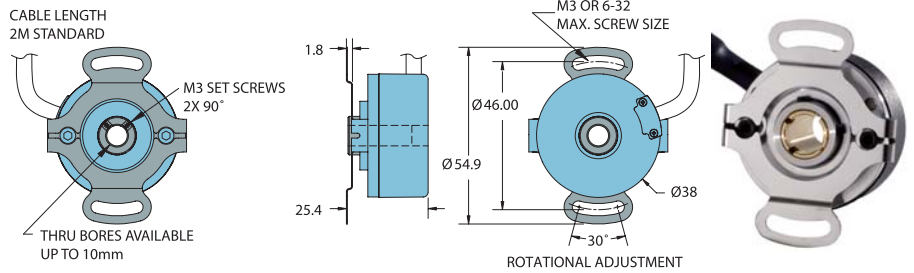
Mechanical

Max Shaft Speed 8000 RPM. Higher speeds may be achievable, contact Customer Service.
 Bore Size 5 mm through 10 mm
 Bore Tolerance H7 (Sliding fit for g6)
 User Shaft Tolerances
 Radial Runout 0.20mm max
 Axial Endplay ±0.75mm max
 Starting Torque IP50 Hollow Bore: 1.4123 x 10⁻³ Nm
 IP50 Thru-Bore: 2.1185 x 10⁻³ Nm
 IP64: 4.2370 x 10⁻³ Nm
 Max Acceleration 1 x 10⁵ rad/sec²
 Electrical Conn 2M cable (foil and braid shield, 24 AWG conductors non-commutated, 28 AWG commutated), 8-pin M12 (12 mm) in-line connector with 0.5M cable (braid shield)
 Mounting 46 mm Slotted Flex mount
 29 mm Slotted Flex Mount
 32.5 mm Slotted Flex Mount
 40 mm Slotted Flex Mount
 (See mechanical drawings for dimensions)
 Weight 100 grams typical

Environmental

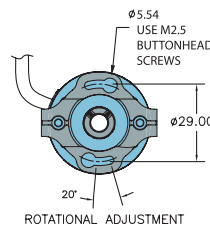
Operating Temp -0° to +70° C standard models
 -40° to +85° C for low temperature option
 -20° to +100° C for high temperature option
 Storage Temp -25° to +85° C
 Humidity 98% RH non-condensing
 Vibration 10 g @ 58 to 500 Hz
 Shock 80 g @ 11 ms duration
 Sealing IP50 standard; IP64 available

Model 15T/H (46 mm) Slotted Flex Mount (SF)

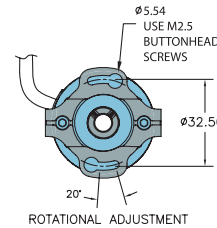


Model 15T/H Small Diameter Slotted Flex Mounts

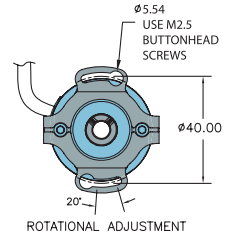
29 mm : SB*



32.5 mm : SC*



40 mm : SD*



Encoder Length and Diameter are the same as SF and SA mounts detailed above
 All dimensions are in mm with a tolerance of ± 0.01* unless otherwise specified

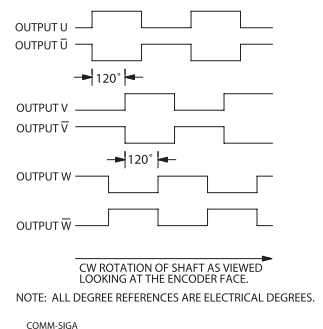
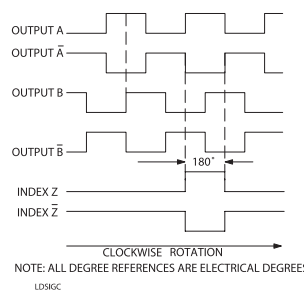
* Order Appropriate Mounting and Installation Kit for SB, SC, or SD Option

176149-01 Installation Kit, M 2.5 Buttonhead Screws with 1.5 mm Shortened Hex Wrench
 Each kit contains 10 screws for mounting 5 encoders



"SB" Slotted Flex Mount

Waveform Diagrams



Wiring Table

Function	Cable Wire Color	8-pin M12**
Com	Black	7
+VDC	White	2
A	Brown	1
A'	Yellow	3
B	Red	4
B'	Green	5
Z	Orange	6
Z'	Blue	8
U	Violet	--
U'	Gray	--
V	Pink	--
V'	Turquoise	--
W	Red/Green	--
W'	Red/Yellow	--
Shield	Bare *	--

Model 15S Servo-Style



Features

- Very High Performance Economical Encoder
- Low Profile 25.4 mm Height and 38 mm Diameter
- Shaft sizes up to 0.250" Diameter
- Up To 12 Pole Commutation Optional (for brush less motor control)

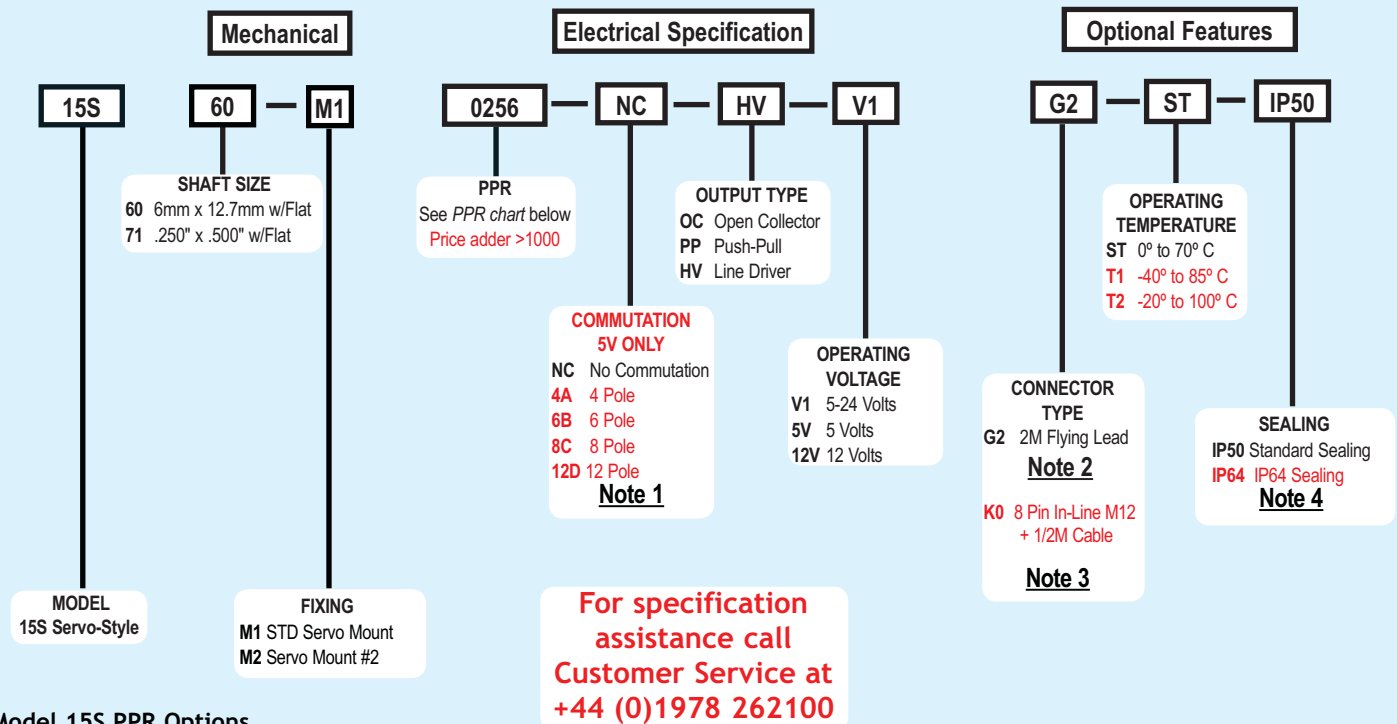
The Model 15S offers a high performance feedback solution in a low profile package, making the Model 15S ideal for commercial and light-duty industrial applications. This industry standard Size 15 (38mm diameter) encoder features a precision bearing set, sealing available to IP64, a durable 1/4" or 6 mm stainless steel shaft, and a selection of servo mount options. The Model 15S may also be specified with features such as extended operating temperatures from -20° C to +100° C, or up to 12 pole commutation for brushless motor control. The Model 15S features our Opto-ASIC circuitry for a clean, reliable signal. Its durable, yet economical design makes it an ideal encoder for high precision OEM applications.

Common Applications

Servo Motor Control, Robotics, Speciality Assembly Machines, Digital Plotters, High Power Motors

Model 15S Ordering Guide

Red type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.



Model 15S PPR Options

0001 thru 0189*	0200	0250	0256
0300	0315	0360	0400
0512	0580	0600	0800
1024	1200	1250	1500
2000	2048	2500	2540
3600	4000	4096	5000
8192	10000		6000

*Contact Customer Service For Availability

New PPR values are periodically added to those listed. Contact Customer Service to determine all currently available values. Special disc resolutions are available upon request and may be subject to a one-time NRE fee.

NOTES:

- 1 Not available in all configurations. **Only available with 5V Input Voltage.** 12D Only available with 80 PPR. Contact Customer Service for availability.
- 2 For non-standard cable lengths contact sales for availability and cost.
- 3 8 Pin Not available with commutation
- 4 Increased starting torque with IP64 selection.

Model 15S Servo-Style



Model 15S Specifications

Electrical

Input Voltage 4.75 to 28 VCC max for temperatures up to 85° C
4.75 to 24 VCC for temperatures between 85° to 100° C
5V Only for Commutation Encoders.

Input Current 100 mA max (65 mA typical) with no output load

Output Format Incremental- Two square waves in quadrature with channel A leading B for clockwise shaft rotation, as viewed from the encoder mounting face. See *Waveform Diagrams* below.

Output Types Open Collector- 20 mA max per channel
Push-Pull- 20 mA max per channel
Line Driver- 20 mA max per channel (Meets RS 422 at 5 VCC supply)

Index Once per revolution.
190 to 2540 PPR: Gated to output A
1 to 189 PPR: Ungated
See *Waveform Diagrams* below.

Freq. Response 200 kHz standard (up to 1MHz)

Noise Immunity Tested to BS EN61000-6-2; BS EN50081-2; BS EN61000-4-2; BS EN61000-4-3; BS EN61000-4-6; BS EN500811

Symmetry 180° (±18°) electrical

Quad. Phasing 90° (±22.5°) electrical

Min. Edge Sep 67.5° electrical

Accuracy Within 0.017° mechanical or 1 arc-minute from true position. (for PPR>189)

Commutation Up to 12 pole. Contact Customer Service for availability.

Comm. Accuracy 1° mechanical

Mechanical

Max Shaft Speed 8000 RPM. Higher speeds may be achievable, contact Customer Service.

Shaft Size 6mm & 0.250" g6 Tolerance

Shaft Material Stainless Steel

Radial Shaft Load 2.27 Kg max. Rated load of 0.91 Kg to 1.36 Kg

Axial Shaft Load 2.27 Kg max. Rated load of 0.19 Kg to 1.36 Kg

Starting Torque IP50 3.531 x 10⁻⁴ Nm
IP64 2.825 x 10⁻³ Nm

Max Acceleration 1 x 10⁵ rad/sec²

Electrical Conn 2M cable (foil and braid shield, 24 AWG conductors non-commutated, 28 AWG commutated), 8-pin M12 (12 mm) in-line connector with 0.5M cable (braid shield)

Weight 100 grams typical

Environmental

Operating Temp -0° to +70° C standard models
-40° to +85° C for low temperature option
-20° to +100° C for high temperature option

Storage Temp -25° to +85° C

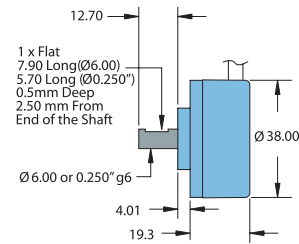
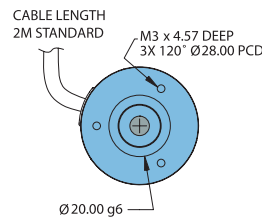
Humidity 98% RH non-condensing

Vibration 10 g @ 58 to 500 Hz

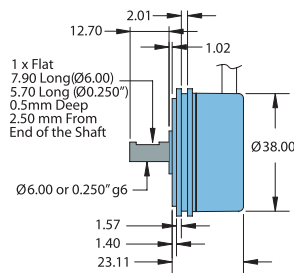
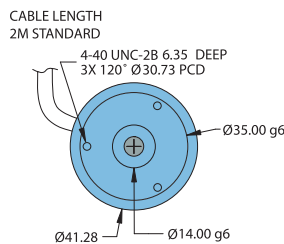
Shock 80 g @ 11 ms duration

Sealing IP50 standard; IP64 available

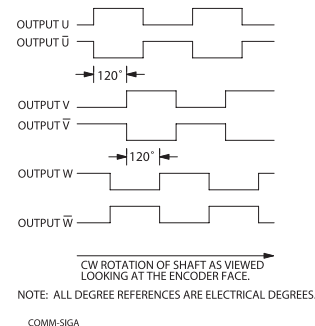
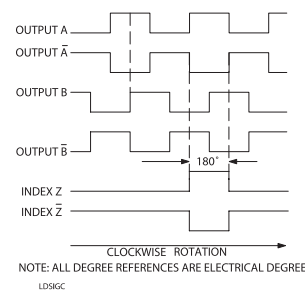
Model 15S Standard Servo Mount (M1)



Model 15S Servo Mount (M2)



Waveform Diagrams



Wiring Table

Function	Cable Wire Color	8-pin M12**
Com	Black	7
+VDC	White	2
A	Brown	1
A'	Yellow	3
B	Red	4
B'	Green	5
Z	Orange	6
Z'	Blue	8
U	Violet	--
U'	Gray	--
V	Pink	--
V'	Turquoise	--
W	Red/Green	--
W'	Red/Yellow	--
Shield	Bare *	--

Model TR1 - Tru-Trac

Encoder and Spring Loaded Measuring Wheel



Features

- Encoder And Measuring Wheel Solution Integrated Into One Compact Unit
- Spring Loaded Torsion Arm Makes Wheel Pressure Adjustments So Easy
- Easily Installed In A Vertical, Horizontal, or Upside-Down Orientation
- Operates Over A Variety Of Surfaces At Speeds Up To 3000 Feet Per Minute
- Integrated Module Simplifies Your System Design, Reducing Cost

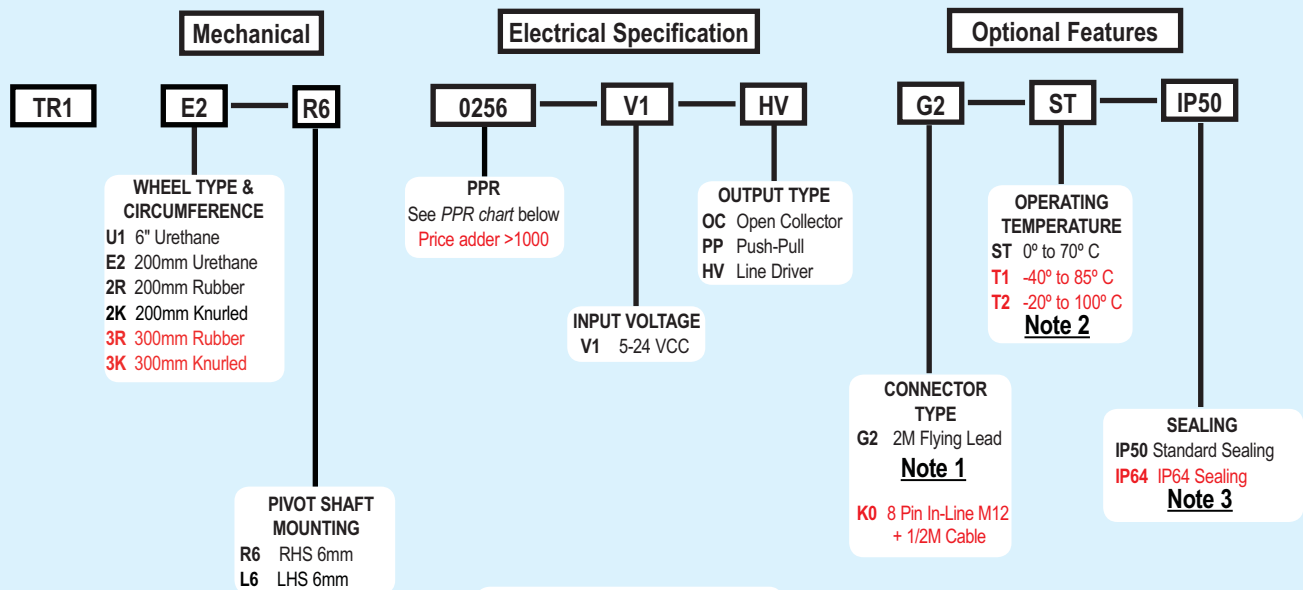
FINALLY! An integrated encoder and spring loaded measuring wheel assembly available in one, easy-to-use, compact unit. The NEW Tru-Trac is a versatile solution for tracking velocity, position, or distance over a wide variety of surfaces in almost any application. Its spring-loaded torsion arm provides a simple-to-adjust torsion load, allowing the Tru-Trac to be mounted in almost any orientation, even upside-down. The threaded shaft on the pivot axis is field reversible providing mounting access from either side. The Tru-Trac housing is a durable, conductive composite material that will eliminate static build up. With operating speeds up to 3000 feet per minute and a wide variety of configuration options, it's easy to see the Tru-Trac is the ideal solution for countless applications.

Common Applications

Web Tension Control, Paper Monitoring, Glue Dispensing, Linear Material Monitoring, Conveyor Systems, Printing, Labelling, Document Handling

Model TR1 Tru-Trac Ordering Guide

Red type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.



For specification assistance call Customer Service at +44 (0)1978 262100

Model TR1 TRU-TRAC PPR Options

0200	0250	0254	0256	0300	0360	0400
0500	0512	0600	0720	0800	0840	1000
1024	1200	1220	1250	1270	1500	1800
2000	2048	2500	2540	3000	3600	4096
4000	6000	8192	10000			

*Contact Customer service for High Temp option

Contact Customer Service for other disc resolutions; not all disc resolutions available with every commutation option.

NOTES:

- 1 For non-standard cable lengths - Contact Customer Service for availability and cost.
- 2 With input voltage higher than 16 VCC, The operating temperature is limited to 85°C.
- 3 Increased starting torque with IP64 selection.

Model TR1 - Tru-Trac Encoder and Spring Loaded Measuring Wheel



**BRITISH
ENCODER**
PRODUCTS COMPANY



Model TR1 - Tru-Trac™ Specifications

Electrical

Input Voltage	4.75 to 28 VCC max for temperatures up to 85° C
	4.75 to 24 VCC for temperatures between 85° C to 100° C
Input Current	100 mA max (65 mA typical) with no output load
Output Format	Incremental- Two square waves in quadrature with channel A leading B for clockwise shaft rotation, as viewed from the wheel side. See <i>Waveform Diagrams</i> below.
Output Types	Open Collector- 20 mA max per channel Push-Pull- 20 mA max per channel Line Driver- 20 mA max per channel (Meets RS 422 at 5 VDC supply)
Index	Once per revolution. 0190 to 2540 PPR: Gated to output A 0001 to 0189 PPR: Ungated See <i>Waveform Diagrams</i> below.
Freq. Response	200 kHz standard (up to 1MHz)
Noise Immunity	Tested to BS EN61000-6-2; BS EN50081-2; BS EN61000-4-2; BS EN61000-4-3; BS EN61000-4-6, BS EN500811
Symmetry	180° (±18°) electrical
Quad. Phasing	90° (±22.5°) electrical
Min. Edge Sep	67.5° electrical
Accuracy	Within 0.017° mechanical or 1 arc-minute from true position. (for CPR>189)

Mechanical

Max Shaft Speed	6000 RPM. Higher speeds may be achievable, contact Customer Service.
Shaft Material	Stainless Steel
Shaft Toleranceg6
Radial Shaft Load	2.5kg max. Rated load of 1.25kg to 1.75kg for bearing life of 1.2×10^{10} revolutions
Axial Shaft Load	2.5kg max. Rated load of 1.25kg to 1.75kg for bearing life of 1.2×10^{10} revolutions
Starting Torque	IP50 3.531×10^{-4} Nm IP64 2.825×10^{-3} Nm
Electrical Conn	2M cable (foil and braid shield, 24 AWG conductors), 8-pin M12 (12 mm) in-line connector with 0.5M cable (braid shield)
Mounting	Pivot shaft can be mounted from either side of the Tru-Trac™ housing, and is reversible in the field. Specify 1/4-20 or M6 threads
Housing	Stainless steel fibers in a high temperature nylon composite
Wheel Width	0.25"
Weight	150 gms typical

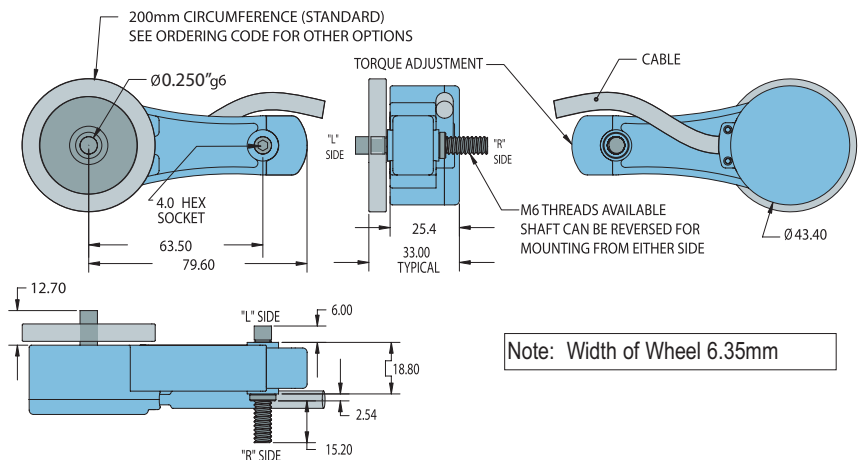
Environmental

Operating Temp	-0° to +70° C for standard models -40° to +85° C for low temperature option -20° to +100° C for high temperature option
Storage Temp	-25° to +85° C
Humidity	98% RH non-condensing
Vibration	10 g @ 58 to 500 Hz
Shock	80 g @ 11 ms duration
Sealing	IP50 standard; IP64 available



Angle Mounting Bracket for TR1 Tru-Trac can be ordered separately as part No: 140104 Dimensional drawing shown on accessory Data-sheet

Model TR1 - Tru-Trac™



Model TR1 - Tru-Trac™ Applications



For Linear Applications the Tru-Trac™ can be mounted above or below the moving object, and the tension on the wheel adjusted for a wide range of applications such as packaging, conveyors, mail sorting, cut to length, labelling, gantries etc.

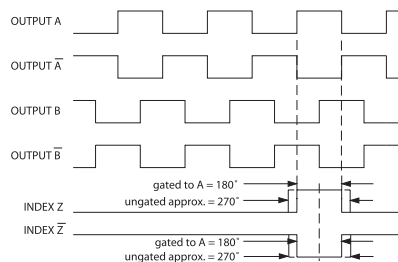


For Rotational Applications the Tru-Trac™ can be mounted in any orientation to monitor the position or velocity of many types of rotating equipment such as web tension control drums, rotary tables, printing, spooling, etc.



Waveform Diagrams

INCREMENTAL SIGNALS



Waveform shown with optional complementary signals \bar{A} , \bar{B} , \bar{Z} for HV and OD outputs only.

Wiring Table

Function	Cable Wire Color	8-pin M12**
Com	Black	7
+VDC	White	2
A	Brown	1
A'	Yellow	3
B	Red	4
B'	Green	5
Z	Orange	6
Z'	Blue	8
Shield	Bare *	--

Model TR3 - Heavy Duty Tru-Trac Encoder and Spring Loaded Measuring Wheel



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PRODUCTS COMPANY



Model TR3 Specifications

Electrical

- Input Voltage 4.75 to 28 VCC max for temperatures up to 85° C
4.75 to 24 VCC for temperatures between 85° C to 100° C
- Input Current 100 mA max (65 mA typical) with no output load
- Output Format Incremental- Two square waves in quadrature with channel A leading B for clockwise shaft rotation, as viewed from the wheel side. See *Waveform Diagrams* below.
- Output Types Open Collector- 20 mA max per channel
Push-Pull- 20 mA max per channel
Line Driver- 20 mA max per channel (Meets RS 422 at 5 VCC supply)
- Index Once per revolution.
0200 to 10000 PPR: Gated to output A
See *Waveform Diagrams* below.
- Freq. Response 200 kHz standard (up to 1MHz)
- Noise Immunity Tested to BS EN61000-6-2; BS EN50081-2;
BS EN61000-4-2; BS EN61000-4-3;
BS EN61000-4-6, BS EN500811
- Symmetry 180° (±18°) electrical
- Quad. Phasing 90° (±22.5°) electrical
- Min. Edge Sep 67.5° electrical
- Accuracy Within 0.017° mechanical or 1 arc-minute from true position.

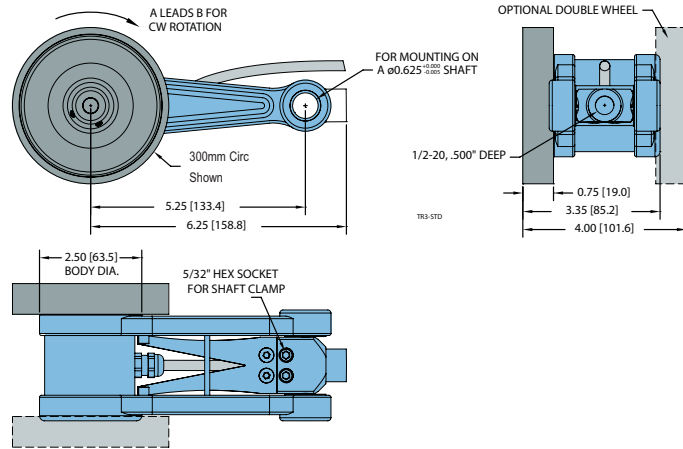
Mechanical

- Max Shaft Speed Not to exceed a maximum shaft speed of 6000 RPM
- Shaft Material Stainless Steel
- Shaft Tolerance 9.525 g6
- Radial Shaft Load ..5kg max. Controlled by spring torsion.
- Starting Torque 7.06 x 10⁻³ Nm for IP50
2.82 x 10⁻² Nm for IP65 seal
- Electrical Conn 2M cable (foil and braid shield, 24 AWG conductors), 8-pin M12 (12 mm) in-line connector with 0.5M cable (braid shield)
- Mounting 15.875mm diameter thru hole with clamp
- Housing Powder coated aluminium
- Wheel Width Up to 20mm
- Weight 1.40Kg typical with dual wheel

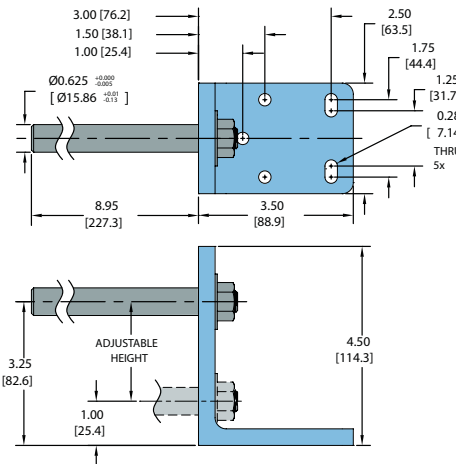
Environmental

- Operating Temp -0° to +70° C for standard models
-40° to +85° C for low temperature option
-20° to +100° C for high temperature option
- Storage Temp -25° to +85° C
- Humidity 98% RH non-condensing
- Vibration 10 g @ 58 to 500 Hz
- Shock 80 g @ 11 ms duration
- Sealing IP50 standard; IP65 available

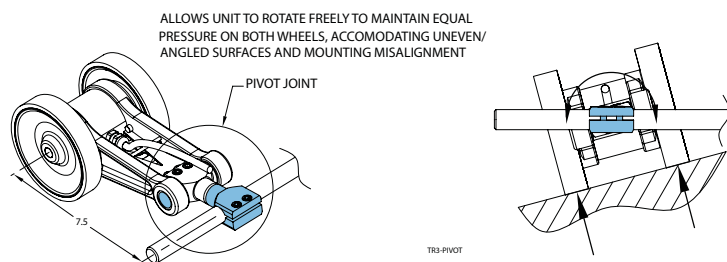
Model TR3 - Heavy Duty Tru-Trac™



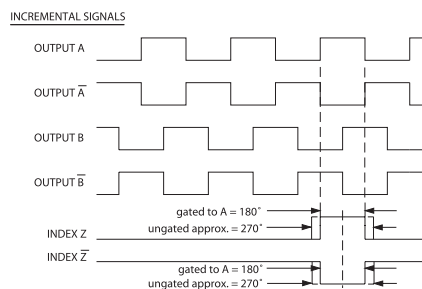
Model TR3 Mounting Bracket (Order #176389-01)



Model TR3 Wheel Pivot (Order #176391-01)



Waveform Diagrams



Wiring Table

Function	Cable Wire Color	8-pin M12**
Com	Black	7
+VDC	White	2
A	Brown	1
A'	Yellow	3
B	Red	4
B'	Green	5
Z	Orange	6
Z'	Blue	8
Shield	Bare *	--

Model 260 Ultra Versatile Commutated Encoder



**BRITISH
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PRODUCTS COMPANY



Features

- Low Profile 30.30mm
- Up to 12 Pole Commutation Available
- Thru-Bore Style or Hollow Blind Bore
- Simple, Innovative Flexible Mounting System
- Incorporates Opto-ASIC Technology



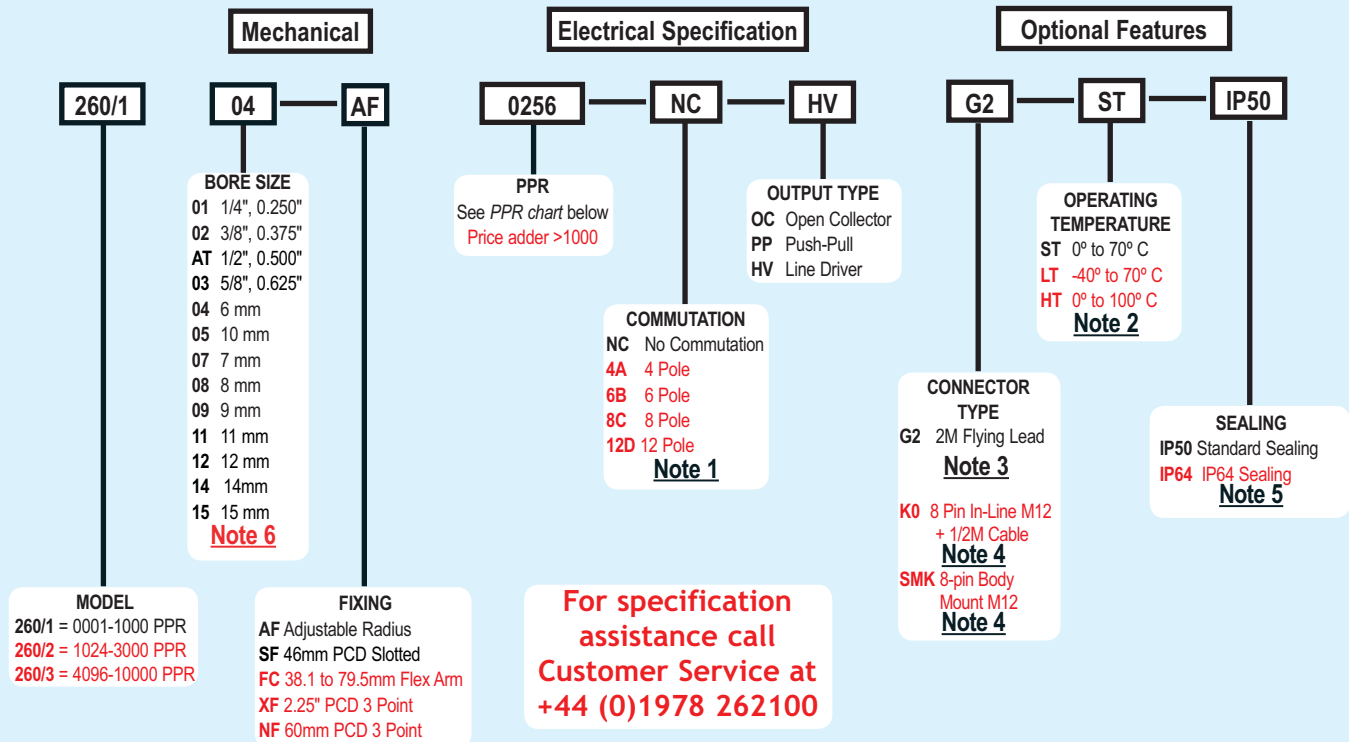
The Model 260's larger bore (up to 15.875mm) and low profile make it the perfect solution for many machine and motor applications, and is provided with a full Thru-Bore or Hollow Blind Bore. The Model 260 uses a pioneering Opto-ASIC design, and innovative anti-backlash mounting system, allowing simple, reliable, and precise encoder attachment. Unlike traditional kit or modular encoder designs, its integral bearing set provides stable and consistent operation without concerns for axial or radial shaft runout. For brushless servo motor applications, the Model 260 can be specified with three 120° electrical phase tracks to provide up to 12 pole commutation feedback. The optional extended temperature capability allows servo motors to operate at higher power outputs and duty cycles.

Common Applications

Brushless Servo Motor Commutation, Robotics, Motor-Mounted Feedback, Assembly Machines, Digital Plotters, High Power Motors

Model 260 Ordering Guide

Red type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.



Model 260 PPR Options

0001*	0010*	0011*	0012*	0020*	0025*	0030*	0040*
0050	0060	0100	0120	0128*	0200	0250	0254
0256	0300	0360	0400	0500	0512	0600	0720
0800	1000	1024	1200	1220	1250	1270	1500
1800	2000	2048	2500	2540	3000	4096	5000
6000	8192	10000					

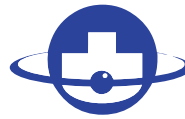
*Contact Customer service for High Temp option

Contact Customer Service for other disc resolutions; not all disc resolutions available with every commutation option.

NOTES:

- 1 Not available in all configurations. Contact Customer Service for availability.
- 2 5 to 16 VCC supply only for HT option.
- 3 For non-standard cable lengths contact sales office for details and cost.
- 4 Not available with commutation.
- 5 Increased starting torque with IP64 Option.
- 6 For Hollow Blind Option - Please add the letter "B" before the code for the Bore size - Example "14" for thru-bore or "B14" for Blind Hollow Bore.

Model 260 Ultra Versatile Commutated Encoder



**BRITISH
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PRODUCTS COMPANY



Model 260 Specifications

Electrical

Input Voltage.....4.75 to 24 VCC for temperatures up to 70° C
5 to 16 VCC for 0° to 100° C operating temperature

Input Current.....100 mA max with no output load

Output Format.....Incremental- Two square waves in quadrature with channel A leading B for clockwise shaft rotation, as viewed from the mounting face. See *Waveform Diagrams* below.

Output Types.....Open Collector- 20 mA max per channel
Push-Pull- 20 mA max per channel
Line Driver- 20 mA max per channel (Meets RS 422 at 5 VDC supply)

Index.....Once per revolution gated to channel A. See *Waveform Diagrams* below.

Freq. Response.....200 kHz standard (up to 1MHz)

Noise Immunity.....Tested to BS EN61000-6-2; BS EN50081-2; BS EN61000-4-2; BS EN61000-4-3; BS EN61000-4-6, BS EN55011

Symmetry.....180° (±18°) electrical

Quad. Phasing.....90° (±22.5°) electrical

Min. Edge Sep.....67.5° electrical

Accuracy.....Within 0.01° mechanical from one cycle to any other cycle, or 0.6 arc minutes.

Commutation.....Up to 12-pole. Contact Customer Service for availability.

Comm. Accuracy.....1° mechanical

Mechanical

Max Shaft Speed.....7500 RPM. Higher shaft speeds may be achievable, contact Customer Service.

Bore Size.....6mm through 0.625" (15.875mm)

Bore Tolerance.....H7 (SLIDING FIT FOR g6)

User Shaft Tolerances
Radial Runout.....0.2mm max TIR
Axial Endplay.....0.75mm max

Starting Torque.....IP50 : 3.53 x 10⁻³ Nm
IP64 : 1.765 x 10⁻² Nm
38.84 x 10⁻³ Nm for -40° C operation

Max Acceleration.....1 X 10⁵ rad/sec²

Electrical Conn.....2M cable (foil and braid shield, 24 AWG conductors non-commutated, 28 AWG commutated), or 8-pin M12 (12 mm) in-line connector with 0.5M cable (foil and braid shield)

Housing.....Black non-corrosive finish

Mounting.....Slotted Flex Mount standard, additional flex mount options available (see Ordering Guide)

Weight.....200 gms typical

Environmental

Operating Temp.....0° to 70° C for standard models
-40° to 70° C for low temperature option
0° to 100° C for high temperature option

Storage Temp.....-40° to +100° C

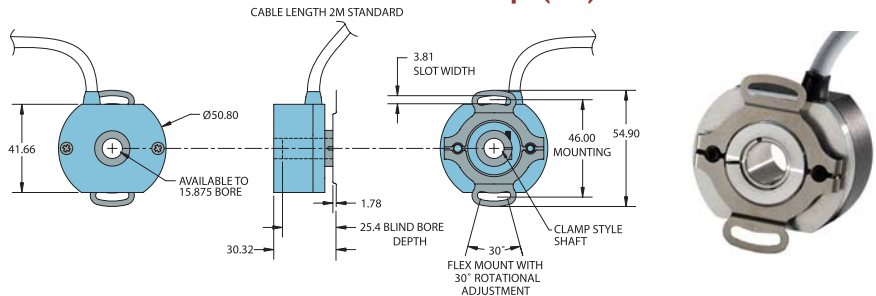
Humidity.....98% RH non-condensing

Vibration.....10 g @ 58 to 500 Hz

Shock.....50 g @ 11 ms duration

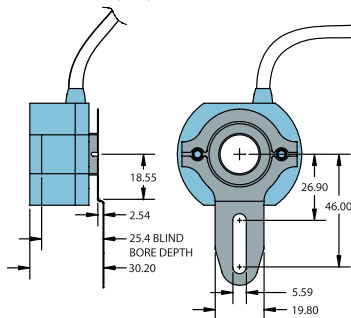
Sealing.....IP50; IP64 available

Model 260 With Front Shaft Clamp (SF)

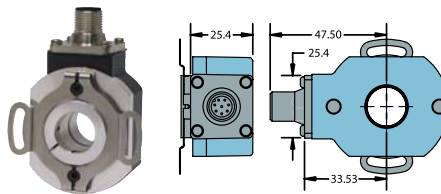


Model 260 Additional Mounts

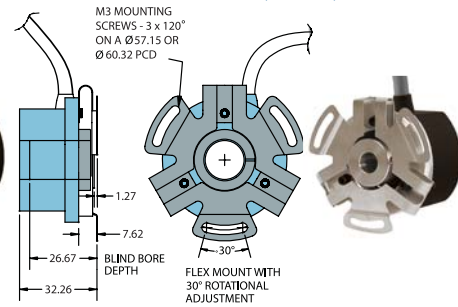
Flex Arm (AF)



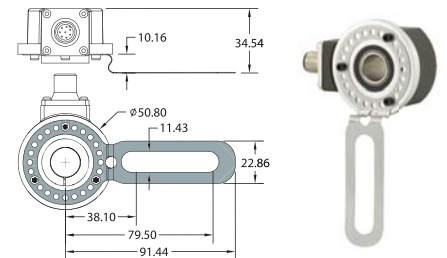
Body Mount M12 (SMK)



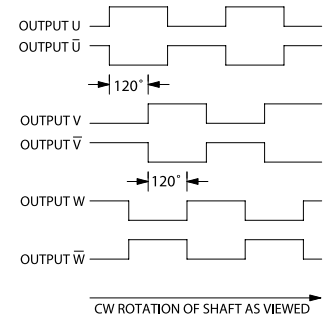
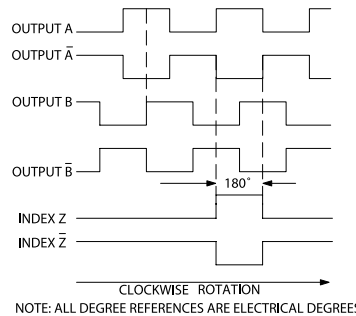
Three Point Flex Mount (NF, XF)



38.1mm to 79.50mm Flex Arm (FC)



Waveform Diagrams



Wiring Table

Function	Cable Wire Color	8-pin M12**
Com	Black	7
+VDC	White	2
A	Brown	1
A'	Yellow	3
B	Red	4
B'	Green	5
Z	Orange	6
Z'	Blue	8
U	Violet	--
U'	Gray	--
V	Pink	--
V'	Turquoise	--
W	Red/Green	--
W'	Red/Yellow	--
Shield	Bare *	--

Model 711 Single Channel Model 716 Quadrature



Features

- The Original Industry-Standard Cube
- Wide Choice of PPR's
- Enhanced Technology Using Opto-ASIC circuitry

The Model 711/716 is ideally suited for applications requiring a quadrature output. Designed for compatibility with most programmable controllers, electronic counters, motion controllers, and motor drives, it is ideally suited for industrial applications where it is important that the direction of rotation be known.

The new Opto-ASIC version increases critical performance specifications for the most popular resolutions. This version features advanced Opto-ASIC circuitry, a single chip design that eliminates many board level components. This increases the reliability of an already dependable and durable encoder. With new options continually being added, the 711/716 just keeps getting better, and better!

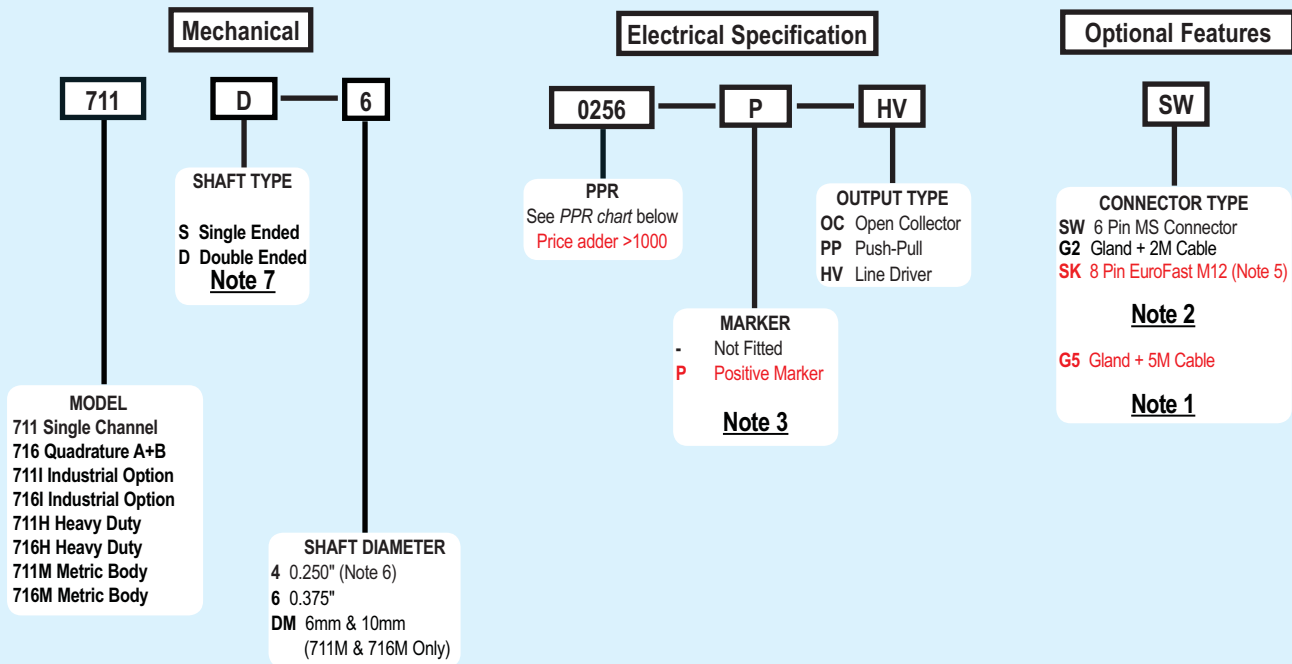
Also Available in Industrial , Heavy Duty or Metric Housings.

Common Applications

Feedback for counters, PLC's & Motors, Cut To Length, Labelling, Measuring For Packaging, Filling & Materials Handling Machines, Wire Winding, Film Extrusion

Model 711/716 Ordering Guide

Red type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.



Model 711/716 PPR Options *

Standard Cube: All resolutions from 1 to 900 except where Opto-ASIC resolutions are available

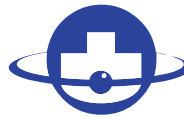
0001 thru	0198	0200	0205	0250
0256	0300	0305	0308	0315
0360	0400	0500	0512	0580
0600	0720	0800	1000	
1024	1200	1250	1500	1800
2000	2048	2500	3000	4096
5000	6000	8192	10000	

Contact Customer Service for other disk resolutions; not all disk resolutions available with all output types See **Note 4** for * Details

NOTES:

- 1 For non standard cable lengths, call the sales office.
- 2 For mating connectors - see accessories page.
- 3 Call sales office for marker availability and configuration options.
- 4 For PPR between 0001 thru 0198 Call Sales office for availability.
- 5 Not Available in Heavy Duty.
- 6 Standard 711/716 Only.
- 7 Double Ended Not available in Heavy Duty.

Model 711 Single Channel Model 716 Quadrature



**BRITISH
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PRODUCTS COMPANY



Model 711/716 Specifications

Electrical

Input Voltage	4.75 to 24 Vcc max to temperatures up to 70°C
Input Current	100 mA max (65 mA typical) with no output load
Input Ripple	100 mV peak to peak at 0 to 100 kHz
Output Format	711. Square wave with single channel 716. Quadrature two square waves, channel A leading B for clockwise shaft rotation, as viewed from the encoder mounting face. See <i>Waveform Diagrams</i> below.
Output Types.....	Open Collector- 20 mA max per channel Push-Pull- 20 mA max per channel 20 mA max per channel Line Driver- 20 mA max per channel (Meets RS 422 at 5 VCC supply)
Index.....	Once per revolution.
Freq. Response	20 kHz standard
Noise Immunity	Tested to BS EN61000-6-2; BS EN50081-2; BS EN61000-4-2; BS EN61000-4-3; BS EN61000-4-6; BS EN500811
Symmetry	180° (±18°) electrical
Quad. Phasing	90° (±22.5°) electrical
Min. Edge Sep	67.5° electrical
Accuracy.....	Within 0.10° mechanical or 6 arc-minutes from true position
Electrical Conn.....	Refer to ordering guide notes

Mechanical

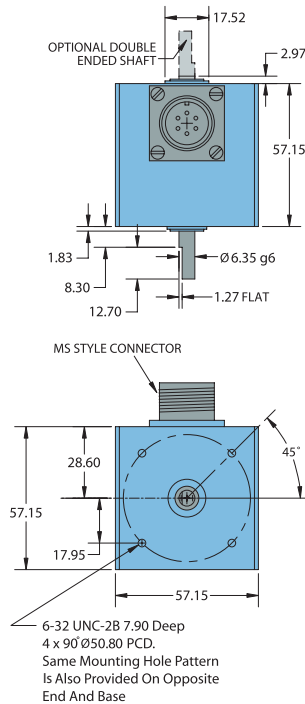
Shaft Size	0.250" or 0.375"
Shaft Type	Single or double-ended (specify choice)
Shaft Material.....	303 stainless steel
Radial Loading	7 Kg maximum (0.250" diameter shaft) 18 Kg maximum (0.375" diameter shaft)
Axial Loading.....	4.5 Kg maximum (0.250" diameter shaft) 13.6 Kg maximum (0.375" diameter shaft)
Starting Torque	9.18 x 10 ⁻⁴ Nm typical for 0.250" shaft 2.68 x 10 ⁻³ Nm typical for 0.375" shaft
Housing.....	Black non-corrosive finished 6063-T6 aluminum
Bearings	Precision ABEC Ball Bearings
Mounting.....	Tapped mounting holes on three sides for base or face mounting
Weight.....	300 gms typical

Environmental

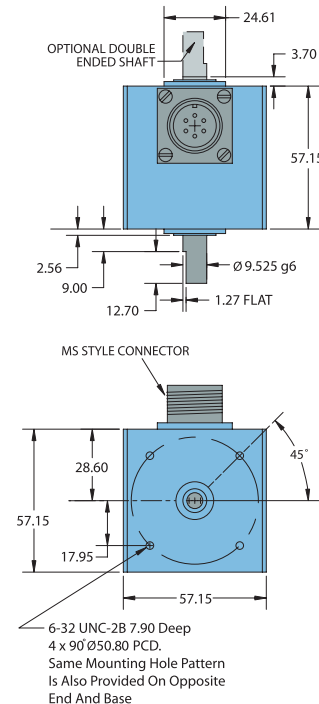
Operating Temp.....	0° to +70° C standard models
Storage Temp.....	-25° to +85° C
Humidity.....	98% RH non-condensing
Vibration	10 g @ 58 to 500 Hz
Shock.....	80 g @ 11 ms duration
Sealing.....	IP50 standard

Model 711/716 Encoder

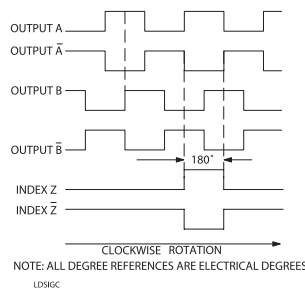
711/716 Housing With 1/4" Shaft



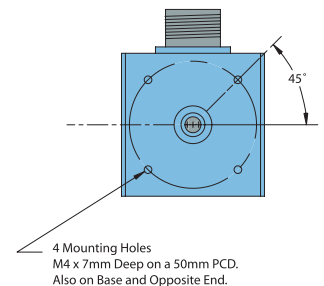
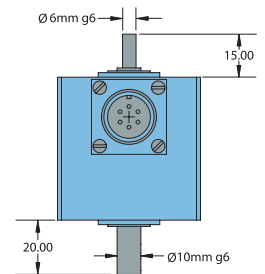
711/716 Housing With 3/8" Shaft



Waveform Diagrams



711/716 Metric Version



Wiring Table

Function	Gland Cable Wire Color	8-pin M12 HV A,B,Z	6-pin MS HV A+B	6-pin MS HV A+Z	6-pin MS OC PP
Com	Black	7	A	A	A
+VDC	Red	2	B	B	B
A'	Brown	1	C	C	---
A	White	3	D	D	D
B	Blue	4	E	---	E
B'	Violet	5	F	---	---
Z	Orange	6	---	E	C
Z'	Yellow	8	---	F	---
Shield	Screen	---	---	---	---

CAUTION - Always check wiring colour code against Encoder Label due to changes in specification since September 2006

Industrial Cube Housing (711I/716I)

Industrial Housing Features

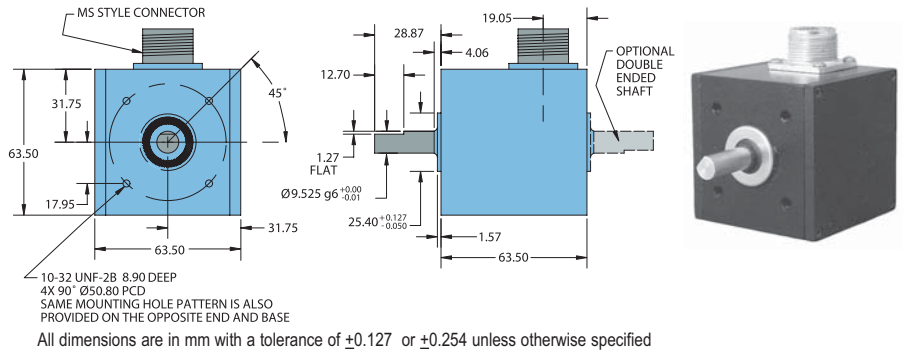
This more robust unit meets requirements between Standard and Heavy Duty housings while retaining the Cube design. The Industrial model features an IP65 shaft seal. The tough, sealed aluminum housing has a wall thickness of 4.75mm and offers greater protection from wash down, sprays, dust, moisture, shock, vibration, and other hazards found in industrial environments.

Industrial Cube Housing (711I/716I) Specifications

Refer to all Standard Cube Housing specifications except as follows:

Mechanical

- Shaft Size.....0.375" diameter
- Shaft Type.....Single- or Double-Ended Shaft Available
- Radial Loading.....10 Kg Maximum
- Axial Loading.....5 Kg Maximum
- Starting Torque.....0.0219 Nm Starting Torque w/IP65 Shaft Seal



Heavy Duty Cube Housing (711H/716H)

The Heavy Duty housing uses a separate 0.375" diameter external shaft and bearing assembly to rotate the shaft of an internally mounted Cube Housing. This provides mechanical isolation from external loads and stress. A flexible coupling between the external shaft and the encoder protects the internal unit from axial and radial loading. The 6.35mm aluminum walls protect the encoder from external shock, vibration, and the outside environment.

Heavy Duty Housing Measurement

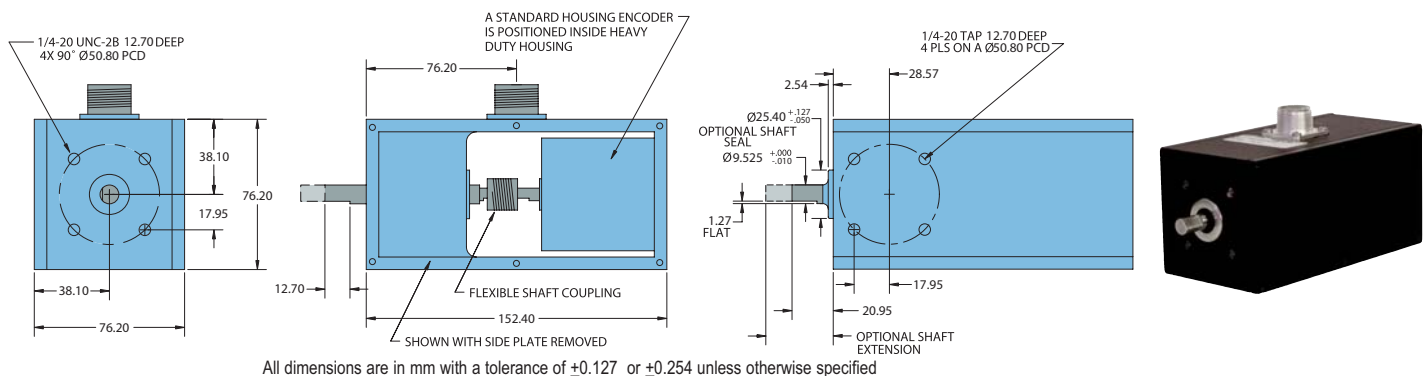
- Heavy Duty 76.20mm X 152.40mm housing

Heavy Duty Cube Housing (711H/716H) Specifications

Refer to all cube specifications except as follows:

Mechanical

- Max Speed.....6000 RPM
- Shaft Size.....0.375"
- Rotation.....Either direction
- Radial Loading.....15 Kg maximum
- Axial Loading.....10 Kg maximum
- Bearings.....Precision ABEC ball bearings
- Mounting.....Tapped holes face and base
- Weight.....2.0 Kg



Cube Housings Pivot Brackets

700 Series Pivot Brackets

Gravity Driven Pivot Brackets allow an Encoder and Measuring Wheel to adjust to variations in the material surface being measured.

A spring loaded version is also available

These Brackets replace our original Pivot brackets (140039 & 140040)

These are for Standard Cube and Industrial Cube Housing's Only

176430-01

Single Pivot Mounting Bracket

176431-01

Double Pivot Mounting Bracket

176430-02

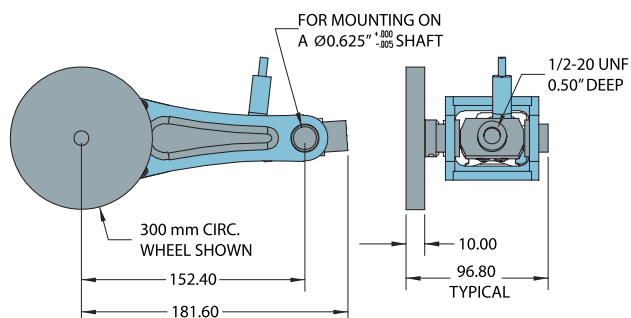
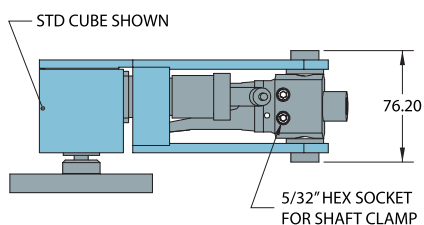
Spring Loaded Single Pivot Mounting Bracket

176431-02

Spring Loaded Double Pivot Mounting Bracket



Single Wheel Bracket

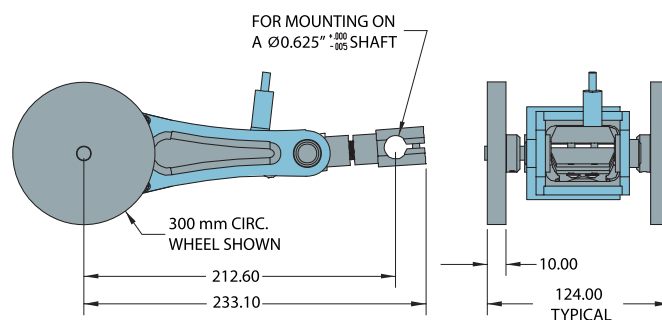
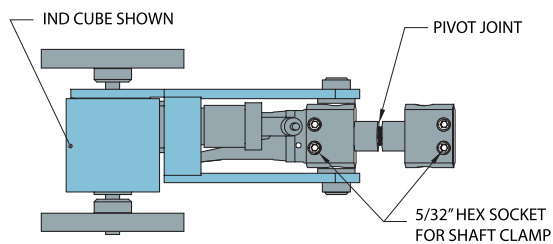


Single Wheel, Stainless Steel Spring, Mounting Bracket

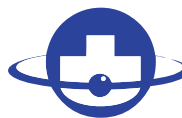
Dual Wheel Bracket



Dual Wheel



Model LCE Linear Cable Encoder



**BRITISH
ENCODER**
PRODUCTS COMPANY



Features

- Low Cost Linear Solution
- Imperial and Metric Options
- Up to 1.27M or 50 Inches Full Stroke Length

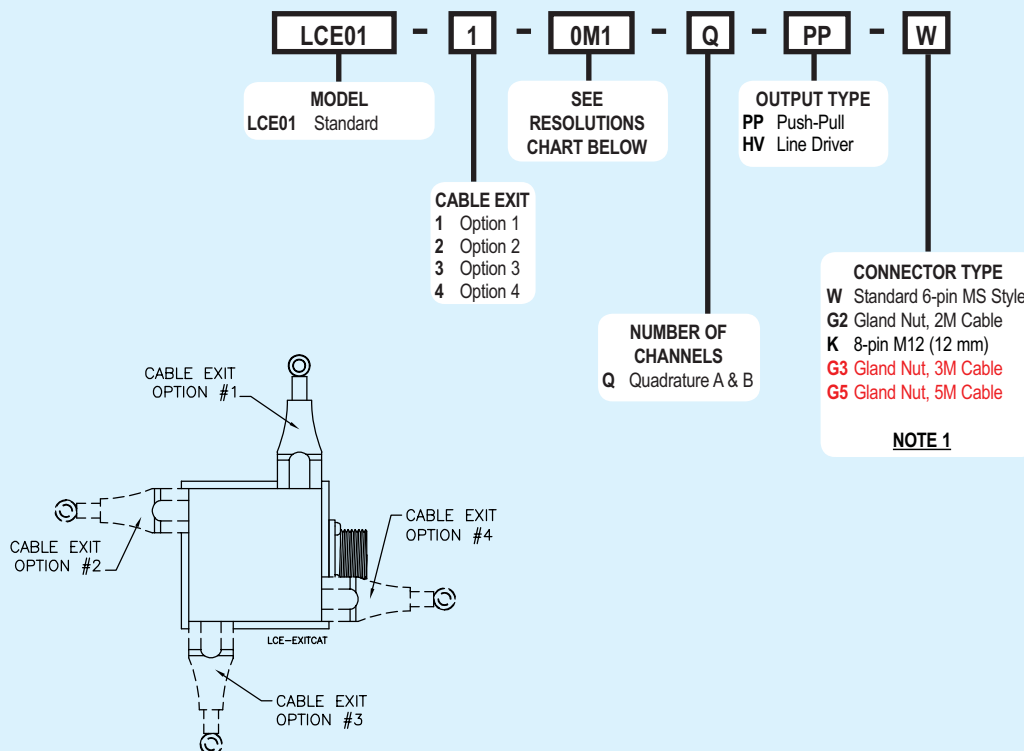
The Linear Cable Encoder (LCE) provides a low cost alternative for obtaining accurate linear measurements. As opposed to typical rotary shaft style encoders, the LCE has a retractable stainless steel cable, allowing for numerous and unusual measuring configurations. Placing the LCE away from harsh environmental conditions, while still providing precise measurements, gives the LCE an outstanding advantage over shaft style encoders. Installation is easy with a variety of cable exit directions, and perfect parallel alignment is no longer necessary. The heart of the LCE is the 716 Series encoder. The 716 provides a reliable digital pulse train in quadrature format, with resolutions down to 0.1mm. The small overall size, a variety of resolutions, and choice of connector types, makes the versatility of the LCE unbeatable!

Common Applications

Robotics, Extrusion Presses, Valve Positioning, Textile Machinery, Control Gate Positioning

Model LCE Ordering Guide

Red type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.



Model LCE Resolution Table

Pulses Per 127mm / 5.0" Linear Travel	0127	1270	0050	0500
Linear Resolution	1.00mm	0.10mm	0.10"	0.01"
Select Option	1M0	0M1	E10	E01

NOTES:

1 For non-standard cable lengths, please call the sales office.

Model LCE Linear Cable Encoder



Model LCE Specifications

Electrical

Input Voltage.....4.75 to 24 VCC max for temperatures up to 70° C
 Input Current.....80 mA maximum with no output load
 Input Ripple100 mV peak-to-peak at 0 to 100 kHz
 Output FormatIncremental- Square wave with channel A leading B during linear extension
 Output Type
 Push-Pull- 20 mA max per channel
 Line Driver- 20 mA max per channel (Meets RS 422 at 5 VCC supply)
 Freq Response.....Up to 125 kHz
 Symmetry180° (±18°) electrical
 Quad Phasing.....90° (±22.5°) electrical
 Rise Time.....Less than 1 microsecond

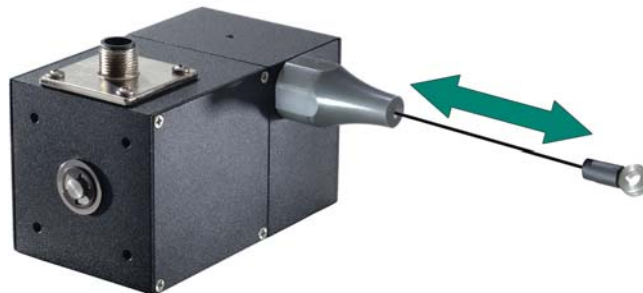
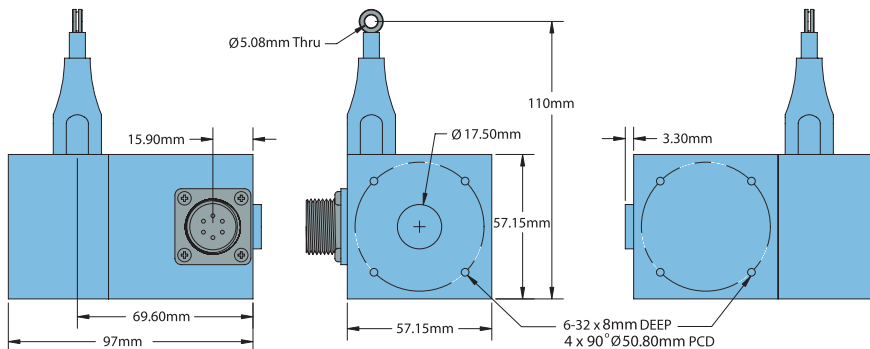
Mechanical

Full Stroke.....1.27M / 50" standard.
 FinishBlack powder coated aluminum
 Accuracy±0.10% of FSL
 Repeatability±0.015% of FSL
 Linear Resolution**See resolution table**
 Cable Material0.864mm Dia nylon coated stainless steel rope
 Cable Tension.....570 gms maximum typical
 Life (cycles)1,000,000 predicted at zero angle cable exit
 Electrical Conn6-pin MS, or 8-pin M12 Eurofast
 Gland with 2M cable (foil and braid shield, 24 AWG conductors)

Environmental

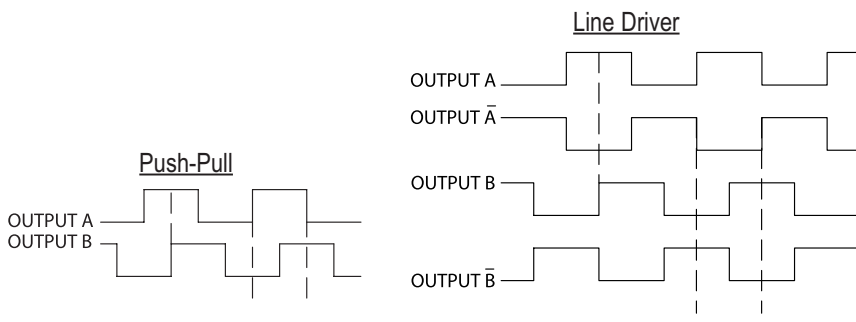
Operating Temp.....0° to 70° C standard
 Sealing.....IP50 Standard

Model LCE



1.27M or 50" Full Stroke Length

Waveform Diagrams



Wiring Tables

Function	Gland Cable Wire Color	8-pin M12 HV A+B	6-pin MS HV A+B	6-pin MS PP A+B
Com	Black	7	A	A
+VDC	Red	2	B	B
A'	Brown	1	C	---
A	White	3	D	D
B	Blue	4	E	E
B'	Violet	5	F	---
Shield	Screen	---	---	---

Model 702 Ultra Rugged 50.80mm Diameter



**BRITISH
ENCODER**
PRODUCTS COMPANY



Features

- Standard Size 20 Package (50mm x 50mm)
- Flange, and Servo Mounting
- Up to 30,000 PPR
- 35 kg Max. Axial and Radial Shaft Loading
- IP65 Sealing Available

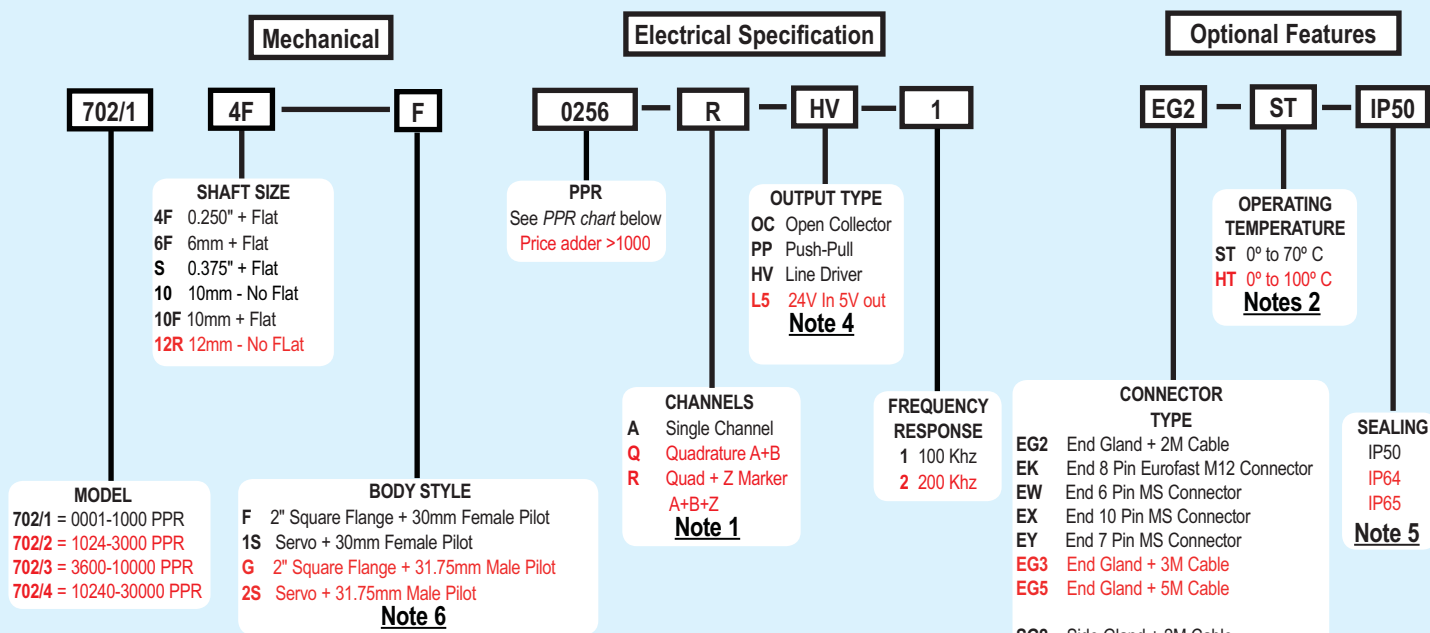
The Model 702 is a heavy duty, extremely rugged, reliable, yet compact industry standard 50.8mm diameter encoder, designed for harsh factory and plant floor environments. The double shielded ball bearings are rated at 35 kg maximum axial and radial shaft loading to ensure a long operating life. Made to withstand the harsh effects of the real world, both the flange and servo models are rated IP65 with the option of an extra heavy duty shaft seal. With a variety of mounting options in both the flange and servo models, the Model 702 is ideal for both new application and replacements. If you need an encoder that won't let you down, the Model 702 is it.

Common Applications

Motion Control Feedback, Conveyors, Elevator Controls, Machine Control, Food Processing, Process Control, Robotics, Material Handling, Textile Machines

Model 702 Ordering Guide

Red type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.



Model 702 PPR Options

0010*	0020	0025*	0030*	0040*	0060	0100	0120	0125
0128*	0144*	0150*	0160*	0200	0240*	0250	0254*	0256*
0300	0333*	0360	0400	0500	0512	0600	0625*	0635
0720	0800	0900*	1000	1024	1200 ^a	1250 ^a	1270 ^a	1440
1500	1800	2000	2048	2400 ^a	2500	2540 ^a	2880 ^a	3000 ^a
3600 ^a	4000 ^a	4096 ^a	5000 ^a	6000 ^a	7200 ^a	7500 ^a	9000 ^a	10,000 ^a
10,240 ^a	12,500 ^a	14,400 ^a	15,000 ^a	18,000 ^a	20,000 ^a	20,480 ^a	25,000 ^a	30,000 ^a

* Contact Customer Service for High Temperature Option.

^a High Temperature Option (H) limited to 85° C maximum for these PPR options.

New PPR values are periodically added to those listed. Contact Customer Service to determine all currently available PPR values. Special disk resolutions are available upon request.

A one-time NRE (Non Recurring Engineering) fee may apply.

**For specification
assistance call
Customer Service at
+44 (0)1978 262100**

NOTES:

- 1 Contact Customer Service for index gating options.
- 2 24 VCC max for high temperature option.
- 3 For Non-Standard Cable Lengths Contact the sales office.
- 4 Marker not available with 6-pin or 7-pin MS connector & HV Output.
- 5 Increased starting torque with IP64 and IP65 Options.
- 6 Please make sure that you state the type of Servo Option when ordering (Servo #1 or Servo #2) Please see opposite page for mounting arrangement.

Model 702 Ultra Rugged 50.80mm Diameter



Model 702 Specifications

Electrical

Input Voltage.....4.75 to 24 VCC max for temperatures up to 100° C
 Input Current 100 mA max with no output load
 Input Ripple 100 mV peak-to-peak at 0 to 100 kHz
 Output Format Incremental- Two square waves in quadrature with channel A leading B for clockwise shaft rotation, as viewed from the encoder mounting face. See *Waveform Diagrams* below.
 Output Types Open Collector- 50 mA max per channel
 Push-Pull- 20 mA max per channel
 Line Driver- 20 mA max per channel (Meets RS 422 at 5 VDC supply)
 Index Occurs once per revolution. The index for units >3000 PPR is 90° gated to Output A. See *Waveform Diagrams* below.
 Freq Response..... Up to 500 KHz.
 Noise Immunity..... Tested to BS EN61000-4-2; IEC801-3; BS EN61000-4-4; DENV 50141; DENV 50204; BS EN55022 (with European compliance option); BS EN61000-6-2; BS EN50081-2
 Symmetry 1 to 6000 PPR: 180° (±18°) electrical at 100 kHz output
 6001 to 20,480 PPR: 180° (±36°) electrical
 Quad Phasing..... 1 to 6000 PPR: 90° (±22.5°) electrical at 100 kHz output
 6001 to 20,480 PPR: 90° (±36°) electrical
 Min Edge Sep..... 1 to 6000 PPR: 67.5° electrical at 100 kHz
 6001 to 20,480 PPR: 54° electrical
 >20,480 PPR: 50° electrical
 Rise Time..... Less than 1 microsecond
 Accuracy..... Instrument and Quadrature Error: For 200 to 1999 PPR, 0.017° mechanical (1.0 arc minutes) from one cycle to any other cycle. For 2000 to 3000 PPR, 0.01° mechanical (0.6 arc minutes) from one cycle to any other cycle. Interpolation error (units > 3000 PPR only) within 0.005° mechanical. (Total Optical Encoder Error = Instrument + Quadrature + Interpolation)

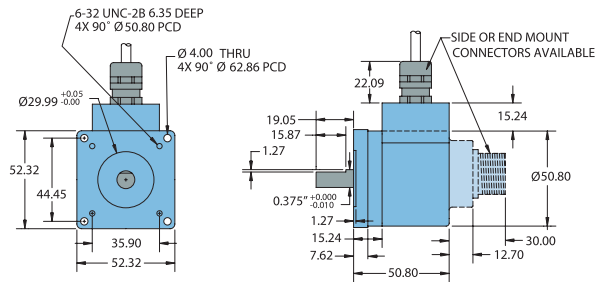
Mechanical

Max Shaft Speed.....8000 RPM. Higher shaft speeds may be achievable, contact Customer Service.
 Shaft Size 0.250", 0.375", 10mm or 12mm
 Shaft Rotation.....Bi-directional
 Radial Shaft Load.....35kg max. Rated load of 10kg to 20kg for bearing life of 1.5×10^9 revolutions
 Axial Shaft Load35kg max. Rated load of 10kg to 20kg for bearing life of 1.5×10^9 revolutions
 Starting Torque 7.0615×10^{-3} Nm typical with IP64 seal or no seal
 2.0118 x 10⁻² Nm typical with IP65 shaft seal
 Max Acceleration 1×10^5 rad/sec²
 Connector Type 6-, 7-, and 10-pin MS Style, 8-pin M12 (12 mm), or gland with 2 Metres of cable (foil and braid shield, 24 AWG conductors)
 Housing.....Black non-corrosive finish
 Bearings.....Precision ABEC ball bearings
 Mounting.....Various flange or servo mounts
 Weight.....320g typical

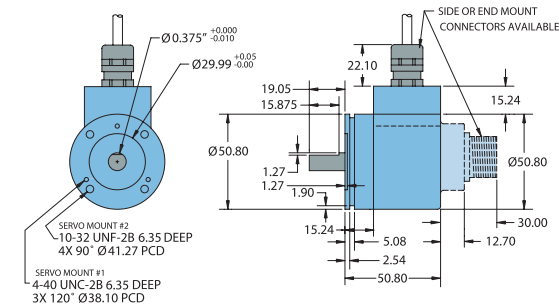
Environmental

Operating Temp.....0° to 70° C for standard models
 0° to 100° C for high temperature option
 Storage Temp -25° to +85° C
 Humidity.....98% RH non-condensing
 Vibration.....20 g @ 58 to 500 Hz
 Shock.....75 g @ 11 ms duration
 Sealing.....IP64/IP65 with shaft seal and cable gland.

Model 702 Flange Mount (F)



Model 702 Servo Mount

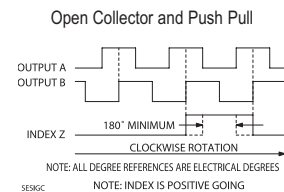
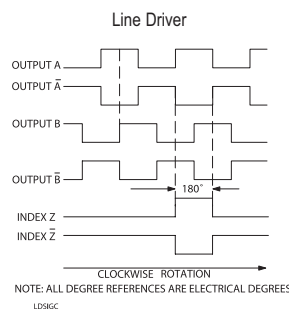


Servo #2 (C)



Servo #1 (S)

Waveform Diagrams



Wiring Tables

Function	Gland Cable Wire Color	8-pin M12	10-pin MS	7-pin MS HV L5	7-pin MS PP OC	6-pin MS PP OC
Com	Black	7	F	F	F	F
+VDC	White	2	D	D	D	D
A	Brown	1	A	A	A	A
A'	Yellow	3	H	C	---	---
B	Red	4	B	B	B	B
B'	Green	5	I	E	---	---
Z	Orange	6	C	---	C	C
Z'	Blue	8	J	---	---	---
Case	---	---	G	G	G	---
Shield	Screen	---	---	---	---	---

CAUTION - Always check wiring colour code against Encoder Label due to changes in specification since September 2006

Model 725 Heavy Duty (Formerly 730 & 735 Series)



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Features

- Standard Size 25 Package 63.50mm Diameter
- Up to 30,000 PPR
- Servo and Flange Mounting
- IP65 Sealing Available

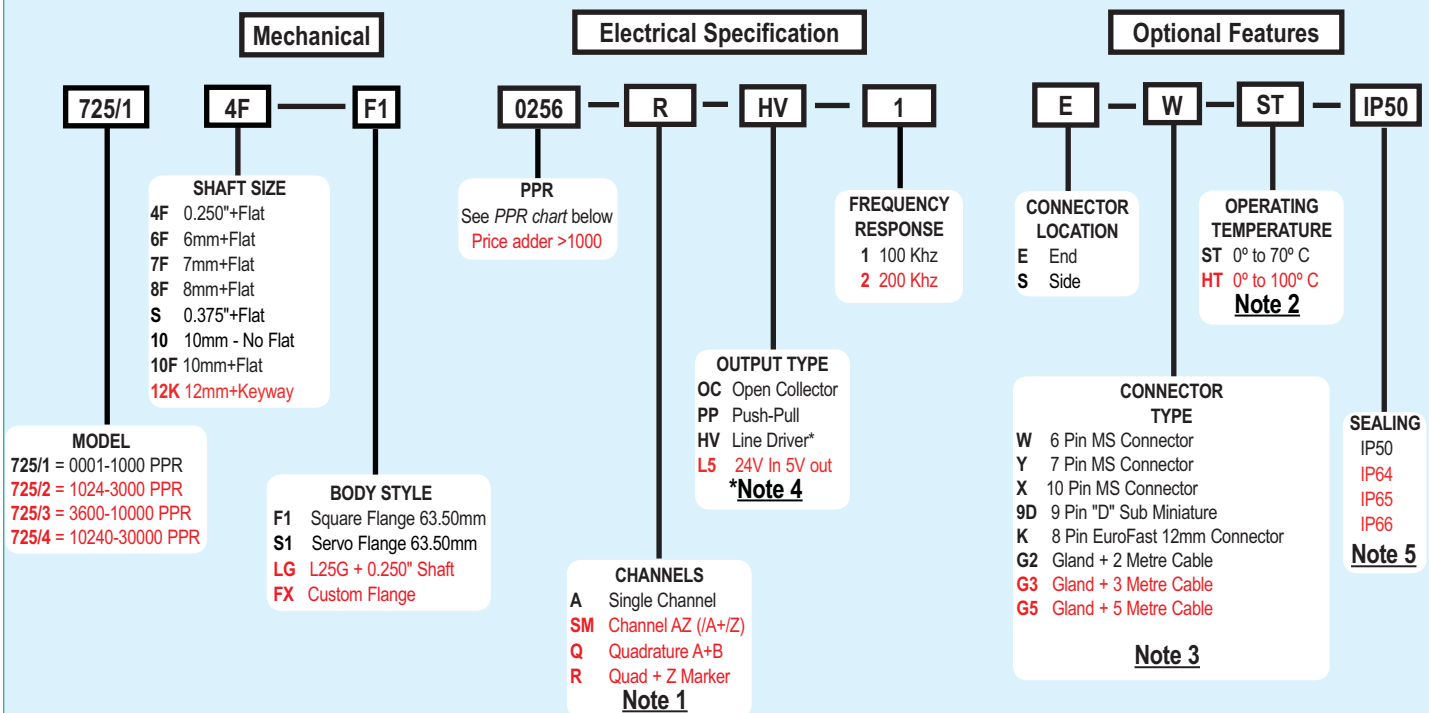
Model 725, (Formerly 730 & 735 Series) is specifically designed for the challenges of an industrial environment. But don't let its tough, industrial package fool you; it still has the performance to reach resolutions up to 30,000 pulses per revolution. The Model 725 is available with both flange and servo mounting options. The rugged housing isolates the internal electronics from the shock and stress of the outer environment.

Common Applications

Motion Control Feedback, Conveyors, Elevator Controls, Machine Control, Food Processing, Process Control, Robotics, Material Handling, Textile Machines

Model 725 Ordering Guide

Red type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.



Model 725 PPR Options

0010*	0020	0025*	0030*	0040*	0060	0100	0120	0125
0128*	0144*	0150*	0160*	0200	0240*	0250	0254*	0256*
0300	0333*	0360	0400	0500	0512	0600	0625*	0635
0720	0800	0900*	1000	1024	1200 ^a	1250 ^a	1270 ^a	1440
1500	1800	2000	2048	2400 ^a	2500	2540 ^a	2880 ^a	3000 ^a
3600 ^a	4000 ^a	4096 ^a	5000 ^a	6000 ^a	7200 ^a	7500 ^a	9000 ^a	10,000 ^a
10,240 ^a	12,500 ^a	14,400 ^a	15,000 ^a	18,000 ^a	20,000 ^a	20,480 ^a	25,000 ^a	30,000 ^a

* Contact Customer Service for High Temperature Option.

^a High Temperature Option (H) limited to 85° C maximum for these PPR options.

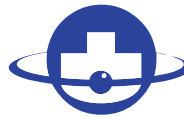
New PPR values are periodically added to those listed. Contact Customer Service to determine all currently available PPR values. Special disk resolutions are available upon request. A one-time NRE (Non Recurring Engineering) fee may apply.

**For specification
assistance call
Customer Service at
+44 (0)1978 262100**

NOTES:

- 1 Contact Customer Service for index gating options.
- 2 24 VCC max for high temperature option.
- 3 For Non-Standard Cable Lengths Contact the sales office.
- 4 Marker not available with 6-pin or 7-pin MS connector & HV Output.
- 5 Increased starting torque with IP64, IP65 and IP66 Options.

Model 725 Heavy Duty (Formerly 730 & 735 Series)



**BRITISH
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Model 725 Specifications

Electrical

Input Voltage.....4.75 to 24 VCC max for temperatures up to 70° C
 Input Current.....100 mA max with no output load
 Input Ripple.....100 mV peak-to-peak at 0 to 100 kHz
 Output Format.....Incremental- Two square waves in quadrature with channel A leading B for clockwise shaft rotation, as viewed from the encoder mounting face. See *Waveform Diagrams* below.
 Output Types.....Open Collector- 50 mA max per channel
 Push-Pull- 20 mA max per channel
 Line Driver- 20 mA max per channel (Meets RS 422 at 5 VCC supply)
 Index.....Occurs once per revolution. The index for units >3000 PPR is 90° gated to Outputs A and B. See *Waveform Diagrams* below.
 Freq Response.....Up to 200 KHz
 Noise Immunity.....Tested to BS EN61000-4-2; IEC801-3; BS EN61000-4-4; DENV 50141; DENV 50204; BS EN55022 (with European compliance option); BS EN61000-6-2; BS EN50081-2
 Symmetry.....1 to 6000 PPR: 180° (±18°) electrical at 100 kHz output
 6001 to 20,480 PPR: 180° (±36°) electrical
 Quad Phasing.....1 to 6000 PPR: 90° (±22.5°) electrical at 100 kHz output
 6001 to 20,480 PPR: 90° (±36°) electrical
 Min Edge Sep.....1 to 6000 PPR: 67.5° electrical at 100 kHz output
 6001 to 20,480 PPR: 54° electrical
 >20,480 PPR: 50° electrical
 Rise Time.....Less than 1 microsecond
 Accuracy.....Instrument and Quadrature Error: For 200 to 1999 PPR, 0.017° mechanical (1.0 arc minutes) from one cycle to any other cycle. For 2000 to 3000 PPR, 0.01° mechanical (0.6 arc minutes) from one cycle to any other cycle. Interpolation error (units > 3000 PPR only) within 0.005° mechanical. (Total Optical Encoder Error = Instrument + Quadrature + Interpolation)

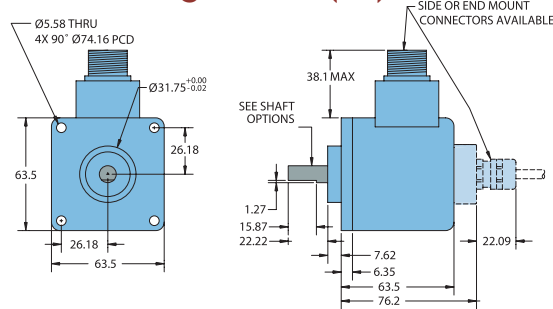
Mechanical

Max Shaft Speed.....6000 RPM. Higher shaft speeds may be achievable, contact Customer Service.
 Shaft Size.....See order code
 Shaft Material.....303 stainless steel
 Shaft Rotation.....Bi-directional
 Radial Shaft Load.....16kg max (standard housing)
 Axial Shaft Load.....18 kg max (standard housing)
 Starting Torque.....7.0615 x 10⁻³ Nm typical with IP64 seal or no seal
 2.118 x 10⁻² Nm typical with IP65 shaft seal
 Max Acceleration.....1 x 10⁵ rad/sec²
 Electrical Conn.....6-, 7-, or 10-pin MS Style, 8-pin M12 (12 mm), 9-pin D-subminiature, or gland with 2M of cable (foil and braid shield, 24 AWG conductors)
 Housing.....Black non-corrosive finish
 Bearings.....Precision ABEC ball bearings
 Mounting.....Flange, servo
 Weight.....570gms typical

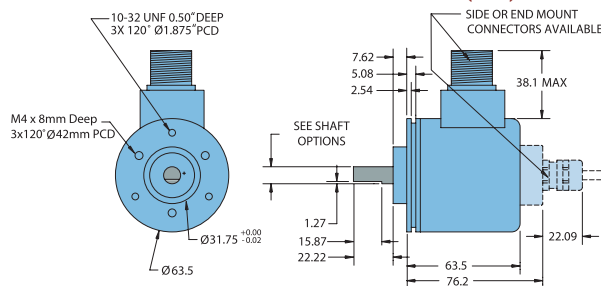
Environmental

Operating Temp.....0° to 70° C for standard models
 0° to 100° C for high temperature option (0° to 85° C for certain resolutions, see PPR Options.)
 Storage Temp.....-25° to +85° C
 Humidity.....95% RH non-condensing
 Vibration.....725: 10 g @ 58 to 500 Hz
 Shock.....725: 50 g @ 11 ms duration
 Sealing.....IP50 standard, IP64, IP65 and IP66 optional

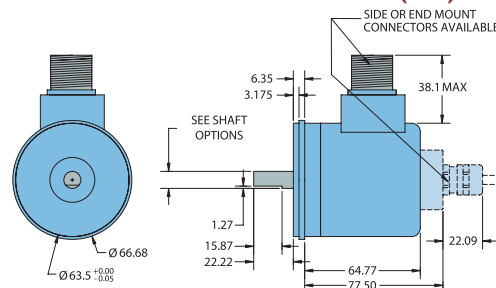
Model 725 Flange Mount (F1)



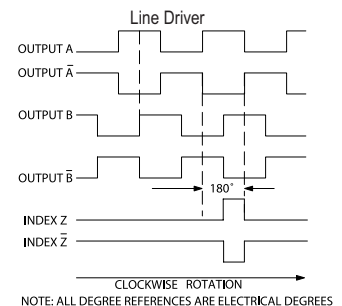
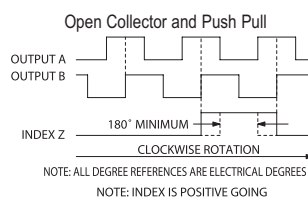
Model 725 2.5" Servo Mount (S1)



Model 725 2.62" Servo Mount (LG)



Waveform Diagrams



Wiring Table

Function	Gland Cable Wire Color	8-pin M12 ²	10-pin MS	7-pin MS HV, L5	7-pin MS PP, OC	6-pin MS PP, OC	6-pin MS SM (HV) Output	9-pin D-sub
Com	Black	7	F	F	F	F	F	9
+VDC	White	2	D	D	D	D	D	1
A	Brown	1	A	A	A	A	A	2
A'	Yellow	3	H	C	---	---	C	3
B	Red	4	B	B	B	B	---	4
B'	Green	5	I	E	---	---	---	5
Z	Orange	6	C	---	C	C	B	6
Z'	Blue	8	J	---	---	---	E	7
Case	---	---	G	G	G	---	---	8
Shield	Screen	---	---	---	---	---	---	---

CAUTION - Always check wiring colour code against Encoder Label due to changes in specification since September 2006

Model 25T Thru-Bore Encoder Model 25H Hollow Blind Bore



Features

- 63.50mm Opto-Asic Encoder with a low profile (50mm)
- Bore Sizes Ranging From 0.50" to 28mm
- Resolutions to 10,000 PPR
- Versatile Flexible Mounting Options
- RoHS Compliant

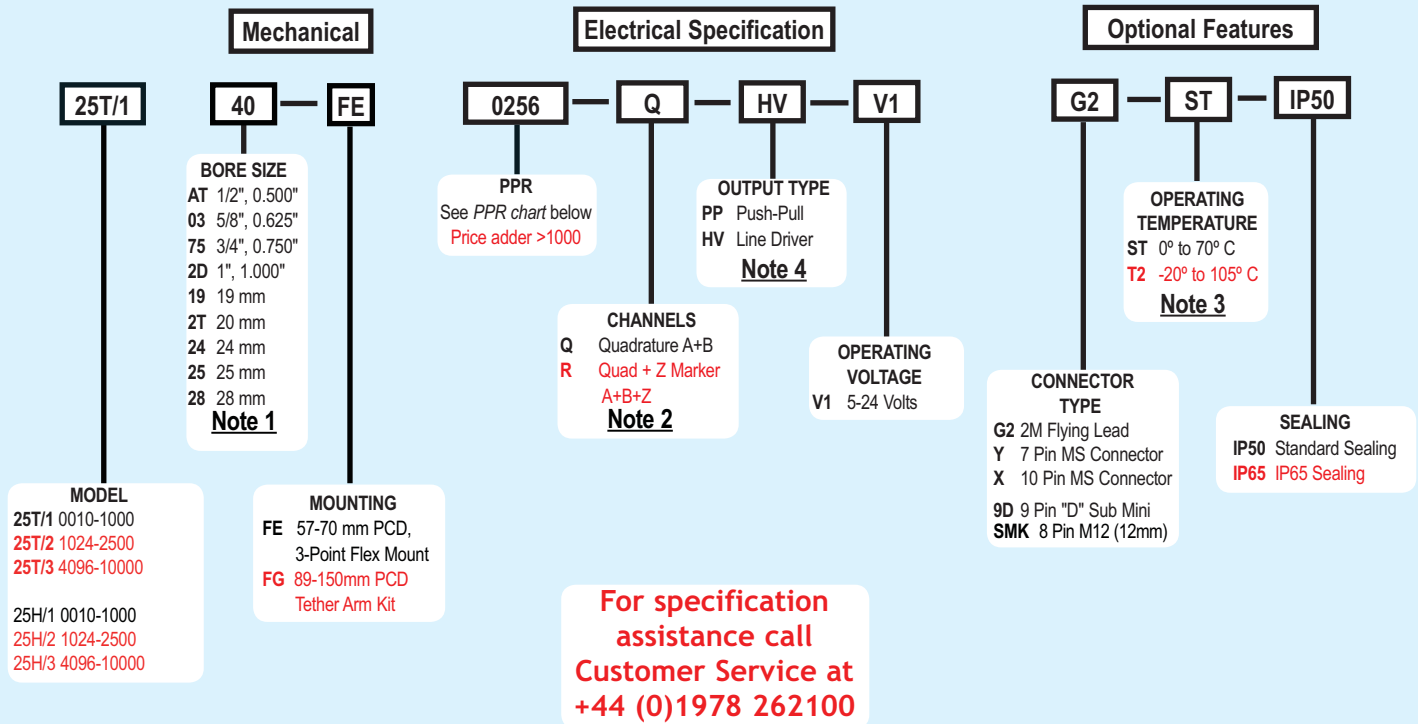
Introducing the next generation of high performance encoders - the Model 25T/H. As contemporary as its appearance, the Model 25T/H features the largest bore available in a 63.50mm encoder, mounting directly on shafts as large as 28 mm. With resolutions of up to 10,000 PPR, and frequencies of up to 1MHz this industrial strength encoder is perfect for fast revving motors. The 25T/H features the next generation of proprietary Opto-ASIC sensor which provides superior accuracy and precision counts. The injection molded housing, made from a blend of nylon composites, is grooved with "cooling fins" and can take the extreme heat of the motion control industry. With sealing available of up to IP65 and many new rugged flexible mounting options, the Model 25T/H can perform in demanding industrial environments.

Common Applications

**Motor-Mounted Feedback and Vector Control, Speciality Machines, Robotics
Web Process Control, Paper and Printing, High Power Motors**

Model 25T/H Ordering Guide

Red type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.



Model 25T PPR Options

0010	0060	0100	0120	0240	0250	0256
0300	0360	0500	0512	0600	1000	1024
1200	2000	2048	2500	4096	5000	10,000

*Contact Customer Service For Availability

New PPR values are periodically added to those listed. Contact Customer Service to determine all currently available values. Special disc resolutions are available upon request and may be subject to a one-time NRE fee.

NOTES:

- 1 **More Bore Sizes Available** - Contact Customer Service for additional options not shown.
- 2 Contact Customer Service for non-standard index gating.
- 3 With Input Voltage above 16 Vcc, Operating Temperature is limited to 85°C max.
- 4 Marker not available with 7-pin MS connector & HV Output.

Model 25T Thru-Bore Encoder Model 25H Hollow Blind Bore



Model 25T/H Specifications

Electrical

Input Voltage4.75 to 24 VCC max
 Input Current100 mA max (65 mA typical) with no output load
 Output FormatIncremental- Two square waves in quadrature with channel A leading B for clockwise shaft rotation, as viewed from the encoder mounting face. See *Waveform Diagrams* below.
 Output Types.....Push-Pull- 20 mA max per channel
 Line Driver- 20 mA max per channel (Meets RS 422 at 5 VCC supply)
 Index.....Once per revolution.
 361 to 10000 PPR: Gated to output A
 1 to 360 PPR: Ungated
 See *Waveform Diagrams* below.
 Freq. Response200 kHz standard (up to 1MHz)
 Noise ImmunityTested to BS EN61000-6-2; BS EN50081-2; BS EN61000-4-2; BS EN61000-4-3; BS EN61000-4-6; BS EN500811
 Symmetry180° (±18°) electrical
 Quad. Phasing90° (±22.5°) electrical
 Min. Edge Sep45° electrical
 Accuracy.....Within 0.1° mechanical or 6 arc-minutes from any other cycle

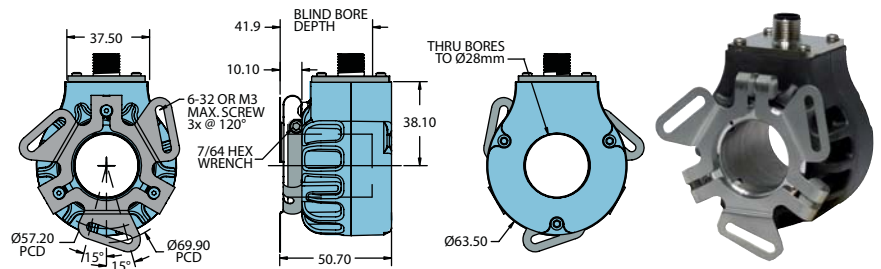
Mechanical

Max Shaft Speed.....6000 RPM.(4000 RPM for IP65)
 Bore Size0.50" through 28 mm
 Bore ToleranceH7 (Sliding fit for g6)
 User Shaft Tolerances
 Radial Runout.....0.10mm max
 Axial Endplay.....±0.75mm max
 Starting Torque.....IP50 Thru-Bore: 7.0 x 10⁻³ Nm
 IP65: 28.0 x 10⁻³ Nm
 (Note: Add 7.0 x 10⁻³ Nm for 20°C Operation)
 Max Acceleration.....1 x 10⁵ rad/sec²
 Electrical Conn2M cable (foil and braid shield, 24 AWG conductors), 8-pin M12 Eurofast
 Mounting.....57.15mm to 69.85mm PCD 3-Point Flex Mount
 Tether Arm Kit 88.90mm to 150mm PCD
 (See mechanical drawings for dimensions)
 Weight400 grams typical

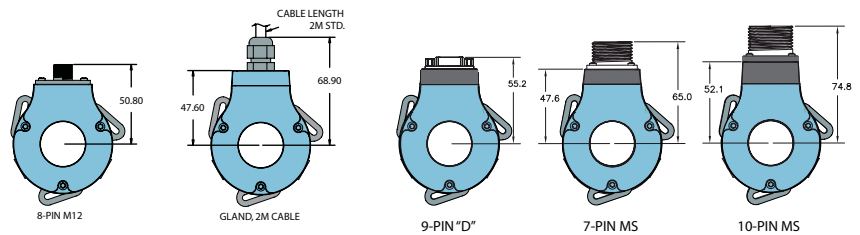
Environmental

Operating Temp.....-20° to +85° C standard models
 -20° to +105° C for high temperature option
 Storage Temp.....-25° to +85° C
 Humidity.....98% RH non-condensing
 Vibration20 g @ 5 to 2000 Hz
 Shock.....80 g @ 11 ms duration
 Sealing.....IP50 standard; IP65 with Seals

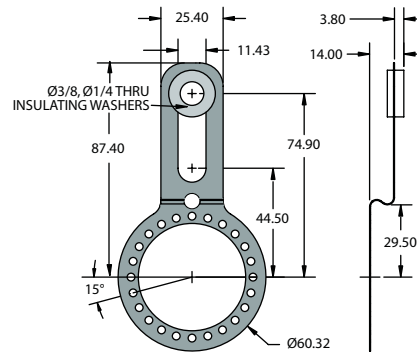
Model 25T/H



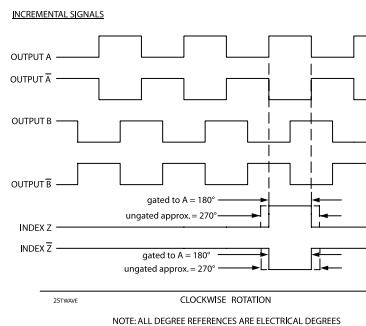
Model 25T/H Connector Options



Model 25T/H Tether Arm Kit



Waveform Diagrams



Wiring Table

Function	Gland Cable Wire Color	8-pin M12	10-pin MS	7-pin MS HV	7-pin MS PP	9-pin D-sub
0 Volts	Black	7	F	F	F	9
+Vcc	White	2	D	D	D	1
A	Brown	1	A	A	A	2
A'	Yellow	3	H	C	---	3
B	Red	4	B	B	B	4
B'	Green	5	I	E	---	5
Z	Orange	6	C	---	C	6
Z'	Blue	8	J	---	---	7
Case	---	---	G	G	G	8
Shield	Screen	---	---	---	---	---

Model 744 Heavy Duty 444 Tacho Style



Features

- Standard "444" Style, 115mm Diameter
- Up to 30,000 PPR
- Choice of Shaft Sizes
- IP64 Sealing Available

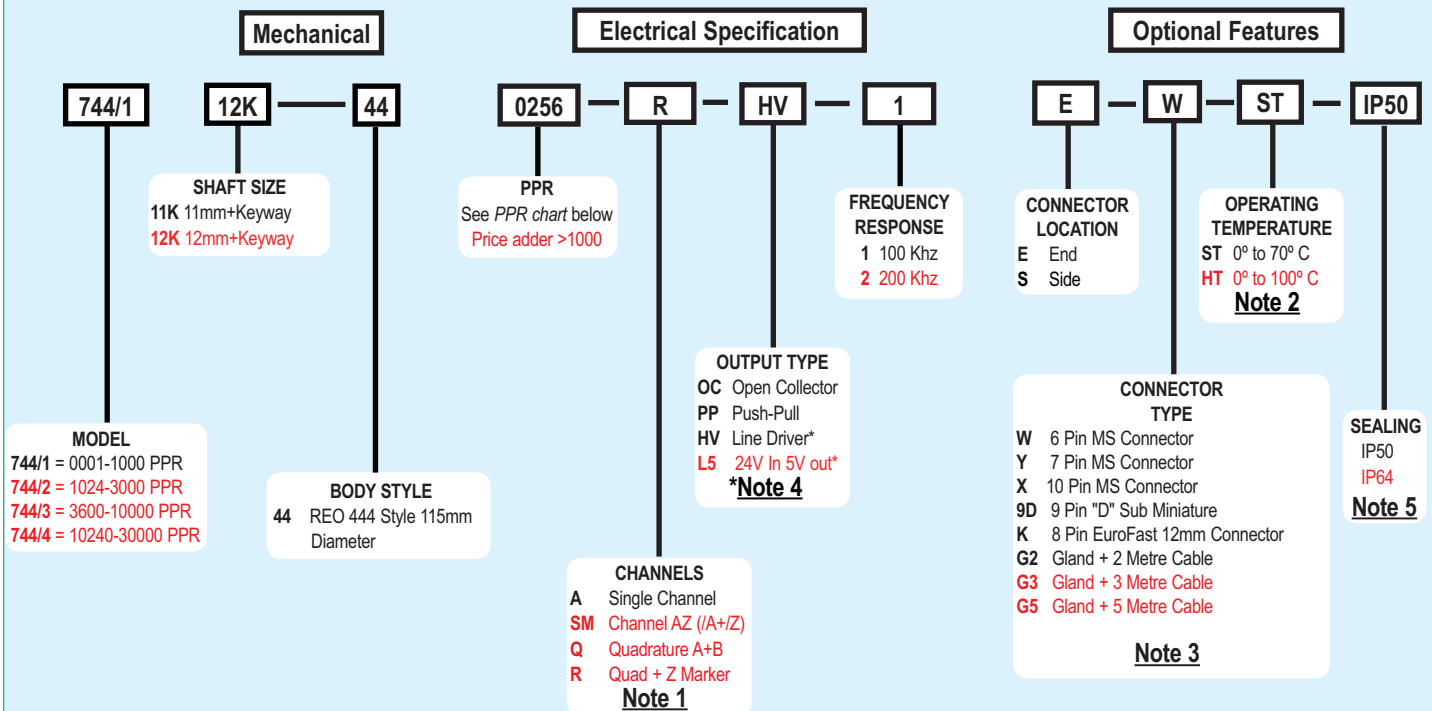
The 744 is designed to provide a digital encoder signal format to replace traditional Tacho style feedback devices. The heavy duty bearings and mechanical assembly make the 744 perfect for those applications requiring a rugged and dependable encoder.

Common Applications

Motion Control Feedback, Conveyors, Elevator Controls, Machine Control, Food Processing, Process Control, Robotics, Material Handling, Textile Machines

Model 744 Ordering Guide

Red type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.



Model 744 PPR Options

0010*	0020	0025*	0030*	0040*	0060	0100	0120	0125
0128*	0144*	0150*	0160*	0200	0240*	0250	0254*	0256*
0300	0333*	0360	0400	0500	0512	0600	0625*	0635
0720	0800	0900*	1000	1024	1200 ^a	1250 ^a	1270 ^a	1440
1500	1800	2000	2048	2400 ^a	2500	2540 ^a	2880 ^a	3000 ^a
3600 ^a	4000 ^a	4096 ^a	5000 ^a	6000 ^a	7200 ^a	7500 ^a	9000 ^a	10,000 ^a
10,240 ^a	12,500 ^a	14,400 ^a	15,000 ^a	18,000 ^a	20,000 ^a	20,480 ^a	25,000 ^a	30,000 ^a

* Contact Customer Service for High Temperature Option.

^a High Temperature Option (H) limited to 85° C maximum for these PPR options.

New PPR values are periodically added to those listed. Contact Customer Service to determine all currently available PPR values. Special disk resolutions are available upon request.

A one-time NRE (Non Recurring Engineering) fee may apply.

**For specification
assistance call
Customer Service at
+44 (0)1978 262100**

NOTES:

- 1 Contact Customer Service for index gating options.
- 2 24 VCC max for high temperature option.
- 3 For Non-Standard Cable Lengths Contact the sales office.
- 4 Marker not available with 6-pin or 7-pin MS connector & HV Output.
- 5 Increased starting torque with IP64 Option.

Model 744 Heavy Duty 444 Tacho Style



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Model 744 Specifications

Electrical

Input Voltage.....	4.75 to 24 VCC max for temperatures up to 70° C
Input Current.....	100 mA max with no output load
Input Ripple.....	100 mV peak-to-peak at 0 to 100 kHz
Output Format.....	Incremental- Two square waves in quadrature with channel A leading B for clockwise shaft rotation, as viewed from the encoder mounting face. See <i>Waveform Diagrams</i> below.
Output Types.....	Open Collector- 50 mA max per channel Push-Pull- 20 mA max per channel Line Driver- 20 mA max per channel (Meets RS 422 at 5 VCC supply)
Index.....	Occurs once per revolution. The index for units >3000 PPR is 90° gated to Outputs A and B. See <i>Waveform Diagrams</i> below.
Freq Response.....	Up to 200 KHz
Noise Immunity.....	Tested to BS EN61000-4-2; IEC801-3; BS EN61000-4-4; DDENV 50141; DDENV 50204; BS EN55022 (with European compliance option); BS EN61000-6-2; BS EN50081-2
Symmetry.....	1 to 6000 PPR: 180° (±18°) electrical at 100 kHz output 6001 to 20,480 PPR: 180° (±36°) electrical
Quad Phasing.....	1 to 6000 PPR: 90° (±22.5°) electrical at 100 kHz output 6001 to 20,480 PPR: 90° (±36°) electrical
Min Edge Sep.....	1 to 6000 PPR: 67.5° electrical at 100 kHz output 6001 to 20,480 PPR: 54° electrical >20,480 PPR: 50° electrical
Rise Time.....	Less than 1 microsecond
Accuracy.....	Instrument and Quadrature Error: For 200 to 1999 PPR, 0.017° mechanical (1.0 arc minutes) from one cycle to any other cycle. For 2000 to 3000 PPR, 0.01° mechanical (0.6 arc minutes) from one cycle to any other cycle. Interpolation error (units > 3000 PPR only) within 0.005° mechanical. (Total Optical Encoder Error = Instrument + Quadrature + Interpolation)

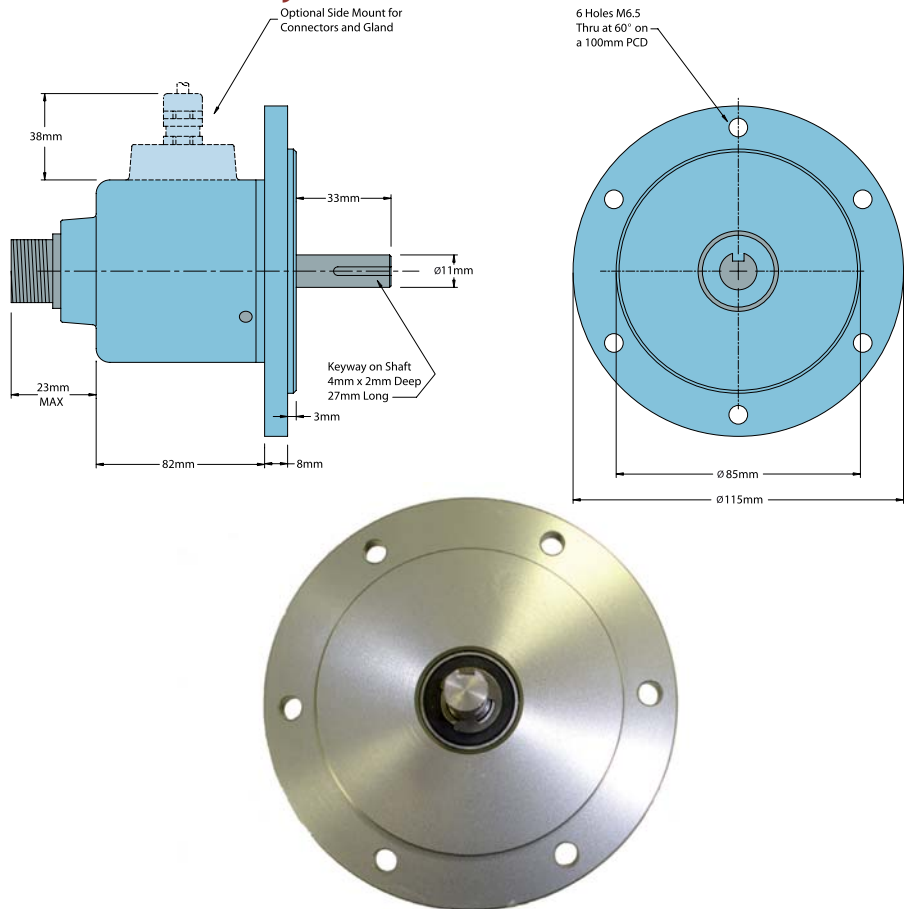
Mechanical

Max Shaft Speed.....	6000 RPM. Higher shaft speeds may be achievable, contact Customer Service.
Shaft Size.....	See order code
Shaft Material.....	303 stainless steel
Shaft Rotation.....	Bi-directional
Radial Shaft Load.....	120N Operating
Axial Shaft Load.....	120N Operating
Starting Torque.....	7.0615 x 10 ⁻³ Nm typical with no seal 2.118 x 10 ⁻² Nm typical with IP64 shaft seal
Max Acceleration.....	1 x 10 ⁵ rad/sec ²
Electrical Conn.....	6-, 7-, or 10-pin MS Style, 8-pin M12 (12 mm), 9-pin D-subminiature, or gland with 2M of cable (foil and braid shield, 24 AWG conductors)
Housing.....	Black non-corrosive finish
Bearings.....	Precision ABEC ball bearings
Mounting.....	115/85mm, 6 x M6 @ 100mm PCD
Weight.....	600 gms typical

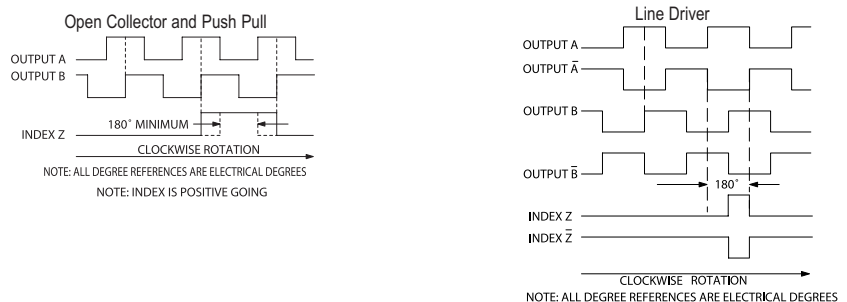
Environmental

Operating Temp.....	0° to 70° C for standard models 0° to 100° C for high temperature option (0° to 85° C for certain resolutions, see PPR Options.)
Storage Temp.....	-25° to +85° C
Humidity.....	95% RH non-condensing
Vibration.....	10 g @ 58 to 500 Hz
Shock.....	50 g @ 11 ms duration
Sealing.....	IP50 standard, IP64 optional

Model 744 '444' Style 115mm Dia



Waveform Diagrams



Wiring Table

Function	Gland Cable Wire Color	8-pin M12 ²	10-pin MS	7-pin MS HV,L5	7-pin MS PP,OC	6-pin MS PP,OC	9-pin D-sub
Com	Black	7	F	F	F	F	9
+VDC	White	2	D	D	D	D	1
A	Brown	1	A	A	A	A	2
A'	Yellow	3	H	C	---	---	3
B	Red	4	B	B	B	B	4
B'	Green	5	I	E	---	---	5
Z	Orange	6	C	---	C	C	6
Z'	Blue	8	J	---	---	---	7
Case	---	---	G	G	G	---	8
Shield	Screen	---	---	---	---	---	---

CAUTION - Always check wiring colour code against Encoder Label due to changes in specification since September 2006

Model 745 Heavy Duty 90mm Encoder



Features

- European 90/80/40mm Configuration
- Up to 30,000 PPR
- Hohner 3000/4000 Direct Replacement
- IP64 Sealing Available

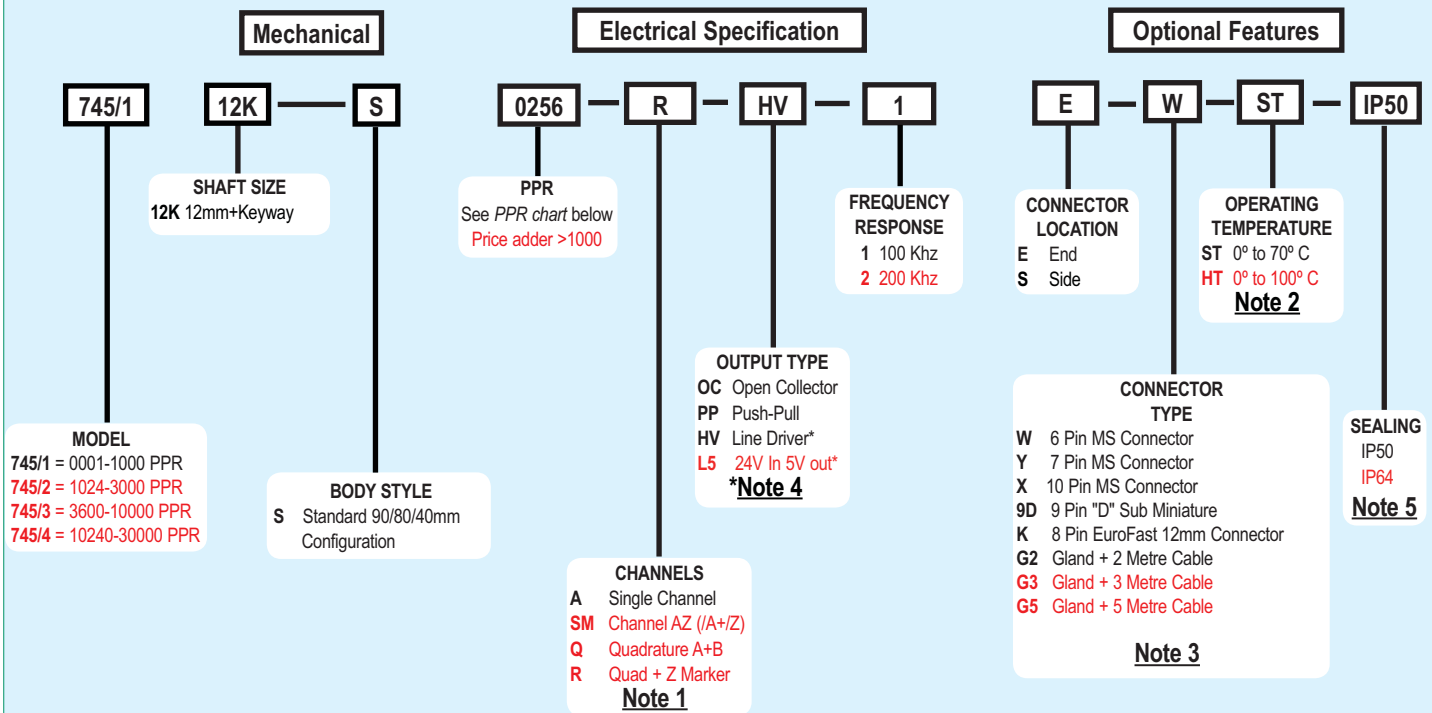
Due to some major technology enhancements, the 745 encoder is now available from 0001 PPR thru to 30000 PPR. This encoder is a direct replacement for the popular 90/80/40 spigot style encoder and may be ordered with a variety of output circuits, shaft sizes, and connector styles. Using the same Opto-Asic technology as most of our encoder range, you have the advantage of high tech signal generation, and a rugged mechanical assembly.

Common Applications

Motion Control Feedback, Conveyors, Elevator Controls, Machine Control, Food Processing, Process Control, Robotics, Material Handling, Textile Machines

Model 745 Ordering Guide

Red type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.



Model 745 PPR Options

0010*	0020	0025*	0030*	0040*	0060	0100	0120	0125
0128*	0144*	0150*	0160*	0200	0240*	0250	0254*	0256*
0300	0333*	0360	0400	0500	0512	0600	0625*	0635
0720	0800	0900*	1000	1024	1200 ^a	1250 ^a	1270 ^a	1440
1500	1800	2000	2048	2400 ^a	2500	2540 ^a	2880 ^a	3000 ^a
3600 ^a	4000 ^a	4096 ^a	5000 ^a	6000 ^a	7200 ^a	7500 ^a	9000 ^a	10,000 ^a
10,240 ^a	12,500 ^a	14,400 ^a	15,000 ^a	18,000 ^a	20,000 ^a	20,480 ^a	25,000 ^a	30,000 ^a

* Contact Customer Service for High Temperature Option.

^a High Temperature Option (H) limited to 85° C maximum for these PPR options.

New PPR values are periodically added to those listed. Contact Customer Service to determine all currently available PPR values. Special disk resolutions are available upon request.

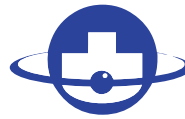
A one-time NRE (Non Recurring Engineering) fee may apply.

**For specification
assistance call
Customer Service at
+44 (0)1978 262100**

NOTES:

- 1 Contact Customer Service for index gating options.
- 2 24 VCC max for high temperature option.
- 3 For Non-Standard Cable Lengths Contact the sales office.
- 4 Marker not available with 6-pin or 7-pin MS connector & HV Output.
- 5 Increased starting torque with IP64 Option.

Model 745 Heavy Duty 90mm Encoder



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Model 745 Specifications

Electrical

Input Voltage.....	4.75 to 24 VCC max for temperatures up to 70° C
Input Current.....	100 mA max with no output load
Input Ripple.....	100 mV peak-to-peak at 0 to 100 kHz
Output Format.....	Incremental- Two square waves in quadrature with channel A leading B for clockwise shaft rotation, as viewed from the encoder mounting face. See <i>Waveform Diagrams</i> below.
Output Types.....	Open Collector- 50 mA max per channel Push-Pull- 20 mA max per channel Line Driver- 20 mA max per channel (Meets RS 422 at 5 VCC supply)
Index.....	Occurs once per revolution. The index for units >3000 PPR is 90° gated to Outputs A and B. See <i>Waveform Diagrams</i> below.
Freq Response.....	Up to 200 KHz
Noise Immunity.....	Tested to BS EN61000-4-2; IEC801-3; BS EN61000-4-4; DENV 50141; DENV 50204; BS EN55022 (with European compliance option); BS EN61000-6-2; BS EN50081-2
Symmetry.....	1 to 6000 PPR: 180° (±18°) electrical at 100 kHz output 6001 to 20,480 PPR: 180° (±36°) electrical
Quad Phasing.....	1 to 6000 PPR: 90° (±22.5°) electrical at 100 kHz output 6001 to 20,480 PPR: 90° (±36°) electrical
Min Edge Sep.....	1 to 6000 PPR: 67.5° electrical at 100 kHz output 6001 to 20,480 PPR: 54° electrical >20,480 PPR: 50° electrical
Rise Time.....	Less than 1 microsecond
Accuracy.....	Instrument and Quadrature Error: For 200 to 1999 PPR, 0.017° mechanical (1.0 arc minutes) from one cycle to any other cycle. For 2000 to 3000 PPR, 0.01° mechanical (0.6 arc minutes) from one cycle to any other cycle. Interpolation error (units > 3000 PPR only) within 0.005° mechanical. (Total Optical Encoder Error = Instrument + Quadrature + Interpolation)

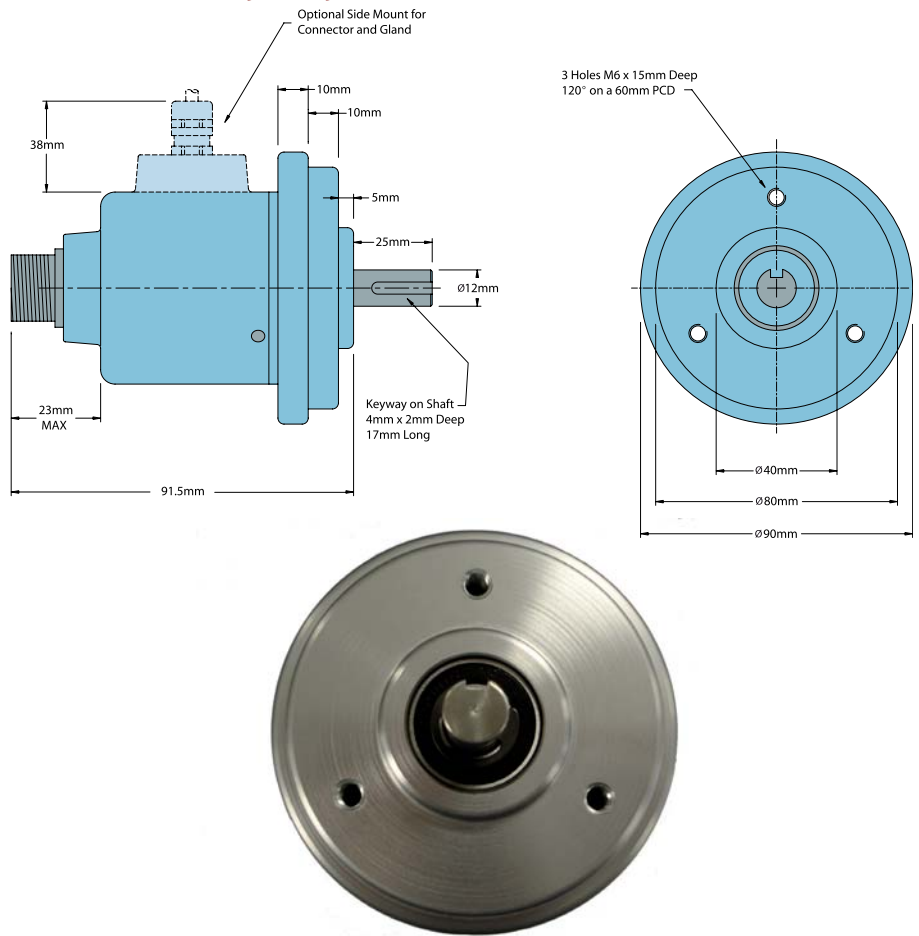
Mechanical

Max Shaft Speed.....	6000 RPM. Higher shaft speeds may be achievable, contact Customer Service.
Shaft Size.....	See order code
Shaft Material.....	303 stainless steel
Shaft Rotation.....	Bi-directional
Radial Shaft Load.....	120N Operating
Axial Shaft Load.....	120N Operating
Starting Torque.....	7.0615 x 10 ⁻³ Nm typical with no seal 2.118 x 10 ⁻² Nm typical with IP64 shaft seal
Max Acceleration.....	1 x 10 ⁵ rad/sec ²
Electrical Conn.....	6-, 7-, or 10-pin MS Style, 8-pin M12 (12 mm), 9-pin D-subminiature, or gland with 2M of cable (foil and braid shield, 24 AWG conductors)
Housing.....	Black non-corrosive finish
Bearings.....	Precision ABEC ball bearings
Mounting.....	90/80/40mm, 3 x M6 @ 60mm PCD
Weight.....	800 gms typical

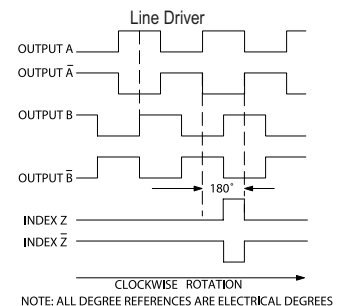
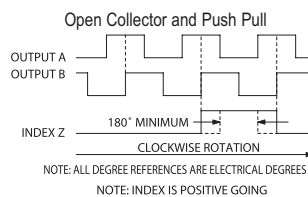
Environmental

Operating Temp.....	0° to 70° C for standard models 0° to 100° C for high temperature option (0° to 85° C for certain resolutions, see PPR Options.)
Storage Temp.....	-25° to +85° C
Humidity.....	95% RH non-condensing
Vibration.....	10 g @ 58 to 500 Hz
Shock.....	50 g @ 11 ms duration
Sealing.....	IP50 standard, IP64 optional

Model 745 Heavy Duty 90mm



Waveform Diagrams



Wiring Table

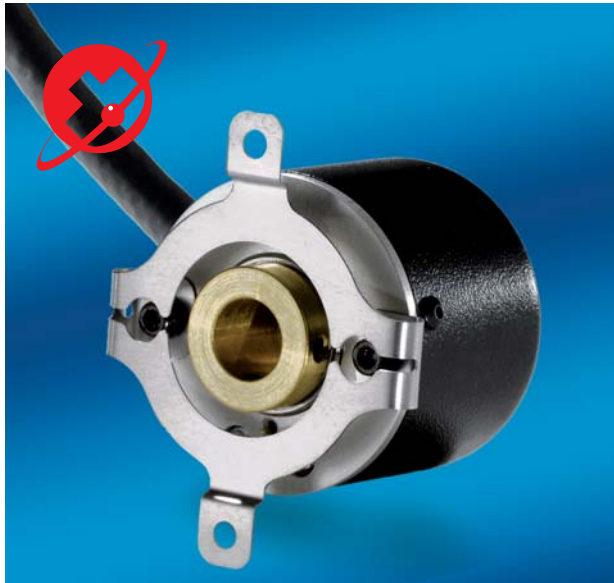
Function	Gland Cable Wire Color	8-pin M12 ²	10-pin MS	7-pin MS HV,L5	7-pin MS PP,OC	6-pin MS PP,OC	9-pin D-sub
Com	Black	7	F	F	F	F	9
+VDC	White	2	D	D	D	D	1
A	Brown	1	A	A	A	A	2
A'	Yellow	3	H	C	---	---	3
B	Red	4	B	B	B	B	4
B'	Green	5	I	E	---	---	5
Z	Orange	6	C	---	C	C	6
Z'	Blue	8	J	---	---	---	7
Case	---	---	G	G	G	---	8
Shield	Screen	---	---	---	---	---	---

CAUTION - Always check wiring colour code against Encoder Label due to changes in specification since September 2006

Model 755HS 38mm High Precision Hollow Blind Bore



**BRITISH
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Features

- Miniature Size (38.1mm Diameter)
- Up to 30,000 Cycles Per Revolution
- Flex Mounting
- Hollow Bore Option (up to 10mm)
- High Temperature Option

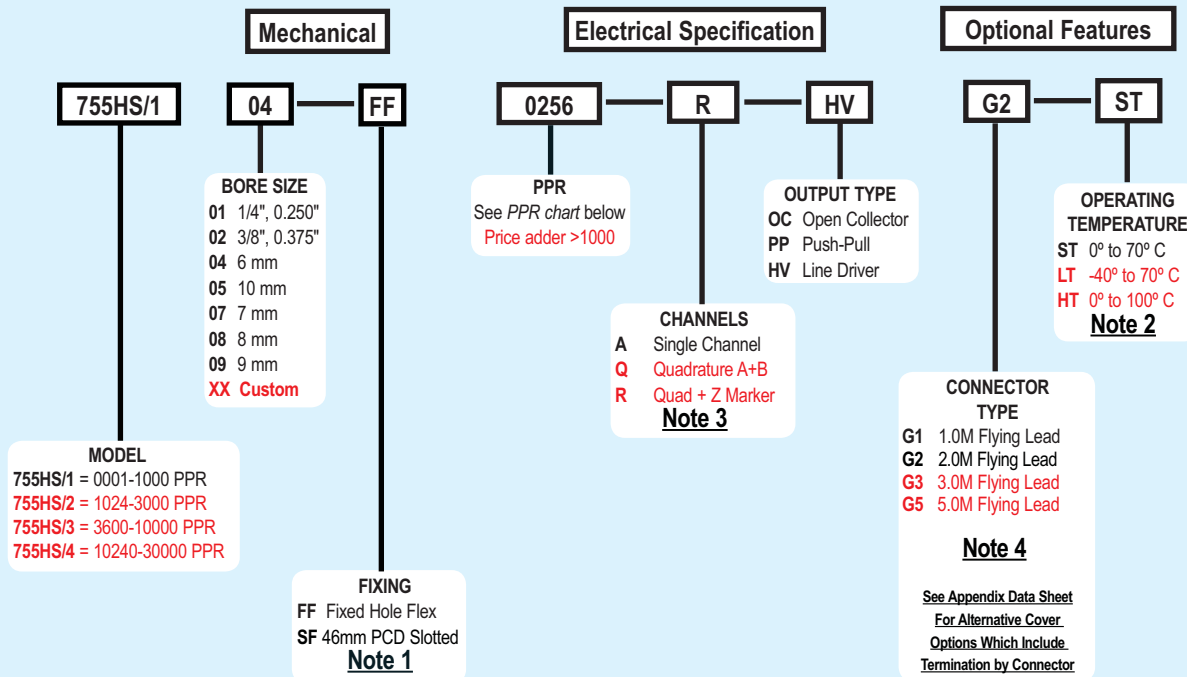
The Model 755HS Size is ideal for applications requiring a small, high precision, high performance encoder. Approximately 38.1mm in diameter and 38mm long, it will fit where many encoders cannot. All metal construction and shielded ball bearings provides years of trouble-free use. A variety of blind hollow bore sizes are available, for shafts up to 10mm. Attaching directly to a motor is quick and simple with the innovative flex mount, first developed by us. This industry standard mount eliminates couplings, increases reliability, while reducing overall length and cost. Where critical alignment is required, a Slotted Flex (SF) is available. A perfect replacement encoder where high reliability is required.

Common Applications

Robotics, Assembly Machines, Motor-Mounted Feedback, Phototypesetters, Printers & Digital Plotters, Elevator Controls, Medical Diagnostic Equipment

Model 755HS Ordering Guide

Red type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.



Model 755HS PPR Options

0001*	0005*	0010*	0020	0025*	0030*	0040*	0050*	0060
0100	0120	0125	0128*	0144*	0150*	0160*	0200	0240*
0250	0254*	0256*	0300	0333*	0360	0400	0500	0512
0600	0625*	0635	0720	0800	0900*	1000	1024	1200 ^a
1250 ^a	1270	1440	1500	1800	2000	2048	2400 ^a	2500
2540 ^a	2880 ^a	3000 ^a	3600 ^a	4000 ^a	4096 ^a	5000 ^a	6000 ^a	7200 ^a
7500 ^a	9000 ^a	10,000 ^a	10,240 ^a	12,500 ^a	14,400 ^a	15,000 ^a	18,000 ^a	20,000 ^a
20,480 ^a	25,000 ^a	30,000 ^a						

* Contact Customer Service for High Temperature Option.

^a High Temperature Option (H) limited to 85° C maximum for these PPR options.

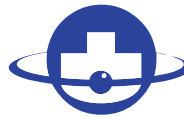
Contact Customer Service to determine all currently available PPR values. Special disk resolutions are available upon request. A one-time NRE fee may apply.

For specification
assistance call
**Customer Service at
+44 (0)1978 262100**

NOTES:

- 1 See 755 Appendix sheet for flange options or Contact Customer Service for additional options.
- 2 0° to 85° C for certain resolutions, see PPR Options.
- 3 Contact Customer Service for index gating options.
- 4 For non-standard cable lengths, please call our sales office.

Model 755HS 38mm High Precision Hollow Blind Bore



**BRITISH
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Model 755HS Specifications

Electrical

Input Voltage.....	4.75 to 28 VCC max for temperatures up to 70° C 4.75 to 24 VCC for temperatures between 70° C to 100° C
Input Current.....	100 mA max with no output load
Input Ripple	100 mV peak-to-peak at 0 to 100 kHz
Output Format	Incremental- Two square waves in quadrature with channel A leading B for clockwise shaft rotation, as viewed from the encoder mounting face. See <i>Waveform Diagrams</i> below.
Output Types.....	Open Collector- 50 mA max per channel Push-Pull- 20 mA max per channel Line Driver- 20 mA max per channel (Meets RS 422 at 5 VCC supply)
Index	Occurs once per revolution. The index for units >3000 PPR is 90° gated to Outputs A and B. See <i>Waveform Diagrams</i> below.
Freq Response.....	Up to 1 MHz
Noise Immunity.....	Tested to BS EN61000-4-2; IEC801-3; BS EN61000-4-4; DDENV 50141; DDENV 50204; BS EN55022 (with European compliance option); BS EN61000-6-2; BS EN50081-2
Symmetry	1 to 6000 PPR: 180° (±18°) electrical at 100 kHz output 6001 to 20,480 PPR: 180° (±36°) electrical
Quad Phasing.....	1 to 6000 PPR: 90° (±22.5°) electrical at 100 kHz output 6001 to 20,480 PPR: 90° (±36°)
Min Edge Sep.....	1 to 6000 PPR: 67.5° electrical at 100 kHz output 6001 to 20,480 PPR: 54° electrical >20,480 PPR: 50° electrical
Rise Time.....	Less than 1 microsecond
Accuracy.....	Instrument and Quadrature Error: For 200 to 1999 PPR, 0.017° mechanical (1.0 arc minutes) from one cycle to any other cycle. For 2000 to 3000 PPR, 0.01° mechanical (0.6 arc minutes) from one cycle to any other cycle. Interpolation error (units > 3000 PPR only) within 0.005° mechanical. (Total Optical Encoder Error = Instrument + Quadrature + Interpolation)

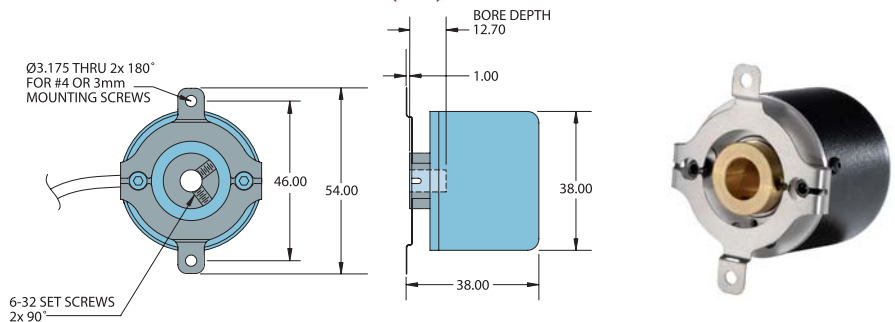
Mechanical

Max Shaft Speed.....	7500 RPM. Higher shaft speeds may be achievable, contact Customer Service.
Bore Size.....	Up to 10mm (See order code)
Bore Tolerance	H7, Sliding fit for g6 host shaft
User Shaft Tolerances	
Radial Runout.....	0.2mm max
Axial End Play.....	±0.8mm max
Starting Torque	9.886 x 10 ⁻³ Nm typical 2.824 x 10 ⁻² Nm typical for -40° C operation
Max Acceleration.....	1 x 10 ⁵ rad/sec ²
Electrical Conn	2M cable (foil and braided shield, 24 SWG conductors) 5 Pin, 6 Pin or 8 Pin connectors available - see Appendix data sheet for connector cover options
Housing.....	Black non-corrosive finish
Bearings.....	Precision ABEC ball bearings
Mounting.....	Flex, and Slotted Flex Mounting
Weight.....	100gm typical

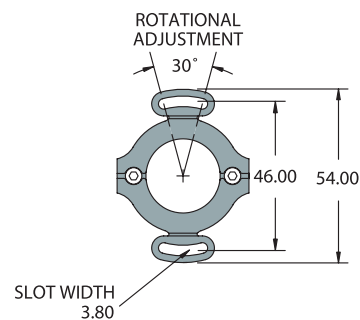
Environmental

Operating Temp.....	0° to 70° C for standard models -40 to 70° C for low temperature option 0° to 100° C for high temperature option (0° to 85° C for certain resolutions, see PPR Options.)
Storage Temp.....	-25° to +85° C
Humidity.....	98% RH non-condensing
Vibration.....	10 g @ 58 to 500 Hz
Shock.....	50 g @ 11 ms duration
Sealing.....	IP50 standard

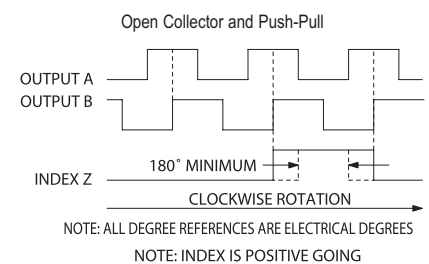
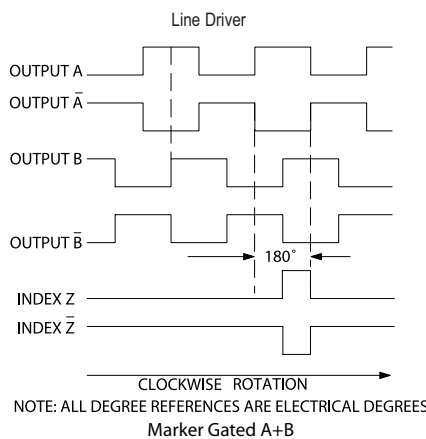
Model 755HS Flex Mount (FF)



Optional Slotted Flex Mount (SF)



Waveform Diagrams

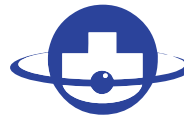


Wiring Table

Function	Cable Wire Color	6-pin MS	5-pin Binder	8-pin M12
Com	Black	A	3	7
+ VCC	White	B	1	2
A	Brown	D	4	1
A'	Yellow	-----	-----	3
B	Red	E	2	4
B'	Green	-----	-----	5
Z	Orange	C	5	6
Z'	Blue	-----	-----	8
Shield	Bare	-----	-----	-----

See appendix Data Sheet for Connector Cover options.

Model 755RG 38mm High Precision Servo or Square Flange Mount



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Features

- Miniature Size (38mm Diameter)
- Up to 30,000 Cycles Per Revolution
- Servo or Square Flange
- 1 MHz Frequency Response Available
- Extended Temperature Operating Range Available

The Model 755RG Size Encoder is ideal for applications requiring a small, high precision, high performance encoder. Approximately 38mm in diameter and 38mm long, it will fit where many encoders cannot. Designed with all metal construction and shielded ball bearings, it will provide years of trouble-free use.

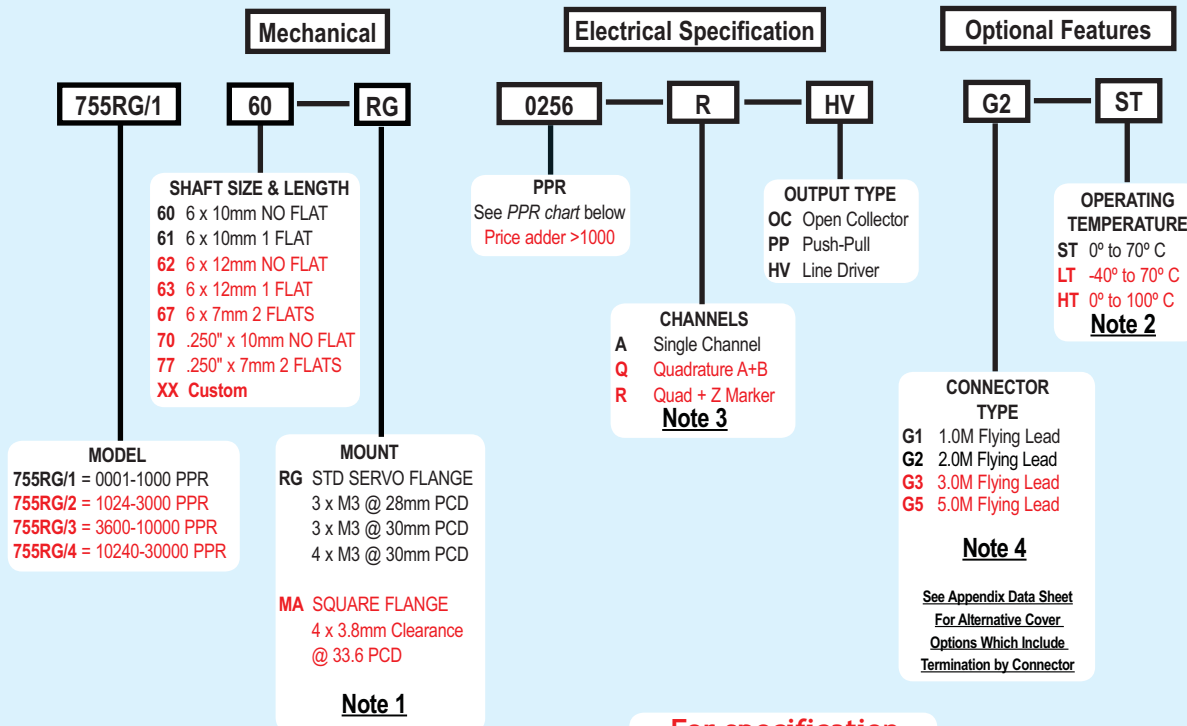
The standard servo mount (RG) version is available with a variety of shaft sizes and lengths, and 3 unique sets of fixing hole patterns. The optional flange mounting (MA) is ideal for applications requiring a bolt-on, high precision encoder. With its high reliability and quick delivery, the Model 755RG encoder is the perfect replacement encoder for less reliable encoders of this size.

Common Applications

Robotics, Assembly Machines, Motor-Mounted Feedback, Phototypesetters, Printers & Digital Plotters, Elevator Controls, Medical Diagnostic Equipment

Model 755RG Ordering Guide

Red type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.



Model 755RG PPR Options

0001*	0005*	0010*	0020	0025*	0030*	0040*	0050*	0060
0100	0120	0125	0128*	0144*	0150*	0160*	0200	0240*
0250	0254*	0256*	0300	0333*	0360	0400	0500	0512
0600	0625*	0635	0720	0800	0900*	1000	1024	1200 ^a
1250 ^a	1270	1440	1500	1800	2000	2048	2400 ^a	2500
2540 ^a	2880 ^a	3000 ^a	3600 ^a	4000 ^a	4096 ^a	5000 ^a	6000 ^a	7200 ^a
7500 ^a	9000 ^a	10,000 ^a	10,240 ^a	12,500 ^a	14,400 ^a	15,000 ^a	18,000 ^a	20,000 ^a
20,480 ^a	25,000 ^a	30,000 ^a						

* Contact Customer Service for High Temperature Option.

^a High Temperature Option (H) limited to 85° C maximum for these PPR options.

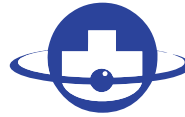
Contact Customer Service to determine all currently available PPR values. Special disk resolutions are available upon request. A one-time NRE fee may apply.

For specification
assistance call
Customer Service at
+44 (0)1978 262100

NOTES:

- 1 Contact Customer Service for additional options.
- 2 0° to 85° C for certain resolutions, see PPR Options.
- 3 Contact Customer Service for index gating options.
- 4 For non-standard cable lengths, please call our sales office.

Model 755RG 38mm High Precision Servo or Square Flange Mount



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Model 755RG Specifications

Electrical

Input Voltage.....4.75 to 28 VCC max for temperatures up to 70° C
4.75 to 24 VCC for temperatures between 70° C to 100° C

Input Current.....100 mA max with no output load

Input Ripple100 mV peak-to-peak at 0 to 100 kHz

Output FormatIncremental- Two square waves in quadrature with channel A leading B for clockwise shaft rotation, as viewed from the encoder mounting face. See *Waveform Diagrams* below.

Output Types.....Open Collector- 50 mA max per channel
Push-Pull- 20 mA max per channel
Line Driver- 20 mA max per channel (Meets RS 422 at 5 VCC supply)

IndexOccurs once per revolution. The index for units >3000 PPR is 90° gated to Outputs A and B. See *Waveform Diagrams* below.

Freq Response.....Up to 1 MHz

Noise Immunity.....Tested to BS EN61000-4-2; IEC801-3; BS EN61000-4-4; DDENV 50141; DDENV 50204; BS EN55022 (with European compliance option); BS EN61000-6-2; BS EN50081-2

Symmetry1 to 6000 PPR: 180° (±18°) electrical at 100 kHz output
6001 to 20,480 PPR: 180° (±36°) electrical

Quad Phasing.....1 to 6000 PPR: 90° (±22.5°) electrical at 100 kHz output
6001 to 20,480 PPR: 90° (±36°)

Min Edge Sep.....1 to 6000 PPR: 67.5° electrical at 100 kHz output
6001 to 20,480 PPR: 54° electrical
>20,480 PPR: 50° electrical

Rise Time.....Less than 1 microsecond

Accuracy.....Instrument and Quadrature Error: For 200 to 1999 PPR, 0.017° mechanical (1.0 arc minutes) from one cycle to any other cycle. For 2000 to 3000 PPR, 0.01° mechanical (0.6 arc minutes) from one cycle to any other cycle. Interpolation error (units > 3000 PPR only) within 0.005° mechanical. (Total Optical Encoder Error = Instrument + Quadrature + Interpolation)

Mechanical

Max Shaft Speed.....7500 RPM. Higher shaft speeds may be achievable, contact Customer Service.

Shaft SizeUp to 0.250" Diameter (See order code)

Shaft Tolerance.....g6, Sliding fit for H7 host bore

User Shaft Tolerances
Radial Shaft Load2.25 Kg max
Axial Shaft Load1.36 Kg max
Starting Torque9.886 x 10⁻³ Nm typical
2.824 x 10⁻² Nm typical for -40° C operation

Max Acceleration1 x 10⁵ rad/sec²

Electrical Conn2M cable (foil and braided shield, 24 SWG conductors) 5 Pin, 6 Pin or 8 Pin connectors available - see Appendix data sheet for connector cover options

Housing.....Black non-corrosive finish

Bearings.....Precision ABEC ball bearings

Mounting.....3 x M3 on a 30mm PCD , 4 x M3 on a 30mm PCD , 3 x M3 on a 28mm PCD / Square Flange

Weight.....100gm typical

Environmental

Operating Temp.....0° to 70° C for standard models
-40 to 70° C for low temperature option
0° to 100° C for high temperature option (0° to 85° C for certain resolutions, see PPR Options.)

Storage Temp.....-25° to +85° C

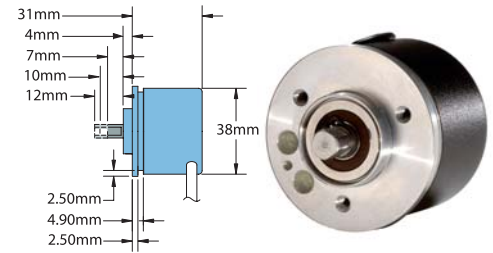
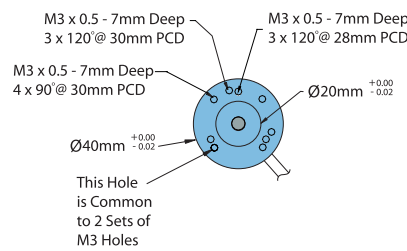
Humidity.....98% RH non-condensing

Vibration.....10 g @ 58 to 500 Hz

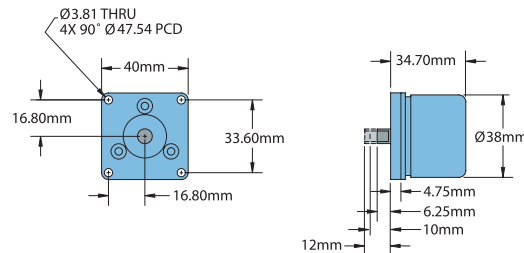
Shock.....50 g @ 11 ms duration

Sealing.....IP50 standard

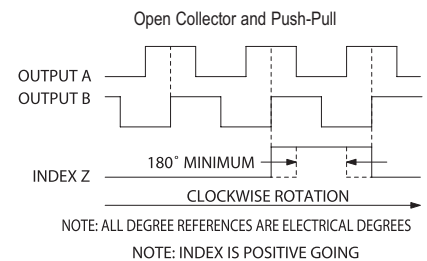
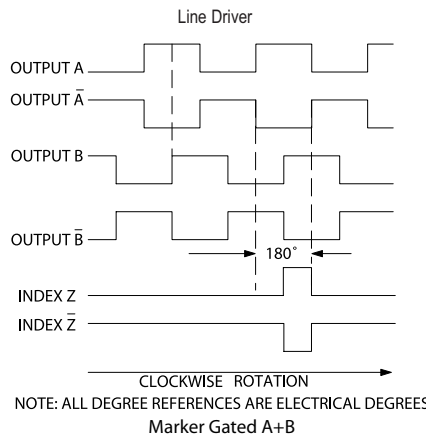
Model 755RG Servo Mount (RG)



Model 755RG Mounting Flange Option (MA)



Waveform Diagrams



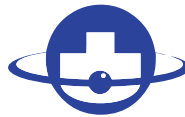
Wiring Table

Function	Cable Wire Color	6-pin MS	5-pin Binder	8-pin M12
Com	Black	A	3	7
+VCC	White	B	1	2
A	Brown	D	4	1
A'	Yellow	-----	-----	3
B	Red	E	2	4
B'	Green	-----	-----	5
Z	Orange	C	5	6
Z'	Blue	-----	-----	8
Shield	Bare	-----	-----	-----

See appendix Data Sheet for Connector Cover options.

755 Accessories

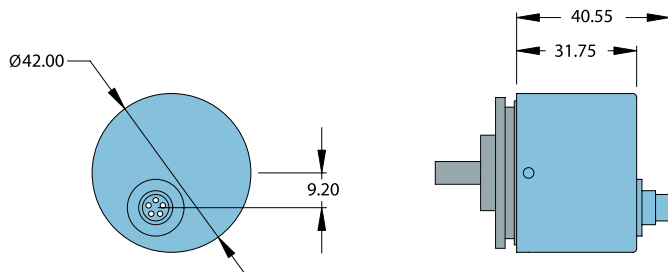
Cover & Connector Types / Flanges



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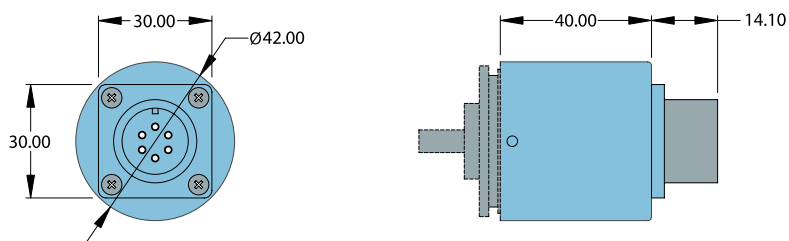


755 Cover & 5 Pin Binder Connector



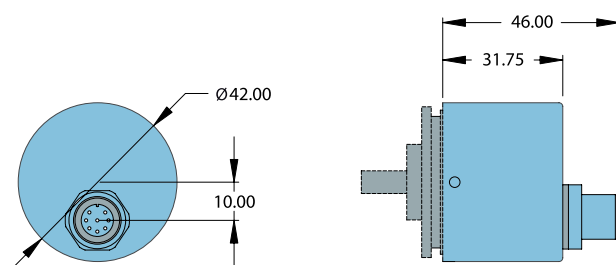
5E05

755 Cover & 6 Pin MS Connector



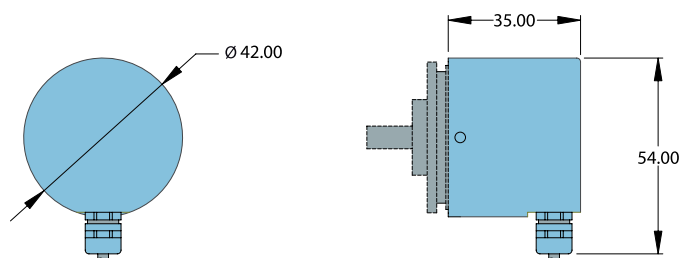
5E06

755 Cover & M12 EuroFast Connector



5E08

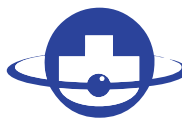
755 Cover & M10 Gland + 2M Cable



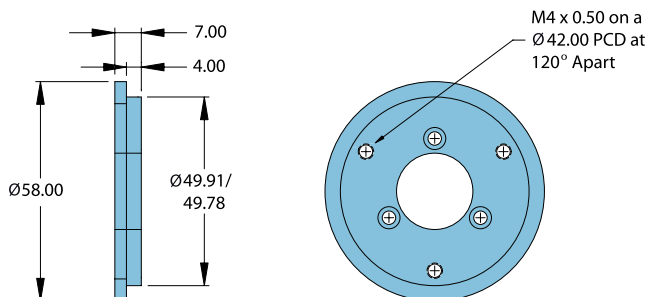
5SG2

755 Accessories

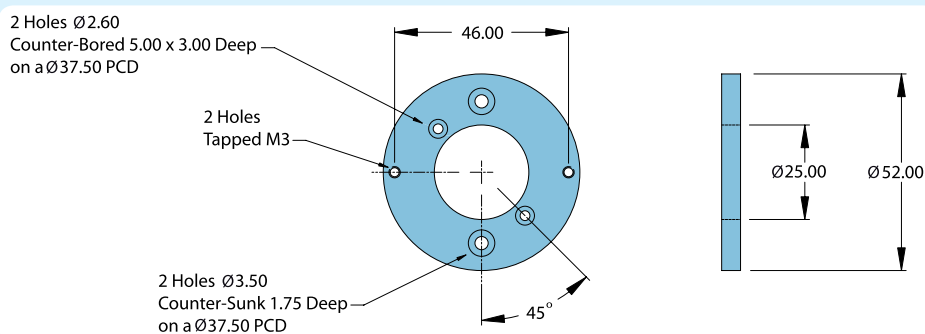
Cover & Connector Types / Flanges



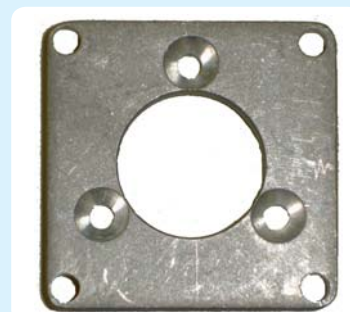
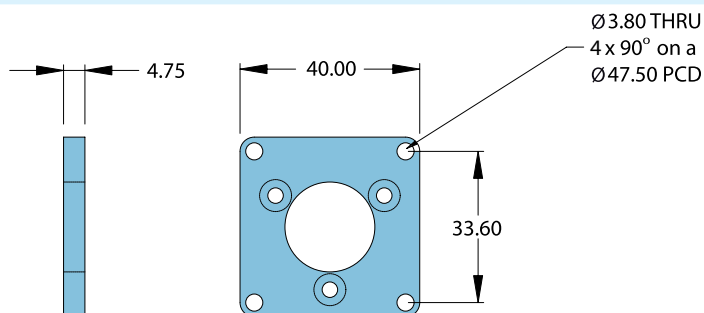
755 MHH Flange (M-1)



755 Parvex Flange (M-9)



755 Square Flange (M-A)



755 Special Covers & Connector Types

Connector Code	Description
5E05	5 Pin DIN (Binder)
5E06	6 Pin MS (Crown)
5E08	8 Pin M12 (EuroFast)
5SG2	M10 Gland & 2M Cable

Model 758 - 58mm Euro-Standard



**BRITISH
ENCODER**
PRODUCTS COMPANY



Features

- Standard Size 58 Mounting (58 mm Diameter)
- Up to 30,000 PPR
- 36Kg Max. Axial and Radial Shaft Loading
- High Temperature Option (100° C)
- IP65 Sealing Available

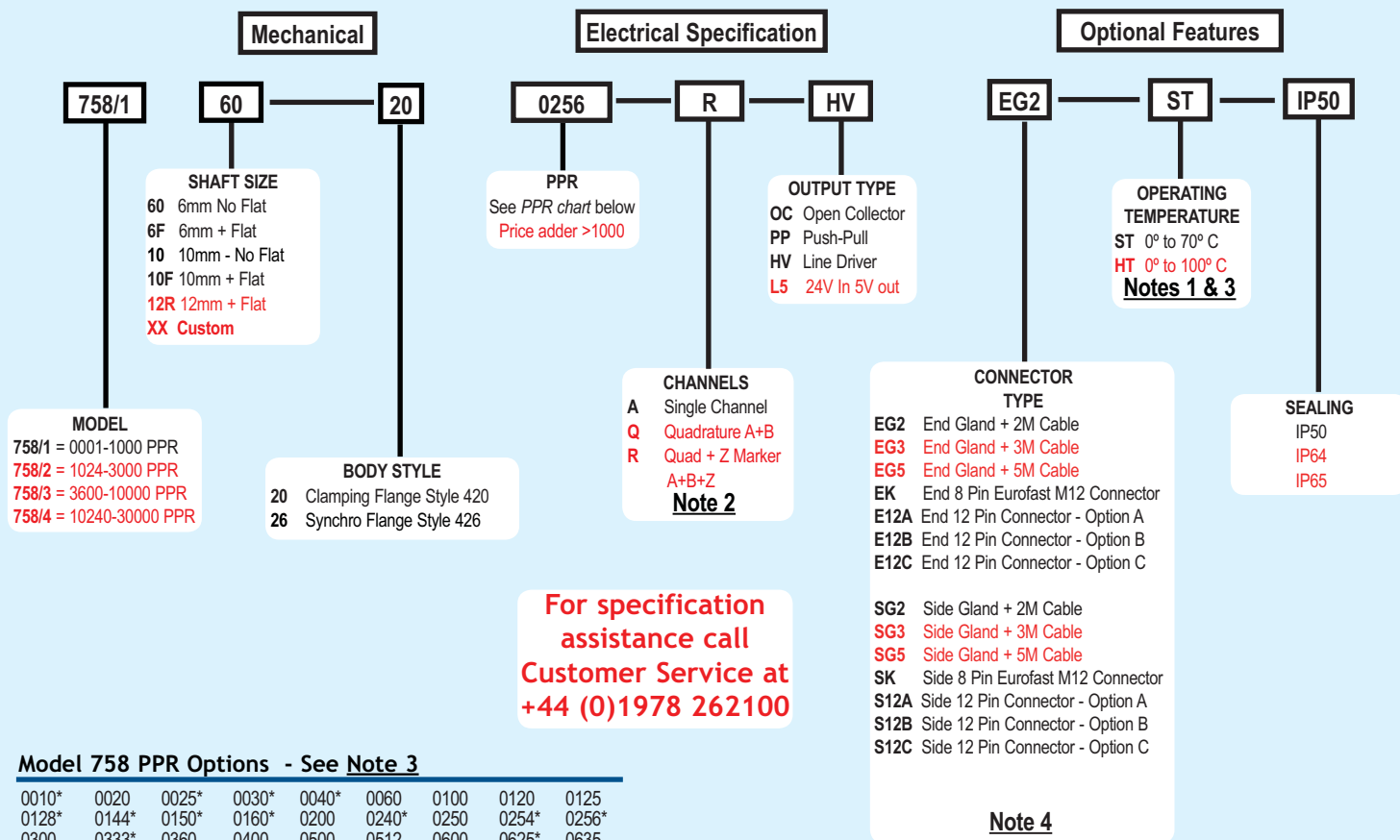
The Model 758 is a heavy duty, extremely rugged, reliable, yet compact European standard 58 mm diameter encoder, designed for harsh factory and plant floor environments. Shaft loading is no problem for the double-shielded ball bearings; their 36Kg load rating ensures a long operating life. If fitted with the optional heavy-duty shaft seal, the Model 758 is rated IP65. Two standard mounting options are available: Clamping Flange (20 type) or Synchro Flange (26 type). The Model 758 is the perfect replacement encoder for units requiring the popular European mount.

Common Applications

Motion Control Feedback, Machine & Elevator Controls, Food Processing, Robotics, Material Handling, Conveyors, Textile Machines

Model 758 Ordering Guide

Red type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.



For specification assistance call
Customer Service at
+44 (0)1978 262100

Model 758 PPR Options - See Note 3

0010*	0020	0025*	0030*	0040*	0060	0100	0120	0125
0128*	0144*	0150*	0160*	0200	0240*	0250	0254*	0256*
0300	0333*	0360	0400	0500	0512	0600	0625*	0635
0720	0800	0900*	1000	1024	1200 ^a	1250 ^a	1270 ^a	1440
1500	1800	2000	2048	2400 ^a	2500	2540 ^a	2880 ^a	3000 ^a
3600 ^a	4000 ^a	4096 ^a	5000 ^a	6000 ^a	7200 ^a	7500 ^a	9000 ^a	10,000 ^a
10,240 ^a	12,500 ^a	14,400 ^a	15,000 ^a	18,000 ^a	20,000 ^a	20,480 ^a	25,000 ^a	30,000 ^a

* Contact Customer Service for High Temperature Option.

^a High Temperature Option (H) limited to 85° C maximum for these PPR options.

New PPR values are periodically added to those listed. Contact Customer Service to determine all currently available PPR values. Special disk resolutions are available upon request.

A one-time NRE (Non Recurring Engineering) fee may apply.

NOTES:

- 1 0° to 85° for certain resolutions, See PPR options.
- 2 Contact customer service for marker gating options.
- 3 Standard temperature, 50 to 3000 PPR only.
- 4 For non-standard cable lengths - call sales office.

Model 758 - 58mm Euro-Standard



Model 758 Specifications

Electrical

Input Voltage.....	4.75 to 28 Vcc max for temperatures up to 70° C 4.75 to 24 Vcc for temperatures between 70° C to 100° C
Input Current.....	100 mA max with no output load
Input Ripple	100 mV peak-to-peak at 0 to 100 kHz
Output Format.....	Incremental- Two square waves in quadrature with channel A leading B for clockwise shaft rotation, as viewed from the encoder mounting face. See <i>Waveform Diagrams</i> below.
Output Types.....	Open Collector- 50 mA max per channel Push-Pull- 20 mA max per channel Line Driver- 20 mA max per channel (Meets RS 422 at 5 Vcc supply)
Index.....	Occurs once per revolution. The index for units >3000 PPR is 90° gated to Outputs A and B. See <i>Waveform Diagrams</i> below.
Freq Response.....	Up to 1 MHz
Noise Immunity.....	Tested to BS EN61000-4-2; IEC801-3; BS EN61000-4-4; DENV 50141; DENV 50204; BS EN55022 (with European compliance option); BS EN61000-6-2; BS EN50081-2
Symmetry	1 to 6000 PPR: 180° (±18°) electrical at 100 kHz output 6001 to 20,480 PPR: 180° (±36°) electrical
Quad Phasing.....	1 to 6000 PPR: 90° (±22.5°) electrical at 100 kHz output 6001 to 20,480 PPR: 90° (±36°)
Min Edge Sep.....	1 to 6000 PPR: 67.5° electrical at 100 kHz output 6001 to 20,480 PPR: 54° electrical >20,480 PPR: 50° electrical
Rise Time.....	Less than 1 microsecond
Accuracy.....	Instrument and Quadrature Error: For 200 to 1999 PPR, 0.017° mechanical (1.0 arc minutes) from one cycle to any other cycle. For 2000 to 3000 PPR, 0.01° mechanical (0.6 arc minutes) from one cycle to any other cycle. Interpolation error (units > 3000 PPR only) within 0.005° mechanical. (Total Optical Encoder Error = Instrument + Quadrature + Interpolation)

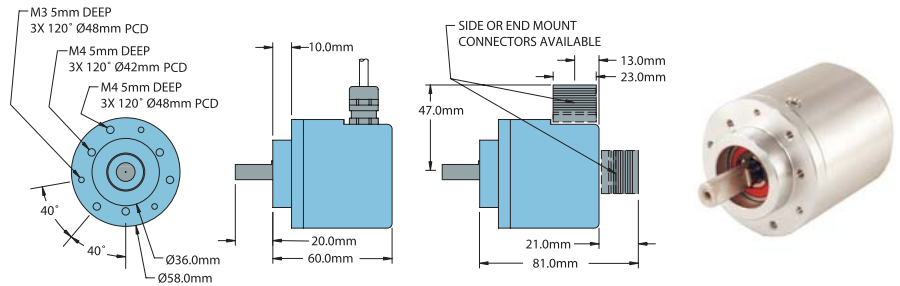
Mechanical

Max Shaft Speed.....	8000 RPM. Higher shaft speeds may be achievable, contact Customer Service.
Shaft Size	6 mm, 10 mm
Shaft Rotation.....	Bi-directional
Radial Shaft Load.....	36 Kg max. Rated load of 10 to 20 Kg for bearing life of 1.5 x 10 ⁹ revolutions
Axial Shaft Load	36 Kg max. Rated load of 10 to 20 Kg for bearing life of 1.5 x 10 ⁹ revolutions
Starting Torque.....	7.061 x 10 ⁻³ Nm typical with IP64 seal or no seal 2.118 x 10 ⁻² Nm typical with IP66 shaft seal
Max. Acceleration.....	1 x 10 ⁵ rad/sec ²
Electrical Conn	Gland with 2M cable (foil and braid shield, 24 AWG conductors) 12-pin connector, or 8-pin M12 (12 mm)
Housing.....	Anodised Aluminium
Bearings.....	Precision ABEC ball bearings
Mounting.....	European Standard Clamping Flange (20 Type) and Synchro Flange (26 Type)
Weight.....	320 gms typical

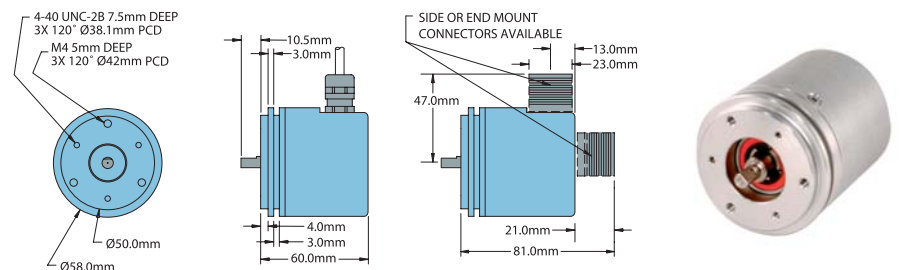
Environmental

Operating Temp.....	0° to 70° C for standard models 0° to 100° C for high temperature option (0° to 85° C for certain resolutions, see PPR Options.)
Storage Temp.....	-25° to +85° C
Humidity.....	98% RH non-condensing
Vibration.....	20 g @ 58 to 500 Hz
Shock.....	75 g @ 11 ms duration
Sealing.....	IP64 shaft seal or IP65 shaft seal

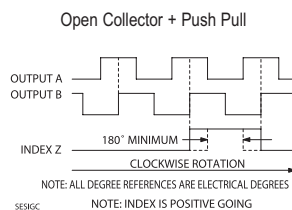
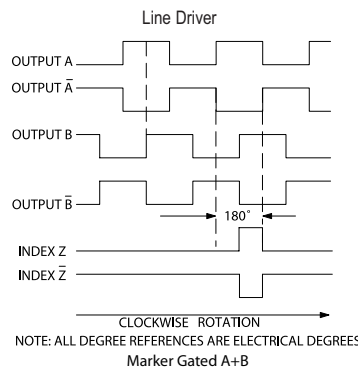
Model 758 Clamping Flange 20 Type



Model 758 Synchro Flange 26 Type



Waveform Diagrams



Wiring Table

Function	Gland Cable Wire Color	8-pin M12 ²	12-pin Option A CW	12-pin Option B CW	12-pin Option C CCW
Com	Black	7	1	11	10
+VCC	White	2	2	7	12
A	Brown	1	3	4	5
A'	Yellow	3	6	3	6
B	Red	4	4	1	8
B'	Green	5	7	8	1
Z	Orange	6	5	6	3
Z'	Blue	8	8	5	4
Shield	Screen	----	----	----	----
+VDC Sense	----	----	----	10	2
Com Sense	----	----	----	12	11
Case	Green	----	12	----	9

CAUTION - Always check wiring colour code against Encoder Label due to changes in specification since September 2006

Model 760 Commutated Thru-Bore / Blind-Bore



Features

- Size 25 / 63.5 mm Diameter (Hollow Shaft)
- Up to 12 Pole Commutation Available
- Thru-Bore or Blind-Bore Options
- Simple, Innovative Flexible Mounting System
- Incorporates Opto-ASIC Technology

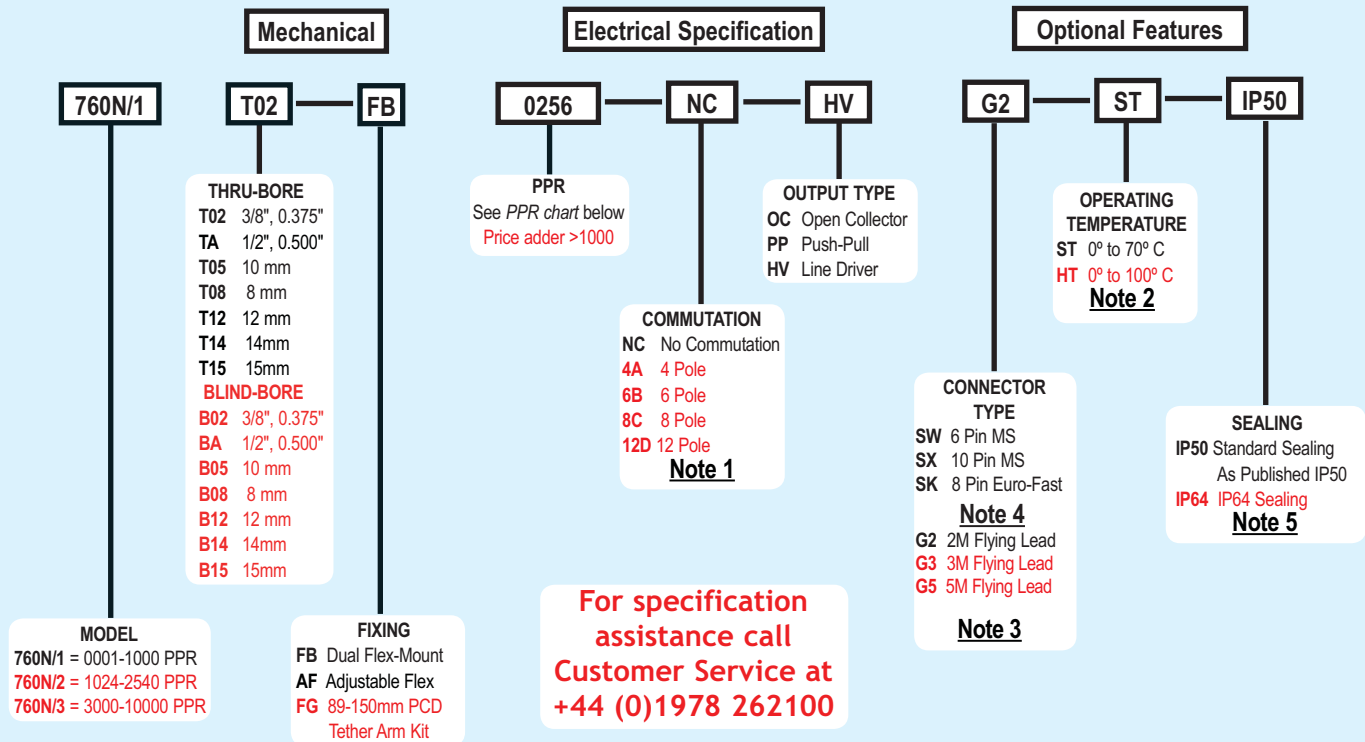
The 760N encoder is configured with either a full thru-bore (which may be fixed at either end of the shaft), or with a blind-bore which uses the front shaft fixing only. The encoder body is retained by means of 2 flexible mountings, or by a single adjustable radius fixing, which compensate for minor shaft misalignment. This encoder can now be provided with commutation signals for use with brushless motor control. Output circuits available include 5-24V RS422, 5-24V push-pull or 5-24V input / NPN open-collector. This encoder also now uses the same pioneering Opto-ASIC technology used in the model 260 encoder.

Common Applications

Brushless Servo Motor Commutation, Robotics, Motor-Mounted Feedback, Assembly Machines, Digital Plotters, High Power Motors

Model 760 Ordering Guide

Red type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.



Model 760 PPR Options

0001*	0010*	0011*	0012*	0020*	0025*	0030*
0040*	0060	0100	0120	0128*	0200	0250
0254	0256	0300	0360	0400	0500	0512
0600	0720	0800	1000	1024	1200	1220
1250	1270	1500	1800	2000	2048	2500
2540	3000	4096	5000	6000	8192	10000

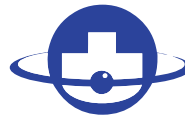
*Contact Customer service for High Temp option

Contact Customer Service for other disc resolutions; not all disc resolutions available with every commutation option.

NOTES:

- 1 Not available in all configurations. Contact Customer Service for availability.
- 2 5 to 16 VCC supply only for HT option.
- 3 For non-standard cable lengths contact sales office for details and cost.
- 4 Not available with commutation.
- 5 Blind-Bore + Flying lead options only

Model 760 Commutated Thru-Bore / Blind-Bore



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Model 760 Specifications

Electrical

Input Voltage.....4.75 to 24 VCC for temperatures up to 70° C
5 to 16 VCC for 0° to 100° C operating temperature

Input Current.....100 mA max with no output load, Typical

Output Format.....Incremental- Two square waves in quadrature with channel A leading B for clockwise shaft rotation, as viewed from the mounting face. See *Waveform Diagrams* below.

Output Types.....Open Collector- 20 mA max per channel
Push-Pull- 20 mA max per channel
Line Driver- 20 mA max per channel (Meets RS 422 at 5 VDC supply)

Index.....Once per revolution gated to channel A. See *Waveform Diagrams* below.

Freq. Response.....200 kHz standard (up to 1MHz)

Noise Immunity.....Tested to BS EN61000-6-2; BS EN50081-2; BS EN61000-4-2; BS EN61000-4-3; BS EN61000-4-6, BS EN55011

Symmetry.....180° (±18°) electrical

Quad. Phasing.....90° (±22.5°) electrical

Min. Edge Sep.....67.5° electrical

Accuracy.....Within 0.01° mechanical from one cycle to any other cycle, or 0.6 arc minutes.

Commutation.....Up to 12-pole. Contact Customer Service for availability.

Comm. Accuracy.....1° mechanical

Mechanical

Max Shaft Speed.....6000 RPM.

Bore Size.....8mm through 15mm

Bore Tolerance.....H7 (SLIDING FIT FOR g6)

User Shaft Tolerances
Radial Runout.....0.2mm max TIR
Axial Endplay.....0.75mm max

Starting Torque.....IP50 Thru-Bore: 3.53×10^{-3} Nm
IP64 Thru-Bore: 1.765×10^{-2} Nm

Max Acceleration..... 1×10^5 rad/sec²

Electrical Conn.....2M cable (foil and braid shield, 24 AWG conductors non-commutated, 28 AWG commutated), 6-pin MS, 10 Pin MS, or 8 Pin Euro-Fast

Housing.....Black non-corrosive finish

Mounting.....Dual adjustable radius Flex Mount standard, or single adjustable radius options.

Weight.....600 gms typical

Environmental

Operating Temp.....0° to 70° C for standard models
0° to 100°C for high temperature option

Storage Temp.....-40° to +100° C

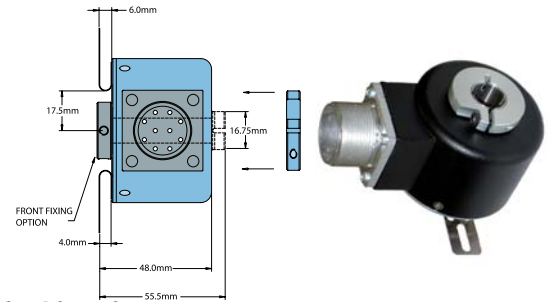
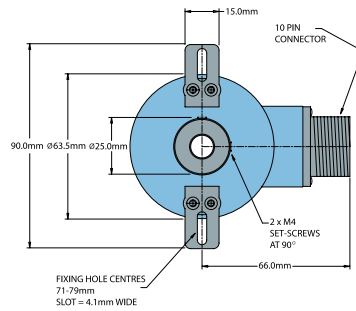
Humidity.....98% RH non-condensing

Vibration.....10 g @ 58 to 500 Hz

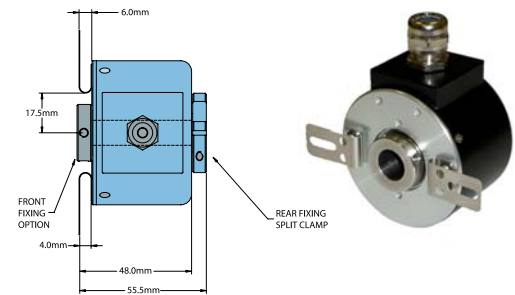
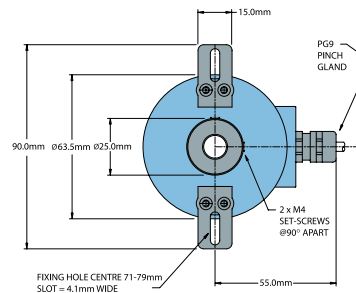
Shock.....50 g @ 11 ms duration

Sealing.....IP50; IP64

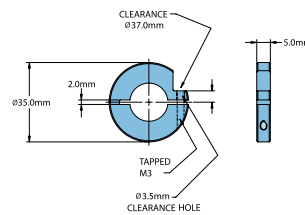
Model 760 With 10 Pin Connector



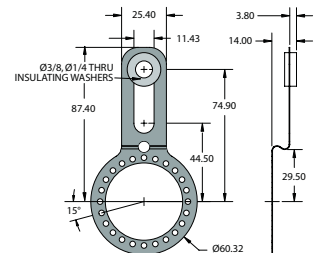
Model 760 With PG9 Pinch Gland



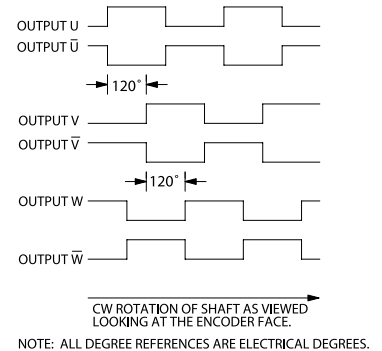
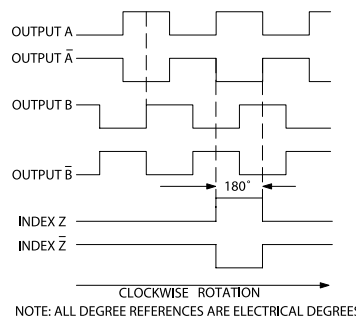
Rear Fixing Clamp



FG Flex Mount



Waveform Diagrams



Wiring Table - With Commutation

Function	Cable Wire Color
Com	Black
+VDC	White
A	Brown
A'	Yellow
B	Red
B'	Green
Z	Orange
Z'	Blue
U	Violet
U'	Gray
V	Pink
V'	Turquoise
W	Red/Green
W'	Red/Yellow
Shield	Bare *

Wiring Table - Non-Commutation

Function	Gland Cable Wire Color	8-pin HV	10-pin MS HV	6-pin MS PP, OC
Com	Black	7	F	F
+VDC	White	2	D	D
A	Brown	1	A	A
A'	Yellow	3	H	---
B	Red	4	B	B
B'	Green	5	I	---
Z	Orange	6	C	C
Z'	Blue	8	J	---
Case	---	---	G	---
Shield	Screen	---	---	---

Model 775 Slim Thru-Bore



Features

- Thru-Bore Design For Easy Mounting
- Bore Options to 1.375"
- Incorporates Opto-ASIC Technology
- Resolutions to 4096 PPR
- 100° C Operating Temperature Available

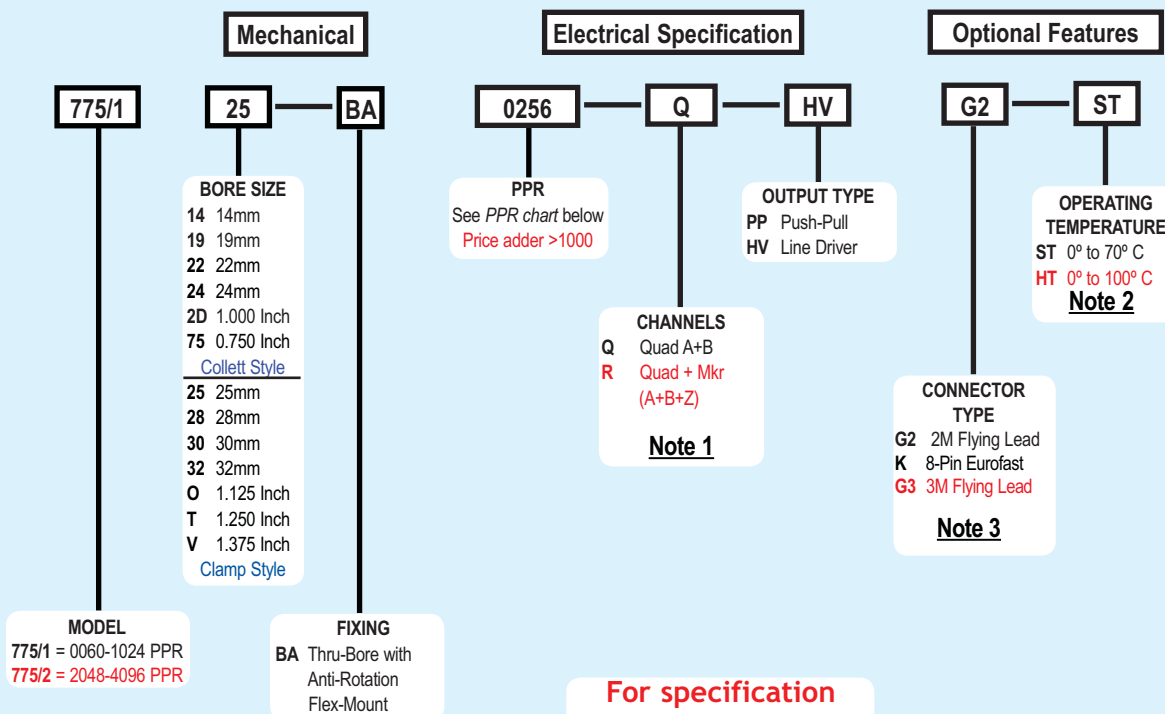
The sleek design of the Model 775 Thru-Bore Encoder makes form and function a successful reality. The slim profile and Thru-Bore design, makes installation easy by simply slipping the bore over motor shafts up to 1.375" in diameter. The advanced Opto-ASIC based electronics provide the superior noise immunity necessary in many industrial applications. With a variety of bore sizes, resolutions, and connector types, application possibilities are endless.

Common Applications

Motor Feedback, Velocity & Position Control, Food Processing, Robotics, Material Handling

Model 775 Ordering Guide

Red type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.



For specification assistance call Customer Service at +44 (0)1978 262100

Model 775 PPR Options

0060	0100	0120	0240	0250	0256
0500	0512	0600	1000	1024	2048
2500	4096				

NOTES:

- 1 Contact Sales Office for index gating options.
- 2 5 to 24 VCC max for high temperature option.
- 3 For non-standard cable lengths, Please Contact the Sales Office.

Model 775 Slim Thru-Bore



Model 775 Specifications

Electrical

Input Voltage.....4.75 to 28 VCC max for temperatures up to 70° C
 4.75 to 24 VCC for temperatures between 70° C to 100° C
 Input Current.....100 mA max with no output load
 Input Ripple100 mV peak-to-peak at 0 to 100 kHz
 Output Format.....Incremental- Two square waves in quadrature with channel A leading B for clockwise shaft rotation, as viewed from the mounting face. See *Waveform Diagrams* below.
 Output Types.....Push-Pull- 20 mA max per channel
 Line Driver- 20 mA max per channel (Meets RS 422 at 5 VCC supply)
 Index.....Once per revolution.
 0500 to 4096 PPR: Gated to output A
 0001 to 0500 PPR: Ungated
 See *Waveform Diagrams* below.
 Freq. Response.....200 kHz
 Noise Immunity.....Tested to BS EN61000-4-2; IEC801-3; BS EN61000-4-4; DENV 50141; DENV 50204; BS EN55022; BS EN61000-6-2; BS EN50081-2
 Symmetry180° (±18°) electrical
 Quad. Phasing.....90° (±22.5°) electrical
 Min. Edge Sep.....67.5° electrical
 Rise Time.....Less than 1 microsecond

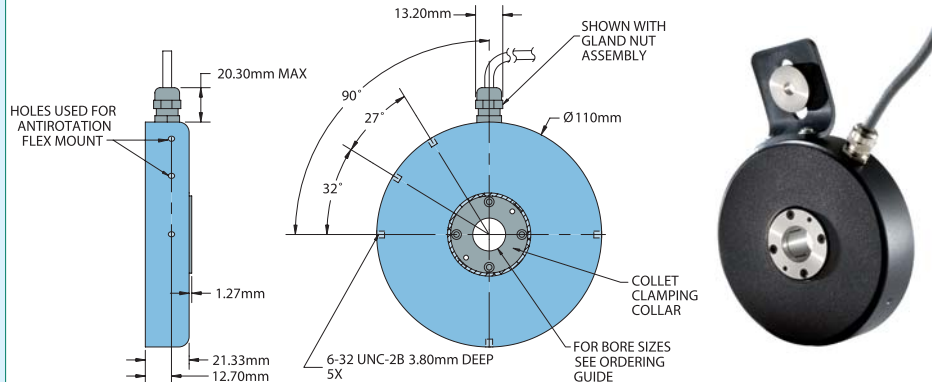
Mechanical

Max Shaft Speed.....6000 RPM. Higher shaft speeds may be achievable, contact Customer Service.
 Bore Size.....**See ordering chart**
 User Shaft Tolerances
 Radial Runout0.15mm TIR
 Axial Endplay±0.70mm with style BA flex-mount
 Electrical Conn.....Gland nut with 2M cable (foil and braid shield, 24 AWG conductors), or 8-pin M12 (12 mm)
 Housing.....All metal construction
 Mounting.....Thru-Bore with collet clamp or single-screw clamp mount
 Weight.....455 gms
 Note: All weights typical

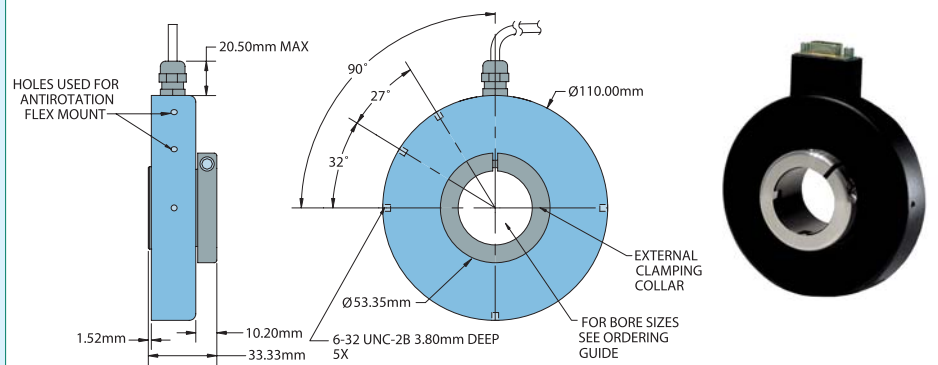
Environmental

Operating Temp.....0° to 70° C for standard models
 0° to 100° C for high temperature option
 Storage Temp-25° to 100° C
 Humidity.....98% RH non-condensing
 Vibration.....10 g @ 58 to 500 Hz
 Shock.....50 g @ 11 ms duration
 Sealing.....IP50

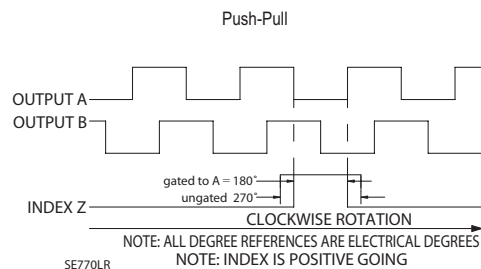
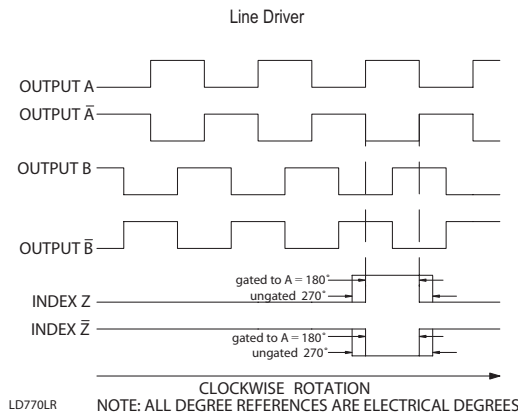
Model 775 Collet Style



Model 775 Clamp Style



Waveform Diagrams



Wiring Table

Function	Gland Cable Wire Color	8-pin M12
Com	Black	7
+VCC	Red	2
A	White	1
A'	Brown	3
B	Blue	4
B'	Violet	5
Z	Orange	6
Z'	Yellow	8
Shield	Bare	----
Case	----	----

Model 776 Large Bore Slim Thru-Bore



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Features

- Slim Profile - Only 34.55mm In Depth
- Thru-Bore Design For Easy Mounting
- Incorporates Opto-ASIC Technology
- Resolutions to 4096
- Bore Options to 1.875"

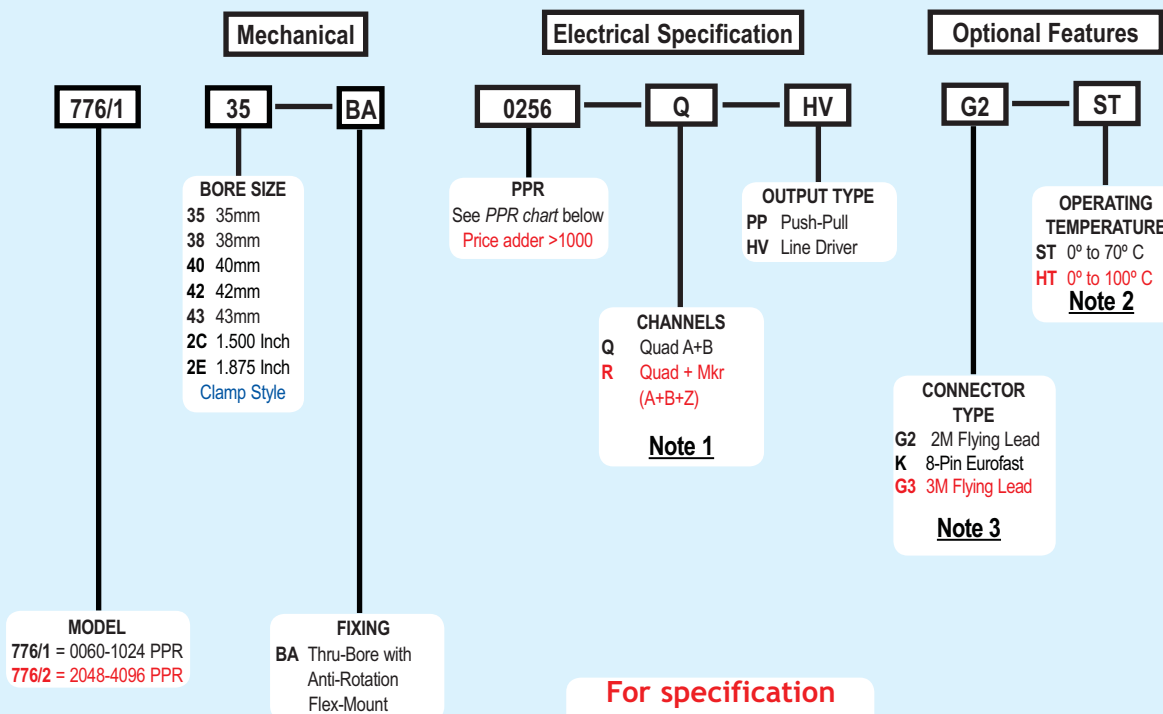
The Thru-Bore Model 776 encoder is designed to fit directly on either a motor or other shaft where position, direction, or velocity information is needed. The advanced Opto-ASIC based electronics provide the superior noise immunity necessary in many industrial applications. The Model 776 conveniently features a clamp type mount for fast and easy mounting over a large range of shaft sizes. An optional anti-rotation flex mount maintains housing stability.

Common Applications

Motor Feedback, Velocity & Position Control, Robotics, Conveyors, Material Handling

Model 776 Ordering Guide

Red type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.



For specification assistance call Customer Service at +44 (0)1978 262100

Model 775 PPR Options

0060	0100	0120	0240	0250	0256
0500	0512	0600	1000	1024	2048
2500	4096				

NOTES:

- 1 Contact Sales Office for index gating options.
- 2 5 to 24 VCC max for high temperature option.
- 3 For non-standard cable lengths, Please Contact the Sales Office.

Model 776 Large Bore Slim Thru-Bore



Model 776 Specifications

Electrical

Input Voltage.....	4.75 to 28 VCC max for temperatures up to 70° C 4.75 to 24 VCC for temperatures between 70° C to 100° C
Input Current.....	100 mA max with no output load
Input Ripple.....	100 mV peak-to-peak at 0 to 100 kHz
Output Format.....	Incremental- Two square waves in quadrature with channel A leading B for clockwise shaft rotation, as viewed from the mounting face. See <i>Waveform Diagrams</i> below.
Output Types.....	Push-Pull- 20 mA max per channel Line Driver- 20 mA max per channel (Meets RS 422 at 5 VCC supply)
Index.....	Once per revolution. 0500 to 4096 PPR: Gated to output A 0001 to 0500 PPR: Ungated See <i>Waveform Diagrams</i> below.
Freq. Response.....	200 kHz
Noise Immunity.....	Tested to BS EN61000-4-2; IEC801-3; BS EN61000-4-4; DENV 50141; DENV 50204; BS EN55022; BS EN61000-6-2; BS EN50081-2
Symmetry.....	180° (±18°) electrical
Quad. Phasing.....	90° (±22.5°) electrical
Min. Edge Sep.....	67.5° electrical
Rise Time.....	Less than 1 microsecond

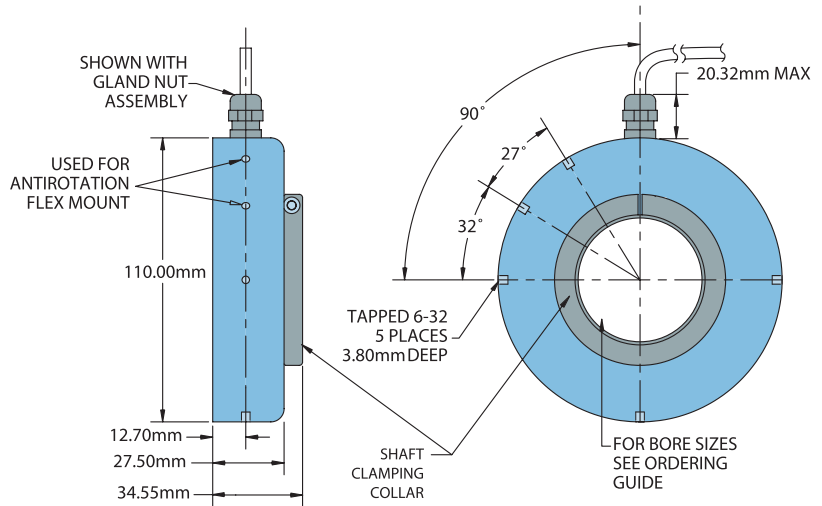
Mechanical

Max Shaft Speed.....	6000 RPM. Higher shaft speeds may be achievable, contact Customer Service.
Bore Size.....	See ordering chart
User Shaft Tolerances	
Radial Runout.....	0.15mm TIR
Axial Endplay.....	±0.70mm with style BA flex-mount
Electrical Conn.....	Gland nut with 2M cable (foil and braid shield, 24 AWG conductors), or 8-pin M12 (12 mm)
Housing.....	All metal construction
Mounting.....	Thru-Bore with collet clamp or single-screw clamp mount
Weight.....	455 gms Note: All weights typical

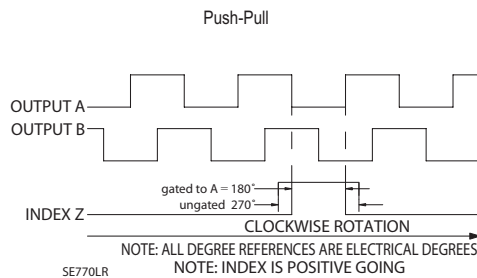
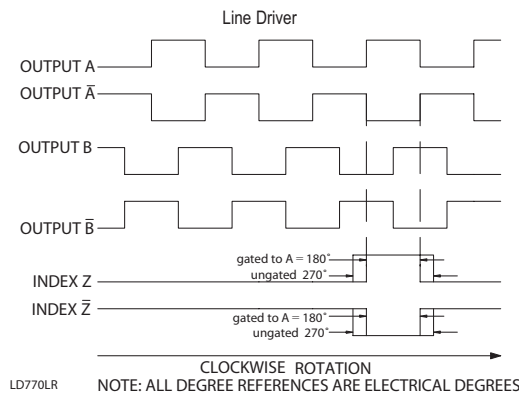
Environmental

Operating Temp.....	0° to 70° C for standard models 0° to 100° C for high temperature option
Storage Temp.....	-25° to 100° C
Humidity.....	98% RH non-condensing
Vibration.....	10 g @ 58 to 500 Hz
Shock.....	50 g @ 11 ms duration
Sealing.....	IP50

Model 776 With Gland



Waveform Diagrams



Wiring Table

Function	Gland Cable Wire Color	8-pin M12
Com	Black	7
+VCC	Red	2
A	White	1
A'	Brown	3
B	Blue	4
B'	Violet	5
Z	Orange	6
Z'	Yellow	8
Shield	Bare	----
Case	----	----

Model 7RP Extra Heavy Duty Thru-Shaft



Features

- Extra heavy duty mechanical assembly
- Single Ended or Double Ended shaft
- Reversible face fixing option
- Incorporates Opto-ASIC Technology

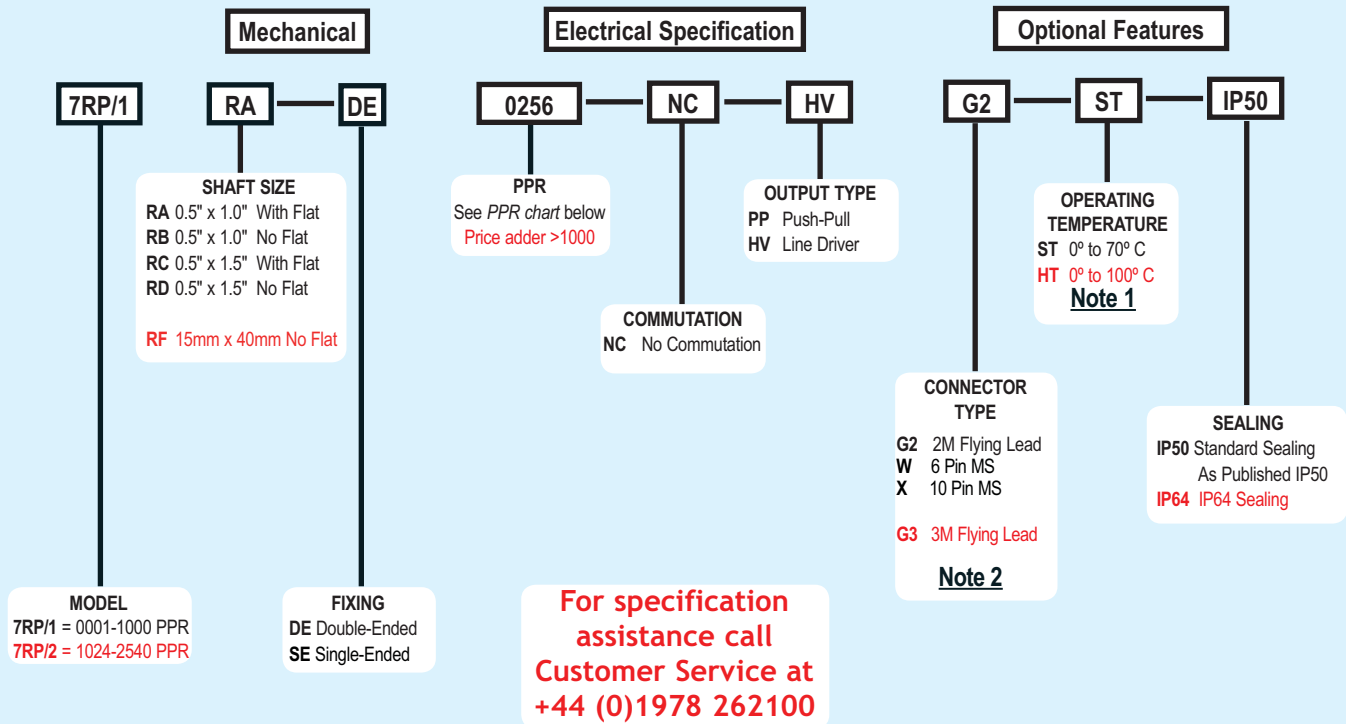
The model 7RP provides yet another extra heavy duty encoder which has the advantage of a double-ended male shaft together with a totally reversible mounting configuration. This arrangement will allow for the fixing of measuring wheels on both shafts, thus ensuring secure and error free contact with conveyor, or moving product, during length measurement applications. A single-ended shaft configuration is also available. This encoder employs our highly reliable Opto-ASIC technology.

Common Applications

Robotics, Motor-Mounted Feedback, Assembly Machines, High Power Motors

Model 7RP Ordering Guide

Red type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.



Model 7RP PPR Options

0001*	0010*	0011*	0012*	0020*	0025*	0030*
0040*	0060	0100	0120	0128*	0200	0250
0254	0256	0300	0360	0400	0500	0512
0600	0720	0800	0840	1000	1024	1200
1220	1250	1270	1500	1800	2000	2048
2500	2540	3000	4096	6000	8192	10000

*Contact Customer service for High Temp option

Contact Customer Service for other disc resolutions; not all disc resolutions available with every commutation option.

NOTES:

- 1 5 to 16 VCC supply only for HT option.
- 2 For non-standard cable lengths contact sales office for details and cost.

Model 7RP Extra Heavy Duty Thru-Shaft



Model 7RP Specifications

Electrical

Input Voltage.....4.75 to 24 VCC for temperatures up to 70° C
5 to 16 VCC for 0° to 100° C operating temperature

Input Current.....100 mA max with no output load

Output Format.....Incremental- Two square waves in quadrature with channel A leading B for clockwise shaft rotation, as viewed from the mounting face. See *Waveform Diagrams* below.

Output Types.....Push-Pull- 20 mA max per channel
Line Driver- 20 mA max per channel (Meets RS 422 at 5 VCC supply)

Index.....Once per revolution gated to channel A. See *Waveform Diagrams* below.

Freq. Response.....200 kHz standard

Noise Immunity.....Tested to BS EN61000-6-2; BS EN50081-2; BS EN61000-4-2; BS EN61000-4-3; BS EN61000-4-6, BS EN55011

Symmetry.....180° (±18°) electrical

Quad. Phasing.....90° (±22.5°) electrical

Min. Edge Sep.....67.5° electrical

Accuracy.....Within 0.01° mechanical from one cycle to any other cycle, or 0.6 arc minutes.

Commutation.....Up to 12-pole. Contact Customer Service for availability.

Comm. Accuracy.....1° mechanical

Mechanical

Max Shaft Speed.....3600 RPM. Higher shaft speeds may be achievable, contact Customer Service.

Shaft Size.....10mm through 15mm

Shaft Tolerance.....g6 (SLIDING FIT FOR H7)

Starting Torque.....IP50: 7.0615×10^{-3} Nm
IP64: 2.0118×10^{-2} Nm

Max Acceleration..... 1×10^5 rad/sec²

Electrical Conn.....cable (foil and braid shield, 24 AWG or 6-pin or 10-Pin MS connector)

Housing.....Anodised Aluminium

Weight.....800 gms typical

Environmental

Operating Temp.....0° to 70° C for standard models
0° to 100°C for high temperature option

Storage Temp.....-40° to +100° C

Humidity.....98% RH non-condensing

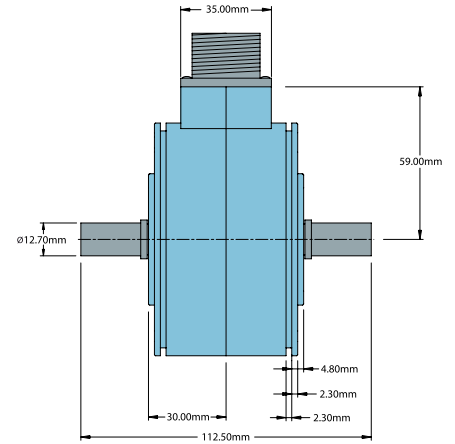
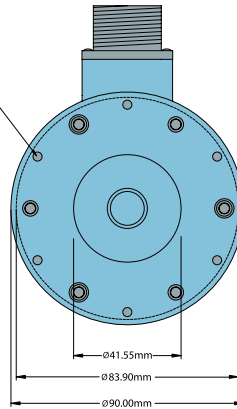
Vibration.....10 g @ 58 to 500 Hz

Shock.....50 g @ 11 ms duration

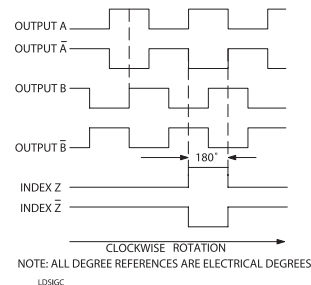
Sealing.....IP50; IP64 available

Model 7RP Double-Ended w/10 Pin

6 Holes 60° Apart on a Ø80.20mm FCD Tapped M3 x 9mm Deep



Waveform Diagrams



Wiring Table

Function	Gland Cable Wire Color	10-pin MS HV	6-pin MS PP
Com	Black	C	C
+VCC	White	E	E
A	Brown	B	B
A'	Yellow	G	----
B	Red	D	D
B'	Green	H	----
Z	Orange	A	A
Z'	Blue	I	----
Case	----	F	F
Shield	Screen	----	----

Model 858 58mm Stainless Steel



Features

- Standard Size 58 Mounting (58 mm Diameter)
- Up to 30,000 PPR
- 36Kg Max. Axial and Radial Shaft Loading
- High Temperature Option (100° C)
- Manufactured in Food Grade Stainless Steel

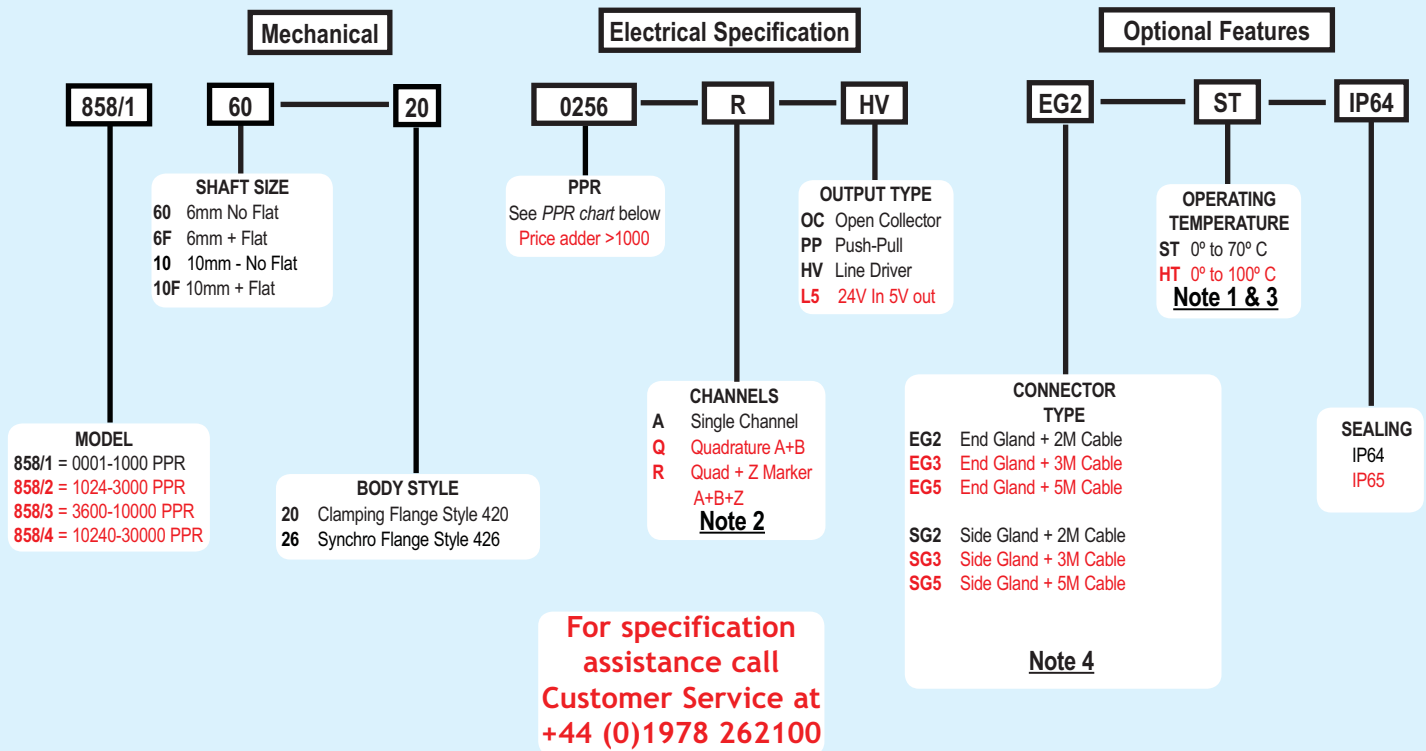
The Model 858 is a heavy duty, Stainless Steel, extremely rugged, reliable, yet compact European standard 58 mm diameter encoder, designed for harsh factory and Food Industry environments. Shaft loading is no problem for the double-shielded ball bearings; their 36Kg load rating ensures a long operating life. If fitted with the optional heavy-duty shaft seal, the Model 858 is rated IP65. Two standard mounting options are available: Clamping Flange (20 type) or Synchro Flange (26 type). The Model 858 is the perfect Encoder for food industry, wash-down, or marine environments.

Common Applications

Food Processing, Oil, Gas & Chemical Processing, Material Handling, Conveyors, Robotics, Lift Controls, Textile Machines.

Model 858 Ordering Guide

Red type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.



Model 858 PPR Options - See Note 3

0010*	0020	0025*	0030*	0040*	0060	0100	0120	0125
0128*	0144*	0150*	0160*	0200	0240*	0250	0254*	0256*
0300	0333*	0360	0400	0500	0512	0600	0625*	0635
0720	0800	0900*	1000	1024	1200 ^a	1250 ^a	1270 ^a	1440
1500	1800	2000	2048	2400 ^a	2500	2540 ^a	2880 ^a	3000 ^a
3600 ^a	4000 ^a	4096 ^a	5000 ^a	6000 ^a	7200 ^a	7500 ^a	9000 ^a	10,000 ^a
10,240 ^a	12,500 ^a	14,400 ^a	15,000 ^a	18,000 ^a	20,000 ^a	20,480 ^a	25,000 ^a	30,000 ^a

* Contact Customer Service for High Temperature Option.

^a High Temperature Option (H) limited to 85° C maximum for these PPR options.

New PPR values are periodically added to those listed. Contact Customer Service to determine all currently available PPR values. Special disk resolutions are available upon request. A one-time NRE (Non Recurring Engineering) fee may apply.

NOTES:

- 1 0° to 85° for certain resolutions, See PPR options.
- 2 Contact customer service for marker gating options.
- 3 Standard temperature, 50 to 3000 PPR only.
- 4 For non-standard cable lengths - call sales office.

Model 858 58mm Stainless Steel



Model 858 Specifications

Electrical

Input Voltage.....	4.75 to 28 Vcc max for temperatures up to 70° C 4.75 to 24 Vcc for temperatures between 70° C to 100° C
Input Current.....	100 mA max with no output load
Input Ripple	100 mV peak-to-peak at 0 to 100 kHz
Output Format.....	Incremental- Two square waves in quadrature with channel A leading B for clockwise shaft rotation, as viewed from the encoder mounting face. See <i>Waveform Diagrams</i> below.
Output Types.....	Open Collector- 50 mA max per channel Push-Pull- 20 mA max per channel Line Driver- 20 mA max per channel (Meets RS 422 at 5 Vcc supply)
Index.....	Occurs once per revolution. The index for units >3000 PPR is 90° gated to Outputs A and B. See <i>Waveform Diagrams</i> below.
Freq Response.....	Up to 1 MHz
Noise Immunity.....	Tested to BS EN61000-4-2; IEC801-3; BS EN61000-4-4; DENV 50141; DENV 50204; BS EN55022 (with European compliance option); BS EN61000-6-2; BS EN50081-2
Symmetry	1 to 6000 PPR: 180° (±18°) electrical at 100 kHz output 6001 to 20,480 PPR: 180° (±36°) electrical
Quad Phasing.....	1 to 6000 PPR: 90° (±22.5°) electrical at 100 kHz output 6001 to 20,480 PPR: 90° (±36°)
Min Edge Sep.....	1 to 6000 PPR: 67.5° electrical at 100 kHz output 6001 to 20,480 PPR: 54° electrical >20,480 PPR: 50° electrical
Rise Time.....	Less than 1 microsecond
Accuracy.....	Instrument and Quadrature Error: For 200 to 1999 PPR, 0.017° mechanical (1.0 arc minutes) from one cycle to any other cycle. For 2000 to 3000 PPR, 0.01° mechanical (0.6 arc minutes) from one cycle to any other cycle. Interpolation error (units > 3000 PPR only) within 0.005° mechanical. (Total Optical Encoder Error = Instrument + Quadrature + Interpolation)

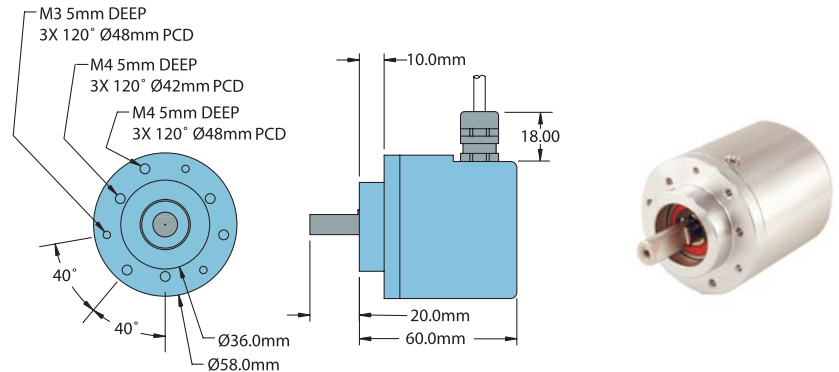
Mechanical

Max Shaft Speed.....	8000 RPM. Higher shaft speeds may be achievable, contact Customer Service.
Shaft Size	6 mm, 10 mm
Shaft Rotation.....	Bi-directional
Radial Shaft Load.....	36 Kg max. Rated load of 10 to 20 Kg for bearing life of 1.5×10^9 revolutions
Axial Shaft Load	36 Kg max. Rated load of 10 to 20 Kg for bearing life of 1.5×10^9 revolutions
Starting Torque.....	7.061×10^{-3} Nm typical with IP64 seal or no seal 2.118×10^{-2} Nm typical with IP66 shaft seal
Max. Acceleration.....	1×10^5 rad/sec ²
Electrical Conn	Gland with 2M cable
Housing.....	STAINLESS STEEL
Bearings.....	Precision ABEC ball bearings
Mounting.....	European Standard Clamping Flange (20 Type) and Synchro Flange (26 Type)
Weight.....	750 gms typical

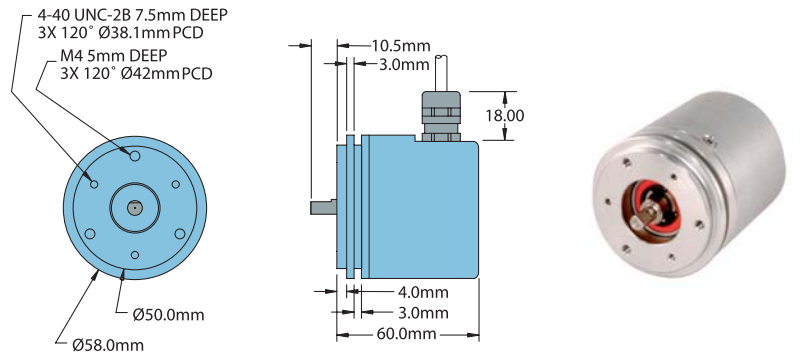
Environmental

Operating Temp.....	0° to 70° C for standard models 0° to 100° C for high temperature option (0° to 85° C for certain resolutions, see PPR Options.)
Storage Temp	-25° to +85° C
Humidity.....	98% RH non-condensing
Vibration.....	20 g @ 58 to 500 Hz
Shock.....	.75 g @ 11 ms duration
Sealing.....	IP64 shaft seal or IP65 shaft seal

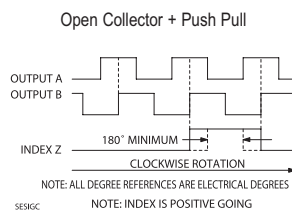
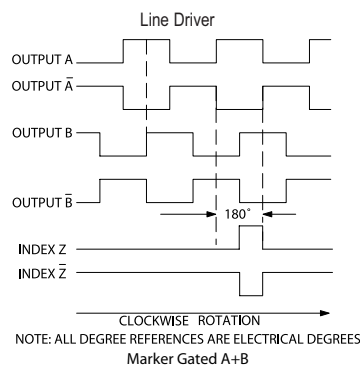
Model 858 Clamping Flange 20 Type



Model 858 Synchro Flange 26 Type



Waveform Diagrams



Wiring Table

Function	Gland Cable Wire Color
Com	Black
+VCC	White
A	Brown
A'	Yellow
B	Red
B'	Green
Z	Orange
Z'	Blue
Shield	Screen
+VDC Sense	---
Com Sense	---
Case	Green

CAUTION - Always check wiring colour code against Encoder Label due to changes in specification since September 2006

Model 86A Extra Heavy Duty Machine Tool Encoder



Features

- Standard 68mm Diameter Package
- Up to 3000 PPR, Opto-Asic Technology
- Square Flange Mounting
- IP65 Double O-Ring Sealed

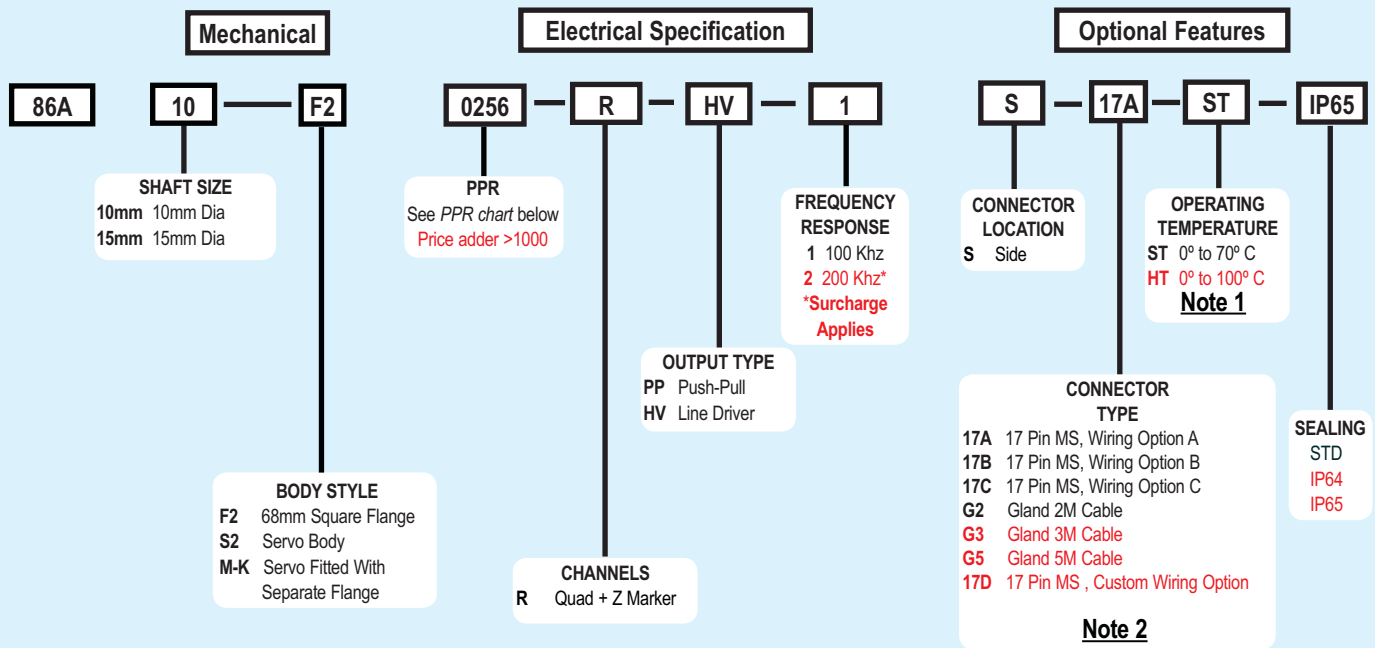
Model 86A is an extra heavy duty unit which employs a highly reliable Opto-Asic encoder module mounted within a rugged mechanical housing. The heavy duty sealed bearings, together with double O-Ring sealing makes this encoder a serious and reliable alternative to a wide range of machine tool encoders, and at an advantageous price.

Common Applications

Motion Control Feedback, Conveyors, Elevator Controls, Machine Control, Food Processing, Process Control, Robotics, Material Handling, Textile Machines

Model 86A Ordering Guide

Red type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.



For specification assistance call
Customer Service at +44 (0)1978 262100

Model 86A PPR Options

0500 0512 1000 1024 1250 2000 2048 2500 2540 3000

NOTES:

- 1 24 VCC max for high temperature option.
- 2 For Non-Standard Cable Lengths Contact the sales office.

Model 86A Extra Heavy Duty Machine Tool Encoder



**BRITISH
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Model 86A Specifications

Electrical

Input Voltage.....4.75 to 24 VCC max for temperatures up to 70° C
 Input Current.....100 mA max with no output load
 Input Ripple.....100 mV peak-to-peak at 0 to 100 kHz
 Output Format.....Incremental- Two square waves in quadrature with channel A leading B for clockwise shaft rotation, as viewed from the encoder mounting face. See *Waveform Diagrams* below.
 Output Types.....Push-Pull- 20 mA max per channel
 Line Driver- 20 mA max per channel (Meets RS 422 at 5 VCC supply)
 Index.....Occurs once per revolution. The index is Ungated. See *Waveform Diagrams* below.
 Freq Response.....Up to 200 KHz
 Noise Immunity.....Tested to BS EN61000-4-2; IEC801-3; BS EN61000-4-4; DENV 50141; DENV 50204; BS EN55022 (with European compliance option); BS EN61000-6-2; BS EN50081-2
 Symmetry.....180° (±18°) electrical at 100 kHz output
 Quad Phasing.....1 to 2540 PPR: 90° (±22.5°) electrical at 100 kHz output
 Min Edge Sep.....1 to 2540 PPR: 67.5° electrical at 100 kHz output
 Rise Time.....Less than 1 microsecond
 Accuracy.....Instrument and Quadrature Error: For 0500 to 2540 PPR, 0.017° mechanical (1.0 arc minutes) from one cycle to any other cycle.

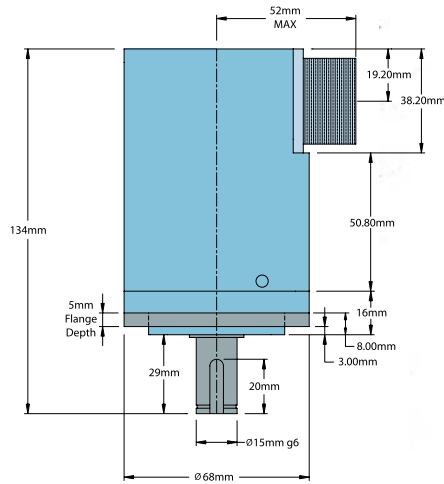
Mechanical

Max Shaft Speed.....3600 RPM. Higher shaft speeds may be achievable, contact Customer Service.
 Shaft Size.....See order code
 Shaft Material.....303 stainless steel
 Shaft Rotation.....Bi-directional
 Radial Shaft Load.....35kg max
 Axial Shaft Load.....35kg max
 Starting Torque.....2.118 x 10⁻² Nm typical.
 Max Acceleration.....1 x 10⁵ rad/sec²
 Electrical Conn.....17-pin MS Style, or gland with 2M of cable (foil and braid shield, 24 AWG conductors)
 Housing.....Anodised Aluminium
 Bearings.....Precision ABEC ball bearings
 Mounting.....Square Flange with 4 Holes 5.50mm Dia on a 71.19 PCD
 Weight.....800gms typical

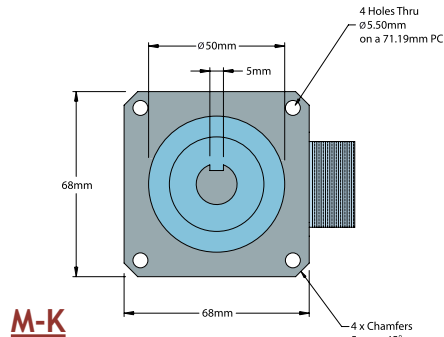
Environmental

Operating Temp.....0° to 70° C for standard models
 0° to 100° C for high temperature option
 Storage Temp.....-25° to +85° C
 Humidity.....95% RH non-condensing
 Vibration.....10 g @ 58 to 500 Hz
 Shock.....50 g @ 11 ms duration
 Sealing.....IP64, (IP65 optional)

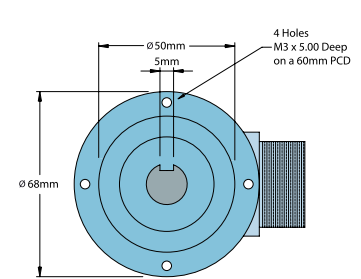
Model 86A



F2

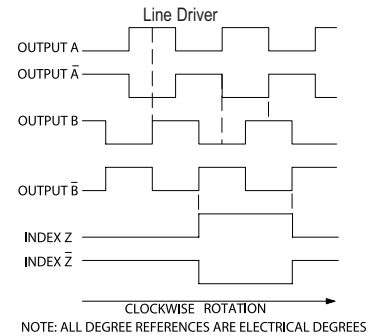
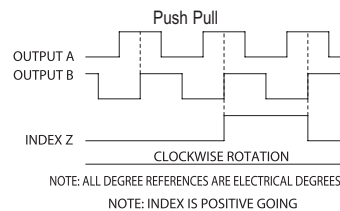


M-K



S2

Waveform Diagrams



Wiring Tables

17 Pin Connector

17 pin Conn	Option A	Option B	Option C
A	A	A	A
B	Z	B	Z
C	B	+Vcc	B
D	---	/A	---
E	---	/B	---
F	---	Z	---
G	---	/Z	---
H	+Vcc	Screen	+Vcc
J	---	+Vcc	---
K	0 Volts	+Vcc	0 Volts
L	---	---	---
M	---	---	0 Volts
N	/A	0 Volts	---
P	/Z	0 Volts	---
R	/B	---	---
S	---	---	---
T	---	0 Volts	Case

Cable Colours

Cable Colours	Function
Black	0 Volts
White	+Vcc
Brown	A
Yellow	/A
Red	B
Green	/B
Orange	Z
Blue	/Z
Drain	Screen

Model 86F Extra Heavy Duty Machine Tool Encoder



**BRITISH
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Features

- Transverse Slotted Shaft
- Up to 3000 PPR, Opto-Asic Technology
- 90mm Round Flange with 3 4.5mm Dia fixing holes at 120° on 82mm PCD
- Double O-Ring Sealed

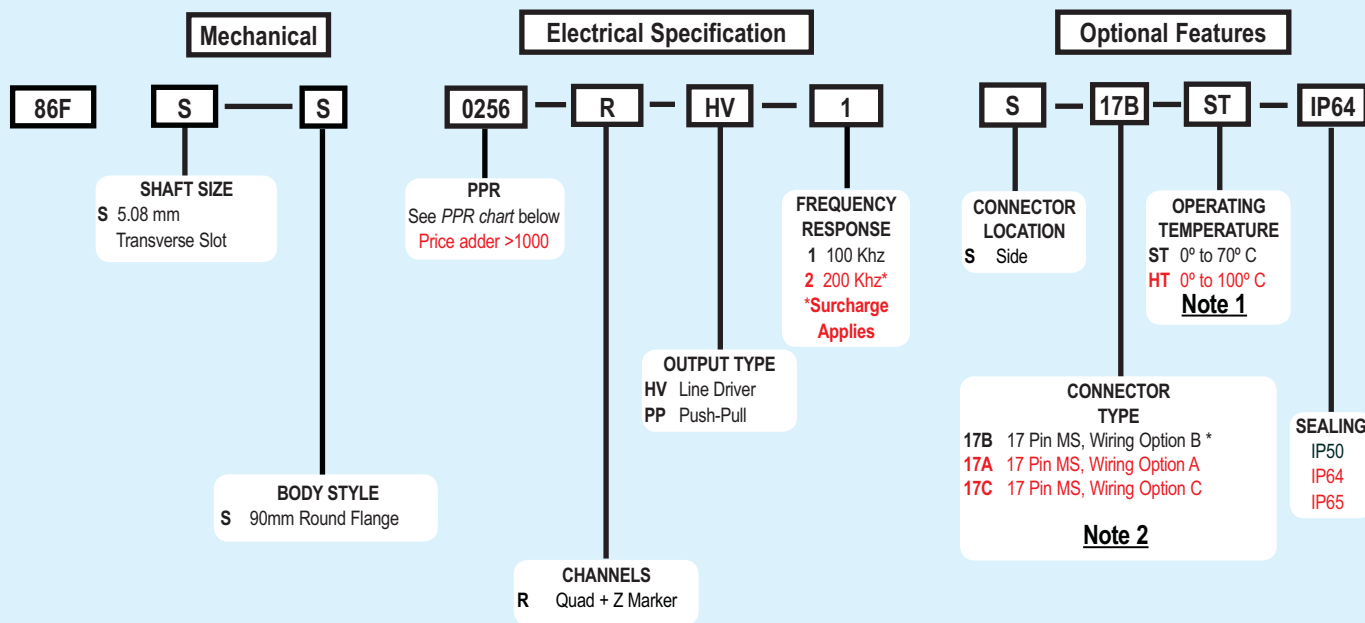
Model 86F is an extra heavy duty unit which employs a highly reliable Opto-Asic encoder module mounted within a rugged mechanical housing. The heavy duty sealed bearings, together with double O-Ring sealing makes this encoder a serious and reliable alternative to a wide range of machine tool encoders, and at an advantageous price.

Common Applications

Motion Control Feedback, Conveyors, Elevator Controls, Machine Control, Food Processing, Process Control, Robotics, Material Handling, Textile Machines

Model 86F Ordering Guide

Red type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.



For specification assistance call
Customer Service at
+44 (0)1978 262100

Model 86A PPR Options

0500 0512 1000 1024 1250 2000 2048 2500 2540
3000

NOTES:

- 1 24 VCC max for high temperature option.
- 2 * Option 17B = STD Wiring Code.

Model 86F Extra Heavy Duty Machine Tool Encoder



Model 86F Specifications

Electrical

Input Voltage.....4.75 to 24 VCC max for temperatures up to 70° C
 Input Current.....100 mA max with no output load
 Input Ripple.....100 mV peak-to-peak at 0 to 100 kHz
 Output Format.....Incremental- Two square waves in quadrature with channel A leading B for clockwise shaft rotation, as viewed from the encoder mounting face. See *Waveform Diagrams* below.
 Output Type.....Line Driver- 20 mA max per channel (Meets RS 422 at 5 VCC supply)
 Index.....Occurs once per revolution. See *Waveform Diagrams* below.
 Freq Response.....Up to 200 KHz
 Noise Immunity.....Tested to BS EN61000-4-2; IEC801-3; BS EN61000-4-4; DDENV 50141; DDENV 50204; BS EN55022 (with European compliance option); BS EN61000-6-2; BS EN50081-2
 Symmetry.....180° (±18°) electrical at 100 kHz output
 Quad Phasing.....1 to 2540 PPR: 90° (±22.5°) electrical at 100 kHz output
 Min Edge Sep.....1 to 2540 PPR: 67.5° electrical at 100 kHz output
 Rise Time.....Less than 1 microsecond
 Accuracy.....Instrument and Quadrature Error: For 0500 to 2540 PPR, 0.017° mechanical (1.0 arc minutes) from one cycle to any other cycle.

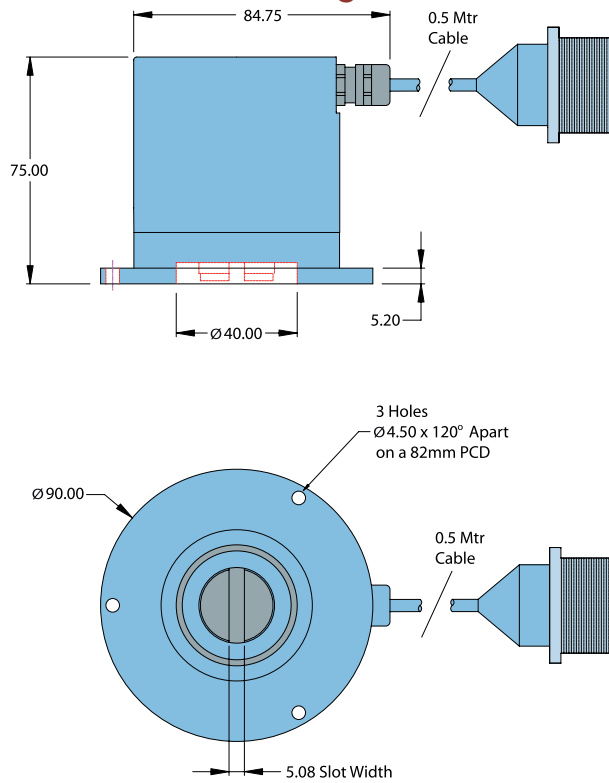
Mechanical

Max Shaft Speed.....3600 RPM. Higher shaft speeds may be achievable, contact Customer Service.
 Shaft Type.....Transverse Slotted
 Shaft Material.....303 stainless steel
 Shaft Rotation.....Bi-directional
 Axial Shaft Load.....35kg max
 Starting Torque.....2.118 x 10⁻² typical.
 Max Acceleration.....1 x 10⁵ rad/sec²
 Electrical Conn.....17-pin MS Style
 Housing.....Anodised Aluminium
 Bearings.....Precision ABEC ball bearings
 Mounting.....90mm Round Flange with 3 x 4.5mm Dia Holes at 120° On an 82mm PCD.
 Weight.....800gms typical

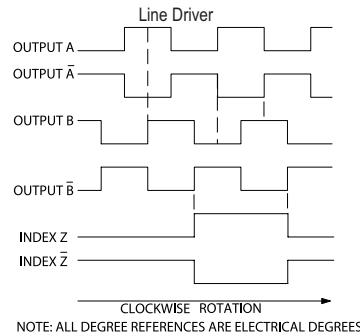
Environmental

Operating Temp.....0° to 70° C for standard models
 0° to 100° C for high temperature option
 Storage Temp.....-25° to +85° C
 Humidity.....95% RH non-condensing
 Vibration.....10 g @ 58 to 500 Hz
 Shock.....50 g @ 11 ms duration
 Sealing.....IP50, IP64

Model 86F Round Flange



Waveform Diagrams



Wiring Tables

17 Pin Connector

17pin Conn	Option A	Option B	Option C
A	A	A	A
B	Z	B	Z
C	B	+Vcc	B
D	---	/A	---
E	---	/B	---
F	---	Z	---
G	---	/Z	---
H	+Vcc	Screen	+Vcc
J	---	+Vcc	---
K	0 Volts	+Vcc	0 Volts
L	---	---	---
M	---	---	0 Volts
N	/A	0 Volts	---
P	/Z	0 Volts	---
R	/B	---	---
S	---	---	---
T	---	0 Volts	Case

Model 925 Heavy Duty Single Turn Absolute



Features

- Standard Size 25 Package (63.5mm)
- Resolutions Up To 12 Bit (4096 Counts)
- Incorporates Opto-ASIC Technology
- Industrial Grade, Heavy Duty Housing
- Wide Range of Operating Voltages (4.75 to 24 Vcc)

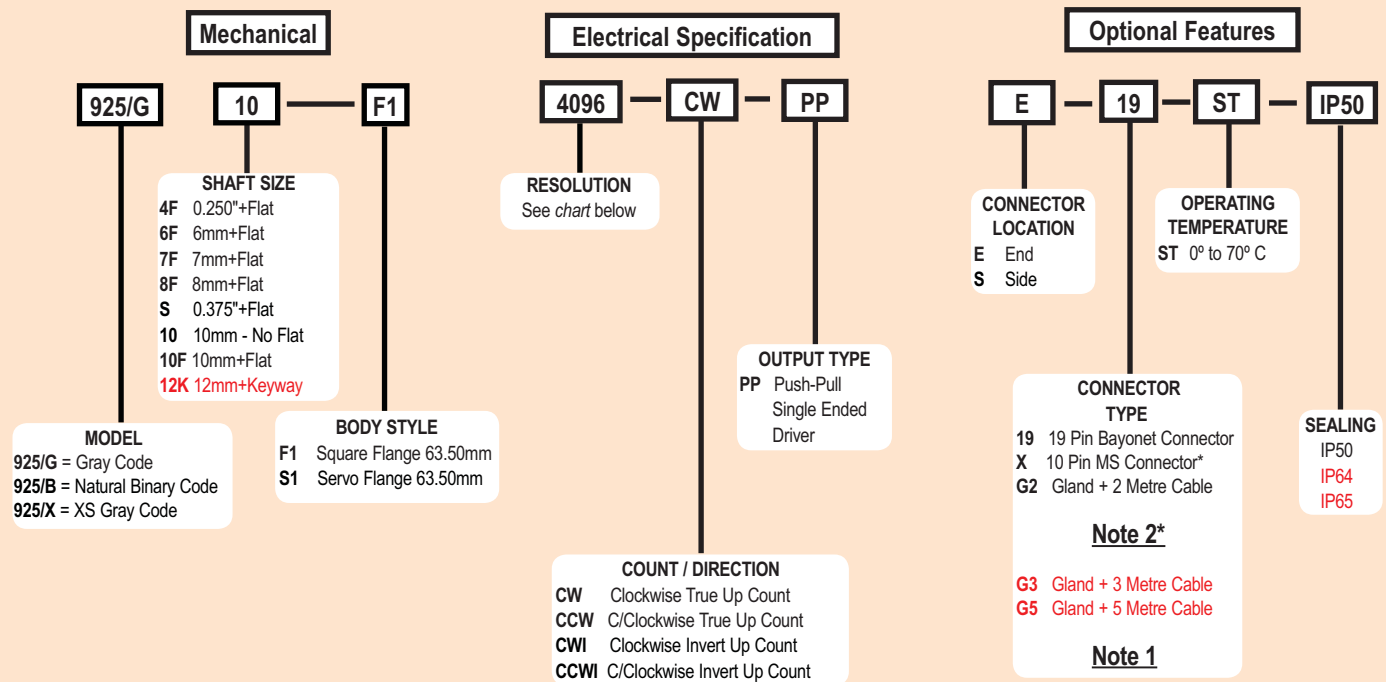
The Model 925 Single Turn Absolute is ideal for a wide variety of industrial applications that require an encoder with the capability of absolute positioning output. Its fully digital output and innovative use of Opto-ASIC technology make the Model 925 an excellent choice for all applications, especially ones with a high presence of noise. Available with either round servo or square flange mounting, and a variety of connector and cabling options, the Model 925 is easily designed into a variety of application requirements. The Model 925, with its wide selection of shaft sizes supported by industrial grade, heavy duty bearings, is ideal for rough environments.

Common Applications

Machine Tools, Robotics, Telescopes, Antennas, Rotary & X-Y Positioning Tables, Medical Scanners

Model 925 Ordering Guide

Red type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.



Model 925 Resolution Table

	Output Code	Pulses Per Resolution				
925/G	Gray Code	0256	0512	1024	2048	4096
925/B	Natural Binary	0250	0256	0360	0500	0512 0720
		1000	1024	1440	2000	2048 2880
		4000	4096			
925/X	Excess Gray	0180	0250	0360	0500	0720 1000
		1440	2000	2880	4000	

For specification assistance call
Customer Service at
+44 (0)1978 262100

NOTES:

- 1 For non-standard cable lengths - contact sales office for availability.
- 2 Only available with 8 bit resolution encoder.

Model 925 Heavy Duty Single Turn Absolute



Model 925 Specifications

Electrical

Input Voltage4.75 to 24 Vcc max
 Regulation.....100 mV peak-to-peak, max ripple at 0 to 10 kHz
 Input Current.....100 mA max with no external load
 Output FormatAbsolute- Parallel Outputs
 Output TypePush-Pull- 20 mA max per channel
 CodeGray Code, Natural Binary Code, Excess Gray Code
 Max Frequency.....50 kHz (LSB)
 Rise Time.....Less than 1 microsecond
 Resolution.....Up to 12 bit
 Accuracy.....±1/2 LSB

Control

Directional Control...Field selectable for increasing counts (CW or CCW)

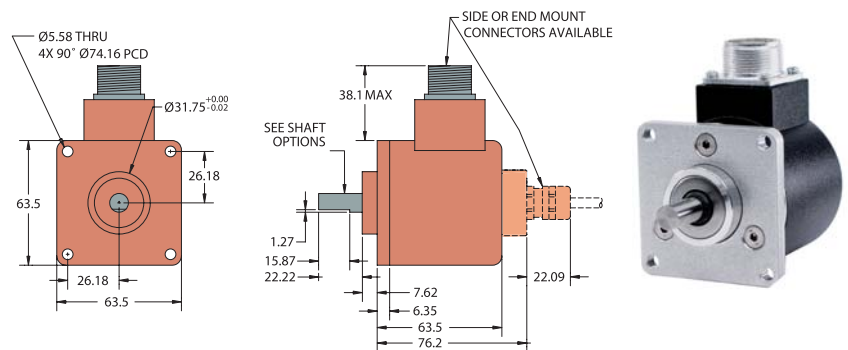
Mechanical

Max Shaft Speed.....6000 RPM continuous
 Shaft Size0.250", 0.3125", 0.375", 6 mm, 8 mm
 Radial Shaft Load.....15 Kg max
 Axial Shaft Load20 Kg max
 Starting Torque7.061 x 10⁻³ Nm typical for no seal
 1.412 x 10⁻² Nm with IP64 shaft seal
 Max Acceleration1 x 10⁵ rad/sec²
 Electrical ConnGland with 2M cable (braid shield, 30 AWG conductors), 10-, 16-, and 19-pin
 Housing.....Aluminium
 Mounting.....Flange or servo type
 Weight.....630 gms typical

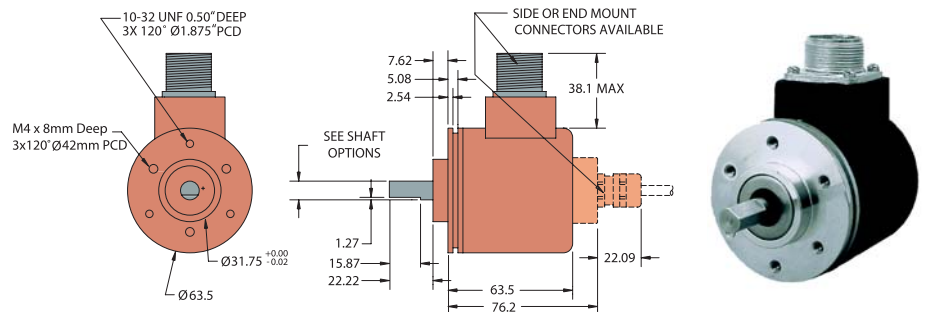
Environmental

Operating Temp.....0° to 70° C
 Storage Temp-20° to +85° C
 Humidity.....98% RH non-condensing
 Vibration.....10 g @ 58 to 500 Hz
 Shock.....20 g @ 11 ms duration
 Sealing.....IP50 (standard)
 IP64, or IP65 optional

Model 925 Flange Mount F1



Model 925 Servo Mount S1



Wiring Table

	19-PIN KPT02E14-19P	10-PIN* MS	Gland Cable or Mating Conn.	NOTES:
Function	Pin	Pin	Wire Color	
S1 MSB	A	A	Brown	* Only available with 8-bit resolution encoders
S2	B	B	White	** Where Fitted
S3	C	C	Green	*** Direction Control-
S4	D	D	Orange	Standard is CW increasing
S5	E	E	Blue	when viewed from the
S6	F	F	Violet	shaft end. Direction pin is
S7	G	G	Grey	pulled high normally to 5V
S8 LSB 8-bit	H	H	Pink	internally. Direction pin
S9 LSB 9-bit	J	—	Red/Green	must be pulled low
S10 LSB 10-bit	K	—	Red/Yellow	(GND, Common) to reverse
S11 LSB 11-bit	L	—	Turquoise	count direction. 0V only
S12 LSB 12-bit	M	—	Yellow	should be applied to
Direction***	R	—	Red/Blue	the direction pin.
Case Ground	S	—	Drain/Screen	
0V Common	T	J	Black	
Special**	U	—	White/Red	
+Vcc	V	I	Red	

Model 958 Single Turn 58mm Absolute



Features

- 58 mm Package
- Resolutions Up To 12 Bit (4096 PPR equivalent)
- Incorporates Opto-ASIC Technology
- Industrial Grade, Heavy Duty Housing
- Wide Range of Operating Voltages (4.75 to 24 VCC)

The Model 958 Single Turn Absolute is ideal for a wide variety of industrial applications requiring an encoder with Size 58 mm mounting and absolute positioning output. A rugged, industrial grade housing allows the Model 958 to be used in a wide variety of applications calling for a reliable, heavy-duty encoder. In addition, its innovative Opto-ASIC circuitry, coupled with its digital output, make it an excellent choice in those applications plagued by unusually high levels of electrical noise. Available with a choice of either type 20 or type 26 servo mounting, and a variety of connector and cabling options, the Model 958 is easily designed into a variety of applications. The Model 958 can also be ordered with stainless steel housing, heavy duty bearings, and an IP66 seal.

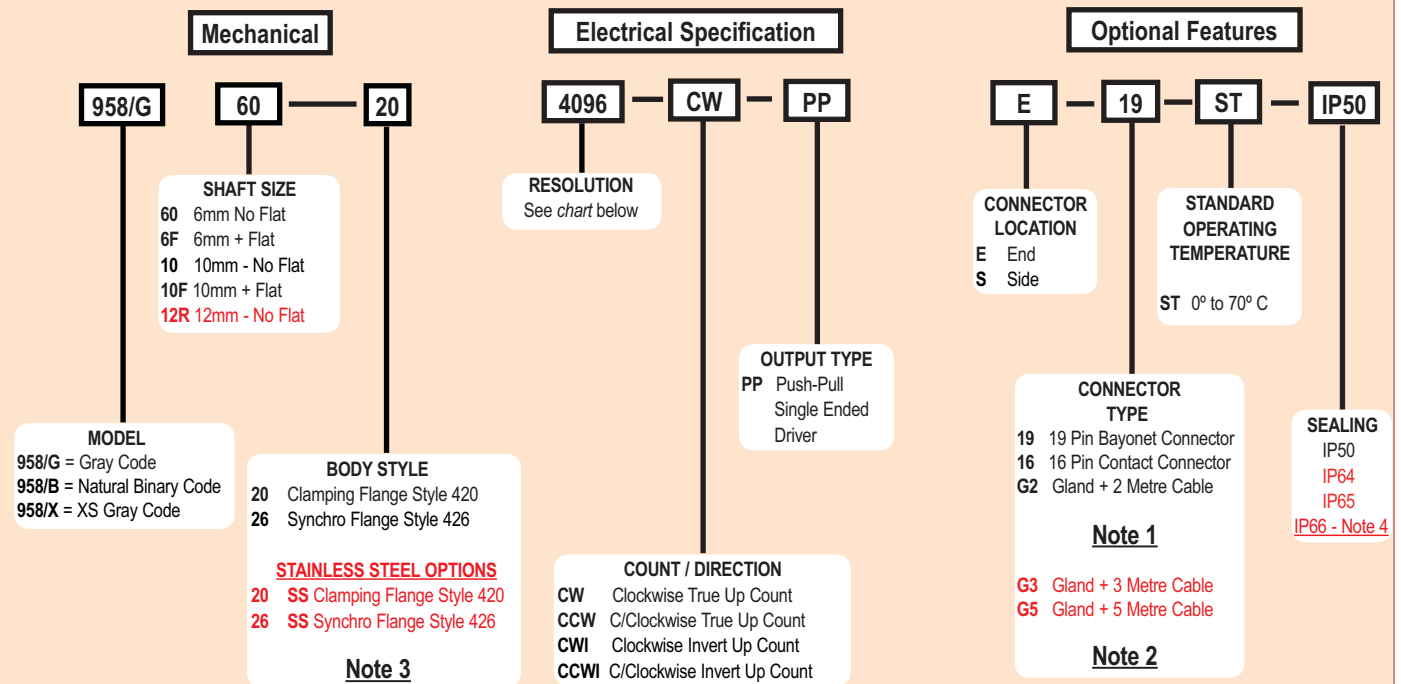
With so many options that make the Model 958 ultra-durable, this absolute encoder can tolerate the worst environments!

Common Applications

Machine Tools, Robotics, Telescopes, Antennas, Rotary & X-Y Positioning Tables, Medical Scanners

Model 958 Ordering Guide

Red type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.



Model 958 Resolution Table

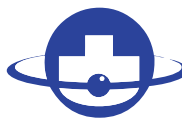
	Output Code	Pulses Per Resolution					
958/G	Gray Code	0256	0512	1024	2048	4096	
958/B	Natural Binary	0250	0256	0360	0500	0512	0720
		1000	1024	1440	2000	2048	2880
		4000	4096				
958/X	Excess Gray	0180	0250	0360	0500	0720	1000
		1440	2000	2880	4000		

For specification assistance call
Customer Service at
+44 (0)1978 262100

NOTES:

- 1 For additional connector styles - contact sales office for availability.
- 2 For non-standard cable lengths - contact the sales office.
- 3 For Stainless Steel options - contact the sales office.
- 4 Significantly increased torque.

Model 958 Single Turn 58mm Absolute



**BRITISH
ENCODER**
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Model 958 Specifications

Electrical

Input Voltage.....4.75 to 24 VCC max
 Regulation.....100 mV peak-to-peak, max ripple at 0 to 100 kHz
 Input Current.....100 mA max with no external load
 Output Format.....Absolute- Parallel Outputs
 Output Type.....Push-Pull- 20 mA max per channel
 Code.....Gray Code, Natural Binary Code, Excess Gray Code
 Max Frequency.....50 kHz (LSB)
 Rise Time.....Less than 1 microsecond
 Resolution.....Up to 12 bit
 Accuracy.....+1/6th LSB

Control

Directional Control....Field selectable for increasing counts (CW or CCW)

Mechanical

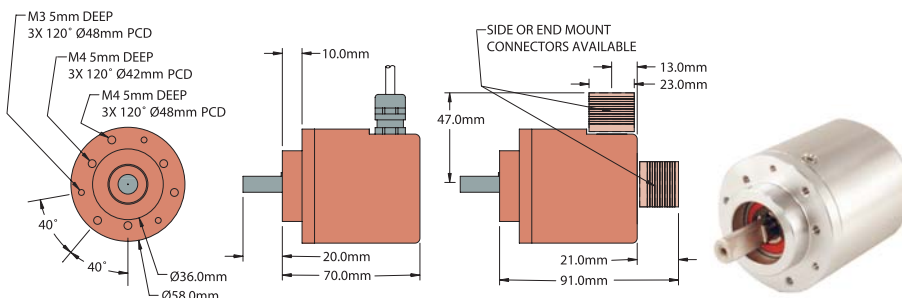
Max Shaft Speed.....6000 RPM continuous
 Shaft Size.....6mm, 10mm, 12mm
 Radial Shaft Load.....15Kg max
 Axial Shaft Load.....20Kg max
 Starting Torque..... 7.061×10^{-3} Nm typical for no seal or IP64
 2.118×10^{-2} Nm typical with IP65 shaft seal
 Max Acceleration..... 1×10^5 rad/sec²
 Electrical Conn.....Gland with 2M cable (braid shield, 30 AWG conductors), 16 Pin, or 19-pin connector
 Housing.....Aluminium / Stainless Steel on request
 Mounting.....European Standard Clamping Flange (20 Type) and Synchro Flange (26 Type)
 Weight.....750gms typical

Environmental

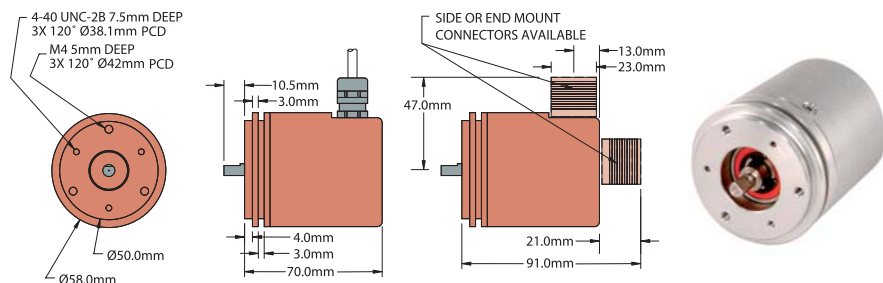
Operating Temp.....0° to 70° C
 Storage Temp.....-20° to +85° C
 Humidity.....98% RH non-condensing
 Vibration.....10 g @ 58 to 500 Hz
 Shock.....20 g @ 11 ms duration
 Sealing.....IP50 (standard)
 IP64, IP65 or IP66**

** IP66 Significantly increased torque.

Model 958 Clamping Flange 20 Type (20)



Model 958 Synchro Flange 26 Type (26)



Wiring Table

Function	19-PIN	16-PIN	Gland Cable or Mating Conn.	NOTES:
	KPT02E14-19P			
S1 MSB	A	3	Brown	* Where Fitted ** Direction Control- Standard is CW increasing when viewed from the shaft end. Direction pin is pulled high normally to 5V internally. Direction pin must be pulled low (GND, Common) to reverse count direction. 0V only, should be applied to the direction pin.
S2	B	5	White	
S3	C	6	Green	
S4	D	7	Orange	
S5	E	8	Blue	
S6	F	9	Violet	
S7	G	10	Grey	
S8 LSB 8-bit	H	11	Pink	
S9 LSB 9-bit	J	12	Red/Green	
S10 LSB 10-bit	K	13	Red/Yellow	
S11 LSB 11-bit	L	14	Turquoise	
S12 LSB 12-bit	M	15	Yellow	
Direction **	R	4	Red/Blue	
Case Ground	S	16	Drain/Screen	
0V Common	T	1	Black	
Special *	U	---	White/Red	
+VCC	V	2	Red	

Model 960 Single Turn Thru-Bore Absolute, 8-11 Bits



Features

- Low Profile - 40mm
- Thru-Bore and Blind Bore Styles
- Sturdy all Metal Construction
- State-of-the-Art Opto-ASIC Circuitry

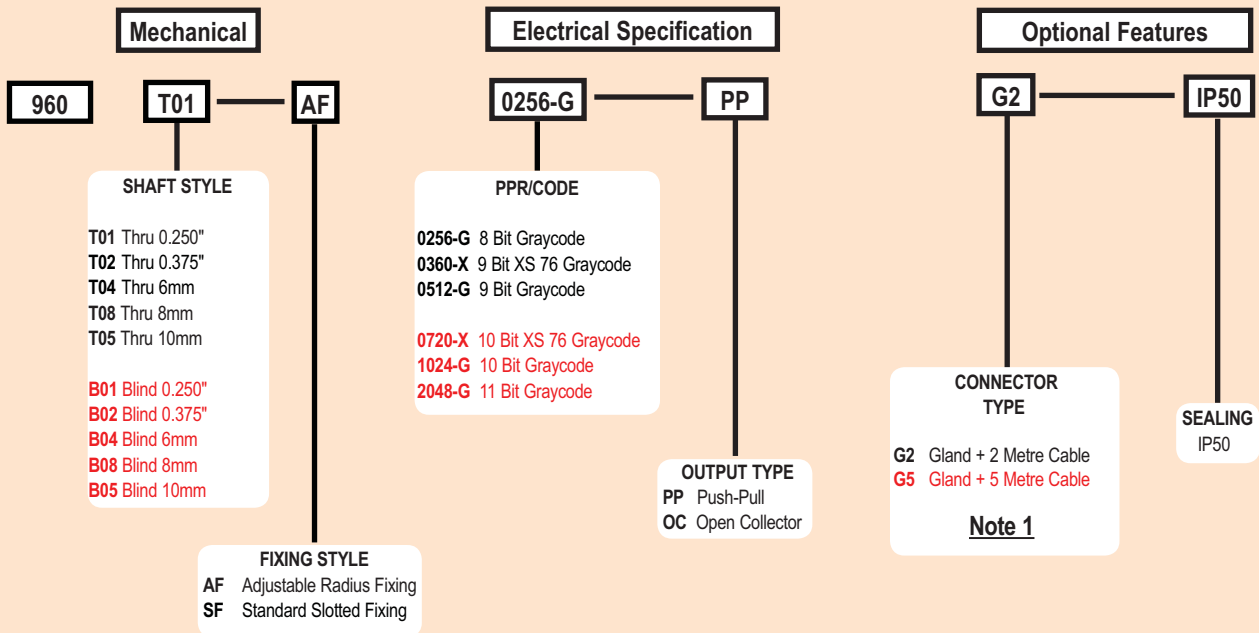
The single-turn Model 960 Absolute Series provides an unique solution to a wide variety of industrial applications requiring absolute position information. By providing a low profile package of just 40mm, a variety of thru-bore and blind-bore sizes, and an easy to use flexible mounting system, the Model 960 goes where traditional absolute encoders do not fit. In addition, its innovative Opto-ASIC circuitry, coupled with its digital output, make it an excellent choice in those applications plagued by an unusually high level of electrical noise. The Model 960 can easily be mounted directly on a motor shaft, bringing the advantage of absolute positioning in an all metal housing while eliminating the fixtures, couplers, and adapters required by other absolute encoder designs.

Common Applications

Machine Tools, Robotics, Telescopes, Antennas, Rotary & X-Y Positioning Tables, Medical Scanners

Model 960 Ordering Guide

Red type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.



For specification assistance call Customer Service at +44 (0)1978 262100

Model 960 Resolution Table

Output Code	Counts Per Resolution			
Gray Code	0256	0512	1024	2048
Excess Gray	0360	0720		

NOTES:
1 For non-standard cable lengths, call the sales office

Model 960 Single Turn Thru-Bore Absolute, 8-11 Bits



Model 960 Specifications

Electrical

Input Voltage.....	4.75 to 24 VCC max
Regulation.....	100 mV peak-to-peak, max ripple at 0 to 100 kHz
Input Current.....	100 mA max with no output load
Output Format.....	Absolute- Parallel Outputs
Output Type.....	Open Collector- 20 mA max per channel Push-Pull- 20 mA max per channel
Code.....	Gray Code, Excess Gray Code
Max Frequency.....	25.6 kHz (LSB)
Rise Time.....	Less than 1 microsecond
Resolution.....	up to 11 bit
Accuracy.....	±1/6 LSB

Control

Directional Control... Field selectable for increasing counts (CW or CCW). Standard configuration user selects the applicable MSB wire for direction of count. Direction control option allows user to select count direction by applying 0 VCC to the direction control input. See *Absolute Series Wiring Tables* below.

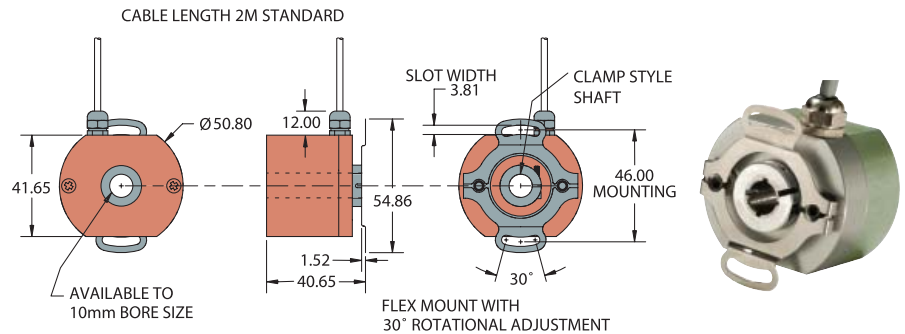
Mechanical

Max. Shaft Speed.....	6000 RPM continuous
Bore Size.....	0.250", 0.375", 6 mm, 8 mm, 10 mm
Bore Tolerance.....	H7, Sliding fit for g6 host shaft
User Shaft Tolerances	
Radial Runout.....	0.2mm
Axial Endplay.....	±0.75mm
Starting Torque.....	3.53 x 10 ⁻³ Nm typical for IP50
Max Acceleration.....	1 x 10 ⁵ rad/sec ²
Electrical Conn.....	Gland with 2M cable (braid shield, 30 AWG conductors)
Housing.....	Aluminium with non-corrosive finish
Mounting.....	Slotted Flex Mount standard, Adjustable Radius Fixing Optional
Weight.....	200 gms typical

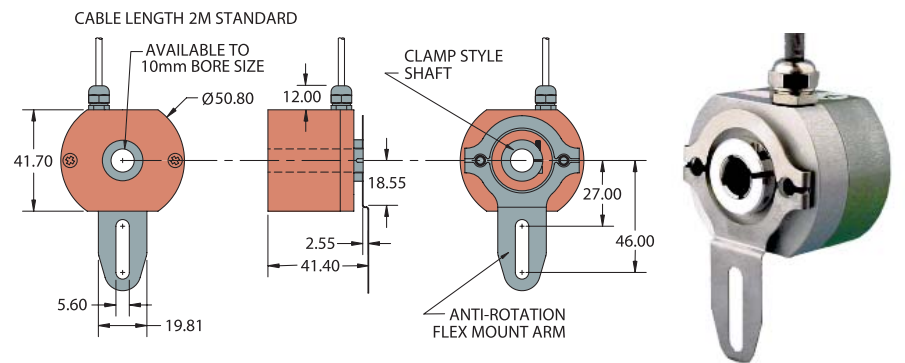
Environmental

Operating Temp.....	0° to 70° C
Storage Temp.....	-20° to +85° C
Humidity.....	98% RH non-condensing
Vibration.....	10 g @ 58 to 500 Hz
Shock.....	20 g @ 11 ms duration

Model 960 Slotted Flex Mount (SF)



Model 960 With Flex Arm (AF)



Wiring Table

Function	Gland Cable Wire Color	NOTES: * Standard is CW increasing count (when viewed from shaft end, and using brown wire for MSB). Direction Control is pulled up internally to 5 VDC. To reverse count direction, Direction Control must be pulled low (0 VDC). If 5 VDC is applied to Direction Control, unit remains in standard CW increasing count mode. Count direction can also be reversed by using the Yellow MSB wire instead of the Brown. 0V only, should be applied to Direction Control Conductor.
Common	Black	
+VDC	Red	
S1 cw MSB	Brown	
S1 ccw MSB	Yellow	
S2	White	
S3	Green	
S4	Orange	
S5	Blue	
S6	Violet	
S7	Grey	
S8 LSB 8-bit	Pink	
S9 LSB 9-bit	Red/Green	
S10 LSB 10-bit	Red/Yellow	
S11 LSB 11-bit	Turquoise	
Direction Control*	Red/Blue	
Case Ground	Shield	

Model MA36S MultiTurn Absolute



Ø36 mm

Features

- Standard Size 36 mm Package
- Durable Magnetic Technology
- Multiturn Absolute Encoder (12 Bit/40 Bit)
- SSI and CANopen Communications
- Proven New Turns Counting Technology - No Gears or Batteries

The Model MA36S Multiturn Absolute is ideal for a wide variety of industrial applications that require an encoder with the capability of absolute positioning output. Its fully digital output and innovative use of battery-free multiturn technology make the Model MA36S an excellent choice for all applications, especially ones with a high presence of noise. Its durable magnetic technology and high sealing make it a perfect choice for dirty industrial environments. Available with a 6 mm or 1/4" shaft and a servo mount, the Model MA36S is easily designed into a variety of applications.

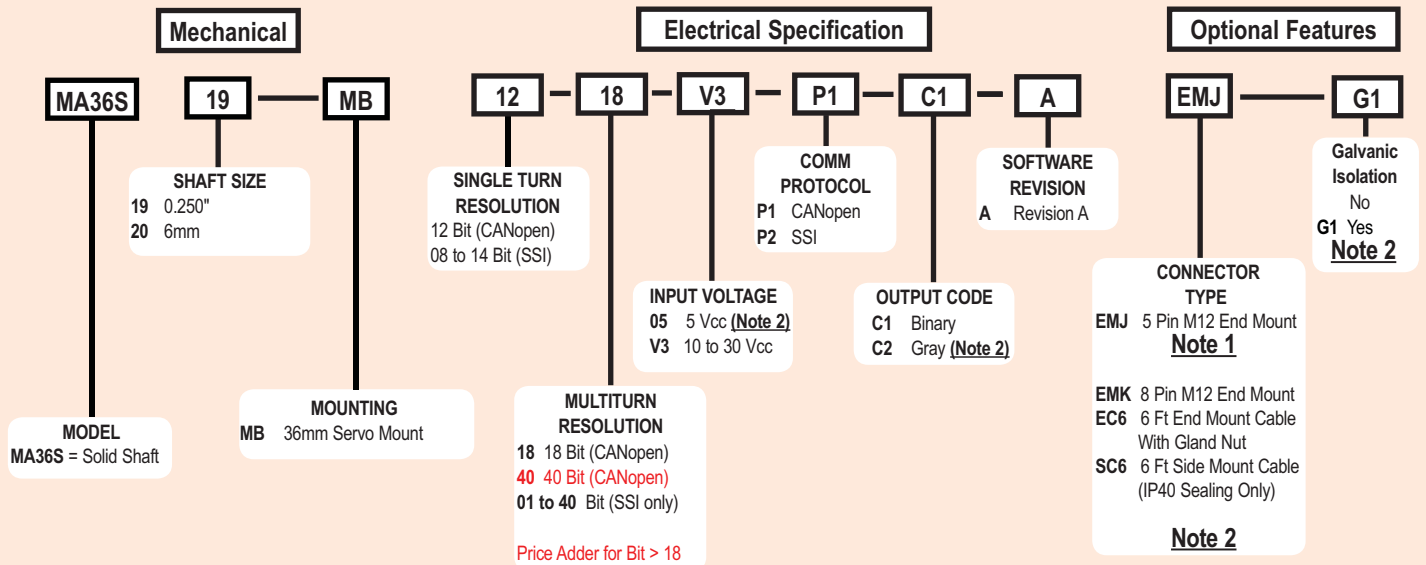
Common Applications

Robotics, Telescopes, Antennas, Medical Scanners, Windmills, Elevators, Lifts, Motors, Automatic Guided Vehicles, Rotary and X/Y Positioning Tables

Model MA36S Ordering Guide

For Single turn applications see Model SA36S

Red type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.



Notes:

- 1 Only available with CANopen.
- 2 Only available with SSI.

Model MA36S

MultiTurn Absolute

Model MA36S Specifications

Electrical

Input Voltage	10 to 30 Vcc max SSI or CAN 5 Vcc SSI Only
Input Current.....	50 mA max with no external load
Power Consumption.....	0.5 W max
Resolution.....	12 bit (CAN) 8 to 14 bit (SSI)
Accuracy	Less than .15° (CANopen) Less than .35° (SSI)

CANopen Interface

Protocol.....	CANopen:
	- Communication profile CiA 301 - Device profile for encoder CiA 406 V3.2 class C2
Node Number	0 to 127 (default 127)
Baud Rate.....	10 Kbaud to 1 Mbaud with automatic bit rate detection

The standard settings as well as any customization in the software can be changed via LSS (CiA 305) and the SDO protocol, e.g. PDOs, scaling, heartbeat, node-ID, baud rate, etc

Programmable CAN Transmission Modes

Synchronous.....	When a synchronisation telegram (SYNC) is received from another bus node, PDOs are transmitted independently
Asynchronous.....	A PDO message is triggered by an internal event (e.g. change of measured value, internal timer, etc.)

SSI Interface

Clock Input.....	via opto coupler
Clock Frequency...	100KHz to 500KHz
Data Output	RS485 / RS422 compatible
Output Code	Gray or binary
SSI Output	Angular position value
Parity Bit.....	Optional (even/odd)
Error Bit.....	Optional
Turn On Time.....	<1.5 sec
Pos. Counting Dir..	Connect DIR to GND for CW Connect DIR to VDC for CCW (when viewed from shaft end)
Set to Zero	Apply Vcc for 2 sec

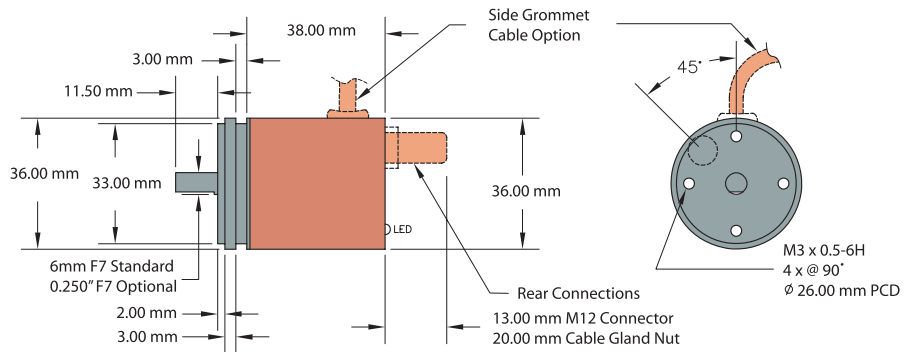
Mechanical

Max Shaft Speed.....	12,000 RPM
Shaft Size	6 mm, 0.250"
Radial Shaft Load.....	32 N = bearing life 1.10 ¹⁰ revs 16 N = bearing life 1.10 ¹¹ revs
Axial Shaft Load	20 N = bearing life 1.10 ¹⁰ revs 10 N = bearing life 1.10 ¹¹ revs
Starting Torque.....	<0.0032 N-m typical
Housing.....	Ferrous chrome-plated magnetic screening
Mounting	Flange or servo type
Weight.....	630 gms typical

Environmental

Operating Temp.....	-40° to +80° C
Storage Temp	-40° to +100° C
Humidity.....	95% RH non-condensing
Vibration.....	5 g @ 10 to 2000 Hz
Shock	100 g @ 6 ms duration
Sealing.....	IP64, shaft sealed to IP65

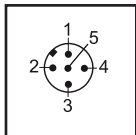
Model MA36S Solid Shaft



Wiring Table

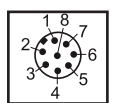
CANopen Encoders

Function	Pin
U _B	2
Ground (GND)	3
CAN _{High}	4
CAN _{Low}	5
CAN _{GND} / shield	1

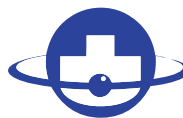


SSI Encoders

Function	8-pin M12	Cable
Ground (GND)	1	White
+Vcc	2	Brown
SSI CLK+	3	Green
SSI CLK-	4	Yellow
SSI DATA+	5	Gray
SSI DATA-	6	Pink
PRESET	7	Blue
DIR	8	Red
Shield	housing	Side Exit - Housing End Exit - N/C



Model MA36H MultiTurn Absolute



**BRITISH
ENCODER**
PRODUCTS COMPANY



Features

- Standard Size 36 mm Package
- Durable Magnetic Technology
- Multiturn Absolute Encoder (14 Bit/40 Bit)
- SSI and CANopen Communications
- Proven New Turns Counting Technology - No Gears or Batteries
- Flex Mount Eliminates Couplings and is Ideal for Motors or Shafts

The Model MA36H Multiturn Absolute Encoder is ideal for a wide variety of industrial applications that require an encoder with the capability of absolute positioning output. Its fully digital output and innovative use of battery-free multiturn technology make the Model MA36H an excellent choice for all applications, especially ones with a high presence of noise. Its durable magnetic technology and high sealing make it a perfect choice for dirty industrial environments. Available with a 1/4" or 6 mm hollow bore and a selection of flexible mounting options, the Model MA36H is easily designed into a variety of applications.

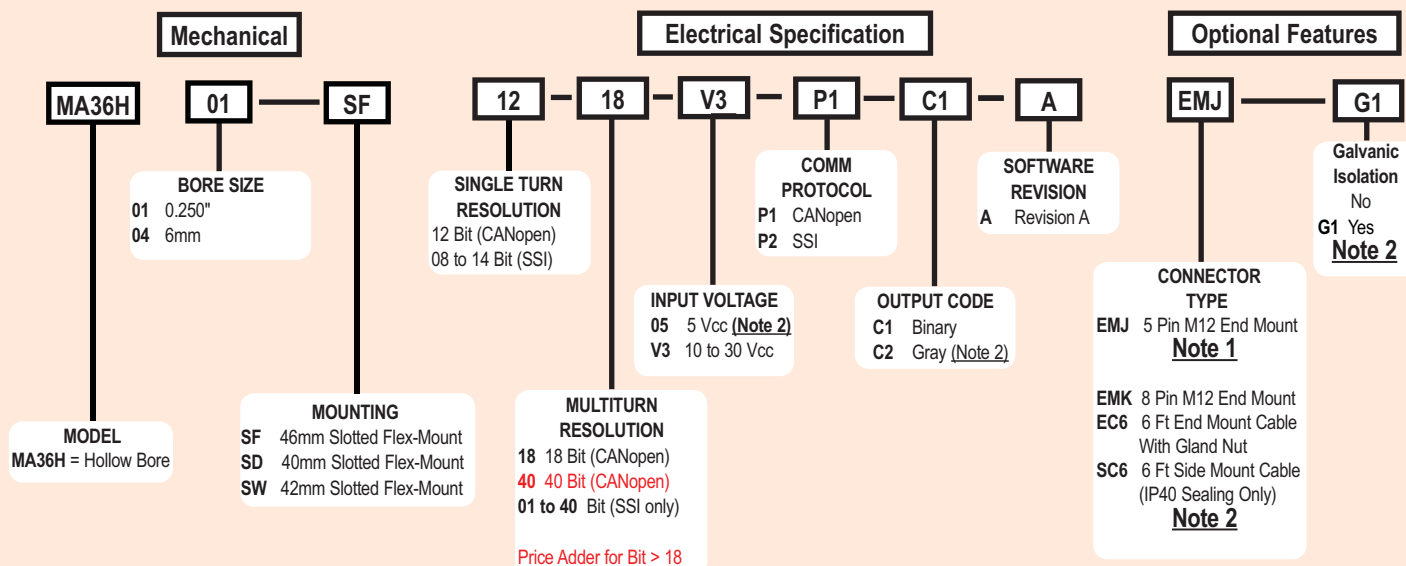
Common Applications

Robotics, Telescopes, Antennas, Medical Scanners, Windmills, Elevators, Lifts, Motors, Automatic Guided Vehicles, Rotary and X/Y Positioning Tables

Model MA36H Ordering Guide

For Single turn applications see Model SA36H

Red type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.



For specification assistance call
Customer Service at
+44 (0)1978 262100

Notes:

- 1 Only available with CANopen.
- 2 Only available with SSI.

Model MA36H MultiTurn Absolute



Model MA36H Specifications

Electrical

Input Voltage 10 to 30 Vcc max SSI or CAN
5 Vcc SSI Only
Input Current 50 mA max with no external load
Power Consumption 0.5 W max
Resolution (Single) 12 bit (CAN)
8 to 14 bit (SSI)
Resolution (Multi) Up to 40 bit multiturn (CANopen or SSI)
Accuracy Less than .15° (CANopen)
Less than .35° (SSI)

CANopen Interface

Protocol CANopen:
- Communication profile CiA 301
- Device profile for encoder CiA 406
V3.2 class C2
Node Number 0 to 127 (default 127)
Baud Rate 10 Kbaud to 1 Mbaud with automatic bit rate detection

The standard settings as well as any customization in the software can be changed via LSS (CiA 305) and the SDO protocol, e.g. PDOs, scaling, heartbeat, node-ID, baud rate, etc

Programmable CAN Transmission Modes

Synchronous When a synchronisation telegram (SYNC) is received from another bus node, PDOs are transmitted independently
Asynchronous A PDO message is triggered by an internal event (e.g. change of measured value, internal timer, etc.)

SSI Interface

Clock Input via opto coupler
Clock Frequency 100KHz to 500KHz
Data Output RS485 / RS422 compatible
Output Code Gray or binary
SSI Output Angular position value
Parity Bit Optional (even/odd)
Error Bit Optional
Turn On Time <1.5 sec
Pos. Counting Dir.. Connect DIR to GND for CW
Connect DIR to VDC for CCW
(when viewed from shaft end)
Set to Zero Apply Vcc for 2 sec

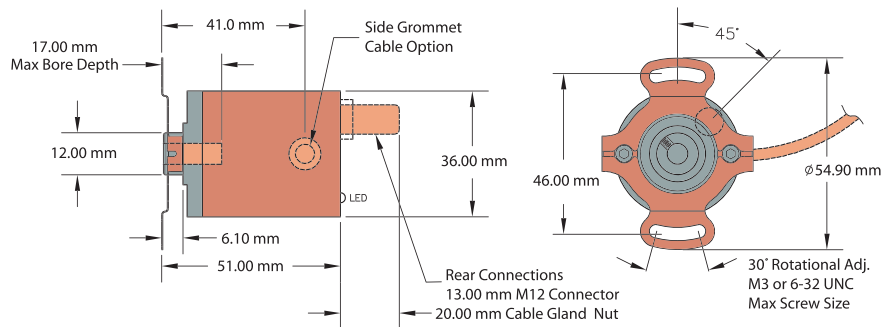
Mechanical

Max Shaft Speed 12,000 RPM
Bore Size 6 mm, .250"
Bore Depth 17 mm
User Shaft
Radial Runout 0.005" max
Starting Torque <0.0032 N-m typical
Housing Ferrous chrome-plated magnetic screening
Mounting Hollow shaft with flex mount
Weight 630 gms typical

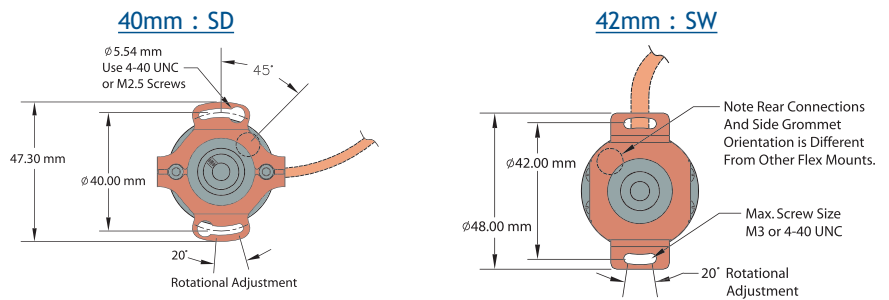
Environmental

Operating Temp -40° to +80° C
Storage Temp -40° to +100° C
Humidity 95% RH non-condensing
Vibration 5 g @ 10 to 2000 Hz
Shock 100 g @ 6 ms duration
Sealing IP64, shaft sealed to IP65

Model MA36H 46mm Slotted Flex Mount (SF)



Model MA36H Optional Flex Mounts



Wiring Table

CANopen Encoders

Function	Pin
U _B	2
Ground (GND)	3
CAN _{High}	4
CAN _{Low}	5
CAN _{GND} / shield	1

SSI Encoders

Function	8-pin M12	Cable
Ground (GND)	1	White
+Vcc	2	Brown
SSI CLK+	3	Green
SSI CLK-	4	Yellow
SSI DATA+	5	Gray
SSI DATA-	6	Pink
PRESET	7	Blue
DIR	8	Red
Shield	housing	Side Exit - Housing End Exit - N/C

Model SA36S Single Turn Absolute



Features

- Standard Size 36 mm Package
- Durable Magnetic Technology
- Up to 14 Bits of Single Turn Resoluion
- SSI and CANopen Communications

The Model SA36S Single Turn Absolute is ideal for a wide variety of industrial applications that require an encoder with the capability of absolute positioning output. Its fully digital output, rugged magnetic technology and high sealing make the Model SA36S an excellent choice for all applications, especially ones with a high presence of noise. Available with a 6 mm or 1/4" shaft and a servo mount, the Model SA36S is easily designed into a variety of applications.

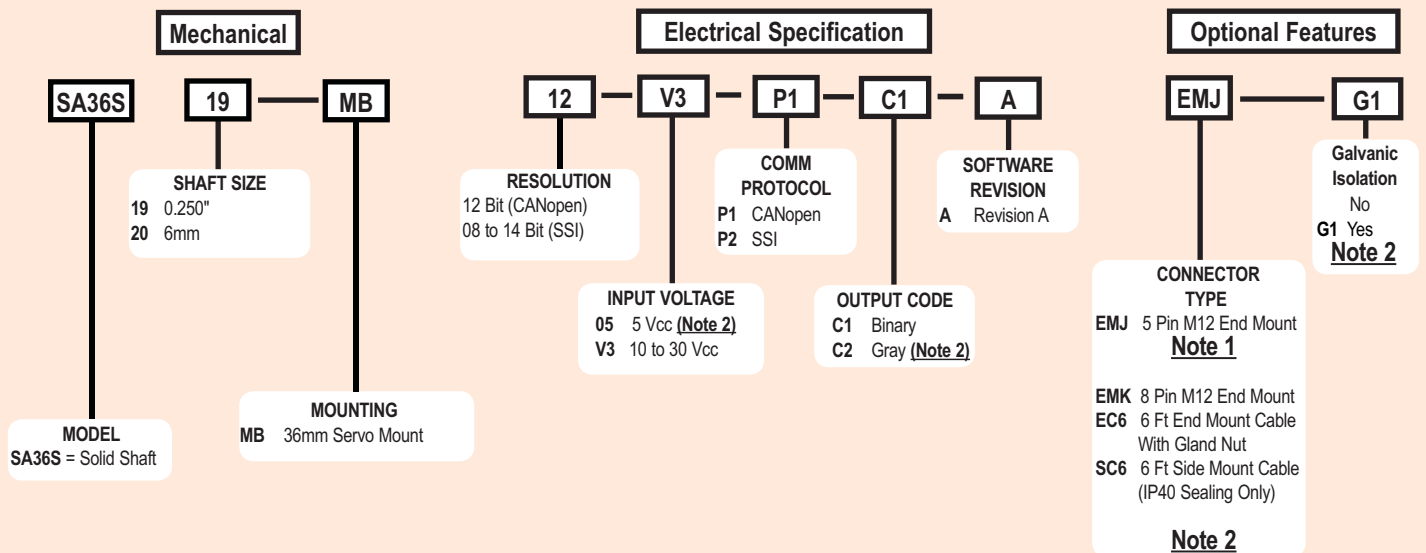
Common Applications

Robotics, Telescopes, Antennas, Medical Scanners, Windmills, Elevators, Lifts, Motors, Automatic Guided Vehicles, Rotary and X/Y Positioning Tables

Model SA36S Ordering Guide

For Multiturn applications see Model MA36S

Red type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.



For specification assistance call
Customer Service at
+44 (0)1978 262100

Notes:

- 1 Only available with CANopen.
- 2 Only available with SSI.

Model SA36S

Single Turn Absolute



Model SA36S Specifications

Electrical

Input Voltage 10 to 30 Vcc max SSI or CAN
 5 Vcc SSI Only
 Input Current 50 mA max with no external load
 Power Consumption 0.5 W max
 Resolution 12 bit (CAN)
 8 to 14 bit (SSI)
 Accuracy Less than .15° (CANopen)
 Less than .35° (SSI)

CANopen Interface

Protocol CANopen:
 - Communication profile CiA 301
 - Device profile for encoder CiA 406
 V3.2 class C2
 Node Number 0 to 127 (default 127)
 Baud Rate 10 Kbaud to 1 Mbaud with automatic bit rate detection

The standard settings as well as any customization in the software can be changed via LSS (CiA 305) and the SDO protocol, e.g. PDOs, scaling, heartbeat, node-ID, baud rate, etc

Programmable CAN Transmission Modes

Synchronous When a synchronisation telegram (SYNC) is received from another bus node, PDOs are transmitted independently
 Asynchronous A PDO message is triggered by an internal event (e.g. change of measured value, internal timer, etc.)

SSI Interface

Clock Input via opto coupler
 Clock Frequency 100KHz to 500KHz
 Data Output RS485 / RS422 compatible
 Output Code Gray or binary
 SSI Output Angular position value
 Parity Bit Optional (even/odd)
 Error Bit Optional
 Turn On Time <1.5 sec
 Pos. Counting Dir. Connect DIR to GND for CW
 Connect DIR to VDC for CCW
 (when viewed from shaft end)
 Set to Zero Apply Vcc for 2 sec

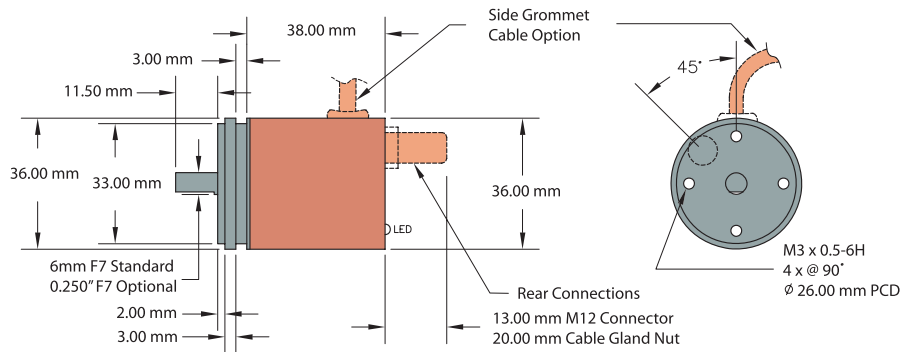
Mechanical

Max Shaft Speed 12,000 RPM
 Shaft Size 6 mm, 0.250"
 Radial Shaft Load 32 N = bearing life 1.10¹⁰ revs
 16 N = bearing life 1.10¹¹ revs
 Axial Shaft Load 20 N = bearing life 1.10¹⁰ revs
 10 N = bearing life 1.10¹¹ revs
 Starting Torque <0.0032 N-m typical
 Housing Ferrous chrome-plated magnetic screening
 Mounting Flange or servo type
 Weight 630 gms typical

Environmental

Operating Temp -40° to +80° C
 Storage Temp -40° to +100° C
 Humidity 95% RH non-condensing
 Vibration 5 g @ 10 to 2000 Hz
 Shock 100 g @ 6 ms duration
 Sealing IP64, shaft sealed to IP65

Model SA36S Solid Shaft



Wiring Table

CANopen Encoders

Function	Pin
U _B	2
Ground (GND)	3
CAN _{High}	4
CAN _{Low}	5
CAN _{GND} / shield	1

SSI Encoders

	8-pin M12	Cable
Function		
Ground (GND)	1	White
+Vcc	2	Brown
SSI CLK+	3	Green
SSI CLK-	4	Yellow
SSI DATA+	5	Gray
SSI DATA-	6	Pink
PRESET	7	Blue
DIR	8	Red
Shield	housing	Side Exit - Housing End Exit - N/C

Model SA36H Single Turn Absolute



Features

- Standard Size 36 mm Package
- Durable Magnetic Technology
- Up to 14 Bits of Single Turn Resolution
- SSI and CANopen Communications
- Flex Mount Eliminates Couplings and is Ideal for Motors or Shafts

The Model SA36H Single Turn Absolute Encoder is ideal for a wide variety of industrial applications that require an encoder with the capability of absolute positioning output. Its fully digital output, rugged magnetic technology and high sealing make the Model SA36H an excellent choice for all applications, especially ones with a high presence of noise. Available with a 1/4" or 6 mm hollow bore and a wide selection of flexible mounting options, the Model SA36H is easily designed into a variety of applications.

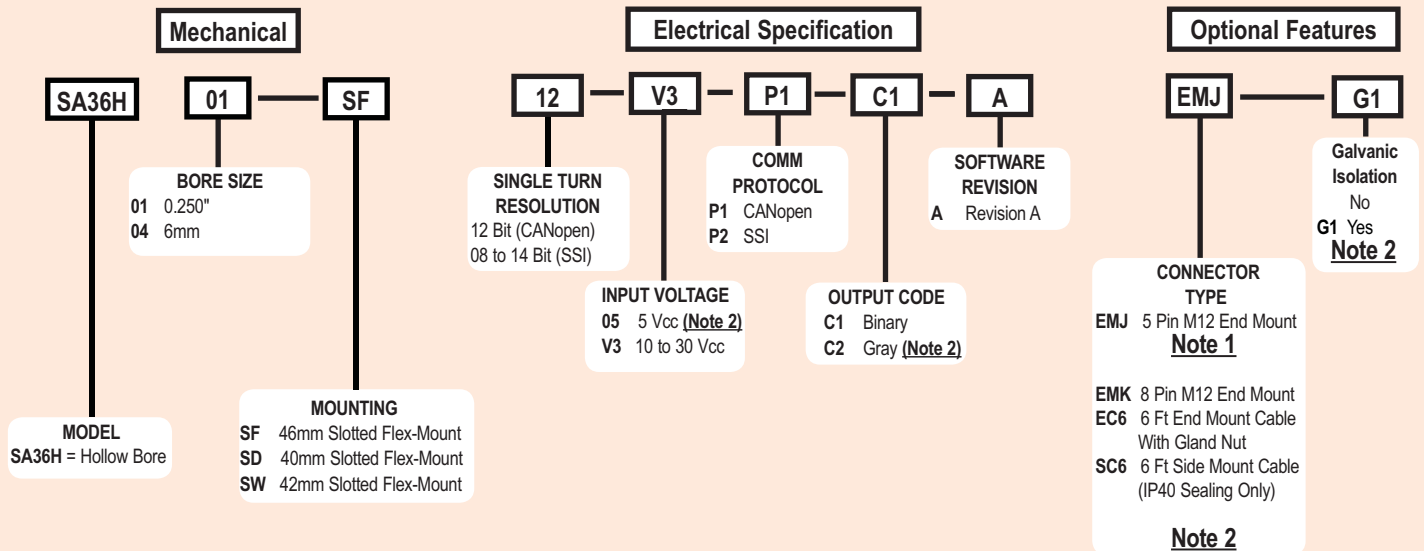
Common Applications

Robotics, Telescopes, Antennas, Medical Scanners, Windmills, Elevators, Lifts, Motors, Automatic Guided Vehicles, Rotary and X/Y Positioning Tables

Model SA36H Ordering Guide

For Multiturn applications see Model MA36H

Red type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.



For specification assistance call Customer Service at +44 (0)1978 262100

Notes:

- 1 Only available with CANopen.
- 2 Only available with SSI.

Model SA36H Single Turn Absolute



Model SA36H Specifications

Electrical

Input Voltage 10 to 30 Vcc max SSI or CAN
5 Vcc SSI Only
Input Current 50 mA max with no external load
Power Consumption 0.5 W max
Resolution (Single) 12 bit (CAN)
8 to 14 bit (SSI)
Resolution (Multi) Up to 40 bit multiturn (CANopen or SSI)
Accuracy Less than .15° (CANopen)
Less than .35° (SSI)

CANopen Interface

Protocol CANopen:
- Communication profile CiA 301
- Device profile for encoder CiA 406
V3.2 class C2
Node Number 0 to 127 (default 127)
Baud Rate 10 Kbaud to 1 Mbaud with automatic bit rate detection

The standard settings as well as any customization in the software can be changed via LSS (CiA 305) and the SDO protocol, e.g. PDOs, scaling, heartbeat, node-ID, baud rate, etc

Programmable CAN Transmission Modes

Synchronous When a synchronisation telegram (SYNC) is received from another bus node, PDOs are transmitted independently
Asynchronous A PDO message is triggered by an internal event (e.g. change of measured value, internal timer, etc.)

SSI Interface

Clock Input via opto coupler
Clock Frequency 100KHz to 500KHz
Data Output RS485 / RS422 compatible
Output Code Gray or binary
SSI Output Angular position value
Parity Bit Optional (even/odd)
Error Bit Optional
Turn On Time <1.5 sec
Pos. Counting Dir.. Connect DIR to GND for CW
Connect DIR to VDC for CCW
(when viewed from shaft end)
Set to Zero Apply Vcc for 2 sec

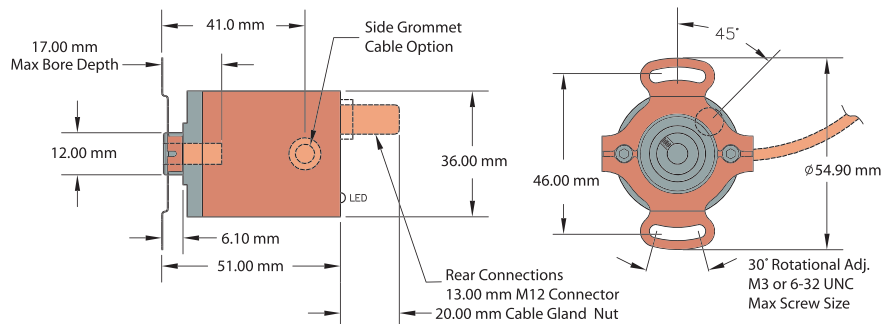
Mechanical

Max Shaft Speed 12,000 RPM
Bore Size 6 mm, .250"
Bore Depth 17 mm
User Shaft
Radial Runout 0.005" max
Starting Torque <0.0032 N-m typical
Housing Ferrous chrome-plated magnetic screening
Mounting Hollow shaft with flex mount
Weight 630 gms typical

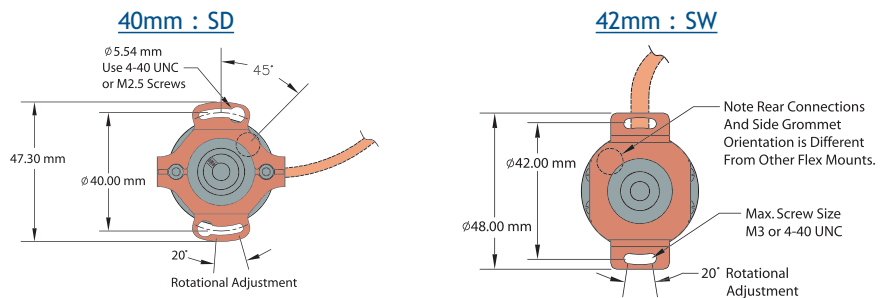
Environmental

Operating Temp -40° to +80° C
Storage Temp -40° to +100° C
Humidity 95% RH non-condensing
Vibration 5 g @ 10 to 2000 Hz
Shock 100 g @ 6 ms duration
Sealing IP64, shaft sealed to IP65

Model SA36H 46mm Slotted Flex Mount (SF)



Model SA36H Optional Flex Mounts



Wiring Table

CANopen Encoders

Function	Pin
U _B	2
Ground (GND)	3
CAN _{High}	4
CAN _{Low}	5
CAN _{GND} / shield	1

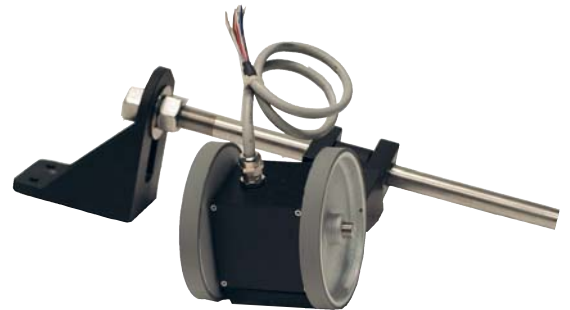
SSI Encoders

	8-pin M12	Cable
Function		
Ground (GND)	1	White
+Vcc	2	Brown
SSI CLK+	3	Green
SSI CLK-	4	Yellow
SSI DATA+	5	Gray
SSI DATA-	6	Pink
PRESET	7	Blue
DIR	8	Red
Shield	housing	Side Exit - Housing End Exit - N/C

Custom Flange Mountings and Shafts

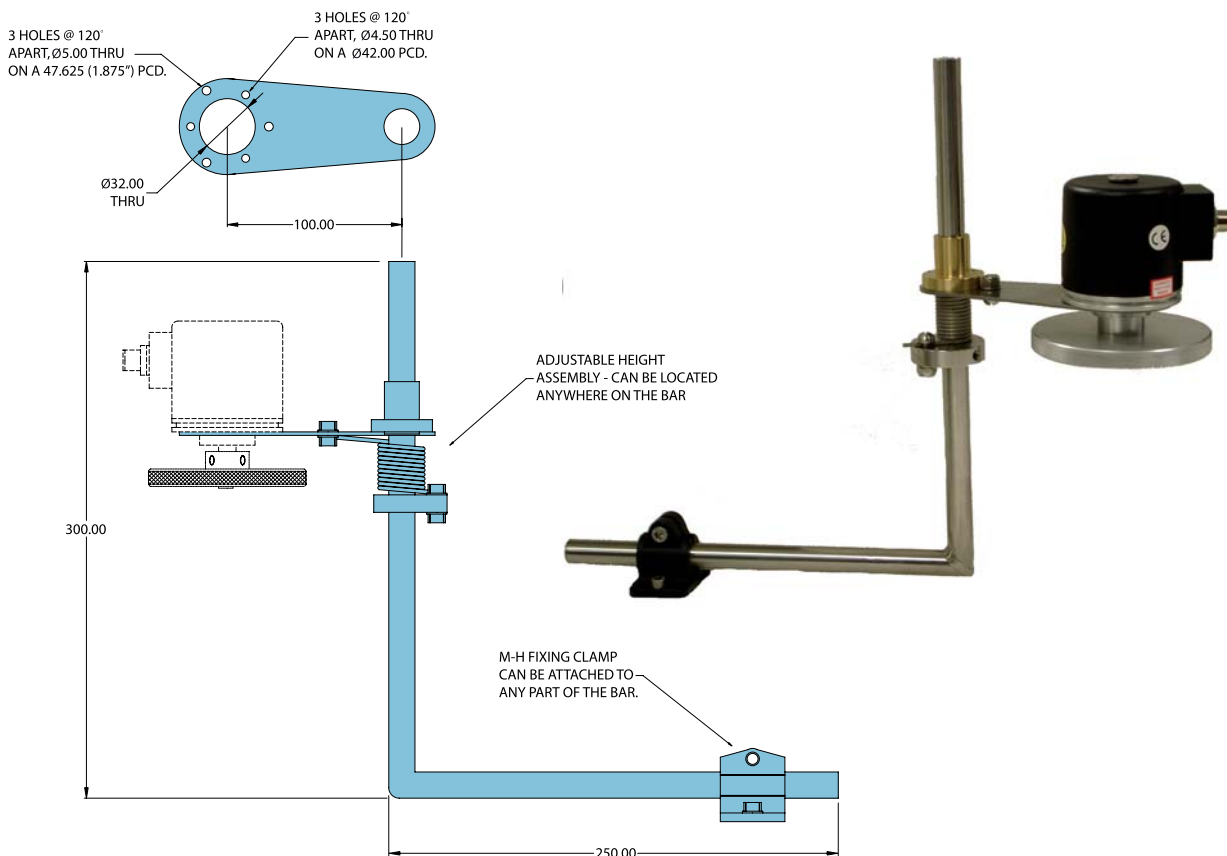
Here at British Encoder Products we offer a wide selection of Flange's, Brackets and Fixings for all our Encoder range to match existing OEM Products (See Page 71). However we also recognise that the mounting you require may not be listed. We offer the ability to Design and create Flanges and Shafts to modify our existing encoders to match what you need to replace your existing model or allow you to mount it as per your own requirements.

So if your looking for a unique/special Flange or Shaft to fit an existing application and cant see anything in the pages of this catalogue that match , then call our Sales Team to discuss the possibility of having one custom made for your application.

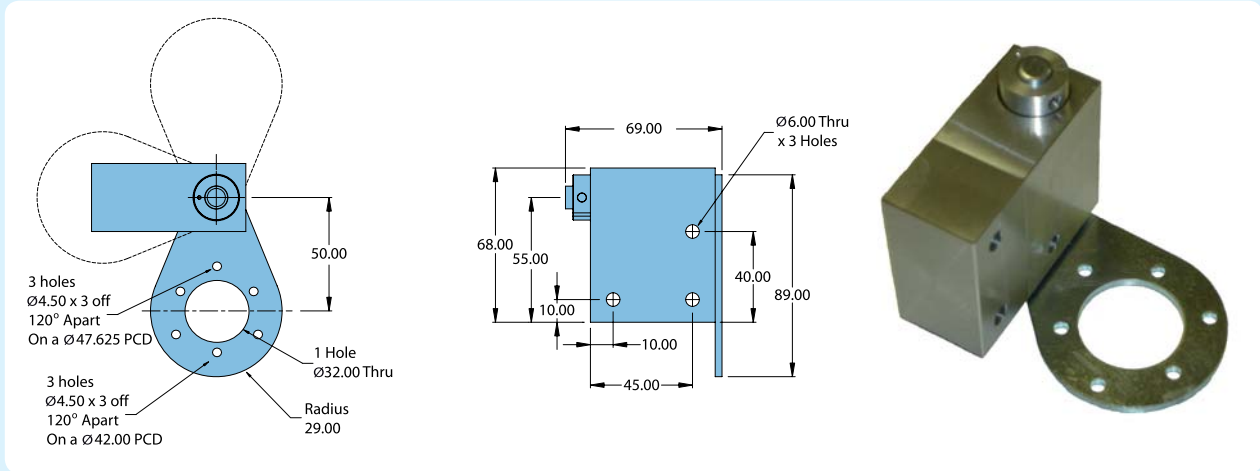


Cube Pivot Brackets 140039 and 140040 are now Obsolete - Please see Pages 18 and 19 for the New version of the Single and Double Pivot's

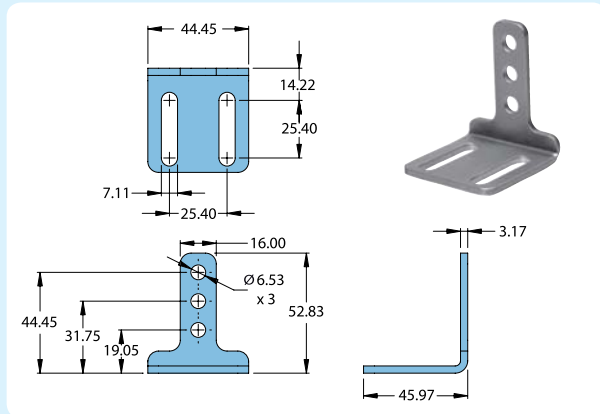
M-H Spring Loaded Bracket Arm Assembly



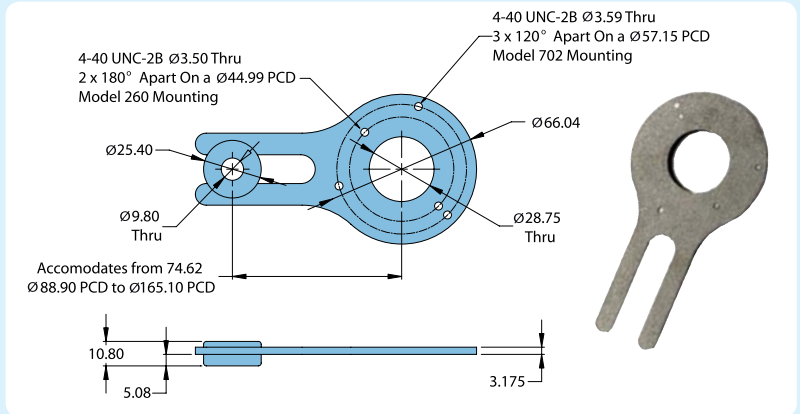
M-F Spring Loaded Pivot Block



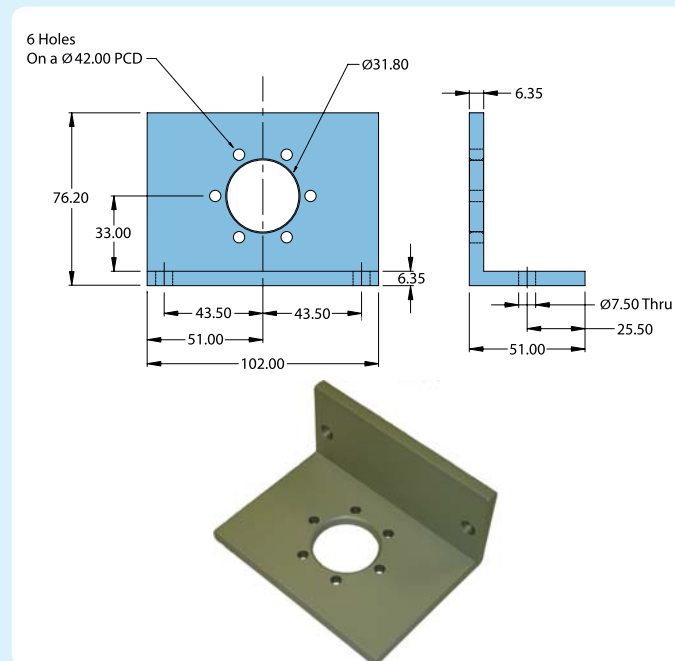
140104 - TR1 Mounting Bracket



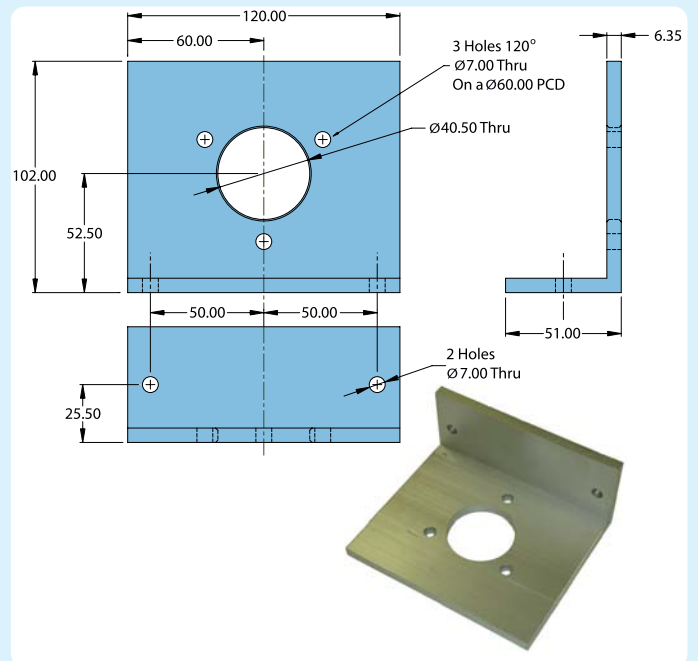
175997-1 - 260/702 Uni-Bracket



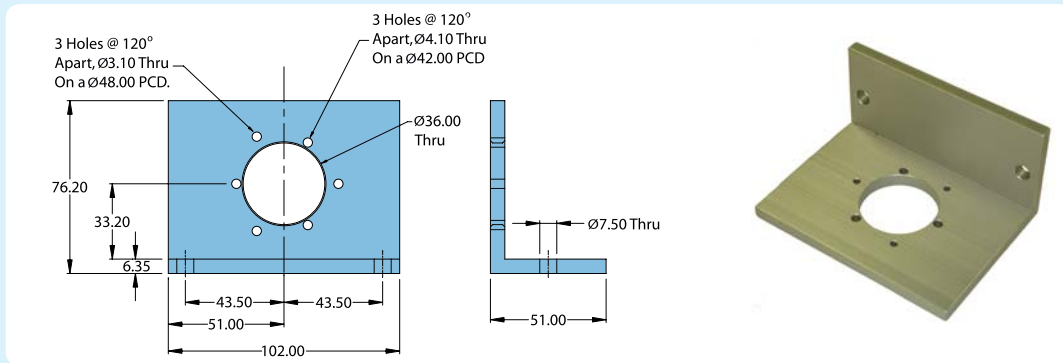
M-3 725/925 "L" Bracket



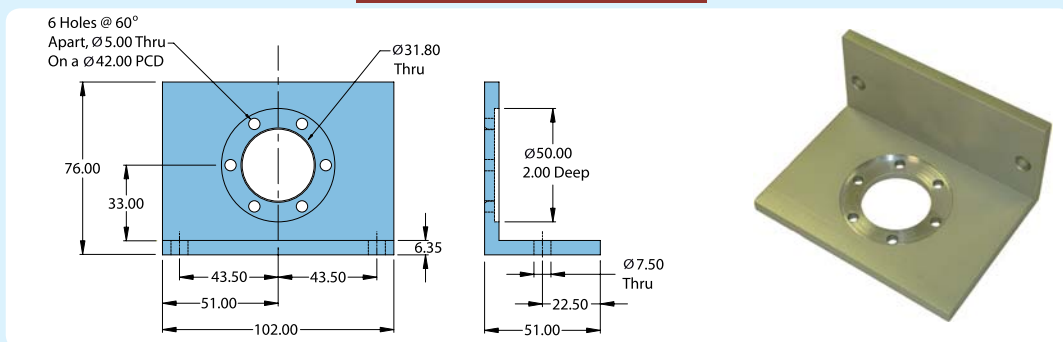
M-4 740 STD "L" Bracket



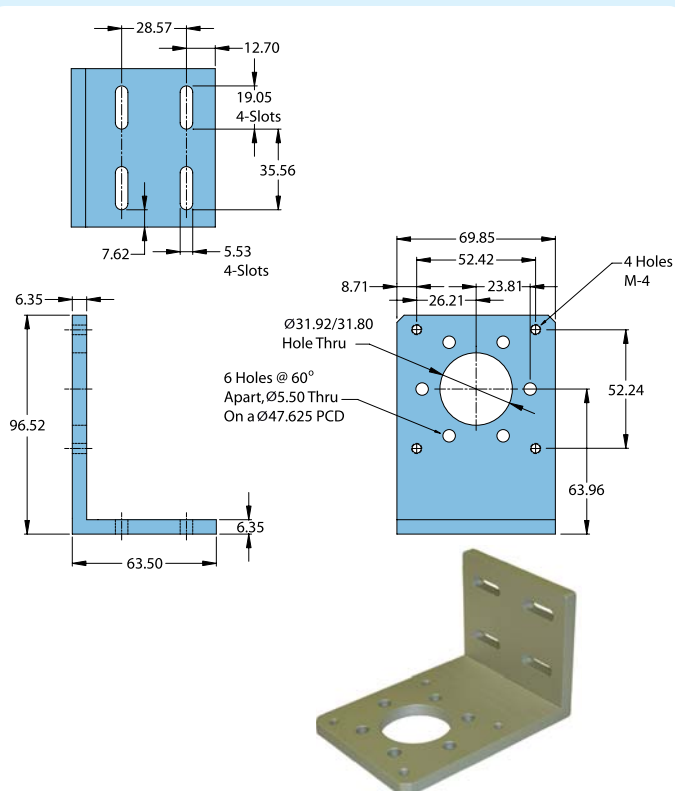
M-B 758/958-20 "L" Bracket



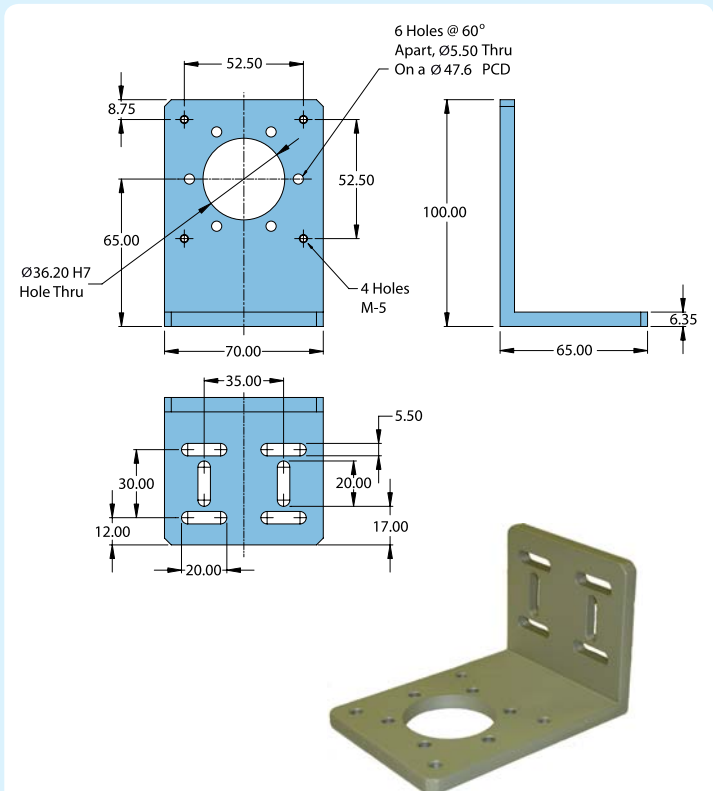
M-C 758/958-26 "L" Bracket

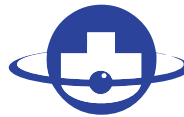


M-G 725 "L" Bracket



M-J 725/758-20 "L" Bracket





Fixed Brackets

Description	To Fit Encoder :-	Order Code
725/925 "L" Bracket	730, 725, 925	M-3
740 STD "L" Bracket	745 STD	M-4
758/958-20 "L" Bracket	758-20, 958-20	M-B
758/958-26 "L" Bracket	758-26, 958-26	M-C
725 "L" Bracket	730, 725, 925	M-G
725/758-20 "L" Bracket	730, 725, 925, 758-20	M-J
TR1 Mounting Bracket	TR1, Tru Trac	140104
Uni-Bracket	260, 702	175997-1

Hinged Brackets

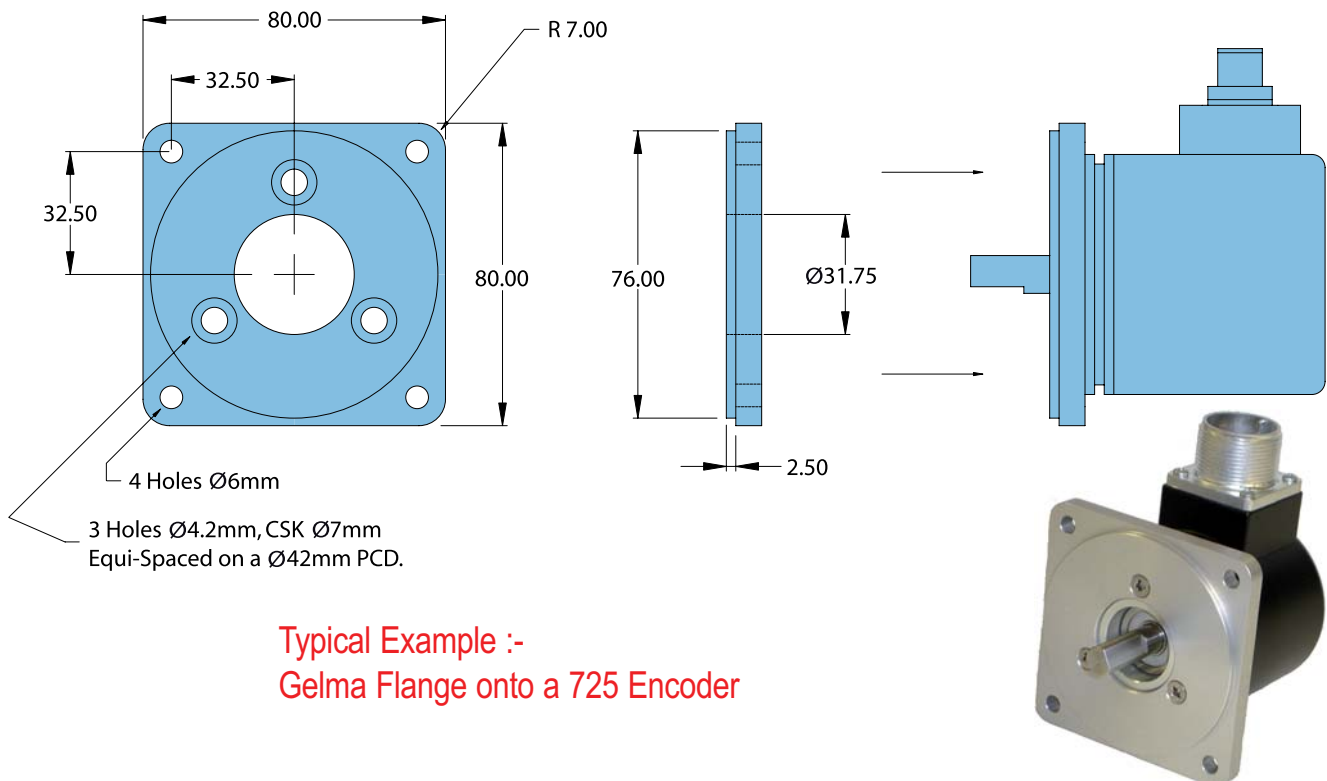
Description	To Fit Encoder :-	Order Code
Single Pivot Bracket	711, 716	140039
Double Pivot Bracket	711, 716	140040

Spring Loaded Brackets

Description	To Fit Encoder :-	Order Code
Pivot Block	758-26, 958-26	M-F
Bracket Arm Assembly	730, 725, 925	M-H

Encoder Flanges

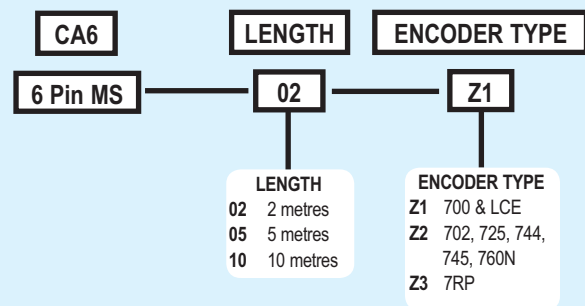
We offer a wide range of add-on flanges which convert the hole fixing patterns and dimensions of our standard encoders to that of various OEM and obsolete devices. Please call our applications engineers for further details.



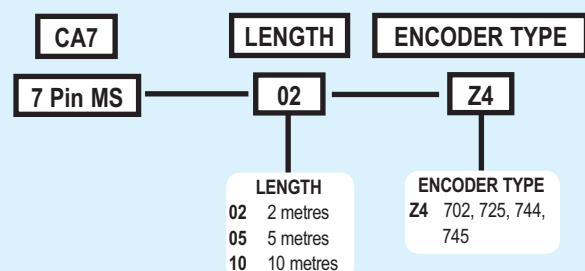
Accessories - Connectors/Cables



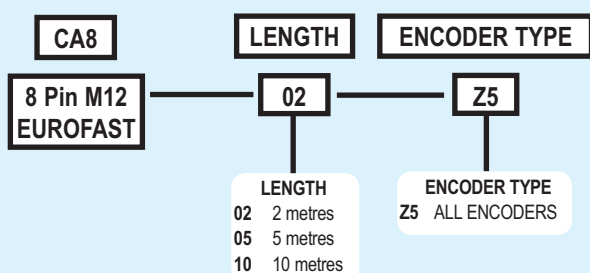
**BRITISH
ENCODER**
PRODUCTS COMPANY



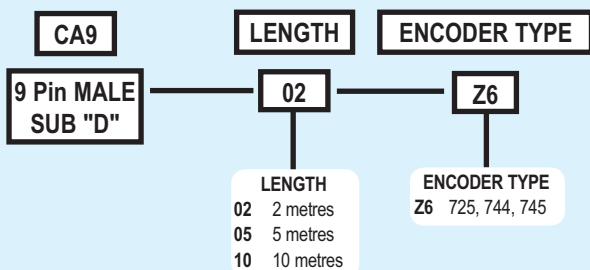
For Pin Detail & Wiring Colours please refer To the Correct Encoder Type Data Sheet



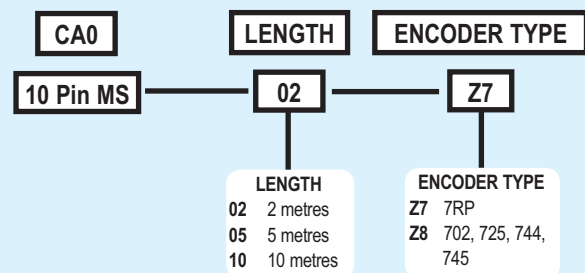
For Pin Detail & Wiring Colours please refer To the Correct Encoder Type Data Sheet



For Pin Detail & Wiring Colours please refer To the Correct Encoder Type Data Sheet

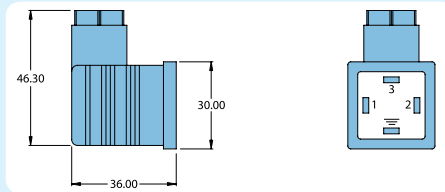


For Pin Detail & Wiring Colours please refer To the Correct Encoder Type Data Sheet

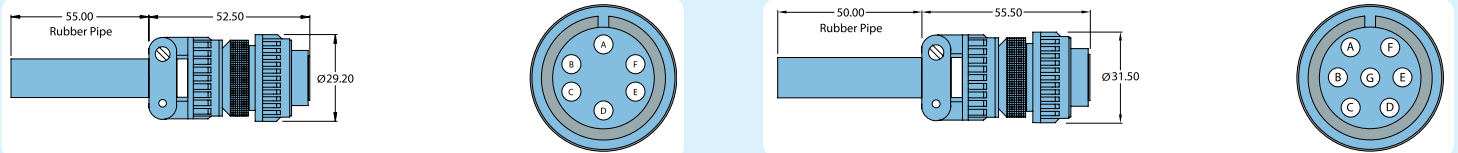


For Pin Detail & Wiring Colours please refer To the Correct Encoder Type Data Sheet

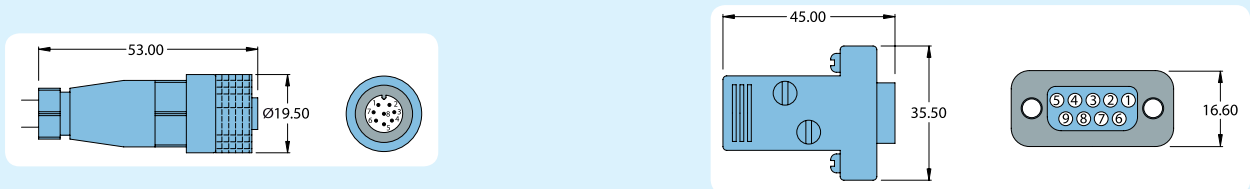
4 pin (C04) Hirschmann Connector & Front Face Pin-Out Information



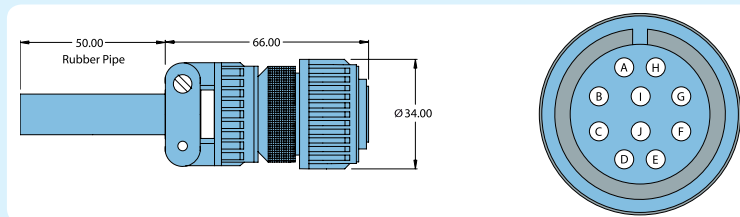
6 Pin & 7 Pin (C06 & C07) MS Connector & Front Face Pin-Out Information



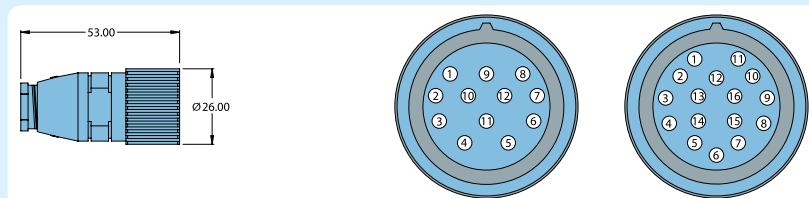
8 Pin (C08) M12 Eurofast Connector & 9 Pin "D" (C09) Connector (Female) & Front Face Pin-Out Information



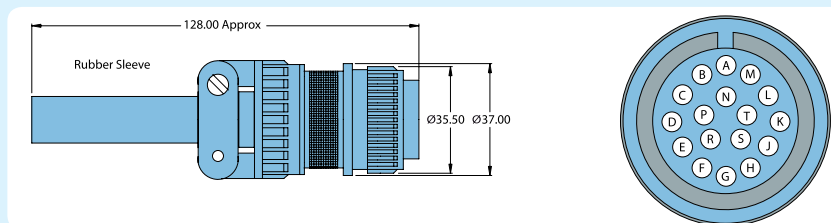
10 Pin (C10) MS Connector & Front Face Pin-Out Information



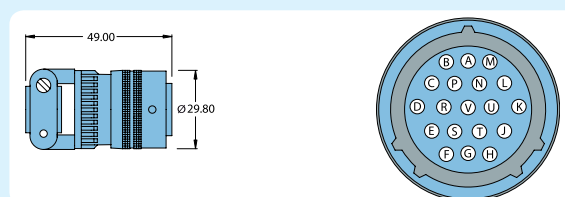
12 Pin (C12) and 16 pin (C16) MS Connector & Front Face Pin-Out Information



17 pin (C17) MS Connector & Front Face Pin-Out Information



19 pin (C19) MS Connector & Front Face Pin-Out Information



Accessories - Measuring Wheels



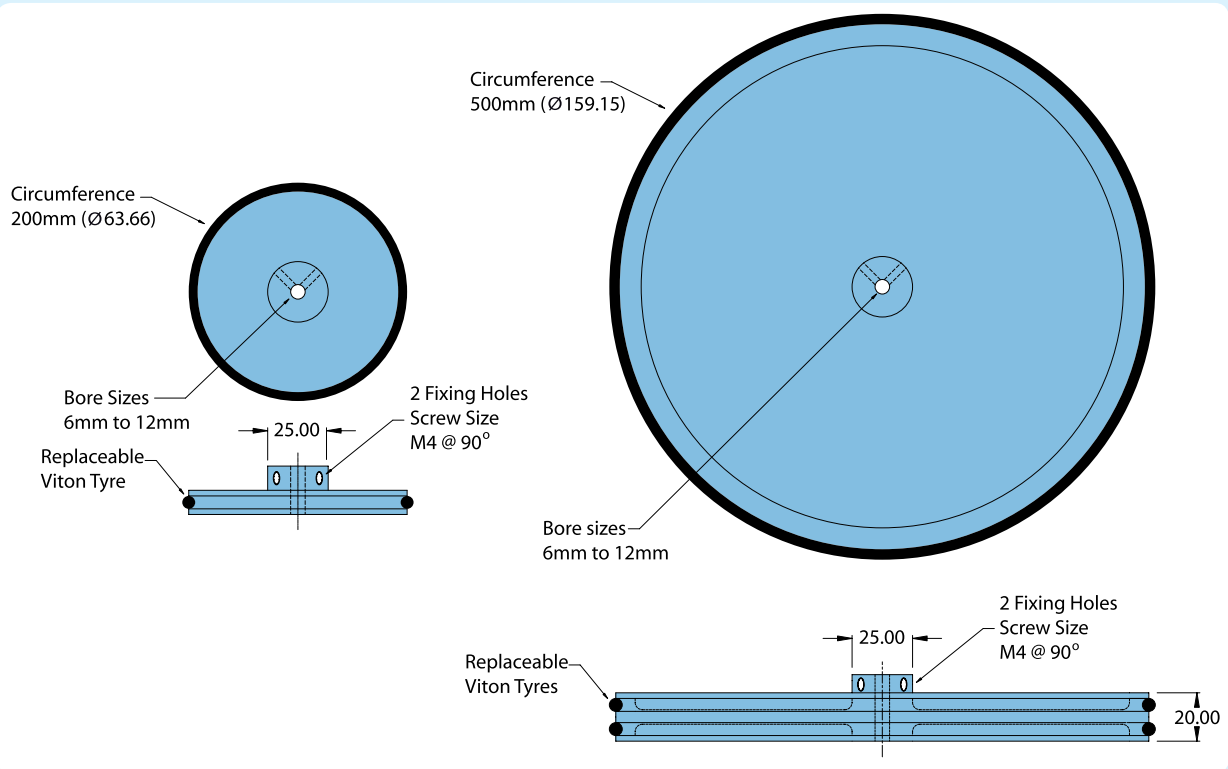
6mm Bore

10mm Bore

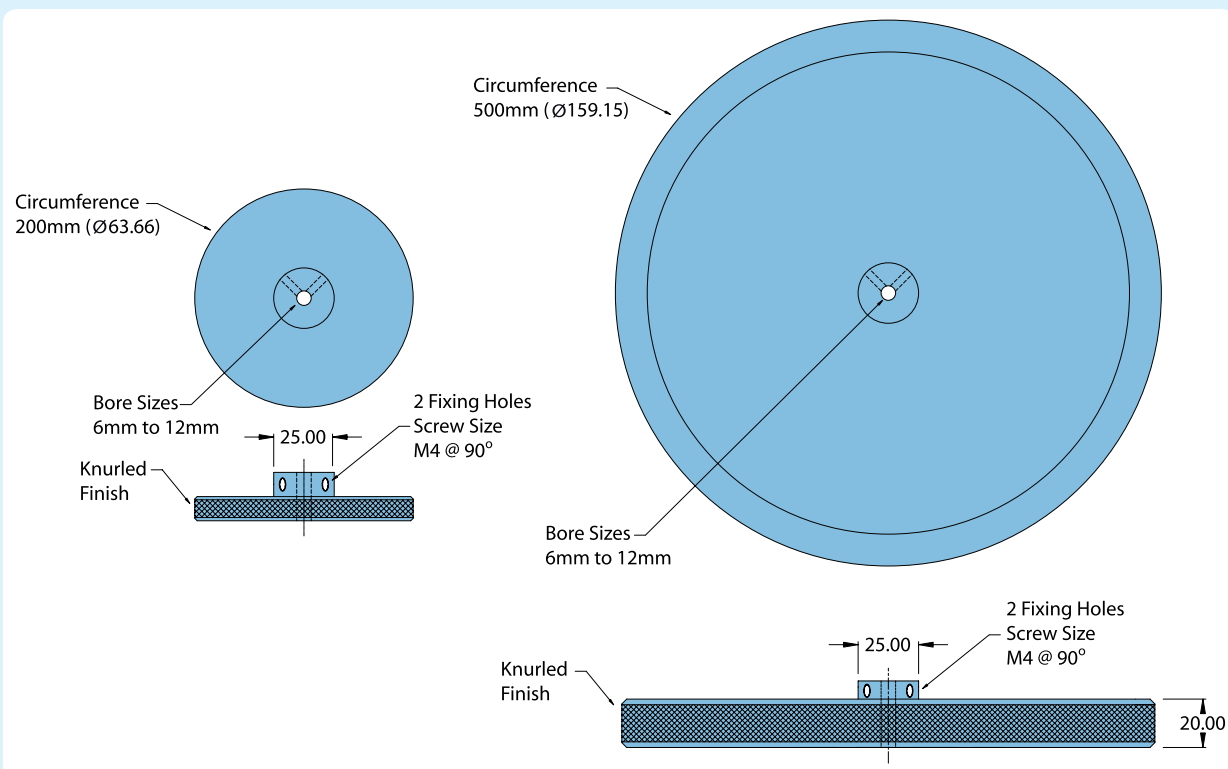
Wheel Type	Circumference	Order Code	Wheel Type	Circumference	Order Code
Rubber Tyre	200mm Circumference	MWB2RU-06	Rubber Tyre	200mm Circumference	MWB2RU-10
Rubber Tyre	300mm Circumference	MWB3RU-06	Rubber Tyre	300mm Circumference	MWB3RU-10
Rubber Tyre	400mm Circumference	MWB4RU-06	Rubber Tyre	400mm Circumference	MWB4RU-10
Rubber Tyre	500mm Circumference	MWB5RU-06	Rubber Tyre	500mm Circumference	MWB5RU-10
Rubber Tyre	6" Circumference	MWB06RU-06	Rubber Tyre	6" Circumference	MWB06RU-10
Rubber Tyre	12" Circumference	MWB12RU-06	Rubber Tyre	12" Circumference	MWB12RU-10
Rubber Tyre	333.3mm Circumference	MWB33RU-06	Rubber Tyre	333.3mm Circumference	MWB33RU-10
Knurled Aluminium	200mm Circumference	MWB2KN-06	Knurled Aluminium	200mm Circumference	MWB2KN-10
Knurled Aluminium	300mm Circumference	MWB3KN-06	Knurled Aluminium	300mm Circumference	MWB3KN-10
Knurled Aluminium	400mm Circumference	MWB4KN-06	Knurled Aluminium	400mm Circumference	MWB4KN-10
Knurled Aluminium	500mm Circumference	MWB5KN-06	Knurled Aluminium	500mm Circumference	MWB5KN-10
Knurled Aluminium	6" Circumference	MWB06KN-06	Knurled Aluminium	6" Circumference	MWB06KN-10
Knurled Aluminium	12" Circumference	MWB12KN-06	Knurled Aluminium	12" Circumference	MWB12KN-10
Knurled Aluminium	333.3mm Circumference	MWB33KN-06	Knurled Aluminium	333.3mm Circumference	MWB33KN-10

We also stock other sizes & types of wheels, and can customise bore sizes.
Please call the sales office for Price and delivery.

200mm (MWB2RU) and 500mm (MWB5RU) Rubber Viton Tyre Wheels - Diagram Illustrations



200mm (MWB2KN) and 500mm (MWB5KN) Knurled Finish Wheels - Diagram Illustrations

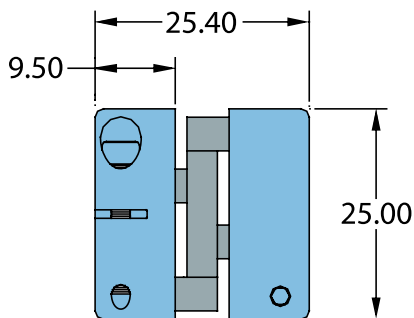
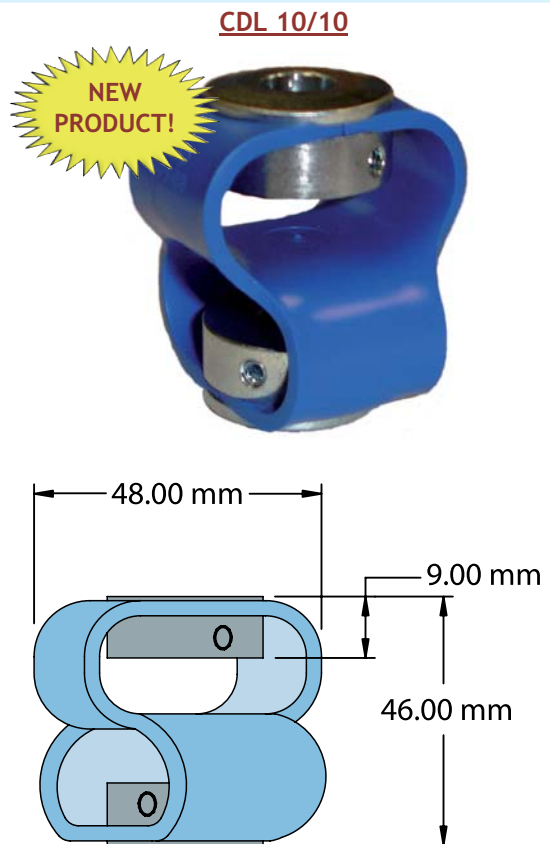


Accessories - Flexible Couplings

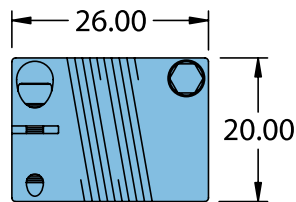


O.D.	Bore Sizes	Order Code
25.00 mm	12mm x 12mm	CPA/12/12
20.00 mm	10mm x 10mm	CPA/10/10
20.00 mm	10mm x 6mm	CPA/10/6
20.00 mm	6mm x 6mm	CPA/6/6
20.00 mm	.375 x .375 In	CPA/S/S
20.00 mm	.375 x .250 In	CPA/S/4
20.00 mm	.375 In x 6mm	CPA/S/6
20.00 mm	.250 x .250 In	CPA/4/4
25.00 mm	6mm x 6mm	CCF/6/6
25.00 mm	10mm x 10mm	CCF/10/10
48.00 mm	10mm x 10mm	CDL/10/10

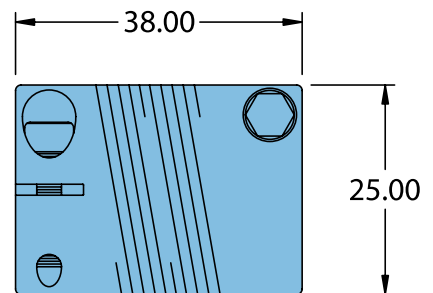
Non-Stock Bore sizes can be manufactured to customer requirements. Call sales office for price and delivery.



eg **CCF/6/6 & CCF/10/10**



eg **CPA/6/6 & CPA/10/10**



eg **CPA/12/12**

Accessories - Encoder Power Supply



BECo Power Supply

Ordering Information (Specify Order Code when ordering)

EPS-5V	100043
EPS-12V	100044
EPS-24V	100045

Features

A clean source of dedicated power for your encoder is an important factor when designing a reliable system. Now available from British Encoder are small, easily mounted Din Rail power supplies specifically chosen to power encoders. Designed for space efficiency, these compact power supplies are available in 5, 12, or 24 Vcc.

Easy to see LED indicators show the power supply is working properly. Screw type terminals easily accommodate wires from SWG 24 to 14. The shock proof housing is both UL and CE approved.

These supplies have been tested to work with all our Encoders. Save yourself time and money, call British Encoder today and order a power supply that you *know* will work with your encoder!

Specifications

Electrical

Nominal Input Voltage	100 to 240 Vac / 47 to 63 Hz
Input Voltage Range.....	90 to 265 Vac / 47 to 63 Hz or 120 to 370 Vcc
Frequency.....	100 kHz min
Inrush Surge Current.....	< 10 A @ 115Vac, < 18A @ 230 Vac
Input Fuse	T2A / 250 Vac

	EPS-5V	EPS-12V	EPS-24V
Nominal Output Voltage	5 Vcc	12 Vcc	24 Vcc
Tolerance.....	± 1 %	± 1 %	± 1 %
Nominal Output Current	3 A	1.5 A	0.75 A
Efficiency	> 75%	> 77 %	> 77 %
Ripple and Noise.....	50 mV	50 mV	50 mV

Mechanical

Dimensions.....	3.54" L x 0.89" W x 4.5" D (90 mm L x 22.5 mm W x 115 mm D)
Connection Type.....	Screw Clamp Connection

Environmental

Operating Temperature.....	-10° C to +50° C
Storage Temperature.....	-25° C to +85° C
Relative Humidity.....	95 % RH

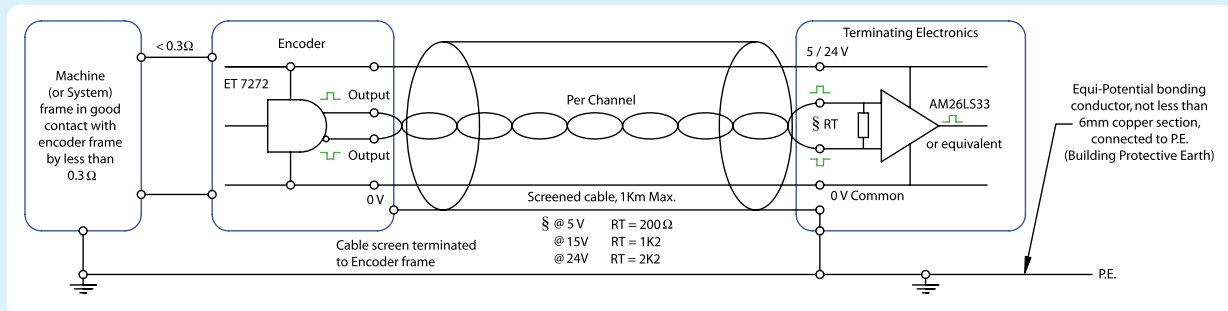
Approvals and Standards

UL / cUL.....	UL508 / UL 1310 Listed, Class 2
TUV	EN 60950
CE	EN 50081-1 / EN 55022 Class B EN 61000-3-2 EN 61000-3-3 EN 50082-1 / EN 55024
FCC.....	Class B

HV Including RS422, RS485, TTL, HTL, NPN, PNP (A, \bar{A} , B, \bar{B} , Z, \bar{Z})

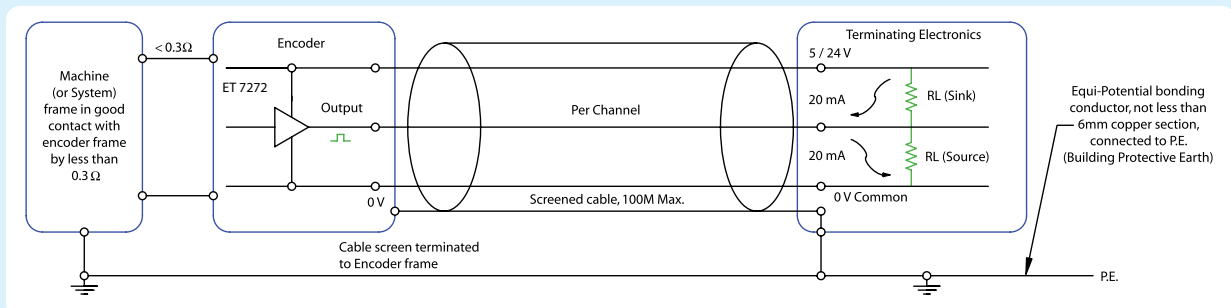
This UNIVERSAL HIGH VOLTAGE OUTPUT DRIVER may be used in either single ended or differential mode. In differential mode, the HV driver will function as an RS422 driver, a TTL driver, or an HTL driver. In single ended mode (i.e. without the complement signals), it will function as a current sink driver (NPN), a current source driver (PNP), or as a Push-Pull driver.

The driver will operate throughout a wide voltage range, from 4.75V through 28V, and has internal over-current protection. Each leg of each channel is also protected by a Schottky Diode. All screens should be terminated to P.E. (building protective earth) at each end. **It may also be necessary to provide an equi-potential bonding conductor between all parts of the machine or system in order to maintain a 0V potential difference to P.E.**



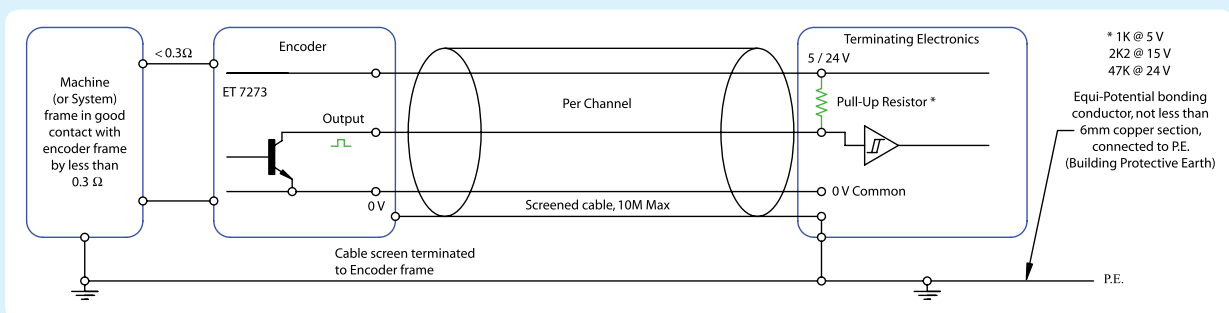
PP Push-Pull (A, B, Z)

The output driver is simply the HV UNIVERSAL HIGH VOLTAGE OUTPUT DRIVER configured without the complement signals. It will equally Sink or Source up to 20 mA per channel. All screens should be terminated to P.E. (building protective earth) at each end. **It may also be necessary to provide an equi-potential bonding conductor between all parts of a machine or system in order to maintain a 0V potential difference to P.E.**



OC open collector (A, B, Z)

This NPN Open Collector driver is capable of sinking up to 50 mA per channel and (in MOST models) is also capable of providing a complement signal which may be employed as an extra or redundant circuit. All screens should be terminated to P.E. (building protective earth) at each end. **It may also be necessary to provide an equi-potential bonding conductor between all parts of a machine or system in order to maintain a 0V potential difference to P.E.**



Electro Magnetic Compatibility, EC Directive 89/336/EC

All of our products have been CERTIFIED by an INDEPENDENT TEST HOUSE to ensure that each type will fully integrate into systems or machines requiring EMC certification.

Since JAN 2001, 1996, Encoders fitted with a flying lead HAVE THE CABLE SCREEN IN CONTACT WITH THE ENCODER FRAME. The purpose of this is to ensure total shielding of the encoder electronics by virtue of its metallic body and cover, all of which will be bonded together and terminated to the screen.

The user should ensure that the component parts of the machine, or system frame, are at the SAME POTENTIAL (FRAME/GROUND/EARTH/SIGNAL GROUND/PE), if necessary, by bonding together by means of a copper "EQUI-POTENTIAL BONDING CONDUCTOR" of at least 6mm section to the P.E. (building protective earth).

For Encoders fitted with a connector, WHEREVER POSSIBLE, we will fit a "case ground" to one of the connector pins; this will be in contact with THE ENCODER FRAME.

RS422 differential drive should be employed wherever possible. Always use sensible cabling practice by separating encoder signal cable routing from other devices, if necessary, by use of grounded separators or trunking. Use twisted pair cables with an overall BRAIDED screen, e.g. BELDEN 9807 or equivalent.

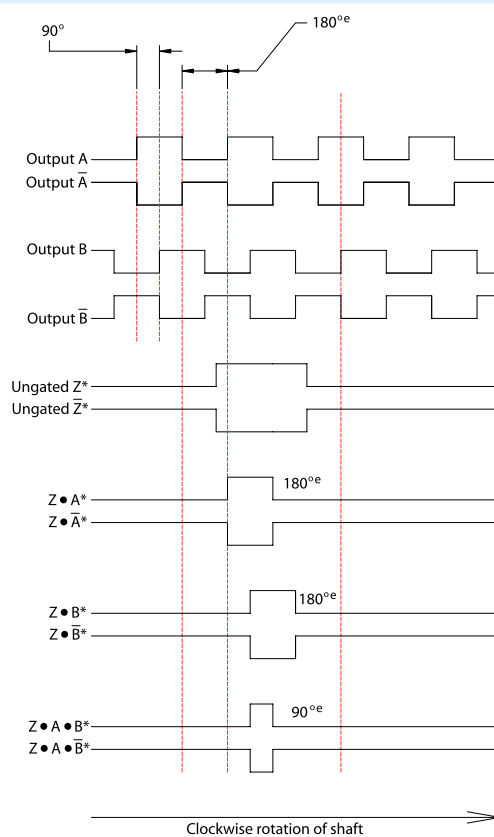
The RXTX module can help to solve most problems when transmitting encoder signals over long lengths of cable.

Waveform Timing

These output waveform timing diagrams illustrate the relationship of output A, B, and index. Quadrature separation (right) is typically 90 electrical degrees with a tolerance of 10%, giving minimum edge separation of 72°^e. Output A leads B for clockwise rotation of the encoder shaft. For NPN output \bar{A} , \bar{B} , and \bar{Z} will not be present. For some types the marker pulse can be gated $Z \cdot A$, $Z \cdot B$, $Z \cdot A \cdot B$.

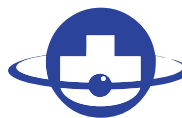
Note:-

These Signal configurations were obtained from a clockwise turning shaft (viewed from the shaft end) with the oscilloscope triggering on the negative edge of Output A with scope channel 1, and Output B or Output Z on scope channel 2



* For resolutions above 2000 PPR and above, the minimum edge separation can only be guaranteed to 50°^e

Phasing and Gating Diagrams



**BRITISH
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PRODUCTS COMPANY



Diagram Examples of Various Phasing and Gatings Options.

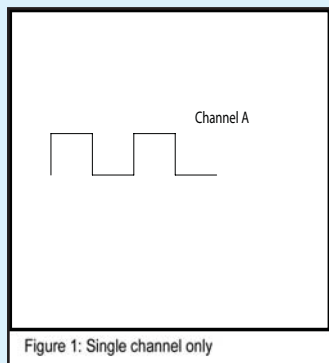


Figure 1: Single channel only

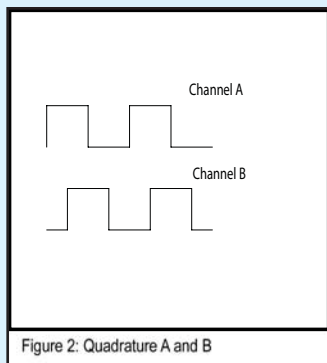


Figure 2: Quadrature A and B

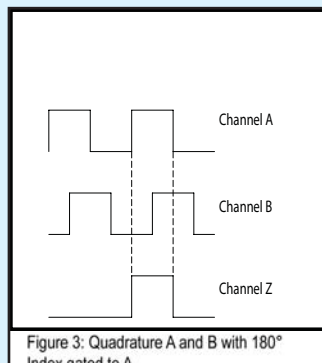


Figure 3: Quadrature A and B with 180° Index gated to A

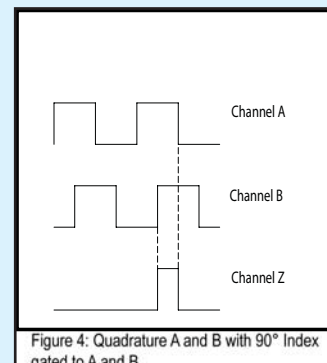


Figure 4: Quadrature A and B with 90° Index gated to A and B

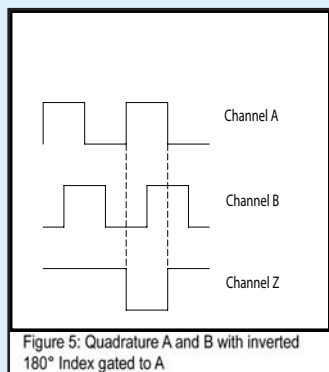


Figure 5: Quadrature A and B with inverted 180° Index gated to A

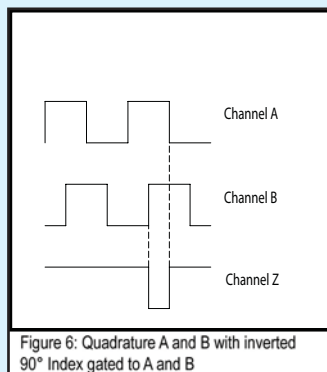


Figure 6: Quadrature A and B with inverted 90° Index gated to A and B

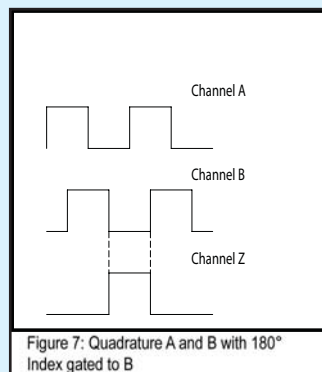


Figure 7: Quadrature A and B with 180° Index gated to B

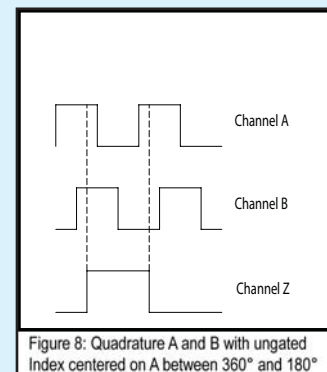


Figure 8: Quadrature A and B with ungated Index centered on A between 360° and 180°

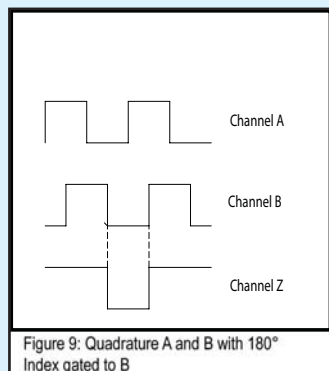


Figure 9: Quadrature A and B with 180° Index gated to B

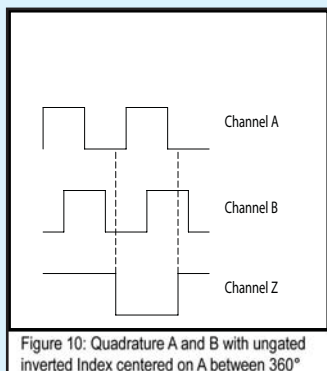


Figure 10: Quadrature A and B with ungated inverted Index centered on A between 360° and 180°

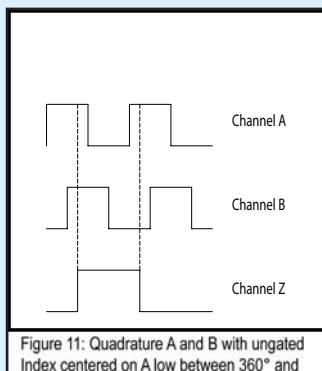


Figure 11: Quadrature A and B with ungated Index centered on A low between 360° and 180°

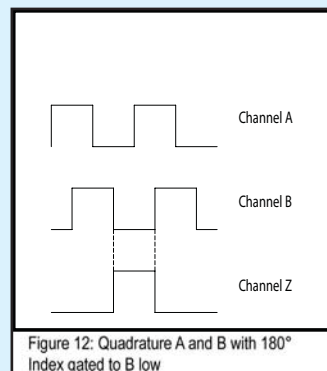


Figure 12: Quadrature A and B with 180° Index gated to B low

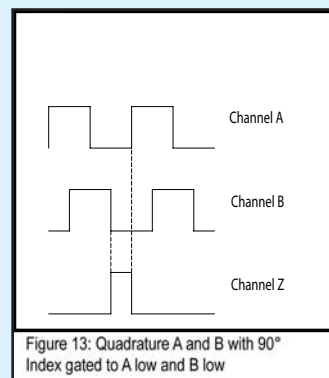


Figure 13: Quadrature A and B with 90° Index gated to A low and B low

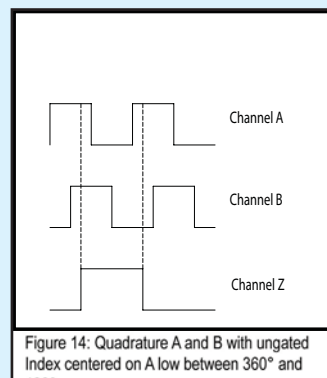


Figure 14: Quadrature A and B with ungated Index centered on A low between 360° and 180°

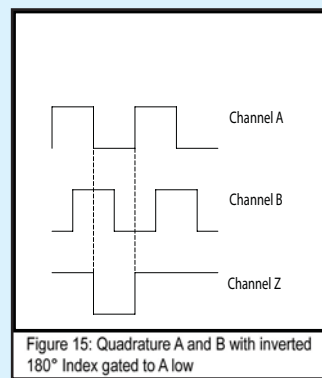


Figure 15: Quadrature A and B with inverted 180° Index gated to A low

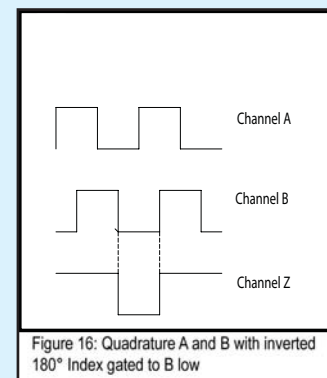
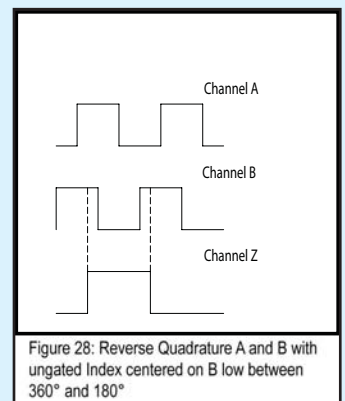
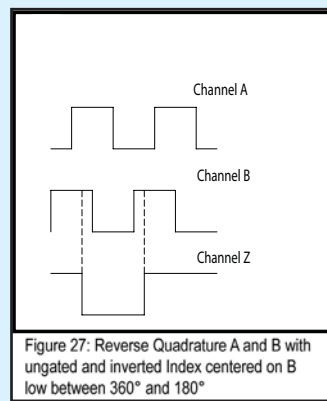
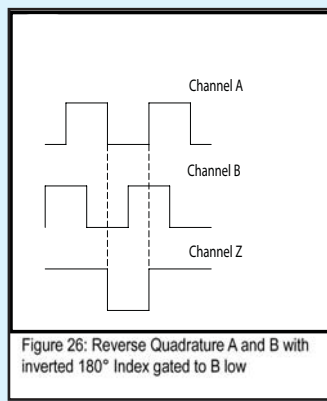
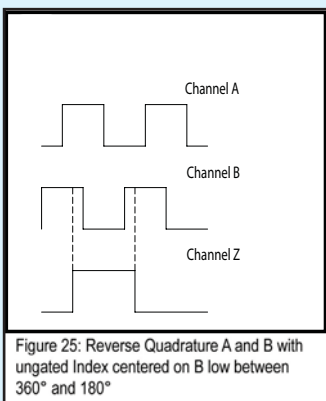
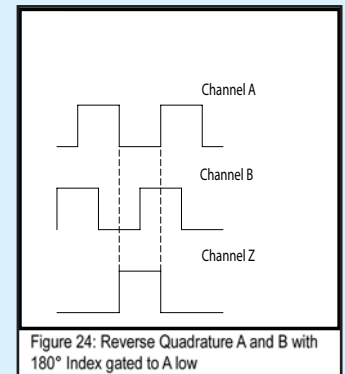
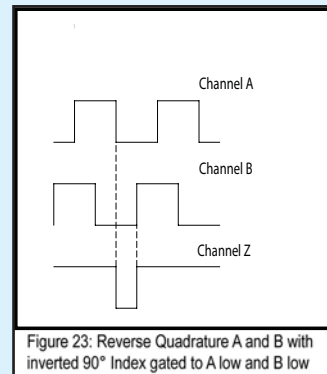
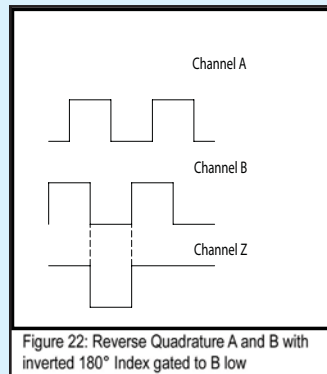
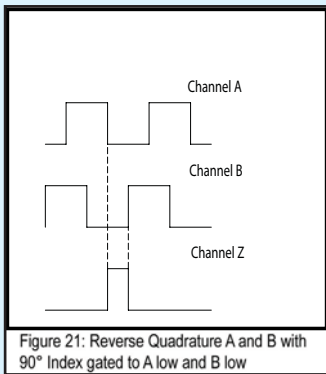
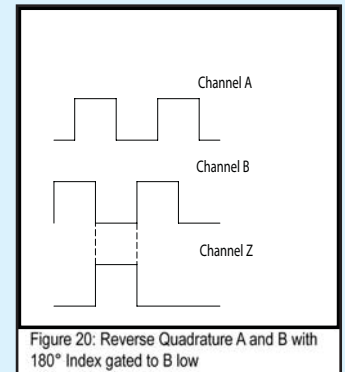
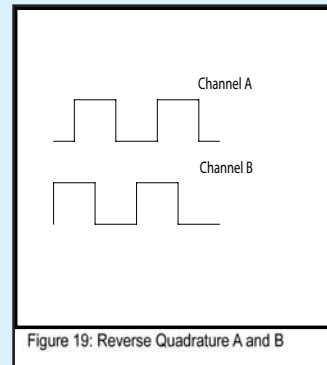
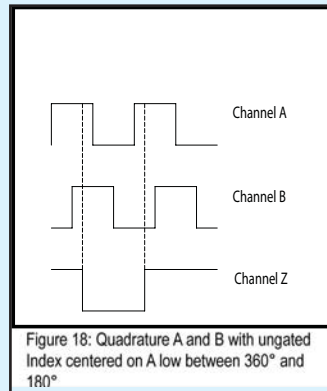
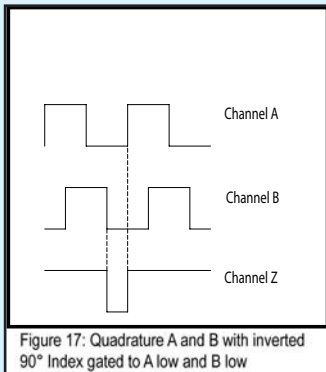


Figure 16: Quadrature A and B with inverted 180° Index gated to B low

Phasing and Gating Diagrams

Diagram Examples of Various Phasing and Gating Options.



**For specification assistance call
Customer Service at
+44 (0)1978 262100**

RXTXD Receiver-Transmitter Unit

Versatile Encoder Interface



Features

- DIN Rail Mount.
- Level Changes from Vcc to 5V.
- Signal Conditioner, or Repeater for Distance Transmission.
- 2 or 3 Way Splitter/Level Changer.
- Encoder Tester/Verifier.

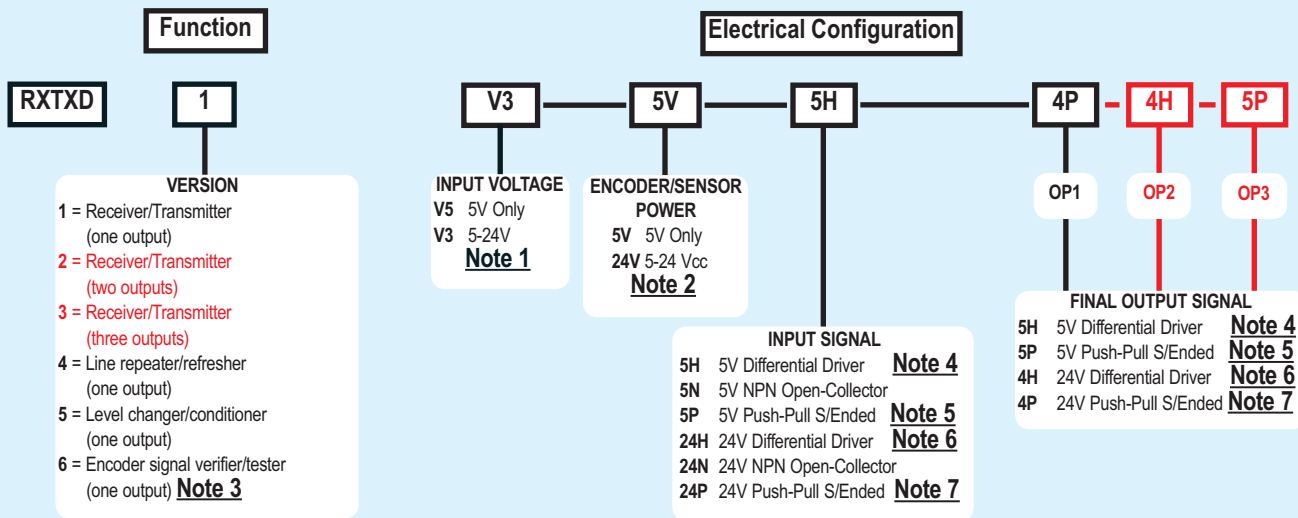
This lightweight DIN rail mountable unit, Line Driver and Line Receiver, comes in a stylish green PC/ABS self-extinguishing material blend. Configurable as a level changer, line repeater, splitter or encoder tester. The RXTXD will accept TTL, RS422, RS485, PP, NPN, NPN OC, or, PNP encoder inputs at 5V, or HTL, PP, NPN, NPN OC & PNP at 6-28V. It will provide up to 3 outputs in any combination of TTL, RS422, RS485, PP, NPN or PNP, at 5V, or, HTL, PP, NPN or PNP, at 6-28V. A series of LEDs on the front panel indicates power and signal presence. Connections are made via the easily accessible screw terminals as standard. This device may be used as both as Line Driver and Line Receiver.

Specifications

Input Voltage6V to 28V Max
 Current Consumption250 mA Typical
 Repeater Output Voltage.....5V or Vcc
 Frequency ResponseUp to 800 KHz
 Weight250g
 Enclosure.....PC/ABS, IP20
 Terminal.....Screw Type 30/12 AWG

RXTX Ordering Guide

Red type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.



For specification assistance call
 Customer Service at
 +44 (0)1978 262100

- NOTES:**
- 1 28V Maximum Voltage.
 - 2 Encoder/Sensor and output signal voltages are limited to the input voltage supplied.
 - 3 To be used in series with encoder.
 - 4 TTL, RS422 & RS485 Compatible.
 - 5 TTL, NPN (Sink), PNP (Source), PP.
 - 6 HTL Compatible
 - 7 NPN (Sink), PNP (Source), PP

RXTXD Receiver-Transmitter Unit Versatile Encoder Interface



RX/TXD Specifications

Electrical

Input Voltage5V to 24V Max
 Current Consumption250 mA Typical
 Repeater Output Voltage.....5V or Vcc
 Frequency ResponseUp to 800 KHz

Mechanical

Weight250g
 EnclosurePC/ABS, IP20
 Terminal.....Screw Type 30/12 AWG

Definitions

VersionNumber of complete sets of output channels
 Input VoltageThe voltage supplied to the RX/TXD. The input voltage sets the maximum voltage the RX/TXD can supply the encoder/sensor and maximum voltage of the output signals.
 Encoder/Sensor Power.....The voltage supplied by the RX/TXD to the encoder/sensor.
 Input Signal.....The signal voltage level from the encoder/sensor to the RX/TXD.
 Final Output Signal.....The Signal voltage level from the RX/TXD to the receiving device.

Example: If the input voltage is V3, Encoder/sensors power is 24V.
 Output 1 is 4H, Output 2 is 5H.

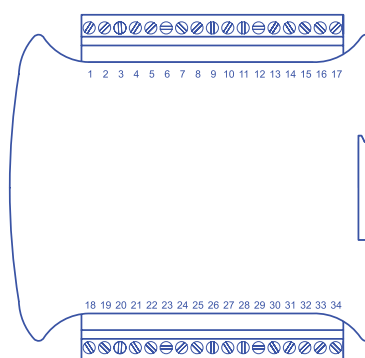
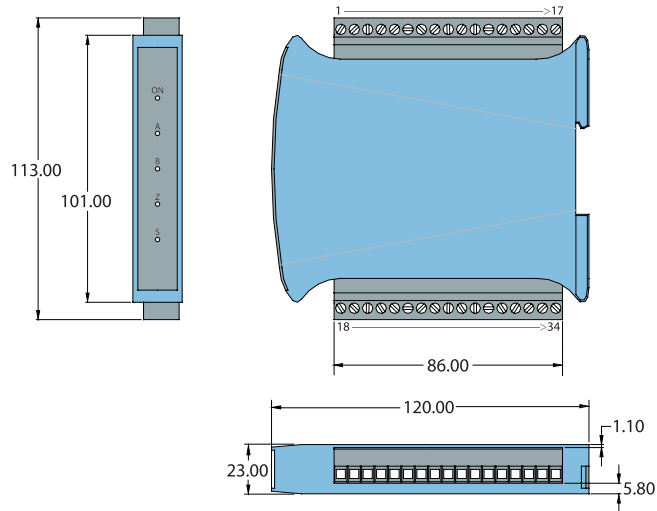
Set input voltage to 24V

Encoder/sensor power = 24V
 Output 1 = 24V
 Output 2 = 5V

Set input voltage to 12V

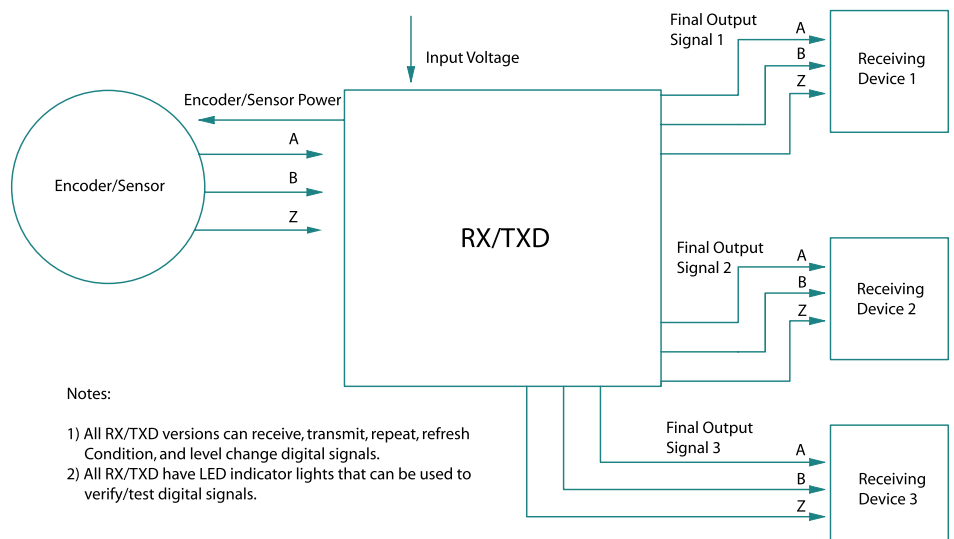
Encoder/sensor power = 12V
 Output 1 = 12V
 Output 2 = 5V

RX/TXD Receiver-Transmitter



TMNL	SIGNAL	TMNL	SIGNAL
1	Z'	18	N/C
2	Z	19	Z'
3	B'	20	Z
4	B	21	B'
5	A'	22	B
6	A	23	A'
7	0V	24	A
8	N/C	25	0V
9	Z'	26	N/C
10	Z	27	Z'
11	B'	28	Z
12	B	29	B'
13	A'	30	B
14	A	31	A'
15	0V	32	A
16	0V	33	0V
17	+Vcc	34	+Vcc

All inputs and outputs may not be present, depending on the RX/TXD version.



Notes:

- 1) All RX/TXD versions can receive, transmit, repeat, refresh Condition, and level change digital signals.
- 2) All RX/TXD have LED indicator lights that can be used to verify/test digital signals.

The Responsive People in Motion Control



British Encoder Products Co. (BECo) is the European Branch of the Encoder Products Group, a world-wide manufacturer of motion sensing and control devices that serves the diverse needs of a wide range of global customers. Founded more than 30 years ago on a philosophy of meeting or exceeding each customer's expectations, the Encoder Products Group, through its dedicated employees, has committed itself to responding to your unique needs and concerns with a "can do" attitude.

BECo prides itself on being a customer driven company that is especially responsive in the areas of customer service, technical support and custom application design. Through an inimitable blend of performance, delivery, and competitive pricing, BECo provides a combination of quality products and services designed to give customers the best overall value for their money. One of BECo's most important goals is to establish long lasting relationships with its customers, a goal it shares with the entire Encoder Products Group.

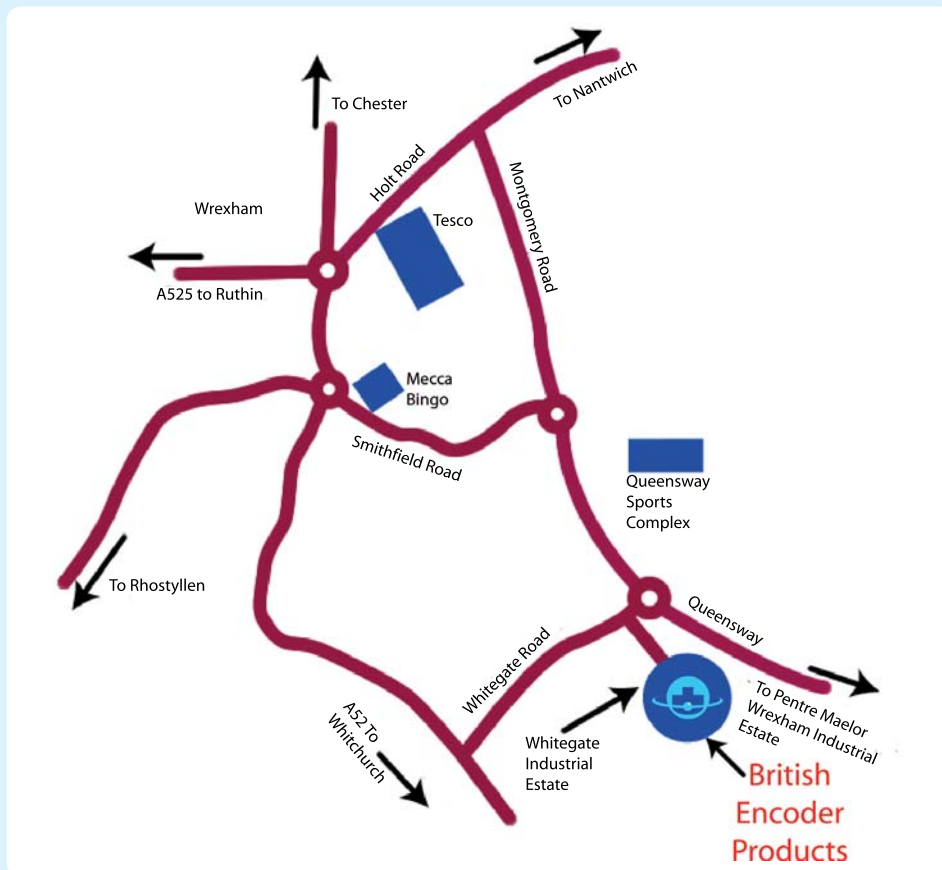
We are guided by principles of :

- **Consensus Drive Teamwork.**
- **Energetic and Enthusiastic Performance.**
- **Honesty, Integrity and Trust.**
- **High Quality of Workmanship.**
- **Dedication to the Company's Mission.**

We are the "Responsive People in Motion Control"



How to find us :-



Product Overview

Quick Selection Chart



INCREMENTAL ENCODERS (STANDARD SHAFT)										
Series Model	Overall Size	Shaft / Bore *	Flex Mount	Low L/Temp	High H/Temp	IP Rating	Integral Bearings	Output Circuit	Maximum PPR	Technology Comment
15S	38mm	6mm/0.250"	No	Yes	Yes	IP64	Yes	OC, PP, HV	10000	ASIC/Low Cost
711/716	2.25" Cube	0.375"/0.250"	No	No	No	IP50	Yes	OC, PP, HV	10000	ASIC/Cube
702	50mm	6mm/10mm	No	No	Yes	IP65	Yes	OC, PP, HV, L5	30000	ASIC/Heavy Duty
725	63.5mm	6mm/12mm	No	No	Yes	IP65	Yes	OC, PP, HV, L5	30000	ASIC/Industrial
744	115mm	11mm/12mm	No	No	Yes	IP64	Yes	OC, PP, HV, L5	30000	ASIC/REO Equivalent
745	90mm	12mm	No	No	Yes	IP64	Yes	OC, PP, HV, L5	30000	ASIC/Hohner Equivalent
755RG	38mm	6mm/0.250"	No	Yes	Yes	IP50	Yes	OC, PP, HV	30000	ASIC/Medium Duty
758	58mm	6mm/12mm	No	No	Yes	IP65	Yes	OC, PP, HV, L5	30000	ASIC/Heavy Duty
858	58mm	6mm/10mm	No	No	Yes	IP65	Yes	OC, PP, HV, L5	30000	ASIC/Stainless Steel

INCREMENTAL ENCODERS (HOLLOW SHAFT)										
Series Model	Overall Size	Shaft / Bore *	Flex Mount	Low L/Temp	High H/Temp	IP Rating	Integral Bearings	Output Circuit	Maximum PPR	Technology Comment
121	50mm	6mm/15mm	No	No	Yes	N/A	No	OC, PP, HV	2540	ASIC/Modular
15H/15T	38mm	6mm/10mm	Yes	Yes	Yes	IP64	Yes	OC, PP, HV	10000	ASIC/Motor Mount
25T	63.5mm	0.50"/28mm	Yes	No	Yes	IP65	Yes	PP, HV	10000	ASIC/Motor Mount
260	50mm	6mm/0.625"	Yes	Yes	Yes	IP64	Yes	OC, PP, HV	10000	ASIC/Motor Mount
755HS	38mm	6mm/10mm	Yes	Yes	Yes	IP50	Yes	OC, PP, HV	30000	ASIC/Motor Mount
760N	63.5mm	8mm/15mm	Yes	No	Yes	IP64	Yes	OC, PP, HV	10000	ASIC/Motor Mount
775	110mm	14mm/1.375"	Yes	No	Yes	IP50	Yes	PP, HV	4096	ASIC/Slim-Large Bore
776	110mm	35mm/1.875"	Yes	No	Yes	IP50	Yes	PP, HV	4096	ASIC/Slim-Large Bore

SPECIAL PURPOSE ENCODERS										
Series Model	Overall Size	Shaft / Bore *	Flex Mount	Low L/Temp	High H/Temp	IP Rating	Integral Bearings	Output Circuit	Maximum PPR	Technology Comment
7RP	90mm	0.50"/15mm	No	No	Yes	IP64	Yes	PP, HV	10000	ASIC/RP60 Equivalent
86A	68mm	10mm/15mm	No	No	Yes	IP65	Yes	PP, HV	3000	ASIC/A86L Equivalent
86F	90mm	N/A	No	No	Yes	IP65	Yes	PP, HV	3000	ASIC/A860-300 Equiv
TR1/TR3	N/A	N/A	Yes	Yes	Yes	IP64	Yes	OC, PP, HV	10000	ASIC/Spring Loaded
LCE	N/A	N/A	No	No	No	IP50	Yes	PP, HV	(1270)	ASIC/Draw Wire

ABSOLUTE ENCODERS										
Series Model	Overall Size	Shaft / Bore *	Flex Mount	Low L/Temp	High H/Temp	IP Rating	Integral Bearings	Output Circuit	Maximum PPR	Technology Comment
925	63.5mm	6mm/12mm	No	No	No	IP65	Yes	PP	12 Bit	ASIC/Single Turn
958	58mm	6mm/12mm	No	No	No	IP66	Yes	PP	12 Bit	ASIC/Single Turn
960	50mm	6mm/10mm	Yes	No	No	IP64	Yes	PP	11 Bit	ASIC/Hollow Shaft

* Shaft or Bore diameters may be considered as being available in most popular sizes between the dimensions published.

Spare Page Section For Notes



World-Wide Manufacturing Locations

Europe

British Encoder Products

Unit 33 , Whitegate Industrial Estate, Wrexham

LL13 8UG, United Kingdom

Tel: +44 (0) 1978 262100

Fax: +44 (0) 1978 262101

Email: sales@encoder.co.uk

Website: www.encoder.co.uk

America

Encoder Products Company

464276 Highway 95 South

P.O. Box 249

Sagle, Idaho 83860

USA

Tel: 208-263-8541

Fax: 208-263-0541

Sales: sales@encoder.com

Website: www.encoder.com

Asia

Zhuhai precision Encoder Co., Ltd

RM.308C, 3/F, Zhongdian Bldg

No. 1082, Jiuzhou Avenue

Ji Da District, Zhuhai City

Guang Dong Province, China, 519015

Tel: +86.756.3363470

Fax: +86.756.3363573

Sales: EPC-Asia@163.com

Website: www.asiaencoder.com



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