TUFF-CODER™

Made in U.S.A.

Optical Incremental Shaft Position Encoder

FEATURES

- NEMA 4 Housing
- Two Independent Shaft Seals
- Heavy Duty Sealed Bearings
- Reverse Polarity Protection
- Short Circuit Protection
- Low Current Consumption
- Mating Connector Included
- Infrared LED and SMD Circuitry
- Weathertight Connector w/ gold plated contacts
- MIL-8625F Type 3 Class 1 Hard Coat Anodized Aluminum Housing

APPLICATIONS

- Paper and Pulp Processing
- Chemical Plants
- Steel Mills
- Food Processing
- Heavy Equipment
- Textile Mills

SPECIFICATIONS

Input
Voltage: 5 or 12-28 VDC, others available
Current: 45 ma. @ 15 VDC typical

Output
Squarewave 50/50 duty cycle
0 - 20,000 pulses/sec.

Temperature Range: -30° to 165° F (-35° to 75°C)

Mechanical
Housing: MIL-8625F Type 3 Class 1
Hard coat anodized aluminum
Shaft Rotation: Either direction
Shaft speed: 6000 RPM max. *
Bearings: Teflon® sealed heavy duty ABEC 3
Load: 300 lbs. radial *
100 lbs. axial *

* Please consult factory for details, technical bulletins, and see the safety and warranty sheet for additional information.

DESCRIPTION

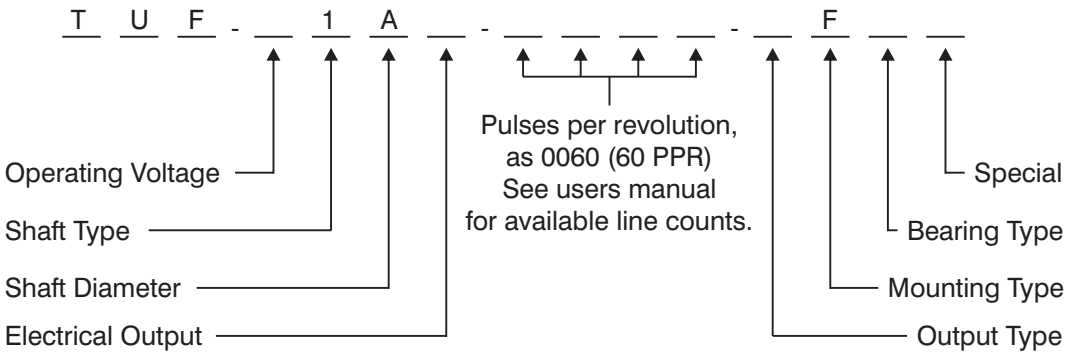
The TUFF-CODER™ series is a NEMA 4, rotary optical incremental shaft encoder designed with high precision mechanical and opto-electronic components. It is enclosed in a sealed rugged hard coat anodized (MIL-8625F Type 3 Class 1) aluminum housing designed to operate in the most severe environments. Infrared LED and SMD circuitry provides high noise immunity. Two independent shaft seals packed with grease prevent internal contamination due to moisture and dust. Teflon® sealed ABEC 3 with grease lube (standard) provide for heavier shaft loads. Single channel, index pulse, quadrature, and other special outputs are available with standard resolutions up to 2500 PPR. Over four decades of engineering and manufacturing experience is embodied in every FSI encoder. FSI is committed to manufacturing quality products and providing complete customer satisfaction!

FSI™ Encoders Controls Sensors

FSI Technologies Inc.

668 Western Ave. • Lombard, IL 60148-2097 (630) 932-9380 • FAX: (630) 932-0016 www.fsinet.com

ORDERING INFORMATION FOR RSE SERIES ENCODERS



Operating Voltage

1	5 VDC
2	12 - 28 VDC
3	Special
4	12 - 28 VDC (In), 5 VDC (Out)
5	4.5 - 14 VDC
6	6 - 24 VDC
7	9-15 VDC (Use with electrical output 6)

Shaft Type

1	Single ended

Shaft Diameter & Style

A	¾" Steel keyed shaft

Electrical Output

1	Pulse NPN
2	Open Collector NPN
3	Pulse PNP
4	Open Collector PNP
5	8830 TTL diff. line driver (5 VDC)
6	88C30 CMOS diff. line driv. (15 VDC Max)
7	7272 CMOS diff. line driv. (30 VDC Max)
8	Red Lion pin-out, pulse NPN
9	Red Lion pin-out, open collector NPN
A	7404 TTL complement
D	Dynapar, 1.5 KΩ P/U, 120 Ω SR
E	Encoder Products, 1.5 KΩ P/U, no SR
F	Encoder Products, open collector, no SR
G	Red Lion pin-out & out, 1.5 KΩ P/U, no SR
H	Red Lion pin-out & out, op. collect., no SR

Output Type

S	Single Channel
Q	Quadrature
P	Positive going index pulse *
N	Negative going index pulse *
Note:	*With P or N outputs, also specify S,Q,D,B,G*
D	Count / Direction
B	Up / Down count
G	Anti-Jitter, Quad. output

** Note: Synonyms: Index Pulse, Reference Pulse, Marker Pulse, or Z Channel*

Mounting Type

F	Base flange

Bearing Type

None	Precision ABEC 3 film seal, oil lube

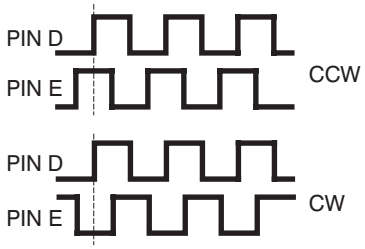
Special Options

A	High speed output - 36 KHz (consult factory)
C	Water tight connector with mating connector
I	Delete 220 Ω (no short circuit protect)
J	Replace 220 Ω with 100 Ω
L	Low power (consult factory)
R-X	Strain relief and "X" length of cable
X	Customer specific special
2-XXX	Electronic 2X line count (XXX=mS.)
4-XXX	Electronic 4X line count (XXX=mS.)
6	8 pin weather tight connector w/gold contacts
7	Seven pin MS connector

COMMON OUTPUT OPTIONS

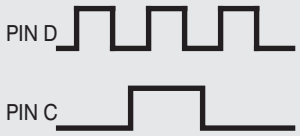
Option S Squarewave

A series of squarewaves corresponding to shaft rotation in either a clockwise (CW) or a counterclockwise (CCW) direction, will appear on Pin D.



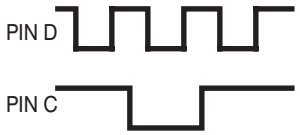
Option Q Quadrature

Quadrature Output on Pin E will lead the Pin D squarewave output for CCW shaft rotation and lag the Pin D squarewave output for CW shaft rotation.



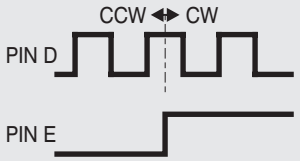
Option P Positive Index Pulse

In addition to the squarewave(s), one positive going index pulse per revolution will be on Pin C.



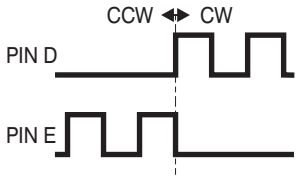
Option N Negative Index Pulse

In addition to the squarewave(s), one negative going index pulse per revolution will be on Pin C.



Option D Count / Direction

Squarewave will appear on Pin D regardless of direction of shaft rotation. Pin E will be "high" for CW (Up Count) and "low" for CCW (Down Count).

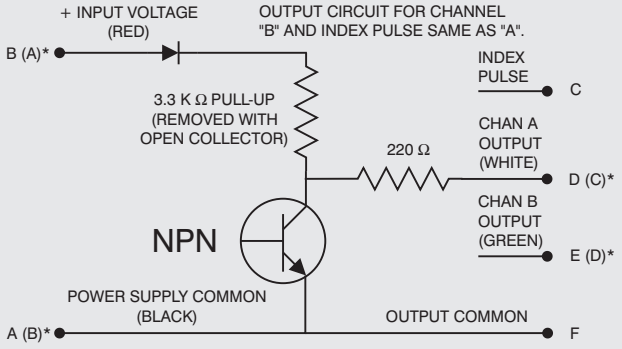


Option B Up / Down Count

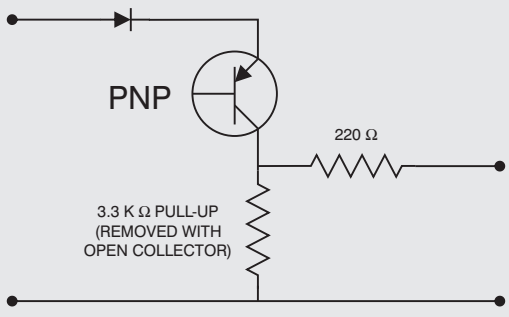
A squarewave will appear on Pin D for CW shaft rotation and on Pin E for CCW shaft rotation.

WIRING INFORMATION

NOTE: Standard pin out shown - Additional output types are available.



*** NOTES: (1) (X) INDICATES PIN OUT FOR OPTIONS 8 & 9.**
(2) CHANNEL "B" QUAD & INDEX PULSE ARE OPTIONS - SEE ORDERING GUIDE.



NOTE: "PNP" INPUT AND OUTPUT DESIGNATION SAME AS "NPN"

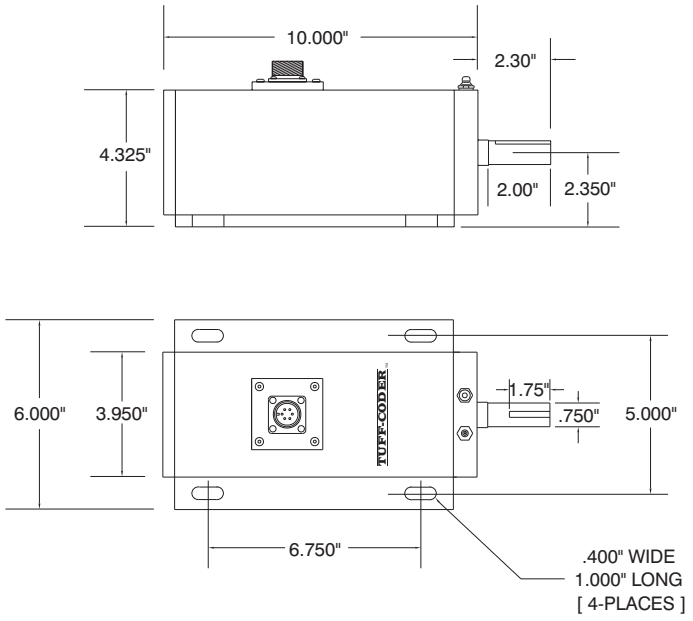
ACCESSORIES

C-1	6 pin MS Series plug, clamp and boot - unassembled
C-1F-XX	C-1 plug and "XX" ft. of cable - assembled
C-1R-XX	C-1 plug with Red Lion pin-out and "XX" ft. of cable - assembled
C-4	6 pin MS Series right angle plug, clamp, and boot - unassembled
C-4F-XX	C-4 plug and "XX" ft. of cable - assembled
C-5	10 pin mating connector: unassembled
C-5F-xx	C-5 and xx ft. of cable: assembled
C-6	8 pin weather tight connector w/gold contacts - unassembled
C-6F-XX	C-6 (8 pin) and XX feet of cable - assembled

NEMA 4 DESCRIPTION & APPLICATION - Ref: NEMA Standard 250

Type 4 Enclosures are intended for indoor or outdoor use primarily to provide a degree of protection against windblown dust, and rain, splashing water, and hose directed water; and to be undamaged by the formation of ice on the enclosure. They shall meet hose down, external icing, and rust-resistance design tests. They are Not intended to provide protection against conditions such as internal condensation or internal icing.

TUFF-CODER™ MECHANICAL



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