

Largest Selection of Optical Encoders

Rotary Incremental Shaft Size 15, 20, 25 & 30
Hollow Shaft, Wheeled, Qube 2.25" & Absolute Encoders.
Manual Pulse Generators & Pendant Hand-Helds.



LISTED 87ML
IND. CONT. EQ.



WORLD[®] ENCODERS



CATALOG NO. WE-0124

Delivering Reliable, Durable and Cost Effective Encoders for many years!!
Failure Rate: 0.01%

The World Encoders!

Quality Products, Super-Low Prices, Best Service & Immediate Delivery
Incredible Features and Super-Low Prices!

Compare Pricing S.R.P. (List Price) Basis

	 #1 World Encoders	Dynapar 	BEI(Sensata) 	EPC 
Size 15-Shaft	\$345.00 TRDA-2E	\$606.00 E14	\$718.00 L15	\$256.00 15S
Size 20-Shaft	\$420.00 TRDA-20N	\$583.00 H23	\$493.00 H20	\$400.00 702
Size 25-Shaft	\$450.00 TRDA-25N	\$811.00 HA625	\$734.00 H25	\$489.00 725N
Qube 2.25"	\$410.00 RS	\$431.00 21/22	\$ N/A none	\$291.00 711
Size 20-Hollow	\$485.00 HS20	\$570.00 HS20	\$621.00 HS25	\$361.00 260
Size 35-Hollow	\$725.00 HS31	\$642.00 HS35R	\$809.00 HS35	\$539.00 25T
NEMA4 IP66 w/Cover	w/Metal Body	w/Metal Body	w/Metal Body	w/Plastic Body
Lead-Time	In Stock	2–6 wks ARO	2–8 wks ARO	1–6 wks ARO
Shipping Charges	Free Shipping	Add Freight/Expedited Fee	Add Freight/Expedited Fee	Add Freight/Expedited Fee
Sales Tax (Online)	Tax Exempt	Add Sales Tax	Add Sales Tax	Add Sales Tax

Quality Products

- World Encoders offer quality products which are made in certified ISO 9001 and 14001 factories. All our encoders have standard UL (USA and Canada) and CE product markings.

Value & Technology

- World Encoders has been producing reliable, durable and cost-effective encoders for many years. Our encoders are used by many OEM companies in major industries worldwide for angle controls, precision measuring, position sensing in Machine Tools, Medical, Packaging and Motion Control Industries.

Durability

- All World Encoders feature a reinforced aluminum die cast or stainless steel cap and come equipped with Standard Protection such as NEMA 4/IP66 and NEMA 12/IP54



Our Staff is waiting anxiously to serve you.

INDEX

1. Absolute Encoder	Size 12 Shaft 8, 9 bits	Series SR12	Page 4-5
2. Incremental Encoder	Size 15 Solid Shaft	Series TRDA-2E	Page 6-9
3. Incremental Encoder	Size 20 Solid Shaft	Series TRDA-20N	Page 10-12
4. Incremental Encoder	Size 25 Solid Shaft	Series TRDA-25N	Page 13-17
5. Incremental Encoder	Metric OEM Solid Shaft	Series TRD-J	Page 18-20
6. Incremental Encoder	Metric Spindle for CNC	Series TRDA-2A	Page 21-22
7. Incremental Encoder	Qube 2.25"	Series RS	Page 23-25
8. Incremental Encoder	Size 20 Wheeled	Series R22	Page 26-27
9. Incremental Encoder	Size 30 Wheeled	Series RH	Page 28-31
10. Incremental Encoder	Size 20 Hollow Shaft	Series TRD-RV	Page 32-34
11. Incremental Encoder	Size 20 Hollow Shaft Thru Hub	Series HS20	Page 35-37
12. Incremental Encoder	Size 31 Hollow Shaft Thru Hub	Series HS31	Page 38-40
13. Hand-wheel	Size 20	Series MPG-N1	Page 41-42
14. Hand-wheel	Size 20	Series MPG-N2	Page 43-44
15. Hand-wheel	Size 30	Series MPG	Page 45-56
16. Pendant Hand-held		Series PHD	Page 47-58
17. Warranty and Terms			Page 59-60

SIZE SR12

ABSOLUTE SHAFT ENCODER 8 BITS, 9 BITS & 10 BITS

Starting at \$330.00–8bits, \$340.00–9 bits,
\$390.00–10 bits
Binary, Gray code & Analog outputs



SPECIFICATIONS

Electrical

Pulse per Revolution	256 (8-bits), 512 (9-bits), 1024 (10-bits)
Supply Voltage	5vdc (Binary, Gray, 12-30vdc (Analog)
Current	25ma Max. (No Load)
Operating Temp.	0° to 70°C
Interrogation Rate	1 KHZ
Accuracy	Plus Minus 2/3 bit digital, 1 bit analog
Rotation	CW-increase as viewed from the shaft end.
Digital Output Logic Level	Logic "0": Low voltage, 0.6 Max Logic "1": High voltage, Supply 0.7v Min.
Data Ready Outputs	Normally high, goes low momentarily 7 sec. while the outputs are changing. Stays low to indicate error.
Analog Output Levels	Zero code error: 20mv, Full-scale error: 125mv. Relative accuracy: plus minus 20mv
Output Circuits	Totem-pole 5ma. max source and 6ma. max sink current
Analog 0-10 vdc	Potentiometer is hooked up to 10v & Grd. The output looks like a sawtooth wave where the output voltage increases from 0 to 10v for each complete rev. and then immediately drops to 0v as a new rev. is started.

FEATURES

**WORLD
ENCODERS**

brand, Made in USA

- Size 12 dia, 1/4" Shaft Single-turn
- 256 (8 bits), 512 (9 bits), 1024 (10 bits) Resolution
- Natural Binary, Parallel 5v outputs
Analog 0-10v outputs, 12-30v input
- Std. 3 ft. cable w/2x6 header conn. (Parallel outputs)
- 3 pos. terminal block for Analog outputs

Mechanical & Environmental

Max. Speed	5,000 rpm
Bearings	Shielded ball bearings
Shaft loading	10 lbs. Axial, 10 lbs. Radial
Weight	2 oz
Materials	Case: Anodized Aluminum Shaft: 303 Stainless Steel
Humidity	35-85% w/o condensation
Vibration	Max 10g (58 to 500Hz)
Shock	50g (11ms duration)
Enclosure	IP-54/NEMA 12

Wiring Diagram

Digital Parallel (8, 9-bits)

PIN #	Function
1	Supply
2	2 ³
3	2 ²
4	2 ¹
5	2 ⁰
6	Data Ready
7	2 ⁸
8	2 ⁷
9	2 ⁶
10	2 ⁵
11	2 ⁴
12	Common

Digital Pararell (10-bits)

PIN#	FUNCTION
1	Reserved
2	Reserved
3	Supply
4	2 ³
5	2 ²
6	2 ¹
7	2 ⁰
8	Data Ready
9	2 ⁸
10	2 ⁷
11	2 ⁶
12	2 ⁵
13	2 ⁴
14	Common
15	2 ⁹
16	Reserved

Analog

Terminal	Function
—	Common
~	0-10vdc output
+	12-30vdc supply

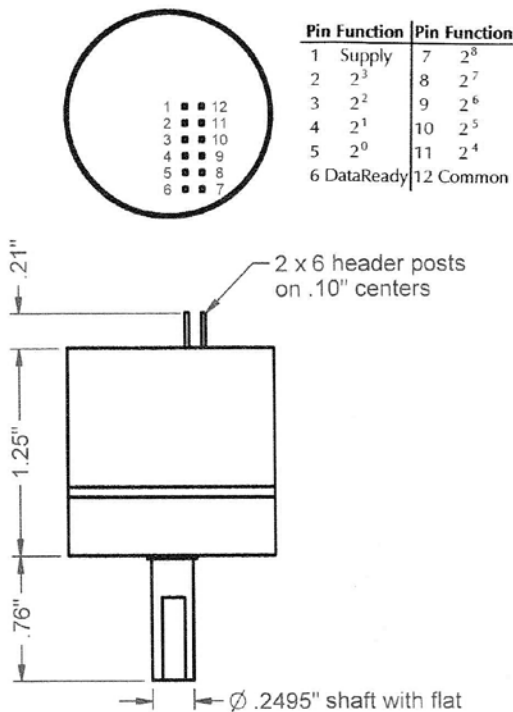
Note: Analog outputs
has no cable.

SIZE SR12

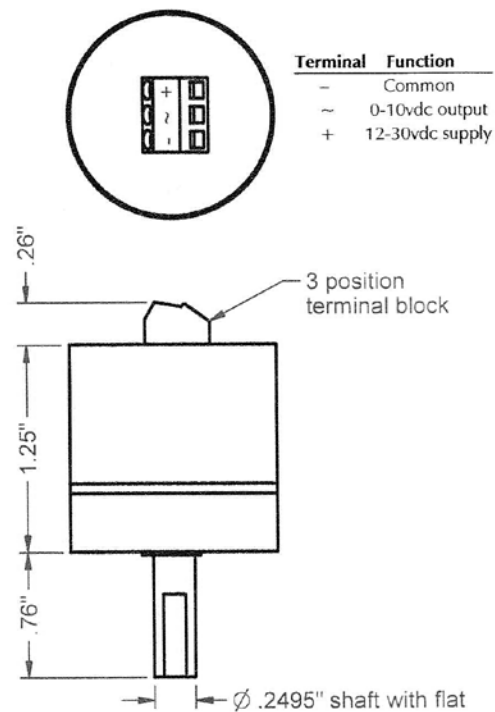
ABSOLUTE SHAFT ENCODER 8 BITS, 9 BITS & 10 BITS

MODEL NUMBER	SPECIFICATION	CABLE	S.R.P.
SR12-256N/5	8 bits Natural Binary, Parallel 5v outputs	3ft. Ribbon Cable	\$330.00
SR12-512N/5	9 bits Natural Binary, Parallel 5v outputs		\$340.00
SR12-1024N/5	10 bits Natural Binary, Parallel 5v outputs		\$390.00
SR12-256G/5	8 bits Gray code, Parallel 5v outputs		\$330.00
SR12-512G/5	9 bits Gray code, Parallel 5v outputs		\$340.00
SR12-1024G/5	10 bits Gray code, Parallel 5v outputs		\$390.00
SR12-256A/12-30	8 bits Analog 0-10v outputs, 12-30v input	N/A	\$330.00
SR12-512A/12-30	9 bits Analog 0-10v outputs, 12-30v input	N/A	\$340.00
SR12-1024A/12-30	10 bits Analog 0-10v outputs, 12-30v input	N/A	\$390.00

SR12 with parallel outputs



SR12 with analog output



SIZE 15 SERIES TRDA-2E
INCREMENTAL SHAFT ENCODER



SPECIFICATIONS

Electrical	
Pulse per Revolution	Up to 2500
Supply Voltage	5Vdc (line driver), 5V~26Vdc (open collector)
Output Format	Dual Square Wave in Quadrature with Index
Output Option	TTL Line Driver Output 26LS31 (EIA:RS-422A) Open Collector Output
Current Consumption	TTL Line Driver: 50mA Max. No Load Open Collector: 50mA Max. No Load
Frequency Response	200 KHz [A, B and Index]
Electrical Connections	3.3ft. Shielded Cable
Duty Ratio	50±25%
Phase Shift	25±12.5%
Index Signal Width	100±50%
Output Level	(H) ≥2.5V (L) ≤0.5V
Rise and Fall Time	≤1μs (When cable length is 1m)
Insulation Resistance	≥50MΩ

Mechanical

Shaft Diameter	.2497"/.2495"
Shaft Loading	Axial: 4.5 lbs. Max. (20N) Radial: 6.7 lbs. Max. (30N)
Shaft Runout	.0016" TIR Max.
Starting Torque at 25°C	0.01N • m Max.
Shaft Angular Acceleration	1x10 ⁴ rad/Sec ² Max.
Moment of Inertia	0.6x10 ⁻⁶ Kg • m ²
Rated Speed	5000RPM
Weight	3.5 oz. Max.

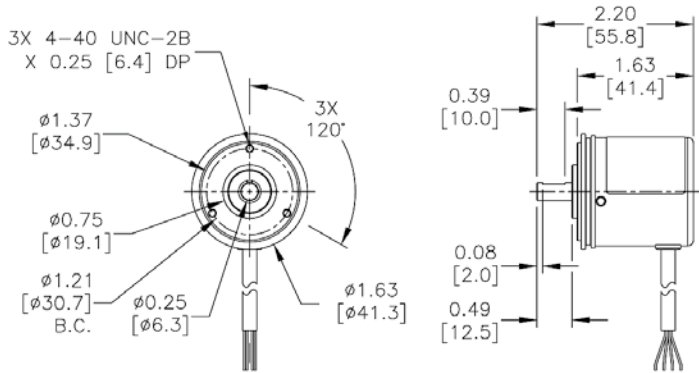
Environmental

Temperature	Operating: -10 ~ +70°C Storage: -25 ~ +85°C
Operating Humidity	35 ~ 85% without condensation
Vibration	Durable for one hour along 3 axes at 10 to 55 Hz 0.75mm amplitude
Shock	490 m/s ² (11ms 3-times, each X, Y, Z)
Withstand Voltage	500VAC at 50/60 Hz for 1 minute
Construction	NEMA12/IP-54

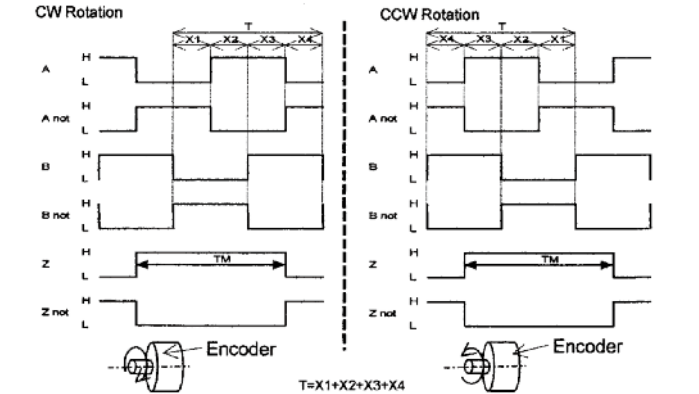
FEATURES

- 1.5" O.D./Servo Mount
- Up to 2500 P/R, heavy-duty, alumi-diecast case NEMA12 (IP-54)
- 200 KHz frequency response
- A, B, Index with complements
- C-Flange, Flex-coupling available
- Applications:
Machine Tool, Robotics, Packaging,
Medical Diagnostic Equipment,
Elevator Control, Printing Equipment
Semiconductor Processing, Food Process

OUTLINE DIMENSIONS



LINE DRIVER WAVE FORM



CW or CCW ROTATION AS VIEWED FROM ENCODER SHAFT

DIVISION ACCURACY

Symmetry	X1+X2=0.5T±0.25T X2+X3=0.5T±0.25T
Phase shift	Xn=0.25±0.125T (n=1, 2, 3, 4)
Signal width of Z ch.	TM=1T±0.25T

T=360° /N N: Pulse per revolution

DIVISION ACCURACY OF SIGNAL

Accumulative Angle Error	≤0.4T
Pitch Error	±0.01T
Adjacent Pitch Error	±0.01T

Series TRDA-2E / Size 15 Shaft Encoder

Model	Resolution	Voltage/Output	Flange		
TRDA-2E	☐ ☐ ☐ ☐	☐ —	☐		
ORDERING INFORMATION					
TRDA-2E Size 15 Shaft Encoder	50	512	A = Open Collector	NONE = 0	SHIELDED CABLE 1 m/ 3.3 ft. Dia: 5mm Sheath: PVC Wire: AWG 24-26
	100	600	5 - 12 VDC	F - 2	
	200	800		F - 3	
	240	1000	B = Open Collector	F - 6	
	250	1024	10.8 - 26.4 VDC	F - 7	
	300	1200		F - 8	
	360	2000	V = Line Driver		
	400	2048	5 VDC		
	500	2500			
All Glass Disks					

PRICING INFORMATION						
	RESOLUTION		ELECTRICAL	FLANGE		TERMINATION
TRDA-2E Base price \$300.00	50		5 - 26 V	F - 2 Add \$35.00		Shielded Cable std. 3 ft. N/C
	Thru	N/C	Open Collector -	F - 3 Add \$40.00		
	512		- Quadrature A & B	F - 6 Add \$35.00		
			w/ Index Z	F - 7 Add \$30.00		
			Add \$20.00	F - 8 Add \$50.00		
	1000					
	Thru	Add \$25.00	5V linedriver -			
	2048		- Quadrature A & B			
			w/ Index Z			
	2500	Add \$40.00	Add \$20.00			

PART NUMBER	LIST PRICE	Flexible Couplings (Aluminum, Clamping Design Both Ends)	
		3/4" dia X 3/4" L	
TRDA-2E100V	\$320.00	BT 075-C.250-C.250	\$80.00
TRDA-2E100V-7148	\$430.00	BT 075-C.375-C.250	\$80.00
TRDA-2E250V-F3-7140	\$500.00	BT 075-C.375-C.375	\$80.00
TRDA-2E360A	\$320.00	BT 075-C.6MM-C.6MM	\$80.00
TRDA-2E360B	\$320.00	BT 075-C.250-P000	\$80.00
TRDA-2E360V	\$320.00	BT 075-P05MM (metric plastic insert)	N/C
TRDA-2E500A	\$320.00	BT 075-P06MM (metric plastic insert)	N/C
TRDA-2E500V	\$320.00	BT 075-P08MM (metric plastic insert)	N/C
		1.00" dia X 1.00" L	
TRDA-2E1000A	\$345.00	BT 100-C.250-C.250	\$90.00
TRDA-2E1000B	\$345.00	BT 100-C.250-C.375	\$90.00
TRDA-2E1000V	\$345.00	BT 100-C.250-C.500	\$90.00
TRDA-2E1000V-F6-7135	\$525.00	BT 100-C.375-C.375	\$90.00
TRDA-2E1000V-F8-7137	\$550.00	BT 100-C.500-C.250	\$90.00
TRDA-2E1024A	\$345.00	BT 100-C.8MM-C.8MM	\$90.00
TRDA-2E1024B	\$345.00	BT 100-C.10MM-C.10MM	\$90.00
TRDA-2E1024V	\$345.00	BT 100-C.375-P000	\$90.00
TRDA-2E2000B	\$345.00	BT 100-P06MM (metric plastic insert)	N/C
TRDA-2E2000V	\$345.00	BT 100-P08MM (metric plastic insert)	N/C
TRDA-2E2000V	\$345.00	BT 100-P10MM (metric plastic insert)	N/C
		1.25" dia X 1.25" L	
TRDA-2E2048A	\$345.00	BT 125-C.375-C.250	\$100.00
TRDA-2E2048B	\$345.00	BT 125-C.375-C.375	\$100.00
TRDA-2E2048V	\$345.00	BT 125-C.375-C.500	\$100.00
TRDA-2E2500A	\$360.00	BT 125-C.375-P.000	\$100.00
TRDA-2E2500B	\$360.00	BT 125-P06MM (metric plastic insert)	N/C
TRDA-2E2500V	\$360.00	BT 125-P08MM (metric plastic insert)	N/C
		BT 125-P10MM (metric plastic insert)	N/C

FLANGES

**WORLD
ENCODERS**

1-800-903-9093

FEATURES

- NEMA 23, NEMA 34/42 Motor Mount Bell Flanges
- Size 2.1" O.D. NEMA 23 Flanges:
F-2 (1.05" height), F-6 (1.34" height)
- Size 3.25" O.D. NEMA 34 Flange: F-3
- Size 3.25" O.D. NEMA 42 Flange: F-8

• Parker Compumotor Equivalent:

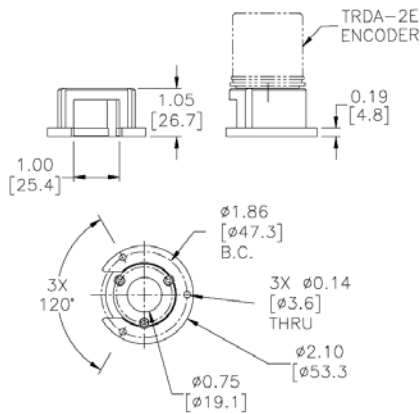
E 57= F-6, E 83/E 106=F-8

TRDA-2E1000V-F6-7135	E57
TRDA-2E1000V-F8-7136	E83
TRDA-2E1000V-F8-7137	E106

• Dynapar E-23 Series, DRC M21AA Series Interchangeable: F-7

NEMA 23

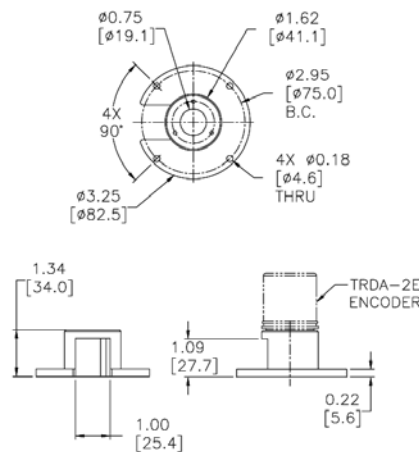
F-2 Mounting Flange



F-2

NEMA 34

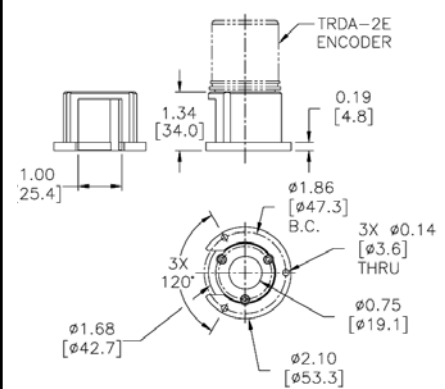
F-3 Mounting Flange



F-3

NEMA 23

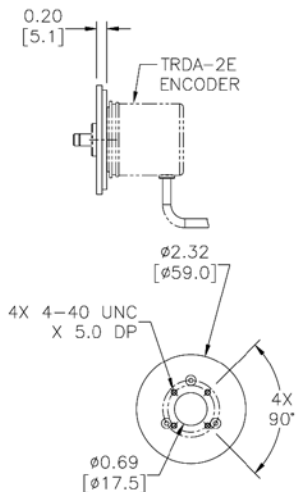
F-6 Mounting Flange



F-6

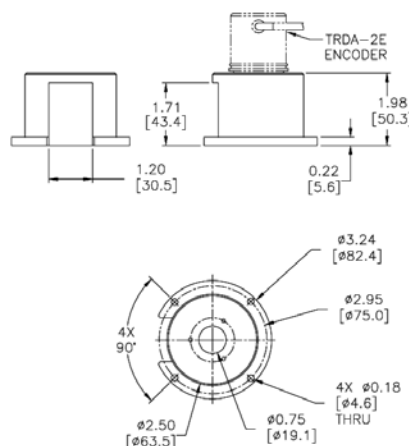
NEMA 42

F-7 Mounting Flange



F-7

F-8 Mounting Flange



F-8

FLANGES	LIST PRICE
F-2	\$35.00
F-3	\$40.00
F-6	\$35.00
F-7	\$30.00
F-8	\$50.00
F-20	\$60.00
F-21	\$60.00

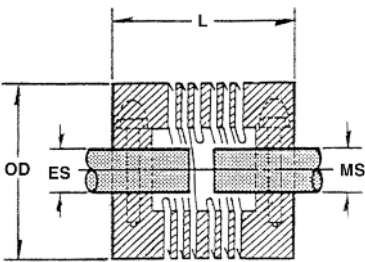
NOTE: When F-7 flange will be mounted on the unit, shaft length get shorter to 1/4".

FLEX-COUPLING

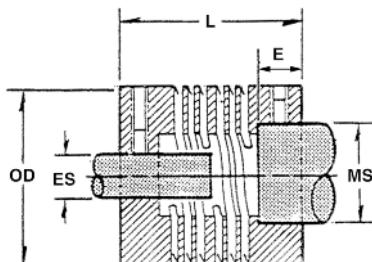


FEATURES

- Precision All Mighty Flexible Coupling
- 6 Short Thin-Double Tapered Curved Beams restrict torque wind-up
- Protects electrical leakage and thermal stress
- Reliable Integral Clamp Design
- Metric Phenolic Insert Coupling available in 5, 6, 8, 10mm



THROUGH BORE



THROUGH AND LIMITED BORE

Coupling Specifications

	BT 075	BT 100	BT 125
O.D.	0.75	1	1.25
Length	0.75	1	1.25
E(depth)	0.22	0.28	N/A
Torque lb.in.	7	18	34
Angular Offset	4°	5°	5°
Parallel Offset	0.008	0.01	0.01
Axial Offset	±.005	±.010	±.012
Static Torque	20	42	103
Inertia lb.in.2	2.463	8.888	26.18
Mass lb.	0.031	0.062	0.122

PART NUMBER	LIST PRICE
Flexible Couplings (Aluminum, Clamping Design Both Ends)	
3/4" dia X 3/4" L	
BT 075-C.250-C.250	\$80.00
BT 075-C.375-C.250	\$80.00
BT 075-C.375-C.375	\$80.00
BT 075-C.6MM-C.6MM	\$80.00
BT 075-C.250-P000	\$80.00
BT 075-P05MM (metric plastic insert)	N/C
BT 075-P06MM (metric plastic insert)	N/C
BT 075-P08MM (metric plastic insert)	N/C
1.00" dia X 1.00" L	
BT 100-C.250-C.250	\$90.00
BT 100-C.250-C.375	\$90.00
BT 100-C.250-C.500	\$90.00
BT 100-C.375-C.375	\$90.00
BT 100-C.500-C.250	\$90.00
BT 100-C.8MM-C.8MM	\$90.00
BT 100-C.10MM-C.10MM	\$90.00
BT 100-C.375-P000	\$90.00
BT 100-P06MM (metric plastic insert)	N/C
BT 100-P08MM (metric plastic insert)	N/C
BT 100-P10MM (metric plastic insert)	N/C
1.25" dia X 1.25" L	
BT 125-C.375-C.250	\$100.00
BT 125-C.375-C.375	\$100.00
BT 125-C.375-C.500	\$100.00
BT 125-C.375-P.000	\$100.00
BT 125-P06MM (metric plastic insert)	N/C
BT 125-P08MM (metric plastic insert)	N/C
BT 125-P10MM (metric plastic insert)	N/C

SIZE 20 SERIES TRDA-20N
INCREMENTAL SHAFT ENCODER



SPECIFICATIONS

Electrical

Pulse per Revolution	Up to 2500 ppr
Supply Voltage	5Vdc line driver, 5V~30Vdc TTL & Super line driver
Output Format	Dual Square Wave in Quadrature with Index
Output Option	TTL Output Line Driver
Current Requirements	TTL: 40mA Max. No Load Line Driver: 60mA Max. No Load
Frequency Response	250 KHz
Duty Ratio	50±25%
Phase Shift	25±12.5%
Index Signal Width	100±50%
Output Level	(H) ≥2.5V (L) ≤0.5V
Rise and Fall Time	≤1μs (When cable length is 1m)
Insulation Resistance	≥50MΩ

Mechanical

Shaft Diameter	.3747"/.3744"
Shaft Loading	Axial: 40 lbs. Max. Radial: 35 lbs. Max.
Shaft Seal	Std. (Detachable, Repairable)
Starting Torque	2.8 oz.-in at 77°F (25°C)
Shaft Angular Acceleration	1000 rad/sec ²
Moment of Inertia	2.0x10 ⁻⁶ Kg • m ²
Mech. Perm. Speed	6000 RPM Max.
Weight	1 lb.

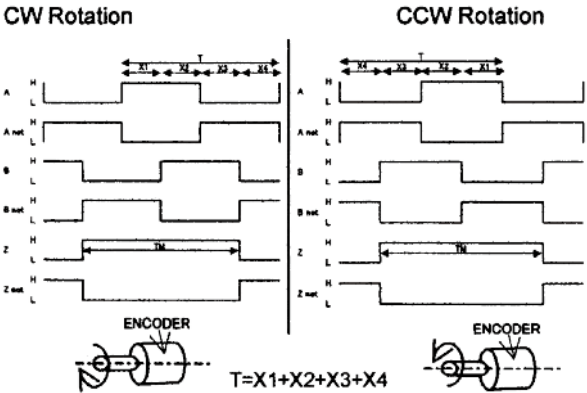
Environmental

Temperature	Operating: -10 ~ +70°C Storage: -25 ~ +85°C
Operating Humidity	35 ~ 85% without condensation
Vibration	Durable for one hour along 3 axes at 10 to 55 Hz 0.75mm amplitude
Shock	Metal Slit 981 m/s ² (11ms 3-times, each X, Y, Z) Glass Slit 490 m/s ² (11ms 3-times, each X, Y, Z)
Withstand Voltage	500VAC
Construction	NEMA12/IP-50 (Cable), NEMA4/IP-65 (MS connector)

FEATURES:

- 2.0" O.D., heavy duty designed
- 3/8" shaft, shaft seal option (Detachable and Repairable)
- 250 KHz frequency response
- Detachable Square and Servo flanges configuration
- Super Linedriver OL7272 Compatible 5-30 Vdc available

LINE DRIVER WAVE FORM



CW or CCW ROTATION AS VIEWED FROM ENCODER SHAFT

DIVISION ACCURACY

Symmetry (A, B)	$X1+X2=0.5T\pm0.25T$ $X2+X3=0.5T\pm0.25T$
Phase shift	$Xn=0.25T\pm0.125T$ (n=1, 2, 3, 4)
Signal width of Z ch.	$TM=1T\pm0.5T$
$T=360^\circ/N$ N: Pulse per revolution	

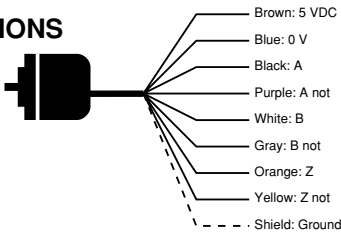
DIVISION ACCURACY OF SIGNAL

Pitch Error	±0.01T
Adjacent Pitch Error	±0.02T

WIRING DIAGRAMS

LINE DRIVER CONNECTIONS

(Shield = Body)



ELECTRICAL CONNECTIONS/ORDER SEPARATELY

#DMS3102E18-1P (10 Pin)/MATING# DMS3106E18-1S

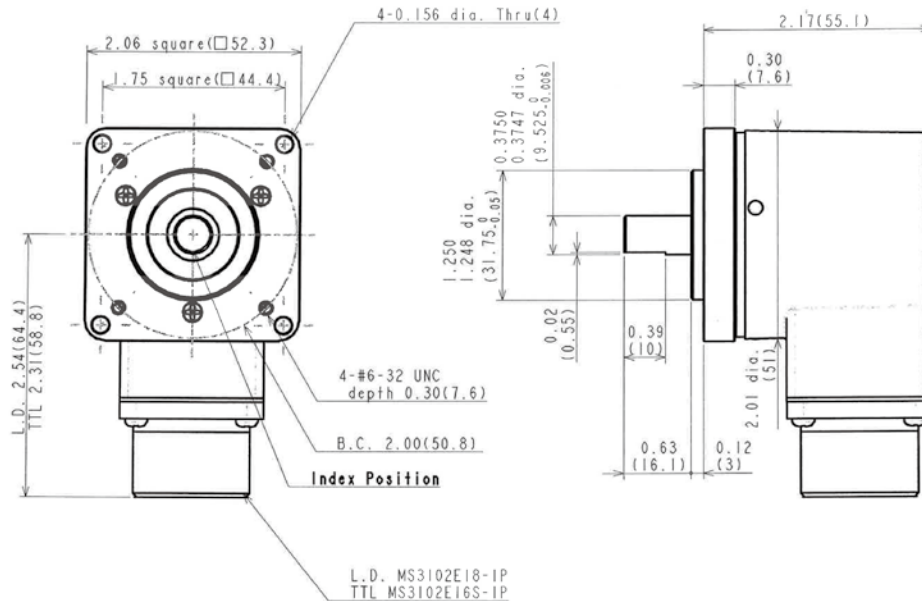
Pin Code	Line Driver
A	Channel A
B	Channel B
C	Index Z
D	Vcc
E	-
F	OV, Common
G	Case Ground
H	Channel A not
I	Channel B not
J	Index Z not

SIZE 20 SERIES TRDA-20N

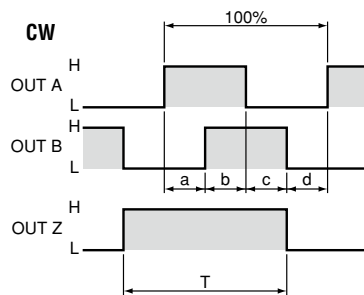
INCREMENTAL SHAFT ENCODER

OUTSIDE DIMENSIONS

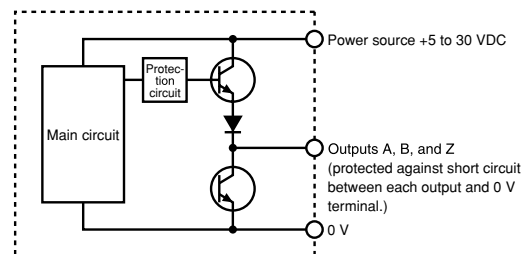
TRDA-20SNXXXX □ W-MS



TTL (Totem Pole) Wave Form (viewed from shaft side)

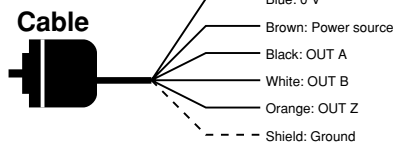


TTL Output circuit

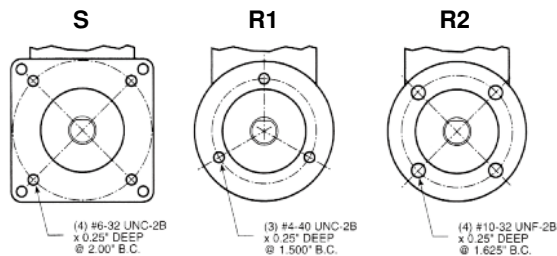


WIRING DIAGRAMS (TTL)

AWG 20-22



Detachable Flanges (You may choose and change)



TTL Connections (7 pin)/
Order Separately
#DMS3102E16-P
Mating# DMS3106E16-1S
(Shield = Body)

Pin Code	Function
A	Channel A
B	Channel B
C	Index Z
D	Vcc
E	-
F	0V, Common
G	Case, GRD



Series TRDA-20N / Size 20 Shaft Encoder

Model	Flange	N	Resolution	Output	Housing	Termination
TRDA-20	☐	N	☐ ☐ ☐ ☐	☐	☐	☐
ORDERING INFORMATION						
TRDA-20 Size 20 Shaft Encoder	S: Square Flange	N	Metal Disks	RZ: 5 - 30V TTL (single ended)	Blank: NEMA 12/IP50 ABS Plastic Cap	Blank: Cable (3.3 ft.)
	R1: Round Flange (3) #4-40 @1.5" BC		3 4 5 10 30 40 50 60 100 120 200 240 250 300 360 400 480 500 600	V: 5V Line Driver (26C31 Compatible)	W: NEMA 4/IP65 Aluminum Diecast Cap w/ MS Connector	MS: Side Mount MS Connector
	R2: Round Flange (4) #4.40 @1.625" BC		Glass Disks	S: 5 - 30V Super Line Driver (0L7272 Compatible)		ME: End Mount MS Connector
			750 1000 1024 1200 2000 2048 2500			

PRICING INFORMATION					
	FLANGE:		RESOLUTION	ELECTRICAL	MECHANICAL
TRDA-20 Base Price \$312.00	Detachable Flanges		3 Thru 500 N/C	TTL 5-30V (Single Ended) - Quadrature A & B with Index Z Add \$20.00	Shaft Seal -MS Connector Model Standard N/C
	Square Flange #TRDA-20SN Add \$8.00			Linedriver 5V Quadrature A & B with Index Z Add \$20.00	
	Round Flange 1 #TRDA-20R1N Add \$8.00	1000 Thru 2048 Add \$25.00		Super Linedriver 5-30V Quadrature A & B with Index Z Add \$30.00	3 ft. cable/ ABS Body NEMA12, IP-50 N/C
	Round Flange 2 #TRDA-20R2N Add \$8.00	2500 Add \$40.00			MS 10 pin Mating- Part #DMS3106E18-1S \$38.00 (order separately) MS 7 pin Mating- Part #DMS3106E16-1S \$30.00 (order separately)

PART NUMBER	LIST PRICE	Flanges	
TRDA-20SN500VW-MS	\$395.00	TRDA-20SN	\$8.00
TRDA-20SN1000VW-MS	\$420.00	TRDA-20R1	\$8.00
TRDA-20SN2000SW-MS	\$430.00	TRDA-20R2	\$8.00
TRDA-20SN2000VW-MS	\$420.00	Mating Connector	
TRDA-20SN2048VW-MS	\$420.00	DMS3106E18-1S (10pin Linedriver)	\$45.00
TRDA-20R1N2500RZW-MS	\$435.00	DMS3106E16-1S (7pin TTL)	\$35.00
TRDA-20SN2500SW-MS	\$445.00	Mating Connector w/10ft cable assemblies	
TRDA-20SN2500VW-MS	\$435.00	C10-9-10 LD (Linedriver)	\$85.00
		MS10 pin mating w/10ft cable (9 wires)	
		C7-5-10 RC (TTL)	\$75.00
		MS7 pin mating w/10ft cable (5 wires)	
		Cables	
		CBL-2025N-XXX FT	\$3.00 per Ft.
		Bell Flanges	
		F-20	\$60.00
		F-21	\$60.00
		3.5" Center Height Foot Mounting Bracket	
		LM-001	\$90.00

NOTE: Above stock items show Square Flange.
Round Flange Models 1 & 2 are also stock items.

SIZE 25 SERIES TRDA-25N

INCREMENTAL SHAFT ENCODER

Nicely equipped MS
Connector Model
US \$450.00
(up to 1024ppr)



FEATURES

- 2.5" O.D., heavy duty designed, NEMA4/IP65
- 3/8" shaft, shaft seal standard (Detachable and Repairable)
- Up to 5000 P/R Available
- 250 KHz frequency response
- Index gated 1/2, 1/4 channel cycle available
- Detachable Square flange or Servo/face flange mounting
- Super Linedriver OL7272 Compatible 5-30 Vdc available

SPECIFICATIONS

Electrical

Pulse per Revolution	Up to 5000 ppr, real direct count
Supply Voltage	5Vdc line driver, 5~30Vdc TTL & Super line driver
Output Format	Dual Square Wave in Quadrature with Index
Output Option	TTL Output Line Driver
Current Requirements	TTL: 40mA Max. No Load Line Driver: 60mA Max. No Load
Frequency Response	250 KHz
Duty Ratio	50±25%
Phase Shift	25±12.5%
Index Signal Width	100±50%
Output Level	(H) ≥2.5V (L) ≤0.5V
Rise and Fall Time	≤1μs (When cable length is 1m)
Insulation Resistance	≥50MΩ

Mechanical

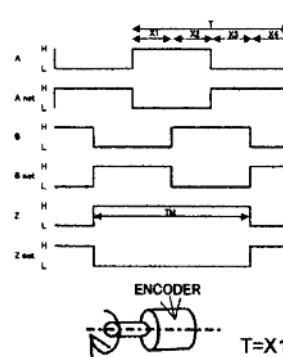
Shaft Diameter	.3747"/.3744"
Shaft Loading	Axial: 40 lbs. Max. Radial: 35 lbs. Max.
Shaft Seal	Standard (Detachable, Repairable)
Starting Torque	2.8 oz.-in at 77°F (25°C)
Shaft Angular Acceleration	1000 rad/sec ²
Moment of Inertia	2.0x10 ⁻³ Kg • m ²
Mech. Perm Speed	6000 RPM Max.
Weight	1 lb.

Environmental

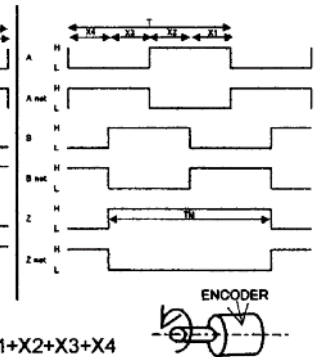
Temperature	Operating: -10 ~ +70°C Storage: -25 ~ +85°C
Operating Humidity	35 ~ 85% without condensation
Vibration	Durable for one hour along 3 axes at 10 to 55 Hz 0.75mm amplitude
Shock Metal Slit	981 m/s ² (11ms 3-times, each X, Y, Z)
Glass Slit	490 m/s ² (11ms 3-times, each X, Y, Z)
Withstand Voltage	500VAC
Construction	NEMA4/IP-65

LINE DRIVER WAVE FORM

CW Rotation



CCW Rotation



CW or CCW ROTATION AS VIEWED FROM ENCODER SHAFT

DIVISION ACCURACY

Symmetry (A, B)	X1+X2=0.5T±0.25T X2+X3=0.5T±0.25T
Phase shift	Xn=0.25T±0.125T (n=1, 2, 3, 4)
Signal width of Z ch.	TM=1T±0.5T

T=360°/N N: Pulse per revolution

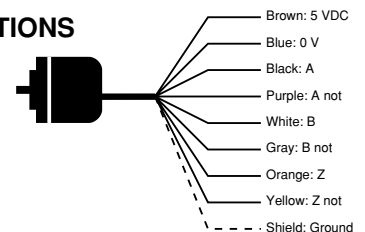
DIVISION ACCURACY OF SIGNAL

Pitch Error	±0.01T
Adjacent Pitch Error	±0.02T

WIRING DIAGRAMS

LINE DRIVER CONNECTIONS

(Shield = Body)



ELECTRICAL CONNECTIONS/ORDER SEPARATELY

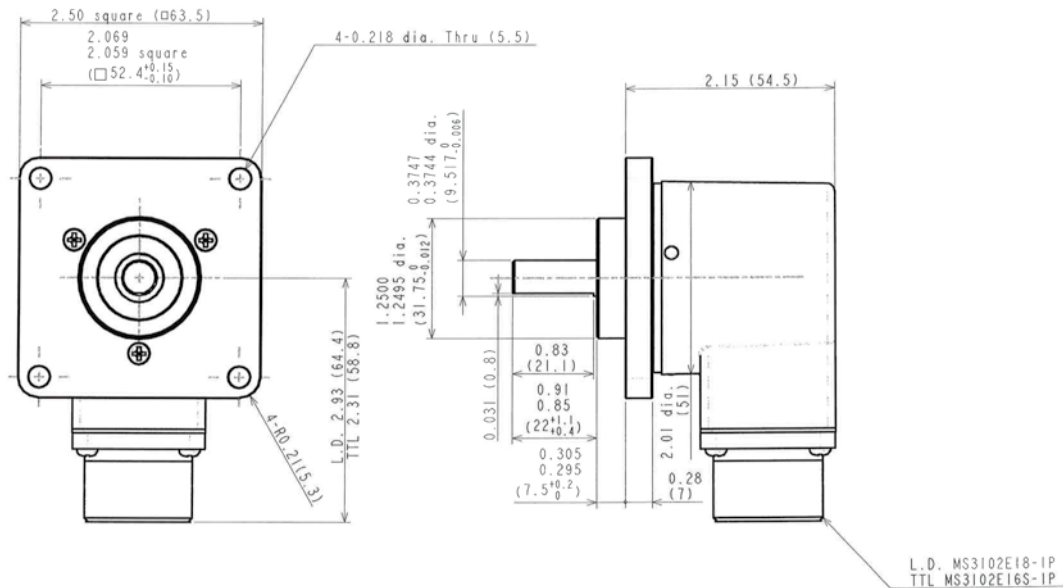
#DMS3102E18-1P (10 Pin)/MATING# DMS3106E18-1S

Pin Code	Line Driver
A	Channel A
B	Channel B
C	Index Z
D	Vcc
E	—
F	OV, Common
G	Case Ground
H	Channel A not
I	Channel B not
J	Index Z not

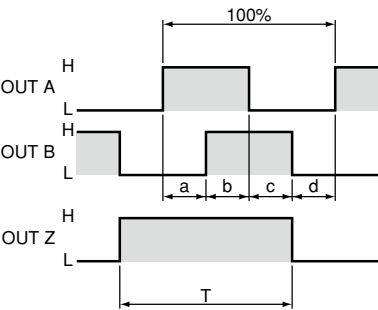
SIZE 25 SERIES TRDA-25N
INCREMENTAL SHAFT ENCODER

OUTSIDE DIMENSIONS

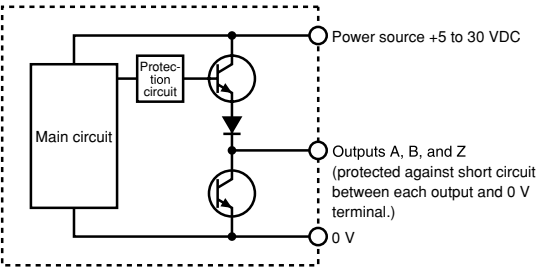
TRDA-25SNXXXX □ W-MS



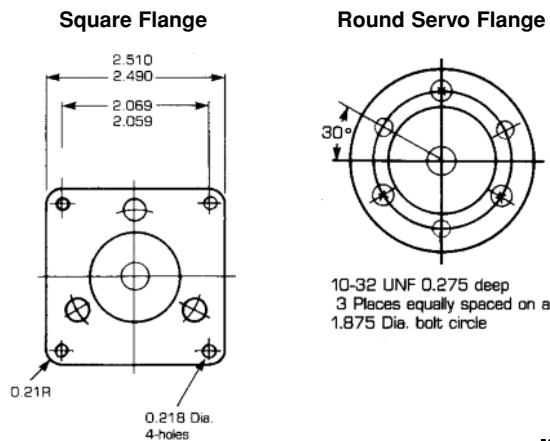
TTL (Totem Pole) Wave Form
(viewed from shaft side)



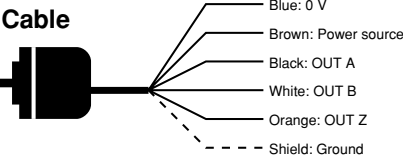
TTL Output circuit



Detachable Flanges (You may choose and change)



WIRING DIAGRAMS (TTL)
AWG 20-22



TTL Connections (7 pin)/
Order Separately
#DMS3102E16-P
Mating# DMS3106E16-1S
(Shield = Body)

Pin Code	Function
A	Channel A
B	Channel B
C	Index Z
D	Vcc
E	—
F	OV, Common
G	Case, GRD

Series TRDA-25N / Size 25 Shaft Encoder

Model	Flange	N	Resolution	Output	W	Termination	
TRDA-25	☐	N	☐ ☐ ☐ ☐	☐	W	☐	
ORDERING INFORMATION							
TRDA-25 Size 25 Shaft Encoder	S: Square Flange	N	Metal Disks	RZ: 5 - 30V TTL (single ended)	W NEMA 4 (IP65)	Blank: Cable (3.3 ft.) MS: Side Mount MS Connector ME: End Mount MS Connector	
			3 4 5				
			10 30 40				
			50 60 100				
			120 192 200				
	R: Round Flange (3) #10-32 @1.875" BC		240 250 300	V: 5V Line Driver (26C31 Compatible)			
			360 400 480				
			500				
			Glass Disks				S: 5 - 30V Super Line Driver (0L7272 Compatible)
			600 750 1000				
			1024 1200 2000				
			2048 2500 5000				

PRICING INFORMATION

	FLANGE:		RESOLUTION	ELECTRICAL		MECHANICAL	TERMINATION
TRDA-25 Base Price \$340.00	Detachable Flanges		3 Thru N/C 500	TTL 5-30V (Single Ended) - Quadrature A & B with Index Z Add \$20.00		Shaft Seal Standard N/C	MS Conn.—Diecast Body NEMA4 IP-65 - Side Mount Add \$55.00
	Square Flange #TRDA-25SN Add \$10.00		1000 Thru Add \$25.00 2048	Linedriver 5V Quadrature A & B with Index Z Add \$20.00			3 ft. cable/Diecast Body NEMA4, IP-65 N/C
	Round Flange #TRDA-25RN Add \$10.00		2500 Add \$40.00	Super Linedriver 5-30V Quadrature A & B with Index Z Add \$30.00			MS 10 pin Mating-Part #DMS3106E18-1S \$38.00 (order separately) MS 7 pin Mating-Part #DMS3106E16-1S \$30.00 (order separately)
			5000 Add \$365.00				

PART NUMBER	LIST PRICE	PART NUMBER	LIST PRICE	Flanges	
TRDA-25SN100RZW-MS	\$425.00	TRDA-25SN1024RZW-MS	\$450.00	TRDA-25RN	\$10.00
TRDA-25SN100SW-MS	\$435.00	TRDA-25SN1024SW-MS	\$460.00	TRDA-25SN	\$10.00
TRDA-25SN100VW-MS	\$425.00	TRDA-25SN1024VW-MS	\$450.00	Mating Connector	
TRDA-25SN192RZW-MS	\$830.00	TRDA-25SN2000RZW-MS	\$450.00	DMS3106E18-1S (10pin Linedriver)	\$45.00
TRDA-25SN250SW-MS	\$435.00	TRDA-25SN2000SW-MS	\$460.00	DMS3106E16-1S (7pin TTL)	\$35.00
TRDA-25SN250VW-MS	\$425.00	TRDA-25SN2000VW-MS	\$450.00	MS mating conn. w/10ft cable assemblies	
TRDA-25SN360SW-MS	\$435.00	TRDA-25SN2048SW-MS	\$460.00	C10-9-10 LD (Linedriver)	\$85.00
TRDA-25SN360VW-MS	\$425.00	TRDA-25SN2048VW-MS	\$450.00	MS10 pin mating w/10ft cable (9 wires)	
TRDA-25SN500RZW-MS	\$425.00	TRDA-25SN2500RZW-MS	\$465.00	C7-5-10 RC (TTL)	\$75.00
TRDA-25SN500SW-MS	\$435.00	TRDA-25SN2500SW-MS	\$475.00	MS7 pin mating w/10ft cable (5 wires)	
TRDA-25SN500VW-MS	\$425.00	TRDA-25SN2500VW-MS	\$465.00	Cables	
TRDA-25SN1000RZW-MS	\$450.00	TRDA-25SN5000VW-MS	\$830.00	CBL-2025N-XXX FT	\$3.00 per Ft.
TRDA-25SN1000SW-MS	\$460.00			Bell Flanges	
TRDA-25SN1000VW-MS	\$450.00			F-20	\$60.00
				F-21	\$60.00
				3.5" Center Height Foot Mounting Bracket	
				LM-001	\$90.00

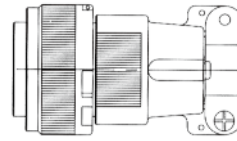
OPTIONAL PARTS:

Order Separately

DETACHABLE FLANGE

	Part No.	List Price
Square Flange	TRDA-25SN	\$10.00
Round Flange	TRDA-25RN	\$10.00

Plug Connector

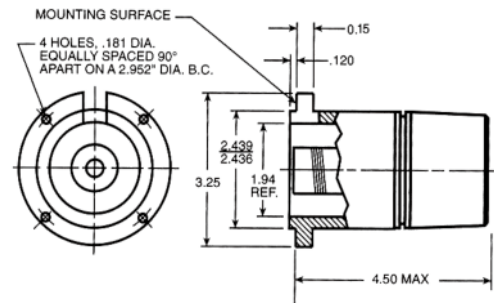
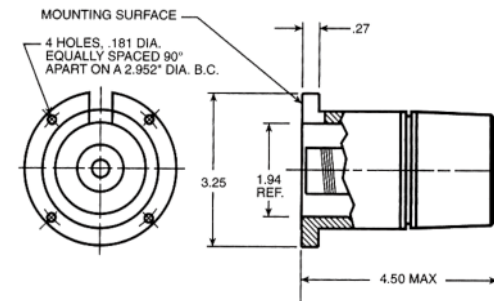


MATING CONNECTOR KIT

LD 10 Pin	DMS3106E18-1S	\$45.00
TTL 7 Pin	DMS3106E16-1S	\$35.00
(Including Straight Plug w/Cable Clamp, Insertion & Bushing)		
Cable	CBL-2025N-XXXFT	\$ 3.00/Ft.

BELL FLANGES / For Servo / Round Flange Encoder

NEMA 42-Flat Bottom	F-20	\$60.00
NEMA 42-Pilot@Bottom	F-21	\$60.00

F-21

F-20


FLEXIBLE COUPLING

BT100-C.250-C.375	\$90.00
BT125-C.375-C.250	\$100.00
BT100-C.375-C.375	\$90.00
BT125-C.375-C.375	\$100.00
BT125-C.375-C.500	\$100.00
BT125-C.375-P8MM	\$100.00
BT125-C.375-P10MM	\$100.00

(Refer to Page 20 for the detail specifications.)



3.5" CENTER HEIGHT FOOT MOUNTING BRACKET

5.25"Hx3.2"Wx2.5"L	LM-001	\$90.00
--------------------	--------	---------

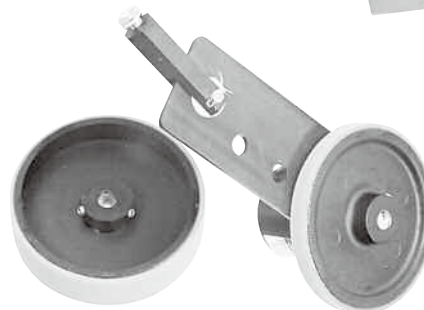


12" CIRCUMFERENCE MEASURING WHEEL (3.82" dia)

Material	Hub x Width		
Urethane	3/8" x 3/8"	MW-1-B	\$45.00
Urethane	3/8" x 1"	MW-1W-B	\$50.00

Urethane Rubber: 83A Shore Hardness

Operating Temperature: -25° to 65° C, -20° to 150° F



OPTIONAL PARTS:

Order Separately

● Measuring Wheel Mounting Adapter & Yoke Assembly Kit

Mt. Beam Size	Part No.	List Price
1/4" - 28	MTA/Y-1	\$30.00
3/8" - 16	MTA/Y-3	\$30.00

Measuring Wheel Mounting Adapter

Size	Part No.	List Price
6"x2.25"x1/8" Thickness	MTA-001	\$15.00

Yoke Assembly

Size	Mt. Beam Size	Part No.	List Price
2.25"L x 5/8"	1/4" - 28	Y-1	\$15.00
2.25"L x 5/8"	3/8" - 16	Y-3	\$15.00

● Measuring Wheel Mounting Adapter & Offset Foot Bracket Assembly Kit

Arm Length	Part No.	List Price
7.00"	MTA/MB-UB2	\$90.00
11.25"	MTA/MB-UB2A	\$100.00

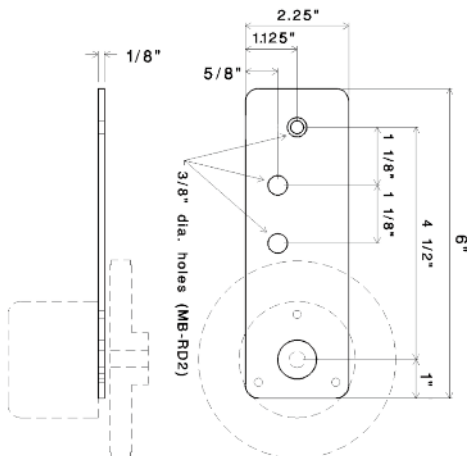
Measuring Wheel Mounting Adapter

Size	Part No.	List Price
6"x2.25"x1/8" Thickness	MTA-001	\$15.00

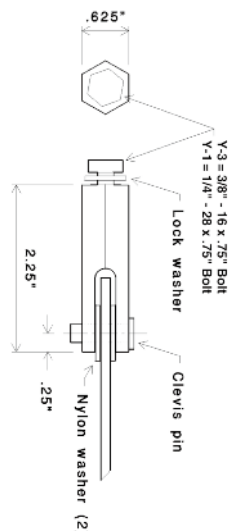
Offset Foot Bracket

Size	Part No.	List Price
3.125"H x 7.00" Arm	MB-UB2	\$60.00
3.125"H x 11.25" Arm	MB-UB2A	\$70.00

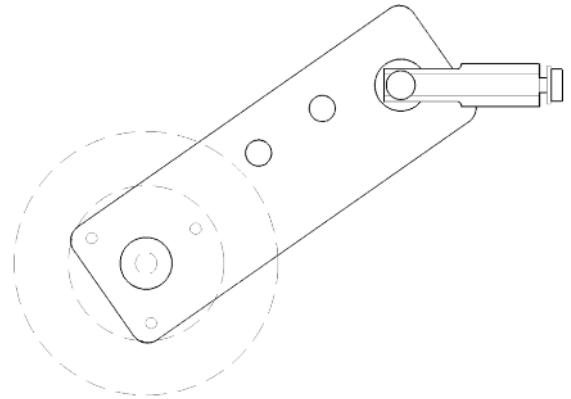
Measuring Wheel Mounting Adapter



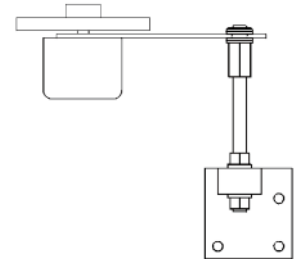
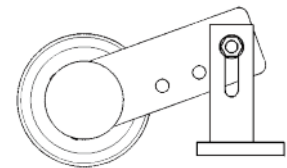
Yoke Assembly



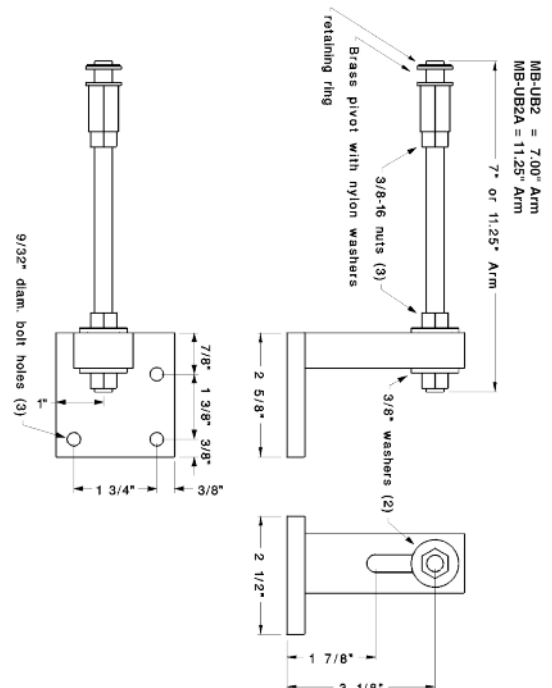
Mounting Adapter & Yoke Assembly Kit



Mounting Adapter & Offset Foot Bracket Assembly Kit



Offset Foot Bracket



METRIC OEM SERIES TRD-J

INCREMENT SHAFT ENCODER

FEATURES

- 2.0" (50mm) O.D.m Medium-duty designed, NEMA 12/IP54
- .315"(8mm) Solid Shaft, Standard Shaft Protection Scraper
- Up to 1024 P/R
- Strong in vibration and shock using all Metal disks.
- 5-30Vdc TTL and 5Vdc Line Driver Output.
- Competitive Low Prices!



Linedriver, 1024 P/R

S.R.P. List Price
US \$285.00

SPECIFICATIONS

Electrical

Pulse per Revolution	Up to 1024 P/R
Supply Voltage	5~30Vdc TTL & 5Vdc Line Driver
Output Format	Dual Square Wave in Quadrature with Index
Output Option	TTL Output, Line Driver
Current Requirement	TTL: 60mA Max. No Load Line Driver: 130mA Max. No Load
Frequency Response	200 KHz
Duty Ratio	50±25%
Phase Shift	25±12.5%
Index Signal Width	100±50%
Output Level	(H) ≥2.5V (L) ≤0.5V
Rise and Fall Time	≤1μs (When cable length is 1m)
Insulation Resistance	≥50MΩ

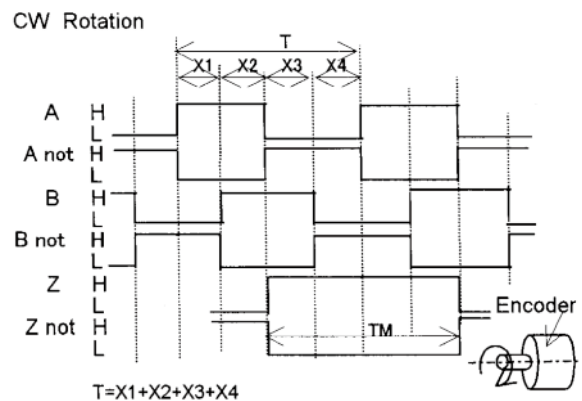
Mechanical

Shaft Diameter	8 mm (0.315")
Shaft Loading	Axial: 60N (14 lbs) Radial: 100N (23 lbs)
Shaft Scraper	Standard (Detachable, Repairable)
Starting Torque	1.4 oz. in (0.003N•m) at 20°C
Shaft Angular Acceleration	1000 rad/Sec ²
Moment of Inertia	2.0x10 ⁻³ Kg • m ²
Mech. Perm. Speed	6000 rpm Max.
Weight	0.5 lb

Environmental

Temperature	Operating: -10 ~ +70°C Storage: -25 ~ +85°C
Operation Humidity	35 ~ 85% without condensation
Vibration	Durable for one hour along 3 axes at 10 to 55 Hz 0.75mm amplitude
Shock	981 m/s ² (11ms 3 times, each X, Y, Z)
Withstand Voltage	500VAC
Construction	NEMA 12/IP-54

LINE DRIVER WAVE FORM



DIVISION ACCURACY

Symmetry (A,B)	$X1+X2=0.5\pm0.25T$ $X2+X3=0.5T\pm0.25T$
Phase shift	$Xn=0.25T\pm0.125T$ (n=1, 2, 3, 4)
Signal width of Z ch.	$TM=1T\pm0.25T$

$T=360^\circ/N$ N: Pulse per revolution

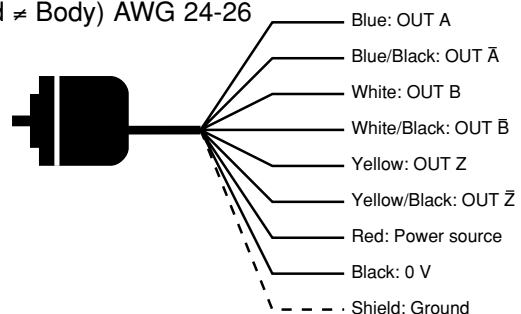
DIVISION ACCURACY OF SIGNAL

Pitch Error	±0.01T
Adjacent Pitch Error	±0.02T

WIRING DIAGRAMS

LINE DRIVER CONNECTIONS

(Shield ≠ Body) AWG 24-26

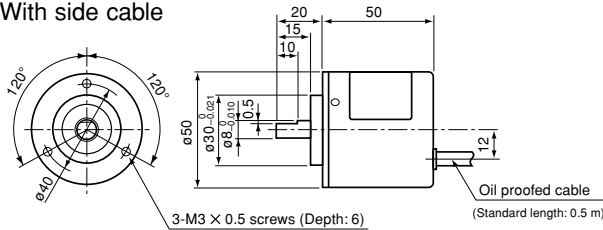


METRIC OEM SERIES TRD-J

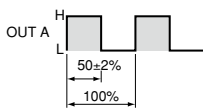
INCREMENT SHAFT ENCODER

OUTSIDE DIMENSIONS

● With side cable

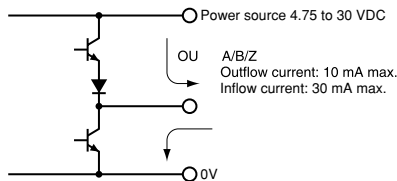


TTL (Totem Pole) Wave Form CW (Viewed from the encoder shaft)
One-phase: TRD-JXXX-S

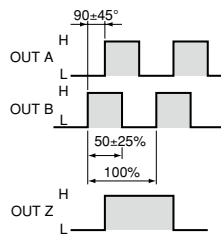


TTL OUTPUT circuit

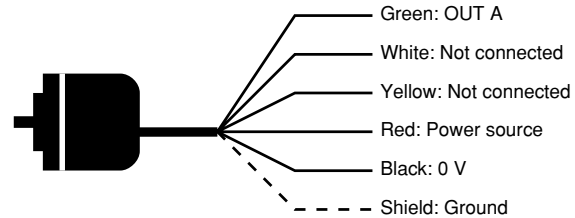
Totem-pole output:



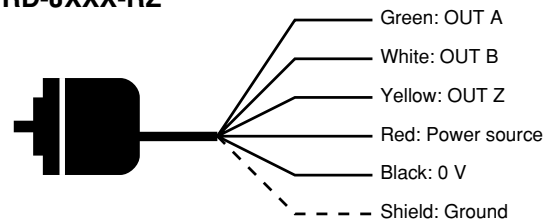
Two-phase with Index: TRD-JXXX-RZ



WIRING DIAGRAM (Shield ≠ Body) AWG 20-22
One-phase: TRD-JXXX-S



Two-phase with Index: AWG 20-22
TRD-JXXX-RZ



OPTIONAL PARTS: Order Separately

FLEXIBLE COUPLING

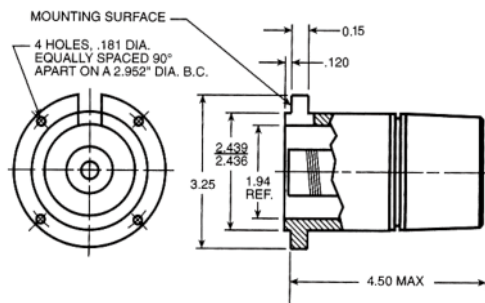
BT075-C.250-P8MM	\$80.00
BT100-C.375-P8MM	\$90.00
BT125-C.375-P8MM	\$100.00

(Refer to Page 20 for the detail specifications.)

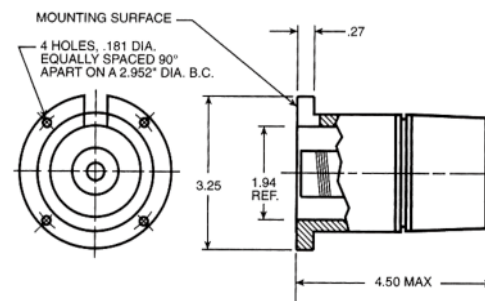
BELL FLANGES / For Servo / Round Flange Encoder

NEMA 42-Flat Bottom	F-20	\$60.00
NEMA 42-Pilot@Bottom	F-21	\$60.00

F-21



F-20



35mm CENTER HEIGHT FOOT MOUNTING BRACKET

65mmHx65mmWx45mmL	JT-035	\$16.00
-------------------	--------	---------



12" CIRCUMFERENCE MEASURING WHEEL (3.82" dia)

Material	Hub x Width		
Urethane	8mm x 3/8"	MW-1-8MM	\$45.00
Urethane	8mm x 1"	MW-1W-8MM	\$50.00

Urethane Rubber: 83A Shore Hardness

Operating Temperature: -25° to 65° C, -20° to 150° F

Koyo has been changed the Brand to **JTEKT**

JTEKT Electronics Corp. – since Oct.1, 2022



Metric OEM Series TRD-J / Size 20 Shaft Encoder

Model	Resolution		Output Signal	Output Type	Termination	Options
TRD-J	☐	☐	☐	☐	☐	☐
ORDERING INFORMATION						
TRD-J Size 20 Shaft Encoder	10	300	S: One-Phase*SB Channel A Only	Blank: Totem-pole TTL (5 - 30V)	Blank: Rear Cable (Length=0.5m)	W: Water Proof
	30	360				
	40	400				
	50	500	RZ: Quadrature*RZB A & B with Index Z	V: Line Driver 5V		
	60	600				
	100	750				
	120	1000				
	200	1024				
	240					

PRICING INFORMATION						
	RESOLUTION			ELECTRICAL	TERMINATION	OPTIONAL
TRD-J Base price \$210.00	30 Thru 200	Add \$10.00		S: TTL Single Phase 5 - 30V Add \$30.00	Std. 1.5ft. Shielded Cable	W: Water Proof Add \$60.00
	240 Thru 600	Add \$20.00		RZ: TTL Quadrature A & B w/ Index Z 5 - 30V Add \$40.00		
	750 Thru 1024	Add \$30.00		V: Linedriver Quadrature A & B w/ Index Z 5V Add \$45.00		

PART NUMBER		LIST PRICE	PART NUMBER		LIST PRICE
TRD-J100-S		\$250.00	TRD-J500-RZV		\$275.00
TRD-J120-S		\$250.00	TRD-J600-RZ		\$270.00
TRD-J200-S		\$250.00	TRD-J1000-RZ		\$280.00
TRD-J400-S		\$260.00	TRD-J1000-RZV		\$285.00
TRD-J500-S		\$260.00	TRD-J1000-RZW		\$345.00
TRD-J1000-S		\$270.00	TRD-J1024-RZ		\$280.00
TRD-J360-SW		\$320.00	TRD-J1024-RZV		\$285.00
TRD-J1000-SW		\$330.00	TRD-J1024-RZVW		\$345.00
TRD-J30-RZ		\$260.00	Retired Model Numbers		
TRD-J50-RZ		\$260.00	Not Available		Direct Replacement
TRD-J60-RZ		\$260.00	TRD-J100-RZ-1664		*TRD-J100-RZ
TRD-J100-RZ		\$260.00	TRD-J1000-1472D		*TRD-J1000-RZ
TRD-J100-RZW		\$320.00	TRD-J400-RZ-2306		*TRD-J400-RZ
TRD-J200-RZ		\$260.00	Foot Mtg. Bracket (Center Height: 35mm)		
TRD-J300-RZ		\$270.00	JT-035		\$20.00
TRD-J300-RZW		\$330.00	Koyo has been changed the Brand to JTEKT JTEKT Electronics Corp. – since Oct.1, 2022		
TRD-J360-RZ		\$270.00			
TRD-J400-RZ		\$270.00			
TRD-J500-RZ		\$270.00			

Series TRDA-2A / Size 25 Metric Spindle Encoder For CNC

MODEL NUMBER	SPECIFICATION	LIST PRICE	OPTIONAL
TRDA-2AS1024V-7083	Square Flange	\$930.00	Mating Connector Kit Part #DMS3106E20-29S Order separately List \$65.00
NEW! TRDA-2ASR1024V-7083	Round Flange	\$930.00	

SIZE 25 SERIES TRDA-2A

INCREMENTAL SHAFT ENCODER



US \$930.00
S.R.P. List Price

SPECIFICATIONS

Electrical

Pulse per Revolution	1024
Supply Voltage	4.75~5.25Vdc allowable ripple < 3%
Output Format	Line driver output 26C31 (EIA: RS-422A)
Current Consumption	150mA
Frequency Response	171 KHz
Duty Ratio	50±25%
Phase Shift	25±12.5%
Index Signal Width	100±50%
Output Level	(H) ≥2.3V (L) ≤0.5V
Rise and Fall Time	≤3μs
Insulation Resistance	≥50MΩ
Signal Wave	Two channel + index output

Mechanical

Shaft Loading	Axial: 50 (11.2)N (lbs) Radial: 100 (22.5)N (lbs)
Starting Torque	≤ 0.1N • m at +25°C
Moment of Inertia	1.0x10 ⁻³ Kg • m ²
Slew Speed	10000 min ⁻¹
Weight	0.75 kg

Environmental

Temperature	Operating: -10 ~ +70°C Storage: -25 ~ +85°C
Operating Humidity	35 ~ 85% without condensation
Vibration	Durable for one hour along 3 axes at 10 to 55 Hz 0.75mm amplitude
Shock	294 m/s ² (1ms 3-times, each X, Y, Z)
Withstand Voltage	500VAC at 50/60Hz for 1 minute
Construction	NEMA4/IP65

DIVISION ACCURACY

Symmetry (A, B)	X1+X2=0.5T±0.25T X2+X3=0.5T±0.25T
Phase shift	Xn=0.25T±0.125T (n=1, 2, 3, 4)
Signal width of Z ch.	TM=1T±0.5T

T=360° / N N: Pulse per revolution

DIVISION ACCURACY OF SIGNAL

Pitch Error	±0.01T
Adjacent Pitch Error	±0.02T

PULSE PER REVOLUTION	1024
-----------------------------	------

Spindle Encoder for CNC Machine Tools
Interchangeable with FANUC, SUMTAK, Kuroda and Tamagawa

FANUC # A86L-0027-001#002 (=Kuroda)

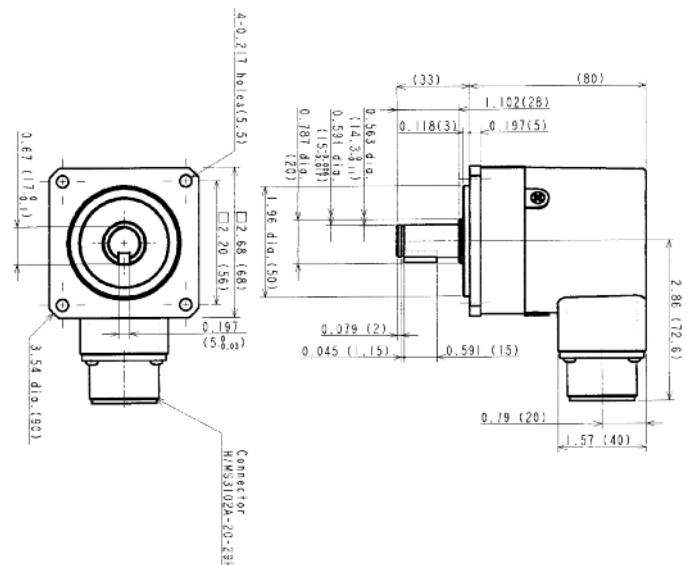
Tamagawa # TS 1508N91

SUMTAK # LF102.4BMC05P, #LF102.4BMS116, #LFC-002-1024

FEATURES:

- 2.5" (63mm) O.D. Heavy-duty designed. NEMA4/IP65
- 0.6" (15mm) Shaft, Shaft Seal Std.
- 1024 P/R Only, Square Flange & Round Flange
- Cost-effective, easy to switch for system integrators
- For Cincinnati Machine, Mazak, Yaskawa, Hitachi (Mori) Seiki, Vickers, etc.

OUTSIDE DIMENSIONS/SQUARE FLANGE MODEL

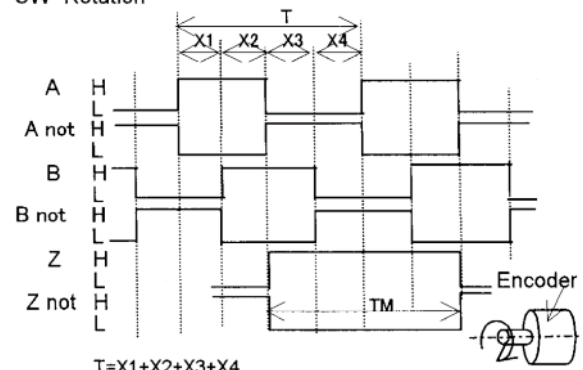


Order No.:

TRDA-2AS1024V-7083

LINE DRIVER WAVE FORM

CW Rotation



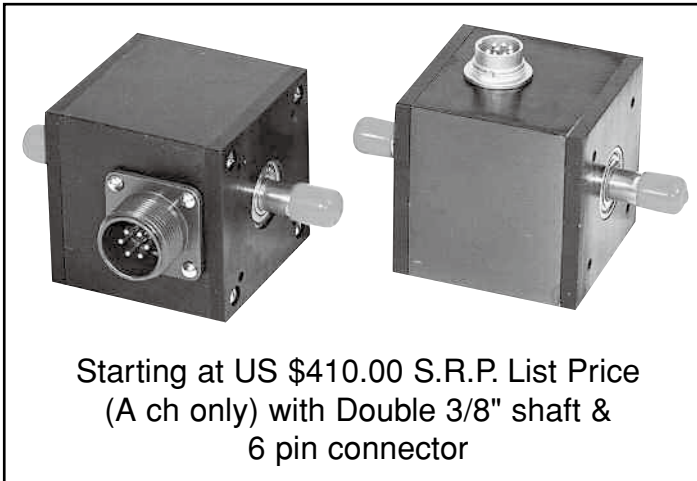
$$T = X1 + X2 + X3 + X4$$

CW ROTATION AS VIEWED FROM ENCODER SHAFT

Koyo. has been changed the Brand to **JTEKT**

JTEKT Electronics Corp. – since Oct.1, 2022

QUBE 2.25" SERIES RS INCREMENTAL SHAFT ENCODER



Electrical

Pulse per Revolution	Up to 1200 P/R
Output Format	Single Ended (A ch.) Dual Square Wave in Quadrature (A & B ch.) Dual Square Wave in Quadrature with Index (A, B, Z ch.)
Supply Voltage (v) & Output Circuit	
8-30	Pull-up Resistor TTL current sinking (Max. 50mA)
5-26C	Open Collector 7273 (Max. 50mA)
5-26D	Diff. Line Driver 7272 (Max. 100mA)
5-26PP	Push-Pull Resistor 7272 (Max. 50mA)
Frequency Response	100kHz
Duty Ratio	50±25%
Phase Shift	25±12.5%
Index Signal Width	100±50%

Outputs

- **Pull Up Resistor (Current Sinking)** An NPN transistor with a pull-up resistor and capable of sinking 50ma of current per output. This type of encoder output is used with a PLC or other control device that sources current. Current flows out of the PLC to the encoder, which uses the NPN transistor to represent binary logic by optionally switching the current source to ground.
- **7273 Open Collector (NPN)** For applications requiring an uncommitted output. The output voltage level can be pulled up with an external resistor to a maximum of 30vdc. Maximum sink current is 50ma. per output.
- **Differential Line Driver (7272)** An 7272 differential line driver that generates complimentary outputs: A / -A, B / -B, and Z / -Z as needed. The encoder must be operated at 5-26 vdc, input and output.
- **Push-Pull (7272)** This general purpose output functions as a PNP transistor for applications requiring a current sourcing output. It functions as an NPN transistor with 3.3K pull-up for applications requiring a current sinking output. This output is TTL compatible when used with a 5vdc supply. Maximum source / sink current is 50 ma. per output.

FEATURES

**WORLD
ENCODERS**

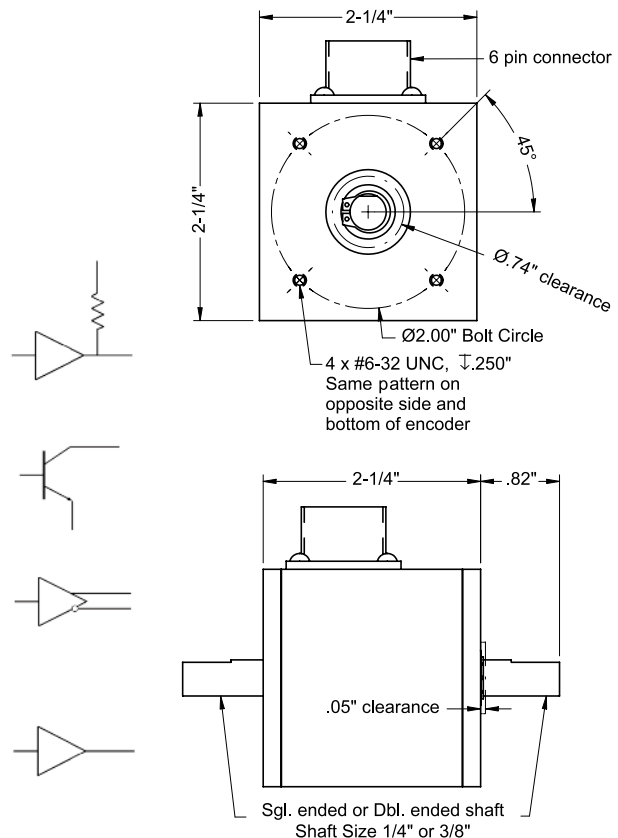
brand, Made in USA

- Qube 2.25" series RS is designed for application in industrial environments such as Measuring, Cut-to-Length, Size for Textile, Metal, Lumber and Rubber Industries.
- Tracking, Storage and Retrieval, Pick and Place, Conveying and Elevating for Material Handling applications.
- Environmentally IP54/NEMA 12 enclosure
- Up to 1200 P/R

Mechanical

Shaft Diameter	1/4", 5/16", 3/8", 1/2"
Shaft Type	Sgl. ended, Dbl. ended
Shaft Loading 1/4", 3/8"	Axial: 15 lbs. Radial: 25 lbs.
Shaft Loading 1/2"	Axial: 35 lbs. Radial: 45 lbs.
Rated Speed	6000 RPM
Materials	Aluminum Case (Anodized) Shaft: 303 Stainless
Weight	13 oz.

DIMENSIONS



QUBE 2.25" SERIES RS

INCREMENTAL SHAFT ENCODER

Environmental

Temperature	Operating: 0 ~ 70°C Storage: -10 ~ 85°C
Operation Humidity	35-85% without condensation
Vibration	Max 10g (58 to 500 Hz)
Shock	50g (11 ms duration)
Enclosure	IP-54/NEMA 12

Wiring Diagram

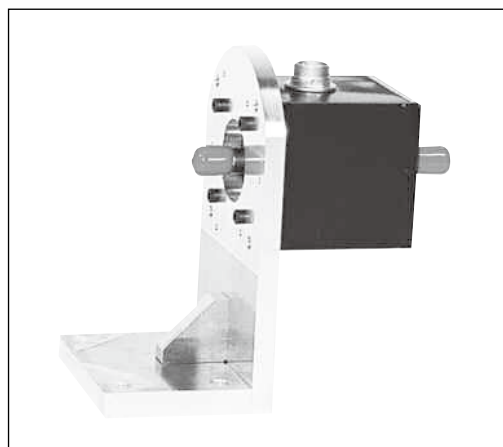
PIN #	6 Pin Sgle-ended	Same Wire Color	6 pin Diff. Line Driver	Same Wire Color
A	Common	Black	Common	Black
B	Supply Voltage	Red	Supply Voltage	Red
C	N/C	—	A ch.	White
D	A ch.	White	A not ch.	Blue
E	N/C	—	B ch.	Green
F	N/C	—	B not ch.	Brown
Mating Connector		MS 3106A (Shell), 14S-6S (Insert)		
Mating connector with 10 ft Cable Ass'y		A ch. only A, B, Z ch.	Part #C6-3-10CF (3 wires) Part #C6-6-10CF (6 wires)	

PIN #	8 Pin Diff. Line Driver w/Index Z	Same Wire Color
1	A ch.	White
2	B ch.	Green
3	Z ch.	Yellow
4	Supply Voltage	Red
5	Common	Black
6	A not ch.	Blue
7	B not ch.	Brown
8	Z not ch.	Orange
Mating Connector		8 pin 16 mm Metric Circular Conn.
Mating Connector with 10 ft Cable Ass'y		Part #D8-8-10 (8 wires)

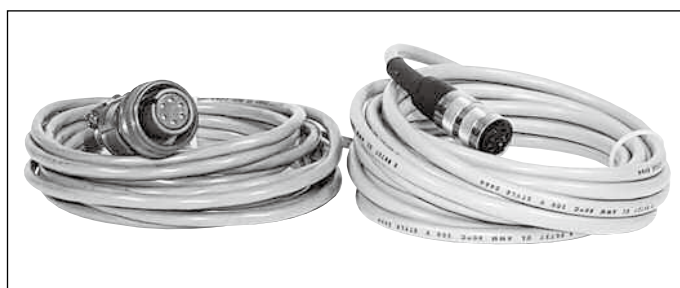
Measuring Wheels



3.5" Center Hgt Foot Bracket #LM-001



Mating Connector with 10 ft cable ass'y



QUBE 2.25" Series RS Incremental Shaft Encoder

Model	Shaft Size	Prog.	Shaft Style	Channels	Resolution	Anti-Jitter	Voltage/Output
RS	☐	☐	☐	☐	- ☐ ☐ ☐ ☐	☐ ☐	/ ☐
ORDERING INFORMATION							
RS	B: 3/8" (Std.) C: 1/4" (Std.) .5: 1/2" (Opt.) A: 5/16" (Opt.)	Blank: Std. P: Programmable	Blank: Sgl-ended Shaft D: Double-ended Shaft	Blank: Sgl-ended (A ch. Only) Q*: Dual Quadrature: (A & B ch.) QZ*: Dual Quadrature: (A, B & Z ch.)	60 500 100 512* 120 600* 180* 720* 200* 1000 250* 1024 300* 1200* 360	Blank: Std. AJ: Anti-jitter	8-30 = Pull-up Resistor TTL Current Sinking 8~30vdc 5-26C = Open Collector 5~26vdc (NPN w/o resistor) 7273 5-26D = Diff. Line Driver 7272 5~26vdc in, 5v out 5-26PP = Push-Pull resistor 7272 5~26vdc

PRICING INFORMATION							
Model	Shaft Size	Prog.	Shaft Style	Channels	Resolution	Anti-Jitter	Voltage/Output
RS Base Price \$410.00	B: 3/8" N/C C: 1/4"	Blank: Std. N/C P: Programmable Add \$30.00	Blank: Sgl-ended Shaft N/C D: Dbl-ended Shaft N/C	Blank: A Ch. Only N/C *Q: A & B Ch. Add \$30.00 *QZ: A, B & Z Ch. Add \$80.00	60 Thru 600 720 Add \$25.00 Thru 1200	Blank: Std. AJ: Add \$40.00	8-30: N/C (Pull-up) 5-26C: Add \$25.00 (Open Collector) 5-26D Add \$25.00 (Line Driver) 5-26PP Add \$25.00 (Push-Pull)

Standard Stock Items: Shipped immediately. *Lead Time: 7 - 10 days to ship.

PART NUMBER	LIST PRICE	PART NUMBER	LIST PRICE
RSB60/8-30	\$410.00	Mating Connector with 10-20 Ft. Cable Assembly	
RSB120/8-30	\$410.00	#C6-3-10CF (A ch. Only-Sgl.ended) MS 6pin Mating w/10ft cable (3 wires)	\$35.00
RSB360/8-30	\$410.00	#C6-4-10CF (A,B ch-Sgl.ended) MS 6pin Mating w/10ft cable (4 wires)	\$40.00
RSB500/8-30	\$410.00	#C6-6-10CF (A,B & Z chs.) or (A, $\bar{A}$, B, $\bar{B}$, chs.) MS 6pin Mating w/10ft cable (6 wires)	\$40.00
RSB600/8-30	\$410.00	#C6-6-20CF MS 6 pin mating w/20ft cable (6 wires)	\$80.00
RSB1000/8-30	\$435.00	#D8-8-10 (A, $\bar{A}$, B, $\bar{B}$, Z, $\bar{Z}$ chs.-Linedriver) Amphenol 16mm Circular Mating w/10ft cable (8 wires)	\$50.00
RSBQ-1056/5-26C	\$640.00	#D8-8-20 M16 conn. 8 pin mating w/20ft cable (8 wires)	\$80.00
RSBDQ-250/8-30	\$440.00	Mounting Flange	
Best Selling Models for Conveyors		#MB-FL3 Rectangular Flange 2.25" W x 3.25" L x 0.25" T with 1" hole in center.	\$18.00
RSBQ-500/8-30	\$440.00	#LM-001 3.5" Center Height Ft. Mounting Bracket 5.25" H x 3.2" W x 2.5" L w/1.25" hole	\$90.00
RSBQ-600/8-30	\$440.00	Measuring Wheels	
RSBQ-1000/8-30	\$465.00	#MW-1-B 3" Dia,12" Circumference 3/8" wide, 3/8" Hub I.D.	\$50.00
RSBQ-1200/8-30	\$465.00	#MW-1W-B 3" Dia,12" Circumference 1" wide, 3/8" Hub I.D.	\$50.00
RSB-5AJ/8-30	\$450.00	#MW-30-B 30cm Circumference 3/8" wide, 3/8" Hub I.D.	\$50.00
RSB-P64AJ/8-30	\$510.00	#MW-30W-B 30cm Circumference 1" wide, 3/8" Hub I.D.	\$50.00

Standard Stock Items: Shipped immediately. *Lead Time: 7 - 10 days to ship.

SIZE 20 SERIES R22

WHEELED INCREMENTAL SHAFT ENCODER



Starting at US \$450.00 S.R.P. List Price
(A ch only) with Std. 8" cir. wheels
(Urethane Tire)

FEATURES

**WORLD
ENCODERS**

brand, Made in USA

- Generates pulses for accurate linear measurement.
- Heavy Duty construction, NEMA12, IP-54.
- Compact size vs. Size 30.
- Precision 8" or 20cm circumference measuring wheels.
- 16mm or M12 mating conn. with 10' cable.
- "Anti-Jitter" and other material handling features.
- ESD, Short Circuit, Reverse Voltage protection.
- Various mounting hardware kits are available.
- Programmable model available - see Model R22-P.

Electrical

Pulse per Revolution	Up to 1200 P/R, 1800, 3600 (A ch only)
Output Format	Single Ended (A ch.) Dual Square Wave in Quadrature (A & B ch.) Dual Square Wave in Quadrature with Index (A, B, Z ch.)
Supply Voltage (V) & Output Circuit	
5-26*	Push-Pull 5-26 vdc 7272
5-26C*	Open Collector 7273 (Max. 50mA)
5-26D*	Diff. Line Driver 7272 (Max. 100mA)
5-26DH*	Diff. Line Driver 7272 (Max. 100mA) w/index
Frequency Response	100kHz
Duty Ratio	50±25%
Phase Shift	25±12.5%
Index Signal Width	100±50%

* Note: Refer to Outputs on page 50.

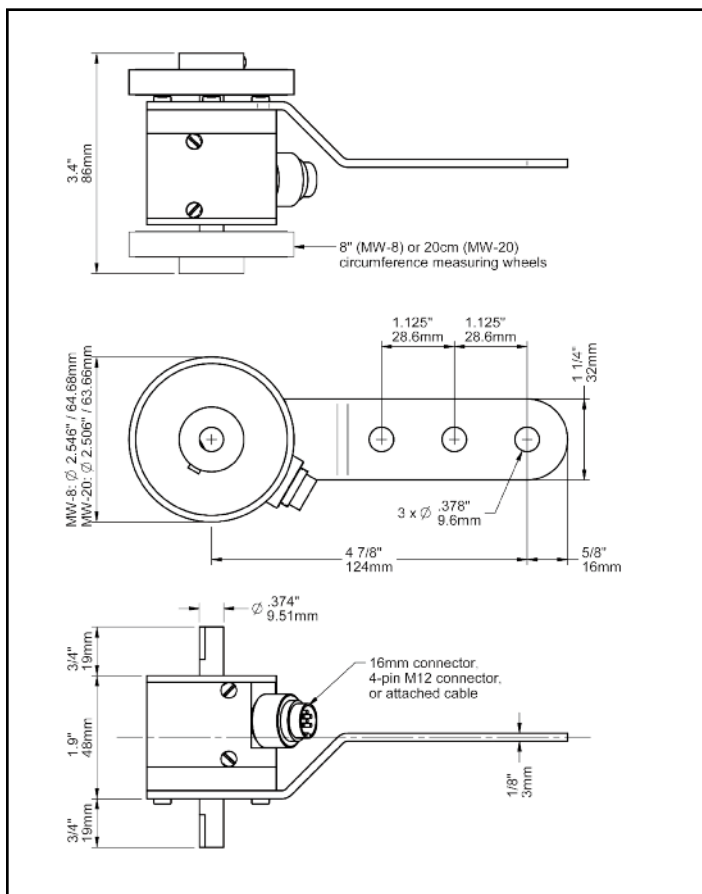
Mechanical

Shaft Diameter	3/8"
Shaft Type	Dbl. ended
Shaft Loading	Axial: 30 lbs. Max. Radial: 40 lbs. Max.
Rated Speed	6000 RPM
Materials	Aluminum Case (Anodized) Shaft: 303 Stainless
Weight	12 oz. (340g)

Environmental

Temperature	Operating: 0 ~ 70°C Storage: -10 ~ 85°C
Operation Humidity	35-85% without condensation
Vibration	Max 10g (58 to 500 Hz)
Shock	50g (11 ms duration)
Enclosure	IP-54/NEMA 12

DIMENSIONS



SIZE 20 SERIES R22

WHEELED INCREMENTAL SHAFT ENCODER

Wiring Diagram

M16-6 Pin Sgl-ended	M12-4 Pin Sgl-ended	Function	Wire Color	6 pin Diff. Line Driver	Pin #	Same Wire Color
1	3	Common	Black	Common	5	Black
2	1	Supply Voltage	Red	Supply Voltage	4	Red
3	—	Z ch.	Brown	A ch.	1	White
4	4	A ch.	White	A not ch.	6	Blue or Green
5	2	B ch.	Green	B ch.	2	Green
6	—	N/C	—	B not ch.	7	Brown
				Z ch.	3	Yellow
				Z not ch.	8	Orange

M12-4 pin Connector: Turck FS4.4

M16-6 pin/8 pin Connector: Amphenol T3402000.

Model	Channels	Resolution	Voltage/Output	Measuring Wheel
R22	☐ - ☐ ☐ ☐ ☐ / ☐			☐
ORDERING INFORMATION				
R22	Blank: Sgl-ended (A ch. Only) M12-4 pin Q: Quadrature (A & B ch.) M12-4 pin QZ: Quadrature w/index (A, B, & Z ch.) M16-6 pin, M16-8 pin P: Programmable w/Sgl-ended (A ch.) M12-4 pin	24 360 60 500 100 512* 120 600* 180* 720* 200* 1000 240 1024 250* 1200 300* 1800** 3600**	5-26 = Push-Pull 5-26vdc 7272 (M12-4 pin) 5-26C = Open Collector 5-26vdc 7273 (NPN w/o resistor) (M12-4 pin) 5-26D = Diff. Line Driver 7272 5-26vdc (M16-6 pin, A & B ch) 5-26DH = Diff. Line Driver 7272 5-26vdc (M16-8 pin, A, B & Z ch)	MW8: Std. (2) MW-8-B wheels 2.5" dia., 8" cir., 3/8" wide Options: MW20: 64mm dia, 3/8" wide, 20 cm cir.

PRICING INFORMATION

Model	Channels	Resolution	Anti-Jitter	Voltage/Output
R22	Blank: A Ch. Only N/C *Q: A & B Ch. Add \$30.00 *QZ: A, B & Z Ch. Add \$80.00 P: Prog. Add \$30.00	60 Thru N/C 1200 1800** 3600** Add \$30.00	Blank: Std. AJ: Add \$40.00	5-26: (Push-Pull) N/C 5-26C: (Open Collector) Add \$25.00 5-26D or 5-26DH: (Line Driver) Add \$25.00

Standard Stock Items: Shipped immediately.

*Lead Time: 7 - 10 days to ship.

**Available: A ch only

PART NUMBER	LIST PRICE	PART NUMBER	LIST PRICE
R22-60/5-26MW-8	\$450.00	Replacement Measuring Wheels (Urethane Tire)	
R22-120/5-26MW-8	\$450.00	#MW-8-B 2.5" Dia., 8" Circumference 3/8" wide, 3/8" Hub I.D.	\$45.00
R22-360/5-26MW-8	\$450.00	#MW-20-B 20cm Circumference, 64mm dia 3/8" wide, 3/8" Hub I.D.	\$45.00
R22-1000/5-26MW-8	\$450.00	Mating Connector with 10-20 Ft. Cable Assembly	
R22-1024/5-26MW-8	\$450.00	#D4-4-10 (1 or 2 ch. Sgl.ended) M12 conn. 4 pin mating w/10 ft cable (4 wires)	\$35.00
R22Q-1024/5-26CMW8	\$480.00	#D6-5-10 (A,B & Z chs.) or (A, Ā, B, B̄, chs.) M16 conn. 6 pin mating w/10 ft cable (5 wires)	\$40.00
R22-1200/5-26MW-8	\$450.00	#D8-8-10 (A, Ā, B, B̄, Z, Z̄ chs.- Linedriver) M16 conn. 8 pin mating w/10ft cable (8 wires)	\$50.00
R22Q-1200/5-26DMW8	\$485.00	#D8-8-20 M16 conn. 8 pin mating w/20ft cable (8 wires)	\$80.00
R22QZ-1200/5-26DHMW8	\$555.00		
Mounting Bracket			
#Y-1 York Ass'y w/1/4"-28 Bolt	\$15.00		
#Y-3 York Ass'y w/3/8"-16 Bolt	\$15.00		
#MB-UB2 Offset Mtg. Bracket w/7" Arm	\$60.00		
#MB-UB2A Offset Mtg. Bracket w/11.25" Arm	\$70.00		
#MB-UB3 Under-Belt Center Hgt. Foot Bracket w/2 springs tension controlled	\$90.00		
#MB-UB4 Under-Belt Mtg. Bracket w/2 springs tension controlled	\$85.00		

Standard Stock Items: Shipped immediately.

*Lead Time: 7 - 10 days to ship.

**Available: A channel only

SIZE 30 SERIES RH **WHEELED INCREMENTAL SHAFT ENCODER**



Starting at US \$520.00 S.R.P. List Price
(A ch only) with Std. 12" cir. wheels
(Urethane Tire)

Electrical

Pulse per Revolution	Up to 1200 P/R, 1800, 3600 (A ch only)
Output Format	Single Ended (A ch.) Dual Square Wave in Quadrature (A & B ch.) Dual Square Wave in Quadrature with Index (A, B, Z ch.)
Supply Voltage (V) & Output Circuit	
8-30	Pull-up Resistor TTL, Current Sinking (Max. 50mA)
5-26C	Open Collector 7273 (Max. 50mA)
5-26D, 5-26DH	Diff. Line Driver 7272 (Max. 100mA)
5-26PP	Push-Pull 7272 (Max. 50mA)
120ACT	AC120v, Triac Output
Frequency Response	100kHz
Duty Ratio	50±25%
Phase Shift	25±12.5%
Index Signal Width	100±50%

Mechanical

Shaft Diameter	3/8"
Shaft Type	Dbl. ended
Shaft Loading	Axial: 10 lbs. Max. Radial: 25 lbs. Max.
Rated Speed	6000 RPM
Materials	Aluminum Case (Anodized) Shaft: 303 Stainless
Weight	1.5 lb. (700g)

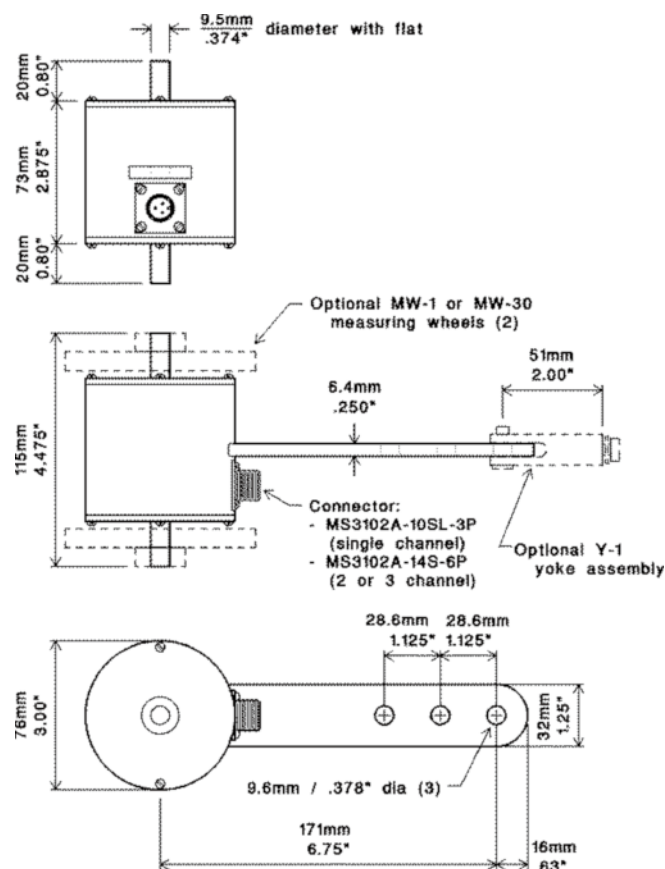
FEATURES

**WORLD
ENCODERS**

brand, Made in USA

- The RH encoder, also known as a Pulse Position Indicator (PPI), generates tracking pulses for web applications when used with barcode laser scanners or CCD vision systems.
- It typically is equipped with two 12 inch or 30 centimeter circumference measuring wheels that ride directly on the conveyor belt or web, eliminating any slippage problems typically encountered with shaft encoders.
- With its double wheel construction, the encoder is self-aligning when allowed to pivot freely from its integral arm.
- The encoder's weight is sufficient to maintain contact when mounted above the moving material.
- Special mounting accessories are also available.

DIMENSIONS



SIZE 30 Series RH Wheeled Incremental Shaft Encoder

Model	Channels	Resolution	Voltage/Output	Measuring Wheel
RH	☐ - ☐ ☐ ☐ ☐ / ☐	☐ ☐ ☐ ☐ ☐ ☐	☐	☐
ORDERING INFORMATION				
RH	Blank: Sgl-ended (A ch. Only) Q: Quadrature (A & B ch.) QZ: Quadrature w/index (A, B, & Z ch.) P: Programmable w/Sgl-ended (A ch.)	24 360 60 500 100 512* 120 600* 180* 720* 200* 1000 240 1024 250* 1200 300* 1800** 3600**	8-30 = Pull-up Resistor TTL Current Sinking 8~30vdc 5-26C = Open Collector 5~26vdc 7273 (NPN w/o resistor) 5-26D = Diff. Line Driver 7272 5~26vdc (MS 6 pin, A & B ch) 5-26DH = Diff. Line Driver 7272 5~26vdc (MS 10 pin, A, B & Z ch) 5-26PP = Push-Pull 5~26vdc 7272 120ACT = 120vAC Triac**	MW-1: Std. (2) MW-1-B wheels 3" dia., 12" cir., 3/8" wide Options: MW-1W: 1" wide, 12" cir. MW-30W: 1" wide, 30 cm cir. MW-30: 3/8" wide, 30 cm cir.

PRICING INFORMATION				
Model	Channels	Resolution	Anti-Jitter	Voltage/Output
RH	Blank: A Ch. Only N/C *Q: A & B Ch. Add \$30.00 *QZ: A, B & Z Ch. Add \$80.00 P: Prog. Add \$30.00	24 Thru 360 N/C 500 Thru 1200 Add \$30.00 1800** 3600** Add \$50.00	Blank: Std. AJ: Add \$40.00	8-30: (Pull-up) N/C 5-26C: Add \$25.00 (Open Collector) 5-26D Add \$25.00 (Line Driver) 5-26PP Add \$25.00 (Push-Pull) 120ACT Add \$70.00 (120vAC Triac)
Base Price \$490.00				

Standard Stock Items: Shipped immediately. *Lead Time: 7 - 10 days to ship. **Available: A ch only

PART NUMBER	LIST PRICE	PART NUMBER	LIST PRICE
RH-500/8-30MW-1	\$520.00	Measuring Wheels for Replacement (Urethane Tire)	
RHQ-1000/5-26DLMW-1	\$575.00	#MW-1-B 3" Dia, 12" Circumference 3/8" wide, 3/8" Hub I.D."	\$50.00
RH-1000/8-30MW-1	\$520.00	#MW-1W-B 3" Dia, 12" Circumference 1" wide, 3/8" Hub I.D.	\$50.00
RH-1024/8-30MW-1	\$520.00	#MW-30-B 30cm Circumference 3/8" wide, 3/8" Hub I.D.	\$50.00
RH-1200/8-30MW-1	\$520.00	#MW-30W-B 30cm Circumference 1" wide, 3/8" Hub I.D.	\$50.00
Best Selling Models for Conveyors		Mating Connector with 10-20 Ft. Cable Assembly	
RH-4AJ/24PMW-1	\$560.00	#C3-3-10CF (A ch. only Sgl. ended) MS 3 pin mating w/10ft cable (3 wires)	\$35.00
RH-24AJ/12CMW-1	\$530.00	#C6-4-10CF (A, B ch) MS 6pin mating w/10ft cable (4 wires)	\$40.00
RH-P240AJ/8-30MW-1	\$590.00	#C6-6-10CF (A, B & Z chs.) or (A, $\bar{A}$, B, $\bar{B}$, chs.) MS 6 pin mating w/10ft cable (6 wires)	\$40.00
RH-P600AJ2/8-30MW-1	\$590.00	#C6-6-20CF MS 6 pin mating w/20ft cable (6 wires)	\$80.00
RH-P600AJB/8-30MW-1	\$590.00	#C10-9-10LD (A, $\bar{A}$, B, $\bar{B}$, Z, $\bar{Z}$ chs. - Linedriver) MS10 pin mating w/10ft cable (9 wires)	\$85.00
RHQZ360/5-26DHW1M226	\$595.00		
Mounting Bracket			
#Y-1 York Ass'y w/1/4"-28 Bolt	\$15.00		
#Y-3 York Ass'y w/3/8"-16 Bolt	\$15.00		
#MB-UB2 Offset Mtg. Bracket w/7" Arm	\$60.00		
#MB-UB2A Offset Mtg. Bracket w/11.25" Arm	\$70.00		
#MB-UB3 Under-Belt Center Hgt. Foot Bracket w/2 springs tension controlled	\$90.00		
#MB-UB4 Under-Belt Mtg. Bracket w/2 springs tension controlled	\$85.00		

Standard Stock Items: Shipped immediately. *Lead Time: 7 - 10 days to ship. **Available: A ch only

SIZE 30 SERIES RH

WHEELED INCREMENTAL SHAFT ENCODER

Environmental

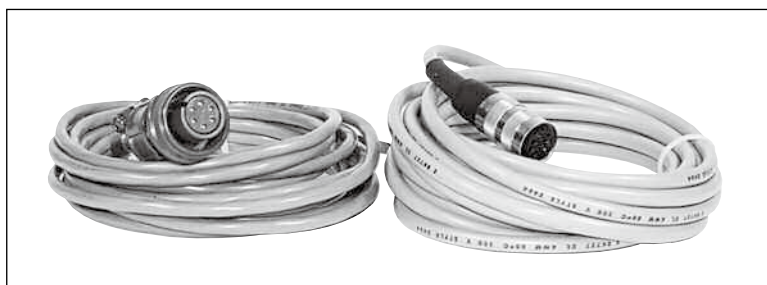
Temperature	Operating: 0 ~ 70°C Storage: -10 ~ 85°C
Operation Humidity	35-85% without condensation
Vibration	Max 10g (58 to 500 Hz)
Shock	50g (11 ms duration)
Enclosure	IP-54/NEMA 12

Wiring Diagram

Wiring Diagram

PIN #	3 Pin Sgl-ended	6 Pin Sgl-ended	Same Wire Color	6 pin Diff. Line Driver	Same Wire Color
A	Common	Common	Black	Common	Black
B	Supply Voltage	Supply Voltage	Red	Supply Voltage	Red
C	—	Z ch.	Brown	A ch.	White
D	A ch.	A ch.	White	A not ch.	Blue
E	—	B ch.	Green	B ch.	Green
F	—	N/C	—	B not ch.	Brown
Mating Connector	3 Pin=MS3102A-10SL-3P		6 Pin=MS3102A-14S-6P		
Mating connector with 10 ft Cable Ass'y	A ch only 3 Pin	Part #C6-3-10CF (3 wires)			
	A, B, Z, ch 6 Pin	Part #C6-6-10CF (6 wires)			

Mating Connector with 10 ft cable ass'y



Diff. Line Driver 10 pin-MS conn.

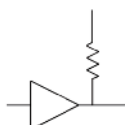
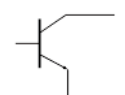
MS10 Connector Pin	Function	Wire Color
A	Output +A	White
B	Output +B	Green
C	Output +Z	Yellow
D	Supply Volts	Red
E	not used	—
F	Common	Black
G	Case Ground	Shield
H	Output -A	Blue
I	Output -B	Brown
J	Output -Z	Orange

Mating Connector (10 pin)

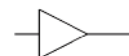
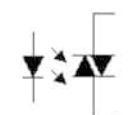
#DMS3106E18-1S \$38.00 (order separately)

Outputs

- **Pull Up Resistor (Current Sinking)** An NPN transistor with a pull-up resistor and capable of sinking 50ma of current per output. This type of encoder output is used with a PLC or other control device that sources current. Current flows out of the PLC to the encoder, which uses the NPN transistor to represent binary logic by optionally switching the current source to ground.
- **7273 Open Collector (NPN)** For applications requiring an uncommitted output. The output voltage level can be pulled up with an external resistor to a maximum of 30vdc. Maximum sink current is 50ma. per output.
- **Push-Pull (7272)** This general purpose output functions as a PNP transistor for applications requiring a current sourcing output. It functions as an NPN transistor with 3.3K pull-up for applications requiring a current sinking output. This output is TTL compatible when used with a 5vdc supply. Maximum source / sink current is 50 ma. per output.



- **Differential Line Driver (7272)** An 7272 differential line driver that generates complimentary outputs: A / -A, B / -B, and Z / -Z as needed. The encoder must be operated at 5-26 vdc, input and output.
- **120vac Triac** an optically isolated triac capable of directly driving most 120 vac loads up to 2 amps (ms) without the use of any external components. It includes a zero crossing detector that switches the triac on and off synchronously at near zero volts. The triac output can be directly interfaced to AC inputs on most PLCs and other motion controllers. Only available with 120 vac supply voltage.



OPTIONAL PARTS:

Order Separately

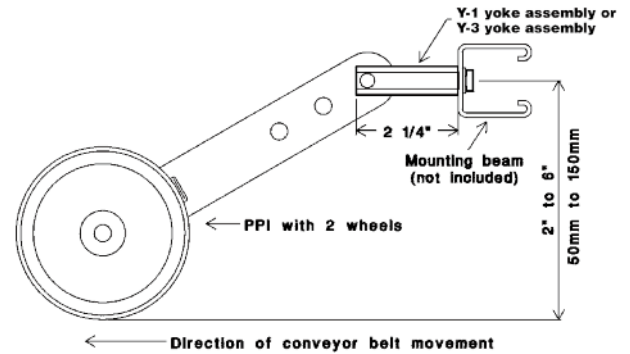
● Yoke Assembly

Size	Mt. Beam Size	Part No.	List Price
2.25"L x 5/8"	1/4" - 28	Y-1	\$15.00
2.25"L x 5/8"	3/8" - 16	Y-3	\$15.00

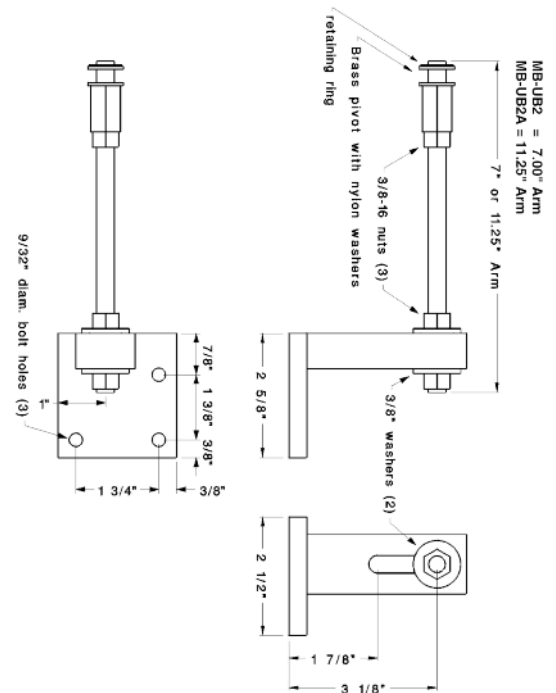
● Offset Foot Bracket

Size	Part No.	List Price
3.125"H x 7.00" Arm	MB-UB2	\$60.00
3.125"H x 11.25" Arm	MB-UB2A	\$70.00

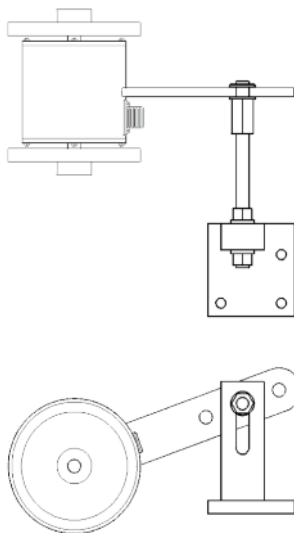
Yoke Assembly



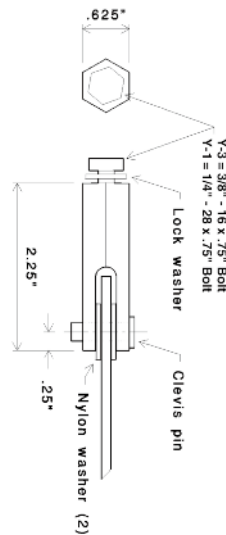
Offset Foot Bracket



w/ Offset Foot Bracket



Yoke Assembly



MB-UB3 / Under-Belt Center Hgt Bracket

List Price \$90.00

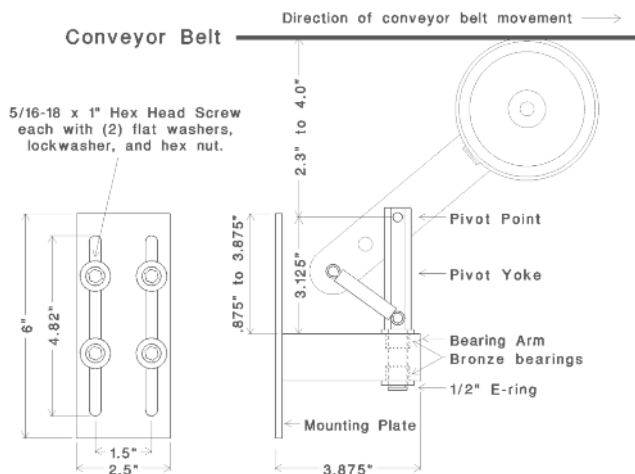


Figure 1: MB-UB3 Assembly (shown with PPI)

MB-UB4 / Under-Belt Center Hgt Bracket

List Price \$85.00

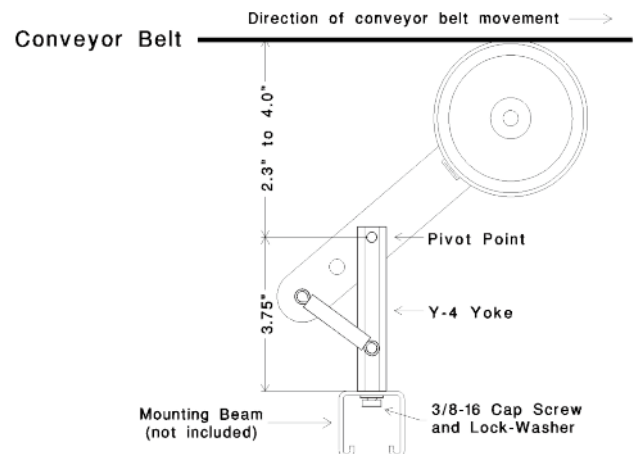
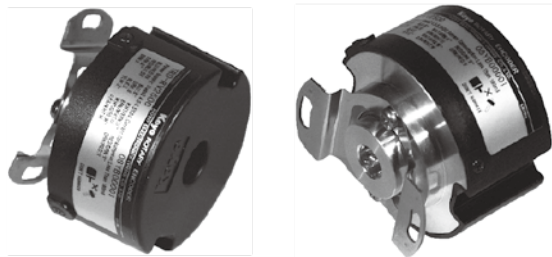


Figure 1: MB-UB4 Assembly (shown with PPI)

Series TRD-RV

Size 20 Hollow Shaft Encoder w/Commutation



S.R.P. List \$ 350.00 up to 2500 ppr

FEATURES

- 2.0" O.D., Thru-Hollow shaft designed with 1.3" Thickness
- Hi-Res. up to 2500 P/R, 120 °C Operating Temperature
- Frequency Response 200 kHz
- Hub I.D. 6mm, 8mm, Unique Tapered 7.5-9.0mm(bet.15mm)
- Mounting B.C. 1.57" (40mm) only
- Commutation Signals: 2PR, 3PR, 4PR, 5PR
- Applications: DC Brushless, Brush or Stepper Motors
- Interchangeable with: Tamagawa OIH-48, EPC 260/15T Dynapar F18

Electrical

Supply Voltage	5.0 ± 0.5vdc
Allowable Ripple	less than 1%
Current Consumption	less than 180mA
H-level voltage	Min. 2.3V
L-level voltage	Max. 0.5V
Output Channel	Main: A, B, Z Commutation: U, V, W
Output Signals	A, A not, B, B not, Z, Z not U, U not, V, V not, W, W not
Output Circuit	Linedriver 26C31 compatible
Frequency Response	200 kHz
Rise/Fall time	100 ns

Environmental

Temperature	Operating: 0-120C, Storage: -20-120C
Humidity	35 to 90%
Vibration	10 to 2000Hz, 10G
Shock resistance	6 millisecond, half-sine, 75G
Withstand Voltage	500VAC
Insulation resistance	More than 50MOhm between 0v and GRD
Construction	IP40

Mating Connector	Housing: SHR-15V-S
Mating Connector	Contact Pin: SSH-003T-P0.2

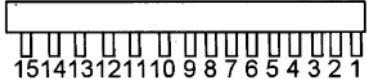
Outputs Specs.

Output Ch.A,B,Z	Incremental
Output wave form	Rectangular Pulse Signal
Flutter	0.1T Max.
Duty Ratio	50% less than 10%
Phase Shift	25% less than 10%
Index Z width	100% less than 50%
Commutation U,V,W	2PR,3PR,4PR,5PR
Flutter	0.01f maximum
Period	90deg.plus-minus 1deg.
Phase Shift	15deg.plus-minus 1deg.
Output position"C" mechanically	Plus-minus 1deg. It is aligned to the rising edge of U ch.with the center of Index Zch.

PCB Connector

JST

15-Pin Connector: SM15B-SRSS



PIN	WIRE COLOR	SIGNAL
1	Blue/Red	0V
2	Red/Blue	5V
3	Green	A not
4	Brown	A
5	Blue	B not
6	Orange	B
7	Black	Z
8	Yellow	Z not
9	White/Brown	U not
10	Brown/White	U
11	White/Gray	W not
12	Gray/White	W
13	Red/Orange	V not
14	Orange/Red	V
15	—	NC

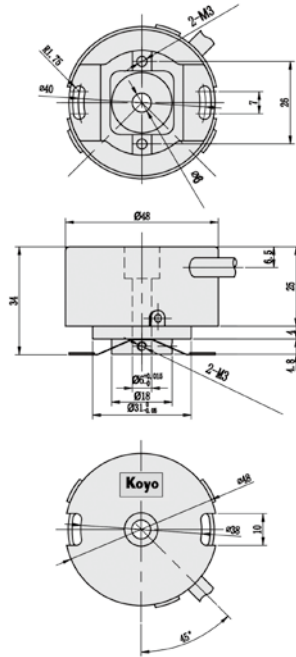
Mechanical

Rated Speed	7500 rpm
Starting Torque	less than 0.01Nm
Shaft Loading	Axial: 10N , Radial: 10N
Shaft Axial Play	± 0.005"
Shaft Runout	0.001"
Cable Material	Oil resistant PVC
Loan/Cross-section	0.089mm2 (AWG#28)
Material Base, body	20% glass filled PBT
Weight	82g

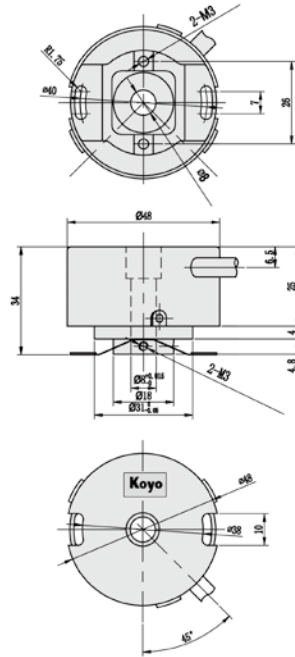
SIZE 20 SERIES TRD-RV

Hollow Shaft Encoder w/Commutation

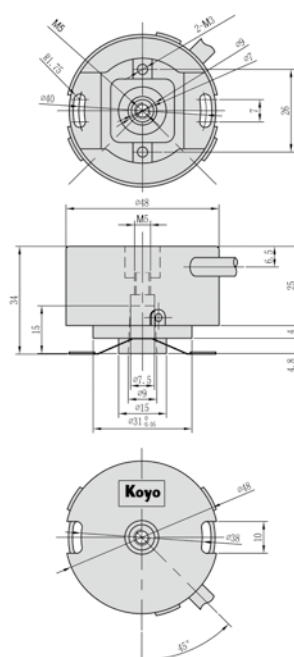
6mm Hub Straight



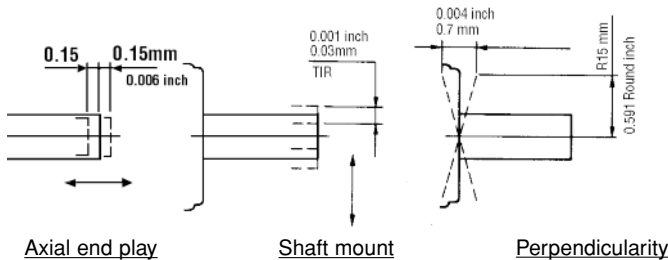
8mm Hub Straight



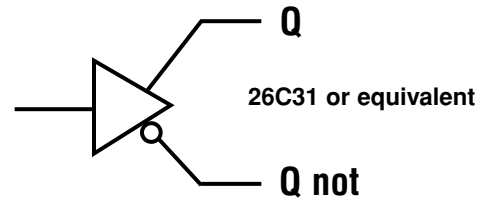
Tapered 7.5–9 mm Hub



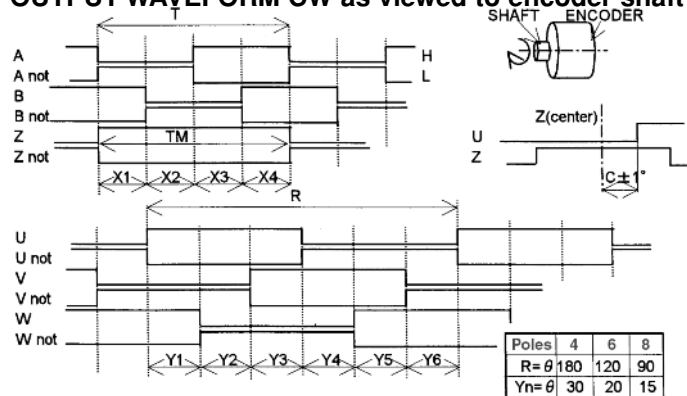
MOUNTING SHAFT SPECIFICATIONS (mm/inch)



OUTPUT CIRCUIT



OUTPUT WAVEFORM CW as viewed to encoder shaft



DIVISION ACCURACY

Symmetry (A, B)	$X1+X2=0.5T \pm 0.1T$ $X3+X4=0.5T \pm 0.1T$
Phase shift (A, B)	$Xn=0.25T \pm 0.1T$ (n=1, 2, 3, 4)
Signal width of Z ch.	$TM=1.0T \pm 0.5T$
Symmetry (U, V, W)	$R=\pm 1.0^\circ$ (mechanical angle) $Yn=0 \pm 1.0^\circ$ (mechanical angle) $C=\pm 1.0^\circ$ (mechanical angle) $Y1+Y2+Y3=0.5R \pm 0.03R$ $Y4+Y5+Y6=0.5R \pm 0.03R$ $Yn=0.1666R \pm 0.03R$

DIVISION ACCURACY OF SIGNAL

Accumulative Angle Error	$\leq 0.4T$
Pitch Error	$\pm 0.01T$
Adjacent Pitch Error	$\pm 0.02T$

T=360°/N N: Pulse per revolution

Series TRD-RV / Size 20 Hollow Shaft Encoder

Model	Resolution	Output	Hub I.D.	Commutation Signals	Termination
TRD-RV	☐ ☐ ☐ ☐	RZV	☐	☐ ☐ ☐	☐ ☐ ☐ ☐
ORDERING INFORMATION					
TRD-RV Size 20 Hollow Shaft Encoder	500	RZV: Line Driver 5VDC	6 = 6mm	2PR = 4 Poles	NONE = Std. 3ft. Pigtail Cable
	1000			3PR = 6 Poles	
	1024		8 = 8mm	4PR = 8 Poles	3704 = PCB JST 15pin conn. w/ 3ft Cable
	2000			5PR = 10 Poles	
	2048		T = Tapered 7.5~9mm (bet. 15mm)		
	2500				
	All Glass Disks				

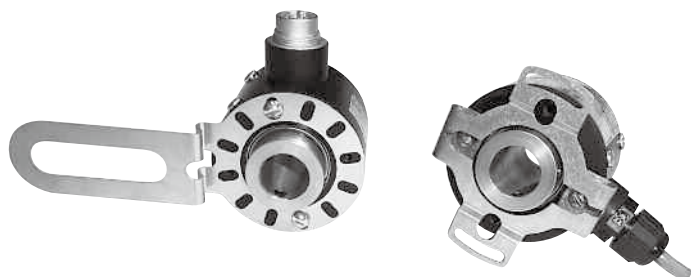
PRICING INFORMATION					
	RESOLUTION		MECHANICAL	ELECTRICAL	TERMINATION
TRDA-VA Base price \$300.00	500 Thru Add \$30.00 2500		HUB I.D. 6mm, 8mm N/C	Commutation 4, 6, 8, 10 poles N/C	Std. 3 ft. Shielded Cable N/C
			T= Tapered Add \$30.00		3704= PCB JST 15pin Conn. Add \$20.00

These encoders for OEM users only.
Lead time and Qty D/C Pricing, consult factory.

SIZE 20 SERIES HS20

INCREMENTAL HOLLOW SHAFT ENCODER / Thru-Hub

Starting at US \$430.00 List Price
(w/cable model - A ch. only)



Amphenol connector w/ L.D. model
US \$485.00 List Price

FEATURES

**WORLD
ENCODERS**

brand, Made in USA

- Size 20 Housing, heavy duty designed
- Up to 5/8" or 16mm, Thru-hub design
- Unbreakable code disk
- Short circuit and ESD protected
- Up to 1200 PPR
- Attached cable or optional Amphenol connector
- Super Linedriver 7272 compatible 5-26Vdc available
- NEMA12/IP54 enclosure

SPECIFICATIONS

Mechanical

Shaft Bore	3/8", 1/2", 5/8", 16mm diameter
Maximum Speed	6000 RPM
Shaft Loading	Radial: 30 lbs. Axial: 20 lbs.
Materials	Case: Aluminum, anodized Shaft: 303 Stainless Steel
Weight	8.0 oz

Electrical

Supply Voltage	5-26 Vdc Push-Pull, Open Collector, Line Driver
Current	50mA Max. No Load 100mA Max. (Line Driver)
Pulse Rate	0-30 kHz
Pulses per Revolution	1 to 1200
Output Circuit	Single-ended <ul style="list-style-type: none"> • 7273 open collector (30VDC max, 50 mA max) • 7272 Push-Pull (50 mA max source or sink) Differential Line Driver <ul style="list-style-type: none"> • 7272 differential line driver
Output Wave	Square wave outputs A, B and Z are 50/50 duty cycle nominal output Z (index output) is approximately the width of one cycle on outputs A or B. <ul style="list-style-type: none"> • Pulse symmetry: 180 ±30% • Pulse interval jitter: 30% max • Quadrature: 90° ±30% max • Phase jitter: 30% max

Environmental

Temperature	Operating: 0 ~ 70°C Storage: -10 ~ 85°C
Operation Humidity	35-85% without condensation
Vibration	Max 10g (58 to 500 Hz)
Shock	50g (11 ms duration)
Enclosure	IP-54/NEMA 12

Electrical Connections

Single-ended Outputs:

6-Pin Connector*	Function	Wire Color
1	Common	Black
2	+vdc	Red
3	Output Z	Brown
4	Output A	White
5	Output B	Green
6	not used	—

*connector is Amphenol T34020000 or equivalent

Differential Line Driver Outputs:

8-Pin Connector*	Function	Wire Color
1	Output +A	White
2	Output +B	Green
3	Output +Z	Yellow
4	Supply Voltage	Red
5	Common	Black
6	Output -A	Blue
7	Output -B	Brown
8	Output -Z	Orange

*connector is Amphenol T34020000 or equivalent

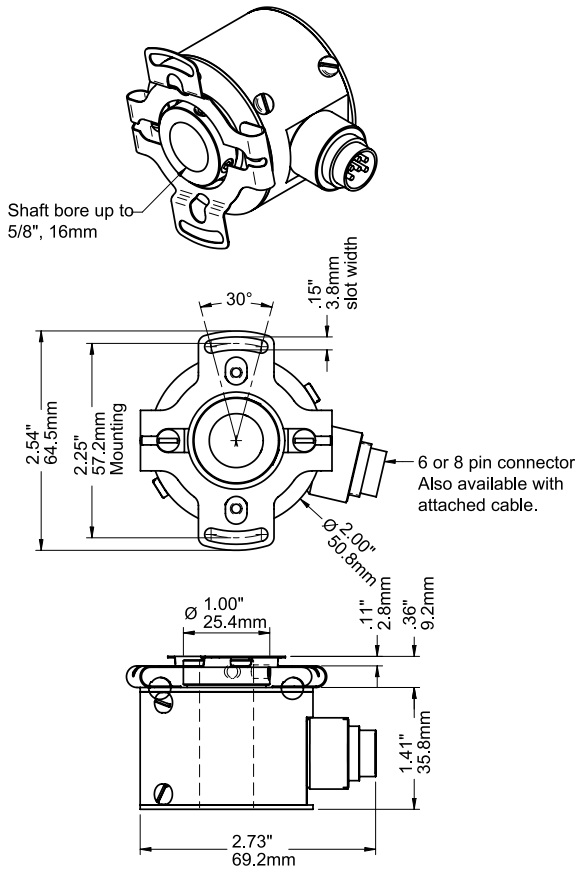
Standard Cable length is 10 ft / 3 meters.

SIZE 20 SERIES HS20

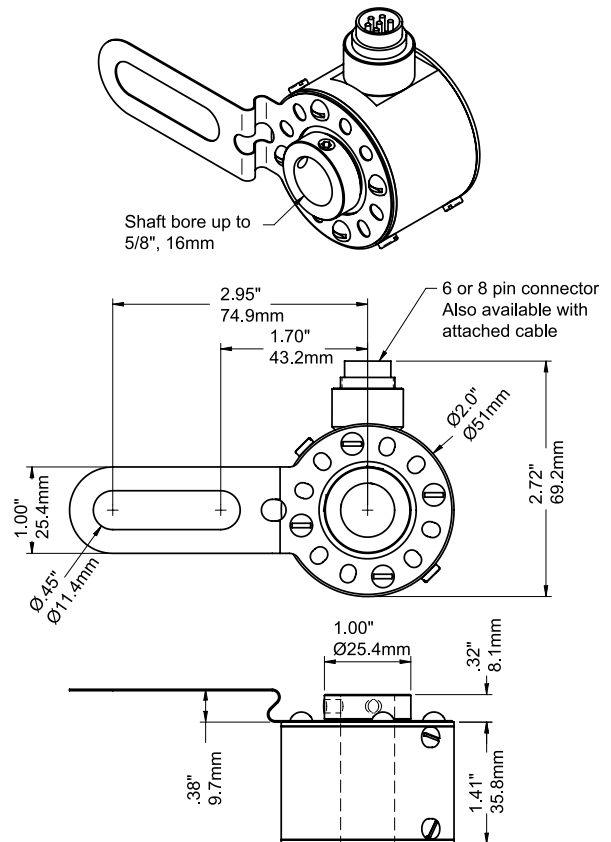
INCREMENTAL HOLLOW SHAFT ENCODER / Thru-Hub

DIMENSIONS

Std. Flex-Mtg. Spring 2.25" B.C.

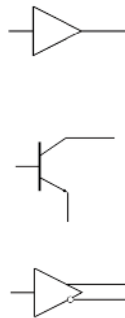


C-Face Motor Mtg. 3.4" - 5.9" B.C.

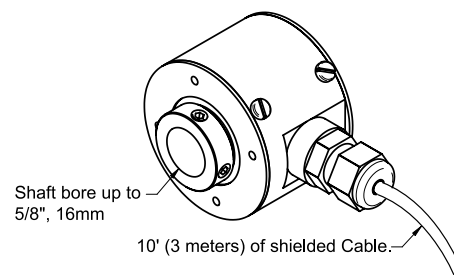


Outputs

- **Push-Pull (7272)** This general purpose output functions as a PNP transistor for applications requiring a current sourcing output. It functions as an NPN transistor with 3.3K pull-up for applications requiring a current sinking output. This output is TTL compatible when used with a 5vdc supply. Maximum source / sink current is 50 ma. per output.
- **7273 Open Collector (NPN)** For applications requiring an uncommitted output. The output voltage level can be pulled up with an external resistor to a maximum of 30vdc. Maximum sink current is 50ma. per output.
- **Differential Line Driver (7272)** An 7272 differential line driver that generates complimentary outputs: A / -A, B / -B, and Z / -Z as needed. The encoder must be operated at 5-26 vdc, input and output.



Std. 10 ft Cable w/ Straight Plug Cap



Size 20 Series HS20 Hollow Shaft Encoder/Thru-Hub

Model	Hub I.D.	Channels	Resolution	Voltage/Output	Cable/Connector	Flex-Mtg. Spring
HS20	☐	☐	☐ ☐ ☐ ☐ /	☐	☐	☐

ORDERING INFORMATION

HS20	B = 3/8"	Blank: Sgl. Ended (A ch.)	100	1000	5-26: Push-Pull (7272)	Blank: 10 ft. Cable	Blank: Std. Flex-Mtg. (2) holes @ 2.25" B.C.
	.5 = 1/2"		250	1024			
	.625 = 5/8"		360	1200	5-26C: Open Collector (7273) 5-26D: Line Driver* (7272)	S: 16mm Circular Conn. at side	C: C-face Motor Mtg. (1) slot hole @ 3.4" ~ 5.9" B.C.
	M8 = 8mm	Q: Quadrature (A, B ch.)	500				
	M10 = 10mm		512				
	M12 = 12mm	QZ: Quadrature (A, B, Z ch. w/Index)					
	M14 = 14mm						
	M16 = 16mm						

PRICING INFORMATION

MODEL	HUB I.D.	HUB I.D.	RESOLUTION	VOLTAGE/OUTPUT	CABLE/CONNECTOR	FLEX-MTG. SPRING
HS20 Base price \$370.00	B = 3/8"	Blank: A ch. only N/C	50 Thru 100 N/C	5-26: Push-Pull N/C	Blank: 10 ft. Cable N/C	Blank: Std. Flex-Mtg. (2) holes @ 2.25" B.C. N/C
	.5 = 1/2"					
	.625 = 5/8"	Q: A, B ch. Add \$20.00	360 Thru 1200 Add \$30.00	5-26C: Open Collector Add \$25.00	S: 16mm Circular Conn. at side Add \$30.00	C: C-face Motor Mtg. (1) slot hole @ 3.4" ~ 5.9" B.C. Add \$20.00
	M8 = 8mm					
	M10 = 10mm	QZ: A, B, Z ch. Add \$30.00		5-26D: Line Driver* Add \$25.00		
	M12 = 12mm					
	M14 = 14mm					
	M16 = 16mm					
	N/C					

PART NUMBER	LIST PRICE	PART NUMBER	LIST PRICE
HS20M6QZ50/5-26D	\$425.00	HS20.625QZ360/5-26D	\$455.00
HS20M8Q1000/5-26C	\$445.00	HS20.625QZ100/5-26DS	\$455.00
HS20M10QZ1000/5-26DS	\$485.00	HS20.625QZ100/8-30	\$400.00
HS20BQZ100/5-26DS	\$455.00	HS20.625-500/8-30	\$400.00
HS20BQZ500/5-26DS	\$485.00	HS20.625QZ1000/526DS	\$485.00
HS20BQZ1000/5-26	\$430.00	HS20.625QZ1024/526DS	\$485.00
HS20BQZ1024/5-26DS	\$485.00	Mating Connector w/ 10-20ft. Cable Assemblies	
HS20.5QZ100/5-26DS	\$455.00	D6-5-10 (Sgl.Ended) Amphenol 6 pin mating conn. w/10ft. Cable (5 wires)	\$40.00
HS20.5QZ500/5-26DS	\$485.00	D6-6-20CF (Sgl.Ended) Amphenol 6 pin mating conn. w/20ft. Cable (6 wires)	\$80.00
HS20.5QZ1000/5-26DS	\$485.00	D8-8-10 (Linedriver) Amphenol 8 pin mating conn. w/10ft. Cable (8 wires)	\$50.00
HS20.5Q1024/5-26DC	\$465.00	D8-8-20 (Linedriver) Amphenol 8 pin mating conn. w/20ft. Cable (8 wires)	\$80.00
HS20M12Q1200/8-30DHS	\$495.00	Mounting Bracket	
HS20M8QZ1024/5-26DC	\$450.00	#MB-FB2	
HS20M10QZ1000/5-26DS	\$485.00	C-face Motor Mtg. Bracket	\$20.00
HS20.5QZ1024/5-26DS	\$485.00		
HS20.625QZ360/5D	\$455.00		

Standard Stock Items: Shipped immediately. Non Stock Items: 2-3 weeks Lead Time

SIZE 31 SERIES HS31

INCREMENTAL HOLLOW SHAFT ENCODER / Thru-Hub



MS connector w/ L.D. US \$725.00 List Price

SPECIFICATIONS

Mechanical

Shaft Bore/Tolerance	5/8", 3/4", 7/8", 1" Hub I.D. / 0.001" T.I.R. Max	
Shaft Speed	Base 1800 rpm, *Max 3600 rpm	
Bearings	# 6807 35mm, abec 1, Double Shielded, AV2 grease (Shell Alvania #2)	
Bearing Life	at 1800 rpm	25,000 hrs
	at 3600 rpm	12,000 hrs
Bearing Temp.	5/8" Hub	Derating 5°C/1000 rpm over *1800 rpm
	1" Hub	Derating 10°C/1000 rpm over *1800 rpm
Shaft Loading	Radial: 40 lbs. Runout: 0.005" T.I.R. Max on Mating Shaft. Axial: 30 lbs. Endplay: 0.05" T.I.R. Max on Mating Shaft	
Materials	Body: Anodized Aluminum with anodized protective finish Hub: Aluminum with anodized protective finish, Option-Stainless Steel, Seals- Teflon, N.B.R.	
Weight	16 oz.	

*Over 1800-Max-3600 rpm speed reduces the bearing life by its heating and brown

Electrical

Supply Voltage	5-26 Vdc
Current	50mA Max. No Load 100mA Max. (Line Driver)
Pulse Rate	0-40 kHz
Pulses per Revolution	up to 1024
Output Circuit	Single-ended, TTL Outputs • 7272 Push-Pull 50 mA max source or sink (Std.) • 7273 open collector 50 mA max, 30VDC max (option) Differential Line Driver • 7272Super Linedriver / 100 mA Max, 5-26VDC Max (Std.) • RS422 TTL-6 ch. or Linedriver 50 mA max, input 8-30v, output 5v
Output Wave	Square wave outputs A, B are 50/50 duty cycle nominal. Output Z index is approximately the width of one cycle on outputs A or B. • Pulse symmetry: 180 ±30% • Pulse interval jitter: 30% max • Quadrature: 90° ±30% max • Phase jitter: 30% max

FEATURES

**WORLD
ENCODERS**

brand, Made in USA

- Size 31 Housing, NEMA4/IP66 Heavy-duty Enclosure.
- Std. Electrically, Thermally Insulated & Isolated Hub.
- Std. Equipped with 56C Cover & Tether Mtg. Bracket.
- Hub I.D. 5/8", 3/4", 7/8", 1", Thru-hub deisgn.
- Up to 1024 ppr and Unbreakable Code Disk.
- Electrical Protection Std.: Voltage Transients, Reverse Voltage, Output Short Circuit Proof.
- Super Linedriver 5-26v, Push-Pull 5-26v TTL outputs. Linedriver or TTL (RS422 compatible) Complimentary-6ch. input 8-30v, output 5v Industrial Encoder IH950 Interchangeable.
- Military Std. 7 pin, 10 pin, Conn. NEMA4/IP66
- D-sub 9 pin, 10ft. Cable w/Straight Plug. NEMA12/IP50

Environmental

Temperature	Operating: 0 ~ 70°C Storage: -10 ~ 85°C
Humidity	98% RH without condensation
Vibration	20 G's at 5 tp 2000Hz
Shock	50 G's at 11 ms duration
Enclosure	NEMA4/IP66: MS 7-pin, 10pin Conn. NEMA 12/IP50; D-sub 9 pin, 10 ft Cable w/straight Plug
Sealing	Shaft Gaskets-Teflon, NBR, Viton, Neoprene. Sleeve-Delrin™ (DuPont® plastic), Washer-Teflon
Isolation	Encoder to be electrically isolated from motor by using insulating shaft sleeve and insulating washers on Flexible Tether Mtg. Bracket

Electrical Connections

Push-Pull Outputs:

MS 7-Pin Connector	Function	Wire Color	DB9 Conn.
F	Common	Black	1
D	+vdc	Red	2
C	Output Z	Brown	5
A	Output A	White	3
B	Output B	Green	4
G	Case Ground	Shield	6
E	not used	—	7,8,9

Differential Line Driver Outputs:

MS 10-Pin Connector	Function	Wire Color	DB9 Conn.
A	Output +A	White	3
B	Output +B	Green	4
C	Output +Z	Yellow	5
D	Supply Voltage	Red	2
F	Common	Black	1
H	Output -A	Blue	6
I	Output -B	Brown	7
J	Output -Z	Orange	8
G	Case Ground	Shield	9
E	not used	—	—

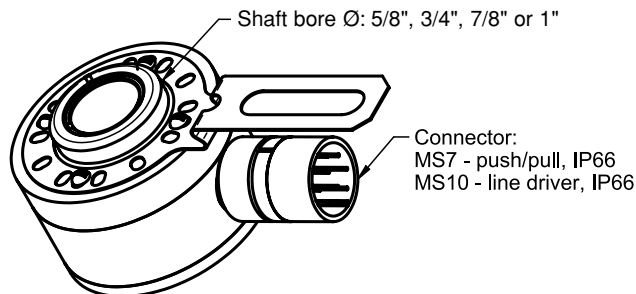
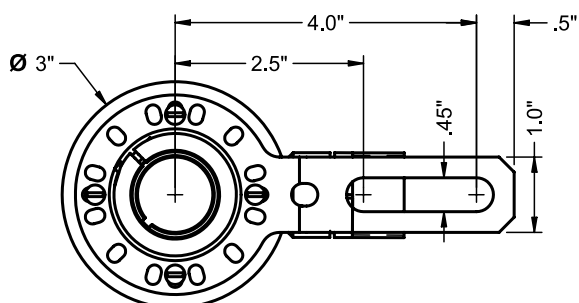
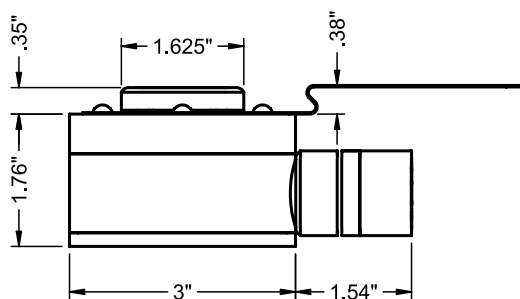
Standard Cable length is 10 ft / 3 meters.

SIZE 31 SERIES HS31

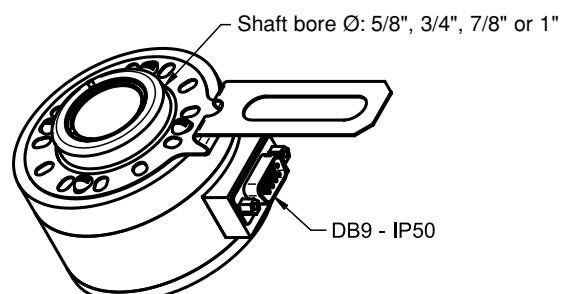
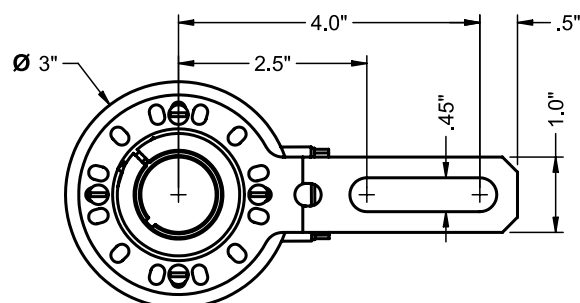
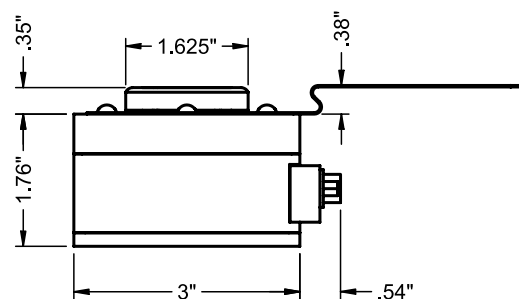
INCREMENTAL HOLLOW SHAFT ENCODER / Thru-Hub / with Tether Mtg. 5"-8" B.C.

DIMENSIONS

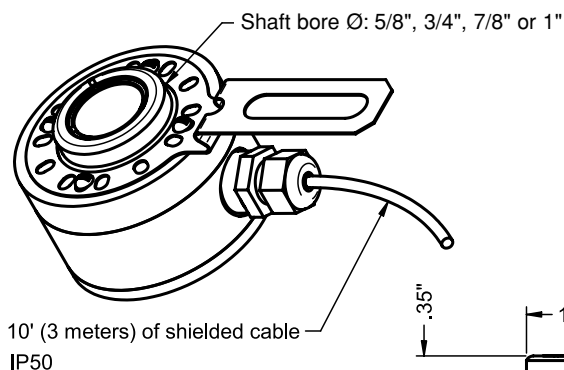
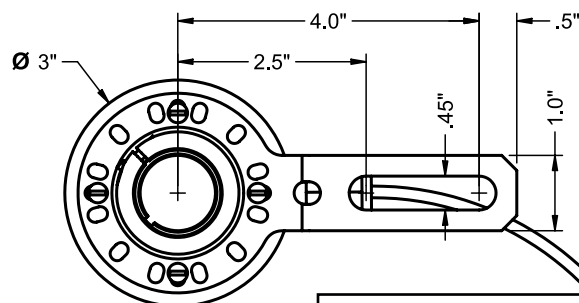
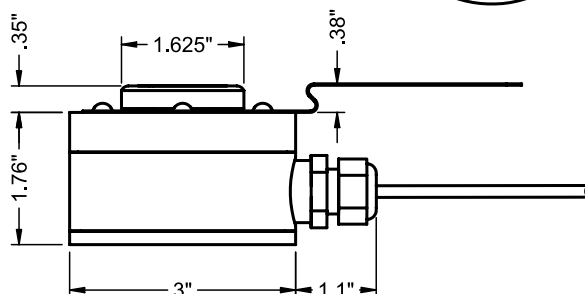
MS Conn. (MS7, MS10 pin)



D-sub (DB9) Conn.



Std. 10 ft Cable w/ Straight Plug Cap



Std. 56C Protection Cover



Size 31 Series HS31 Hollow Shaft Encoder/Thru-Hub/NEMA 4

Model	Hub I.D.	Channels	Pulse	Voltage/Output	Cable/Connector	Mtg. Spring	56C Cover
HS31	☐	☐	☐	☐ -	☐ ☐ ☐ ☐	Blank	Blank
ORDERING INFORMATION							
HS31	.625 = 5/8" .75=3/4" .875=7/8" 1.00 = 1" with Std. Electrical Insulated & Isolated Plastic Sleeve	Blank: Sgl. Ended (A ch.) Q: Quadrature (A, B ch.) QZ: Quadrature (A, B, Z ch. w/Index)	100 360 500 1000 1024	5-26: Push-Pull Sgl. Ended 7272 5-26v TTL (Std.) 5-26D: Super Line* driver 7272 compatible 5-26v (Std.) 8-30DL: Linedriver or TTL-RS422 Complimentary-6 ch. input 8-30v, output 5v Add \$45.00	Blank: 10 ft. Cable w/Straight Plug MS10: L.D. MS 10 pin Conn. MS7: TTL MS 7 pin Conn. DB9: D-sub 9 pin Conn.	Blank: Std. Flex Tether Mtg. Spring (1) slot hole @ 5"-8" B.C.	Blank: Std. 56C Protection Cover

PRICING INFORMATION

Model	Hub I.D.	Hub I.D.	Pulse	Voltage/Output	Cable/Connector	Mtg. Spring	56C Cover
HS31 Base Price \$580.00	.625 = 5/8" .75=3/4" .875=7/8" 1.00 = 1" with Std. Electrical Insulated & Isolated Plastic Sleeve	Blank: N/C Sgl. Ended. A ch. Q: Add \$20.00 Quadrature A, B Ch. QZ: Add \$30.00 Quadrature A, B, Z Ch. w/index	100 Thru 500 N/C 1000 Thru 1024 Add \$40.00	5-26: N/C Push-Pull Sgl. Ended 7272 5-26v TTL (Std.) 5-26D: Add \$25.00 Super Linedriver* 7272 compatible 5-26v (Std.) 8-30DL: Add \$45.00 Linedriver or TTL-RS422 Complimentary-6 ch. input 8-30v, output 5v	Blank: N/C 10 ft. Cable w/Straight Plug MS10: Add \$50.00 MS 10 pin Conn. MS7: Add \$50.00 MS 7 pin Conn. DB9: Add \$30.00 D-sub 9 pin Conn.	Blank: N/C Std. Flex Tether Mtg. Spring (1) slot hole @ 5"-8" B.C. N/C	Blank: N/C Std. 56C Protection Cover N/C

Standard Stock Items: Shipped immediately.

Non Stock Items: 2-3 weeks Lead Time

* 5-26D: 5-26vdc input and output. **5-26DL: 5-26vdc input, 5vdc output

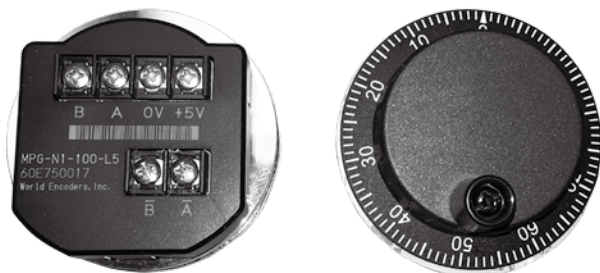
PART NUMBER	LIST PRICE	Mating Connector	
HS31.625QZ1000/5-26DMS10	\$725.00	DMS3106E18-1S (10pin Linedriver)	\$45.00
		DMS3106E16-1S (7pin TTL)	\$35.00
HS31.625QZ1024/8-30DLDB9	\$725.00	MS mating w/10ft Cable Assemblies	
		C10-9-10LD (Linedriver)	\$85.00
HS31.625QZ1024/5-26DMS10	\$725.00	C7-5-10RC(TTL Sgl.ended)	\$75.00
		Cables	
HS311.00QZ1000/5-26DMS10	\$725.00	CBL-2025N-XXX FT	\$3.00 per Ft.
		D-sub conn.w/10ft. Cable Assemblies	
HS311.00QZ1024/8-30DLDB9	\$725.00	DB9-8-10 (Linedriver)	\$50.00
		D-sub 8pin w/10ft.cable	
HS311.00QZ1024/5-26DMS10	\$725.00	DB9-5-10 (TTL Sgl.ended)	\$45.00
		D-sub 5pin w/10ft.cable	

Standard Stock Items: Shipped immediately.

Non Stock Items: 1 week Lead Time

Series MPG-N1 SIZE 20 HAND WHEEL

US \$280.00 (Sgl. Dail)
S.R.P. List Price



FEATURES

- 2" O.D. Compact size MPG
- Panel plate Sandwich design
- Black Plastic dial & body with matt finish
- 100 ppr Std.
- Dual Quadrature Channels
- Line driver 5v differential outputs

SPECIFICATIONS

Electrical

Outputs	Line Driver
Pulse per Revolution	100 PPR
Supply Voltage	5 v±0.25 v
Output Voltage (VH)	≥2.5 v
Output Voltage (VL)	≤0.5 v
Current Requirement	≤60 mA (No Loading)
Sink Current	≤20 mA
Output Capacity	Sync. Current: 20 mA, Residual Voltage: ≤0.5 v
Phase Difference	Quadrature Square Wave A & B: 90°±45° (T/4±T/8)
Rise/Fall Time	≤2 μs
Frequency Response	0-10 kHz
Insulation Resistance	20 MΩ At 500 v dc Megger (Circuit-Body)

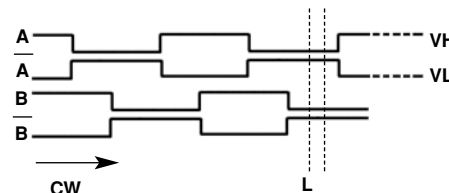
Mechanical

Dial Rotating Speed	600 r/min. Max., 200 r/min.-Normal (Continuous)
Starting Torque	8.34 ozf-in (600 gf-cm) at 25°C
Rotational Life	10x 6 bits turns at ≤ 200 rpm
Weight	6 oz. (200g)

Environmental

Operating Temperature	0° to 60° C
Humidity	RH 35% to 90% no condensation
Storage Temperature	0° to 80° C
Vibration	10-50 Hz/1.5mm X, Y, Z - 2 hrs. each
Shock	50 G per 11 ms
Enclosure	IP50/NEMA 12

OUTPUT WAVE FORMS



Relation between output signals
and click stop position.

ELECTRICAL CONNECTION



Linedriver Outputs

Series MPG-N1 / Size 20 Hand Wheel/Plastic Sgl. Dial

1-800-903-9093

MODEL NUMBER	SPECIFICATION	LIST PRICE
MPG-N1-100-L5	100 Pulse, 5vDC, Linedriver Output, Quadrature Dual Channels	\$280.00

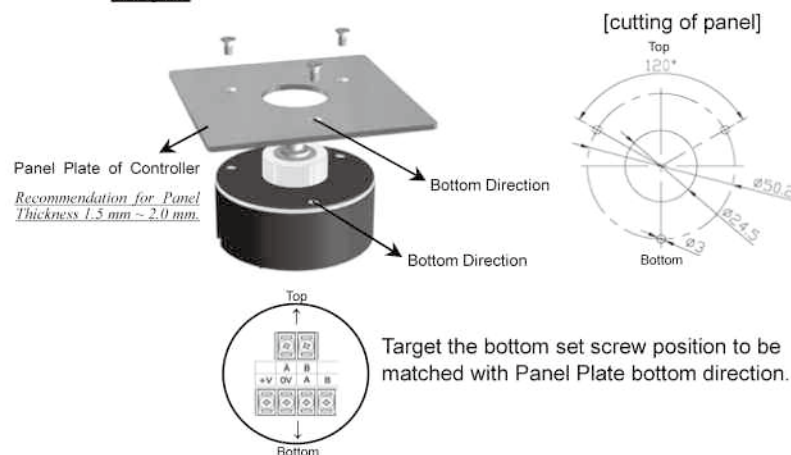
Mounting Instructions

Dimensions (mm)

Step 1



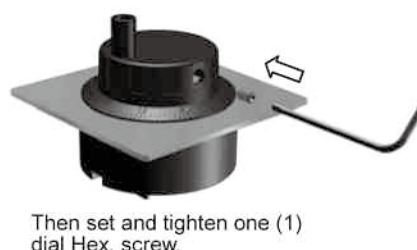
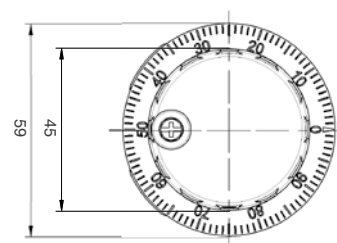
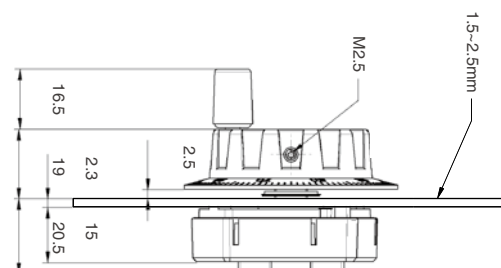
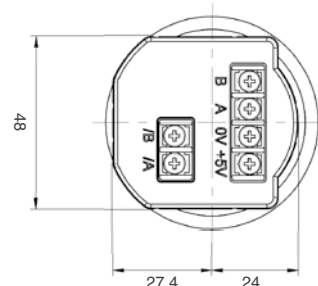
Step 2



Step 3



Step 4

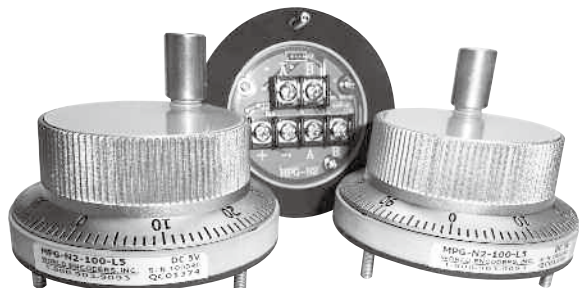


Accessories



Series MPG-N2 SIZE 20 FLAT-DESIGN HAND WHEEL

US \$280.00 (Sgl. Dial)
S.R.P. List Price



FEATURES

- 2" O.D. Compact size MPG
- Flat-design
- Zinc metal dial & body
- 100 ppr Std. only
- Dual Quadrature Channels
- Line driver 5v and TTL 5v Outputs

SPECIFICATIONS

Electrical

Outputs	Line Driver	TTL (NPN)
Pulse per Revolution	100 PPR	
Supply Voltage	5 v±0.25 v	5 v dc
Output Voltage (VH)	≥2.5 v	Vcc -1.0 v
Output Voltage (VL)	≤0.5 v	
Current Requirement	≤60 mA (No Loading)	
Sink Current	≤20 mA	
Output Capacity	Sync. Current: 20 mA, Residual Voltage: ≤0.5 v	
Phase Difference	Quadrature Square Wave A & B: 90°±45° (T/4±T/8)	
Rise/Fall Time	≤2 μs	
Frequency Response	0-10 kHz	
Insulation Resistance	20 MΩ At 500 v dc Megger (Circuit-Body)	

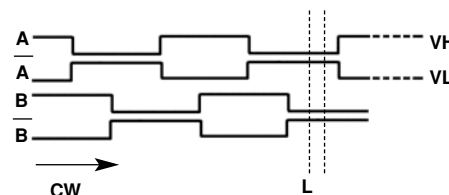
Mechanical

Dial Rotating Speed	600 r/min. Max., 200 r/min.-Normal (Continuous)
Starting Torque	8.34 ozf-in (600 gf-cm) at 25°C
Rotational Life	10x 6 bits turns at ≤ 200 rpm
Weight	8 oz. (270g)

Environmental

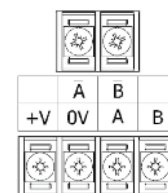
Operating Temperature	0° to 60° C
Humidity	RH 35% to 90% no condensation
Storage Temperature	0° to 80° C
Vibration	10-50 Hz/1.5mm X, Y, Z - 2 hrs. each
Shock	50 G per 11 ms
Enclosure	IP50/NEMA 12

OUTPUT WAVE FORMS



Relation between output signals
and click stop position.

ELECTRICAL CONNECTION

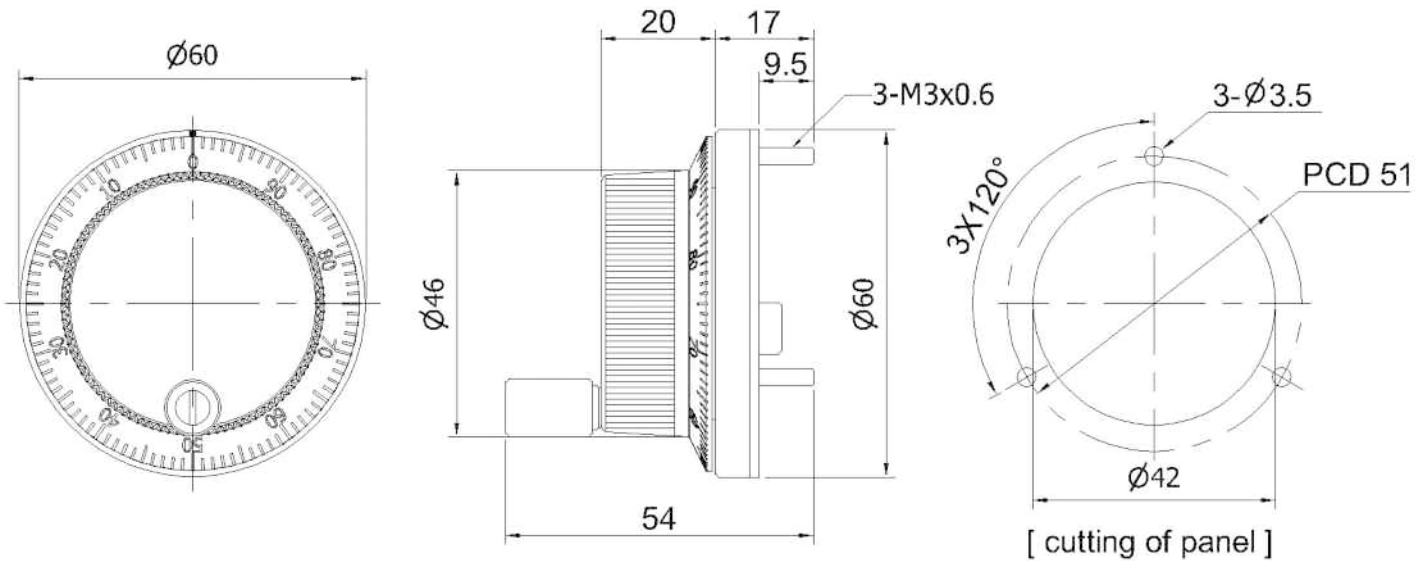


Linedriver Outputs

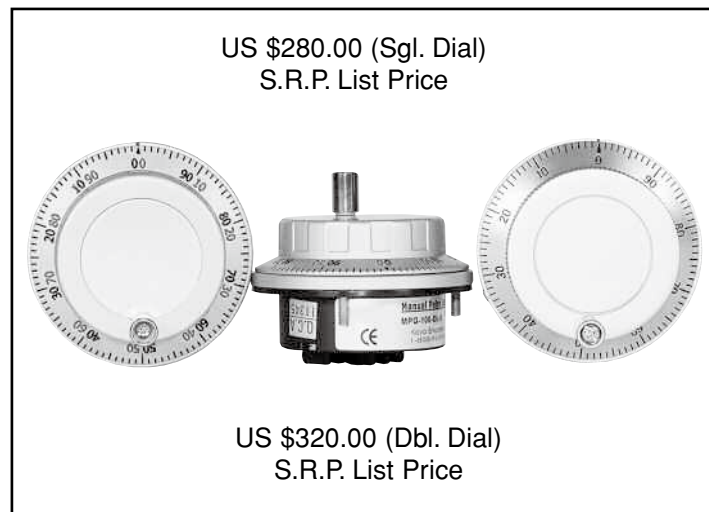
Series MPG-N2 / Size 20 Flat-Design Hand Wheel/Metal Sgl. Dial

MODEL NUMBER	SPECIFICATION	LIST PRICE
MPG-N2-100-L5	100 Pulse, 5vDC, Linedriver Output, Quadrature Dual Channels	\$280.00
MPG-N2-100-T	100 Pulse, 5vDC, TTL Output, Quadrature Dual Channels	\$280.00

Dimensions (mm)



Series MPG/SIZE 30 HAND WHEEL



For CNC Panels Interchangeable with

- Euchner
- Nemicon
- Sumtak
- Fanuc

FEATURES

- Std. Interchangeable Designed
- Quadrature Dual Channels
- Line driver 5v and Voltage 8-26v Outputs

SPECIFICATIONS

Electrical

Outputs	Line Driver	Voltage Output-TTL (NPN)
Pulse per Revolution	100 PPR	
Supply Voltage	5 v±0.25 v dc	8-26 v dc
Output Voltage (VH)	≥2.5 v	Vcc -1.0 v
Output Voltage (VL)	≤0.5 v	≤0.5 v
Current Requirement	≤60 mA (No Loading)	
Sink Current	≤20 mA	
Output Capacity	Sync. Current: 20 mA, Residual Voltage: ≤0.5 v	
Phase Difference	Quadrature Square Wave A & B: 90°±45° (T/4±T/8)	
Rise/Fall Time	≤2 μs	
Frequency Response	0-10 kHz	
Insulation Resistance	20 MΩ At 500 v dc Megger (Circuit-Body)	

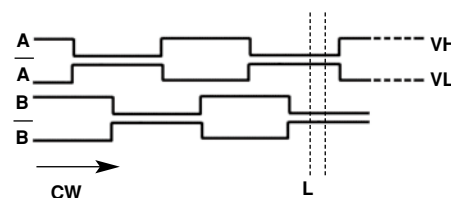
Mechanical

Dial Rotating Speed	600 r/min.-Max., 200 r/min.-Normal (Continuous)
Starting Torque	8.34 ozf-in (600 gf-cm) at 25°C
Rotational Life	10x 6 bits turns at ≤ 200 rpm
Weight	8.2 oz (270 g)

Environmental

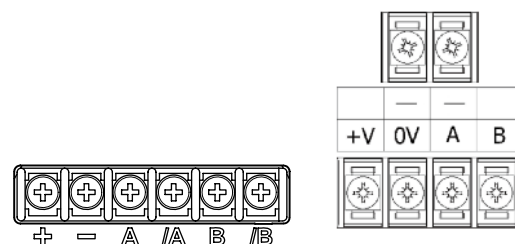
Operating Temperature	0° to 60° C
Humidity	RH 35% to 90% no condensation
Storage Temperature	0° to 80° C
Vibration	10-50 Hz/1.5mm X, Y, Z - 2 hrs. each
Shock	50 G per 11 ms
Enclosure	IP54/NEMA 12

OUTPUT WAVE FORMS



Relation between output signals and click stop position.

CONNECTIONS



L.D.
5VDC

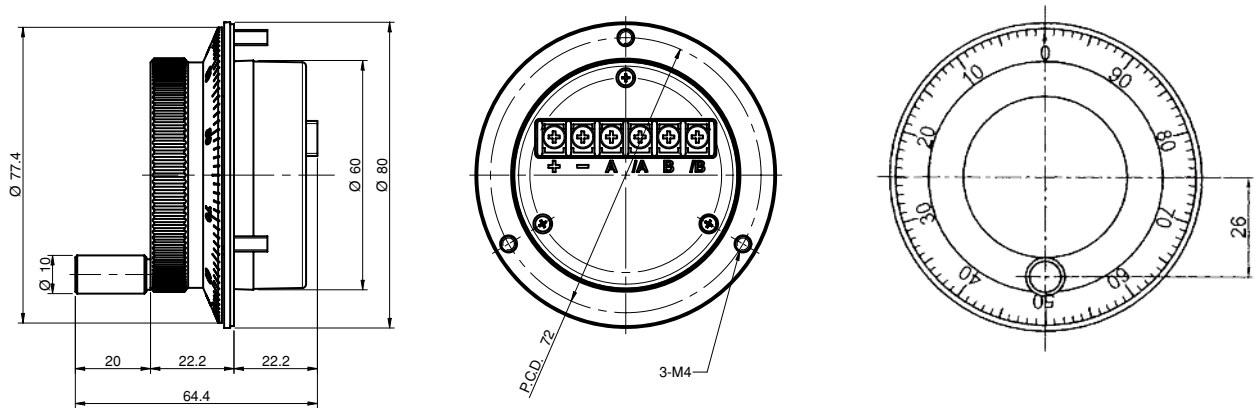
Voltage
8-26VDC

MPG-100-L5

MPG-100-V

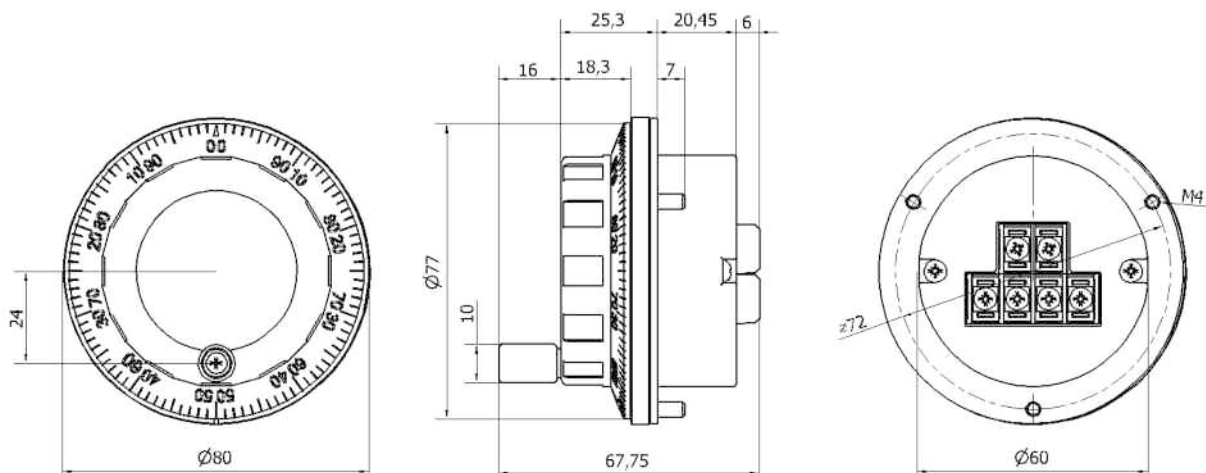
Series MPG / Size 30 Hand Wheel/Single Dial

MODEL NUMBER	SPECIFICATION	LIST PRICE
MPG-100-L5	100 Pulse, 5vDC, Linedriver Output, Quadrature Dual Channels	\$280.00
MPG-100-V	100 Pulse, 8-26vDC, Voltage TTL Output, Quadrature Dual Channels	\$280.00



Series MPG / Size 30 Hand Wheel/Double Dial (Black: CW Red: CCW)

MODEL NUMBER	SPECIFICATION	LIST PRICE
MPG-100-DL-5	100 Pulse, 5vDC, Linedriver Output, Quadrature Dual Channels	\$320.00



Series PHD/Pendant Hand-held

For CNC Panels/4 Axis/Without E-Stop



US \$730.00
S.R.P.
List Price

FEATURES

- Hand-held Pulse Generator for “manual” axis jog
- Differential Line Driver Output & Fanuc 5v TTL Output
- X, Y Z Selector switch with OFF position plus 4 axis
- “Handy” and “Light Weight” and “Very Thin”
- Standard 10 ft. extended spiral cable
- Rear Magnets

FANUC CNC model available

#EPG-B-A-4-S \$660.00 S.R.P.

SPECIFICATIONS

Electrical

Outputs	Line Driver	TTL Voltage Output for FANUC
Pulse per Revolution	100 PPR	
Supply Voltage	5 v±0.25 v dc	5 v±0.25 v dc
Output Voltage (VH)	≥2.5 v	≥4.0 v
Output Voltage (VL)	≤0.5 v	≤0.5 v
Current Requirement	≤60 mA (No Loading)	
Sink Current	≤20 mA	
Output Capacity	Sync. Current: 20 mA, Residual Voltage: ≤0.5 v	
Phase Difference	Quadrature Square Wave A & B: 90°±45° (T/4±T/8)	
Rise/Fall Time	≤2 μs	
Frequency Response	0-10 kHz	
Insulation Resistance	20 MΩ At 500 v dc Megger (Circuit-Body)	
Spiral Cable	10 ft. extended, 21/17 pol., 22-24 AWG	

Mechanical

Dial Rotating Speed	500 r/min.-Max., 200 r/min.-Normal (Continuous)
Starting Torque	8.34 ozf-in (600 gf-cm) at 25°C
Rotational Life	10x6 bits turns at ≤ 200 rpm
Weight	2.2 lbs (1 kg)

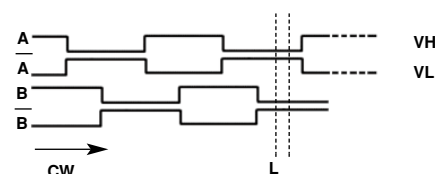
Environmental

Operating Temperature	0° to 60° C
Humidity	RH 35% to 90% no condensation
Storage Temperature	0° to 80° C
Vibration	10-50 Hz/1.5mm X, Y, Z - 2 hrs. each
Shock	50 G per 11 ms
Enclosure	IP64/NEMA 4

Rotary Switch

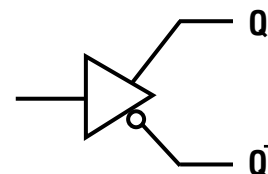
Max. Voltage	28 v dc
Current	10 mA
Operating Torque	0.005-0.02 Nm

OUTPUT WAVE FORMS



Relation between output signals and click stop position.

OUTPUT CIRCUIT



26LS31 or equivalent
Recommended line receiver: 26LS32

MODEL	PRICE
Amp CPC Size 17 connector kit	\$90.00
1.3"O.D., 0.75" I.D., 28 pos., #18-28 AWG Gold Solder 1-#206039-1 Plug, 28-#66570-3 Pin, 28-#66569-3 Socket, 1-#206038-1 Mating Receptacle 1-#207241-1 Cable Boot, 1-#207387 Cable Grip	

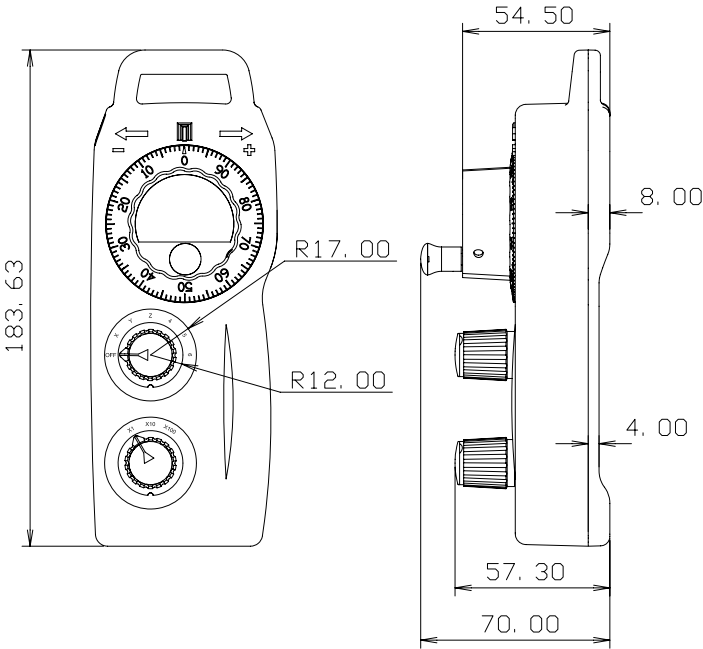


MODEL	PRICE
Amphenol Alloy Size 24 connector kit	\$90.00
1.7"O.D., 1.2" I.D., 24 pos., Size 24-28, 1-1/2"-18 UNEF 1-#MS3106F24-28P Straight Cable Plug with 24 Pin-Solder-Contacts, 1-Cable Clamp Backshell, 1-Rubber Grommet 1-#MS3102E24-28S Mating Receptacle with 24 Socket-Solder-Contacts, 1-Rubber Washer 1-1/4"O.D.x 3/8" I.D. x 1/16" 1-#AN3420-16, 1-#AN3420-6 Rubber Bushing Boots	



Series PHD / Pendent Hand-Held / 4 Axis without E-Stop

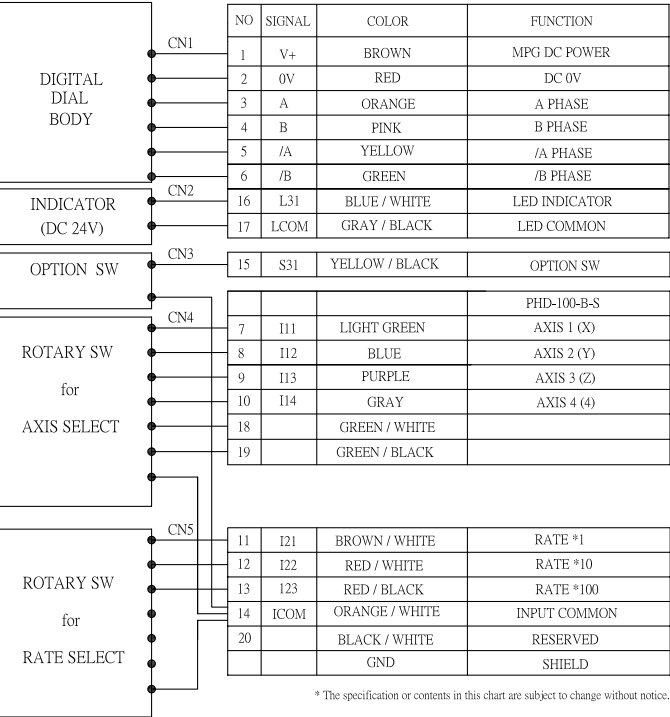
MODEL NUMBER	SPECIFICATION	LIST PRICE
PHD-100-B-S	100 Pulse, 5v DC, Linedriver Output, Quadrature Dual Channels. Rear Magnets Two (2) Mode Switches. (4 axis and multiplier) 3m (10 ft.) Spiral Cable	\$730.00
EPG-B-A-4-S	For FANUC CNC, 5v DC, TTL Output, Quadrature Dual Channels. Rear Magnets Two (2) Mode Switches. (4 axis and multiplier) 3m (10 ft.) Spiral Cable	\$730.00



Replacement 5m (16ft.) Spiral Cable (21 wires) - D.I.Y. work

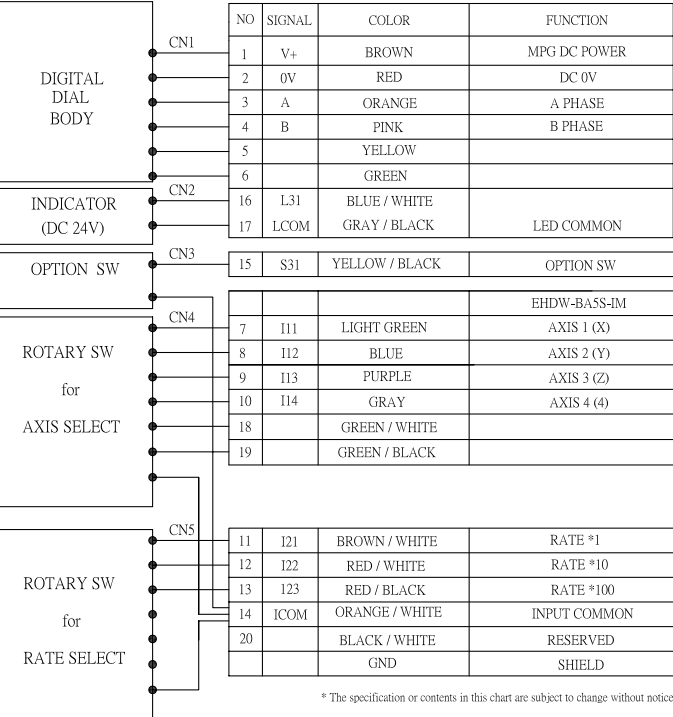
Model	Price
Replacement Cable 5M	\$250.00

PHD-100-B-S CONNECTION DIAGRAM



* The specification or contents in this chart are subject to change without notice.

EPG-B-A-4-S CONNECTION DIAGRAM



* The specification or contents in this chart are subject to change without notice.

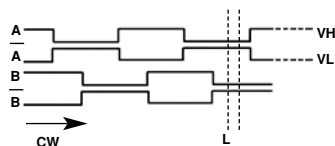
Series PHD/Pendant Hand-held

with E-Stop(2-Contacts) / Enable SW / Push Button SW capability



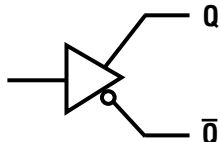
US \$870.00
S.R.P.
List Price

OUTPUT WAVE FORMS



Relation between output signals and click stop position.

OUTPUT CIRCUIT



26LS31 or equivalent
Recommended line receiver: 26LS32

FEATURES

- New! 2-Contacts E-Stop SW (2B-Options are pre-wired)
selection of wiring either 1A or 2B available
- New! Durable thick-wall case & reliable thread mold with brass inserts
- New! Durable thick multiplier & axis selector Blue SW's
- New! Push Button SW's by IDEC (Sold Separately)
- 5v Linedriver and 5v TTL outputs (Point to point)
- IP 65, NAMA 4 enclosure protection
- Std. 16ft.extended spiral cable
- Std. Magnets attached in rear
- Circular Plastic Size 17 & Amphenol Alloy Size 24 Connector Kits

SPECIFICATIONS

Electrical

Outputs	Line Driver	TTL Voltage Output for FANUC
Pulse per Revolution	100 PPR	
Supply Voltage	5 v±0.25 v dc	5 v±0.25 v dc
Output Voltage (VH)	≥2.5 v	≥4.0 v
Output Voltage (VL)	≤0.5 v	≤0.5 v
Current Requirement	≤60 mA (No Loading)	
Sink Current	≤20 mA	
Output Capacity	Sync. Current: 20 mA, Residual Voltage: ≤0.5 v	
Phase Difference	Quadrature Square Wave A & B: 90°±45° (T/4±T/8)	
Rise/Fall Time	≤2 μs	
Frequency Response	5 kHz	
Insulation Resistance	20 MΩ At 500 v dc Megger (Circuit-Body)	
Spiral Cable	16 ft. extended, 25 pol., 22-24 AWG	

Mechanical

Dial Rotating Speed	500 r/min.-Max., 200 r/min.-Normal (Continuous)
Starting Torque	5 ozf-in (360 gf-cm) at 25°C
Rotational Life	10x 6 bits turns at ≤ 200 rpm
Weight	3 lbs (1.5 kg)

Environmental

Operating Temperature	0° to 60° C
Humidity	RH 35% to 90% no condensation
Storage Temperature	0° to 80° C
Vibration	2G
Shock	0.5G
Enclosure	IP65/NEMA 4

Rotary Switch (PTP, Step Angle 30 Degree)

Max. Voltage	30 v dc
Current / Switch Life	50 mA / ≥25,000 cycles

Emergency Stop Switch (Omron, 2B, A165E-S-02)

DC Load Resistance	30 vdc, 1.0 A OMRON # A165E-S-02
--------------------	----------------------------------

Enable Switch (Dailywell, 1A, PAS6B1M1CES-5)

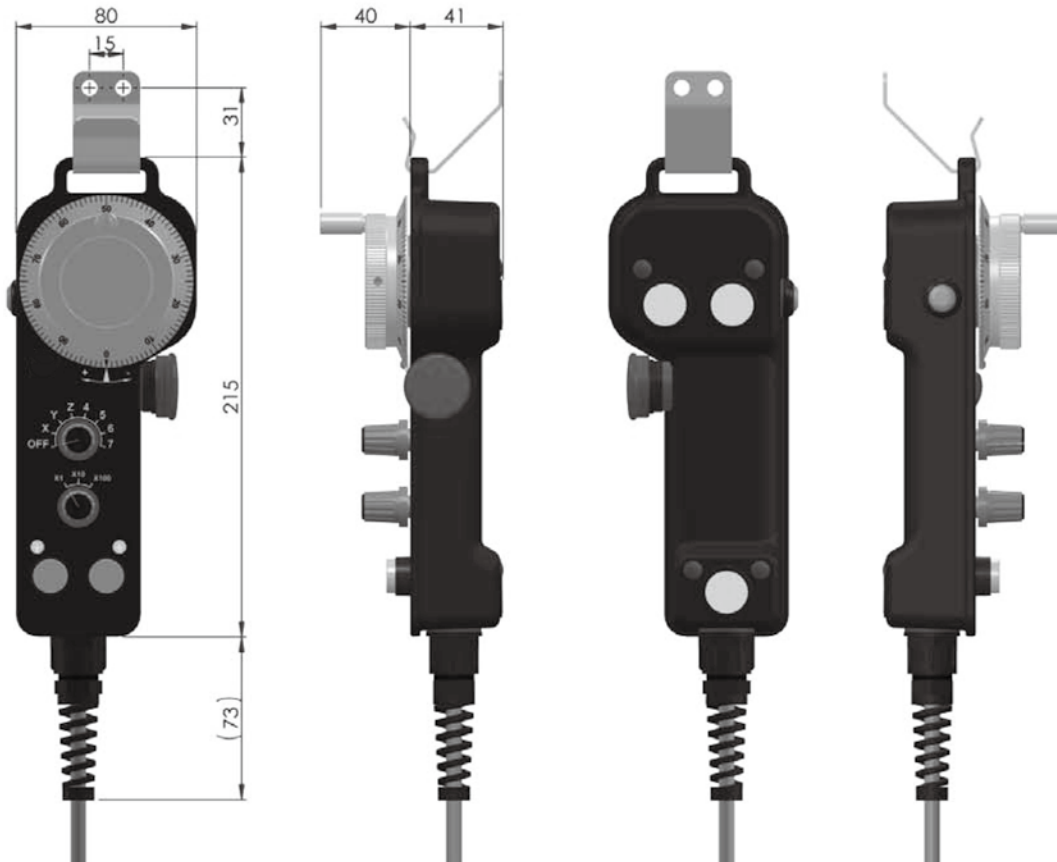
DC Load Resistance	50 vdc, 100 mA Dailywell # PAS6B1M1CES-5
--------------------	--

Series PHD / Pendent Hand-Held / 6 Axis / With E-Stop (2-Contacts) / Enable SW

MODEL NUMBER	SPECIFICATION	LIST PRICE
PHD-100-E-6-L	100 Pulse, 5v DC, Linedriver Output, E-Stop SW, Rear Magnets Two (2) Mode Switches. (6 axis and multiplier) 5m (16 ft.) Spiral Cable	\$870.00
PHD-100-E-6-L-EN (w/Push Button SW capability)	100 Pulse, 5v DC, Linedriver Output, E-Stop SW, Enable SW, Rear Magnets Two (2) Mode Switches. (6 axis and multiplier) 5m (16 ft.) Spiral Cable	\$950.00
PHD-100-E-6-T-EN (For FANUC w/Push Button SW capability)	100 Pulse, 5v DC, TTL Output, E-Stop SW, Enable SW, Rear Magnets Two (2) Mode Switches. (6 axis and multiplier) 5m (16 ft.) Spiral Cable	\$950.00

Series PHD / Pendent Hand-Held / 6 Axis / E-Stop (2-Contacts) / Push Button SW

MODEL NUMBER	SPECIFICATION	LIST PRICE
PHD-100-E-6-L-PB (w/Push Button SW capability)	100 Pulse, 5v DC, Linedriver Output, E-Stop SW, Push Button SW Capability. Order Separately. Rear Magnets Two (2) Mode Switches. (6 axis and multiplier) 5m (16 ft.) Spiral Cable	\$890.00
PHD-100-E-6-T-PB (For FANUC w/Push Button SW capability)	100 Pulse, 5v DC, TTL Output, E-Stop SW, Push Button SW Capability. SW Order Separately. Rear Magnets Two (2) Mode Switches. (6 axis and multiplier), 5m (16 ft.) Spiral Cable	\$890.00

Outline Drawings (mm)


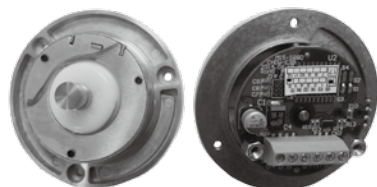
Series PHD / Pendant Hand-held

with E-Stop(2-Contacts) / Enable SW / Push Button SW capability



Push Button SW (-Sold Separately) -D.I.Y.Work

MODEL NUMBER	SPECIFICATION	LISTPRICE
AL6M-M14PWC	Momentary Push Button SW -IDEC, Hole dia 16 mm, SW dia 16-18 mm. Direct replacement for our previous Deca #D16LMR2 comes with One(1) set -(2) flying 3" wires w/2-pin conn. on the end	\$24.00
AL6M-A14PWC	Alternate Push Button SW-IDEC, Hole dia 16 mm, SW dia 16-18 mm. Direct replacement for our previous Deca #D16LAR2 comes with One(1) set -(2) flying 3" wires w/2-pin conn. on the end	\$24.00



Replacement MPG for PHD-100-E-6 Series-Yellow SW's

MODEL NUMBER	SPECIFICATION	LIST PRICE
HDW-AE-80-CHM	Replacement MPG for 5v Line Driver outputs such as PHD-100-E-6-L, PHD-100-E-6-L-EN, PHD-100-E-6-L-PB, D.I.Y.Work	\$250.00
HDW-AA-80-CHM	Replacement MPG for 5v TTL-Fanuc models outputs such as PHD-100-E-6-T-EN, PHD-100-E-6-T-PB, D.I.Y.Work	\$250.00

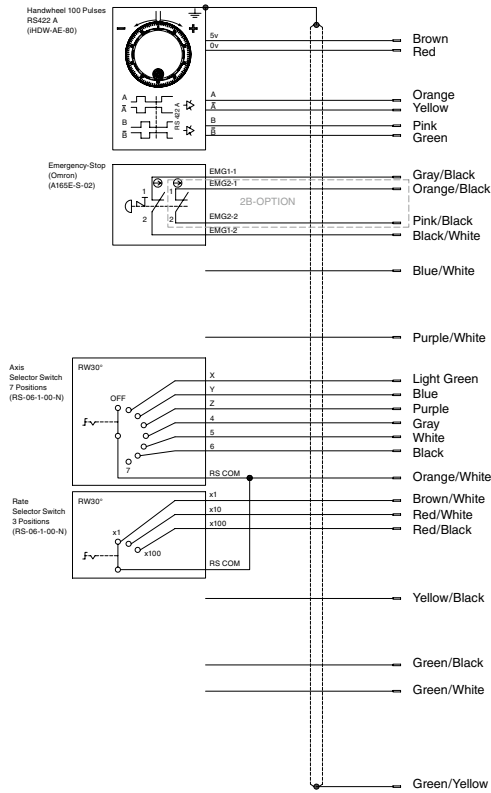
How to install a Replacement MPG to the old Pendant 2006-2016 model (Yellow SW's, Symmetrical Design)



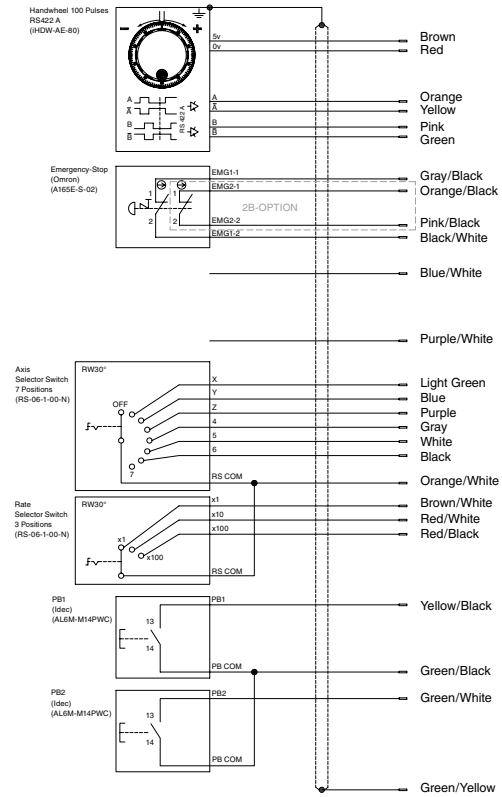
1. Take MPG dial out either side Hex. 2mm set screw of dial or remove the center aluminum plate out using a mini-flat screw driver.
2. Also, take (2) SW's out.
3. Take all screws (8) out from the front panel.
4. Cut over-sized 1.65" hole on the existing 1" hole of the front plastic panel.
5. Cut previous 6-wires and those flying wires insert into the new MPG.
6. Wire-color code:
5v – Brown
0v – Red
Ch.A – Orange
Ch.B – Pink
Ch.Anot – Yellow(Line Driver only)
Ch.Bnot – Green (Line Driver only)

Wiring Diagram-5v Line driver output (2B-Options are pre-wired)

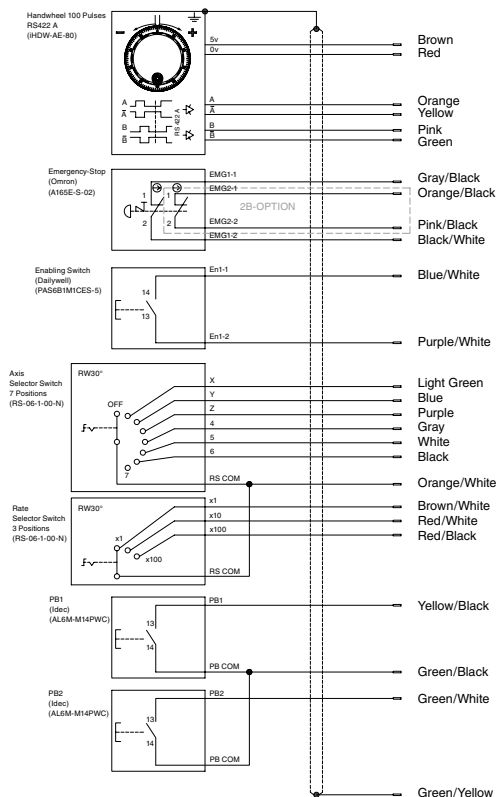
PHD-100-E-6-L



PHD-100-E-6-L-PB

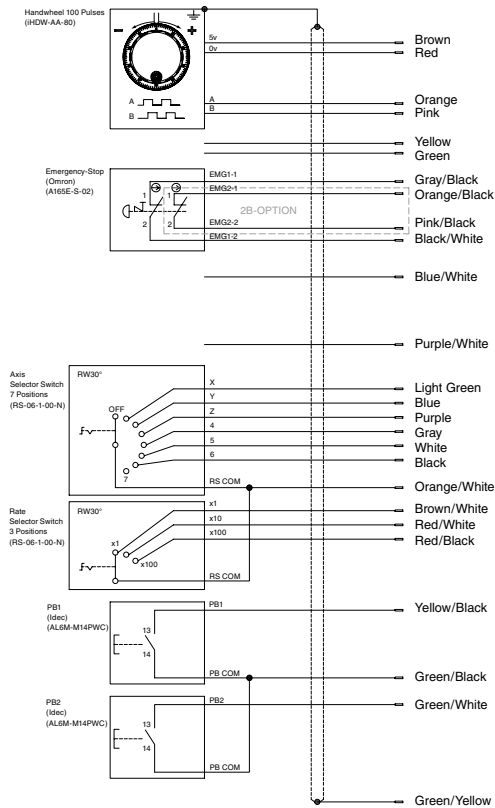


PHD-100-E-6-L-EN

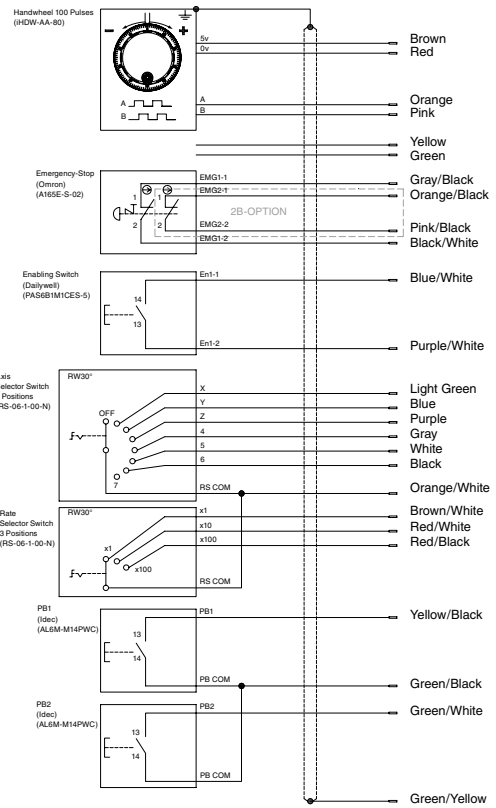


Wiring Diagram-5v TTL(Fanuc) output (2B-Options are pre-wired)

PHD-100-E-6-T-PB



PHD-100-E-6-T-EN



MODEL	PRICE
EE-6C004-A01	\$280.00
Replacement *5 m (16 ft.) Spiral Cable (25 wires)D.I.Y.Work* 5 m (16 ft.)-Extended length. Shrunk length= approx. 6 ft.	



MODEL	PRICE
PH2.0-2P L8cm**	\$4.00
Two(2) sets 3' length flying wires w/2-pin conn.on the end for your own Push Button SW's (Not World Encoders Brand)**If use World Encoders Push Button SW, Not required .	



MODEL	PRICE
Amp CPC Size 17 connector kit	\$90.00
1.3"O.D., 0.75" I.D., 28 pos., #18-28 AWG Gold Solder 1-#206039-1 Plug, 28-#66570-3 Pin, 28-#66569-3 Socket, 1-#206038-1 Mating Receptacle 1-#207241-1 Cable Boot, 1-#207387 Cable Grip	



MODEL	PRICE
Amp CPC Size 23 connector kit	\$190.00
1.73"O.D., 1.20" I.D., 24 pos., #20-26 AWG Gold Solder 1-#206037-1 Plug, 24-#66182-1 Pin, 24-#66183-1 Socket, 1-#206038-Mating Receptacle, 1-#206138-8 Cable Clamp, 1-#CF20MA-BK Strain Relief	



MODEL	PRICE
Amphenol Alloy Size 24 connector kit	\$90.00
1.7"O.D., 1.2" I.D., 24 pos., Size 24-28, 1-1/2"-18 UNEF 1-#MS3106F24-28P Straight Cable Plug with 24 Pin-Solder-Contacts, 1-Cable Clamp Backshell, 1-Rubber Grommet 1-#MS3102E24-28S Mating Receptacle with 24 Socket-Solder-Contacts, 1-Rubber Washer 1-1/4"O.D.x 3/8" I.D. x 1/16" 1-#AN3420-16, 1-#AN3420-6 Rubber Bushing Boots	

Series EHDW/Pendant Hand-held

**WORLD
ENCODERS**

1-800-903-9093



US \$830.00
S.R.P.
List Price

FEATURES

- CNC Controls for Fanuc, Mitsubishi, All others
- Multiplier x1, x10, x100 and axis selector SW's
- 5v TTL outputs (Point to point)
- IP 65, NEMA 4 enclosure protection
- Std. 10 ft. extended spiral cable
- Amp CPC Size 17 or Size 23 connector kit available as options
- John Ford replacement - 4,5 axis SW with Enable SW available
- Centroid Part # 10808, 5v TTL with 5 axis, CNC10 System, CPU10 MPG's CNC Control for Mills
- Centroid Part # 11069, 5v TTL with 3 axis, CNC11 System & Vice-versa, MPU11 MPG's CNC Control for Lathes
- Circular Plastic Size 17 & Amphenol Alloy Size 24 Connector Kits

SPECIFICATIONS

Electrical

Outputs	TTL Voltage Output for FANUC
Pulse per Revolution	100 PPR
Supply Voltage	5 v $\pm$ 0.25 v dc
Output Voltage (VH)	≥ 4.0 v
Output Voltage (VL)	≤ 0.5 v
Current Requirement	≤ 60 mA (No Loading)
Sink Current	≤ 20 mA
Output Capacity	Sync. Current: 20 mA, Residual Voltage: ≤ 0.5 v
Phase Difference	Quadrature Square Wave A & B: 90 $^{\circ}$ $\pm$ 45 $^{\circ}$ (T/4 $\pm$ T/8)
Rise/Fall Time	≤ 2 μ s
Frequency Response	0-10 kHz
Insulation Resistance	20 M Ω At 500 v dc Megger (Circuit-Body)
Spiral Cable	10 ft. extended, 21/17 pol., 22-24 AWG

Mechanical

Dial Rotating Speed	500 r/min.-Max., 200 r/min.-Normal (Continuous)
Starting Torque	8.34 ozf-in (600 gf-cm) at 25 $^{\circ}$ C
Rotational Life	10x 6 bits turns at ≤ 200 rpm
Weight	3 lbs (1.5 kg)

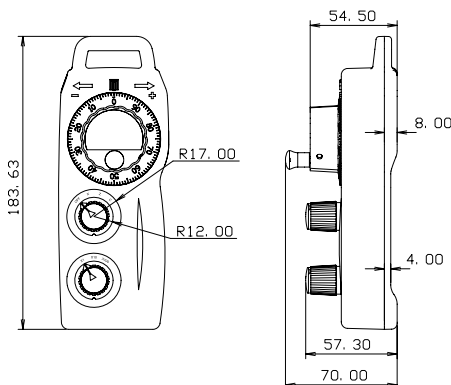
Environmental

Operating Temperature	0 $^{\circ}$ to 60 $^{\circ}$ C
Humidity	RH 35% to 90% no condensation
Storage Temperature	0 $^{\circ}$ to 80 $^{\circ}$ C
Vibration	10-50 Hz/1.5mm X, Y, Z - 2 hrs. each
Shock	50 G per 11 ms
Enclosure	IP65/NEMA 4

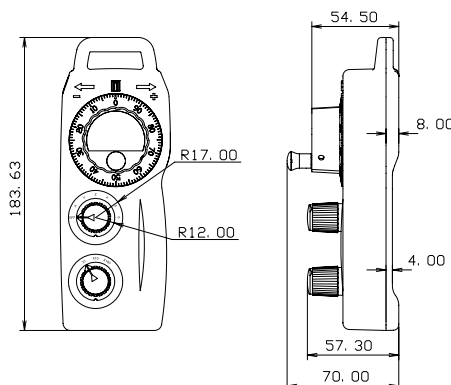
Rotary Switch

Max. Voltage	30 v dc
Current / Switch Life	50 mA / $\geq 25,000$ cycles

3-Axis



5-Axis



Series EHDW-Pendant Hand-Held for FANUC CNC-Lathes or Mills

MODEL NUMBER	SPECIFICATION	LIST PRICE
EHDW-BA3S-IM	Fanuc CNC Control-3 axis Lathes. Centroid Part # 10808 100 Pulse, 5vDC, TTL Output, 3 axis SW. Multiplier SW, 10 ft. Spiral Cable, Magnets in rear.	\$760.00
EHDW-BA5S-IM	Fanuc CNC Control-5 axis Mills. Centroid Part # 11069 100 Pulse, 5vDC, TTL Output, 5 axis SW. Multiplier SW, 10 ft. Spiral Cable, Magnets in rear.	\$760.00
EHDW-CA4S-IM	Fanuc CNC Control-4 axis Mills with Enable SW 100 Pulse, 5vDC, TTL Output, 4 axis SW. Johnford replacement Multiplier & Enable SW's, 10 ft. Spiral Cable, Magnets in rear.	\$830.00
EHDW-CA5S-IM	Fanuc CNC Control-5 axis Mills with Enable SW 100 Pulse, 5vDC, TTL Output, 5 axis SW. Johnford replacement Multiplier & Enable SW's, 10 ft. Spiral Cable, Magnets in rear.	\$830.00

Series EHDW-Pendant Hand-Held for Mitsubishi & Std. CNC Controls

MODEL NUMBER	SPECIFICATION	LIST PRICE
EHDW-CD5S-IM	Mitsubishi CNC Control with Enable SW 25 Pulse, 12vDC, TTL Output, 5 axis SW Multiplier & Enable SW's, 10 ft. Spiral Cable, Magnets in rear.	\$830.00
EHDW-BE5S-IM	Std. CNC Controls 100 Pulse, 5vDC, Diff. Line driver Output, 5 axis SW Multiplier & Enable SW's, 10 ft. Spiral Cable, Magnets in rear.	\$830.00
EHDW-CE3L-IM	Std. CNC Controls 100 Pulse, 5vDC, Diff. Line driver Output, 3 axis SW Multiplier & Enable SW's, 16 ft. Spiral Cable, Magnets in rear.	\$960.00

WIRING DIAGRAM:

Wire Color	Function	Centroid Pin# (AMP#206039-1)
Brown	5v DC	1
Red + Orange/White	Ground	2
Orange	A	3
Pink	B	4
Olive	Axis 1	5
Blue	Axis 2	6
Purple	Axis 3	7
Gray	Axis 4	8 (N/A in 3 Axis)
Green/White	Axis 5	9 (N/A in 3 Axis)
Brown/White	Rate x1	10
Red/White	Rate x10	11
Red/Black	Rate x100	12
Blue/White	LED 5-24v dc	13
Gray/Black	LED Ground	14
Shield	Shield	26

MODEL	PRICE
Amp CPC Size 17 connector kit	\$90.00

1.3"O.D., 0.75" I.D., 28 pos., #18-28 AWG Gold
Solder 1-#206039-1 Plug, 28-#66570-3 Pin, 28-
#66569-3 Socket, 1-#206038-1 Mating Receptacle
1-#207241-1 Cable Boot, 1-#207387 Cable Grip



MODEL	PRICE
Amphenol Alloy Size 24 connector kit	\$90.00

1.7"O.D., 1.2" I.D., 24 pos., Size 24-28, 1-1/2"-18 UNEF
1-#MS3106F24-28P Straight Cable Plug with 24 Pin-Solder-
Contacts, 1-Cable Clamp Backshell, 1-Rubber Grommet
1-#MS3102E24-28S Mating Receptacle with 24 Socket-
Solder- Contacts, 1-Rubber Washer 1-1/4"O.D x 3/8" I.D. x
1/16" 1-#AN3420-16, 1-#AN3420-6 Rubber Bushing Boots



Model	Price
EE-6C004-A01	\$280.00

Replacement 5m (16ft.) Spiral Cable
(25 wires) - D.I.Y. work

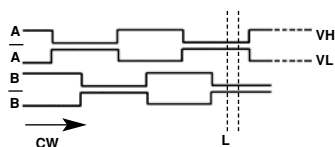


Series iPHD/iHDW Pendant Hand-held with E-Stop (2-Contacts), 2-Enable, Jog+, Jog-, F1 SW's



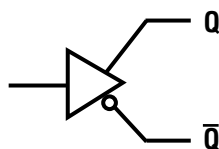
US \$980.00
S.R.P.
List Price

OUTPUT WAVE FORMS



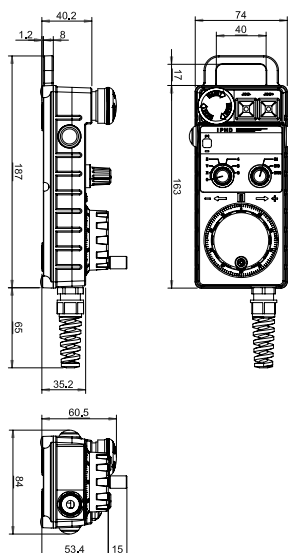
Relation between output signals and click stop position.

OUTPUT CIRCUIT



26LS31 or equivalent
Recommended line receiver: 26LS32

OUTLINE DRAWINGS



FEATURES

- Safety Level 3, conforms to EN418
- 2-Contacts E-Stop SW, 2-Enable SW (R & L)
- Jog+, Jog-, F1 function SW's
- Multiplier x1, x10, x100 and X-Y-Z-4-5 or X-Y-Z-4-5-6 axis selector SW's
- 5v Linedriver and 5v TTL outputs (Point to point)
- IP65, NAMA 4 enclosure protection
- Std. 16 ft. extended spiral cable
- Std. Magnets attached in rear
- Amp CPC Size 17 & Amphenol Allow Size 24 connector kit
- Euchner HBA-072 910 interchangeable model available in stock. (Binary code 0-Z-X-Y-4-5 axis)

SPECIFICATIONS

Electrical

Outputs	Line Driver	TTL Voltage Output for FANUC
Pulse per Revolution	100 PPR	
Supply Voltage	5 v±0.25 v dc	5 v±0.25 v dc
Output Voltage (VH)	≥2.5 v	≥4.0 v
Output Voltage (VL)	≤0.5 v	≤0.5 v
Current Requirement	≤60 mA (No Loading)	
Sink Current	≤20 mA	
Output Capacity	Sync. Current: 20 mA, Residual Voltage: ≤0.5 v	
Phase Difference	Quadrature Square Wave A & B: 90°±45° (T/4±T/8)	
Rise/Fall Time	≤2 μs	
Frequency Response	0-10 kHz	
Insulation Resistance	20 MΩ At 500 v dc Megger (Circuit-Body)	
Spiral Cable	16 ft. extended, 25/26 pol., 22-24 AWG	

Mechanical

Dial Rotating Speed	500 r/min.-Max., 200 r/min.-Normal (Continuous)
Starting Torque	8.34 ozf-in (600 gf-cm) at 25°C
Rotational Life	10x 6 bits turns at ≤ 200 rpm
Weight	3 lbs (1.5 kg)

Environmental

Operating Temperature	0° to 60° C
Humidity	RH 35% to 90% no condensation
Storage Temperature	0° to 80° C
Vibration	10-50 Hz/1.5mm X, Y, Z - 2 hrs. each
Shock	50 G per 11 ms
Enclosure	IP65/NEMA 4

Rotary Switch

Max. Voltage	30 v dc
Current / Switch Life	50 mA / ≥25,000 cycles

Emergency Stop Switch

DC Load Resistance	30 vdc, 1.0 A IDEC # XA1E-BV3U02R
--------------------	-----------------------------------

Enable Switch

DC Load Resistance	50 vdc, 100 mA Dailywell # PAS6B1M1CES-5
--------------------	--

NOTE: Jog+, Jog-, F1 SW's Specifications are Momentary and Normally Open.

Series iPHD/iHWD Pendant Head-Held with E-Stop (2-Contacts), 2-Enable, Jog+, Jog-, F1 SW's

MODEL NUMBER	SPECIFICATION	LIST PRICE
iPHD-FOE6L-IM	100 Pulse 5v DC, Linedriver Output, E-Stop (2-Contacts) SW, 2-Enable SW (R+L), Two (2) Mode SW's (6 axis & multiplier), Jog+, Jog-, F1 Function SW's, 5m (16ft.) Spiral Cable	\$980.00
iPHD-FOA5L-IM	100 Pulse 5v DC, TTL Output, E-Stop (2-Contacts) SW, 2-Enable SW (R+L), Two (2) Mode SW's (5 axis & multiplier), Jog+, Jog-, F1 Function SW's, 5m (16ft.) Spiral Cable	\$980.00
iPHD-FOECL-IM	Euchner HBA-072 910 Interchangeable Model, (Binary Code 0-Z-X-Y-4-5 axis) 100 Pulse, 5v DC, Linedriver Output, E-Stop (2-Contracts) SW (R+L), Two (2) Mode SW's (5 axis & multiplier), Jog+, Jog-, F1 Function SW's, 5m (16 ft.) Spiral Cable	\$1,020.00
iHWD-BPE5L-IM	IPG Photonics Model (Formerly: iPHD-FOE5L-IM) 100 Pulse 5v DC, Linedriver Output, E-stop(2-Contacts) SW, 5 Axis, 2-Enable SW (R+L), Jog+, Jog-, 5m (16 ft.) Spiral Cable	\$1,020.00

MODEL	PRICE
Amp CPC Size 17 connector kit	\$90.00
1.3"O.D., 0.75" I.D., 28 pos., #18-28 AWG Gold Solder 1-#206039-1 Plug, 28-#66570-3 Pin, 28-#66569-3 Socket, 1-#206038-1 Mating Receptacle 1-#207241-1 Cable Boot, 1-#207387 Cable Grip	



MODEL	PRICE
Amp CPC Size 23 connector kit	\$190.00
1.73"O.D., 1.20" I.D., 24 pos., #20-26 AWG Gold Solder 1-#206037-1 Plug, 24-#66182-1 Pin, 24-#66183-1 Socket, 1-#206038-Mating Receptacle, 1-#206138-8 Cable Clamp, 1-#CF20MA-BK Strain Relief	



MODEL	PRICE
Amphenol Alloy Size 24 connector kit	\$90.00
1.7"O.D., 1.2" I.D., 24 pos., Size 24-28, 1-1/2"-18 UNEF 1-#MS3106F24-28P Straight Cable Plug with 24 Pin-Solder-Contacts, 1-Cable Clamp Backshell, 1-Rubber Grommet 1-#MS3102E24-28S Mating Receptacle with 24 Socket-Solder-Contacts, 1-Rubber Washer 1-1/4"O.D.x 3/8" I.D. x 1/16" 1-#AN3420-16, 1-#AN3420-6 Rubber Bushing Boots	

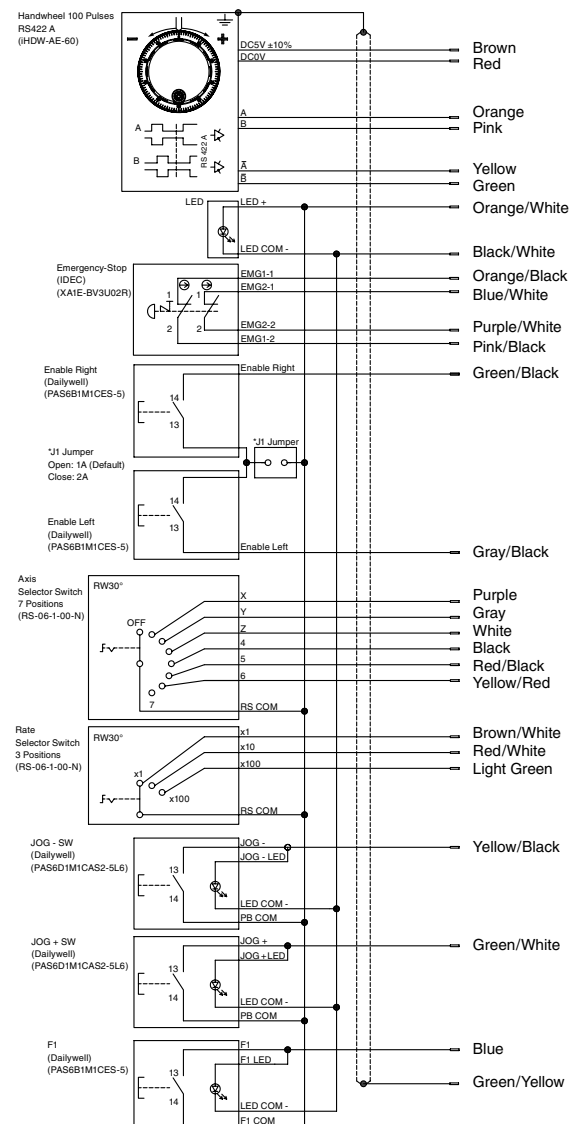


MODEL	PRICE
EE-6C004-A01	\$280.00
Replacement *5 m (16 ft.) Spiral Cable (25 wires) D.I.Y.Work* 5 m (16 ft.)-Extended length. Shrunk length= approx. 6 ft.	



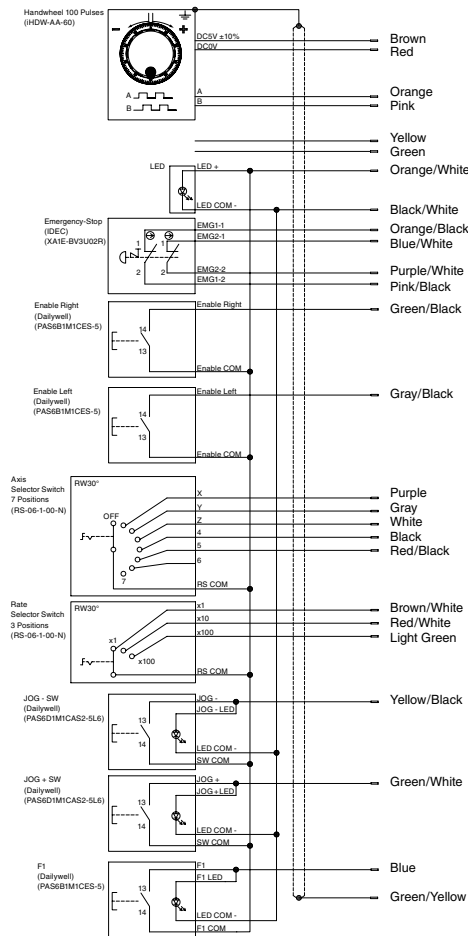
WIRING DIAGRAM

iPHD-FOE6L-IM (6 axis, 5v Line Driver, PTP)

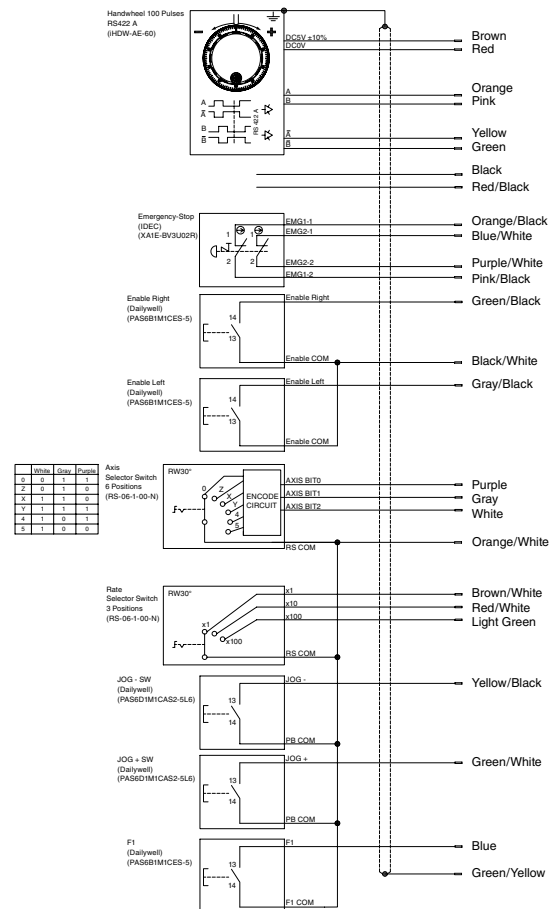


WIRING DIAGRAM

iPHD-FOA5L-IM (5 axis, 5v TTL, PTP)



iPHD-FOECL-IM (5 axis, 5v Line Driver, Binary)



HPG (CNC-B00)/MHDW(CNC-D00) Pendant Hand-held for Brother CNC Tapping Center

HPG / MHDW

HPG (CNC-B00)/MHDW(CNC-D00) Pendant Hand-held for Brother CNC Tapping Center

MODEL NUMBER	SPECIFICATION	LIST PRICE
HPG-B-100-L-CL	CNC-B00, Pendant Hand-held (Rugged Metal Housing), No E-Stop SW MPG 100ppr,5v Lindriver, 2-Rotary SW's-Axis AW, Multiplier SW 3 meter spiral cable with Nanaboshi Plug end. 12 pins-Binary Code PCB	\$980.00
MHDW-LEBS-C26	CNC-D00, Pendant Hand-held (Rugged Metal Housing), w/ E-Stop SW MPG 100ppr,5v Lindriver, 2-Rotary SW's-Axis AW, Multiplier SW 3 meter spiral cable with JAE Military Plug end. 19pins-Binary Code PCB Enable SW, E-Stop SW, Rear Magnets	\$1,180.00

Reference: <http://worldencoders.com/products/hpg/hpg.html>

Warranty and Terms

1. GENERAL

WORLD ENCODERS INCORPORATED is hereinafter referred to as "World Encoders". All sales of World Encoders are subject to the following terms and conditions. Any order that contains terms and conditions in addition to or inconsistent with the following shall not be binding upon World Encoders unless acceptance thereof is made in writing by an authorized representative of World Encoders, and failure of World Encoders to object to provisions contained in any purchase order or other communication from Buyer shall not be construed as a waiver of these conditions nor an acceptance of any such provisions.

Specific quotations showing definite quantities must be made for each order and are subject to immediate acceptance.

No orders for products of World Encoders shall be binding upon World Encoders until accepted in writing by an authorized representative of World Encoders.

The right is reserved to correct clerical and stenographic errors at any time.

World Encoders will comply with all applicable federal, state and local laws. Without limiting the generality of the foregoing, World Encoders represents that the products to be furnished or the services rendered hereunder were or will be produced or performed in compliance with all applicable requirements of Sections 6, 7, and 12 of the Fair Labor Standards Act of 1938, as amended, and of all valid and applicable regulations and orders of the Administrator of the Wage and Hour Division issued under Section 14 thereof.

2. WARRANTY

Standard products manufactured by World Encoders are warranted to be free from defects in workmanship and material for period of one (1) year from the date of shipment, and products which are defective in workmanship or material will be repaired or replaced at the option of World Encoders, at no charge to the Buyer. Final determination as to whether a product is actually defective rests with World Encoders. The obligation of World Encoders hereunder shall be limited solely to repair and replacement of products that fall within the foregoing limitations, and shall be conditioned upon receipt by World Encoders of written notice of any alleged defects, or deficiency promptly after discovery, within the warranty period, and in the case of components or units purchased by World Encoders, the obligation of World Encoders shall not exceed the settlement that World Encoders is able to obtain from the supplier thereof. No products shall be returned to World Encoders without its prior consent. Products which World Encoders consents to have returned shall be shipped of f.o.b. World Encoders's factory. World Encoders cannot assume responsibility or accept invoices for unauthorized repairs to its components, even though defective. The life of the products of World Encoders depends to a large extent upon type of usage thereof, and World Encoders MAKES NO WARRANTY AS TO FITNESS OF ITS PRODUCTS FOR SPECIFIC APPLICATIONS BY THE BUYER NOR AS TO A PERIOD OF SERVICE UNLESS World Encoders SPECIFICALLY AGREES OTHERWISE IN WRITING AFTER THE PROPOSED USAGE HAS BEEN MADE KNOWN TO IT.

THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR

IMPLIED, INCLUDING, BUT NOT LIMITED TO ANY WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE.

3. MINIMUM BILLING

Minimum billing for any apparatus or parts sold by World Encoders shall be \$50.00 NET.

4. DELIVERY POINT

All prices quoted (including repairs, parts, and bases sold separately) are f.o.b. the World Encoders's factory.

5. PACKING

All prices listed provide for standard packing for domestic shipment in accordance with World Encoders's standard specifications. If special packing is required for domestic shipment or for export shipment, refer to the factory, or nearest District Office for price additions.

6. PRICE CHANGES

All prices in World Encoders' price book or other printed matter as well as written or verbal quotations are subject to change without further notice.

7. PENALTY CAUSES

Contracts or quotations showing penalty clause for failure to meet shipment are not acceptable unless specifically approved in writing by an officer of World Encoders.

8. PRODUCT CHANGES

Changes in design and improvements in manufacture are constantly being made by World Encoders. These changes and improvements are being made whenever World Encoders believes the product will be improved. No obligation to incorporate these changes in units manufactured prior to the change will be assumed.

9. CANCELLATION

All orders are considered non-cancelable if our factory is already in the process of manufacturing. However, cancellation may be accepted by World Encoders' Sales Management (at their sole discretion) if the item is considered to be a popular, saleable, item.

Minimum cancellation charge is 25% of unit price.

Orders for non-standard catalog items are not subject to cancellation after order is accepted by World Encoders.

10. DELAY

Delay in delivery of any installment shall not relieve Buyer of his obligations to accept remaining deliveries. World Encoders shall not be liable for damage as a result of any delay due to any cause beyond World Encoders' reasonable control including, without limitation, act of God, act of war, riot, delay in transportation or inability to obtain necessary labor, materials, or manufacturing facilities. In the event of any such delay, the date of delivery shall be extended for a period equal to the time lost by reason of the delay.

Warranty and Terms

**WORLD
ENCODERS**

1-800-903-9093

11. TAXES AND OTHER CHARGES

Any manufacturer's tax, retailer's occupation tax, use tax, sales tax, excise tax, duty, custom inspection or testing fee or any other tax, fee or charge of any nature whatsoever imposed by any governmental authority, on or measured by any transaction between World Encoders and the Buyer, shall be paid by the Buyer in addition to the prices quoted or invoiced. In the event World Encoders shall be required to pay any back tax, fee, or charge, the Buyer shall reimburse World Encoders therefore or in lieu of such payment, the Buyer shall provide World Encoders at the time the order is submitted with an exemption certificate or other document acceptable to the authority imposing the same.

12. PAYMENTS

Standard terms of credit are net 30 days providing satisfactory credit is established with World Encoders.

A 1-1/2% monthly service charge (18% annually) will be added to all accounts not paid within 30 days from date of invoice.

If in the judgement of World Encoders the financial condition of the Buyer at any time does not justify continuance of production or shipment on the terms of payment originally specified World Encoders may require full or partial payment in advance and in the event of bankruptcy or insolvency of the Buyer or if any proceeding is brought by or against the Buyer under the bankruptcy or insolvency laws, World Encoders shall be entitled to cancel any order then outstanding and shall receive reimbursement for its cancellation charges.

Each shipment shall be considered a separate and independent transaction and payment therefore, shall be made accordingly. If shipments are delayed by the Buyer, payments shall become due on the date when World Encoders is prepared to make shipment. If the work covered by the purchase order is delayed by the Buyer payment shall be made on the purchase price and the percentage of completion. Products held for the Buyer shall be at the risk and expense of the Buyer unless otherwise agreed upon in writing. World Encoders reserves the right to ship to its order and make collection by sight draft with bill of lading attached or on a C.O.D. basis or any other terms approved in writing by World Encoders's Credit Department.

13. PATENTS

World Encoders shall defend any suit or proceeding brought against Buyer so far as it is based on a claim that any Company apparatus, or any part thereof furnished, when employed in the manner intended by World Encoders, constitutes an infringement of any patent of the United States, issued on the date hereof, if notified promptly in writing and given authority, information and assistance (at World Encoders's expense) for the defense of same, and World Encoders shall pay all damages and costs awarded therein against Buyer. In case the apparatus or any part thereof is in such suit held to constitute infringement and its use, in the manner intended by World Encoders is enjoined, World Encoders shall, at its own expense, and at its option,

either: Procure the right to continue using said apparatus or replace same with non-infringing apparatus, or modify it so it becomes non-infringing or remove said apparatus and refund the purchase price and the transportation and installation costs thereof.

The foregoing states the entire liability of World Encoders for patent infringements by said apparatus or any part thereof, and in no event shall World Encoders be liable if the infringement is based on the use of the apparatus for a purpose other than that for which sold by World Encoders. As to any product furnished by World Encoders to the Buyer manufactured in accordance with designs proposed, by the Buyer shall indemnify the Company against any loss, cost, expense and/or award made against World Encoders for any patent, trademark, or copyright infringements or alleged infringements.

14. RMA RETURNS

Before returning material to World Encoders, a return authorization number must be obtained. We will not accept any returns or exchange without a return authorization number.

15. WARRANTY & RMA POLICY

World Encoders products are warranted to be free from defects in workmanship and material for a period of one(1) year from the date of shipment. Warranty repairs/Return Material Authorization will not be accepted after one(1) year. Also after one(1) year, we will not accept any repairs. Do not send us any out of warranty items. World Encoders has the right to refuse and dispose of your out of warranty items without notice.

NOTE: PRICE SUBJECT TO CHANGE WITHOUT NOTICE.

**WORLD
ENCODERS**

297 SW 41st St.
Renton, WA 98057 USA
1-800-903-9093
sales@worldencoders.com
www.worldencoders.com