



# FEEDBACK

## QUICK REFERENCE GUIDE

A COMPREHENSIVE LINE OF OPTICAL, RESOLVER, AND MAGNETO-RESISTIVE ROTARY FEEDBACK PRODUCTS.

NorthStar™

ACURO®

Dynapar™

HENGSTLER®

Harowe™

## HOW TO USE THIS GUIDE

The Feedback Quick Reference Guide is designed to make product selection simple.

The guide provides you with a decision tree to assist with selecting the appropriate product for your needs.

**Step 1:** Select the type of interface (Absolute, Resolver, Incremental)

**Step 2:** Select mounting style (Shafted, Hubshaft, Hollowshaft, etc.)

**Step 3:** Select the appropriate "Duty Classification" for your application (See page 4 for encoder duty classifications)

**Step 4:** Scroll down to the appropriate "Duty" section to view encoder specifications

**Step 5:** Select the encoder that fits your criteria

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Absolute	Shafted	Industrial Duty	AI25	2.5" size. Multiple fieldbus options. Up to 22 bit singleturn, 12 bit multiturn resolution.	6	
			AD34	37.5mm diameter. Unique one-step shaft mounting. Up to 19 bit singleturn resolution.	8	
		Servo Duty	AD25	58mm diameter. Up to 22 bit singleturn resolution. Unique conical shaft for concentric mounting.	8	
			AR62/63	58mm size. Oversized bearings. Magnetic sensor. 12 bit singleturn resolution.	11	
		Heavy Duty	AX70/71	70mm diameter. ATEX certified explosion-proof. Aluminum or stainless steel housing.	11	
			Hubshaft	Industrial Duty	AI25	2.5" size. Multiple fieldbus options. IP64 protection rating.
	Servo Duty	AD35		37.5mm diameter. Up to 22 bit singleturn resolution. 5VDC or 7-30VDC.	8	
		AD36		37.5mm diameter. Up to 22 bit singleturn, 12 bit multiturn resolution. 5VDC or 7-30VDC.	8	
	Hollowshaft	Industrial Duty	AC36	37.5mm diameter. Up to 22 bit singleturn, 12 bit multiturn resolution. 5VDC or 7-30VDC.	7	
			AC110	110mm diameter. Up to 50mm hollowshaft bore. Up to 22 bit singleturn resolution. 10-30VDC.	7	
		Servo Duty	AD36	37.5mm diameter. Up to 22 bit singleturn, 12 bit multiturn resolution. 5VDC or 7-30VDC.	8	
	Resolver	Housed	Servo Duty	R11	Size 11 housing - unique shaft pinion for pulley mounting - Up to 125°C temperature rating	8
				11	Size 11 housing - Up to 5X multi-speed available - High 3 arc-min accuracy	8
			Heavy Duty	R25	Industry standard 2.5" housing - Up to 125°C temperature rating - Up to 200g shock rating	11
				Frameless	10	Size 10 bearingless - Brushless construction - Up to 200°C temperature rating
15			Size 15 bearingless - Brushless construction - Multi-speed available		9	
21			Size 21 bearingless - Brushless construction - Multi-speed available		9	
Servo Duty		31	Size 31 bearingless - Brushless construction - Up to 8X multi-speed available		9	
		55	Size 55 bearingless - Up to 3.65" rotor I.D. bore - Up to 32X multi-speed available		9	
		HaroMax 15	Size 15 bearingless - High-accuracy - Light weight aluminum housing - Brushless construction		9	
HaroMax 21		Size 21 bearingless - High-accuracy - Light weight aluminum housing - Brushless construction	9			

			Page		
Incremental	Shafted	Light Duty	E12	Ultra-compact 1.2" Diameter - 5, 12, or 15VDC - Metal housing	5
			E14	1.44" Diameter - 5, 12, or 15VDC - Metal Housing - Line driver outputs.	5
			E23	2.31" Diameter - 5-26VDC - Terminal Strip connections	5
			EC23	2.31" Diameter - 5-26VDC - Up to 5000PPR	5
		Industrial Duty	22 Qube Series	2.25" Anodized Qube - Dual shaft option - 5-26VDC	6
			H20	Industry Standard 2.0" size - Multiple output options - Metal disc option	6
			HA25	Industry Standard 2.5" size - Multiple housing options - Wide range of resolutions	6
			HR25	Same as HA25 with metal disc	6
			HC25	Same as HA25 up to 5000PPR	6
			H58	Industry standard 58mm metric - 5-26VDC - Wide selection of options	6
			H42	Economical 2.5" design - Unbreakable disc - 5-26VDC	6
			HA725	Industry Standard 2.5" size - Up to 10,000PPR direct-read - 5V or 10-30VDC	6
		Heavy Duty	HD 20	2.0" square flange mounting - IP67 seals - up to 3600 PPR - Phased Array sensor	10
			HD25	2.5" square flange mounting - Dual output option - up to 5000 PPR - ATEX option	10
			H56	Foot- or face-mount - 5/8" shaft - M/S or Field serviceable connectors	11
			RIMTach 6200	Foot or face mount - 5/8" single or dual shaft - Magneto-resistive technology - Removable sensor modules	11
			X25	UL rating for Hazardous Locations - Conduit entry - up to 5000PPR	11
			60 Rotopulser	Dual 1/2" shaft option - Heavy duty bearings - 5-15VDC	11
	60P Rotopulser		Foot- or face-mount - "Encoder within Encoder" design	11	
	Hubshaft		Light Duty	E14H	1.44" Diameter - Up to 5/8" hub bore including metric - 5, 12, or 15VDC
		Industrial Duty	H20	Industry Standard 2.0" size - Up to 5/8" hub bore - Metal disc option	6
		Heavy Duty	HSD25	2.3" diameter housing - IP67 sealing - Nickel, stainless, or anodized housing	10
	HSD44		4.4" diameter housing - isolated hub compensates for motor endplay - metal disc	10	
	Hollowshaft	Industrial Duty	HS20	2.0" size - Up to 5/8" hollowshaft including metric - 5-26VDC	7
			HSS5	3.5" diameter - up to 1.25" electrically isolated hollowshaft - 5-26VDC	7
			HS35R	NEW PRODUCT - Phased Array ASIC - Unbreakable discs - Up to 5000 PPR - Up to 1.25" hollowshaft	7
			Ri80E	100mm diameter - large 45mm hollowshaft capability - up to 4096 PPR - 5-30VDC	7
		Heavy Duty	HSD35	Up to 1.25" electrically isolated hollowshaft - Field-serviceable connectors - dual isolated output option	11
			HSD37	3.75" housing - Phased Array Sensor - Up to 5000PPR - Nickel, stainless & dual output housing option	10
			HSD38	Finned 3.8" housing - Phased Array Sensor - Up to 5000 PPR - Ideal for vector motor duty	10
			DWD38	3.75" housing - draw works threaded shaft - ATEX certification available - NAMUR output available	11
			SLIMTach HS56	Magneto-resistive sensor - Up to 1-1/8" hollowshaft - Up to 2048 PPR - Field serviceable connector	10
			SLIMTach HS60	NEW PRODUCT - Up to 2-7/8" stainless hollowshaft - Magneto-resistive sensor - Field serviceable connector	11
		RIMTach HS85	Removeable Magneto-resistive sensors - Up to 4.5" hollowshaft - Dual isolated output option	11	
		Servo Duty	F10	Compact 1.25" diameter - direct-fit for Size 10 resolver - 5VDC - Up to 2048PPR & commutation channels	9
			F14	1.55" Diameter - Flex tether mounting - 5VDC - Up to 5000PPR & commutation channels	9
			F15	1.45" Diameter - direct-fit for size 15 resolver - 5VDC - Up to 2048 PPR & commutation channels	9
			F18	1.96" Diameter - Flex tether mounting - 5VDC - Up to 10,000PPR & Commutation channels	9
			F21	2.06" Diameter - direct-fit for size 21 resolver - 5VDC - Up to 2048PPR & commutation channels	9
			HC20	NEW PRODUCT - 1.97" diameter - multiple shaft mounting options - Up to 2500PPR - 5VDC or 5-26VDC	9
		Bearingless	Heavy Duty	SLIMTach SL56	56C-face mounting. 5-15VDC or 5-26VDC. Magneto-resistive technology. Up to 2048PPR.
	SLIMTach RL67			56C-face mounting or Reliance RPM™ rabbit mounting. Magneto-resistive technology.	10
SLIMTach SL85	180C-face mounting. 5-15VDC or 5-26VDC. Magneto-resistive technology. Up to 2048PPR.			10	
SLIMTach SL1250	250C-face mounting. 5-15VDC or 5-26VDC. Magneto-resistive technology. Up to 2048 PPR.			10	
RIMTach 8500	180C-face mounting. Removeable sensor modules. Magneto-resistive technology. Up to 1200PPR.			10	
RIMTach 1250	250C-face mounting. 5-15VDC or 5-26VDC. Magneto-resistive technology. Up to 2048 PPR.			10	
R45 Rotopulser	56C-face mounting. Reliable ring kit design. Removeable readhead.			11	
Kit/Modular	Servo Duty			M602 & M832	Component-level kit. 5VDC input. Unbreakable discs
		LM & LAM	Component-Level Linear encoder kit. Digital or Analog output. 5VDC input.	8	
		M9 & E9	.9" diameter. Up to 512PPR. 5VDC input.	8	
		M14	1.496" diameter (38mm). Short mounting depth. Up to 1024PPR. 5VDC input.	8	
		M15	1.5" diameter. Up to 1024PPR with commutation channels. Phased-Array sensor technology.	8	
		M53	2.0" diameter. Up to 2500PPR with commutation channels. 5VDC or 12VDC input.	9	

# ENCODER DUTY CLASSIFICATION

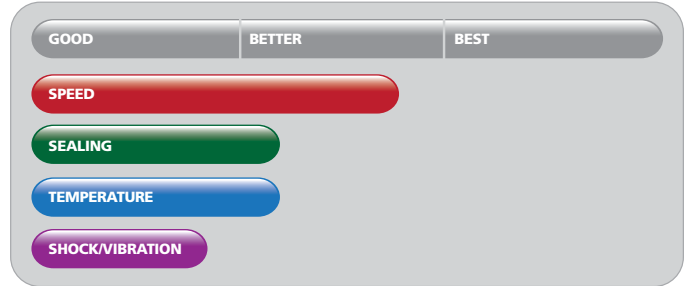
## Light Duty

Light duty encoders are commonly referred to as “commercial duty” due to their frequent use in commercial or office automation products. Copiers, fax machines, lab equipment, and medical equipment are common applications for light duty encoders. Typically these devices reside in fairly benign environments with little temperature variation, are fairly clean, and not generally subjected to high shock loading or moisture.



E14 Pictured.

### GENERAL PERFORMANCE DATA

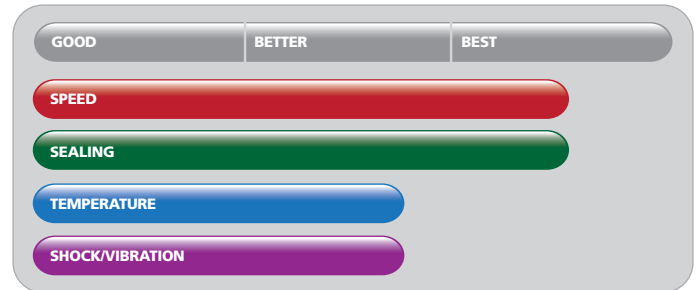


## Industrial Duty

Often considered the “workhorse” of the encoder world, industrial duty encoders achieve a good compromise between ruggedness and performance. These encoders are typically used in factory environments where contaminants like dust and moisture are common. The hollow-shaft variety of industrial duty encoders is often the preferred choice of vector motor OEM's for speed feedback.



HA25 Pictured.

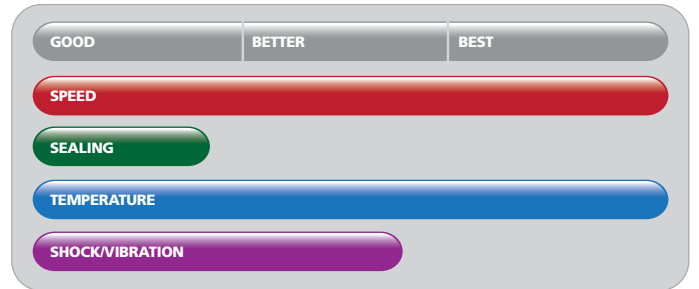


## Servo Duty

This class of encoders and resolvers is specifically suited to use on small-to mid-size stepper and servo motors. They typically have limited sealing due to their use inside motor housings, but are capable of very high speeds and high temperatures, a benefit due to being in such close proximity to motor windings. These devices typically come from the factory ready to mount to common motor back shafts. *\* See Servo Duty section for notes regarding resolver classification.*



AD35 Pictured.

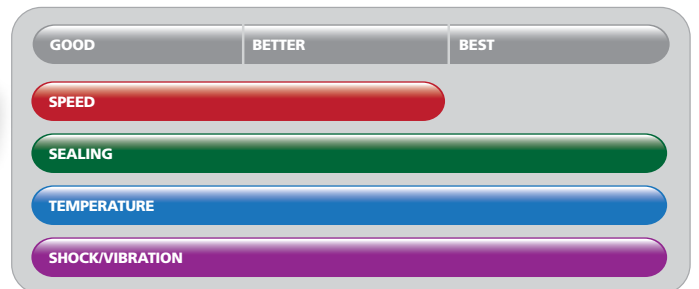


## Heavy Duty

Heavy Duty encoders and resolvers are designed to survive some of the toughest environments. Paper and steel mills, aerospace applications, and food and beverage processing machinery are all areas that benefit from heavy duty encoders. Using magnetic, inductive, or specially designed optical technology, their tight sealing, heavy-duty bearings (where applicable), and high temperature range all suit them for use in harsh environments.



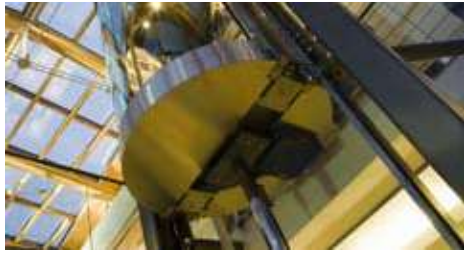
RIMTach 8500 Pictured.





OPTICAL - INCREMENTAL






						
Product	E12	E14	E23	EC23	E14H (Hubshaft)	E14IC (Integral Coupling)
Shaft/Bore Sizes	1/8"	1/8" or 1/4"	1/4"	1/4"	1/4" to 5/8", 6mm to 14mm	1/4" or 3/8"
Available Resolutions (PPR)	100 to 1024	100 to 2540	1 to 2540	3000 to 5000	100 to 2540	100 to 2540
Input Voltage (VDC)	5, 12, 15	5, 12, 15	5-26	5-26	5, 12, 15	5, 12, 15
Operating Temperature (°C)	0 to +70	0 to +70	0 to +70	0 to +70	0 to +70	0 to +70
Enclosure Rating	NEMA 12/IP54	NEMA 12/IP54	NEMA 12/IP54	NEMA 12/IP54	NEMA 12/IP54	NEMA 12/IP54
Special Features	Sub-Compact 1.2" diameter	Rugged Metal Housing	Screw terminal connections	High 5000PPR capability	Hubshaft with flex tether	Integrated coupling



## OPTICAL - INCREMENTAL

									
Product	Qube 22	H20	HA25	HR25	HC25	H58	H42	HA725	
Shaft/Bore Sizes	1/4" or 3/8"	1/4" or 3/8"	1/4" or 3/8"	1/4" or 3/8"	1/4" or 3/8"	6 or 10mm	3/8"	3/8"	
Available Resolutions (Bits)	1 to 1270	1 to 2540	1 to 2540	1 to 1024	3000 to 5000	1 to 2540	1 to 600	8192 to 10000	
Input Voltage (VDC)	5-26	5-26	5-26	5-26	5 to 26	5-26	5-26	5 or 10 to 30	
Operating Temperature (°C)	0 to +70	0 to +70 (-40 to +85 opt.)	0 to +70 (-40 to +85 opt.)	0 to +70 (-40 to +85 opt.)	0 to +70 (-40 to +85 opt.)	0 to +70 (-40 to +85 opt.)	0 to +70	-10 to +70	
Enclosure Rating	NEMA 12/IP54	NEMA 12/IP54 (NEMA 4/IP66 opt.)	NEMA 12/IP54 (NEMA 4/IP66 opt.)	NEMA 12/IP54 (NEMA 4/IP66 opt.)	NEMA 12/IP54 (NEMA 4/IP66 opt.)	NEMA 12/IP54 (NEMA 4/IP66 opt.)	NEMA 12/IP54	NEMA 4/IP66	
Key Features	Economical anodized housing	Reliable dual-row bearing design	Wide range of resolutions available	Unbreakable code disc	High 5000PPR capability	Euro-Standard 58mm mounting	Simplified economical design	Direct-read resolution up to 10,000PPR	






## OPTICAL - ABSOLUTE

						
Product	AI25 (DeviceNet)	AI25 (Profibus)	AI25 (Interbus)	AI25 (CANBus)	AI25 (CANLayer2)	
Shaft/Bore Sizes	Shaft: 6 & 10mm, 3/8" Bore: 10 & 12mm, 3/8"	Shaft: 6 & 10mm, 3/8" Bore: 10 & 12mm, 3/8"	Shaft: 6 & 10mm, 3/8" Bore: 10 & 12mm, 3/8"	Shaft: 6 & 10mm, 3/8" Bore: 10 & 12mm, 3/8"	Shaft: 6 & 10mm, 3/8" Bore: 10 & 12mm, 3/8"	
Available Resolutions (Bits)	Up to 14 bit SingleTurn, 12 bit Multiturn	Up to 14 bit SingleTurn, 12 bit Multiturn	Up to 12 bit SingleTurn, 12 bit Multiturn	Up to 14 bit SingleTurn, 12 bit Multiturn	Up to 14 bit SingleTurn, 12 bit Multiturn	
Input Voltage (VDC)	10 to 30	10 to 30	10 to 30	10 to 30	10 to 30	
Operating Temperature (°C)	-40 to +85	-40 to +85	-40 to +85	-40 to +85	-40 to +85	
Enclosure Rating	IP64 or IP67	IP64 or IP67	IP64 or IP67	IP64 or IP67	IP64 or IP67	
Key Features	DeviceNet interface	Profibus interface	Interbus interface	CANBus interface	CANLayer 2 interface	

OPTICAL - INCREMENTAL





								
H20 Hub	HS20	HS35	HS35R	RI 80E	HA26	HR26	HC26	Product
3/8" or 5/8"	1/4" to 5/8" 6mm to 16mm	1/4" to 1 1/8" 6mm to 24mm	up to 1-1/4" hollow shaft	Max 45mm	1/4", 3/8" or 1/2"	1/4", 3/8" or 1/2"	1/4", 3/8" or 1/2"	Shaft/Bore Sizes
1 to 2540	1 to 2540	1 to 2500	1 to 5000	1024, 2048, 4096	1 to 2540	1 to 1024	3000 to 5000	Available Resolutions (PPR)
5-26	5-26	5-26	5-26	5-30	5-26	5-26	5-26	Input Voltage (VDC)
0 to +70 (-40 to +85 opt.)	0 to +70 (-40 to +85 opt.)	-40 to +70 (0 to +100)	-40 to 85 (-40 to +100 optional)	-20 to +70	0 to +70 (-40 to +85 opt.)	0 to +70 (-40 to +85 opt.)	0 to +70 (-40 to +85 opt.)	Operating Temperature (°C)
NEMA 12/IP54 (NEMA 4/IP66 opt.)	NEMA 4/IP65	NEMA 4/IP65	IP67	NEMA 1/IP50	NEMA 12/IP54	NEMA 12/IP54	NEMA 12/IP54	Enclosure Rating
Hubshaft with spring tether	Electrically isolated hollow shaft	Electrically isolated hollow shaft sizes up to 1.25"	Shock Resistant to 400g	Fault detection	Integral coupling	Unbreakable code disc	High 5000PPR resolution capability	Key Features

OPTICAL - ABSOLUTE

					
AI25 (Parallel)	AI25 (SSI)	AI25 (BiSS)	AC36	AC110	Product
Shaft: 6 & 10mm, 3/8" Bore: 10 & 12mm, 3/8"	Shaft: 6 & 10mm, 3/8" Bore: 10 & 12mm, 3/8"	Shaft: 6 & 10mm, 3/8" Bore: 10 & 12mm, 3/8"	8mm	50mm	Shaft/Bore Sizes
Up to 14 bit SingleTurn, 12 bit Multiturn	Up to 17 bit SingleTurn, 12 bit Multiturn	Up to 22 bit SingleTurn, 12 bit Multiturn	Up to 22 bit SingleTurn 12 bit Multiturn	Up to 22 bit SingleTurn 12 bit Multiturn	Available Resolutions (Bits)
5 or 10-30	5 or 10-30	5 or 10-30	5 or 7-30	5 or 10-30	Input Voltage (VDC)
-40 to +100	-40 to +100	-40 to +100	-15 to +120	-20 to +70	Operating Temperature (°C)
IP64 or IP67	IP64 or IP67	IP64 or IP67	IP64	IP40	Enclosure Rating
Parallel output	SSI output	BiSS interface	Multi-turn positioning in compact size	Large 50mm hollow shaft	Key Features








## OPTICAL - ABSOLUTE

	<b>NEW</b> 	<b>NEW</b> 		
Product	AD34	AD35	AD36	AD25
Shaft/Bore Sizes	6mm	8mm	8mm	10mm
Available Resolutions (Bits)	Up to 19 bit Singleturn	Up to 22 bit Singleturn	Up to 22 bit Singleturn, 12 bit multiturn	Up to 22 bit Singleturn, 12 bit multiturn
Input Voltage (VDC)	5 or 7 to 30	5 or 7 to 30	5 or 7 to 30	5
Operating Temperature (°C)	-15 to +120	-15 to +120	-15 to +120	-15 to +120
Enclosure Rating	IP40	IP40	IP40	IP40
Key Features	Unique one-step notched shaft mounting	Short mounting depth	Up to 22 bit singleturn resolution	Unique conical shaft for concentric motor mounting

## INDUCTIVE - RESOLVER

		
	11	R11
	0.120" (3.05mm)	0.120" (3.05mm)
	+/- 3 arcmin	+/- 6 arcmin
	2 to 26	2 to 6
	Up to 155	Up to 155
	N/A	N/A
	Brushless construction	Brushless construction

## OPTICAL - INCREMENTAL

	<b>NEW</b> 	<b>NEW</b> 				
Product	M602/M832 Module	LM/LAM	E9	M9	M14	M15
Shaft/Bore Sizes	1/4" to 10mm	N/A	1.5 to 4mm, .125", .156"	1.5 to 4mm, .125", .156"	3 to 8mm, .1248", .375"	1/8" or 3/8" 6 to 10mm
Available Resolutions (PPR)	1 to 5000	Up to 720 CPI/500 CPI	100 to 512	100 to 512	200 to 1024	200 to 1024
Input Voltage (VDC)	5	5	5	5	5	5 or 12
Operating Temperature (°C)	-40 to +100	-40 to +100	-40 to +100	-40 to +100	-40 to +100	-40 to +120
Enclosure Rating	IP00	IP00	N/A	N/A	N/A	NEMA 1/ IP50 (w/cover)
Key Features	Tool-less gapping	Choice of Digital or Analog Output	Super-compact size for small motors	Up to 512 PPR resolution	Short mounting depth	Easy installation without special tools










## A NOTE ABOUT RESOLVERS

Frameless resolvers are classified here as Servo Duty for their servo ring mounting. By nature, resolvers are extremely rugged devices with no internal electronics. Resolvers can perform flawlessly in harsh duty applications with severe shock, vibration, contamination, and extreme temperatures.

### INDUCTIVE - RESOLVER




















							
Frameless 10	Frameless 15	Frameless 21	Frameless 31	Frameless 55	HaroMax® 15	HaroMax® 21	Product
0.25" (6mm)	0.472" (12mm)	0.800" (20mm)	1.576" (40mm)	3.651" (93mm)	0.472" (12mm)	0.800" (20mm)	Shaft size/ Max bore size
+/- 15 arcmin	+/- 10 arcmin	+/- 7 arcmin	+/- 20 arcmin	+/- 30 arcmin	+/- 5 arcmin	+/- 5 arcmin	Accuracy (Single Speed Only)
2 to 12	2 to 12	2 to 12	2 to 12	2 to 12	2 to 12	2 to 12	Input Voltage (Vrms)
Up to 200	Up to 200	Up to 200	Up to 200	Up to 200	Up to 200	Up to 200	Operating Temperature (°C)
N/A	N/A	N/A	N/A	N/A	N/A	N/A	Enclosure Rating
Compact mounting depth	Compact mounting depth	Compact mounting depth	Compact mounting depth	Compact mounting depth	Machine wound stator for high accuracy	Machine wound stator for high accuracy	Key Features

### OPTICAL - INCREMENTAL

							
M53	F10	F14	F15	F18	F21	HC20	Product
1/4" to 1/2" 6 to 12mm	6mm	1/4", 6mm, 8mm	3/8"	1/4" to 1/2" 6 to 12mm	1/2"	6mm, 8mm hub or hollow, 9mm tapered	Shaft/Bore Sizes
500 to 2500	1024 to 2048	200 to 5000	1024 to 2048	500 to 1000	1024 to 2048	500 to 2500	Available Resolutions (PPR)
5 or 12	5	5	5	5	5	5 or 5 to 26	Input Voltage (VDC)
0 to +120	0 to +120	0 to +120	0 to +120	0 to +120	0 to +120	0 to +120	Operating Temperature (°C)
NEMA 1/ IP50 (w/cover)	N/A	NEMA 1/ IP40 (w/cover)	N/A	NEMA 1/ IP40 (w/cover)	N/A	IP51	Enclosure Rating
Up to 2500PPR with commutation tracks	Compact 1.0" diameter servo ring mount	Non-marring hollow shaft	Industry standard size 15 servo mounting	Under 2.0" dia package with high 10,000PPR capability	Industry standard size 21 servo mounting	Economical servomotor feedback	Key Features



## OPTICAL - INCREMENTAL

	 	 	 	 	 	 	 
Product	HD20	HD25	HSD25	HSD37	HSD38	DWD38	HSD44
Shaft/Bore Sizes	3/8" or 10mm Shaft	3/8" or 10mm Shaft	3/8" to 3/4" Shaft	12mm to 1" hollow shaft	12mm to 1" hollow shaft	1"-14UNS x 5/8"-18 Threaded Shaft or 1"-14UNS Threaded Shaft	16mm isolated hub shaft
Available Resolutions (PPR)	1 to 3600	1 to 5000	1 to 3600	15 to 5000	15 to 5000	15 to 5000	1024
Input Voltage (VDC)	5-26 or 7-26	5-26 or 7-26	5-26 or 7-26	5-26	5-26	5-26 or 7-26	5-30
Operating Temperature (°C)	-40 to +100 (40 to +80 ATEX)	-40 to +100 (40 to +80 ATEX)	-40 to +100 (40 to +80 C ATEX)	-40 to +100 (40 to +80 C ATEX)	-40 to +100	-40 to +100 (40 to +80 ATEX)	-40 to +100
Enclosure Rating	IP67	IP67	IP67	IP67	IP67	IP67	IP67
Special Features	ATEX certification available 	Dual isolated outputs available 	Compact hub shaft design 	ATEX certification available 	Rugged bearing structure	Draw works threaded shaft 	Isolated coupling compensates for motor shaft endplay

## MAGNETIC - INCREMENTAL

						
Product	SLIM Tach® SL56	SLIM Tach® RL67	SLIM Tach® SL85	SLIM Tach® SL1250	RIM Tach® 8500	RIM Tach® 1250
Shaft/Bore Sizes	5/8" to 2-7/8" Standard, Up to 3.75" Available	5/8" to 2-7/8" Standard, Up to 3.75" Available	5/8" to 2-7/8" Standard, Up to 3.75" Available	5/8" to 2-7/8" Standard, Up to 3.75" Available	5/8" to 2-7/8" Standard, Up to 3.75" Available	5/8" to 2-7/8" Standard, Up to 8" Available
Available Resolutions (PPR)	64 to 2048	64 to 2048	64 to 2048	64 to 2048	60 to 1200	60 to 2048
Input Voltage (VDC)	5 to 15 or 5 to 26	5 to 15 or 5 to 26	5 to 15 or 5 to 26	5 to 15 or 5 to 26	5 to 15 or 15 to 26	5 to 15 or 15 to 26
Operating Temperature (°C)	-40 to +90 (opt to +120)	-40 to +90 (opt to +120)	-40 to +90 (opt to +120)	-40 to +90 (opt to +120)	-40 to +80	-40 to +80
Enclosure Rating	Immune to grease, salt water, dust	Immune to grease, salt water, dust	Immune to grease, salt water, dust	Immune to grease, salt water, dust	Immune to grease, salt water, dust	Immune to grease, salt water, dust
Special Features	Bearingless design	Bearingless design	Bearingless design	Bearingless design	Bearingless design with removable sensors	Bearingless design with removable sensors



OPTICAL - INCREMENTAL

OPTICAL - ABSOLUTE

INDUCTIVE - RESOLVER

HSD35	Series 60 Rotopulser®	Series 60P Rotopulser®	H56 Rotopulser®	X25	AX70/71	R25 Resolver	Product
1/4" to 1-1/4", or 6mm to 28mm hollow shaft	1/4" or 1/2"*	5/8" shaft (single or dual)	5/8"	1/4" or 3/8"	10mm shaft	Shaft Size: 0.3745" (9.51mm)	Shaft/Bore Sizes
1 to 2500	1 to 2500	1-2500PPR	1 to 2500	1 to 5000	Up to 16 bit ST, 12 bit MT	Single speed or Multi-Speed	Available Resolutions (PPR)
5-26	5 to 15	5-15	5-26	5 to 26	10-30	2 to 8 Vrms (+/- 3 arc min)	Input Voltage (VDC)
-40 to +85 (-40 to +100 Optional)	0 to +54	0 to +54	-40 to +85	0 to +70	-40 to +60 or -40 to +40	Up to 125	Operating Temperature (°C)
IP65	NEMA 12/IP54 (NEMA 4/IP66 opt.)	IP54 or IP66	NEMA 4/ IP66	NEMA 4/ IP66, Class 1&2, Div. 1&2	IP64 or IP67	IP65	Enclosure Rating
Field serviceable connector	Dual shaft output option	Both foot and face mount design	Encoder within encoder design	NEC Class 1&2, Div 1&2, Groups C,D,E,F,G	Explosion proof	Shock resistant to 200g	Special Features

MAGNETIC - INCREMENTAL

MAGNETIC ABSOLUTE

RIM Tach® 6200 (4)	SLIM Tach® HS56	SLIM Tach® HS60	RIM Tach® HS85	R45 Rotopulser®	AR62/63	Product
5/8"	5/8" to 1-1/8"	1-1/8" to 2-7/8" hollow shaft	5/8" to 2-7/8" Standard, Up to 4.5" Available	5/8" or 7/8"	10mm or 12mm shaft	Shaft/Bore Sizes
60 to 2048	64 to 2048	64 to 2048	60 to 2048	60	12 bit singleturn, up to 16 bit Multi-turn	Available Resolutions (PPR)
5 to 15 or 15 to 26	5 to 15 or 5 to 26	5-15 or 5-26	5 to 15 or 15 to 26	5 to 26	10-30	Input Voltage (VDC)
-40 to +70	-20 to +80	-20 to +80	-20 to +70	-40 to +85	0 to +100	Operating Temperature (°C)
Immune to grease, salt water, dust	Resistant to grease, dust	Immune to grease, salt water, dust	Immune to grease, salt water, dust	Immune to grease, water, dust	IP67 or IP69k	Enclosure Rating
Shafted foot-mount or face mount	Hollowshaft design	Large bore Hollowshaft design	Hollow shaft design with removable sensors	56C-face mounting	Shock resistant to 200g	Special Features

# ACCESSORIES

For full part numbers and descriptions please visit our catalog or website @ [www.dynapar.com](http://www.dynapar.com)

## RIM SS2 SIGNAL SPLITTER



The NorthStar signal splitter routes one encoder signal to multiple isolated locations.

## RIM SSW SIGNAL SWITCHER



The NorthStar signal switcher enables the use of one drive with two separate encoders.

## RIM 100 ENCODER TESTER



The NorthStar brand encoder tester is an instrument used to evaluate signal presence and quality produced by any manufacturer's digital encoder.

## CPL FLEXIBLE SHAFT COUPLINGS



CPL Series couplings provide maximum mechanical, thermal, and electrical protection for encoder shaft connections.

## FV3 FREQUENCY TO VOLTAGE CONVERTER



The FV3 converter converts the frequency output of the encoder to an analog signal for operating chart recorders, or for supplying velocity feedback in closed loop speed control systems.

## CABLE ASSEMBLIES



NorthStar brand offers shielded cable with MS or M12 connector and cable clamps at one end and tinned leads at the other end.

## MATING CONNECTORS



Dynapar offers a wide variety of military-style connectors for use with different style encoders.

## NEMA & 5PY ADAPTERS



Dynapar offers NEMA C-face, 5PY and custom adapters to allow you to mount a variety of flange mounted encoders to 4-1/2" NEMA and DC accessory flanges.

## GROUNDING BRUSH KITS



Provide a low resistance, and electrical contact to the motor shaft to reduce or eliminate induced shaft currents in AC and DC motors.



For additional information or to receive a full-line catalog, contact your Dynapar representative at 1.800.873.8731 or visit our web site at: [www.dynapar.com](http://www.dynapar.com)

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#### Satellite Locations:

**North America:** North Carolina, South Carolina, Connecticut, Massachusetts, New York, Canada, West Indies

**Europe:** United Kingdom, France, Germany, Spain, Slovakia

**Latin America:** Brazil

**Asia:** China, Japan, Korea, Singapore