



FEEDBACK

QUICK REFERENCE GUIDE

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

NorthStar™ *ACURO*® *Dynapar*™ HENGSTLER® *Harowe*™



NEW HARSH-DUTY **OPTICAL INCREMENTAL ENCODERS**

NorthStar™ brand highly accurate incremental encoders blended with the rugged magneto-resistive performance you would expect from NorthStar™.

Long a recognized brand and international leader in magneto-resistive technology and mill-duty industrial applications, NorthStar, a division of Dynapar Group, continues to produce innovative and highly dependable products for measuring speed in tough manufacturing environments.

For more than 30 years, NorthStar has specialized in meeting the needs of the industrial community with a proven and

time tested line of heavy-duty, mill-duty magneto-resistive incremental encoders and pulse tachs. More recently, NorthStar expanded the line to include a new line of compact and washdown resistant, harsh-duty optical incremental encoders. All NorthStar encoders are designed to provide rugged, high performance velocity feedback in extreme application environments...where accuracy counts (guaranteed).

Which size and type of motion feedback control do you need?



ABSOLUTE ENCODERS

DYNAPAR™ brand
HENGSTLER™ brand

Absolute encoders provide position data at all times. Use when establishing a home position will cause costly downtime or scrap, is impractical, or where a device is inactive for long periods of time and/or moves at a slow rate.

Types: Single-turn, multi-turn, diverse communication/fieldbus options



GENERAL-PURPOSE INCREMENTAL ENCODERS

DYNAPAR™ brand
HENGSTLER™ brand

Incremental encoders read optical pulses to provide a cost-effective means of measuring speed or rotational position.

Types:

Commercial-Light Duty

Commercial-light duty encoders deliver precise feedback for fractional horsepower motors in relatively clean environments.

Industrial-Duty

Rugged industrial encoders are required for digital feedback applications in environments having electrical noise, airborne contaminants and medium horsepower motors.

Explosion Proof

Explosion proof encoders are UL, CE and CSA approved for safe performance where flammable gases, vapors, liquids, combustible dust or ignitable fibers are present.



MOTOR MOUNT INCREMENTAL ENCODERS

DYNAPAR™ brand

For stepper motor and servo motor control, compact motor mount encoders install without adaptors or extra hardware for fast, simple direct to motor mounting (or mounting to other free shaft). Ruggedized versions with unbreakable metal disks are available for high-speed motors, harsh environments, or heat up to 120°C.

Types: Hub shaft, hollowshaft, commercial-light duty, industrial duty, and servo/commutation



HEAVY-DUTY MAGNETO-RESISTIVE INCREMENTAL ENCODERS & PULSE TACHS

NorthStar™ brand

Your choice for high-horsepower, large-shaft motors and extreme environments. Unlike optical encoders, NorthStar encoders use magneto-resistive technology that is not affected by dirt, dust or dampness.

Types: Industrial-duty, heavy-duty, mill-duty encoders, digital pulse tachs












ULTRA-PERFORMANCE RESOLVERS

HAROWE™ brand

Magnetic reading resolvers are considered more rugged than encoders for use in adverse operating conditions involving extreme temperature (up to 220°C), high shock, vibration, static, or dirty environments.

Types: Housed, frameless, heavy-duty, mill-duty, heavy-duty high accuracy

ACURO™ Series Industrial-Duty									
	Industrial Series						Drive Series		
									
	DeviceNet Output	Profibus Output	Interbus Output	BiSS Output	SSI Outputs	Parallel Output	AD25-Drive	NEW (3) AD36-Drive	NEW (3) AC110-Drive
Encoder Size	58mm	58mm	58mm	58mm	58mm	58mm	58mm	36mm	110mm
Mounting									
Square Flange	●	●	●	●	●	●			
Clamping Flange	●	●	●	●	●	●			
Servo Flange	●	●	●	●	●	●			
Hub Shaft								●	
Hub Shaft w/ Tether	●	●	●	●	●	●			
Hollowshaft w/ Tether									●
BLDC Servomotor Mount							●	●	
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"	Shaft: 6 & 10mm, 3/8" Bore: 10 & 12mm, 3/8"	10mm Shaft 10mm Bore (tapered)	8mm Bore	50mm Bore
Max Rotation Speed (RPM)	10000 (cont) 12000 (peak)	10000 (cont) 12000 (peak)	10000 (cont) 12000 (peak)	10000 (cont) 12000 (peak)	10000 (cont) 12000 (peak)	10000 (cont) 12000 (peak)	12000 (cont) 15000 (peak, ST Only)	10000 (peak)	3600 (peak)
Single-Turn Resolution	10, 12, 13, 14 Bits	10, 12, 13, 14 Bits	10, 12 Bits	10, 12, 13, 14, 17 Bits	10, 12, 13, 14, 17 Bits	10, 12, 13, 14 Bits, 360PPR, 720PPR	BiSS: 22 Bits SSI: 13 Bits	BiSS: 19 Bits SSI: 13 Bits	11–17 Bits
Multi-Turn Resolution	12 Bits	12 Bits	12 Bits	12 Bits	12 Bits	12 Bits	12 Bits	12 Bits	
Input Power	10 to 30 VDC	10 to 30 VDC	10 to 30 VDC	5 VDC or 10–30 VDC	5 VDC or 10–30 VDC	5 VDC or 10–30 VDC	5 VDC	5 VDC or 7–30 VDC	5 VDC or 10–30 VDC
Available Interface Types	DeviceNet	Profibus	Interbus	BiSS	SSI	Parallel	BiSS or SSI	BiSS or SSI	SSI
Available Output Types									
Binary				●	●	●	●		●
Gray Code				●	●	●	● (1)	●	●
Gray Excess						● (2)			
DeviceNet	●								
Profibus		●							
Interbus			●						
Operating Temperature (°C)	–40 to +85	–40 to +85	–40 to +85	–40 to +100	–40 to +100	–40 to +100	–15 to +120	–15 to +120	–20 to +70
Enclosure Rating	IP64 or IP67	IP64 or IP67	IP64 or IP67	IP64 or IP67	IP64 or IP67	IP64 or IP67	IP 40	IP 40	IP 40









(1) = For AD25 Drive, when resolution is 13 bits (ST) or 25 bits (MT)

(2) = For only 360 CPR or 720 CPR

(3) = Consult Customer Service for availability.














Reader/User Tip: For detailed specifications on DICG feedback control products and accessories, refer to our website at www.dynapar-encoders.com, our Feedback Line Brochure, or our Full Line Encoder Catalog. Also, be sure to reference our Encoder Applications Handbook, available on the website at www.dynapar-encoders.com.






Incremental Encoder Selection Guide


	GENERAL-PURPOSE (Shafted Encoder)							
	Commercial Light-Duty							
								
Features and Specs	E12	E14	E23/EC23	H20	HA25	HR25	HC25	HA725
Encoder Size	1.1"	1.5"	2.3"	2"	2.5"	2.5"	2.5"	2.5"
Mounting								
Square Flange		●		●	●	●	●	●
Servo Flange	●	●	●	●	●	●	●	
Face Mount	●	●	●	●	●	●	●	
4.5" Face Mount								
Foot Mount								
Bottom Mount								
Hollowshaft								
Tapered Shaft (Spring Tether)								
Hollowshaft (Tether)								
Hub Shaft								
Integral Coupling								
DrawWorks Mounting								
8.5" Face Mount								
12.5" Face Mount								
Shaft/Bore Sizes	1/8"	1/8" or 1/4"	1/4"	1/4" or 3/8"	1/4" or 3/8"	1/4" or 3/8"	1/4" or 3/8"	3/8"
Code Disk Type Available								
Unbreakable Code Disk								
Plastic								
Metal				● (1)		●		
Glass	●	●	●	● (1)	●		●	●
Gear								
Magnetic Wheel								
Max Shaft Speed	5000 RPM	5000 RPM	5000 RPM	5000 to 10000 RPM	5000 RPM	10000 RPM	10000 RPM	10000 RPM
Available Resolutions (PPR)	100 to 1024	100 to 1024	1 to 2540 or 3000 to 5000	1 to 2540	1 to 2540	1 to 1024	3000 to 5000	8192 to 10000
Commutation Available								
Input Power (VDC)	5, 12, 15	5, 12, 15	5 to 26	5 to 26	5 to 26	5 to 26	5 to 26	5 or 10 to 30
Output Types								
Open Collector			●	●	●	●	●	●
Push-Pull				●				●
Line Driver	●	●	●	●	●	●	●	●
Totem Pole			●		●	●	●	
Sink/Source								
Termination Types								
MS Style				●	●	●	●	●
M12 Style				●	●	●	●	
Conin Style								
Internal Screw Terminals, Conduit Entry								
Shielded Pigtail	●	●	●	●	●	●	●	
Screw Terminals			●					
Latching Industrial Style								
Flying Leads								
Ribbon Cable								
PCB Mounted Connector								
Sub-D Connector								
Operating Temperature (°C)	0 to +70	0 to +70	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.)	-10 to +70
Enclosure Rating	NEMA 12/ IP54	NEMA 12/ IP54	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 4/ IP66

* = Double Shaft Available
 (1) = If less than or equal to 1024 PPR, disk will be metal. If greater than 1024 PPR, disk will be glass.
 (2) = Resolutions of 2048 only.
 (3) = Consult Customer Service for availability.
 (4) = Foot mount.
 (5) = Consult factory for available resolutions in plastic

Industrial-Duty						Commercial Light-Duty				Industrial-Light-Duty		
H58	H56 Rotopulser®	H42	21/22	Series 60 Rotopulser®	X25	M9 & E9	M14	E14 Hub	E14 w/IC	M15	M21	F10
58mm	4.5"	2.5"	2.25"	3.5"	4"	.9"	1.5"	1.5"	1.5"	1.5"	2.1"	1.25"
•		•		•	•							
•			•	•								
	•											
	•		•									
			•			•	•	•	•	•	•	•
6 or 10mm	5/8"	3/8"	1/4" or 3/8"	1/4" or 1/2"	1/4" or 3/8"	1.5mm to 4mm, .125", .156"	3mm to 8mm, .1248" to .375"	1/8" to 3/8", 6mm to 10mm	1/4" to 1/2", 6mm to 12mm	1/8" to 3/8", 6mm to 10mm	1/4" to 1/2", 6mm to 12mm	6mm
	• (2)		• (5)	•								
• (1)	•	•			• (1)	•	•					
• (1)	•		•		• (1)			•	•	•	•	•
5000 to 10000 RPM	3600 RPM	7200 RPM	6000 RPM	3600 RPM	5000 RPM	1200 RPM	1200 RPM	12000 RPM	12000 RPM	12000 RPM	12000 RPM	12000 RPM
1 to 2540	1 to 2500	1 to 600	1 to 1270	1 to 2500	1 to 5000	100 to 512	200 to 1024	100 to 1024	100 to 2048	200 to 1024	500 to 2048	1024 or 2048
						•	•			•	•	•
5 to 26	5 to 26	5 to 26	5 to 26	5 to 15	5 to 26	5	5	5, 12, 15	5, 12, 15	5 or 12	5 or 12	5
	•		•	•	•					•	•	•
•	•		•	•	•					•	•	•
•	•	•	•	•	•			•	•	•	•	•
			•			•	•					
					•							
•	•	•	•	•								
•												
•	•											•
						•	•			•	•	
0 to +70 (-40 to +85 opt.)	-40 to +85	0 to +70	0 to +70	0 to +54	0 to +70	-40 to +100	-40 to +100	-40 to +120	-40 to +120	-40 to +120	-40 to +120	0 to +120
NEMA 12/IP54 (NEMA 4/IP66 opt.)	NEMA 4/ IP66	NEMA 12/ IP54	NEMA 12/ IP54	NEMA 12/IP54 (NEMA 4/IP66 opt.)	NEMA 4/ IP66, Class 1&2, Div. 1&2	N/A	N/A	NEMA 1/ IP50 (w/ cover)	NEMA 1/ IP50 (w/ cover)	NEMA 1/ IP50 (w/ cover)	NEMA 1/ IP50 (w/ cover)	N/A

		Harsh-Duty						Heavy-Duty				
												
NEW (3) RI80E	NEW RF53(3) (OEM Special)	NEW HD20	NEW HD25	NEW HSD23	NEW HSD35	NEW HSD38	NEW DWD38	SLIM Tach® SL56	SLIM Tach® SL85	SLIM Tach® RL67	SLIM Tach® HS56	SLIM Tach® SL1250
100mm	53mm							4.5"	8.5"	4.5"	5.5"	12.5"
		•	•									
								•		•		
											•	
•	•				•	•						
				•			•					
									•			
												•
Max 45mm	Special Consult Factory	3/8" or 10mm Shaft	3/8" or 10mm Shaft	3/8", 1/2", 5/8", 3/4" or 10mm bore available	1/4", 1 1/4", 6mm to 28mm bore available	1/2", 5/8", 3/4", 7/8", or 10, 12, 15, 16mm bore available	1"-14UNS x 5/8"-18 Threaded Shaft or 1"-14UNS Threaded Shaft	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 1 1/8"	5/8" to 2-7/8" Standard, Up to 3.75" Available
		•	•	•	•	•	•					
					• (2)							
•	•											
								•	•	•	•	•
3600 RPM	Consult Factory	6000 RPM	6000 RPM	6000 RPM	3600 RPM	6000 RPM	6000 RPM	5000 RPM	5000 RPM	5000 RPM	3600 RPM	5000 RPM
1024, 2048, 4096	4096	1 to 3600	1 to 5000	1 to 3600	1 to 2500	15 to 5000	15 to 5000	64 to 2048	64 to 2048	64 to 2048	64 to 2048	64 to 2048
5 to 30	5	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 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 5 to 26
		•	•	•	•	•	•					
•		•	•	•	•	•	•					
•	•	•	•	•	•	•	•	•	•	•	•	•
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		•	•	•		•	•	•	•	•	•	•
•	•											
-20 to +70	-20 to +120	-40 to +100 C (40 to +80 C ATEX)	-40 to +100 C (40 to +80 C ATEX)	-40 to +100 C (40 to +80 C ATEX)	-40 to +100 C	-40 to +100 C	-40 to +100 C (40 to +80 C ATEX)	-40 to +90 (opt to +120)	-40 to +90 (opt to +120)	-40 to +90 (opt to +120)	-20 to +80	-40 to +90 (opt to +120)
NEMA 1/IP50 COMING SOON!	NEMA 1/IP51 COMING SOON!	Exceed NEMA 4X, 6P & IP66/67	Exceed NEMA 4X, 6P & IP66/67	Exceed NEMA 4X, 6P & IP66/67	Exceed NEMA 4X/IP66	Exceed NEMA 4X/IP66	Exceed NEMA 4X/IP66	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

Mill-Duty					
					
SLIM Tach® SL1250	RIM Tach® 8500	RIM Tach® HS85	RIM Tach® 6200 (4)	RIM Tach® 1250	Features and Specs
12.5"	8.5"	8.5"	4.5"	12.5"	Encoder Size
					Mounting
					Square Flange
					Servo Flange
					Face Mount
					4.5" Face Mount
					Foot Mount
					Bottom Mount
					Hollowshaft
					Tapered Shaft (Spring Tether)
					Hollowshaft (Tether)
					Hub Shaft
					Integral Coupling
					DrawWorks Mounting
					8.5" Face Mount
					12.5" Face Mount
					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 4.5" Available	5/8"	5/8" to 2-7/8" Standard, Up to 8" Available	
					Code Disk Type Available
					Unbreakable Code Disk
					Plastic
					Metal
					Glass
					Gear
					Magnetic Wheel
5000 RPM	5000 RPM	3600 RPM	7000 RPM	5000 RPM	Max Shaft Speed
64 to 2048	60 to 1200	60 to 2048	60 to 2048	60 to 2048	Available Resolutions (PPR)
					Commutation Available
5 to 15 or 5 to 26	5 to 15 or 15 to 26	5 to 15 or 15 to 26	5 to 15 or 15 to 26	5 to 15 or 15 to 26	Input Power (VDC)
					Output Types
					Open Collector
					Push-Pull
					Line Driver
					Totem Pole
					Sink/Source
					Termination Types
					MS Style
					M12 Style
					Conin Style
					Internal Screw Terminals, Conduit Entry
					Shielded Pigtail
					Screw Terminals
					Latching Industrial Style
					Flying Leads
					Ribbon Cable
					PCB Mounted Connector
					Sub-D Connector
-40 to +90 (opt to +120)	-40 to +80	-20 to +70	-40 to +70	-40 to +80	Operating Temperature (°C)
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	Enclosure Rating

	BRUSHLESS ULTRA-PERFORMANCE RESOLVERS									
	HOUSED			FRAMELESS						
	Heavy-Duty		Mill-Duty	Heavy-Duty					Heavy-Duty High Accuracy	
										
11	R11	Series R25	10	15	21	31	55	HaroMax® 15	HaroMax® 21	
Nominal Size (OD)	1.1 inch	1.1 inch	2.5 inch	1.0 inch	1.5 inch	2.1 inch	3.1 inch	5.5 inch	1.5 inch	2.1 inch
Mounting System	Servo	Servo	Flange/Servo	Flange/Servo	Flange/Servo	Flange/Servo	Flange/Servo	Flange/Servo	Flange/Servo	Flange/Servo
Flux Shield Technology		●	●	●	●	●	●	●	●	●
Shaft/Max Bore Sizes	Shaft Size: 0.120" (3.05mm)	Shaft Size: 0.120" (3.05mm)	Shaft Size: 0.3745" (9.51mm)	Max Bore Size: 0.25" (6mm)	Max Bore Size: 0.472" (12mm)	Max Bore Size: 0.800" (20mm)	Max Bore Size: 1.576" (40mm)	Max Bore Size: 3.651" (93mm)	Max Bore Size: 0.472" (12mm)	Max Bore Size: 0.800" (20mm)
Input Volts (Vrms)	2 to 26	2 to 6	2 to 8	2 to 12	2 to 12	2 to 12	2 to 12	2 to 12	2 to 12	2 to 12
Input Frequency (Hz)	400 to 5K	2K to 10K	2K to 10K	2K to 10K	2K to 10K	2K to 10K	2K to 10K	2K to 10K	2K to 10K	2K to 10K
Transformation Ratio	.39 to 1.75	.45 to 1.4	.25 to 1.0	.25 to 1.0	.25 to 1.0	.25 to 1.0	.25 to 1.0	.25 to 1.0	.25 to 1.0	.25 to 1.0
Resolver Speed (electrical/mechanical cycles)	1X, 2X, 4X or 5X	1X	1X, 2X or 3X	1X	1X, 2X, 3X or 4X	1X, 2X, 3X or 4X	Multi-speeds available (up to 8X)	Multi-speeds available (up to 32X)	1X	1X
Electrical Error (Accuracy) for 1X versions only	±3 arcmin	±6 arcmin	±10 arcmin	±10 arcmin	±10 arcmin	±7 arcmin	±20 arcmin	±30 arcmin	±5 arcmin	±5 arcmin
Bearing Load Ratings	17 lb (static), 44 lb (dynamic)	61 lb (static), 148 lb (dynamic)	303 lb (static), 741 lb (dynamic)							
Max Bearing Radial Play	.0002 to .0005 in	.0003 to .0009 in	.0002 to .0005 in							
Bearing Type	Type ABEC 3	Type ABEC 1	Type ABEC 1							
Shock, Vibration and Radiation Resistance	High shock resistance	High shock resistance	Shock: 200g Vibration: 40g	High shock, vibration and radiation resistance	High shock, vibration and radiation resistance	High shock, vibration and radiation resistance	High shock, vibration and radiation resistance	High shock, vibration and radiation resistance	High shock and vibration resistance	High shock and vibration resistance
Operating Temperature	Up to 155°C	Up to 155°C	Up to 125°C	Up to 200°C	Up to 200°C	Up to 200°C	Up to 200°C	Up to 200°C	Up to 200°C	Up to 200°C
Housing Material	Steel	Steel	Aluminum	Steel	Steel or Aluminum	Steel or Aluminum	Steel	Steel	Aluminum	Aluminum
Enclosure Rating			(IP65)							

*Consult Applications Engineering for any customized needs

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.feedbackdevices.com

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