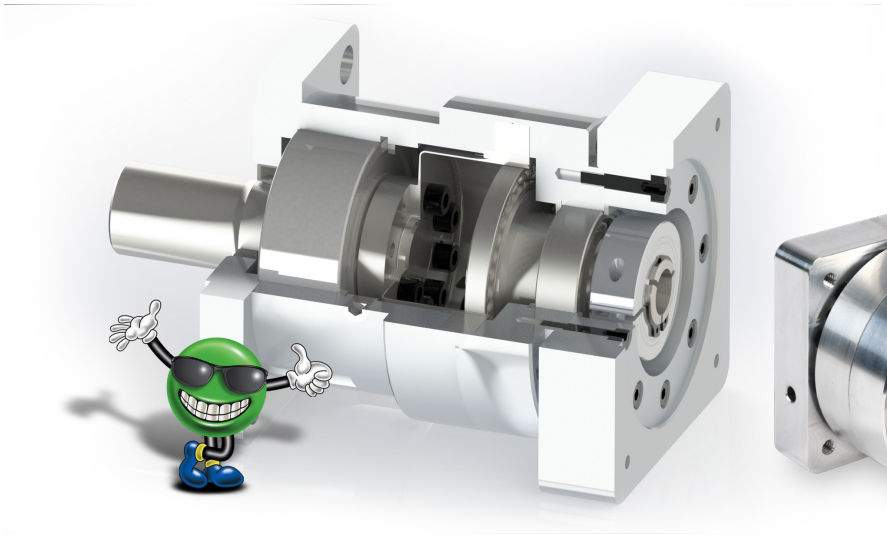
For the latest prices, please check AutomationDirect.com.

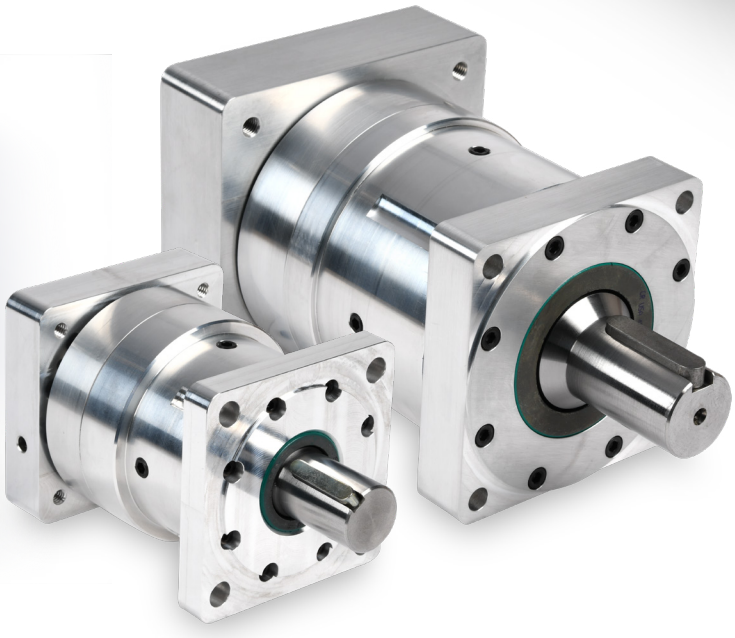
SureGear High-Precision Inline Strain Wave Gearboxes

Strain wave gearboxes offer many advantages over planetary and helical gearboxes. Strain wave technology allows for a higher gear ratio and efficiency in an inline form-factor and smaller size. Many different gear ratios and input flange sizes are available and are designed to work with SureServo2 and SureStep motors.

Strain wave technology provides:

- High gear ratios compared to similar-sized planetary gearboxes (up to 160:1 for stepper gearboxes and 200:1 for servo gearboxes)
- Low heat and noise generation
- Lifetime zero backlash
- Pre-lubricated for life

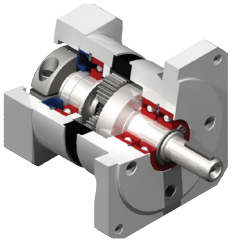




Planetary Gearboxes for NEMA Motors

SureGear® Planetary Gear Reducers for NEMA Motors – Overview

The SureGear PGCN series is a great gearbox (gear reducer) value for servo, stepper, and other motion control applications requiring a NEMA size input/output interface. It offers the best quality available for the price point.



Features

- Wide range of ratios (5, 10, 25, 50, and 100:1)
- Low backlash of 30 arc-min or less
- 20,000 hour service life
- Maintenance free; requires no additional lubrication
- NEMA sizes 17, 23, and 34
- Includes hardware for mounting to SureStep stepper motors
- Optional shaft bushings available for mounting to other motors

Applications

- Material handling
- Pick and place
- Automation
- Packaging
- Other motion control applications requiring a NEMA input/output

SureGear® NEMA Planetary Gearboxes

Part Number	Price	Ratio	NEMA Frame Size	Nominal Output Torque (N·m [lb·in])	Maximum Acceleration Torque (N·m [lb·in])	Emergency Stop Torque (N·m [lb·in])	Standard Output Backlash (arc-min)	Allowable Radial Load (N [lb])	Allowable Axial Load (N [lb])	Torsional Stiffness (N·m/arc-min [lb·in/arc-min])	Mass Moment of Inertia (kg·cm2 [lb·in2])	Efficiency (%)	Approx Weight (kg [lb])	Fits SureStep Stepper Motor (STP-MTR, STP-MTRH, STP-MTRAC)	Drawing Links
PGCN17-055M	$395.00	5:1	17	6.5 [58]	13 [115]	26 [230]	<25	361 [81]	298 [67]	0.8 [7.5]	0.0096 [0.003]	94	0.45 [1.0]	STP-MTR(x)-17xxx(x)	PDF
PGCN17-105M	$395.00	10:1		5.0 [44]	10 [89]	20 [177]	<25			0.5 [4.4]	0.0078 [0.003]	94	0.45 [1.0]		PDF
PGCN17-255M	$496.00	25:1		16 [142]	20 [177]	32 [283]	<30			0.8 [7.5]	0.0096 [0.003]	92	0.55 [1.2]		PDF
PGCN17-505M	$496.00	50:1		16 [142]	20 [177]	32 [283]	<30			0.8 [7.5]	0.0078 [0.003]	92	0.55 [1.2]		PDF
PGCN17-1005M	$496.00	100:1		5.0 [44]	10 [89]	20 [177]	<30			0.5 [4.4]	0.0078 [0.003]	92	0.55 [1.2]		PDF
PGCN23-0525	$436.00	5:1	23	6.5 [58]	13 [115]	26 [230]	<20			0.9 [8.0]	0.04 [0.014]	94	0.45 [1.0]	STP-MTR(x)-23xxx(x)	PDF
PGCN23-1025	$436.00	10:1		5.0 [44]	10 [89]	20 [177]	<20			0.6 [5.3]		94	0.45 [1.0]		PDF
PGCN23-2525	$511.00	25:1		16 [142]	20 [177]	32 [283]	<25			0.9 [8.0]		92	0.55 [1.2]		PDF
PGCN23-5025	$511.00	50:1		16 [142]	20 [177]	32 [283]	<25			0.9 [8.0]		92	0.55 [1.2]		PDF
PGCN23-10025	$511.00	100:1		5.0 [44]	10 [89]	20 [177]	<25			0.6 [5.3]		92	0.55 [1.2]		PDF
PGCN34-0550	$518.00	5:1	34	26 [230]	44 [389]	84 [743]	<15	476 [107]	425 [96]	2.4 [21.2]	0.36 [0.123]	94	1.1 [2.4]	STP-MTR(x)-34xxx(x)*	PDF
PGCN34-1050	$518.00	10:1		16 [142]	24 [212]	62 [549]	<15			1.3 [11.5]	0.34 [0.116]	94	1.1 [2.4]		PDF
PGCN34-2550	$703.00	25:1		42 [372]	52 [460]	84 [743]	<20			2.4 [21.2]	0.36 [0.123]	92	1.4 [3.1]		PDF
PGCN34-5050	$703.00	50:1		42 [372]	52 [460]	84 [743]	<20			2.4 [21.2]	0.34 [0.116]	92	1.4 [3.1]		PDF
PGCN34-10050	$703.00	100:1		16 [142]	24 [212]	62 [549]	<20			1.3 [11.5]	0.34 [0.116]	92	1.4 [3.1]		PDF

Specifications Applicable to All PGCN Gearboxes	
Nominal Speed (rpm)	3500
Maximum Input Speed (rpm)	6000
Mounting Orientation	can be mounted in any orientation
Environmental Rating	IP64
Operating Temperature	-20 to 90 °C [-4 to 194 °F]
Lubrication	Mineral Grease EPO
Service Life (hrs)	>20,000

NOTE: SureGear PGCN gearboxes (gear reducers) are not designed for back driving.
***Does NOT fit STP-MTRAC-34156(D)**

Sure gear

Accessories

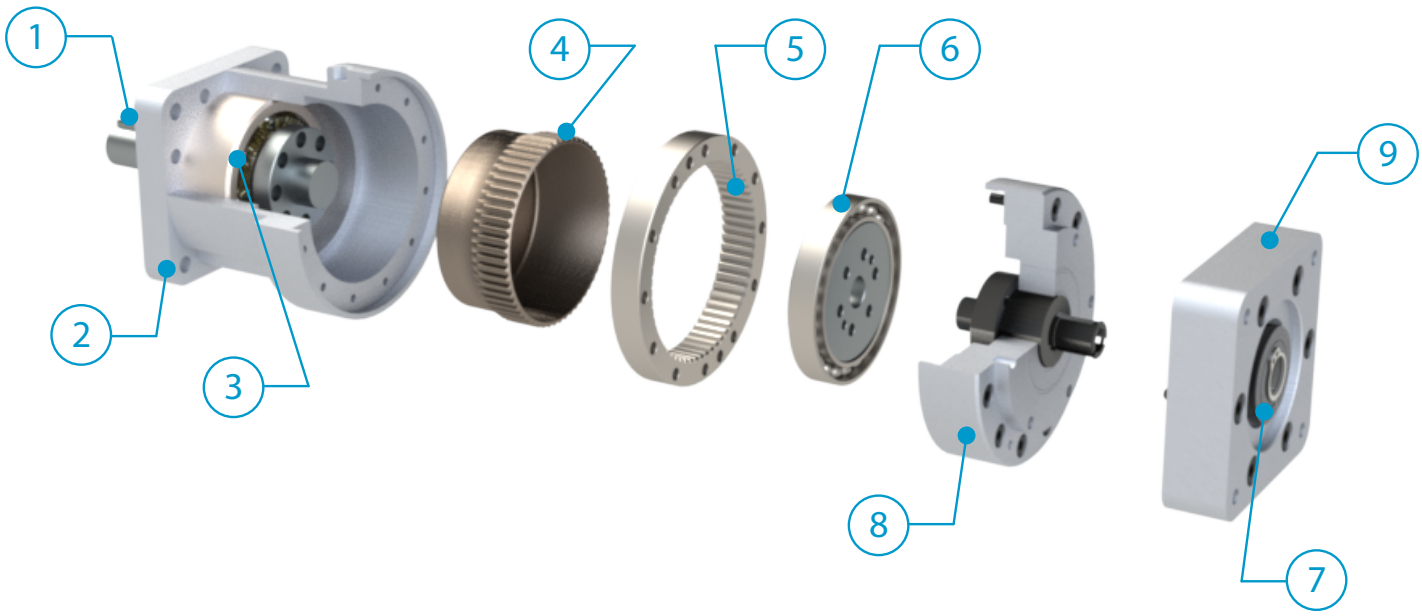
Planetary Gearboxes for NEMA Motors

Typical PGCN Accessory Bushings

Typical PGCN Accessory Screws

SureGear® NEMA Planetary Gearbox Accessories			
Part Number	***Price***	***Description***	***Fits SureGear NEMA Planetary Gearbox***
PGCN17-SK	$3.00	Mounting screws, replacement, for SureGear NEMA size 17 gearboxes (Package of 4)	PGCN17-xxxx
PGCN17-BSH5M	$25.00	Motor shaft bushing for SureGear NEMA size 17 gearboxes, fits 5mm diameter motor shaft	
PGCN17-BSH8M	$25.00	Motor shaft bushing for SureGear NEMA size 17 gearboxes, fits 8mm diameter motor shaft	
PGCN17-BSH9M	$25.00	Motor shaft bushing for SureGear NEMA size 17 gearboxes, fits 9mm diameter motor shaft	
PGCN17-BSH25	$25.00	Motor shaft bushing for SureGear NEMA size 17 gearboxes, fits 1/4 inch diameter motor shaft	
PGCN23-SK	$3.00	Mounting screws, replacement, for SureGear NEMA size 23 gearboxes (Package of 4)	PGCN23-xxxx
PGCN23-BSH8M	$25.00	Motor shaft bushing for SureGear NEMA size 23 gearboxes, fits 8mm diameter motor shaft	
PGCN23-BSH9M	$25.00	Motor shaft bushing for SureGear NEMA size 23 gearboxes, fits 9mm diameter motor shaft	
PGCN23-BSH25	$25.00	Motor shaft bushing for SureGear NEMA size 23 gearboxes, fits 1/4 inch diameter motor shaft	
PGCN23-BSH37	$25.00	Motor shaft bushing for SureGear NEMA size 23 gearboxes, fits 3/8 inch diameter motor shaft	
PGCN34-SK	$3.00	Mounting screws, replacement, for SureGear NEMA size 34 gearboxes (Package of 4)	PGCN34-xxxx
PGCN34-BSH9M	$25.00	Motor shaft bushing for SureGear NEMA size 34 gearboxes, fits 9mm diameter motor shaft	
PGCN34-BSH11M	$25.00	Motor shaft bushing for SureGear NEMA size 34 gearboxes, fits 11mm diameter motor shaft	
PGCN34-BSH37	$25.00	Motor shaft bushing for SureGear NEMA size 34 gearboxes, fits 3/8 inch diameter motor shaft	
PGCN34-BSH50	$25.00	Motor shaft bushing for SureGear NEMA size 34 gearboxes, fits 1/2 inch diameter motor shaft	

SureGear® Strain Wave Zero Backlash Gearbox

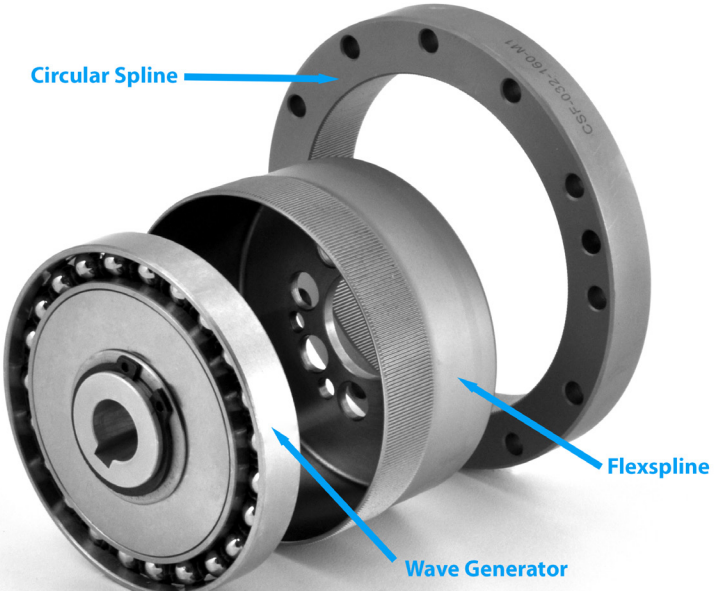


SureGear® Strain Wave Gearboxes – Overview

1. **Stressproof® Output Shaft** – provides a minimum 115,000 psi tensile strength, resistance to fatigue and excellent wearability
2. **Output Flange** – has a precision pilot and is available in metric, NEMA 17, 23, & 34 sizes
3. **Double Row Angular Contact Bearing** – provides a precision output with high stiffness, high radial and axial load capacities
4. **Flexspline** – a thin walled external spline that progressively engages with the Circular Spline with a zero backlash tooth mesh
5. **Circular Spline** – precision shaped internal spline, remains stationary and engages the Flexspline
6. **Wave Generator** – precision elliptical ball bearing that turns with the input motor and causes the rotating elliptical wave form on the Flexspline
7. **Sealed Bearing** – a precision bearing axially fixes the input shaft and wave generator positions
8. **Quick Connection Motor Coupling** – a socket head tightened clamping collar provides a reliable and simple motor connection
9. **Input Flange** – factory machined to match your motor dimensions and available in metric and standard NEMA 17, 23,& 34 sizes
10. **Lubrication** – Mobil Beacon 325 grease. The gearbox is sealed and pre–lubricated for its lifetime and does not require a change of lubricant.

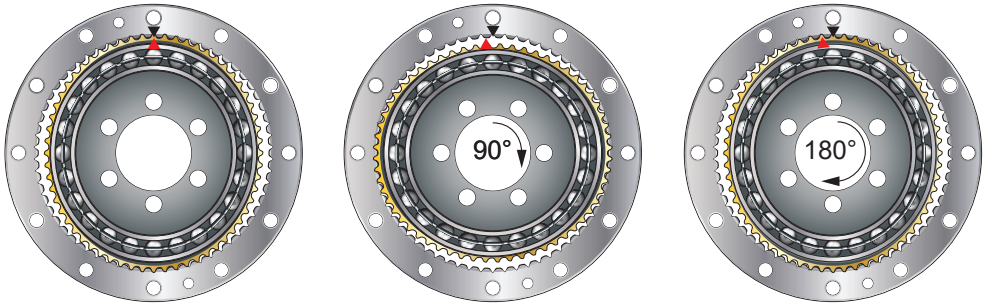
SureGear® Strain Wave Features and Benefits

- Lifetime zero backlash
- Lifetime lubrication
- Lifetime ultra-high repeatability
- Lifetime high positional accuracy
- Single stage, high reduction ratios of 50:1 to 200:1
- Low noise and heat generation
- High efficiency, torsional stiffness and torque-to-weight ratio
- High torque capacity with a large number of teeth sharing load

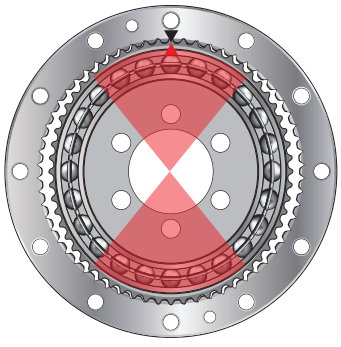


Harmonic Gearing Tooth Engagement

Tooth engagement between the Flexspline and the Circular Spline takes place at two areas located 180° from each other on the ellipse's major axis. The rotation of the wave generator inside the Flexspline generates relative motion between the two splines.

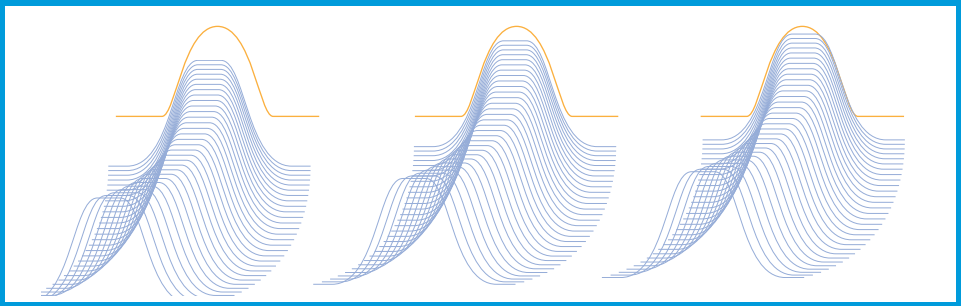


Example: with 100:1 ratio, 100 clockwise input motor rotations results in 1 counterclockwise output rotation.



Tooth Engagement Zones

Characteristically, 30-40 percent of the teeth are engaged dependent upon the ratio, and load is shared amongst many teeth giving the drive its high torque capacity.



SureGear® Strain Wave Zero Backlash Gearbox

Features

- Lifetime zero backlash
- Fits SureServo® SVL-201 and SV2L-201B servo motors and SureStep® NEMA17 stepper motors
- Single stage, high reduction ratios from 50 to 100:1
- High output torque in a compact gearbox
- Low noise and heat generation
- High efficiency, torsional stiffness and torque-to-weight ratio

SureGear® Strain Wave Gearboxes	
Nominal Input Speed[1]	3000 RPM
Maximum Input Speed[2]	7300 RPM
Maximum Radial Load[3]	1268 N
Maximum Axial Load[4]	870 N
Service Life[5]	25000 hr
Repeatability	±10 arc-sec
Positional Accuracy	±90 arc-sec
Backlash	0 arc-sec
Noise Level	<67 dB(A)
Protection Class	IP64
Permitted Housing Temperature	90°C
Permitted Ambient Temperature	-40°C to 90°C
Torsional Rigidity[6]	2.6 N·m/arc-min
Moment of Inertia	0.047 kgcm2
Weight[7]	0.68 kg
Lubrication	Permanent (Mobil Beacon 325 Grease)

1. Input speed at rated output torque for an average life of 25,000 hours
2. The maximum intermittent input speed
3. At key center line, calculated at 100 rpm output speed and nominal output torque
4. At end of output shaft, calculated at 100 rpm output speed and nominal output
5. Average life at nominal load and input speed
6. Torsional rigidity at nominal torque. Typically, stiffness lessens when applied torque reduces.
7. Weight may vary slightly dependent upon adapter options

HPGA063-50A1

HPGCN17-505M

SureGear® Strain Wave Gearboxes						
Part Number	*HPGA063-50A1*	*HPGA063-80A1*	*HPGA063-100A1*	*HPGCN17-505M*	*HPGCN17-805M*	*HPGCN17-1005M*
Price	$1,051.00	$1,051.00	$1,051.00	$1,051.00	$1,051.00	$1,051.00
Ratio (actual)	50:1	80:1	100:1	50:1	80:1	100:1
Nominal Output Torque[1]	12 N·m (106 lb·in)		15 N·m (133 lb·in)	12 N·m (106 lb·in)		15 N·m (133 lb·in)
Maximum Output Torque[2]	24 N·m (212 lb·in)		30 N·m (266 lb·in)	24 N·m (212 lb·in)		30 N·m (266 lb·in)
No-Load Starting Torque[3]	5.4 N·cm	3.3 N·cm	3 N·cm	5.4 N·cm	3.3 N·cm	3 N·cm
No-Load Back Driving Torque[4]	2.3 N·m	2.6 N·m	2.7 N·m	2.3 N·m	2.6 N·m	2.7 N·m
Fits	SureServo and SureServo2 SV(2)L-201(B) motors			SureStep NEMA 17 motors		
Drawing Link	PDF	PDF	PDF	PDF	PDF	PDF

1. Rated torque at 3,000 rpm input for an average life of 25,000 hours
2. Exceeding the maximum output torque limit may immediately damage the drive
3. Minimum input torque required to turn the output shaft with no load
4. Minimum torque, if applied to the output shaft, that will cause the unit to back drive

SureGear® Strain Wave Zero Backlash Gearbox

Features

- Lifetime zero backlash
- Fits SureServo® SVL-202, SVL-204, SV2L-202B, and SV2L-204B servo motors and SureStep® NEMA23 stepper motors
- Single stage, high reduction ratios from 50 to 160:1
- High output torque in a compact gearbox
- Low noise and heat generation
- High efficiency, torsional stiffness and torque-to-weight ratio

SureGear® Strain Wave Gearboxes	
Nominal Input Speed[1]	3000 RPM
Maximum Input Speed[2]	6500 RPM
Maximum Radial Load[3]	2376 N
Maximum Axial Load[4]	1557 N
Service Life[5]	25000 hr
Repeatability	±10 arc-sec
Positional Accuracy	±90 arc-sec
Backlash	0 arc-sec
Noise Level	<67 dB(A)
Protection Class	IP64
Permitted Housing Temperature	90°C
Permitted Ambient Temperature	-40°C to 90°C
Torsional Rigidity[6]	4.5 N·m/arc-min
Moment of Inertia	0.161 kgcm2
Weight[7]	1.2 kg
Lubrication	Permanent (Mobil Beacon 325 Grease)

1. Input speed at rated output torque for an average life of 25,000 hours
2. The maximum intermittent input speed
3. At key center line, calculated at 100 rpm output speed and nominal output torque
4. At end of output shaft, calculated at 100 rpm output speed and nominal output
5. Average life at nominal load and input speed
6. Torsional rigidity at nominal torque. Typically, stiffness lessens when applied torque reduces.
7. Weight may vary slightly dependent upon adapter options

HPGCN23-5025

HPGA073-50A2

SureGear® Strain Wave Gearboxes										
Part Number	*HPGA073-50A2*	*HPGA073-80A2*	*HPGA073-100A2*	*HPGA073-120A2*	*HPGA073-160A2*	*HPGCN23-5025*	*HPGCN23-8025*	*HPGCN23-10025*	*HPGCN23-12025*	*HPGCN23-16025*
Price	$1,219.00	$1,219.00	$1,219.00	$1,219.00	$1,219.00	$1,219.00	$1,219.00	$1,219.00	$1,219.00	$1,219.00
Ratio (actual)	50:1	80:1	100:1	120:1	160:1	50:1	80:1	100:1	120:1	160:1
Nominal Output Torque[1]	25 N·m (221 lb·in)		30 N·m (266 lb·in)			25 N·m (221 lb·in)		30 N·m (266 lb·in)		
Maximum Output Torque[2]	50 N·m (442 lb·in)		60 N·m (532 lb·in)			50 N·m (442 lb·in)		60 N·m (532 lb·in)		
No-Load Starting Torque[3]	6.2 N·cm	4.6 N·cm	4.3 N·cm	3.3 N·cm	2.3 N·cm	6.2 N·cm	4.6 N·cm	4.3 N·cm	3.3 N·cm	2.3 N·cm
No-Load Back Driving Torque[4]	4 N·m	4.2 N·m	4.5 N·m	6.6 N·m	7 N·m	4 N·m	4.2 N·m	4.5 N·m	6.6 N·m	7 N·m
Fits	SureServo and SureServo2 SV(2)L-202(B) and SV(2)L-204(B) motors					SureStep NEMA 23 motors				
Drawing Link	PDF	PDF	PDF	PDF	PDF	PDF	PDF	PDF	PDF	PDF

1. Rated torque at 3,000 rpm input for an average life of 25,000 hours
2. Exceeding the maximum output torque limit may immediately damage the drive
3. Minimum input torque required to turn the output shaft with no load
4. Minimum torque, if applied to the output shaft, that will cause the unit to back drive

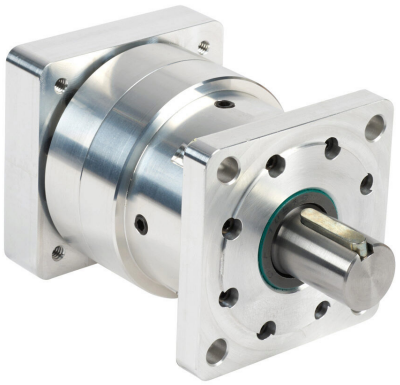
SureGear® Strain Wave Zero Backlash Gearbox

Features

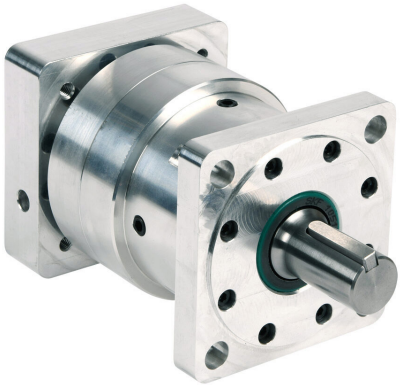
- Lifetime zero backlash
- Fits SureServo® SVL-207 and SV2L-207B servo motors and SureStep® NEMA34 stepper motors
- Single stage, high reduction ratios from 50 to 160:1
- High output torque in a compact gearbox
- Low noise and heat generation
- High efficiency, torsional stiffness and torque-to-weight ratio

SureGear® Strain Wave Gearboxes	
Nominal Input Speed[1]	3000 RPM
Maximum Input Speed[2]	5600 RPM
Maximum Radial Load[3]	2230 N
Maximum Axial Load[4]	3717 N
Service Life[5]	25000 hr
Repeatability	±10 arc-sec
Positional Accuracy	±90 arc-sec
Backlash	0 arc-sec
Noise Level	<67 dB(A)
Protection Class	IP64
Permitted Housing Temperature	90°C
Permitted Ambient Temperature	-40°C to 90°C
Torsional Rigidity[6]	24 N·m/arc-min
Moment of Inertia	0.506 kgcm2
Weight[7]	2.6 kg
Lubrication	Permanent (Mobil Beacon 325 Grease)

1. Input speed at rated output torque for an average life of 25,000 hours
2. The maximum intermittent input speed
3. At key center line, calculated at 100 rpm output speed and nominal output torque
4. At end of output shaft, calculated at 100 rpm output speed and nominal output
5. Average life at nominal load and input speed
6. Torsional rigidity at nominal torque. Typically, stiffness lessens when applied torque reduces.
7. Weight may vary slightly dependent upon adapter options



HPGCN34-5050



HPGA088-50A3

SureGear® Strain Wave Gearboxes										
Part Number	*HPGA088-50A3*	*HPGA088-80A3*	*HPGA088-100A3*	*HPGA088-120A3*	*HPGA088-160A3*	*HPGCN34-5050*	*HPGCN34-8050*	*HPGCN34-10050*	*HPGCN34-12050*	*HPGCN34-16050*
Price	$1,385.00	$1,385.00	$1,385.00	$1,385.00	$1,385.00	$1,385.00	$1,385.00	$1,385.00	$1,385.00	$1,385.00
Ratio (actual)	50:1	80:1	100:1	120:1	160:1	50:1	80:1	100:1	120:1	160:1
Nominal Output Torque[1]	40 N·m (354 lb·in)		50 N·m (443 lb·in)			40 N·m (354 lb·in)		50 N·m (443 lb·in)		
Maximum Output Torque[2]	80 N·m (708 lb·in)		100 N·m (886 lb·in)			80 N·m (708 lb·in)		100 N·m (886 lb·in)		
No-Load Starting Torque[3]	14 N·cm	7 N·cm	7 N·cm	6 N·cm	6 N·cm	14 N·cm	7 N·cm	7 N·cm	6 N·cm	6 N·cm
No-Load Back Driving Torque[4]	7 N·m	7.2 N·m	8.5 N·m	9 N·m	11.3 N·m	7 N·m	7.2 N·m	8.5 N·m	9 N·m	11.3 N·m
Fits	SureServo and SureServo2 SV(2)L-207(B) motors					SureStep NEMA 34 motors				
Drawing Link	PDF	PDF	PDF	PDF	PDF	PDF	PDF	PDF	PDF	PDF

1. Rated torque at 3,000 rpm input for an average life of 25,000 hours
2. Exceeding the maximum output torque limit may immediately damage the drive
3. Minimum input torque required to turn the output shaft with no load
4. Minimum torque, if applied to the output shaft, that will cause the unit to back drive

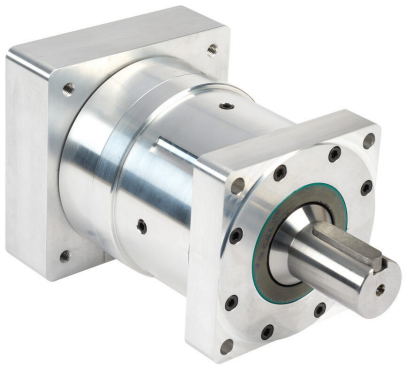
SureGear® Strain Wave Zero Backlash Gearbox

Features

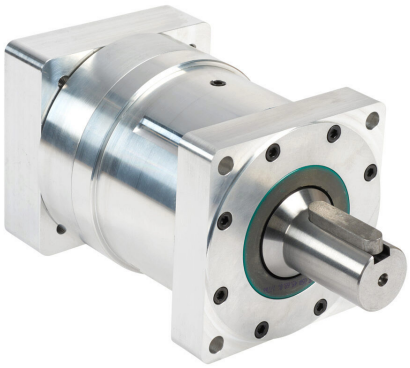
- Lifetime zero backlash
- Fits SureServo® SVL-210, SVM-210, and SV2L-210B servo motors
- Single stage, high reduction ratios from 50 to 200:1
- High output torque in a compact gearbox
- Low noise and heat generation
- High efficiency, torsional stiffness and torque-to-weight ratio

SureGear® Strain Wave Gearboxes	
Nominal Input Speed[1]	3000 RPM
Maximum Input Speed[2]	4800 RPM
Maximum Radial Load[3]	6012 N
Maximum Axial Load[4]	3985 N
Service Life[5]	25000 hr
Repeatability	±10 arc-sec
Positional Accuracy	±90 arc-sec
Backlash	0 arc-sec
Noise Level	<67 dB(A)
Protection Class	IP64
Permitted Housing Temperature	90°C
Permitted Ambient Temperature	-40°C to 90°C
Torsional Rigidity[6]	32 N·m/arc-min
Moment of Inertia	2.12 kgcm2
Weight[7]	6.3 kg
Lubrication	Permanent (Mobil Beacon 325 Grease)

1. Input speed at rated output torque for an average life of 25,000 hours
2. The maximum intermittent input speed
3. At key center line, calculated at 100 rpm output speed and nominal output torque
4. At end of output shaft, calculated at 100 rpm output speed and nominal output
5. Average life at nominal load and input speed
6. Torsional rigidity at nominal torque. Typically, stiffness lessens when applied torque reduces.
7. Weight may vary slightly dependent upon adapter options



HPGA116-50A5



HPGA116-50A4

SureGear® Strain Wave Gearboxes												
Part Number	*HPGA116-50A4*	*HPGA116-80A4*	*HPGA116-100A4*	*HPGA116-135A4*	*HPGA116-160A4*	*HPGA116-200A4*	*HPGA116-50A5*	*HPGA116-80A5*	*HPGA116-100A5*	*HPGA116-135A5*	*HPGA116-160A5*	*HPGA116-200A5*
Price	$1,654.00	$1,654.00	$1,654.00	$1,654.00	$1,654.00	$1,654.00	$1,654.00	$1,654.00	$1,654.00	$1,654.00	$1,654.00	$1,654.00
Ratio (actual)	50:1	80:1	100:1	135:1	160:1	200:1	50:1	80:1	100:1	135:1	160:1	200:1
Nominal Output Torque[1]	100 N·m (885 lb·in)		120 N·m (1062 lb·in)				100 N·m (885 lb·in)		120 N·m (1062 lb·in)			
Maximum Output Torque[2]	200 N·m (1770 lb·in)		240 N·m (2124 lb·in)				200 N·m (1770 lb·in)		240 N·m (2124 lb·in)			
No-Load Starting Torque[3]	38 N·cm	18 N·cm	16 N·cm	14 N·cm	12 N·cm	11 N·cm	38 N·cm	18 N·cm	16 N·cm	14 N·cm	12 N·cm	11 N·cm
No-Load Back Driving Torque[4]	11 N·m	14 N·m	15 N·m	20 N·m	21 N·m	22 N·m	11 N·m	14 N·m	15 N·m	20 N·m	21 N·m	22 N·m
Fits	SureServo and SureServo2 SV(2)L-210(B) motors						SureServo SVM-210(B) motors					
Drawing Link	PDF	PDF	PDF	PDF	PDF	PDF	PDF	PDF	PDF	PDF	PDF	PDF

1. Rated torque at 3,000 rpm input for an average life of 25,000 hours
2. Exceeding the maximum output torque limit may immediately damage the drive
3. Minimum input torque required to turn the output shaft with no load
4. Minimum torque, if applied to the output shaft, that will cause the unit to back drive

Precision Servo Gearboxes

SureGear® Servo Gearbox Overview

PGA In-line Series

The SureGear PGA series of high-precision servo gear reducers is an excellent choice for applications that require good accuracy and reliability at an exceptional value. This in-line planetary gear reducer has a thread-in mounting style, along with a level of precision and torque capacity that is best in its class. Offered in a concentric shaft design with a maximum seven arc-min backlash rating, the SureGear PGA series is an accurate, high-performance, and cost effective solution for any OEM.

The machining quality of the SureGear PGA helical planetary gears provides a very quiet and more efficient reducer than other competitive products that are similarly priced. The SureGear PGA series easily mates to SureServo motors, and is the perfect solution for applications such as gantries, injection-molding machines, pick-and-place automation, and linear slides.

SureGear PGA Gearbox

PGB Right-angle Series

The SureGear PGB series of high-precision right-angle servo gear reducers is an excellent choice for applications that require a more compact footprint.

The PGB right-angle planetary gear reducers offer similar technical specifications to the PGA series in-line gear reducers, and provides the customer with an excellent solution when space and clearance requirements are limited.

Offered with a six arc-min backlash rating for 2-stage and nine arc-min backlash for 3-stage, the SureGear PGB series performs to OEMs' demanding expectations.

SureGear PGB Gearbox

PGD Hub Style In-line Series

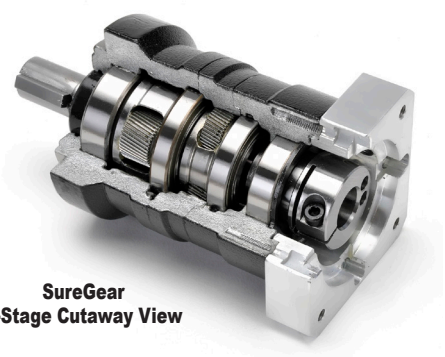
The SureGear PGD series sets a new standard in applications requiring extremely high-torque ratings and rigidity. The compact design and hub-style output is ideal for equipment that requires high-speed, high-precision indexing movement. The remarkable torsion stiffness and the low backlash of the planetary gearing combine to provide outstanding positioning accuracy.

With a backlash rating less than 3 arc-minutes and exceptional torque handling capabilities, the PGD series offers a high performance robust planetary solution for OEM customers. The PGD reducer is often used for larger indexing applications and dial tables commonly found in packaging and filling equipment and assembly automation systems.

SureGear Hub Style PGD Gearbox

Features

- Thread-in mounting style
- Best-in-class backlash
- Four gear ratios available (5:1, 10:1, 15:1, 25:1), Two additional for PGD models (35:1 and 50:1)
- Mounting hardware included for attaching to SureServo motors
- Helical-cut planetary gears for quiet operation and reduced vibration
- Right-angle reducer utilizes a spiral bevel gear; motor can be located at a 90° position from the reducer, providing a more compact footprint
- Uncaged needle roller bearings for high rigidity and torque
- Adapter bushing connection for simple and effective attachment to most servo motors
- High-viscosity, anti-separation grease does not migrate away from the gears; no leakage through the seal
- Maintenance free: No need to replace the grease for the life of the unit
- At nominal speed, service life is 20,000 hours
- Can be positioned in any orientation
- IP55 environmental rating
- 5-year warranty



SureGear 2-Stage Cutaway View

Applications

- Gantries
- Injection-molding machines
- Pick-and-place automation
- Linear slides
- Packaging machines
- Conveyors

Precision Servo Gearboxes

SureGear® Servo Gearbox Selection

Servo Motor	Gear Ratio	SureGear Gearbox	Frame Size (mm)	Motor Nominal Output Torque		Combo Nominal Output Torque		Nominal Output Speed (rpm)	Max Output Speed (rpm)	Available Load Inertia @ 5:1 Mismatch *	
				N·m	lb·in	N·m	lb·in			kg·cm2	lb·in·s2
SV2L-201(x) APMC-FAL01xxx	5:1	PGD047-05A1	47	0.32	2.83	1.52	13.44	600	1200.00	6.76	0.006
		PGA050-05A1	50							6.94	0.006
		PGA070-05A1	70							5.91	0.005
		PGB070-05A1	70			1.49	13.16			1.59**	0.001**
	10:1	PGD047-10A1	47			3.04	26.89	300	600.00	28.15	0.025
		PGA050-10A1	50							28.35	0.025
		PGA070-10A1	70							25.75	0.023
		PGB070-10A1	70			2.98	26.32			8.35**	0.007**
	15:1	PGA050-15A1	50			4.32	38.21	200	400.00	62.66	0.055
		PGA070-15A1	70							58.16	0.051
		PGB070-15A1	70			4.22	37.36			54.11	0.048
	25:1	PGD047-25A1	47			7.20	63.68	120	240.00	174.69	0.155
		PGA050-25A1	50							174.69	0.155
		PGA070-25A1	70							162.81	0.144
		PGB070-25A1	70			7.04	62.26			151.56	0.134
	50:1	PGD064-50A1	64			14.40	127.35	60	120.00	661.25	0.585
SV2L-202(x)	5:1	PGD064-05A2	64	0.64	5.7	3.04	27.08	600	1200.00	28.75	0.025
		PGA070-05A2	70							29.33	0.026
		PGB070-05A2	70			2.98	26.51			25.00	0.022
	10:1	PGD064-10A2	64			6.08	54.15	300	600.00	118.80	0.105
		PGA070-10A2	70							119.40	0.106
		PGB070-10A2	70			5.95	53.01			102.00	0.090
	15:1	PGA070-15A2	70			8.64	76.95	200	400.00	268.88	0.238
		PGB070-15A2	70			8.45	75.24			264.83	0.234
		PGB090-15A2	90							204.75	0.181
	25:1	PGD064-25A2	64			14.40	128.25	120	240.00	747.50	0.662
		PGA070-25A2	70							748.13	0.662
		PGB070-25A2	70			14.08	125.40			736.88	0.652
		PGB090-25A2	90							581.25	0.514
		PGD090-25A2	90			14.40	128.25			700.00	0.620
	50:1	PGD090-50A2	90			28.80	256.50	60	120.00	2875.00	2.544
		PGD110-50A2	110							2125.00	1.881
SV2L-204(x)	5:1	PGD064-05A2	64	1.27	11.2	6.03	53.20	600	1200.00	53.75	0.048
		PGA070-05A2	70							54.33	0.048
		PGB070-05A2	70			5.91	52.08			50.00	0.044
	10:1	PGD064-10A2	64			12.07	106.40	300	600.00	218.80	0.194
		PGA070-10A2	70							219.40	0.194
		PGB070-10A2	70			11.81	104.16			202.00	0.179
	15:1	PGA070-15A2	70			17.15	151.20	200	400.00	493.88	0.437
		PGB070-15A2	70			16.76	147.84			489.83	0.433
		PGB090-15A2	90							429.75	0.380
	25:1	PGD064-25A2	64			28.58	252.00	120	240.00	1372.50	1.215
		PGA070-25A2	70							1373.13	1.215
		PGB070-25A2	70			27.94	246.40			1361.88	1.205
		PGB090-25A2	90							1206.25	1.068
		PGD090-25A2	90			28.58	252.00			1325.00	1.173
	50:1	PGD090-50A2	90			57.15	504.00	60	120.00	5375.00	4.757
		PGD110-50A2	110							4625.00	4.093

* Available load inertia is calculated based on servo motor inertia using the formula: Available Inertia = (5 x Motor Inertia – Gearbox Inertia) x (Gear Ratio)2 A 5:1 inertia mismatch is a good target for design purposes. Systems with lower or higher mismatch may be possible, depending on operating conditions.

** This gearbox is NOT a suitable choice at a 5:1 mismatch. If inertia balancing is a selection criteria for your end use, please use a mismatch of 8:1 to 10:1.

Precision Servo Gearboxes

SureGear® Servo Gearbox Selection

Servo Motor	Gear Ratio	SureGear Gearbox	Frame Size (mm)	Motor Nominal Output Torque		Combo Nominal Output Torque		Nominal Output Speed (rpm)	Max Output Speed (rpm)	Available Load Inertia @ 5:1 Mismatch *	
				N·m	lb·in	N·m	lb·in			kg·cm2	lb·in·s2
SV2L-207(x)	5:1	PGA070-05A3	70	2.39	21.2	11.35	100.70	600	1200.00	186.83	0.165
		PGB090-05A3	90			11.11	98.58			143.75	0.127
		PGD090-05A3	90			11.35	100.70			174.25	0.154
	10:1	PGA090-10A3	90			22.71	201.40	300	600.00	726.00	0.643
		PGB090-10A3	90			22.23	197.16			586.00	0.519
		PGD090-10A3	90			22.71	201.40			722.00	0.639
	15:1	PGA090-15A3	90			32.27	286.20	200	400.00	1669.50	1.478
		PGB090-15A3	90			31.55	279.84			1622.25	1.436
	25:1	PGA090-25A3	90			53.78	477.00	120	240.00	4643.75	4.110
		PGB090-25A3	90			52.58	466.40			4518.75	3.999
		PGD110-25A3	110			53.78	477.00			4281.25	3.789
	50:1	PGD110-50A3	110			107.55	954.00	60	120.00	17875.00	15.819
SV2L-210(x)	5:1	PGA090-05A4	90	3.18	28.15	15.11	133.69	600	1000.00	321.25	0.284
		PGB090-05A4	90			14.79	130.88			286.25	0.253
		PGD090-05A4	90			15.11	133.69			319.25	0.283
	10:1	PGA090-10A4	90			30.21	267.38	300	500.00	1296.00	1.147
		PGB090-10A4	90			29.57	261.75			1156.00	1.023
		PGD090-10A4	90			30.21	267.38			1292.00	1.143
	15:1	PGA120-15A4	120			42.93	379.96	200	333.33	2884.50	2.553
		PGB120-15A4	120			41.98	371.52			2475.00	2.190
	25:1	PGD110-25A4	110			71.55	633.27	120	200.00	7843.75	6.942
		PGA120-25A4	120							8043.75	7.119
		PGB120-25A4	120			69.96	619.20			6918.75	6.123
	50:1	PGD110-50A4	110			143.10	1266.54	60	100.00	32125.00	28.431
SV2M-210(x)	5:1	PGA090-05A5	90	4.77	42.22	22.66	200.54	400.00	600.00	1041.25	0.922
		PGD090-05A5	90							1039.25	0.920
		PGB120-05A5	120			22.18	196.31			925.75	0.819
	10:1	PGA090-10A5	90			45.32	401.07	200.00	300.00	4176.00	3.696
		PGD110-10A5	110							4172.00	3.692
		PGB120-10A5	120			44.36	392.63			3759.00	3.327
	15:1	PGA120-15A5	120			64.40	569.94	133.33	200.00	9364.50	8.288
		PGB120-15A5	120			62.96	557.28			8955.00	7.925
	25:1	PGD110-25A5	110			107.33	949.91	80.00	120.00	25843.75	22.872
		PGA120-25A5	120							26043.75	23.049
		PGB120-25A5	120			104.94	928.80			24918.75	22.053
	35:1	PGD110-35A5	110			150.26	1329.87	57.14	85.71	50653.75	44.829

*** Available load inertia is calculated based on servo motor inertia using the formula: Available Inertia = (5 x Motor Inertia – Gearbox Inertia) x (Gear Ratio)2 A 5:1 inertia mismatch is a good target for design purposes. Systems with lower or higher mismatch may be possible, depending on operating conditions.**

Precision Servo Gearboxes

SureGear® Servo Gearbox Selection

Servo Motor	Gear Ratio	SureGear Gearbox	Frame Size (mm)	Motor Nominal Output Torque		Combo Nominal Output Torque		Nominal Output Speed (rpm)	Max Output Speed (rpm)	Available Load Inertia @ 5:1 Mismatch *	
				N·m	lb·in	N·m	lb·in			kg·cm2	lb·in·s2
SV2M-215(x)	5:1	PGA090-05A5	90	7.16	63.37	34.01	301.01	400.00	600.00	1390.00	1.230
		PGD090-05A5	90							1388.00	1.228
		PGB120-05A5	120			33.29	294.68			1274.50	1.128
	10:1	PGA090-10A5	90			68.02	602.03	200.00	300.00	5571.00	4.930
		PGD110-10A5	110							5567.00	4.927
		PGB120-10A5	120			66.59	589.35			5154.00	4.561
	15:1	PGA120-15A5	120			96.66	855.51	133.33	200.00	12503.25	11.065
		PGB120-15A5	120			94.51	836.50			12093.75	10.703
	25:1	PGD110-25A5	110			161.10	1425.86	80.00	120.00	34562.50	30.588
		PGA120-25A5	120							34762.50	30.765
		PGB120-25A5	120			157.52	1394.17			33637.50	29.769
	35:1	PGD110-35A5	110			225.54	1996.20	57.14	85.71	67742.50	59.952
SV2M-220(x)	5:1	PGD110-05A6	110	9.55	84.52	45.36	401.49	400.00	600.00	4280.00	3.788
		PGA120-05A6	120							4297.50	3.803
		PGB120-05A6	120			44.41	393.04			4212.00	3.728
		PGB155-05A6	155							3914.75	3.465
	10:1	PGD110-10A6	110			90.73	802.98	200.00	300.00	17240.00	15.257
		PGA120-10A6	120							17255.00	15.271
		PGB120-10A6	120			88.82	786.08			16904.00	14.960
		PGB155-10A6	155							15884.00	14.057
	15:1	PGA155-15A6	155			128.93	1141.08	133.33	200.00	38745.00	34.289
		PGB155-15A6	155			126.06	1115.73			37597.50	33.274
	25:1	PGA155-25A6	155			214.88	1901.80	80.00	120.00	107750.00	95.359
		PGB155-25A6	155			210.10	1859.54			104593.75	92.565
SV2M-230(x)	5:1	PGD110-05A6	110	17.55	155.33	83.36	737.80	340.00	600.00	6817.50	6.033
		PGA120-05A6	120							6835.00	6.049
		PGB120-05A6	120			81.61	722.31			6749.50	5.973
		PGB155-05A6	155							6452.25	5.710
	10:1	PGD110-10A6	110			166.73	1475.68	170.00	300.00	27390.00	24.240
		PGA120-10A6	120							27405.00	24.253
		PGB120-10A6	120			163.22	1444.62			27054.00	23.943
		PGB155-10A6	155							26034.00	23.040
	15:1	PGA155-15A6	155			236.93	2097.01	113.33	200.00	61582.50	54.501
		PGB155-15A6	155			231.66	2050.36			60435.00	53.485
	25:1	PGA155-25A6	155			394.88	3494.98	68.00	120.00	171187.50	151.501
		PGB155-25A6	155			386.10	3417.27			168031.25	148.708

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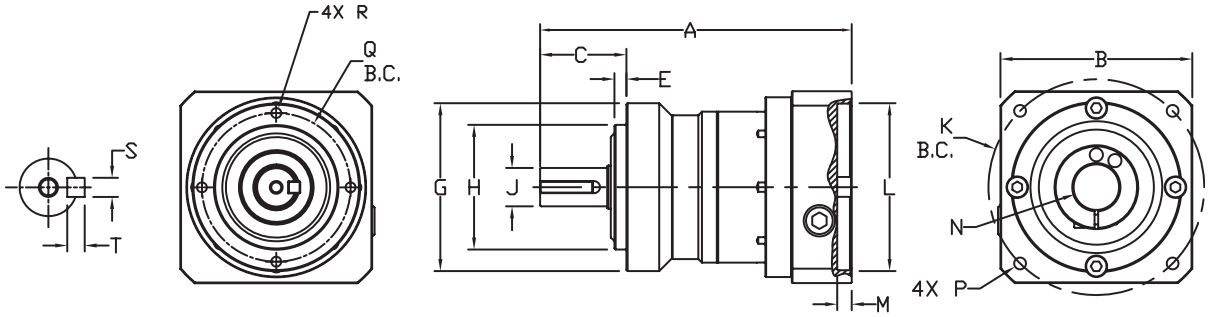
Precision Servo Gearboxes

Pricing & Specifications – In-Line Shaft PGA Series

SureGear® Precision Servo Gearboxes – In-Line Shaft PGA Series

Part Number	Price	Frame Size (mm)	Ratio	Reduction	Nominal Output Torque (N·m [lb-in])	Max. Acceleration Torque (N·m [lb-in])	Emergency Stop Torque (N·m [lb-in])	Backlash (arc-min)	Nominal Input Speed (rpm)	Max. Input Speed (rpm)	Allowable Radial Load (N [lb])	Allowable Thrust Load (N [lb])	Moment of Inertia (kg·cm2)	Efficiency (%)	Max. Housing Temperature	Approx Weight (kg [lb])	Environmental Rating	Fits SureServo Servo Motor (SV & SV2)
PGA050-05A1	$465.00	50	5:1	single	9 [80]	18 [159]	35 [310]	5	4000	8000	290 [65]	330 [74]	0.036	95	90 °C [194 °F]	0.7 [1.5]	IP55	SV(2)L-201(B)
PGA050-10A1	$490.00		10:1	single	6 [53]	12 [106]	30 [266]				360 [81]	450 [101]	0.030					
PGA050-15A1	$672.00		15:1	double	6 [53]	12 [106]	30 [266]	7			410 [92]	540 [121]	0.035	90		0.8 [1.8]		
PGA050-25A1	$672.00		25:1	double	9 [80]	18 [159]	35 [310]				490 [110]	640 [144]	0.034					
PGA070-05A1	$465.00	70	5:1	single	27 [239]	50 [443]	100 [885]	5	3000	6000	510 [115]	390 [88]	0.077	95		1.5 [3.3]		
PGA070-10A1	$490.00		10:1	single	18 [159]	35 [310]	80 [708]				640 [144]	530 [119]	0.056					
PGA070-15A1	$672.00		15:1	double	18 [159]	35 [310]	80 [708]				740 [166]	630 [142]	0.055	90		1.7 [3.7]		
PGA070-25A1	$672.00		25:1	double	27 [239]	50 [443]	100 [885]				870 [196]	790 [178]	0.053					
PGA070-05A2	$508.00		5:1	single	27 [239]	50 [443]	100 [885]				510 [115]	390 [88]	0.160	95		1.5 [3.3]		SV(2)L-202(B) SV(2)L-204(B)
PGA070-10A2	$508.00		10:1	single	18 [159]	35 [310]	80 [708]				640 [144]	530 [119]	0.140					
PGA070-15A2	$696.00		15:1	double	18 [159]	35 [310]	80 [708]				740 [166]	630 [142]	0.140	90		1.7 [3.7]		
PGA070-25A2	$696.00		25:1	double	27 [239]	50 [443]	100 [885]				870 [196]	790 [178]	0.130					
PGA070-05A3	$508.00		5:1	single	27 [239]	50 [443]	100 [885]				510 [115]	390 [88]	0.360	95		1.5 [3.3]		
PGA090-10A3	$601.00	90	10:1	single	50 [443]	80 [708]	200 [1770]				1200 [270]	1600 [360]	0.750			3.5 [7.7]		SV(2)L-207(B)
PGA090-15A3	$794.00		15:1	double	50 [443]	80 [708]	200 [1770]				1400 [315]	1900 [427]	0.720	90		4.0 [8.8]		
PGA090-25A3	$794.00		25:1	double	75 [664]	125 [1106]	250 [2213]				1600 [360]	2200 [495]	0.710					
PGA090-05A4	$600.00		5:1	single	75 [664]	125 [1106]	250 [2213]				960 [216]	1200 [270]	2.900	95		3.5 [7.7]		SV(2)L-210(B)
PGA090-10A4	$600.00		10:1	single	50 [443]	80 [708]	200 [1770]				1200 [270]	1600 [360]	2.800					
PGA090-05A5	$600.00		5:1	single	75 [664]	125 [1106]	250 [2213]				960 [216]	1200 [270]	2.900			3.5 [7.7]		SV(2)M-210(B)
PGA090-10A5	$600.00		10:1	single	50 [443]	80 [708]	200 [1770]				1200 [270]	1600 [360]	2.800					
PGA120-15A4	$997.00	120	15:1	double	120 [1062]	225 [1991]	500 [4425]				2300 [517]	3000 [674]	2.800	90		8.7 [19.2]		SV(2)L-210(B)
PGA120-25A4	$997.00		25:1	double	180 [1593]	330 [2921]	625 [5532]				2700 [607]	3700 [832]	2.800					
PGA120-15A5	$997.00		15:1	double	120 [1062]	225 [1991]	500 [4425]				2300 [517]	3000 [674]	2.800			8.7 [19.2]		SV(2)M-210(B)
PGA120-25A5	$997.00		25:1	double	180 [1593]	330 [2921]	625 [5532]				2700 [607]	3700 [832]	2.800					
PGA120-05A6	$795.00		5:1	single	180 [1593]	330 [2921]	625 [5532]				1600 [360]	1900 [427]	11.000	95		7.8 [17.2]		SV(2)M-220(B) SV(2)M-230(B)
PGA120-10A6	$795.00		10:1	single	120 [1062]	225 [1991]	500 [4425]				2000 [450]	2500 [562]	11.000					
PGA155-10A6	$982.00	155	10:1	single	240 [2124]	470 [4160]	1000 [8851]		2000	4000	4700 [1057]	4100 [922]	11.000	95		16 [35.3]		
PGA155-15A6	$1,336.00		15:1	double	240 [2124]	470 [4160]	1000 [8851]				5400 [1214]	4900 [1102]	11.000	90		18 [40.0]		
PGA155-25A6	$1,336.00		25:1	double	360 [3186]	700 [6196]	1250 [11063]				6400 [1439]	6100 [1371]	11.000					

Dimensions – In-Line Shaft PGA Series



SureGear PGA Series In-Line Shaft Gearboxes Dimension Drawing

SureGear® Precision Servo Gearbox Dimensions – In-Line Shaft PGA Series (dimensions = mm [in])

Part Number	A	B	C	E	G	H	J	K	L	M	N	P	Q	R	S	T
PGA050-05A1 ***PGA050-10A1***	88.5 [3.48]	42.0 [1.65]	24.5 [0.96]	4.0 [0.16]	Ø50.0 [Ø1.97]	Ø35.0 [Ø1.38]	Ø12.0 [Ø0.47]	Ø46.0 [Ø1.81]	Ø30.0 [Ø1.18]	5.0 [0.20]	Ø8.0 [Ø0.31]	M4-0.7x9	Ø44.0 [Ø1.73]	M4-0.7x8	4.0 [0.16]	4.0 [0.16]
PGA050-15A1 ***PGA050-25A1***	105.0 [4.13]	42.0 [1.65]	24.5 [0.96]	4.0 [0.16]	Ø50.0 [Ø1.97]	Ø35.0 [Ø1.38]	Ø12.0 [Ø0.47]	Ø46.0 [Ø1.81]	Ø30.0 [Ø1.18]	5.0 [0.20]	Ø8.0 [Ø0.31]	M4-0.7x9	Ø44.0 [Ø1.73]	M4-0.7x8	4.0 [0.16]	4.0 [0.16]
PGA070-05A1 ***PGA070-10A1***	112.0 [4.41]	52.0 [2.05]	36.0 [1.42]	5.0 [0.20]	Ø70.0 [Ø2.76]	Ø52.0 [Ø2.05]	Ø16.0 [Ø0.63]	Ø46.0 [Ø1.81]	Ø30.0 [Ø1.18]	5.0 [0.20]	Ø8.0 [Ø0.31]	M4-0.7x9	Ø62.0 [Ø2.44]	M5-0.8x10	5.0 [0.20]	5.0 [0.20]
PGA070-05A2 ***PGA070-10A2***	115.0 [4.53]	65.0 [2.56]	36.0 [1.42]	5.0 [0.20]	Ø70.0 [Ø2.76]	Ø52.0 [Ø2.05]	Ø16.0 [Ø0.63]	Ø70.0 [Ø2.76]	Ø50.0 [Ø1.97]	5.0 [0.20]	Ø14.0 [Ø0.55]	M5-0.8x11	Ø62.0 [Ø2.44]	M5-0.8x10	5.0 [0.20]	5.0 [0.20]
PGA070-05A3	130.0 [5.12]	80.0 [3.15]	36.0 [1.42]	5.0 [0.20]	Ø70.0 [Ø2.76]	Ø52.0 [Ø2.05]	Ø16.0 [Ø0.63]	Ø90.0 [Ø3.54]	Ø70.0 [Ø2.76]	6.0 [0.24]	Ø19.0 [Ø0.75]	M6-1.0x13	Ø62.0 [Ø2.44]	M5-0.8x10	5.0 [0.20]	5.0 [0.20]
PGA070-15A1 ***PGA070-25A1***	131.0 [5.16]	52.0 [2.05]	36.0 [1.42]	5.0 [0.20]	Ø70.0 [Ø2.76]	Ø52.0 [Ø2.05]	Ø16.0 [Ø0.63]	Ø46.0 [Ø1.81]	Ø30.0 [Ø1.18]	5.0 [0.20]	Ø8.0 [Ø0.31]	M4-0.7x9	Ø62.0 [Ø2.44]	M5-0.8x10	5.0 [0.20]	5.0 [0.20]
PGA070-15A2 ***PGA070-25A2***	136.0 [5.35]	65.0 [2.56]	36.0 [1.42]	5.0 [0.20]	Ø70.0 [Ø2.76]	Ø52.0 [Ø2.05]	Ø16.0 [Ø0.63]	Ø70.0 [Ø2.76]	Ø50.0 [Ø1.97]	5.0 [0.20]	Ø14.0 [Ø0.55]	M5-0.8x11	Ø62.0 [Ø2.44]	M5-0.8x10	5.0 [0.20]	5.0 [0.20]
PGA090-10A3	153.0 [6.02]	80.0 [3.15]	46.0 [1.81]	7.0 [0.28]	Ø90.0 [Ø3.54]	Ø68.0 [Ø2.68]	Ø22.0 [Ø0.87]	Ø90.0 [Ø3.54]	Ø70.0 [Ø2.76]	6.0 [0.24]	Ø19.0 [Ø0.75]	M6-1.0x13	Ø80.0 [Ø3.15]	M6-1.0x12	6.0 [0.24]	6.0 [0.24]
PGA090-05A4 ***PGA090-10A4***	170.0 [6.69]	100.0 [3.94]	46.0 [1.81]	7.0 [0.28]	Ø90.0 [Ø3.54]	Ø68.0 [Ø2.68]	Ø22.0 [Ø0.87]	Ø115.0 [Ø4.53]	Ø95.0 [Ø3.74]	8.0 [0.31]	Ø22.0 * [Ø0.87]	M8-1.25x17	Ø80.0 [Ø3.15]	M6-1.0x12	6.0 [0.24]	6.0 [0.24]
PGA090-05A5 ***PGA090-10A5***	165.0 [6.50]	130.0 [5.12]	46.0 [1.81]	7.0 [0.28]	Ø90.0 [Ø3.54]	Ø68.0 [Ø2.68]	Ø22.0 [Ø0.87]	Ø145.0 [Ø5.71]	Ø110.0 [Ø4.33]	8.0 [0.31]	Ø22.0 * [Ø0.87]	M8-1.25x17	Ø80.0 [Ø3.15]	M6-1.0x12	6.0 [0.24]	6.0 [0.24]
PGA090-15A3 ***PGA090-25A3***	175.0 [6.89]	80.0 [3.15]	46.0 [1.81]	7.0 [0.28]	Ø90.0 [Ø3.54]	Ø68.0 [Ø2.68]	Ø22.0 [Ø0.87]	Ø90.0 [Ø3.54]	Ø70.0 [Ø2.76]	6.0 [0.24]	Ø19.0 [Ø0.75]	M6-1.0x13	Ø80.0 [Ø3.15]	M6-1.0x12	6.0 [0.24]	6.0 [0.24]
PGA120-05A6 ***PGA120-10A6***	225.0 [8.86]	180.0 [7.09]	70.0 [2.76]	9.0 [0.35]	Ø120.0 [Ø4.72]	Ø90.0 [Ø3.54]	Ø32.0 [Ø1.26]	Ø200.0 [Ø7.87]	Ø114.0 [Ø4.49]	8.0 [0.31]	Ø35.0 * [Ø1.38]	M12-1.75x25	Ø108.0 [Ø4.25]	M8-1.25x16	10.0 [0.39]	8.0 [0.31]
PGA120-15A4 ***PGA120-25A4***	231.5 [9.11]	100.0 [3.94]	70.0 [2.76]	9.0 [0.35]	Ø120.0 [Ø4.72]	Ø90.0 [Ø3.54]	Ø32.0 [Ø1.26]	Ø115.0 [Ø4.53]	Ø95.0 [Ø3.74]	8.0 [0.31]	Ø22.0 * [Ø0.87]	M8-1.25x17	Ø108.0 [Ø4.25]	M8-1.25x16	10.0 [0.39]	8.0 [0.31]
PGA120-15A5 ***PGA120-25A5***	231.5 [9.11]	130.0 [5.12]	70.0 [2.76]	9.0 [0.35]	Ø120.0 [Ø4.72]	Ø90.0 [Ø3.54]	Ø32.0 [Ø1.26]	Ø145.0 [Ø5.71]	Ø110.0 [Ø4.33]	8.0 [0.31]	Ø22.0 * [Ø0.87]	M8-1.25x17	Ø108.0 [Ø4.25]	M8-1.25x16	10.0 [0.39]	8.0 [0.31]
PGA155-10A6	264.0 [10.39]	180.0 [7.09]	97.0 [3.82]	12.0 [0.47]	Ø155.0 [Ø6.10]	Ø120.0 [Ø4.72]	Ø40.0 [Ø1.57]	Ø200.0 [Ø7.87]	Ø114.0 [Ø4.49]	8.0 [0.31]	Ø35.0 * [Ø1.38]	M12-1.75x25	Ø140.0 [Ø5.51]	M10-1.50x28	12.0 [0.47]	8.0 [0.31]
PGA155-15A6 ***PGA155-25A6***	298.5 [11.75]	180.0 [7.09]	97.0 [3.82]	12.0 [0.47]	Ø155.0 [Ø6.10]	Ø120.0 [Ø4.72]	Ø40.0 [Ø1.57]	Ø200.0 [Ø7.87]	Ø114.0 [Ø4.49]	8.0 [0.31]	Ø35.0 * [Ø1.38]	M12-1.75x25	Ø140.0 [Ø5.51]	M10-1.50x28	12.0 [0.47]	8.0 [0.31]

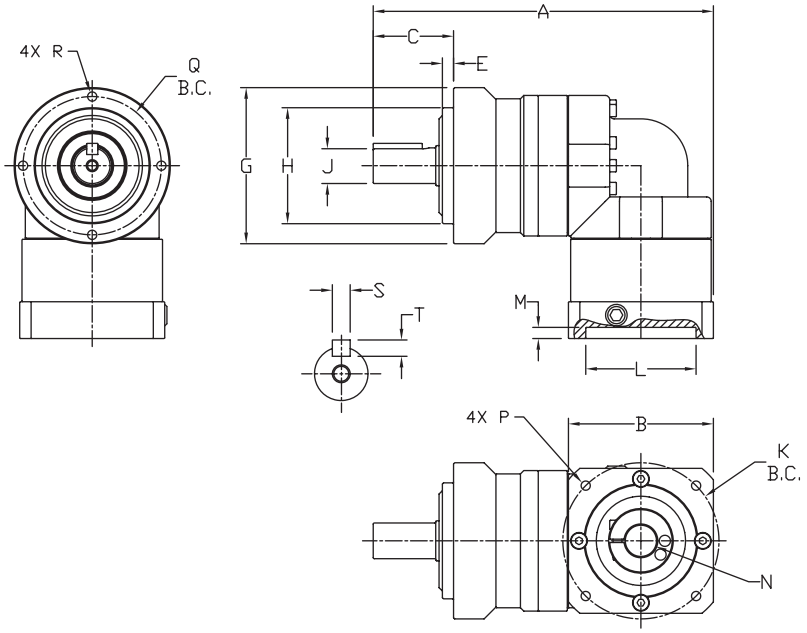
*** Dimension with supplied bushing**
NOTE: See our website: www.AutomationDirect.com for complete engineering drawings.

Precision Servo Gearboxes

Pricing & Specifications – Right-Angle Shaft PGB Series

SureGear® Precision Servo Gearboxes – Right-Angle Shaft PGB Series																		
Part Number	Price	Frame Size (mm)	Ratio	Reduction	Nominal Output Torque (N·m [lb·in])	Max. Acceleration Torque (N·m [lb·in])	Emergency Stop Torque (N·m [lb·in])	Backlash (arc-min)	Nominal Input Speed (rpm)	Max. Input Speed (rpm)	Allowable Radial Load (N [lb])	Allowable Thrust Load (N [lb])	Moment of Inertia (kg·cm2)	Efficiency (%)	Max. Housing Temperature	Approx Weight (kg [lb])	Environmental Rating	Fits SureServo Servo Motor (SV & SV2)
PGB070-05A1	$788.00	70	5:1	double	22 [195]	40 [354]	80 [708]	6	3000	6000	510 [115]	390 [88]	0.250	93	90 °C [194 °F]	1.9 [4.2]	IP55	SV(2)L-201(B)
PGB070-10A1	$788.00		10:1	double	16 [142]	32 [283]	65 [575]				640 [144]	530 [119]	0.230					
PGB070-15A1	$997.00		15:1	triple	16 [142]	32 [283]	65 [575]	9			740 [166]	630 [142]	0.073	88		1.7 [3.7]		
PGB070-25A1	$997.00		25:1	triple	24 [212]	45 [398]	90 [797]				870 [196]	790 [178]	0.071					
PGB070-05A2	$788.00		5:1	double	22 [195]	40 [354]	80 [708]	6			510 [115]	390 [88]	0.320	93		1.9 [4.2]		SV(2)L-202(B) SV(2)L-204(B)
PGB070-10A2	$788.00		10:1	double	16 [142]	32 [283]	65 [575]				640 [144]	530 [119]	0.300					
PGB070-15A2	$997.00		15:1	triple	16 [142]	32 [283]	65 [575]	9			740 [166]	630 [142]	0.118	88		1.7 [3.7]		SV(2)L-202(B)
PGB070-25A2	$997.00		25:1	triple	24 [212]	45 [398]	90 [797]				870 [196]	790 [178]	0.115					
PGB090-15A2	$1,217.00	90	15:1	triple	45 [398]	65 [575]	170 [1505]	9			1400 [314]	1900 [427]	0.410	88		4.3 [9.5]		SV(2)L-202(B) SV(2)L-204(B)
PGB090-25A2	$1,217.00		25:1	triple	65 [575]	110 [974]	220 [1947]				1600 [360]	2200 [495]	0.400					
PGB090-05A3	$932.00		5:1	double	65 [575]	90 [797]	220 [1947]	6			960 [216]	1200 [270]	2.130	93		4.9 [10.8]		SV(2)L-207(B)
PGB090-10A3	$932.00		10:1	double	45 [398]	65 [575]	170 [1505]				1200 [270]	1600 [360]	2.020					
PGB090-15A3	$1,217.00		15:1	triple	45 [398]	65 [575]	170 [1505]	9			1400 [314]	1900 [427]	0.600	88		4.3 [9.5]		
PGB090-25A3	$1,217.00		25:1	triple	65 [575]	110 [974]	220 [1947]				1600 [360]	2200 [495]	0.590					
PGB090-05A4	$932.00		5:1	double	65 [575]	90 [797]	220 [1947]	6			960 [216]	1200 [270]	4.260	93		4.9 [10.8]		SV(2)L-210(B)
PGB090-10A4	$932.00		10:1	double	45 [398]	65 [575]	170 [1505]				1200 [270]	1600 [360]	4.150					
PGB120-15A4	$1,512.00	120	15:1	triple	110 [974]	200 [1770]	450 [3983]	9			2300 [517]	3000 [674]	4.700	88		10 [22]		
PGB120-25A4	$1,512.00		25:1	triple	150 [1328]	300 [2655]	550 [4868]				2700 [607]	3700 [832]	4.640					
PGB120-05A5	$1,217.00		5:1	double	120 [1062]	240 [2124]	500 [4425]	6			1600 [360]	1900 [427]	6.610	93		10.2 [22.5]		SV(2) M-210(B)
PGB120-10A5	$1,217.00		10:1	double	110 [974]	200 [1770]	450 [3983]				2000 [450]	2500 [562]	6.050					
PGB120-15A5	$1,512.00		15:1	triple	110 [974]	200 [1770]	450 [3983]	9			2300 [517]	3000 [674]	4.700	88		10 [22]		
PGB120-25A5	$1,512.00		25:1	triple	150 [1328]	300 [2655]	550 [4868]				2700 [607]	3700 [832]	4.640					
PGB120-05A6	$1,217.00		5:1	double	120 [1062]	240 [2124]	500 [4425]	6			1600 [360]	1900 [427]	13.690	93		10.2 [22.5]		SV(2)M-220(B) SV(2)M-230(B)
PGB120-10A6	$1,217.00		10:1	double	110 [974]	200 [1770]	450 [3983]				2000 [450]	2500 [562]	13.120					
PGB155-15A6	$1,770.00	155	15:1	triple	200 [1770]	400 [3540]	750 [6638]	9	2000	4000	5400 [1214]	4900 [1102]	15.070	88		20.4 [45.0]		SV(2)M-220(B)
PGB155-25A6	$1,770.00		25:1	triple	300 [2655]	600 [5310]	1100 [9736]				6400 [1439]	6100 [1371]	14.820					
PGB155-05A6	$1,401.00		5:1	double	200 [1770]	400 [3540]	1100 [9736]	6			3800 [854]	3000 [674]	21.280	93		19.8 [43.7]		SV(2)M-220(B) SV(2)M-230(B)
PGB155-10A6	$1,401.00		10:1	double	200 [1770]	400 [3540]	750 [6638]				4700 [1057]	4100 [922]	19.030					

Dimensions – Right-Angle Shaft PGB Series



SureGear PGB Series Right-Angle Shaft Gearboxes Dimension Drawing

SureGear® Precision Servo Gearbox Dimensions – Right-Angle Shaft PGA Series (dimensions = mm [in])

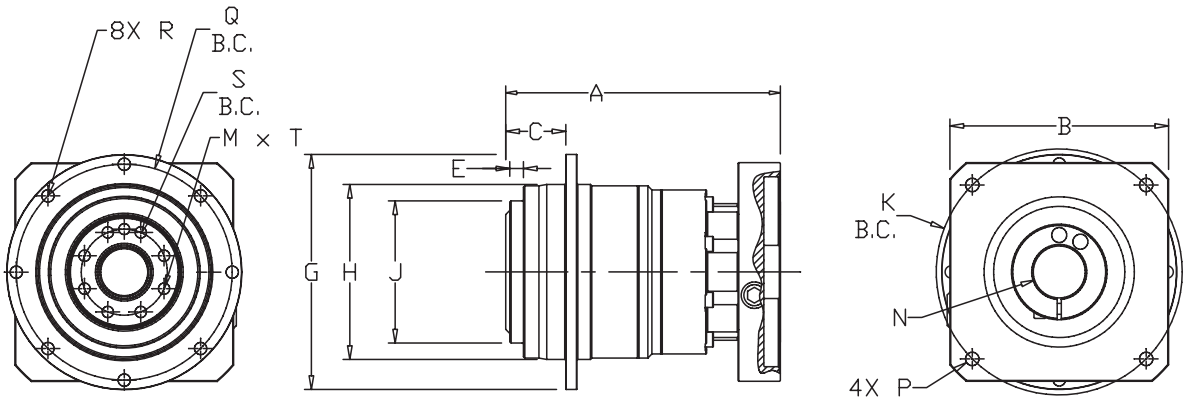
Part Number	A	B	C	E	G	H	J	K	L	M	N	P	Q	R	S	T
PGB070-05A1 PGB070-10A1	151.5 [5.96]	52.0 [2.05]	36.0 [1.42]	5.0 [0.20]	Ø70.0 [Ø2.76]	Ø52.0 [Ø2.05]	Ø16.0 [Ø0.63]	Ø46.0 [Ø1.81]	Ø30.0 [Ø1.18]	5.0 [0.20]	Ø8.0 [Ø0.31]	M4-0.7x9	Ø62.0 [Ø2.44]	M5-0.8x10	5.0 [0.20]	5.0 [0.20]
PGB070-05A2 PGB070-10A2		65.0 [2.56]						Ø70.0 [Ø2.76]	Ø50.0 [Ø1.97]		Ø14.0 [Ø0.55]	M5-0.8x11				
PGB070-15A1 PGB070-25A1	158.0 [6.22]	52.0 [2.05]						Ø46.0 [Ø1.81]	Ø30.0 [Ø1.18]		Ø8.0 [Ø0.31]	M4-0.7x9				
PGB070-15A2 PGB070-25A2	163.5 [6.44]	65.0 [2.56]						Ø70.0 [Ø2.76]	Ø50.0 [Ø1.97]		Ø14.0 [Ø0.55]	M5-0.8x11				
PGB090-15A2 PGB090-25A2	204.5 [8.05]		46.0 [1.81]	7.0 [0.28]	Ø90.0 [Ø3.54]	Ø68.0 [Ø2.68]	Ø22.0 [Ø0.87]						Ø80.0 [Ø3.15]	M6-1.0x12	6.0 [0.24]	6.0 [0.24]
PGB090-05A3 PGB090-10A3	205.5 [8.09]	80.0 [3.15]						Ø90.0 [Ø3.54]	Ø70.0 [Ø2.76]	6.0 [0.24]	Ø19.0 [Ø0.75]	M6-1.0x13				
PGB090-15A3 PGB090-25A3	210.5 [8.29]															
PGB090-05A4 PGB090-10A4	205.5 [8.09]	100.0 [3.94]						Ø115.0 [Ø4.53]	Ø95.0 [Ø3.74]							
PGB120-15A4 PGB120-25A4	272.0 [10.71]		70.0 [2.76]	9.0 [0.35]	Ø120.0 [Ø4.72]	Ø90.0 [Ø3.54]	Ø32.0 [Ø1.26]				Ø22.0 * [Ø0.87]	M8-1.25x17	Ø108.0 [Ø4.25]	M8-1.25x16	10.0 [0.39]	8.0 [0.31]
PGB120-05A5 PGB120-10A5	266.0 [10.47]	130.0 [5.12]						Ø145.0 [Ø5.71]	Ø110.0 [Ø4.33]	8.0 [0.31]						
PGB120-15A5 PGB120-25A5	272.0 [10.71]															
PGB120-05A6 PGB120-10A6	268.5 [10.57]	180.0 [7.09]						Ø200.0 [Ø7.87]	Ø114.0 [Ø4.50]		Ø35.0 * [Ø1.38]	M12-1.75x25				
PGB155-05A6 PGB155-10A6	341.0 [13.43]		97.0 [3.82]	12.0 [0.47]	Ø155.0 [Ø6.10]	Ø120.0 [Ø4.72]	Ø40.0 [Ø1.57]						Ø140.0 [Ø5.51]	M10-1.5x20	12.0 [0.47]	
PGB155-15A6 PGB155-25A6	364.0 [14.33]															

*** Dimension with supplied bushing**
NOTE: See our website: www.AutomationDirect.com for complete engineering drawings.

Pricing & Specifications – Hub Style In-Line PGD Series

SureGear® Precision Servo Gearboxes – Hub Style In-Line PGD Series																		
Part Number	Price	Frame Size (mm)	Ratio	Reduction	Nominal Output Torque (N·m [lb·in])	Max. Acceleration Torque (N·m [lb·in])	Emergency Stop Torque (N·m [lb·in])	Backlash (arc-min)	Nominal Input Speed (rpm)	Max. Input Speed (rpm)	Allowable Radial Load (N [lb])	Allowable Thrust Load (N [lb])	Moment of Inertia (kg·cm2)	Efficiency (%)	Max. Housing Temperature	Approx Weight (kg [lb])	Ingress Protection (IP) Rating	Fits SureServo Servo Motor
PGD047-05A1	$843.00	47	5:1	single	9 [80]	18 [159]	35 [310]	≤ 3	4000	8000	300 [67]	330 [74]	0.043	95	90 °C [194 °F]	0.7 [1.5]	IP54	SV(2)L-201(B)
PGD047-10A1	$843.00		10:1	single	6 [53]	12 [106]	30 [266]				370 [83]	450 [101]	0.032					
PGD047-25A1	$1,056.00		25:1	double	9 [80]	18 [159]	35 [310]	≤ 5			510 [115]	550 [124]	0.034	90		0.8 [1.8]		
PGD064-50A1	$1,277.00	64	50:1	double	27 [239]	50 [443]	100 [885]	≤ 3	3000	6000	850 [191]	750 [169]	0.049	90		1.6 [3.5]		SV(2)L-202(B) SV(2)L-204(B)
PGD064-05A2	$1,090.00		5:1	single	27 [239]	50 [443]	100 [885]				400 [90]	390 [88]	0.1	95		1.4 [3.1]		
PGD064-10A2	$1,090.00		10:1	single	18 [159]	35 [310]	80 [708]				500 [112]	530 [119]	0.062	95		1.4 [3.1]		
PGD064-25A2	$1,277.00		25:1	double	27 [239]	50 [443]	100 [885]				680 [153]	750 [169]	0.054	90		1.6 [3.5]		
PGD090-25A2	$1,464.00	90	25:1	double	75 [664]	125 [1106]	250 [2213]				1300 [292]	1400 [315]	0.130	90		4 [8.8]		
PGD090-50A2	$1,464.00		50:1	double	75 [664]	125 [1106]	250 [2213]				1700 [382]	1700 [382]	0.099	90		4 [8.8]		
PGD090-05A3	$1,277.00		5:1	single	75 [664]	125 [1106]	250 [2213]				780 [175]	680 [153]	0.580	95		3.6 [7.9]		SV(2)L-207(B)
PGD090-10A3	$1,277.00		10:1	single	50 [443]	80 [708]	200 [1770]				980 [220]	920 [207]	0.330	95		3.6 [7.9]		
PGD090-05A4	$1,277.00		5:1	single	75 [664]	125 [1106]	250 [2213]				780 [175]	680 [153]	0.580	95		3.6 [7.9]		SV(2)L-210(B)
PGD090-10A4	$1,277.00		10:1	single	50 [443]	80 [708]	200 [1770]				980 [220]	920 [207]	0.330	95		3.6 [7.9]		
PGD090-05A5	$1,277.00		5:1	single	75 [664]	125 [1106]	250 [2213]				780 [175]	680 [153]	0.580	95		3.6 [7.9]		SV(2)M-210(B)
PGD110-50A2	$1,868.00	110	50:1	double	180 [1593]	330 [2921]	625 [5532]				10000 [2248]	6800 [1529]	0.400	90		8.6 [19]		SV(2)L-202(B) SV(2)L-204(B)
PGD110-25A3	$1,868.00		25:1	double	180 [1593]	330 [2921]	625 [5532]				8200 [1843]	5500 [1236]	0.700	90		8.6 [19]		SV(2)L-207(B)
PGD110-50A3	$1,868.00		50:1	double	180 [1593]	330 [2921]	625 [5532]				10000 [2248]	6800 [1529]	0.400	90		8.6 [19]		
PGD110-25A4	$1,868.00		25:1	double	180 [1593]	330 [2921]	625 [5532]				8200 [1843]	5500 [1236]	0.700	90		8.6 [19]		SV(2)L-210(B)
PGD110-50A4	$1,868.00		50:1	double	180 [1593]	330 [2921]	625 [5532]				10000 [2248]	6800 [1529]	0.400	90		8.6 [19]		
PGD110-10A5	$1,588.00		10:1	single	120 [1062]	225 [1991]	500 [4425]				6200 [1394]	4200 [944]	1.100	95		7.8 [17.2]		SV(2)M-210(B)
PGD110-25A5	$1,868.00		25:1	double	180 [1593]	330 [2921]	625 [5532]				8200 [1843]	5500 [1236]	0.700	90		8.6 [19]		
PGD110-35A5	$1,868.00		35:1	double	180 [1593]	330 [2921]	625 [5532]				9000 [2023]	6100 [1371]	0.700	90		8.6 [19]		
PGD110-05A6	$1,588.00		5:1	single	180 [1593]	330 [2921]	625 [5532]				5000 [1124]	3400 [427]	2.300	95		7.8 [17.2]		SV(2)M-220(B) SV(2)M-230(B)
PGD110-10A6	$1,588.00		10:1	single	120 [1062]	225 [1991]	500 [4425]				6200 [1394]	4200 [944]	1.100	95		7.8 [17.2]		

Dimensions – Hub Style In-Line PGD Series



SureGear PGD Series Hub Style In-Line Gearboxes Dimension Drawing

SureGear® Precision Servo Gearbox Dimensions – Hub Style In-Line PGD Series (dimensions = mm [in])

	Part Number	A*	B*	C	E	G	H	J	K	M	N**	P	Q	R	S	T
1	PGD047-05A1 PGD047-10A1	66.5 [2.62]	42.0 [1.65]	19.5 [0.7677]	3.0 [0.1181]	Ø72.0 [Ø2.83]	Ø47.0 [Ø1.85]	Ø28.0 [Ø1.102]	Ø46.0 [Ø1.811]	4	Ø8.0 [Ø0.31]	M4- 0.7x9	Ø67.0 [Ø2.6378]	3.4 [0.13]	Ø20.0 [Ø0.7874]	M3- 0.5x6.5
2	PGD047-25A1															
2	PGD064-50A1	98.0 [3.86]	52.0 [2.05]			Ø86.0 [Ø3.385]	Ø64.0 [Ø2.52]	Ø40.0 [Ø1.575]		8	Ø8.0 [Ø0.31]		Ø79.0 [Ø3.11]	4.5 [0.18]	Ø31.5 [Ø1.24]	M5- 0.8x10
1	PGD064-05A2 PGD064-10A2	82.0 [3.228]	65.0 [2.56]								Ø14.0 [Ø0.55]	M5- 0.8x11				M5- 0.8x4
2	PGD064-25A2	103.0 [4.055]							Ø70.0 [Ø2.756]		Ø14.0 [Ø0.55]					M5- 0.8x10
2	PGD090-25A2 PGD090-50A2	122.0 [4.803]		30.0 [1.1811]	6.0 [0.236]	Ø118.0 [Ø4.65]	Ø90.0 [Ø3.54]	Ø63.0 [Ø2.48]		8	Ø14.0 [Ø0.55]		Ø109.0 [Ø4.30]	5.5 [0.22]	Ø50.0 [Ø1.9685]	M6- 1.0x12
1	PGD090-05A3 PGD090-10A3	110.0 [4.33]	80.0 [3.15]						Ø90.0 [Ø3.543]		Ø19.0 [Ø0.75]	M6- 1.0x13				
1	PGD090-05A4 PGD090-10A4	127.0 [5.0]	100.0 [3.94]						Ø115.0 ±0.2 [Ø4.528]		Ø28.0 [Ø1.102]	M8- 1.25x17				
1	PGD090-05A5		130.0 [5.12]						Ø145.0 ±0.2 [Ø5.709]							
2	PGD110-50A2	159.5 [6.28]	65.0 [2.56]	29.0 [1.142]		Ø145.0 [Ø5.70]	Ø110.0 [Ø4.33]	Ø80.0 [Ø3.15]	Ø70.0 [Ø2.756]	15	Ø14.0 [Ø0.55]	M5- 0.8x11	Ø135.0 [Ø5.315]		Ø63.0 [Ø2.48]	
2	PGD110-25A3 PGD110-50A3	169.5 [6.673]	80.0 [3.15]						Ø90.0 [Ø3.543]		Ø19.0 [Ø0.75]	M6- 1.0x13				
2	PGD110-25A4 PGD110-50A4	186.5 [7.3425]	100.0 [3.94]						Ø115.0 ±0.2 [Ø4.528]		Ø28.0 [Ø1.102]	M8- 1.25x17				
1	PGD110-10A5	159.0 [6.26]	130.0 [5.12]						Ø145.0 ±0.2 [Ø5.709]							
2	PGD110-25A5 PGD110-35A5	186.5 [7.3425]														
1	PGD110-05A6 PGD110-10A6	180.0 [7.087]	180.0 [7.087]						Ø200.0 ±0.2 [Ø7.874]		Ø38.0 [Ø1.45]	M12- 1.75x25				

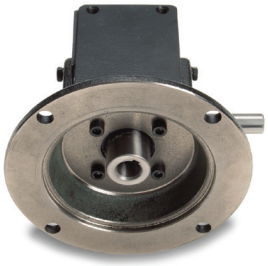
*** Length will vary depending on motor**
**** Bushing will be inserted to adapt to motor shaft**
NOTE: See our website: www.AutomationDirect.com for complete engineering drawings.

SureGear® Servo Gearbox Replacement Parts

SureGear® Precision Servo Gearboxes – Replacement Parts		
Part Number	***Price***	***Description***
PG050-KEY	$4.50	Output Shaft Key, replacement, 4 x 4 x 14 mm, for SureGear PGA050 series gearboxes.
PG070-KEY	$4.50	Output Shaft Key, replacement, 5 x 5 x 22 mm, for SureGear PGA070 and PGB070 series gearboxes.
PG090-KEY	$4.50	Output Shaft Key, replacement, 6 x 6 x 28 mm, for SureGear PGA090 and PGB090 series gearboxes.
PG120-KEY	$4.50	Output Shaft Key, replacement, 10 x 8 x 45 mm, for SureGear PGA120 and PGB120 series gearboxes.
PG155-KEY	$4.50	Output Shaft Key, replacement, 12 x 8 x 65 mm, for SureGear PGA155 and PGB155 series gearboxes.
PGA4-A5-BUSH	$22.50	Input Shaft Bushing, replacement, 28 x 22 x 30.5 mm, for all SureGear gearboxes using SV(2)L-210(B) and SV(2)M-210(B) SureServo motors.
PGA6-BUSH	$22.50	Input Shaft Bushing, replacement, 38 x 35 x 36 mm, for all SureGear gearboxes using SV(2)M-220(B) and SV(2)M-230(B) SureServo motors.

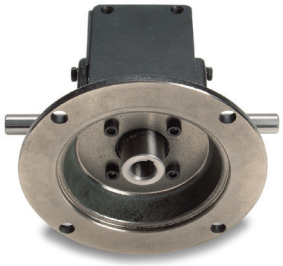
IronHorse® Cast-Iron Worm Gearboxes

Cast-Iron Model Overview



IronHorse Cast-Iron Right-Hand Shaft Worm Gearbox

IronHorse Cast-Iron Left-Hand Shaft Worm Gearbox



IronHorse Cast-Iron Dual Shaft Worm Gearbox

IronHorse Cast-Iron Hollow Bore Worm Gearbox

Gearbox Overview

Gearboxes, also known as enclosed gear drives or speed reducers, are mechanical drive components that can control a load at a reduced fixed ratio of the motor speed. The output torque is also increased by the same ratio, while the horsepower remains the same (less efficiency losses.) For example, a 10:1 ratio gearbox outputs approximately the same motor output horsepower, motor speed divided by 10, and motor torque multiplied by 10.

Worm gearboxes contain a worm (gear type) on the input shaft, and a mating gear on the output shaft. Worm gearboxes also change the drive direction by 90°.

IronHorse worm gearboxes are manufactured in an ISO9001 certified plant by one of the leading gearbox manufacturers in the world today. Only the highest quality materials are tested, certified, and used in the manufacturing process. Strict adherence to and compliance with the toughest international and U.S. testing standards and manufacturing procedures assure you the highest quality products.

As seen above, our cast-iron gearboxes are offered with right-hand, left-hand and dual (both right and left) output shafts, and with hollow-bore outputs (all the way through from one side to the other). We also offer optional gearbox mounting bases for ease of installation.

Features

- C flange input; dual shaft, right-hand shaft, left-hand shaft or hollow-bore output
- Cast iron one-piece housing
- 1045 carbon steel shaft
- AlBC3 (aluminum bronze casting) main gear; much harder than the typical phosphor bronze
- Shaft sleeves protect all shafts
- One-piece output shaft hub secures output shaft bearing
- Double bearing sets on both shaft ends
- Heavy duty bearings on the output shaft
- Interior channel guides oil to directly and constantly lube bearings
- All units filled with Mobil synthetic oil*
- Double-lipped embedded oil seals to prevent leakage
- Special anti-rust primer inside and outside the gearbox
- Special black natural dry paint
- Universally interchangeable compact design ensures easy OEM replacement
- Multiple mounting orientation options (see user manual for allowed mounting orientations)
- Radiused mounting holes
- Optional mounting plates available
- One year warranty

Applications

- Use with electric motors for reducing output speed, increasing torque, changing drive direction, or running two loads from one motor.
- Use for conveyors, packaging machines, rotary tables, etc.

NOTE: Units manufactured with first 4 serial numbers up to 2108 filled with Mobil SHC634 synthetic oil. Units manufactured with first 4 serial numbers from 2109 are filled with SHC632 synthetic oil.

IronHorse® Cast-Iron Worm Gearboxes

Specifications

IronHorse Cast-Iron Worm Gearbox Specifications

Part Number *	Price	Nominal Ratio	Actual Ratio	Output RPM @ 1750 RPM Input	Nominal Motor HP [1] @ 1800 RPM	NEMA Motor Frame	Output Type [2]	Center Distance [3] (in)	Overhung Load [4] (lb)	Thrust Load [5] (lb)	Efficiency (%)	Approx Weight (lb)	Maximum Ratings @ 1750 RPM Input *						Maximum Backlash (arc-minute)
													Mechanical [6]			Thermal [7]			
													Input Power (hp)	Output Power (hp)	Output Torque (lb-in)	Input Power (hp)	Output Power (hp)	Output Torque (lb-in)	
WG-175-005-D	$199.00	5:1	5.25:1	350	1.5	56C	D	1.75	650	550	93	23	2.83	2.62	499	2.28	2.11	402	20
WG-175-005-H	$245.00					56C	H					23							
WG-175-005-R	$199.00					56C	L					22							
WG-175-005-L	$198.00					56C	R					22							
WG-175-010-D	$199.00	10:1	10.33:1	175	1	56C	D				88	23	1.57	1.38	515	1.36	1.19	445	
WG-175-010-H	$245.00					56C	H					23							
WG-175-010-R	$199.00					56C	L					22							
WG-175-010-L	$198.00					56C	R					22							
WG-175-015-D	$199.00	15:1	14.5:1	117	0.75	56C	D				85	23	1.24	1.06	554	1.13	0.96	506	
WG-175-015-H	$245.00					56C	H					23							
WG-175-015-R	$199.00					56C	L					22							
WG-175-015-L	$198.00					56C	R					22							
WG-175-020-D	$199.00	20:1	19.5:1	88	0.75	56C	D				83	23	1.02	0.85	596	0.98	0.81	572	
WG-175-020-H	$245.00					56C	H					23							
WG-175-020-R	$199.00					56C	L					22							
WG-175-020-L	$198.00					56C	R					22							
WG-175-040-D	$199.00	40:1	40:1	44	0.33	56C	D				62	23	0.74	0.49	714	0.59	0.39	558	
WG-175-040-H	$260.00					56C	H					23							
WG-175-040-R	$199.00					56C	L					22							
WG-175-040-L	$198.00					56C	R					22							
WG-175-060-D	$199.00	60:1	60:1	29	0.25	56C	D				52	23	0.38	0.20	469	0.38	0.2	469	
WG-175-060-H	$260.00					56C	H					23							
WG-175-060-R	$199.00					56C	L					22							
WG-175-060-L	$198.00					56C	R					22							

1) Nominal Motor HP is the highest hp 1800 rpm motor to be used with the gearbox under conditions of 1.0 service factor. Gearbox input power capacity decreases as motor speed decreases and as service factor increases.
2) Output Type: D = Dual Shaft; H = Hollow Bore; R = Right-Hand Shaft; L = Left-Hand Shaft
3) The Center Distance is the distance between the centerlines of the input and output shafts.
4) Overhung Load ratings are for forces perpendicular to the output shaft and located at the shaft midpoint, such as from a gear, pulley, or sprocket with a belt or chain. Divide OHL ratings by the applicable OHL K factors shown separately in the Selection Factors tables. OHL ratings should also be divided by applicable service factors.
5) Thrust Load ratings are for forces along the axis of the output shaft, usually encountered in vertical-drive applications from agitators, mixers, fans, blowers, etc.
6) Maximum Mechanical Ratings are limits based on strength and durability of gearbox components; applicable when operating time is short and stopped time is greater than or equal to operating time. These ratings are applicable for 1.0 service factor loads, and may require modification depending upon characteristics of the applicable driven loads. Refer to the "Service Factors" table for more information.
7) Maximum Thermal Ratings are limits for gearbox continuous use without overheating.
* Maximum Input Speed is 2500 rpm.

IronHorse® Cast-Iron Worm Gearboxes

Specifications (continued)

IronHorse Cast-Iron Worm Gearbox Specifications

Part Number *	Price	Nominal Ratio	Actual Ratio	Output RPM @ 1750 RPM Input	Nominal Motor HP [1] @ 1800 RPM	NEMA Motor Frame	Output Type [2]	Center Distance [3] (in)	Overhung Load [4] (lb)	Thrust Load [5] (lb)	Efficiency (%)	Approx Weight (lb)	Maximum Ratings @ 1750 RPM Input *						Maximum Backlash (arc-minute)
													Mechanical [6]			Thermal [7]			
													Input Power (hp)	Output Power (hp)	Output Torque (lb-in)	Input Power (hp)	Output Power (hp)	Output Torque (lb-in)	
WG-206-005-D	$252.00	5:1	5.75:1	350	2	56C	D	2.06	700	750	92	28	3.62	3.33	685	2.57	2.36	486	17
WG-206-005-H	$314.00					56C	H					28							
WG-206-005-R	$252.00					56C	L					27							
WG-206-005-L	$250.00					56C	R					27							
WG-206-010-D	$252.00	10:1	10.33:1	175	1.5	56C	D				90	28	2.77	2.50	935	2.10	1.89	708	
WG-206-010-H	$314.00					56C	H					28							
WG-206-010-R	$252.00					56C	L					27							
WG-206-010-L	$250.00					56C	R					27							
WG-206-015-D	$252.00	15:1	15.5:1	117	1	56C	D				85	28	2.09	1.78	1002	1.40	1.20	673	
WG-206-015-H	$314.00					56C	H					28							
WG-206-015-R	$252.00					56C	L					27							
WG-206-015-L	$250.00					56C	R					27							
WG-206-020-D	$238.00	20:1	19.5:1	88	1	56C	D				82	28	1.57	1.29	914	1.17	0.96	681	
WG-206-020-H	$314.00					56C	H					28							
WG-206-020-R	$252.00					56C	L					27							
WG-206-020-L	$252.00					56C	R					27							
WG-206-040-D	$240.00	40:1	40:1	44	0.5	56C	D	2.06	700	750	71	28	1.09	0.77	1120	0.71	0.50	726	17
WG-206-040-H	$314.00					56C	H					28							
WG-206-040-R	$252.00					56C	L					27							
WG-206-040-L	$252.00					56C	R					27							
WG-206-060-D	$238.00	60:1	60:1	29	0.33	56C	D	2.06	700	750	58	28	0.60	0.35	750	0.48	0.28	606	
WG-206-060-H	$314.00					56C	H					28							
WG-206-060-R	$252.00					56C	L					27							
WG-206-060-L	$252.00					56C	R					27							

1) Nominal Motor HP is the highest hp 1800 rpm motor to be used with the gearbox under conditions of 1.0 service factor. Gearbox input power capacity decreases as motor speed decreases and as service factor increases.
2) Output Type: D = Dual Shaft; H = Hollow Bore; R = Right-Hand Shaft; L = Left-Hand Shaft
3) The Center Distance is the distance between the centerlines of the input and output shafts.
4) Overhung Load ratings are for forces perpendicular to the output shaft and located at the shaft midpoint, such as from a gear, pulley, or sprocket with a belt or chain. Divide OHL ratings by the applicable OHL K factors shown separately in the Selection Factors tables. OHL ratings should also be divided by applicable service factors.
5) Thrust Load ratings are for forces along the axis of the output shaft, usually encountered in vertical-drive applications from agitators, mixers, fans, blowers, etc.
6) Maximum Mechanical Ratings are limits based on strength and durability of gearbox components; applicable when operating time is short and stopped time is greater than or equal to operating time. These ratings are applicable for 1.0 service factor loads, and may require modification depending upon characteristics of the applicable driven loads. Refer to the "Service Factors" table for more information.
7) Maximum Thermal Ratings are limits for gearbox continuous use without overheating.
* Maximum Input Speed is 2500 rpm.

IronHorse® Cast-Iron Worm Gearboxes

Specifications (continued)

IronHorse Cast-Iron Worm Gearbox Specifications

Part Number *	Price	Nominal Ratio	Actual Ratio	Output RPM @ 1750 RPM Input	Nominal Motor HP [1] @ 1800 RPM	NEMA Motor Frame	Output Type [2]	Center Distance [3] (in)	Overhung Load [4] (lb)	Thrust Load [5] (lb)	Efficiency (%)	Approx Weight (lb)	Maximum Ratings @ 1750 RPM Input *						Maximum Backlash (arc-minute)
													Mechanical [6]			Thermal [7]			
													Input Power (hp)	Output Power (hp)	Output Torque (lb-in)	Input Power (hp)	Output Power (hp)	Output Torque (lb-in)	
WG-237-005-D	$286.00	5:1	5.25:1	350	3	56C	D	2.37	900	900	93	38	4.57	4.24	798	3.56	3.31	630	17
WG-237-005-H	$359.00					56C	H					36							
WG-237-005-R	$303.00					56C	L					37							
WG-237-005-L	$303.00					56C	R					37							
WG-237-010-D	$286.00	10:1	10.33:1	175	1.5	56C	D	2.37	900	900	89	38	3.47	3.09	1158	2.24	1.99	746	
WG-237-010-H	$359.00					56C	H					36							
WG-237-010-R	$303.00					56C	L					37							
WG-237-010-L	$300.00					56C	R					37							
WG-237-015-D	$286.00	15:1	15.5:1	117	1	56C	D	2.37	900	900	84	38	2.64	2.22	1249	1.55	1.30	732	
WG-237-015-H	$359.00					56C	H					36							
WG-237-015-R	$303.00					56C	L					37							
WG-237-015-L	$300.00					56C	R					37							
WG-237-020-D	$286.00	20:1	20:1	88	1	56C	D	2.37	900	900	82	38	2.06	1.69	1195	1.36	1.12	791	
WG-237-020-H	$359.00					56C	H					36							
WG-237-020-R	$303.00					56C	L					37							
WG-237-020-L	$300.00					56C	R					37							
WG-237-040-D	$286.00	40:1	40:1	44	0.5	56C	D	2.37	900	900	71	38	1.45	1.02	1483	0.83	0.58	845	
WG-237-040-H	$359.00					56C	H					36							
WG-237-040-R	$303.00					56C	L					37							
WG-237-040-L	$300.00					56C	R					37							
WG-237-060-D	$286.00	60:1	60:1	29	0.5	56C	D	2.37	900	900	61	38	0.86	0.53	1149	0.63	0.39	844	
WG-237-060-H	$359.00					56C	H					36							
WG-237-060-R	$303.00					56C	L					37							
WG-237-060-L	$300.00					56C	R					37							
WG-262-005-D	$306.00	5:1	5.25:1	350	3	182TC	D	2.62	1000	1000	93	57	5.24	4.86	924	4.32	4.00	761	17
WG-262-005-H	$442.00					182TC	H					58							
WG-262-005-R	$327.00					182TC	L					56							
WG-262-005-L	$322.00					182TC	R					56							
WG-262-010-D	$306.00	10:1	10.67:1	175	2	182TC	D	2.62	1000	1000	90	57	4.17	3.74	1445	3.06	2.75	1061	
WG-262-010-H	$442.00					182TC	H					57							
WG-262-010-R	$327.00					182TC	L					56							
WG-262-010-L	$322.00					182TC	R					56							

1) Nominal Motor HP is the highest hp 1800 rpm motor to be used with the gearbox under conditions of 1.0 service factor. Gearbox input power capacity decreases as motor speed decreases and as service factor increases.
2) Output Type: D = Dual Shaft; H = Hollow Bore; R = Right-Hand Shaft; L = Left-Hand Shaft
3) The Center Distance is the distance between the centerlines of the input and output shafts.
4) Overhung Load ratings are for forces perpendicular to the output shaft and located at the shaft midpoint, such as from a gear, pulley, or sprocket with a belt or chain. Divide OHL ratings by the applicable OHL K factors shown separately in the Selection Factors tables. OHL ratings should also be divided by applicable service factors.
5) Thrust Load ratings are for forces along the axis of the output shaft, usually encountered in vertical-drive applications from agitators, mixers, fans, blowers, etc.
6) Maximum Mechanical Ratings are limits based on strength and durability of gearbox components; applicable when operating time is short and stopped time is greater than or equal to operating time. These ratings are applicable for 1.0 service factor loads, and may require modification depending upon characteristics of the applicable driven loads. Refer to the "Service Factors" table for more information.
7) Maximum Thermal Ratings are limits for gearbox continuous use without overheating.
* Maximum Input Speed is 2500 rpm.

IronHorse® Cast-Iron Worm Gearboxes

Specifications (continued)

IronHorse Cast-Iron Worm Gearbox Specifications

Part Number *	Price	Nominal Ratio	Actual Ratio	Output RPM @ 1750 RPM Input	Nominal Motor HP [1] @ 1800 RPM	NEMA Motor Frame	Output Type [2]	Center Distance [3] (in)	Overhung Load [4] (lb)	Thrust Load [5] (lb)	Efficiency (%)	Approx Weight (lb)	Maximum Ratings @ 1750 RPM Input *						Maximum Backlash (arc-minute)
													Mechanical [6]			Thermal [7]			
													Input Power (hp)	Output Power (hp)	Output Torque (lb-in)	Input Power (hp)	Output Power (hp)	Output Torque (lb-in)	
WG-262-015-D	$306.00	15:1	15.5:1	117	2	56C	D	2.62	1000	1000	87	50	3.22	2.81	1577	2.47	2.16	1212	17
WG-262-015-H	$442.00					56C	H					50							
WG-262-015-R	$327.00					56C	L					49							
WG-262-015-L	$322.00					56C	R					49							
WG-262-020-D	$306.00	20:1	19.5:1	88	1.5	56C	D	2.62	1000	1000	83	50	2.67	2.21	1563	1.84	1.53	1078	
WG-262-020-H	$442.00					56C	H					50							
WG-262-020-R	$327.00					56C	L					49							
WG-262-020-L	$322.00					56C	R					49							
WG-262-040-D	$306.00	40:1	40:1	44	0.75	56C	D	2.62	1000	1000	72	50	1.85	1.32	1919	1.11	0.80	1153	
WG-262-040-H	$442.00					56C	H					50							
WG-262-040-R	$327.00					56C	L					49							
WG-262-040-L	$322.00					56C	R					49							
WG-262-060-D	$306.00	60:1	60:1	29	0.75	56C	D	2.62	1000	1000	66	50	1.16	0.77	1670	0.94	0.62	1346	
WG-262-060-H	$442.00					56C	H					51							
WG-262-060-R	$327.00					56C	L					49							
WG-262-060-L	$322.00					56C	R					49							

1) Nominal Motor HP is the highest hp 1800 rpm motor to be used with the gearbox under conditions of 1.0 service factor. Gearbox input power capacity decreases as motor speed decreases and as service factor increases.
2) Output Type: D = Dual Shaft; H = Hollow Bore; R = Right-Hand Shaft; L = Left-Hand Shaft
3) The Center Distance is the distance between the centerlines of the input and output shafts.
4) Overhung Load ratings are for forces perpendicular to the output shaft and located at the shaft midpoint, such as from a gear, pulley, or sprocket with a belt or chain. Divide OHL ratings by the applicable OHL K factors shown separately in the Selection Factors tables. OHL ratings should also be divided by applicable service factors.
5) Thrust Load ratings are for forces along the axis of the output shaft, usually encountered in vertical-drive applications from agitators, mixers, fans, blowers, etc.
6) Maximum Mechanical Ratings are limits based on strength and durability of gearbox components; applicable when operating time is short and stopped time is greater than or equal to operating time. These ratings are applicable for 1.0 service factor loads, and may require modification depending upon characteristics of the applicable driven loads. Refer to the "Service Factors" table for more information.
7) Maximum Thermal Ratings are limits for gearbox continuous use without overheating.
* Maximum Input Speed is 2500 rpm.

IronHorse® Cast-Iron Worm Gearboxes

Specifications (continued)

IronHorse Cast-Iron Worm Gearbox Specifications

Part Number *	Price	Nominal Ratio	Actual Ratio	Output RPM @ 1750 RPM Input	Nominal Motor HP [1] @ 1800 RPM	NEMA Motor Frame	Output Type [2]	Center Distance [3] (in)	Overhung Load [4] (lb)	Thrust Load [5] (lb)	Efficiency (%)	Approx Weight (lb)	Maximum Ratings @ 1750 RPM Input *						Maximum Backlash (arc-minute)
													Mechanical [6]			Thermal [7]			
													Input Power (hp)	Output Power (hp)	Output Torque (lb-in)	Input Power (hp)	Output Power (hp)	Output Torque (lb-in)	
WG-325-010-DC	$483.00	10:1	10.33:1	169	5	182/4TC	D	3.25	1200	1100	90	91	7.19	6.46	2419	4.63	4.16	1558	15
WG-325-010-HC	$633.00					182/4TC	H					90							
WG-325-010-LC	$483.00					182/4TC	L					90							
WG-325-010-RC	$483.00					182/4TC	R					90							
WG-325-015-DC	$483.00	15:1	15.5:1	113	5	182/4TC	D	3.25	1200	1100	85	91	5.45	4.65	2611	3.19	2.72	1527	
WG-325-015-HC	$633.00					182/4TC	H					90							
WG-325-015-LC	$483.00					182/4TC	L					90							
WG-325-015-RC	$483.00					182/4TC	R					90							
WG-325-020-DC	$483.00	20:1	19.5:1	90	3	182TC	D	3.25	1200	1100	86	91	4.74	4.07	2875	3.31	2.85	2011	
WG-325-020-HC	$633.00					182TC	H					90							
WG-325-020-LC	$483.00					182TC	L					90							
WG-325-020-RC	$483.00					182TC	R					90							
WG-325-030-DA	$483.00	30:1	30:1	58	2	56C	D	3.25	1200	1100	77	88	3.66	2.80	3045	2.00	1.53	1661	
WG-325-030-DB	$483.00			90		145TC	D					88							
WG-325-030-HA	$633.00			58		56C	H					87							
WG-325-030-HB	$633.00					145TC	H					87							
WG-325-030-LA	$483.00					56C	L					87							
WG-325-030-LB	$483.00					145TC	L					87							
WG-325-030-LC	$483.00				3	182TC	L					87							
WG-325-030-RA	$483.00				2	56C	R					87							
WG-325-030-RB	$483.00					145TC	R					87							
WG-325-030-RC	$483.00				3	182TC	R					87							

1) Nominal Motor HP is the highest hp 1800 rpm motor to be used with the gearbox under conditions of 1.0 service factor. Gearbox input power capacity decreases as motor speed decreases and as service factor increases.
2) Output Type: D = Dual Shaft; H = Hollow Bore; R = Right-Hand Shaft; L = Left-Hand Shaft
3) The Center Distance is the distance between the centerlines of the input and output shafts.
4) Overhung Load ratings are for forces perpendicular to the output shaft and located at the shaft midpoint, such as from a gear, pulley, or sprocket with a belt or chain. Divide OHL ratings by the applicable OHL K factors shown separately in the Selection Factors tables. OHL ratings should also be divided by applicable service factors.
5) Thrust Load ratings are for forces along the axis of the output shaft, usually encountered in vertical-drive applications from agitators, mixers, fans, blowers, etc.
6) Maximum Mechanical Ratings are limits based on strength and durability of gearbox components; applicable when operating time is short and stopped time is greater than or equal to operating time. These ratings are applicable for 1.0 service factor loads, and may require modification depending upon characteristics of the applicable driven loads. Refer to the "Service Factors" table for more information.
7) Maximum Thermal Ratings are limits for gearbox continuous use without overheating.
* Maximum Input Speed is 2500 rpm.

IronHorse® Cast-Iron Worm Gearboxes

Specifications (continued)

IronHorse Cast-Iron Worm Gearbox Specifications

Part Number *	Price	Nominal Ratio	Actual Ratio	Output RPM @ 1750 RPM Input	Nominal Motor HP [1] @ 1800 RPM	NEMA Motor Frame	Output Type [2]	Center Distance [3] (in)	Overhung Load [4] (lb)	Thrust Load [5] (lb)	Efficiency (%)	Approx Weight (lb)	Maximum Ratings @ 1750 RPM Input *						Maximum Backlash (arc-minute)
													Mechanical [6]			Thermal [7]			
													Input Power (hp)	Output Power (hp)	Output Torque (lb-in)	Input Power (hp)	Output Power (hp)	Output Torque (lb-in)	
WG-325-040-DA	$483.00	40:1	40:1	44	2	56C	D	3.25	1200	1100	76	88	3.35	2.55	3692	1.96	1.49	2156	15
WG-325-040-DB	$483.00					145TC	D					88							
WG-325-040-HA	$633.00					56C	H					87							
WG-325-040-HB	$633.00					145TC	H					87							
WG-325-040-LA	$483.00					56C	L					87							
WG-325-040-LB	$483.00					145TC	L					87							
WG-325-040-RA	$483.00					56C	R					87							
WG-325-040-RB	$483.00					145TC	R					87							
WG-325-060-DA	$483.00	60:1	60:1	29	2	56C	D	3.25	1200	1100	71	88	2.03	1.44	3127	1.61	1.14	2476	
WG-325-060-DB	$483.00					145TC	D					88							
WG-325-060-HA	$633.00					56C	H					87							
WG-325-060-HB	$633.00					145TC	H					87							
WG-325-060-LA	$483.00					56C	L					87							
WG-325-060-LB	$483.00					145TC	L					87							
WG-325-060-RA	$483.00					56C	R					87							
WG-325-060-RB	$483.00					145TC	R					87							

1) Nominal Motor HP is the highest hp 1800 rpm motor to be used with the gearbox under conditions of 1.0 service factor. Gearbox input power capacity decreases as motor speed decreases and as service factor increases.
2) Output Type: D = Dual Shaft; H = Hollow Bore; R = Right-Hand Shaft; L = Left-Hand Shaft
3) The Center Distance is the distance between the centerlines of the input and output shafts.
4) Overhung Load ratings are for forces perpendicular to the output shaft and located at the shaft midpoint, such as from a gear, pulley, or sprocket with a belt or chain. Divide OHL ratings by the applicable OHL K factors shown separately in the Selection Factors tables. OHL ratings should also be divided by applicable service factors.
5) Thrust Load ratings are for forces along the axis of the output shaft, usually encountered in vertical-drive applications from agitators, mixers, fans, blowers, etc.
6) Maximum Mechanical Ratings are limits based on strength and durability of gearbox components; applicable when operating time is short and stopped time is greater than or equal to operating time. These ratings are applicable for 1.0 service factor loads, and may require modification depending upon characteristics of the applicable driven loads. Refer to the "Service Factors" table for more information.
7) Maximum Thermal Ratings are limits for gearbox continuous use without overheating.
* Maximum Input Speed is 2500 rpm.

Gearbox Selection Factors

Overhung Load K Factors for Various Drive Types

Chain & Sprocket	1.00
Gear	1.25
V-belt	1.50
Flat Belt	2.50
Variable Pitch Belt	3.50

Divide gearbox OHL ratings by the applicable OHL K factors.

Service Factors for Selecting Gearboxes (when used with electric motors)

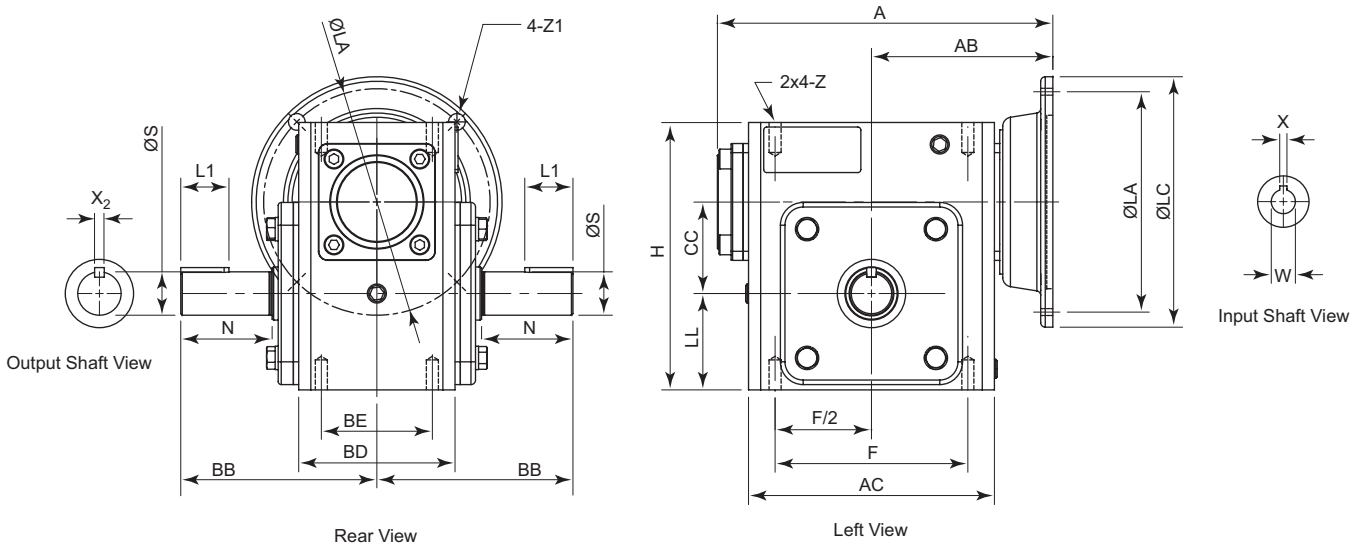
Service Continuity (per day)	Load Characteristics			
	Uniform	Moderate Shock*	Heavy Shock*	Extreme Shock*
Occasional 1/2 hour	1.00	1.00	1.00	1.25
Less than 3 hours	1.00	1.00	1.25	1.50
3-10 hours	1.00	1.25	1.50	1.75
More than 10 hours	1.25	1.50	1.75	2.00

* Shock results from sudden increases in the torque demand of the load, such as: sudden stopping, restarting, and/or reversing; significantly heavy loads dropped onto a moving conveyor; impact loads such as punch press operations.

Depending upon the load characteristics, divide the gearbox HP, Overhung Load, and Maximum Mechanical Capacity ratings by the applicable service factor.

IronHorse® Cast-Iron Worm Gearboxes

Gearbox Dimensions – Cast-Iron Solid-Shaft Output Gearboxes

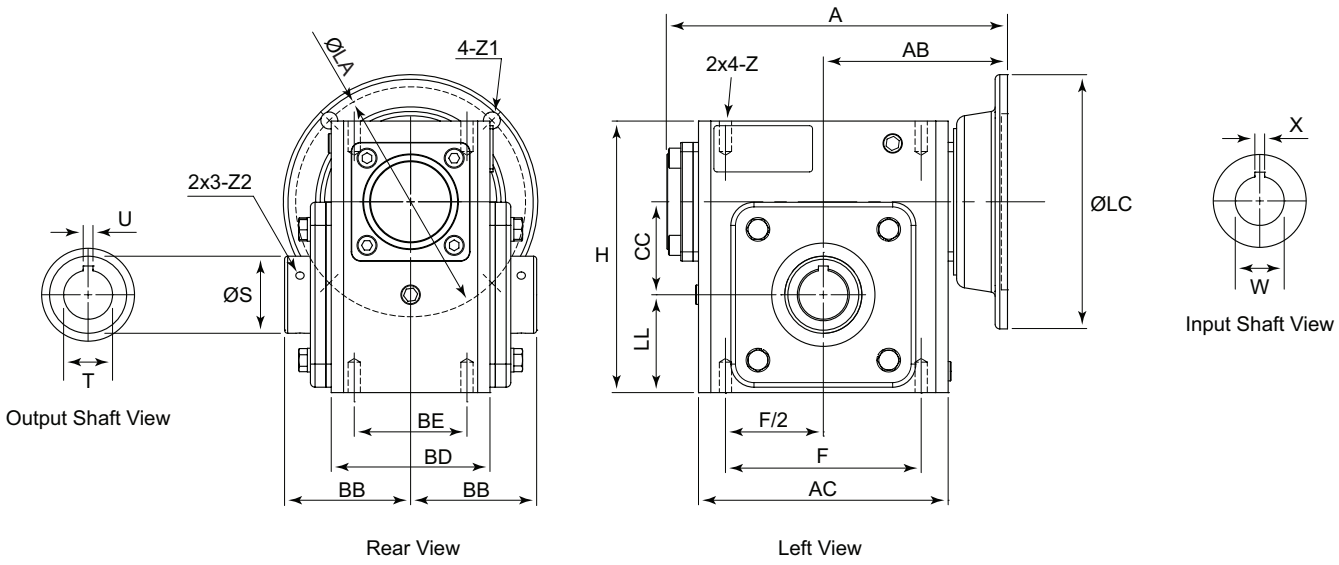


Dimensions (inches) – IronHorse Cast-Iron Worm Gearboxes – Solid-Shaft Outputs																					
Part Number	*Frame*	*A*	*AB*	*AC*	*BB*	*BD*	*BE*	*CC*	*F*	*H*	*LL*	*Z (UNC)*	*Flange*			*Input Shaft*		*Output Shaft*			
													LA	*LC*	*Z1*	*W*	*X*	*L1*	*N*	*S*	X_2
WG-175-xxx-D/L/R	56C	7.29	4.035	5.06	4.311	3.56	2.75	1.75	4.188	5.75	2.062	5/16-18	5.875	6.496	0.433	5/8	3/16	1	1.781	7/8	3/16
WG-206-xxx-D/L/R		7.95	4.37	5.75	4.69	3.82	2.88	2.062	5	6.38	2.281	3/8-16						1.25	2.09	1	1/4
WG-237-xxx-D/L/R		8.71	4.705	6.38	5.087	4.06	2.88	2.375	5	6.94	2.5							1.25	2.37	1-1/8	
WG-262-005-D/L/R	182TC	10.57	6.24	7.17	5.63	4.69	3.375	2.625	6.375	8	2.938		7.25	9	0.551	1-1/8	1/4	2	2.626		
WG-262-010-D/L/R																					
WG-262-015-D/L/R	56C	9.41	5.059										5.875	6.496	0.433	5/8	3/16				
WG-262-020-D/L/R																					
WG-262-040-D/L/R																					
WG-262-060-D/L/R																					
WG-325-010-xC	182/4TC	12.60	7.24	9.02	7.06	5.75	4.00	3.25	7.50	9.38	3.50	7/16-14	7.25	9.00	0.55	1-1/8	1/4	2.44	3.25	1-3/8	5/16
WG-325-015-xC																					
WG-325-020-xC	182TC																				
WG-325-030-xA	56C	11.42	6.06										5.875	6.50	0.41	5/8	3/16				
WG-325-030-xB	145TC															7/8					
WG-325-030-xC	182TC	12.60	7.24										7.25	9.00	0.55	1-1/8	1/4				
WG-325-040-xA	56C	11.42	6.06										5.875	6.50	0.41	5/8	3/16				
WG-325-040-xB	145TC															7/8					
WG-325-060-xA	56C															5/8					
WG-325-060-xB	145TC															7/8					

Dual-shaft output gearboxes have BB, L1, N, S, X_2 dimensions on both sides.
Left-hand shaft gearboxes have output shafts only on the left side, as viewed looking into the input shaft (dimensions BB, L1, N, S, X_2).
Right-hand shaft gearboxes have output shafts only on the right side, as viewed looking into the input shaft (dimensions BB, L1, N, S, X_2).
See our website: www.AutomationDirect.com for complete engineering drawings.

IronHorse® Cast-Iron Worm Gearboxes

Gearbox Dimensions – Cast-Iron Hollow-Bore Output Gearboxes



Dimensions (inches) – IronHorse Cast-Iron Worm Gearboxes – Hollow-Bore Outputs																					
Part Number	*Frame*	*A*	*AB*	*AC*	*BB*	*BD*	*BE*	*CC*	*F*	*H*	*LL*	*Z (UNC)*	*Flange*			*Input Shaft*		*Output Bore*			
													LA	*LC*	*Z1*	*W*	*X*	*S*	*T*	*U*	*Z2 (UNF)*
WG-175-xxx-H	56C	7.28	4.035	5.059	3.091	3.563	2.750	1.75	4.188	5.75	2.062	3/8-16	5.875	6.496	0.433	5/8	3/16	1.575	1.0	1/4	#10-32
WG-206-xxx-H		7.95	4.370	5.748	3.219	3.819	2.880	2.062	5.000	6.375	2.281							1.772	1.125		1/4-28
WG-237-xxx-H		8.68	4.705	6.378	3.220	4.055	2.880	2.375	5.000	6.937	2.500							1.969	1.250		
WG-262-005-H	182TC	10.59	6.240	7.165	3.500	4.685	3.375	2.625	6.375	8.000	2.938		7.25	9.000	0.551	1-1/8	1/4	2.362	1.437	3/8	
WG-262-010-H																					
WG-262-015-H	56C	9.41	5.059										5.875	6.496	0.433	5/8	3/16				
WG-262-020-H																					
WG-262-040-H																					
WG-262-060-H																					
WG-325-010-HC	182/4TC	12.60	7.24	9.02	4.38	5.75	4.00	3.25	7.50	9.38	3.50	7/16-14	7.25	9.00	0.55	1.125	1/4	2.76	1.938	1/2	5/16-24
WG-325-015-HC																					
WG-325-020-HC	182TC																				
WG-325-030-HA	56C	11.42	6.06										5.875	6.50	0.41	0.625	3/16				
WG-325-030-HB	145TC															0.875					
WG-325-040-HA	56C															0.625					
WG-325-040-HB	145TC															0.875					
WG-325-060-HA	56C															0.625					
WG-325-060-HB	145TC															0.875					

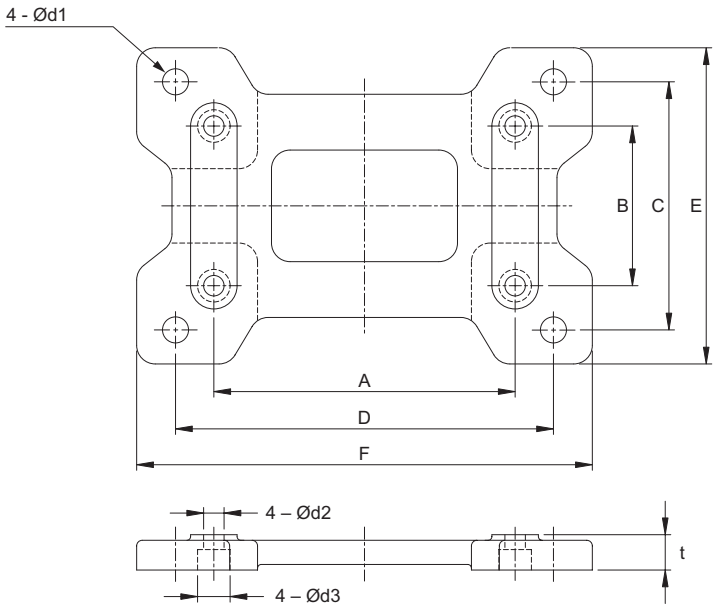
See our website: www.AutomationDirect.com for complete engineering drawings.

IronHorse® Cast-Iron Worm Gearboxes

Accessories – Mounting Base

IronHorse Worm Gearbox Mounting Base

Mounting Base Dimensions



IronHorse Cast-Iron Worm Gearbox Mounting Bases													
Part Number	Price	Fits Gearbox Numbers	Approx Weight (lb)	Dimensions (in)									
				A	B	C	D	E	F	t	d1	d2	d3
WG-175-BASE	$19.00	WG-175-xxx-x	4.0	4.19	2.76	4.50	5.75	5.69	7.00	0.69	0.43	0.35	0.55
WG-206-BASE	$23.00	WG-206-xxx-x	4.8	5.00	2.88	4.69	6.38	5.91	7.76	0.72	0.47	0.43	0.69
WG-237-BASE	$26.00	WG-237-xxx-x	6.2	5.00	2.88	4.88	7.06	6.22	8.50	0.75	0.47	0.43	0.69
WG-262-BASE	$31.00	WG-262-xxx-x	7.5	6.38	3.38	5.25	8.00	6.69	9.65	0.75	0.55	0.43	0.69
WG-325-BASE	$44.00	WG-325-xxx-xx	12	7.50	4.00	6.13	9.50	7.66	11.19	0.88	0.50	0.47	0.71

See our website: www.AutomationDirect.com for complete engineering drawings.

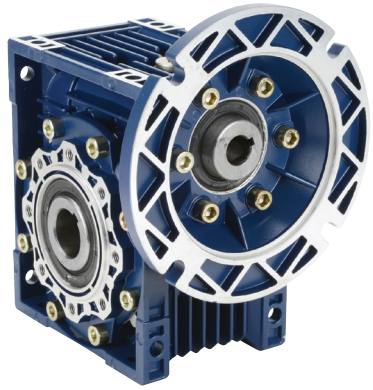
Cast-Iron Worm Gearbox Cross Reference

IronHorse Cast-Iron Worm Gearbox Cross Reference *										
AutomationDirect IronHorse™	WG-175-xxx-		WG-206-xxx-		WG-237-xxx-		WG-262-xxx-		WG-325-xxx-	
	D/L/R	H	D/L/R	H	D/L/R	H	D/L/R	H	D/L/R	H
Alling Lander	17UF	17YF	20UF	20YF	23UF	23YF	26UF	26YF	32UF	32YF
Baldor	F918	HF918	F921	HF921	F924	HF924	F926	HF926	F932	HF932
Boston	F718	HF718	F721	HF721	F724	HF724	F726	HF726	F732	HF732
Browning-Raider	Q175	QH175	Q206	QH206	Q237	QH237	Q262	QH262	Q325	QH325
Dodge-Tigear	Q175	–	Q200	–	–	–	Q262	–	–	–
Falk-Omnibox	1175WBM	1175WBQM	1206WBM	1206WBQM	1238WBM	1238WBQM	1262WBM	1262WBQM	1325WBM	1325WBQM
Grove (new)	BMQ218	HMQ218	BMQ220	HMQ220	BMQ224	HMQ224	BMQ226	HMQ226	BMQ232	HMQ232
Grove (old)	BMQ1175	HMQ1175	BMQ1206	HMQ1206	BWQ1238	HMQ1238	BMQ1262	HMQ1262	BMQ1325	HMQ1325
Leeson	BMQ618	HMQ618	BMQ621	HMQ621	BMQ624	HMQ624	BMQ626	HMQ626	BMQ632	HMQ632
Morse Raider	718F	718SF	721F	721SF	724F	724SF	726F	726SF	732F	732SF
Ohio Gear	BMQ2175	SM2175MQ	BMQ2206	SM2206MQ	BMQ2238	SM2238MQ	BMQ2262	SM2262MQ	BMQ2325	SM2325MQ

*** IronHorse Series Gear Drives are designed to be functionally interchangeable with these and many other manufacturer's drives. This chart is intended to be a guide only. Customers should compare the appropriate manufacturer's specifications for exact details regarding ratings and dimensions.**

IronHorse® Aluminum Worm Gearboxes

Aluminum Model Overview



IronHorse Aluminum Hollow Bore Worm Gearbox

IronHorse Aluminum Worm Gearbox Accessories

Gearbox Overview

Gearboxes, also known as enclosed gear drives or speed reducers, are mechanical drive components that can control a load at a reduced fixed ratio of the motor speed. The output torque is also increased by the same ratio, while the horsepower remains the same (less efficiency losses.) For example, a 10:1 ratio gearbox outputs approximately the same motor output horsepower, motor speed divided by 10, and motor torque multiplied by 10.

Worm gearboxes contain a worm (gear type) on the input shaft, and a mating gear on the output shaft. Worm gearboxes also change the drive direction by 90°.

IronHorse worm gearboxes are manufactured in an ISO9001 certified plant by one of the leading gearbox manufacturers in the world today. Only the highest quality materials are tested, certified, and used in the manufacturing process. Strict
adherence to and compliance with the toughest international and U.S. testing standards and manufacturing procedures assure you the highest quality products.

Aluminum gearboxes feature hollow-bore outputs (hollow all the way through from one side to the other). These gearboxes also utilize C-face mounting interfaces for trouble-free connections to C-face motors. We also offer optional single and double output shafts, output flanges, torque arms, and output covers.

Features

- 10:1 to 100:1 ratios
- Box sizes 30 to 75 mm
- Aluminum alloy housing for lightweight design
- Hardened worm shaft for increased durability
- Two bearings on input and output shafts
- NEMA motor input flanges
- All units filled with Mobil synthetic oil*
- No vent plug or breather needed; maintenance-free reducer
- Double lip oil seals prevent leakage
- Multiple mounting holes for all angle mounts
- Epoxy paint applied to inside and outside of reducer to protect against corrosion
- Hollow output bores with available plug-in output shafts
- Multiple mounting orientation options (see user manual for allowed mounting orientations)
- Single and Double Output Shaft material: S45C
- Single and Double Output Shaft Hardness: HBS220~260

Applications

- Use with electric motors for reducing output speed, increasing torque, changing drive direction, or running two loads from one motor.
- Use for conveyors, packaging machines, rotary tables, etc.

NOTE: Units manufactured with first 4 serial numbers up to 2108 filled with Mobil SHC634 synthetic oil. Units manufactured with first 4 serial numbers from 2109 are filled with SHC632 synthetic oil.

IronHorse® Aluminum Worm Gearboxes

Specifications

IronHorse Aluminum Worm Gearbox Specifications – 30, 40, 50, & 63 mm Frames																
Part Number	Price	Nominal / Actual Ratio	Output RPM @ 1750 RPM Input	Nominal Motor HP [1] @1800 rpm	NEMA Motor Frame	Output Type [2]	Center Distance [3] (mm)	Overhung Load [4] (lb)	Output Shaft Thrust Load (lb)	Efficiency (%)	Approx Weight (lb)	Maximum Ratings @ 1750 RPM Input Mechanical [5]			Maximum Input Speed (rpm)	Maximum Backlash (arc-minute)
												Input Power (hp)	Output Power (hp)	Output Torque (lb-in)		
WGA-30M-010-H1	$118.00	10:1	175	0.5	56C	H	30	142	31	80	3	0.54	0.43	150	2,000	28.8
WGA-30M-020-H1	$118.00	20:1	88	0.25				179	40	72		0.30	0.22	150		28.2
WGA-30M-030-H1	$118.00	30:1	58	0.25				205	45	62		0.25	0.16	177		28.8
WGA-30M-040-H1	$118.00	40:1	44	0.2				225	50	55		0.19	0.10	150		28.2
WGA-30M-060-H1	$118.00	60:1	29	0.12				259	54	46		0.12	0.06	142		25.8
WGA-40M-010-H1	$148.00	10:1	175	1	56C		40	279	60	83	5	1.15	0.95	354		24.0
WGA-40M-020-H1	$148.00	20:1	88	0.5				350	76	78		0.61	0.48	345		
WGA-40M-030-H1	$148.00	30:1	58	0.5				403	87	68		0.53	0.36	389		
WGA-40M-040-H1	$148.00	40:1	44	0.33				441	96	65		0.39	0.25	363		
WGA-40M-060-H1	$148.00	60:1	29	0.25				507	110	56		0.25	0.14	319		21.6
WGA-40M-080-H1	$148.00	80:1	22	0.12				556	121	50		0.19	0.10	283		
WGA-40M-100-H1	$148.00	100:1	17.5	0.12				595	130	47		0.15	0.07	257		
WGA-50M-010-H1	$203.00	10:1	175	2	56C		50	406	83	84	8	2.06	1.73	628		19.2
WGA-50M-020-H1	$203.00	20:1	88	1				510	104	78		1.13	0.88	646		17.4
WGA-50M-030-H1	$203.00	30:1	58	0.75				586	120	70		0.95	0.67	734		19.2
WGA-50M-040-H1	$203.00	40:1	44	0.75				643	132	65		0.70	0.46	664		17.4
WGA-50M-060-H1	$203.00	60:1	29	0.33				739	151	57		0.46	0.26	602		16.2
WGA-50M-080-H1	$203.00	80:1	22	0.33				810	166	50		0.38	0.19	566		
WGA-50M-100-H1	$203.00	100:1	17.5	0.25				866	179	46		0.28	0.13	487		
WGA-63M-010-H1	$261.00	10:1	175	3	56C		63	510	108	86	13	3.67	3.16	1141		17.4
WGA-63M-010-H2	$261.00	10:1	175	3	145TC			510	108	86		3.67	3.16	1141		
WGA-63M-020-H1	$261.00	20:1	88	2	56C			641	137	80		2.04	1.63	1186		16.2
WGA-63M-020-H2	$261.00	20:1	88	2	145TC			641	137	80		2.04	1.63	1186		
WGA-63M-030-H1	$261.00	30:1	58	1.5	56C			736	156	73		1.76	1.28	1416		17.4
WGA-63M-040-H1	$261.00	40:1	44	1				807	172	70		1.26	0.88	1274		16.2
WGA-63M-060-H1	$261.00	60:1	29	0.75				928	197	59		0.86	0.51	1141		13.8
WGA-63M-080-H1	$261.00	80:1	22	0.5				1017	217	53		0.67	0.36	1071		
WGA-63M-100-H1	$261.00	100:1	18	0.5				1088	234	48		0.57	0.27	1035		

1) Nominal Motor HP is the highest HP 1800 rpm motor to be used with the gearbox under conditions of 1.0 service factor. Gearbox input power capacity decreases as motor speed decreases and as service factor increases.
2) Output Type: H = Hollow Bore.
3) The Center Distance is the distance between the centerlines of the input and output shafts/bores; serves as the gearbox frame size.
4) Overhung Load ratings are for forces perpendicular to the output shaft and located at the shaft midpoint, such as from a gear, pulley, or sprocket with a belt or chain. Divide OHL ratings by the applicable OHL K factors shown separately in the Selection Factors tables. OHL ratings should also be divided by applicable service factors.
5) Maximum Mechanical Ratings are limits based on strength and durability of gearbox components; applicable when operating time is short and stopped time is greater than or equal to operating time. These ratings are applicable for 1.0 service factor loads, and may require modification depending upon characteristics of the applicable driven loads. Refer to the "Service Factors" table for more information.

IronHorse® Aluminum Worm Gearboxes

Specifications (continued)

IronHorse Aluminum Worm Gearbox Specifications – 75 mm Frames

Part Number	Price	Nominal / Actual Ratio	Output RPM @ 1750 RPM Input	Nominal Motor HP [1] @1800 rpm	NEMA Motor Frame	Output Type [2]	Center Distance [3] (mm)	Overhung Load [4] (lb)	Output Shaft Thrust Load (lb)	Efficiency (%)	Approx Weight (lb)	Maximum Ratings @ 1750 RPM Input			Maximum Input Speed (rpm)	Maximum Backlash (arc-minute)
												Mechanical [5]				
												Input Power (hp)	Output Power (hp)	Output Torque (lb·in)		
WGA-75M-010-H1	$380.00	10:1	175	5	56C	H	75	604	128	86	19	5.44	4.68	1717	2,000	16.2
WGA-75M-010-H2	$380.00	10:1	175	5	145TC			604	128	86		5.44	4.68	1717		
WGA-75M-010-H3	$380.00	10:1	175	5	182/4TC			604	128	86		5.44	4.68	1717		
WGA-75M-020-H1	$380.00	20:1	88	3	56C			759	161	79		3.14	2.48	1849		14.4
WGA-75M-020-H2	$380.00	20:1	88	3	145TC			759	161	79		3.14	2.48	1849		
WGA-75M-030-H1	$380.00	30:1	58	2	56C			873	185	72		2.48	1.79	2026		16.2
WGA-75M-040-H1	$380.00	40:1	44	1.5				957	203	68		1.88	1.28	1947		14.4
WGA-75M-060-H1	$380.00	60:1	29	1				1099	232	62		1.26	0.78	1770		12.6
WGA-75M-080-H1	$380.00	80:1	22	0.75				1205	256	58		0.97	0.56	1672		
WGA-75M-100-H1	$380.00	100:1	18	0.75				1289	276	52		0.80	0.42	1593		

1) Nominal Motor HP is the highest HP 1800 rpm motor to be used with the gearbox under conditions of 1.0 service factor. Gearbox input power capacity decreases as motor speed decreases and as service factor increases.
2) Output Type: H = Hollow Bore.
3) The Center Distance is the distance between the centerlines of the input and output shafts/bores; serves as the gearbox frame size.
4) Overhung Load ratings are for forces perpendicular to the output shaft and located at the shaft midpoint, such as from a gear, pulley, or sprocket with a belt or chain. Divide OHL ratings by the applicable OHL K factors shown separately in the Selection Factors tables. OHL ratings should also be divided by applicable service factors.
5) Maximum Mechanical Ratings are limits based on strength and durability of gearbox components; applicable when operating time is short and stopped time is greater than or equal to operating time. These ratings are applicable for 1.0 service factor loads, and may require modification depending upon characteristics of the applicable driven loads. Refer to the "Service Factors" table for more information.

Gearbox Selection Factors

Overhung Load K Factors for Various Drive Types

Chain & Sprocket	1.00
Gear	1.25
V-belt	1.50
Flat Belt	2.50
Variable Pitch Belt	3.50

Divide gearbox OHL ratings by the applicable OHL K factors.

Service Factors for Selecting Gearboxes (when used with electric motors)

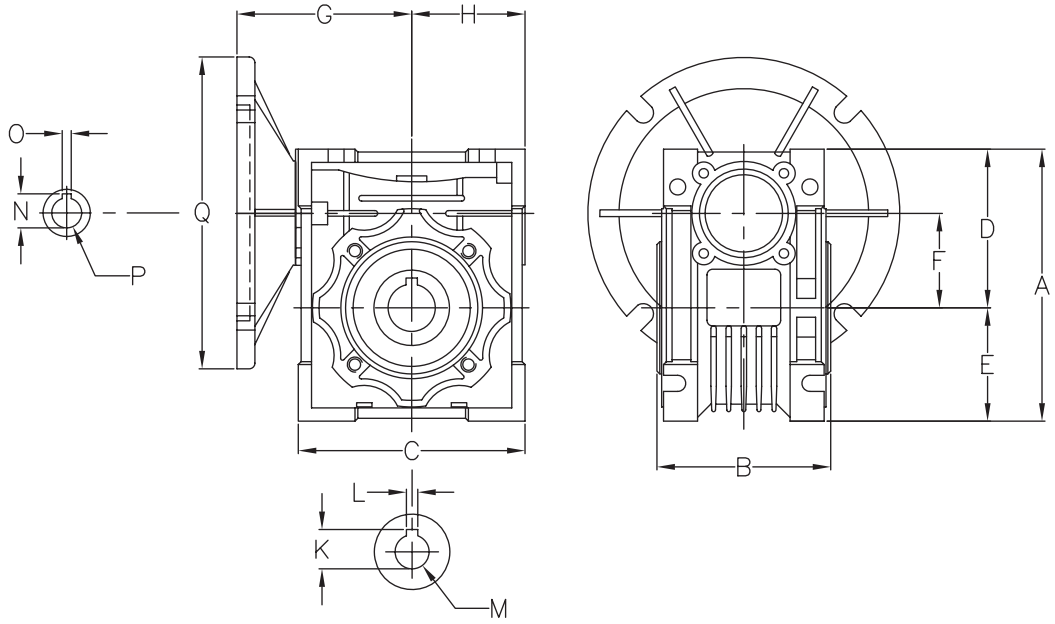
Service Continuity (per day)	Load Characteristics			
	Uniform	Moderate Shock*	Heavy Shock*	Extreme Shock*
Occasional 1/2 hour	1.00	1.00	1.00	1.25
Less than 3 hours	1.00	1.00	1.25	1.50
3-10 hours	1.00	1.25	1.50	1.75
More than 10 hours	1.25	1.50	1.75	2.00

* Shock results from sudden increases in the torque demand of the load, such as: sudden stopping, restarting, and/or reversing; significantly heavy loads dropped onto a moving conveyor; impact loads such as punch press operations.

Depending upon the load characteristics, divide the gearbox HP, Overhung Load, and Maximum Mechanical Capacity ratings by the applicable service factor.

IronHorse® Aluminum Worm Gearboxes

Specifications (continued)

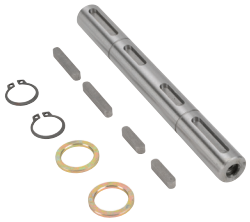


Dimensions (inches) – IronHorse Aluminum Worm Gearboxes																
Part Number	NEMA Motor Face	A	B	C	D	E	F	G	H	Output Bore			Input Shaft			ØQ
										K	L	ØM	N	O	ØP	
WGA-30M-xxx-H1	56C	3.82	2.48	3.15	2.24	1.57	1.18	3.19	1.57	0.720	0.187	0.625	0.73	0.19	0.625	6.50
WGA-40M-xxx-H1		4.78	3.07	3.94	2.81	1.97	1.57	3.18	1.97	0.840	0.187	0.750	0.71	0.19	0.625	6.50
WGA-50M-xxx-H1		5.67	3.62	4.72	3.31	2.36	1.97	3.58	2.36	1.110	0.250	1.000	0.71	0.19	0.625	6.50
WGA-63M-xxx-H1		6.87	4.42	5.69	4.00	2.87	2.48	4.06	2.84	1.250	0.250	1.125	0.71	0.19	0.625	6.50
WGA-63M-xxx-H2	145TC	6.87	4.42	5.69	4.00	2.87	2.48	4.06	2.84	1.250	0.250	1.125	0.97	0.19	0.875	6.50
WGA-75M-xxx-H1	56C	8.07	4.72	6.77	4.69	3.39	2.95	4.68	3.39	1.375	0.250	1.250	0.71	0.19	0.625	6.50
WGA-75M-xxx-H2	145TC	8.07	4.72	6.77	4.69	3.39	2.95	4.68	3.39	1.375	0.250	1.250	1.24	0.25	1.125	6.50
WGA-75M-xxx-H3	182/4TC	8.07	4.72	6.77	4.69	3.39	2.95	4.68	3.39	1.375	0.250	1.250	1.24	0.25	1.125	8.97

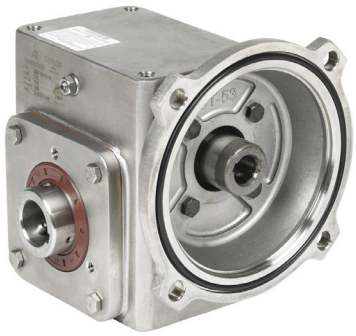
See our website: www.AutomationDirect.com for complete engineering drawings.

IronHorse® Aluminum Worm Gearboxes

Accessories

IronHorse Aluminum Worm Gearbox Accessories			
Part Number	***Price***	***Description***	***Typical Photo***
WGA-30M-ACC1	$11.00	Output flange, for aluminum WGA-30M series gearboxes. Includes (4) mounting screws.	
WGA-40M-ACC1	$12.00	Output flange, for aluminum WGA-40M series gearboxes. Includes (4) mounting screws.	
WGA-50M-ACC1	$13.00	Output flange, for aluminum WGA-50M series gearboxes. Includes (4) mounting screws.	
WGA-63M-ACC1	$17.00	Output flange, for aluminum WGA-63M series gearboxes. Includes (8) mounting screws.	
WGA-75M-ACC1	$26.00	Output flange, for aluminum WGA-75M series gearboxes. Includes (8) mounting screws.	
WGA-30M-ACC2	$14.00	Torque arm, for aluminum WGA-30M series gearboxes. Includes (4) mounting screws.	
WGA-40M-ACC2	$16.00	Torque arm, for aluminum WGA-40M series gearboxes. Includes (4) mounting screws.	
WGA-50M-ACC2	$17.00	Torque arm, for aluminum WGA-50M series gearboxes. Includes (4) mounting screws.	
WGA-63M-ACC2	$27.00	Torque arm, for aluminum WGA-63M series gearboxes. Includes (8) mounting screws.	
WGA-75M-ACC2	$46.00	Torque arm, for aluminum WGA-75M series gearboxes. Includes (8) mounting screws.	
WGA-30M-ACC3	$14.00	Single output shaft, Ø0.625 in, for aluminum WGA-30M series gearboxes. Includes (3) keys, (1) spacer, and (1) retaining ring.	
WGA-40M-ACC3	$16.00	Single output shaft, Ø0.75 in, for aluminum WGA-40M series gearboxes. Includes (3) keys, (1) spacer, and (1) retaining ring.	
WGA-50M-ACC3	$19.00	Single output shaft, Ø1.0 in, for aluminum WGA-50M series gearboxes. Includes (3) keys, (1) spacer, and (1) retaining ring.	
WGA-63M-ACC3	$25.00	Single output shaft, Ø1.125 in, for aluminum WGA-63M series gearboxes. Includes (3) keys, (1) spacer, and (1) retaining ring.	
WGA-75M-ACC3	$33.00	Single output shaft, Ø1.25 in, for aluminum WGA-75M series gearboxes. Includes (3) keys, (1) spacer, and (1) retaining ring.	
WGA-30M-ACC4	$19.00	Double output shaft, Ø0.625 in, for aluminum WGA-30M series gearboxes. Includes (4) keys, (2) spacers, and (2) retaining rings.	
WGA-40M-ACC4	$22.00	Double output shaft, Ø0.75 in, for aluminum WGA-40M series gearboxes. Includes (4) keys, (2) spacers, and (2) retaining rings.	
WGA-50M-ACC4	$25.00	Double output shaft, Ø1.0 in, for aluminum WGA-50M series gearboxes. Includes (4) keys, (2) spacers, and (2) retaining rings.	
WGA-63M-ACC4	$34.00	Double output shaft, Ø1.125 in, for aluminum WGA-63M series gearboxes. Includes (4) keys, (2) spacers, and (2) retaining rings.	
WGA-75M-ACC4	$42.00	Double output shaft, Ø1.25 in, for aluminum WGA-75M series gearboxes. Includes (4) keys, (2) spacers, and (2) retaining rings.	
WGA-30M-ACC5	$6.00	Output cover, for aluminum WGA-30M series gearboxes. Includes (4) mounting screws.	
WGA-40M-ACC5	$6.00	Output cover, for aluminum WGA-40M series gearboxes. Includes (4) mounting screws.	
WGA-50M-ACC5	$11.00	Output cover, for aluminum WGA-50M series gearboxes. Includes (4) mounting screws.	
WGA-63M-ACC5	$11.00	Output cover, for aluminum WGA-63M series gearboxes. Includes (4) mounting screws.	
WGA-75M-ACC5	$11.00	Output cover, for aluminum WGA-75M series gearboxes. Includes (4) mounting screws.	

IronHorse® Stainless Steel Worm Gearboxes



IronHorse 304 Stainless Steel Hollow Bore Worm Gearbox

Features

- Available ratios – 5:1 to 60:1
- Available housing sizes – 1 ¾" to 2 ⅝" (center distance)
- BEAG (formerly BISSC) certified (Bakery Equipment Assessment Group)
- IP69K rated
- Housing, covers, & flange – 304 stainless steel
- External surfaces – polished smooth
- Nameplate – laser etched
- Breather vent – sealed internal bladder functions as a breather vent
- Input flange – includes O-ring to prevent moisture intrusion
- Input quill – 15CrMo4 with carburizing heat treatment
- Worm wheel – CuSn12Ni2 bronze alloy with high efficiency tooth profile
- Output seals – double lipped, VITON
- Top mounting holes – removable plastic plugs installed
- Side mounting holes – removable silicone plugs installed
- Lubrication – prefilled* with Mobil CIBUS 460 H1 food grade lubricant
- Performance – equivalent to other major brands
- Includes – 1 O-Ring and 2 stainless steel keys
- Warranty – 1 year

*NOTE: Prefilled for mounting position 'A'. Other mounting positions may require addition or subtraction of oil. Please refer to the User Manual for proper oil volume for each mounting position.

Gearbox Overview

Gearboxes, also known as enclosed gear drives or speed reducers, are mechanical drive components that can control a load at a reduced fixed ratio of the motor speed. The output torque is also increased by the same ratio, while the horsepower remains the same (less efficiency losses.) For example, a 10:1 ratio gearbox outputs approximately the same motor output horsepower, motor speed divided by 10, and motor torque multiplied by 10.

Worm gearboxes contain a worm (gear type) on the input shaft, and a mating gear on the output shaft. Worm gearboxes also change the drive direction by 90°.

IronHorse worm gearboxes are manufactured in an ISO9001 certified plant by one of the leading gearbox manufacturers in the world today. Only the highest quality materials are tested, certified, and used in the manufacturing process. Strict adherence to and compliance with the toughest international and U.S. testing standards and manufacturing procedures assure you the highest quality products.

The IronHorse® Stainless Steel (WGSS) series of heavy duty, right angle worm gear reducers offer exceptional value for applications where food-grade or corrosion resistant equipment is required. These BEAG (formerly BISSC) Certified reducers offer IP69K Protection for close-range high pressure, high temperature spray downs. We also offer optional gearbox accessories.

Applications

- Use with electric motors for reducing output speed, increasing torque, changing drive direction, or running two loads from one motor.
- Use for conveyors, packaging machines, rotary tables, etc.

Dual Output Shaft Accessories
WGSS-175-DS

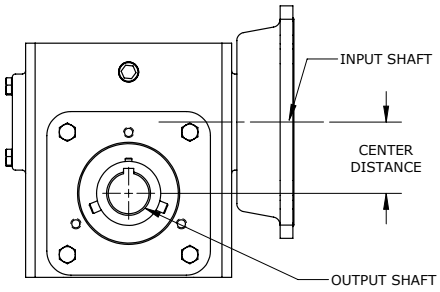
Single Output Shaft Accessories
WGSS-175-S

Output Cover Accessories
WGSS-175-OC

Output Flange Accessories
WGSS-175-OF

Output Bore Accessories
WGSS-175-158-OB

IronHorse® Stainless Steel Worm Gearboxes



IronHorse Stainless Steel Worm Gearbox Specifications

Part Number	Price	Nominal Ratio	Actual Ratio	Output RPM @ 1750 RPM Input	Nominal Motor HP [1] @ 1800 RPM	NEMA Motor Frame	Center Distance (in)	Overhung Load [2] (lb)	Thrust Load [3] (lb)	Efficiency (%)	Approx Weight (lb)	Maximum Ratings @ 1750 RPM Input						Maximum Backlash (arc-minute)	Drawing Links
												Mechanical [4]			Thermal [5]				
												Input Power (hp)	Output Power (hp)	Output Torque (lb·in)	Input Power (hp)	Output Power (hp)	Output Torque (lb·in)		
WGSS-175-005-HA	$956.00	5:1	5.25:1	350	2.36	56C	1 3/4	650	550	93.2	16	2.36	2.2	416	1.99	1.85	350	20	PDF
WGSS-175-010-HA	$893.00	10:1	10:1	175	1.52					90.5		1.52	1.38	495	1.43	1.3	467		PDF
WGSS-175-015-HA	$893.00	15:1	15:1	116	1.09					85.9		1.09	0.94	506	0.96	0.83	448		PDF
WGSS-175-020-HA	$893.00	20:1	20.5:1	87	0.85					84		0.85	0.71	527	0.85	0.71	514		PDF
WGSS-175-030-HA	$893.00	30:1	30:1	58	0.65					75.8		0.65	0.49	532	0.56	0.43	460		PDF
WGSS-175-040-HA	$893.00	40:1	40:1	44	0.57					72.9		0.57	0.42	599	0.5	0.37	527		PDF
WGSS-175-050-HA	$893.00	50:1	50:1	35	0.44					71.7		0.44	0.32	568	0.44	0.32	568		PDF
WGSS-175-060-HA	$893.00	60:1	60:1	29	0.31					68.3		0.31	0.21	457	0.31	0.21	457		PDF
WGSS-206-005-HA	$978.00	5:1	5.25:1	350	3.62		2 1/16	700	750	93.5	22	3.62	3.38	640	3.04	2.84	538	17	PDF
WGSS-206-010-HA	$978.00	10:1	10:1	175	2.47					89.8		2.47	2.22	799	1.94	1.74	627		PDF
WGSS-206-015-HA	$978.00	15:1	15:1	116	1.8					87.4		1.8	1.57	850	1.57	1.37	741		PDF
WGSS-206-020-HA	$978.00	20:1	20.5:1	87	1.48					83		1.48	1.23	907	1.16	0.97	713		PDF
WGSS-206-030-HA	$978.00	30:1	30:1	58	0.95					78.1		0.95	0.74	802	0.9	0.71	762		PDF
WGSS-206-040-HA	$978.00	40:1	40:1	44	0.76					70.7		0.76	0.54	774	0.67	0.48	687		PDF
WGSS-206-050-HA	$978.00	50:1	50:1	35	0.6					71.4		0.6	0.43	771	0.6	0.43	771		PDF
WGSS-206-060-HA	$978.00	60:1	60:1	29	0.52					69.2		0.52	0.36	777	0.52	0.36	777		PDF
WGSS-237-005-HA	$1,275.00	5:1	5.25:1	350	4.32		2 3/8	900	900	93.9	28	4.32	4.06	767	3.91	3.67	693		PDF
WGSS-237-010-HA	$1,190.00	10:1	10:1	175	3.23					90.7		3.23	2.93	1055	2.56	2.32	837		PDF
WGSS-237-015-HA	$1,190.00	15:1	15:1	116	2.36					86.9		2.36	2.05	1108	1.82	1.58	854		PDF
WGSS-237-020-HA	$1,190.00	20:1	20.5:1	87	2.01					83.8		2.01	1.68	1243	1.47	1.23	910		PDF
WGSS-237-030-HA	$1,190.00	30:1	30:1	58	1.33					76.9		1.33	1.02	1105	1.03	0.79	857		PDF
WGSS-237-040-HA	$1,190.00	40:1	40:1	44	1.07					75		1.07	0.8	1156	0.95	0.71	1029		PDF
WGSS-237-050-HA	$1,190.00	50:1	50:1	35	0.87					70.9		0.87	0.62	1111	0.82	0.58	1045		PDF
WGSS-237-060-HA	$1,190.00	60:1	60:1	29	0.71					65.7		0.71	0.47	1008	0.69	0.46	986		PDF

1. Nominal Motor HP is the highest hp 1800 rpm motor to be used with the gearbox under conditions of 1.0 service factor. Gearbox input power capacity decreases as motor speed decreases and as service factor increases.
2. Overhung Load (OHL) ratings are for forces perpendicular to the output shaft and located at the shaft midpoint, such as from a gear, pulley, or sprocket with a belt or chain. Divide OHL ratings by the applicable OHL K factors shown separately in the Selection Factors tables. OHL ratings should also be divided by applicable service factors.
3. Thrust Load ratings are for forces along the axis of the output shaft, usually encountered in vertical-drive applications from agitators, mixers, fans, blowers, etc.
4. Maximum Mechanical Ratings are limits based on strength and durability of gearbox components; applicable when operating time is short and stopped time is greater than or equal to operating time. These ratings are applicable for 1.0 service factor loads, and may require modification depending upon characteristics of the applicable driven loads. Refer to the "Service Factors" table for more information.
5. Maximum Thermal Ratings are limits for gearbox continuous use without overheating.

IronHorse® Stainless Steel Worm Gearboxes

IronHorse Stainless Steel Worm Gearbox Specifications

Part Number	Price	Nominal Ratio	Actual Ratio	Output RPM @ 1750 RPM Input	Nominal Motor HP [1] @ 1800 RPM	NEMA Motor Frame	Center Distance (in)	Overhung Load [2] (lb)	Thrust Load [3] (lb)	Efficiency (%)	Approx Weight (lb)	Maximum Ratings @ 1750 RPM Input						Maximum Backlash (arc-minute)	Drawing Links
												Mechanical [4]			Thermal [5]				
												Input Power (hp)	Output Power (hp)	Output Torque (lb·in)	Input Power (hp)	Output Power (hp)	Output Torque (lb·in)		
WGSS-262-005-HB	$1,658.00	5:1	5.25:1	350	5.24	145TC	2 5/8	1000	1000	94.2	39	5.24	4.94	933	5.17	4.87	920	17	PDF
WGSS-262-010-HB	$1,551.00	10:1	10:1	175	3.96					91.2		3.96	3.61	1301	3.41	3.11	1119		PDF
WGSS-262-015-HB	$1,551.00	15:1	15:1	116	2.96					88.5		2.96	2.62	1415	2.61	2.31	1246		PDF
WGSS-262-020-HA	$1,551.00	20:1	20.5:1	87	2.36	56C				84.5		2.36	1.99	1472	1.93	1.63	1206		PDF
WGSS-262-020-HB	$1,551.00					145TC													PDF
WGSS-262-030-HA	$1,551.00	30:1	30:1	58	1.68	56C				79.7		1.68	1.34	1446	1.48	1.18	1271		PDF
WGSS-262-030-HB	$1,551.00					145TC													PDF
WGSS-262-040-HA	$1,551.00	40:1	40:1	44	1.33	56C				75.9		1.33	1.01	1454	1.24	0.94	1360		PDF
WGSS-262-050-HA	$1,551.00	50:1	50:1	35	1.08					73.2		1.08	0.79	1423	1.08	0.79	1423		PDF
WGSS-262-060-HA	$1,551.00	60:1	60:1	29	0.89					66.5		0.89	0.59	1279	0.89	0.59	1279		PDF

1. Nominal Motor HP is the highest hp 1800 rpm motor to be used with the gearbox under conditions of 1.0 service factor. Gearbox input power capacity decreases as motor speed decreases and as service factor increases.
2. Overhung Load (OHL) ratings are for forces perpendicular to the output shaft and located at the shaft midpoint, such as from a gear, pulley, or sprocket with a belt or chain. Divide OHL ratings by the applicable OHL K factors shown separately in the Selection Factors tables. OHL ratings should also be divided by applicable service factors.
3. Thrust Load ratings are for forces along the axis of the output shaft, usually encountered in vertical-drive applications from agitators, mixers, fans, blowers, etc.
4. Maximum Mechanical Ratings are limits based on strength and durability of gearbox components; applicable when operating time is short and stopped time is greater than or equal to operating time. These ratings are applicable for 1.0 service factor loads, and may require modification depending upon characteristics of the applicable driven loads. Refer to the "Service Factors" table for more information.
5. Maximum Thermal Ratings are limits for gearbox continuous use without overheating.

Gearbox Selection Factors

Overhung Load K Factors for Various Drive Types

Chain & Sprocket	1.00
Gear	1.25
V-belt	1.50
Flat Belt	2.50
Variable Pitch Belt	3.50

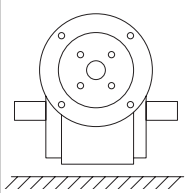
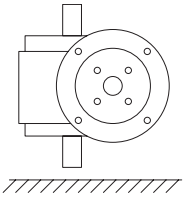
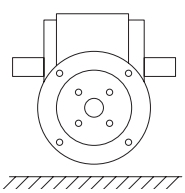
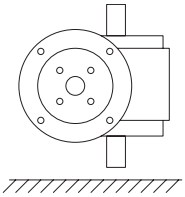
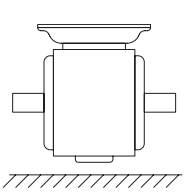
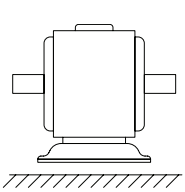
Divide gearbox OHL ratings by the applicable OHL K factors.

Service Factors for Selecting Gearboxes (when used with electric motors)

Service Continuity (per day)	Load Characteristics			
	Uniform	Moderate Shock*	Heavy Shock*	Extreme Shock*
Occasional 1/2 hour	1.00	1.00	1.00	1.25
Less than 3 hours	1.00	1.00	1.25	1.50
3-10 hours	1.00	1.25	1.50	1.75
More than 10 hours	1.25	1.50	1.75	2.00

* Shock results from sudden increases in the torque demand of the load, such as: sudden stopping, restarting, and/or reversing; significantly heavy loads dropped onto a moving conveyor; impact loads such as punch press operations. Depending upon the load characteristics, divide the gearbox HP, Overhung Load, and Maximum Mechanical Capacity ratings by the applicable service factor.

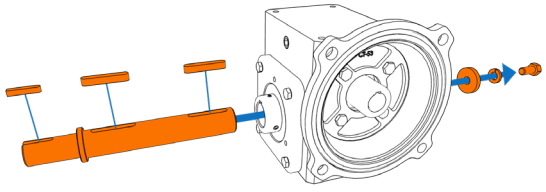
Gearbox Mounting Orientations

Horizontal Input Shaft				Vertical Input Shaft	
A	B	C	D	E	F
		NOT ALLOWED			NOT ALLOWED
					

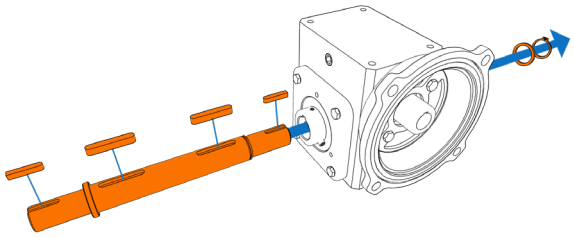
IronHorse® Stainless Steel Worm Gearbox Accessories

IronHorse Stainless Steel Worm Gearbox Output Shaft Kits						
Part Number	*Price*	*Fits*	*Output Shaft Type*	*Output Shaft Diameter*	*Typical Photo*	*Drawing Links*
WGSS-175-S	$72.00	WGSS-175 series gearboxes	Single	0.875”		PDF
WGSS-206-S	$77.00	WGSS-206 series gearboxes		1”		PDF
WGSS-237-S	$94.00	WGSS-237 series gearboxes		1.125”		PDF
WGSS-262-S	$106.00	WGSS-262 series gearboxes		1.25”		PDF
WGSS-262-S-1125	$106.00	WGSS-262 series gearboxes		1.125”		PDF
WGSS-175-DS	$98.00	WGSS-175 series gearboxes	Double	0.875”		PDF
WGSS-206-DS	$106.00	WGSS-206 series gearboxes		1”		PDF
WGSS-237-DS	$132.00	WGSS-237 series gearboxes		1.125”		PDF
WGSS-262-DS	$145.00	WGSS-262 series gearboxes		1.25”		PDF
WGSS-262-DS-1125	$145.00	WGSS-262 series gearboxes		1.125”		PDF

Shafts are Stainless Steel. Kit includes Stainless Steel Keys and components.



Single Shaft

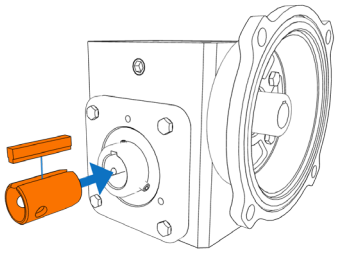


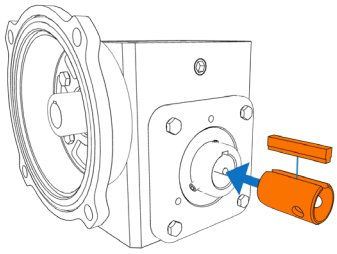
Dual Shaft

IronHorse® Stainless Steel Worm Gearbox Accessories

IronHorse Stainless Steel Worm Gearbox Output Bushing Kits					
Part Number	*Price*	*Fits*	*Bushing Internal Diameter*	*Typical Photo*	*Drawing Links*
WGSS-175-11116-OB	$72.00	WGSS-175 series gearboxes	11/16”		PDF
WGSS-175-134-OB	$72.00	WGSS-175 series gearboxes	3/4”		PDF
WGSS-175-158-OB	$72.00	WGSS-175 series gearboxes	5/8”		PDF
WGSS-175-178-OB	$72.00	WGSS-175 series gearboxes	7/8”		PDF
WGSS-206-237-114-OB	$85.00	WGSS-206 and WGSS-237 series gearboxes	1-1/4”		PDF
WGSS-206-237-118-OB	$85.00	WGSS-206 and WGSS-237 series gearboxes	1-1/8”		PDF
WGSS-206-237-1316-OB	$85.00	WGSS-206 and WGSS-237 series gearboxes	1-3/16”		PDF
WGSS-206-237-1-OB	$85.00	WGSS-206 and WGSS-237 series gearboxes	1”		PDF
WGSS-262-112-OB	$111.00	WGSS-262 series gearboxes	1-1/2”		PDF
WGSS-262-114-OB	$111.00	WGSS-262 series gearboxes	1-1/4”		PDF
WGSS-262-118-OB	$111.00	WGSS-262 series gearboxes	1-1/8”		PDF
WGSS-262-1316-OB	$111.00	WGSS-262 series gearboxes	1-3/16”		PDF
WGSS-262-1716-OB	$111.00	WGSS-262 series gearboxes	1-7/16”		PDF
WGSS-262-1-OB	$111.00	WGSS-262 series gearboxes	1”		PDF

Bushings are Stainless Steel. Kit includes Stainless Steel Keys and components.

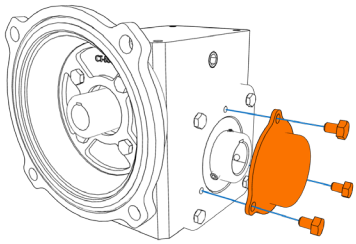




IronHorse® Stainless Steel Worm Gearbox Accessories

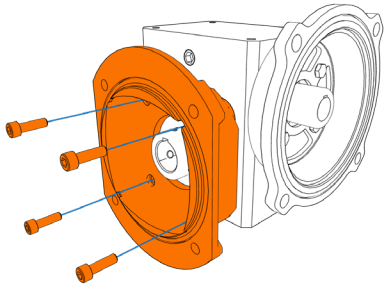
IronHorse Stainless Steel Worm Gearbox Output Covers				
Part Number	*Price*	*Fits*	*Typical Photo*	*Drawing Links*
WGSS-175-OC	$5.50	WGSS-175 series gearboxes		PDF
WGSS-206-OC	$5.50	WGSS-206 series gearboxes		PDF
WGSS-237-OC	$5.50	WGSS-237 series gearboxes		PDF
WGSS-262-OC	$5.50	WGSS-262 series gearboxes		PDF

Output Covers are Plastic. Kit includes Stainless Steel fasteners



IronHorse Stainless Steel Worm Gearbox Output Flanges				
Part Number	*Price*	*Fits*	*Typical Photo*	*Drawing Links*
WGSS-175-OF	$174.00	WGSS-175 series gearboxes		PDF
WGSS-206-OF	$247.00	WGSS-206 series gearboxes		PDF
WGSS-237-OF	$281.00	WGSS-237 series gearboxes		PDF
WGSS-262-OF	$315.00	WGSS-262 series gearboxes		PDF

Flanges are Stainless Steel. Kit includes Stainless Steel fasteners and 1 O-ring



*NOTE: For detailed assembly instructions, see product manual

IronHorse® Worm Gearboxes

Gearbox Selection

Gearbox Selection Steps

1) Determine the torque and speed required for the load.
2) Determine the overall speed ratio of motor speed to load speed.
3) Determine the gearbox ratio as well as any reduction outside the gearbox (pulleys, gears, etc.).
4) Determine the applicable service factor and overhung load K factor.
5) Determine the gearbox real output torque required, and select a gearbox with a higher Maximum Thermal output Torque rating (for WG cast-iron gearboxes; not applicable for WGA aluminum gearboxes).
6) Determine the gearbox design output torque required (torque with service factor applied), and select a gearbox with a higher Maximum Mechanical Output Torque rating. (Gearbox must also meet requirement #5.)
7) Determine the required sizes of pulleys, gears, etc., and determine the overhung load force. Select a gearbox with a higher Overhung Load rating. (Gearbox must also meet requirements #5 & #6.)
8) Confirm that the selected gearbox meets the applicable system requirements.
9) Select a compatible motor.

Gearbox Selection Example (Refer to the specifications tables for gearbox specifications, service factors, and K factors.)

A conveyor will run 10 hours/day with moderate shock loading. The conveyor will be driven by a V-belt and needs to be driven at approximately 20 rpm. The motor to be used will have a nominal speed of 1800 rpm (1725 rpm actual speed). The conveyor will require 2700 in·lb of torque.

1) Required **torque** = 2700 in·lb; required **speed** = 20 rpm.
2) Determine the **overall speed ratio** of motor speed to load speed:
   Overall speed ratio = motor speed / load speed = 1725 / 20 = 86.25 [about 86:1]
3) Determine **pulley ratios** at available **gearbox ratios**:
   Gearbox ratio = (overall speed ratio) / (pulley ratio)
   Pulley ratio = (overall speed ratio) / (gearbox ratio)
   For ~~5:1 gearbox~~: pulley ratio = 86.25 / 5 = ~~17.25~~ [17.25" pulley ratio is prohibitively large]
   For 10:1 gearbox: pulley ratio = 86.25 / 10 = 8.63
   For 15:1 gearbox: pulley ratio = 86.25 / 15 = 5.75
   For 20:1 gearbox: pulley ratio = 86.25 / 20 = 4.31
   For 30:1 gearbox: pulley ratio = 86.25 / 30 = 2.88
   For 40:1 gearbox: pulley ratio = 86.25 / 40 = 2.16
   For 60:1 gearbox: pulley ratio = 86.25 / 60 = 1.44
   Pulley ratio = (conveyor pulley diameter) / (gearbox pulley diameter)
4) Determine **service factor (SF)** and **overhung load factor (K)** from applicable tables:
   SF = 1.25 due to moderate shock loading and 3-10 hours/day operation
   K = 1.5 due to V-belt
5) Use specifications table to select gearbox with **Maximum Thermal* Torque rating > required real torque**:
   Gearbox required real torque = (final torque) / (pulley ratio)
   For 10:1 gearbox: (2700 in·lb) / 8.63 = 312.86 in·lb; use WG-175-x or larger
   For 15:1 gearbox: (2700 in·lb) / 5.75 = 469.57 in·lb; use WG-175-x or larger
   For 20:1 gearbox: (2700 in·lb) / 4.31 = 626.45 in·lb; use WG-206-x or larger
   For 30:1 gearbox: (2700 in·lb) / 2.88 = 937.50 in·lb; use WG-325-x or WGA-63M*
   For 40:1 gearbox: (2700 in·lb) / 2.16 = 1250.0 in·lb; use WG-325-x
   For 60:1 gearbox: (2700 in·lb) / 1.44 = 1875.0 in·lb; use WG-325-x
   *** Aluminum gearboxes do not have thermal ratings; use mechanical ratings.**
6) Use specifications table to select gearbox with **Maximum Mechanical Torque rating > required design torque**:
   Gearbox required design torque = (real gearbox torque)(service factor)
   For 10:1 gearbox: (312.86 in·lb)(1.25) = 391.08 in·lb; use WG-175-x or larger
   For 15:1 gearbox: (469.57 in·lb)(1.25) = 586.96 in·lb; use WG-206-x or larger
   For 20:1 gearbox: (646.45 in·lb)(1.25) = 808.06 in·lb; use WG-206-x or larger
   For 30:1 gearbox: (937.50 in·lb)(1.25) = 1178.88 in·lb; use WG-325-x or WGA-63M or larger
   For 40:1 gearbox: (1250.0 in·lb)(1.25) = 1562.50 in·lb; use WG-325-x
   For 60:1 gearbox: (1875.0 in·lb)(1.25) = 2343.75 in·lb; use WG-325-x

(continued on next page)

Gearbox Selection Example (continued)
(Refer to the specifications tables for gearbox specifications, service factors, and K factors.)
[Load requirements: Conveyor to run 10 hours/day; moderate shock loading; driven by V-belt @ approx 20 rpm; requires 2700 in·lb of torque. Motor speed 1725 rpm (1800 rpm nominal).

7) Use the gearbox overhung load ratings from the specifications table to determine the minimum allowable pulley diameters.
Select gearbox with **Overhung Load rating > overhung load force**:
Gearbox required OHL rating = (gearbox real torque)(K)(SF)/(gearbox pulley diameter / 2)
Minimum gearbox pulley diameter = (T)(K)(SF)(2)/(OHL rating)
Conveyor pulley diameter = (gearbox pulley diameter)(pulley ratio)
For 10:1, WG-175-010-x gearbox:
Minimum gearbox pulley diameter = (312.86 in·lb)(1.5)(1.25)(2)/(650 lb) = 1.8" [use 2"]
Conveyor pulley diameter = (2")(8.63) = ~~17.26"~~ [17.26" pulley size is prohibitively large]
Determine pulley sizes and OHL for next larger gearbox ratio.
For 15:1, WG-206-015-x gearbox:
Minimum gearbox pulley diameter = (469.57 in·lb)(1.5)(1.25)(2)/(700 lb) = 2.5" [use 2.5"]
Conveyor pulley diameter = (2.5")(5.75) = 14.38" [use 14.4"]
Select **WG-206-015-x gearbox, 2.5" gearbox pulley**, and **14.4" conveyor pulley**.
For 20:1, WG-206-020-x gearbox:
N/A – larger ratio of same frame size GB is same price, yet provides lower efficiency and power characteristics
For 30:1, WGA-63M-030-H1 gearbox:
Minimum gearbox pulley diameter = (937.50 in·lb)(1.5)(1.25)(2)/(736 lb) = 4.78" [use 5"]
Conveyor pulley diameter = (5")(2.88) = 14.40" [use 14.4"]
N/A – WGA-63M & WG-325 gearboxes costs more than WG-206
For 40:1, N/A – WG-325-xxx gearboxes cost more than WG-206 at any ratio
For 60:1, N/A – WG-325-xxx gearboxes cost more than WG-206 at any ratio

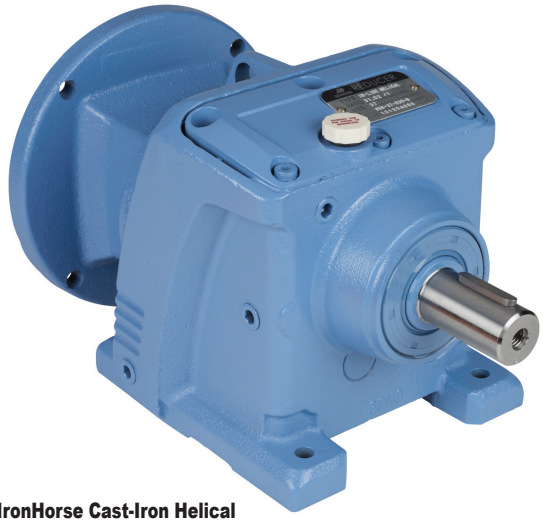
8) **Check results** against original speed and torque requirements:
a) Conveyor speed = (motor speed) / (gearbox ratio)(pulley ratio) = (1725 rpm) / (15)(14.4"/2.5") = 20 rpm
b) Maximum real torque available at conveyor = (gearbox thermal torque)(pulley ratio) = (673 in·lb)(14.4"/2.5") = 3876 in·lb
c) Maximum design torque available at conveyor = (gearbox mechanical torque)(pulley ratio) / (service factor)
= (1002 in·lb)(14.4"/2.5") / 1.25 = 4617 in·lb
The speed is correct as required, and both maximum torque values are greater than the 2700 in·lb required by the load.

9) **Select a motor** and check torque transmitted to the load:
From the gearbox spec tables, WG-206-015-x efficiency = 85%.
maximum thermal input power = 1.40 hp
maximum mechanical input power @ 1.0 SF = 2.09 hp
maximum mechanical input power @ 1.25 SF = (rated max mechanical input power) / (SF) = 2.09 hp / 1.25 = 1.67 hp
maximum allowable motor power = 1.40 hp; select nominal 1hp motor
Select **1hp motor**, and check for adequate torque at the load:
Torque = Power / Speed **[conversion factor: (1hp) = (63,025 in·lb·rpm)]**
Torque load = (63,025 in·lb·rpm / hp)(gearbox input hp)(gearbox efficiency) / (motor rpm / (gearbox ratio)(pulley ratio))
= (63,025)(1)(0.85) / (1725 / (15/1)(14.4/2.5)) = ~~2683 in·lb~~ [insufficient torque at load]
This torque value is less than the 2700 in·lb required by the load.
So, select and check the next larger nominal motor size, which is 1-1/2 hp.
Since the 206 frame size 15 ratio gearboxes do not meet the 1-1/2 hp thermal rating, choose the WG-237-015-x gearbox.
Select **1-1/2 hp motor** and **WG-237-015-x gearbox**, and check for adequate torque:
WG-237-015-x gearbox efficiency = 84%
maximum thermal input power = 1.55 hp
maximum mechanical input power @ 1.25 SF = 2.64 hp / 1.25 = 2.11 hp
maximum allowable motor power = 1.55 hp; select nominal 1-1/2 hp motor
gearbox ratio is still 15:1, and OHL rating is increased to 900 lb, so the previous pulley calculations [step 7] remain sufficient
[smaller pulleys can be calculated and selected for this gearbox, if desired]
Tload = (63,025 in·lb·rpm/hp) (1.5hp) (84%) / (1725 rpm / (15/1)(14.4/2.5)) = 3977 in·lb > 2700 in·lb; sufficient torque at load

Final gearbox and motor selection: 1-1/2 hp motor WG-237-015-x gearbox

IronHorse® Cast-Iron Helical Gearboxes

Helical Gearbox Overview



IronHorse Cast-Iron Helical Gearbox

Gearbox Overview

Gearboxes, also known as enclosed gear drives or speed reducers, are mechanical drive components that can control a load at a reduced fixed ratio of the motor speed. The output torque is also increased by the same ratio, while the horsepower remains the same (less efficiency losses). For example, a 10:1 ratio gearbox outputs approximately the same motor output horsepower, but motor speed is divided by 10 and motor torque is multiplied by 10.

Helical gearboxes use helical gears to provide quiet startup and smooth operation.

IronHorse helical gearboxes are manufactured in an ISO9001- certified plant by one of the leading and most internationally acclaimed gearbox manufacturers in the world today. Only the highest quality materials are tested, certified, and used in the manufacturing process. Strict adherence to and compliance with the toughest international and U.S. testing standards and manufacturing procedures assures you the highest quality products.

We offer straight-through helical gearboxes with cast-iron frames. The output shaft is parallel to the input. Our gearboxes utilize C-face mounting interfaces for C-face motors.

Features

- C-face and TC-face input; inline, parallel output
- FC-20 cast iron one-piece housing
- 1045 carbon steel shaft
- Heat-treated and ground high strength steel gears, AGMA Class 10
- Shaft sleeves protect all shafts
- Heavy duty bearings on the output shaft
- Interior channel guides oil to directly and constantly lube bearings
- Double-lipped embedded oil seals to prevent leakage
- Universally interchangeable compact design ensures easy OEM replacement
- Mountable in most directions
- Two-year warranty

Applications

- Use with electric motors for reducing output speed, increasing torque.
- Use for conveyors, packaging machines, rotary tables, etc.

IronHorse® Cast-Iron Helical Gearboxes

Specifications

IronHorse Cast-Iron Helical Gearbox Specifications (continued from previous page)

Part Number	Price	Box Size	Nominal Ratio	Actual Ratio	Output RPM @ 1750 rpm Input	Nominal HP @ 1.0 Service Factor [1]	NEMA Motor Frame	Output Shaft Diameter (in)	Input Power (hp)	Output Torque (lb-in)	OHL (lbs)[2]	Stages	Efficiency (%)	Approx Weight (lb)
HGR-37-005-A	$488.00	37	5:1	4.88	359	1.0	56C	1	1.00	160	465	2	96	32
HGR-37-005-B	$488.00					2.0	145TC		2.00	330	440			
HGR-37-010-A	$488.00		10:1	10.02	175	1.0	56C		1.00	340	575			
HGR-37-010-B	$488.00					2.0	145TC		2.00	670	530			
HGR-37-015-A	$488.00		15:1	15.75	111	1.0	56C		1.00	530	650			
HGR-37-015-B	$488.00			14.08	124	2.0	145TC		2.00	950	580	3		
HGR-37-020-A	$488.00		20:1	19.95	88	1.0	56C		1.00	670	690	2		
HGR-37-020-B	$488.00					2.0	145TC		2.00	1350	630			
HGR-37-030-A	$488.00		30:1	31.02	56	1.5	56C		1.00	1010	760	3	94	
HGR-37-030-B	$488.00					2.0	145TC		2.00	2020	700			
HGR-37-040-A	$488.00		40:1	40.08	44	1.0	56C		1.00	1310	800			
HGR-37-060-A	$488.00		60:1	60.84	29	1.0			0.82	1770	705			
HGR-47-005-B	$561.00	47	5:1	4.85	361	2.0	145TC	1-1/4	2.00	330	670	2	96	45
HGR-47-005-C	$561.00					5.0	182/4TC		3.00	490	645			51
HGR-47-010-C	$561.00		10:1	11.27	155	3.0				1140	820			
HGR-47-015-C	$561.00		15:1	15.18	115	3.0				1520	880			
HGR-47-020-B	$561.00		20:1	18.37	95	2.0	145TC		2.00	1240	975			45
HGR-47-020-C	$561.00			19.18	91	3.0	182TC		3.00	1860	910	3		51
HGR-47-030-B	$561.00		30:1	31.83	55	2.0	145TC		2.00	2080	1070		94	45
HGR-47-030-C	$561.00					3.0	182/4TC		3.00	3120	1005			51
HGR-47-040-A	$561.00		40:1	41.51	42	1.0	56C		1.00	1360	1215			
HGR-47-060-A	$561.00		60:1	63.37	28	1.0				2070	1215			45
HGR-67-005-B	$798.00	67	5:1	5.23	335	2.0	145TC	1-3/8	2.00	350	770	2	96	63
HGR-67-005-C	$798.00					5.0	182/4TC		5.00	880	710			69
HGR-67-010-C	$798.00		10:1	9.90	177	5.0				1670	845			
HGR-67-015-B	$798.00		15:1	15.41	114	2.0	145TC		2.00	1040	1060			63
HGR-67-015-C	$798.00					3.0	182TC		3.00	1560	1020			69
HGR-67-020-C	$798.00		20:1	21.33	82	5.0				2160	1100		94	
HGR-67-030-B	$798.00		30:1	28.77	61	2.0	145TC		2.00	1880	1220	3		63
HGR-67-040-B	$798.00		40:1	41.22	42	2.0				2690	1320			
HGR-67-060-A	$798.00		60:1	63.07	28	1.0	56C		1.00	2060	1630			
HGR-77-005-C	$935.00	77	5:1	4.78	366	5.0	182/4TC	1-5/8	5.00	800	800	2	96	82
HGR-77-005-D	$935.00					7.5	213/5TC		7.50	1210	765			93
HGR-77-010-D	$935.00		10:1	10.91	160	7.5				2760	935			
HGR-77-020-C	$935.00		20:1	23.31	75	5.0	182/4TC		3.00	2350	1300			82
HGR-77-030-C	$935.00		30:1	31.97	55	5.0				3130	1370	3	94	
HGR-77-040-C	$935.00		40:1	39.31	45	3.0				3850	1420			
HGR-77-060-B	$935.00		60:1	57.73	30	2.0	145TC		2.00	3770	1710			76

1) Nominal Motor HP is the highest HP 1800 rpm motor to be used with the gearbox under conditions of 1.0 service factor. Gearbox input power capacity decreases as motor speed decreases and as service factor increases.
2) OHL = Overhung Load ratings are for forces perpendicular to the output shaft and located at the shaft midpoint, such as from a gear, pulley, or sprocket with a belt or chain. Divide OHL ratings by the applicable OHL K factors shown separately in the Selection Factors tables. OHL ratings should also be divided by applicable service factors.
3) Maximum Mechanical Ratings are limits based on strength and durability of gearbox components; applicable when operating time is short and stopped time is greater than or equal to operating time. These ratings are applicable for 1.0 service factor loads, and may require modification depending upon characteristics of the applicable driven loads. Refer to the "Service Factors" table for more information.

IronHorse® Cast-Iron Helical Gearboxes

Specifications

IronHorse Cast-Iron Helical Gearbox Specifications (continued from previous page)

Part Number	Price	Box Size	Nominal Ratio	Actual Ratio	Output RPM @ 1750 rpm Input	Nominal HP @ 1.0 Service Factor [1]	NEMA Motor Frame	Output Shaft Diameter (in)	Input Power (hp)	Output Torque (lb-in)	OHL (lbs)[2]	Stages	Efficiency (%)	Approx Weight (lb)
HGR-87-005-D	$1,484.00	87	5:1	4.73	370	10.0	213/5TC	2-1/8	10.00	1590	1790	2	96	163
HGR-87-005-E	$1,484.00					20.0	254/6TC		15.00	2390	1730			169
HGR-87-010-D	$1,484.00		10:1	10.66	164	10.0	213/5TC		10.00	3590	2260			163
HGR-87-015-D	$1,484.00		15:1	15.29	114	10.0			7.50	3860	2570			
HGR-87-020-C	$1,484.00		20:1	20.06	87	5.0	182/4TC		5.00	3280	2840	3	94	156
HGR-87-020-D	$1,484.00					10.0	213/5TC		7.50	4910	2710			163
HGR-87-030-C	$1,484.00		30:1	31.73	55	5.0	182/4TC		5.00	5180	3200			156
HGR-87-040-C	$1,484.00		40:1	38.20	46	5.0				6240	3420			
HGR-87-060-B	$1,484.00		60:1	61.54	28	2.0	145TC		2.00	4070	3790			150
HGR-87-060-C	$1,484.00					5.0	182TC		3.00	6030	3790			156

1) Nominal Motor HP is the highest HP 1800 rpm motor to be used with the gearbox under conditions of 1.0 service factor. Gearbox input power capacity decreases as motor speed decreases and as service factor increases.
2) OHL = Overhung Load ratings are for forces perpendicular to the output shaft and located at the shaft midpoint, such as from a gear, pulley, or sprocket with a belt or chain. Divide OHL ratings by the applicable OHL K factors shown separately in the Selection Factors tables. OHL ratings should also be divided by applicable service factors.
3) Maximum Mechanical Ratings are limits based on strength and durability of gearbox components; applicable when operating time is short and stopped time is greater than or equal to operating time. These ratings are applicable for 1.0 service factor loads, and may require modification depending upon characteristics of the applicable driven loads. Refer to the "Service Factors" table for more information.

Accessories

IronHorse Cast-Iron Helical Gearbox Accessories

Part Number	Price	Description	For Use With:
HBR-3777V	$4.75	Breather plug; replacement; for use with HBR & HGR gearboxes sizes 37 thru 77	HB(G)R-37-xx through HB(G)R-77-xx
HBR-8797V	$7.25	Breather plug; replacement; for use with HBR & HGR gearboxes size 87	HB(G)R-87-xx

Gearbox Selection Factors

Overhung Load K Factors for Various Drive Types

Chain & Sprocket	1.00
Gear	1.25
V-belt	1.50
Flat Belt	2.50
Variable Pitch Belt	3.50

Divide gearbox OHL ratings by the applicable OHL K factors.

Service Factors for Selecting Gearboxes (when used with electric motors)

Service Continuity (per day)	Load Characteristics			
	Uniform	Moderate Shock*	Heavy Shock*	Extreme Shock*
Occasional 1/2 hour	1.00	1.00	1.00	1.25
Less than 3 hours	1.00	1.00	1.25	1.50
3-10 hours	1.00	1.25	1.50	1.75
More than 10 hours	1.25	1.50	1.75	2.00

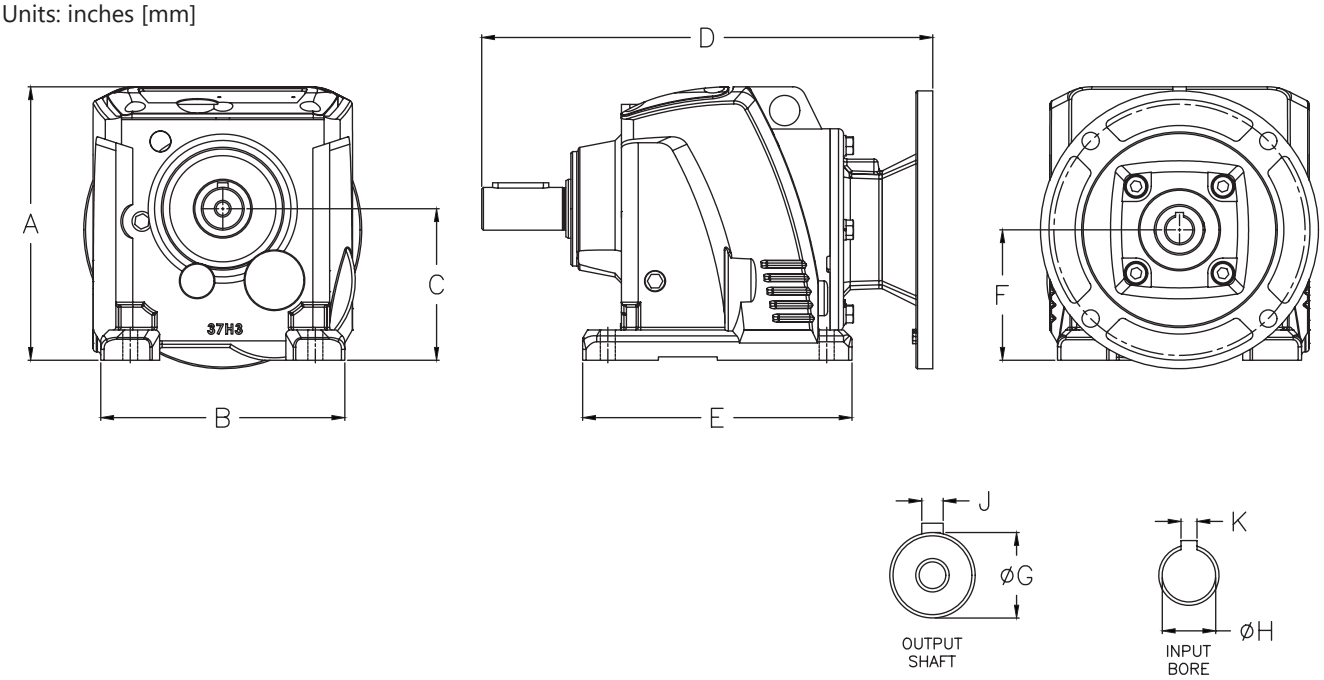
* Shock results from sudden increases in the torque demand of the load, such as: sudden stopping, restarting, and/or reversing; significantly heavy loads dropped onto a moving conveyor; impact loads such as punch press operations.

Depending upon the load characteristics, divide the gearbox HP, Overhung Load, and Maximum Mechanical Capacity ratings by the applicable service factor.

IronHorse® Cast-Iron Helical Gearboxes

Dimensions

Units: inches [mm]

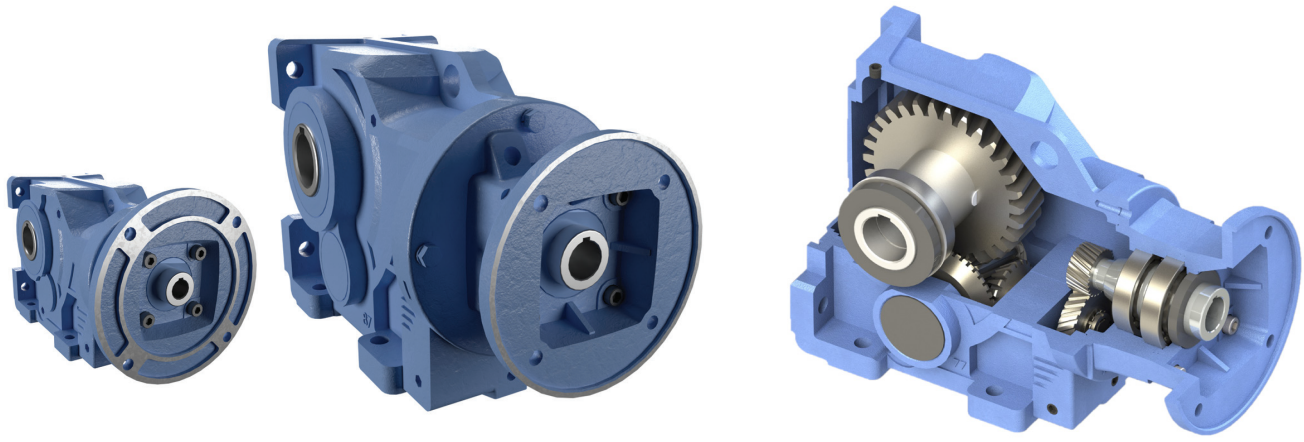


Dimensions – inches [mm] – IronHorse Cast-Iron Helical Gearboxes											
Part Number	*Frame*	*A*	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*J*	*K*
HGR-37-xxx-A	56C	6.40 [162.5]	5.71 [145.0]	3.54 [90.0]	10.55 [268.0]	6.30 [160.0]	3.05 [77.5]	1.00 [25.4]	0.63 [15.9]	0.25 [6.4]	0.19 [4.8]
HGR-47-xxx-A		8.25 [209.5]	6.69 [170.0]	4.53 [115.0]	11.63 [295.4]	7.68 [195.0]	3.98 [101.0]	1.25 [31.8]			
HGR-67-xxx-A		8.89 [226.0]	8.27 [210.0]	5.12 [130.0]	13.13 [333.5]	9.25 [235.0]	4.45 [113.0]	1.38 [34.9]		0.31 [7.9]	
HGR-37-xxx-B	145TC	6.40 [162.5]	5.71 [145.0]	3.54 [90.0]	10.94 [278.0]	6.30 [160.0]	3.05 [77.5]	1.00 [25.4]	0.88 [22.2]	0.25 [6.4]	
HGR-47-xxx-B		8.25 [209.5]	6.69 [170.0]	4.53 [115.0]	12.03 [305.5]	7.68 [195.0]	3.98 [101.0]	1.25 [31.8]			
HGR-67-xxx-B		8.89 [226.0]	8.27 [210.0]	5.12 [130.0]	13.52 [343.5]	9.25 [235.0]	4.45 [113.0]	1.38 [34.9]		0.31 [7.9]	
HGR-77-xxx-B		10.04 [255.0]	9.06 [230.0]	5.51 [140.0]	14.23 [361.5]	9.65 [245.0]	6.38 [162.0]	1.63 [41.4]		0.38 [9.7]	
HGR-87-xxx-B		12.99 [330.0]	11.42 [290.0]	7.09 [180.0]	17.20 [437.0]	12.20 [310.0]	8.05 [204.5]	2.13 [54.1]		0.50 [12.7]	
HGR-47-xxx-C	182/4TC*	8.25 [209.5]	6.69 [170.0]	4.53 [115.0]	12.76 [324.0]	7.68 [195.0]	3.98 [101.0]	1.25 [31.8]	1.13 [28.7]	0.25 [6.4]	0.25 [6.4]
HGR-67-xxx-C		8.89 [226.0]	8.27 [210.0]	5.12 [130.0]	14.25 [362.0]	9.25 [235.0]	4.45 [113.0]	1.38 [34.9]		0.31 [7.9]	
HGR-77-xxx-C		10.04 [255.0]	9.06 [230.0]	5.51 [140.0]	14.96 [380.0]	9.65 [245.0]	6.38 [162.0]	1.63 [41.4]		0.38 [9.7]	
HGR-87-xxx-C		12.99 [330.0]	11.42 [290.0]	7.09 [180.0]	17.32 [440.0]	12.20 [310.0]	8.05 [204.5]	2.13 [54.1]		0.50 [12.7]	
HGR-77-xxx-D	213/5TC	10.04 [255.0]	9.06 [230.0]	5.51 [140.0]	17.22 [437.5]	9.65 [245.0]	6.38 [162.0]	1.63 [41.4]	1.38 [35.0]	0.38 [9.7]	0.31 [7.9]
HGR-87-xxx-D		12.99 [330.0]	11.42 [290.0]	7.09 [180.0]	19.59 [497.5]	12.20 [310.0]	8.05 [204.5]	2.13 [54.1]		0.50 [12.7]	
HGR-87-xxx-E	254/6TC	12.99 [330.0]	11.42 [290.0]	7.09 [180.0]	20.57 [522.5]	12.20 [310.0]	8.05 [204.5]	2.13 [54.1]	1.63 [41.4]	0.50 [12.7]	0.38 [9.7]

***Note: 184TC motor frame sizes where applicable. See gearbox specifications for more information.**
See our website: www.AutomationDirect.com for complete engineering drawings.

IronHorse® Cast-Iron Helical Bevel Gearboxes

Helical Bevel Gearbox Overview



IronHorse Cast-Iron Helical Bevel Gearboxes

Gearbox Overview

Gearboxes, also known as enclosed gear drives or speed reducers, are mechanical drive components that can control a load at a reduced fixed ratio of the motor speed. The output torque is also increased by the same ratio, while the horsepower remains the same (less efficiency loss). For example, a 10:1 ratio gearbox outputs approximately the same motor output horsepower, but motor speed is divided by 10 and motor torque is multiplied by 10.

Helical bevel gearboxes use helical gears to provide quiet startup and smooth operation.

IronHorse helical bevel gearboxes are manufactured in an ISO9001-certified plant by one of the leading and most internationally acclaimed gearbox manufacturers in the world today. Only the highest quality materials are tested, certified, and used in the manufacturing process. Strict adherence to and compliance with the toughest international and U.S. testing standards and manufacturing procedures guarantees you the highest quality products.

We offer helical bevel gearboxes with cast-iron frames. The hollow-bore output accepts double or single shafts which are perpendicular to the input. Our gearboxes utilize C-face mounting interfaces for C-face motors.

Features

- C-face and TC-face input; bevel, perpendicular output
- Universally interchangeable compact design ensures easy OEM replacement
- Flexible installation: 6 mounting positions
- FCD45 cast-iron one-piece housing
- 20CrMO alloy steel pinion and gears
- AGMA 11 & 12 rated, SCM415 pinion gears
- Gears supported by generously-sized precision ball and tapered bearings
- Double-lipped embedded oil seals to prevent leakage
- Two-year warranty

Applications

- Use with electric motors for reducing output speed, increasing torque.
- Use for conveyors, packaging machines, rotary tables, etc.

IronHorse® Cast-Iron Helical Bevel Gearboxes

Specifications

IronHorse Cast-Iron Helical Bevel Gearbox Specifications													
Part Number	PriceCode	Box Size	Nominal Ratio	Actual Ratio	Output RPM @ 1750 RPM Input	NEMA Motor Frame**	Max Input Power (hp) 1) 3)	Max Output Torque (lb·in) 3)	Max OHL (lbs) 2) 3)	Efficiency (%)	Backlash (Arc Minutes)	Approx Weight (lb)	Drawing Links
HBR-37-010-A	$1,272.00	37	10	11.09	158	56C	4.33	1,565	520	91	45	32	PDF
HBR-37-010-B	$1,272.00		10	11.09	158	143/5TC	4.33	1,565	510			37	PDF
HBR-37-025-A	$1,272.00		25	23.10	76	56C	2.20	1,659	635			32	PDF
HBR-37-025-B	$1,272.00		25	23.10	76	143/5TC	2.20	1,659	610			37	PDF
HBR-37-040-A	$1,272.00		40	37.97	46	56C	1.43	1,770	735			32	PDF
HBR-37-040-B	$1,272.00		40	37.97	46	143TC	1.43	1,770	705			37	PDF
HBR-37-060-A	$1,272.00		60	59.67	29	56C	0.91	1,770	815			32	PDF
HBR-47-010-A	$1,393.00	47	10	9.95	176	56C	6.46	2,097	620	91	36	46	PDF
HBR-47-010-B	$1,393.00		10	9.95	176	143/5TC	6.46	2,097	580			51	PDF
HBR-47-010-C	$1,393.00		10	9.95	176	182/4TC	6.46	2,097	550			57	PDF
HBR-47-020-B	$1,393.00		20	20.65	85	143/5TC	3.97	2,675	690			51	PDF
HBR-47-020-C	$1,393.00		20	20.65	85	182TC	3.97	2,675	610			57	PDF
HBR-47-040-A	$1,393.00		40	41.36	42	56C	2.50	3,372	945			46	PDF
HBR-47-040-B	$1,393.00		40	41.36	42	143/5TC	2.50	3,372	905			51	PDF
HBR-47-060-A	$1,393.00		60	58.99	30	56C	1.84	3,540	1030			46	PDF
HBR-47-060-B	$1,393.00		60	58.99	30	143TC	1.84	3,540	980			51	PDF
HBR-47-085-A	$1,393.00		85	86.89	20	56C	1.42	3,540	1110			46	PDF
HBR-67-010-B *	$1,741.00	67	10	9.66	181	143/5TC	12.06	3,800	1500	91	33	73	PDF
HBR-67-010-C *	$1,741.00		10	9.66	181	182/4TC	12.06	3,800	1410			80	PDF
HBR-67-020-B *	$1,741.00		20	22.18	79	143/5TC	6.26	4,530	1760			73	PDF
HBR-67-020-C *	$1,741.00		20	22.18	79	182/4TC	6.26	4,530	1570			80	PDF
HBR-67-040-A *	$1,741.00		40	37.98	46	56C	4.62	5,730	2140			69	PDF
HBR-67-040-B *	$1,741.00		40	37.98	46	143/5TC	4.62	5,730	2140			73	PDF
HBR-67-040-C *	$1,741.00		40	37.98	46	182TC	4.62	5,730	1510			80	PDF
HBR-67-065-A *	$1,741.00		65	64.97	27	56C	2.95	6,260	2140			69	PDF
HBR-67-065-B *	$1,741.00		65	64.97	27	143/5TC	2.95	6,260	2140			73	PDF
HBR-67-085-A *	$1,741.00		85	84.10	21	56C	2.46	6,760	2140			69	PDF
HBR-67-085-B *	$1,741.00		85	84.10	21	143/5TC	2.46	6,760	2140			73	PDF
HBR-67-120-A *	$1,741.00		120	118.14	15	56C	1.88	7,260	2140			69	PDF
HBR-67-120-B *	$1,741.00		120	118.14	15	143TC	1.88	7,260	2140			73	PDF

*** Due to size and/or weight restrictions, gearboxes HBR-67-xxx-x through HBR-87-xxx-x must ship via Freight.**

**** Although physical mounting to other motors is possible, please use only the motors as specified in this table.**

1) Max Input Power is the highest HP 1800 rpm motor to be used with the gearbox under conditions of 1.0 service factor. Gearbox input power capacity decreases as motor speed decreases and as service factor increases.

2) OHL= Overhung Load ratings are for forces perpendicular to the output shaft and located at the shaft midpoint, such as from a gear, pulley, or sprocket with a belt or chain. Divide OHL ratings by the applicable OHL K factors shown separately in the Selection Factors tables. OHL ratings should also be divided by applicable service factors.

3) Maximum Mechanical Ratings are limits based on the strength and durability of gearbox components; applicable when operating time is short and stopped time is greater than or equal to operating time. These ratings are applicable for 1.0 service factor loads and may require modification depending upon characteristics of the applicable driven loads. Refer to the "Service Factors" table for more information.

IronHorse® Cast-Iron Helical Bevel Gearboxes

Specifications (continued)

IronHorse Cast-Iron Helical Bevel Gearbox Specifications

Part Number	PriceCode	Box Size	Nominal Ratio	Actual Ratio	Output RPM @ 1750 RPM Input	NEMA Motor Frame **	Max Input Power (hp) 1) 3)	Max Output Torque (lb-in) 3)	Max OHL (lbs) 2) 3)	Efficiency (%)	Backlash (Arc Minutes)	Approx Weight (lb)	Drawing Links
HBR-77-010-C *	$2,646.00	77	10	9.96	176	182/4TC	24.02	7,800	1860	91	29	132	PDF
HBR-77-010-D *	$2,646.00		10	9.96	176	213/5TC	24.02	7,800	1690			148	PDF
HBR-77-020-C *	$2,646.00		20	20.24	86	182/4TC	14.78	9,765	2080			132	PDF
HBR-77-020-D *	$2,646.00		20	20.24	86	213/5TC	14.78	9,765	1740			148	PDF
HBR-77-040-C *	$2,646.00		40	39.76	44	182/4TC	9.21	11,955	2050			132	PDF
HBR-77-040-D *	$2,646.00		40	39.76	44	213TC	9.21	11,955	1390			148	PDF
HBR-77-060-C *	$2,646.00		60	57.05	31	182/4TC	7.16	13,325	1860			132	PDF
HBR-77-080-B *	$2,646.00		80	78.07	22	143/5TC	5.38	13,710	3080			128	PDF
HBR-77-080-C *	$2,646.00		80	78.07	22	182TC	5.38	13,710	2570			132	PDF
HBR-77-120-B *	$2,646.00		120	122.94	14	143TC	3.42	12,480	3090			128	PDF
HBR-87-020-D *	$4,121.00	87	20	20.90	84	213/5TC	25.88	17,650	2780	91	25	230	PDF
HBR-87-020-E *	$4,121.00		20	20.90	84	254/6TC	25.88	17,650	1940			257	PDF
HBR-87-040-C *	$4,121.00		40	43.31	40	182/4TC	14.76	20,870	3450			208	PDF
HBR-87-040-D *	$4,121.00		40	43.31	40	213/5TC	14.76	20,870	2930			230	PDF
HBR-87-060-C *	$4,121.00		60	61.42	28	182/4TC	11.11	22,270	3510			208	PDF
HBR-87-060-D *	$4,121.00		60	61.42	28	213/5TC	11.11	22,270	2780			230	PDF
HBR-87-080-C *	$4,121.00		80	82.86	21	182/4TC	8.72	23,570	4260			208	PDF
HBR-87-120-C *	$4,121.00		120	117.56	15	182TC	6.23	23,900	4370			208	PDF

* Due to size and/or weight restrictions, gearboxes HBR-67-xxx-x through HBR-87-xxx-x must ship via Freight.
** Although physical mounting to other motors is possible, please use only the motors as specified in this table.
1) Max Input Power is the highest HP 1800 rpm motor to be used with the gearbox under conditions of 1.0 service factor. Gearbox input power capacity decreases as motor speed decreases and as service factor increases.
2) OHL= Overhung Load ratings are for forces perpendicular to the output shaft and located at the shaft midpoint, such as from a gear, pulley, or sprocket with a belt or chain. Divide OHL ratings by the applicable OHL K factors shown separately in the Selection Factors tables. OHL ratings should also be divided by applicable service factors.
3) Maximum Mechanical Ratings are limits based on the strength and durability of gearbox components; applicable when operating time is short and stopped time is greater than or equal to operating time. These ratings are applicable for 1.0 service factor loads and may require modification depending upon characteristics of the applicable driven loads. Refer to the "Service Factors" table for more information.

Gearbox Selection Factors

Overhung Load K Factors for Various Drive Types

Chain & Sprocket	1.00
Gear	1.25
V-belt	1.50
Flat Belt	2.50
Variable Pitch Belt	3.50

Divide gearbox OHL ratings by the applicable OHL K factors.

Service Factors for Selecting Gearboxes (when used with electric motors)

Service Continuity (per day)	Load Characteristics			
	Uniform	Moderate Shock*	Heavy Shock*	Extreme Shock*
Occasional 1/2 hour	1.00	1.00	1.00	1.25
Less than 3 hours	1.00	1.00	1.25	1.50
3-10 hours	1.00	1.25	1.50	1.75
More than 10 hours	1.25	1.50	1.75	2.00

* Shock results from sudden increases in the torque demand of the load, such as: sudden stopping, restarting, and/or reversing; significantly heavy loads dropped onto a moving conveyor; impact loads such as punch press operations.

Depending upon the load characteristics, divide the gearbox HP, Overhung Load, and Maximum Mechanical Capacity ratings by the applicable service factor.

NOTE: For more detailed information regarding service factors and gearbox selection, please refer to our HBR Gearbox User Manual which is available for free download from our website at www.AutomationDirect.com.

IronHorse® Cast-Iron Helical Bevel Gearboxes

Helical Bevel Gearbox Accessories

HBR-37-DS
Double Output Shaft

HBR-37-S
Single Output Shaft

HBR-3777V
Breather Plug

HBR-8797V
Breather Plug

IronHorse Cast-Iron Helical Bevel Gearbox Accessories			
Part Number	***Price***	***Description***	***Drawing Links***
HBR-37-DS	$53.00	IronHorse gearbox double output shaft, 1in. For use with HBR-37 series gearboxes. (4) keys, (1) spacer and (1) retaining ring included.	PDF
HBR-37-S	$27.50	IronHorse gearbox single output shaft, 1in. For use with HBR-37 series gearboxes. (3) keys, (1) end plate, (1) lock washer and (1) bolt included.	PDF
HBR-47-DS	$78.00	IronHorse gearbox double output shaft, 1.25in. For use with HBR-47 series gearboxes. (4) keys, (1) spacer and (1) retaining ring included.	PDF
HBR-47-S	$39.00	IronHorse gearbox single output shaft, 1.25in. For use with HBR-47 series gearboxes. (3) keys, (1) end plate, (1) lock washer and (1) bolt included.	PDF
HBR-67-DS	$168.00	IronHorse gearbox double output shaft, 1.5in. For use with HBR-67 series gearboxes. (4) keys, (1) spacer and (1) retaining ring included.	PDF
HBR-67-S	$83.00	IronHorse gearbox single output shaft, 1.5in. For use with HBR-67 series gearboxes. (3) keys, (1) end plate, (1) lock washer and (1) bolt included.	PDF
HBR-77-DS	$217.00	IronHorse gearbox double output shaft, 2in. For use with HBR-77 series gearboxes. (4) keys, (1) spacer and (1) retaining ring included.	PDF
HBR-77-S	$109.00	IronHorse gearbox single output shaft, 2in. For use with HBR-77 series gearboxes. (3) keys, (1) end plate, (1) lock washer and (1) bolt included.	PDF
HBR-87-DS	$333.00	IronHorse gearbox double output shaft, 2.375in. For use with HBR-87 series gearboxes. (4) keys, (1) spacer and (1) retaining ring included.	PDF
HBR-87-S	$165.00	IronHorse gearbox single output shaft, 2.375in. For use with HBR-87 series gearboxes. (3) keys, (1) end plate, (1) lock washer and (1) bolt included.	PDF
HBR-3777V	$4.75	IronHorse breather plug, replacement. For use with size 37 through 77 HGR- and HBR-series gearboxes.	N/A
HBR-8797V	$7.25	IronHorse breather plug, replacement. For use with size 87 and larger HGR- and HBR-series gearboxes.	N/A