

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
- AIBC3 (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	2.83	NEMA 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					NEMA 56C	H					23									
WG-175-005-R	\$199.00					NEMA 56C	L					22									
WG-175-005-L	\$198.00					NEMA 56C	R					22									
WG-175-010-D	\$199.00	10:1	10.33:1	175	1.57	NEMA 56C	D				88	23	1.57	1.38	515	1.36	1.19	445			
WG-175-010-H	\$245.00					NEMA 56C	H					23									
WG-175-010-R	\$199.00					NEMA 56C	L					22									
WG-175-010-L	\$198.00					NEMA 56C	R					22									
WG-175-015-D	\$199.00	15:1	14.5:1	117	1.24	NEMA 56C	D				85	23	1.24	1.06	554	1.13	0.96	506			
WG-175-015-H	\$245.00					NEMA 56C	H					23									
WG-175-015-R	\$199.00					NEMA 56C	L					22									
WG-175-015-L	\$198.00					NEMA 56C	R					22									
WG-175-020-D	\$199.00	20:1	19.5:1	88	1.02	NEMA 56C	D				83	23	1.02	0.85	596	0.98	0.81	572			
WG-175-020-H	\$245.00					NEMA 56C	H					23									
WG-175-020-R	\$199.00					NEMA 56C	L					22									
WG-175-020-L	\$198.00					NEMA 56C	R					22									
WG-175-040-D	\$199.00	40:1	40:1	44	0.74	NEMA 56C	D				62	23	0.74	0.49	714	0.59	0.39	558			
WG-175-040-H	\$260.00					NEMA 56C	H					23									
WG-175-040-R	\$199.00					NEMA 56C	L					22									
WG-175-040-L	\$198.00					NEMA 56C	R					22									
WG-175-060-D	\$199.00	60:1	60:1	29	0.38	NEMA 56C	D				52	23	0.38	0.20	469	0.38	0.2	469			
WG-175-060-H	\$260.00					NEMA 56C	H					23									
WG-175-060-R	\$199.00					NEMA 56C	L					22									
WG-175-060-L	\$198.00					NEMA 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	3.62	NEMA 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					NEMA 56C	H					28								
WG-206-005-R	\$252.00					NEMA 56C	L					27								
WG-206-005-L	\$250.00					NEMA 56C	R					27								
WG-206-010-D	\$252.00	10:1	10.33:1	175	2.77	NEMA 56C	D				90	28	2.77	2.50	935	2.10	1.89	708		
WG-206-010-H	\$314.00					NEMA 56C	H					28								
WG-206-010-R	\$252.00					NEMA 56C	L					27								
WG-206-010-L	\$250.00					NEMA 56C	R					27								
WG-206-015-D	\$252.00	15:1	15.5:1	117	2.09	NEMA 56C	D				85	28	2.09	1.78	1002	1.40	1.20	673		
WG-206-015-H	\$314.00					NEMA 56C	H					28								
WG-206-015-R	\$252.00					NEMA 56C	L					27								
WG-206-015-L	\$250.00					NEMA 56C	R					27								
WG-206-020-D	\$238.00	20:1	19.5:1	88	1.57	NEMA 56C	D				82	28	1.57	1.29	914	1.17	0.96	681		
WG-206-020-H	\$314.00					NEMA 56C	H					28								
WG-206-020-R	\$252.00					NEMA 56C	L					27								
WG-206-020-L	\$252.00					NEMA 56C	R					27								
WG-206-040-D	\$240.00	40:1	40:1	44	1.09	NEMA 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					NEMA 56C	H					28								
WG-206-040-R	\$252.00					NEMA 56C	L					27								
WG-206-040-L	\$252.00					NEMA 56C	R					27								
WG-206-060-D	\$238.00	60:1	60:1	29	0.6	NEMA 56C	D				58	28	0.60	0.35	750	0.48	0.28	606		
WG-206-060-H	\$314.00					NEMA 56C	H					28								
WG-206-060-R	\$252.00					NEMA 56C	L					27								
WG-206-060-L	\$252.00					NEMA 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	4.57	NEMA 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					NEMA 56C	H												
WG-237-005-R	\$303.00					NEMA 56C	L												
WG-237-005-L	\$303.00					NEMA 56C	R												
WG-237-010-D	\$286.00	10:1	10.33:1	175	3.47	NEMA 56C	D	2.37	900	900	89	38	3.47	3.09	1158	2.24	1.99	746	
WG-237-010-H	\$359.00					NEMA 56C	H												
WG-237-010-R	\$303.00					NEMA 56C	L												
WG-237-010-L	\$300.00					NEMA 56C	R												
WG-237-015-D	\$286.00	15:1	15.5:1	117	2.64	NEMA 56C	D	2.37	900	900	84	38	2.64	2.22	1249	1.55	1.30	732	
WG-237-015-H	\$359.00					NEMA 56C	H												
WG-237-015-R	\$303.00					NEMA 56C	L												
WG-237-015-L	\$300.00					NEMA 56C	R												
WG-237-020-D	\$286.00	20:1	20:1	88	2.06	NEMA 56C	D	2.37	900	900	82	38	2.06	1.69	1195	1.36	1.12	791	
WG-237-020-H	\$359.00					NEMA 56C	H												
WG-237-020-R	\$303.00					NEMA 56C	L												
WG-237-020-L	\$300.00					NEMA 56C	R												
WG-237-040-D	\$286.00	40:1	40:1	44	1.45	NEMA 56C	D	2.37	900	900	71	38	1.45	1.02	1483	0.83	0.58	845	
WG-237-040-H	\$359.00					NEMA 56C	H												
WG-237-040-R	\$303.00					NEMA 56C	L												
WG-237-040-L	\$300.00					NEMA 56C	R												
WG-237-060-D	\$286.00	60:1	60:1	29	0.86	NEMA 56C	D	2.37	900	900	61	38	0.86	0.53	1149	0.63	0.39	844	
WG-237-060-H	\$359.00					NEMA 56C	H												
WG-237-060-R	\$303.00					NEMA 56C	L												
WG-237-060-L	\$300.00					NEMA 56C	R												
WG-262-005-D	\$306.00	5:1	5.25:1	350	5.24	NEMA 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					NEMA 182TC	H												
WG-262-005-R	\$327.00					NEMA 182TC	L												
WG-262-005-L	\$322.00					NEMA 182TC	R												
WG-262-010-D	\$306.00	10:1	10.67:1	175	4.17	NEMA 182TC	D	2.62	1000	1000	90	57	4.17	3.74	1445	3.06	2.75	1061	
WG-262-010-H	\$442.00					NEMA 182TC	H												
WG-262-010-R	\$327.00					NEMA 182TC	L												
WG-262-010-L	\$322.00					NEMA 182TC	R												

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	3.22	NEMA 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					NEMA 56C	H													50
WG-262-015-R	\$327.00					NEMA 56C	L													
WG-262-015-L	\$322.00					NEMA 56C	R													49
WG-262-020-D	\$306.00	20:1	19.5:1	88	2.67	NEMA 56C	D	2.62	1000	1000	83	50	2.67	2.21	1563	1.84	1.53	1078		
WG-262-020-H	\$442.00					NEMA 56C	H													50
WG-262-020-R	\$327.00					NEMA 56C	L													
WG-262-020-L	\$322.00					NEMA 56C	R													49
WG-262-040-D	\$306.00	40:1	40:1	44	1.85	NEMA 56C	D	2.62	1000	1000	72	50	1.85	1.32	1919	1.11	0.80	1153		
WG-262-040-H	\$442.00					NEMA 56C	H													50
WG-262-040-R	\$327.00					NEMA 56C	L													
WG-262-040-L	\$322.00					NEMA 56C	R													49
WG-262-060-D	\$306.00	60:1	60:1	29	1.16	NEMA 56C	D	2.62	1000	1000	66	50	1.16	0.77	1670	0.94	0.62	1346		
WG-262-060-H	\$442.00					NEMA 56C	H													51
WG-262-060-R	\$327.00					NEMA 56C	L													
WG-262-060-L	\$322.00					NEMA 56C	R													49

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2) Output Type: D = Dual Shaft; H = Hollow Bore; R = Right-Hand Shaft; L = Left-Hand Shaft

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Specifications (continued)

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													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	7.19	NEMA 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					NEMA 182/4TC	H													90
WG-325-010-LC	\$483.00					NEMA 182/4TC	L													90
WG-325-010-RC	\$483.00					NEMA 182/4TC	R													90
WG-325-015-DC	\$483.00	15:1	15.5:1	113	5.45	NEMA 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					NEMA 182/4TC	H													90
WG-325-015-LC	\$483.00					NEMA 182/4TC	L													90
WG-325-015-RC	\$483.00					NEMA 182/4TC	R													90
WG-325-020-DC	\$483.00	20:1	19.5:1	90	4.74	NEMA 182TC	D	3.25	1200	1100	86	91	4.74	4.07	2875	3.31	2.85	2011		
WG-325-020-HC	\$633.00					NEMA 182TC	H													90
WG-325-020-LC	\$483.00					NEMA 182TC	L													90
WG-325-020-RC	\$483.00					NEMA 182TC	R													90
WG-325-030-DA	\$483.00	30:1	30:1	58	3.66	NEMA 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		NEMA 145TC	D					88								
WG-325-030-HA	\$633.00			58		NEMA 56C	H					87								
WG-325-030-HB	\$633.00					NEMA 145TC	H					87								
WG-325-030-LA	\$483.00					NEMA 56C	L					87								
WG-325-030-LB	\$483.00					NEMA 145TC	L					87								
WG-325-030-LC	\$483.00			3.66	NEMA 182TC	L	87													
WG-325-030-RA	\$483.00			3.66	NEMA 56C	R	87													
WG-325-030-RB	\$483.00				NEMA 145TC	R	87													
WG-325-030-RC	\$483.00			3.66	NEMA 182TC	R	87													

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													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	3.35	NEMA 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					NEMA 145TC	D					88							
WG-325-040-HA	\$633.00					NEMA 56C	H					87							
WG-325-040-HB	\$633.00					NEMA 145TC	H					87							
WG-325-040-LA	\$483.00					NEMA 56C	L					87							
WG-325-040-LB	\$483.00					NEMA 145TC	L					87							
WG-325-040-RA	\$483.00					NEMA 56C	R					87							
WG-325-040-RB	\$483.00					NEMA 145TC	R					87							
WG-325-060-DA	\$483.00	60:1	60:1	29	2.03	NEMA 56C	D	3.25	1200	1100	71	88	2.03	1.44	3127	1.61	1.14	2476	
WG-325-060-DB	\$483.00					NEMA 145TC	D					88							
WG-325-060-HA	\$633.00					NEMA 56C	H					87							
WG-325-060-HB	\$633.00					NEMA 145TC	H					87							
WG-325-060-LA	\$483.00					NEMA 56C	L					87							
WG-325-060-LB	\$483.00					NEMA 145TC	L					87							
WG-325-060-RA	\$483.00					NEMA 56C	R					87							
WG-325-060-RB	\$483.00					NEMA 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.



NEMA Aluminum Worm 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 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.

We also offer optional single and double output shafts, output flanges, torque arms, and output covers.



IronHorse Aluminum Worm Gearbox Accessories

Features

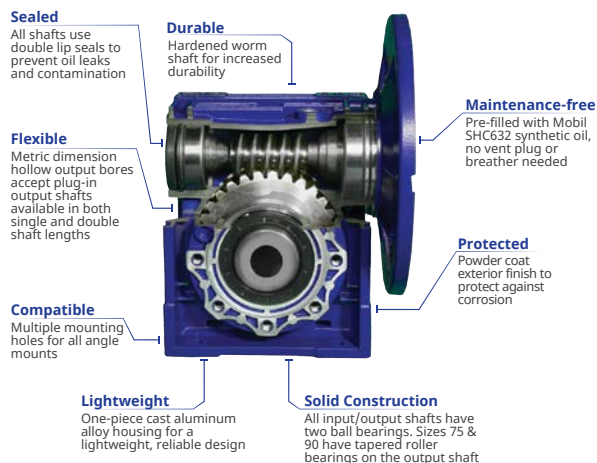
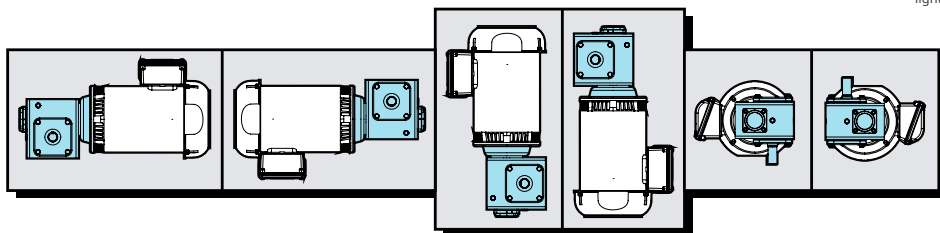
- 10:1 to 100:1 ratios
- Frame sizes 30, 40, 50, 63, and 75 mm
- Compatible with NEMA motor sizes: 56C, 145TC and 182/4TC
- Cast aluminum alloy housing for lightweight design and optimal heat dissipation
- Hardened worm shaft for increased durability
- Two bearings on input and output shafts (Size 75 gearboxes have tapered roller bearings on the output shaft)
- All units filled with Mobil SHC632 synthetic oil
- No breather/vent plug needed; maintenance-free reducer
- Double lip oil seals prevent leakage
- Multiple mounting holes for any mounting orientation
- Gearbox outer finish: Powder Coat
- Hollow output bores

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.

Mounting Orientation

IronHorse NEMA aluminum gearboxes can be mounted in any orientation (see diagram below).





10:1 NEMA Aluminum Worm Gearboxes

IronHorse NEMA Aluminum Worm Gearbox Specifications											
Part Number	Price	Nominal/ Actual Ratio	Center Distance (mm)	Input Sized for NEMA Motor Frame	NEMA Motor Face Type	Input Bore Diameter (in)	Output Bore Diameter (in)	Approx Weight (lb)	Drawing Links		
WGA-30M-010-H1	\$118.00	10:1	30	NEMA 56C	NEMA 56C	0.625	0.625in	3	PDF		
WGA-40M-010-H1	\$148.00		40		NEMA 56C		0.75in	5	PDF		
WGA-50M-010-H1	\$203.00		50		NEMA 56C		1in	8	PDF		
WGA-63M-010-H1	\$261.00		63		NEMA 56C		1.125in	13	PDF		
WGA-63M-010-H2	\$261.00		NEMA 145TC	NEMA 145TC	0.875	PDF					
WGA-75M-010-H1	\$380.00		75	NEMA 56C	NEMA 56C	0.625	1.25in	19	PDF		
WGA-75M-010-H2	\$380.00			NEMA 145TC	NEMA 145TC	1.125			PDF		
WGA-75M-010-H3	\$380.00			NEMA 182/4TC	NEMA 182/4TC				PDF		

IronHorse NEMA Aluminum Worm Gearbox Ratings									
Part Number	Maximum Ratings @ 1750 RPM Input (Mechanical/Thermal)			Nominal Motor HP @ 1800 RPM	Output RPM @ 1750 RPM Input	Overhung Load (lb)	Efficiency (%)	Thrust Load (lb)	Maximum Backlash (arc-minute)
	Input Power (hp)	Output Power (hp)	Output Torque (lb-in)						
WGA-30M-010-H1	0.54	0.43	160	0.54	175	142	80	31	29
WGA-40M-010-H1	1.15	0.95	370	1.21		279	83	60	24
WGA-50M-010-H1	2.06	1.73	664	2.12		406	84	83	19
WGA-63M-010-H1	3.67	3.16	1108	3.52		510	86	108	17
WGA-63M-010-H2									
WGA-75M-010-H1	5.44	4.68	1656	5.2		604		128	16
WGA-75M-010-H2									
WGA-75M-010-H3									



20:1 NEMA Aluminum Worm Gearboxes

IronHorse NEMA Aluminum Worm Gearbox Specifications

Part Number	Price	Nominal/ Actual Ratio	Center Distance (mm)	Input Sized for NEMA Motor Frame	NEMA Motor Face Type	Input Bore Diameter (in)	Output Bore Diameter (in)	Approx Weight (lb)	Drawing Links
WGA-30M-020-H1	\$118.00	20:1	30	NEMA 56C	NEMA 56C	0.625	0.625in	3	PDF
WGA-40M-020-H1	\$148.00		40		NEMA 56C		0.75in	5	PDF
WGA-50M-020-H1	\$203.00		50		NEMA 56C		1in	8	PDF
WGA-63M-020-H1	\$261.00		63		NEMA 56C		1.125in	13	PDF
WGA-63M-020-H2	\$261.00		NEMA 145TC	NEMA 145TC	0.875	PDF			
WGA-75M-020-H1	\$380.00		75	NEMA 56C	NEMA 56C	0.625	1.25in	19	PDF
WGA-75M-020-H2	\$380.00			NEMA 145TC	NEMA 145TC	1.125			PDF

IronHorse NEMA Aluminum Worm Gearbox Ratings

Part Number	Maximum Ratings @ 1750 RPM Input (Mechanical/Thermal)			Nominal Motor HP @ 1800 RPM	Output RPM @ 1750 RPM Input	Overhung Load (lb)	Efficiency (%)	Thrust Load (lb)	Maximum Backlash (arc-minute)
	Input Power (hp)	Output Power (hp)	Output Torque (lb-in)						
WGA-30M-020-H1	0.3	0.22	151	0.28	88	179	72	40	28
WGA-40M-020-H1	0.61	0.48	361	0.63		350	78	76	24
WGA-50M-020-H1	1.13	0.88	656	1.14		510		104	17
WGA-63M-020-H1	2.04	1.63	1225	2.06		641	80	137	16
WGA-63M-020-H2									
WGA-75M-020-H1	3.14	2.48	1953	3.24		759	79	161	14
WGA-75M-020-H2									



IronHorse® Worm Gearboxes

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® Worm Gearboxes

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