

INSTALLATION, MAINTENANCE, AND LUBRICATION



CHAPTER

3

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SAFETY NOTIFICATION

Please read this entire manual before the assembly or operation of this helical gearbox to make sure all safety considerations have been exercised and that care and concern for persons and equipment have been fully understood.

- 1) Failure to adhere to the instructions in this operating manual may result in severe or fatal injuries. During the operation of this unit, please take all necessary actions to protect personnel from all moving, rotating, and high temperature sections to avoid harm to personnel. There is a risk of burns caused by hot surfaces when this product is in use. Use properly rated protective gear when working with these products.
- 2) Only qualified personnel should transport, store, install, assemble, connect, start-up, operate and maintain this unit.
- 3) When you receive the helical bevel gearbox, please check the outside packaging first. If damage is apparent from shipping and transportation, please refuse shipment from the carrier and contact AutomationDirect customer service immediately for unit replacement. Never install and operate damaged products.
- 4) Before lifting, please make sure the lifting equipment for this unit is properly rated for the weight load of this equipment.
- 5) Use the unit only for its intended purpose.
- 6) Never operate the unit without the necessary protective covers or housing firmly in place.

INSTALLATION



NOTE: *Improper installation will cause damage to the speed reducer. Please read and familiarize yourself with every step of these installation instructions before beginning the installation process.*

- 1) Before installation, please check the input horsepower and ratio and verify that they match the ratings on the punched nameplate of the gearbox.
- 2) Clean all dirt from the surface of the flange before installation. During cleaning, be careful not to get cleaning solvents on any seals as cleaning solvents may damage the seals and void product limited warranty.
- 3) This gearbox can be mounted in any of six install positions (M1, M2, M3, M4, M5, M6). Positions M5 and M6 require an oil fill baffle plate, which is preinstalled by the factory and will not affect mounting positions M1–M4. See “Mounting Positions” ([page 3–4](#)) for the definition of mounting positions M1–M6.
- 4) Install the gearbox on a flat, stable, and rigid foundation for accurate alignment to prevent damage to the reducer housing and the motor. The installation location should provide good air ventilation for the unit and allow for convenient oil filling and draining during unit maintenance. The suggested tolerance of flatness on the base is:
 - For gearbox size 77 and smaller: < 0.1 mm/m
 - For gearbox size 87: < 0.2 mm/m
- 5) Once the gearbox is installed, and before connecting the motor, turn the input quill of the reducer by hand to ensure it is turning freely and is not in a dead-lock condition.
- 6) These IronHorse Helical Bevel Gearboxes connect with NEMA frame motors using a quill style mount. *Paint or spray the motor shaft with anti-seize compound before inserting the motor shaft into the gearbox input quill.*

NOTE: *On some gearboxes, the flange will extend below the base of the gearbox.*

- 7) Once the motor and gearbox are connected, run a no-load test on the motor and the gearbox. Correct any abnormalities regarding misalignment before connecting the gearbox load and beginning regular operation.
- 8) To prevent the factory-filled oil lubricant from splashing out during transportation, the brass breather plug has a rubber ring installed. *Remove the rubber ring from the brass breather plug before start-up.* This will allow the gearbox to vent to the atmosphere, and is necessary to ensure proper operation and prevent overheating.

BREATHER PLUG WITH RING INSTALLED

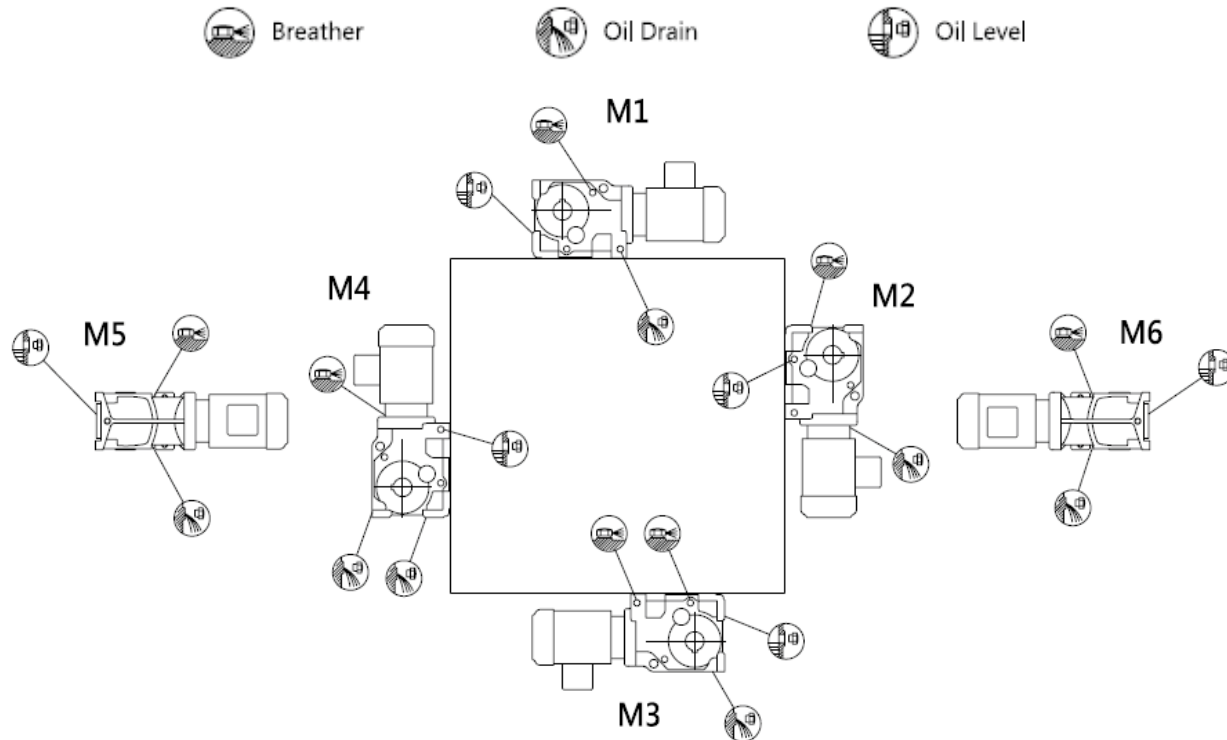


BREATHER PLUG WITH RING REMOVED



- 9) To avoid an overload on the bearings of the output shaft, please refer to the overhung load (OHL) ratings in chapter 2, and ensure that the gearbox is sized properly for the overhung load.

MOUNTING POSITIONS



STARTUP PROCEDURE

- 1) **Check gearbox oil level before starting up.** Please refer to the lubrication section for instructions on proper unit lubrication. Unit lubrication requirements vary depending upon mounting positions.
- 2) Run-In Procedure – This helical & bevel gearbox does **not** require a run-in procedure; however, **the oil should be changed after the first 500 hours of operation.**

INSPECTION AND MAINTENANCE

Check the oil level regularly and change as recommended.

- 1) Change the oil after the first 500 hours of use; subsequent oil changes are needed every 2,500 hours of operation. Regular checks of oil level and conditions are recommended on a more frequent basis.
- 2) Regularly inspect all seals for leaks. If leaks are present, discontinue use until seals have been replaced. Seal sizes are listed later in this chapter ([page 3-7](#)).
- 3) Check for noise during regular operation. Noise coming from the unit may indicate a broken bearing. Discontinue use until bearings have been replaced. Bearing sizes are listed later in this chapter ([page 3-7](#)).
- 4) Regularly check the brass breather vent holes of the gearbox and ensure sure that all openings are free of clogs and debris. *The exterior of the gearbox should be kept clean.* The unit housing dissipates heat, and must be kept free of debris to reduce heat buildup.
- 5) Check installation bolts regularly and tighten as required.
- 6) Any replacement parts used should be equivalent to the original factory standards. When replacement parts are used, a running test should be conducted without load before the unit is returned to full operation.
- 7) This equipment requires regular maintenance. Keep a log of oil changes and bolt tightening. Log any equipment issues and all corrective actions taken for warranty records.

LUBRICATION

LUBRICANT SELECTION AND VOLUME

- 1) All IronHorse helical bevel gearboxes are initially filled with the proper quantity of lubricant for an M1 mounting position. If you want to change the assembly mounting position, please move the breather plug, oil gauge, and drain plug to the correct positions, and add or remove oil to the correct specified fill level. The breather plug should always be located at the highest point above the oil fill level.



NOTE: Failure to move the breather plug to the correct position for the selected mounting position may result in overheating of the unit, potentially causing damage to seals and bearings, and leading to leaks and eventual product failure.

- 2) A certain brand and specification of oil is required and unique to a particular helical bevel gearbox. Do not mix different brands and specification types of oil. Oil suggestions for IronHorse units are as follows:

IronHorse Helical Bevel Gearbox Lubricant Selection				
Gearbox Temperature	CPC	ISO VG	Mobil	Shell
Standard Load @ 1750 RPM Input				
-30°C to -15°C	HD100	VG100	Mobilgear 627	Omala 100
-15°C to -3°C	HD150	VG150	Mobilgear 629	Omala 150
-3°C to 23°C	HD220	VG220	Mobilgear 630	Omala 220
23°C to 40°C	HD320	VG320	Mobilgear 632	Omala 320
40°C to 80°C	HD460	VG460	Mobilgear 634	Omala 460
Heavy Load @ 1750 RPM Input				
-30°C to -15°C	HD150	VG150	Mobilgear 629	Omala 150
-15°C to -3°C	HD220	VG220	Mobilgear 630	Omala 220
-3°C to 23°C	HD320	VG320	Mobilgear 632	Omala 320
23°C to 40°C	HD460	VG460	Mobilgear 634	Omala 460
40°C to 80°C	HD680	VG680	Mobilgear 636	Omala 680

IronHorse Helical Bevel Gearbox Lubricant Volume (unit = liter)					
Mounting Position	Gearbox Size				
	37	47	67	77	87
M1	0.50	0.80	1.10	2.10	3.70
M2	1.00	1.30	2.40	4.10	8.20
M3	1.00	1.60	2.70	4.60	8.80
M4	1.40	2.15	3.70	5.90	11.10
M5	1.00	1.60	2.60	4.40	8.00
M6	1.00	1.60	2.60	4.40	8.00



NOTE: IronHorse helical bevel gearboxes are shipped prefilled with CPC HD320 oil for an M1 mounting position. Operator must add or remove oil if alternative mounting positions are used. Recommended oil fill volumes are shown in the table above, but these values are estimates and should not be used exclusively to correctly set the gearbox oil level. **ALWAYS fill the reducer to the correct oil level plug and recheck after one (1) week of use.**

- 3) Before replacing existing oil, completely flush and drain the interior of the reducer.
- 4) During operation, if the units heats above 80°C or if any abnormal noise occurs, please shut down the unit immediately. Check for proper oil fill, oil type, leaking seals and broken bearings and fix or replace as necessary before restarting the unit again. Do not run the unit if problems exist.

LUBRICANT PLUG LOCATIONS & FILL INSTRUCTIONS

All IronHorse helical bevel gearboxes have multiple locations for the Breather/Fill, Level, and Drain plugs, and the units are shipped with the plugs installed as configured for an M1 mounting position. If the units are installed in an orientation other than M1, the plugs are to be reinstalled by the user in the applicable locations as shown in “Mounting Positions” (page 3-4). The oil Drain plug should always be placed in the lowest position, and the Breather/Fill plug should always be placed in the highest position on the gearbox.

When filling the gearbox with oil, remove the oil Breather/Fill and Level plugs. Add oil through the Fill plug hole until it begins to come out of the Level plug hole. Replace both of the plugs. The gearbox now has enough oil inside.



NOTE: The breather plug should always be placed in the filler position. When filling the gearbox with oil, remove the breather plug, add the oil, and reinstall the breather plug.

RECOMMENDED LUBRICANT: CPC E.P. LUBRICANT HD

CPC E.P. Lubricants HD are engineered for exceptional metal surface adhesion, and are formulated from highly refined base oils and special additives, including EP (extreme pressure) additives, anti-oxidation, anti-rust, anti-foamers, and more. CPC Lubricants also contain sulfur-phosphorus EP additives to form a tenacious oil film on metal surfaces that can endure high E.P. and vibration loads to prevent gear-surface overheating and premature, excessive wear. These oils pass FZG gear test (DIN 51354) with pass load stage 12+.

These oils possess excellent oxidative stability, and they effectively prevent gum formation and oil degradation for extended service. These oils are suitable for lubrication of heavily loaded bearings and gears.

CPC E.P. Lubricants are available in three packages:

- Bulk (HD320, HD460, and HD680)
- 200 liter drum
- 19 liter pail (HD150, HD220, HD320 and HD460)

CPC E.P. Lubricants HD Specifications								
Grade Number	HD32	HD68	HD100	HD150	HD220	HD320*	HD460	HD680
Gravity, API, 15.6°C	30.4	28.5	27.8	27.1	26.5	25.9	25.3	24.4
Viscosity, Kin., cSt @ 40°C	31.15	67.2	98.1	143.6	212.2	310.5	440.4	656.2
Viscosity, Kin., cSt @ 100°C	5.26	8.62	11.16	14.38	18.59	23.70	29.80	38.68
Viscosity Index	99	99	99	98	97	96	96	96
Pour Point, °C	-18	-18	-18	-18	-18	-18	-18	-12
Flash Point, COC, °C	224	240	256	264	278	290	310	316
Color, D1500	L3.0	3.0	L4.0	4.0	L4.5	4.5	4.5	L5.0
TAN, mgKOH/g	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Timken EP, OK Load, Lbs	65	65	65	65	65	65	65	70
Carbon Residue, Rams., %	0.25	0.27	0.34	0.40	0.45	0.51	0.56	0.64
Sulfated Ash, %	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Product Number	LA82032	LA82068	LA82100	LA82150	LA82220	LA82320	LA82460	LA82680

* IronHorse helical bevel gearboxes are shipped prefilled with CPC HD320 oil for an M1 mounting position. (Operator must add or remove oil if alternative mounting positions are used.)

SEAL SIZES

IronHorse Helical Bevel Gearbox Seal Sizes		
<i>Gearbox Model</i>	<i>Input Seal Size [mm]</i>	<i>Output Seal Size [mm]</i>
<i>HBR-37-xxx-A</i>	30x47x6	45x75x8
<i>HBR-37-xxx-B</i>	40x55x8	45x75x8
<i>HBR-47-xxx-A</i>	30x47x6	50x80x12
<i>HBR-47-xxx-B</i>	40x55x8	50x80x12
<i>HBR-47-xxx-C</i>	45x60x7	50x80x12
<i>HBR-67-xxx-A</i>	30x47x6	55x90x13
<i>HBR-67-xxx-B</i>	40x55x8	55x90x13
<i>HBR-67-xxx-C</i>	45x60x7	55x90x13
<i>HBR-77-xxx-B</i>	40x55x8	70x110x12
<i>HBR-77-xxx-C</i>	45x60x7	70x110x12
<i>HBR-77-xxx-D</i>	55x80x10	70x110x12
<i>HBR-87-xxx-C</i>	45x60x7	85x130x12
<i>HBR-87-xxx-D</i>	55x80x10	85x130x12
<i>HBR-87-xxx-E</i>	65x90x12	85x130x12

BEARING SIZES

IronHorse Helical Bevel Gearbox Bearing Sizes		
<i>Gearbox Model</i>	<i>Input Bearings (2 required)</i>	<i>Output Bearing</i>
<i>HBR-37-xxx-A</i>	6006ZZ	6009ZZ
<i>HBR-37-xxx-B</i>	6008ZZ	6009ZZ
<i>HBR-47-xxx-A</i>	6006ZZ	6010ZZ
<i>HBR-47-xxx-B</i>	6008ZZ	6010ZZ
<i>HBR-47-xxx-C</i>	6009ZZ	6010ZZ
<i>HBR-67-xxx-A</i>	6006ZZ	32011
<i>HBR-67-xxx-B</i>	6008ZZ	32011
<i>HBR-67-xxx-C</i>	6009ZZ	32011
<i>HBR-77-xxx-B</i>	6008ZZ	32014
<i>HBR-77-xxx-C</i>	6009ZZ	32014
<i>HBR-77-xxx-D</i>	6210ZZ + 6211ZZ	32014
<i>HBR-87-xxx-C</i>	6009ZZ	32017
<i>HBR-87-xxx-D</i>	6210ZZ + 6211ZZ	32017
<i>HBR-87-xxx-E</i>	6212ZZ + 6213ZZ	32017

STORAGE

If the helical gearbox won't be used immediately and needs to be placed in storage for a period of time that exceeds six months, please pay attention to the special storage instructions outlined below.

- 1) If the gearbox is to be placed in long term storage, care should be taken by applying anti-corrosion inhibitors on all non-coated parts, including the input shaft, output shaft, flange, and foot mounts. Units should be stored under a waterproof cover, and care should be taken to keep the units free of dust and debris.
- 2) All units should be stored in a dry, dust free environment. Avoid exposing the units to sunlight, heat, and humidity during storage.
- 3) All units should be stored in a temperature-controlled environment, between 5° and 40°C (41° and 104°F).
- 4) If the storage time exceeds 2 years, please inspect units carefully before use. Units should be examined for rust. *Units with rust should not be placed into operation.* Check all bearings, seals, oil fill levels, and oil specifications before use. Refer to the Lubrication section ([page 3-5](#)) for proper oil specifications.