

# INSTALLATION, MAINTENANCE, AND LUBRICATION

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## CHAPTER

# 3

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### SAFETY NOTIFICATION

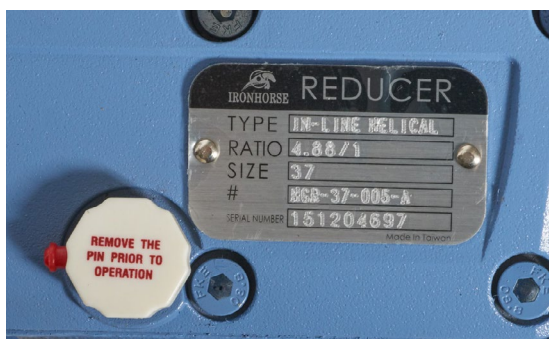
**Please read this entire manual before the assembly or operation of this helical gearbox to make sure all safety considerations have been exercised and that care and concern for persons and equipment have been fully understood.**

- 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 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 protection covers or housing firmly in place.

## INSTALLATION

**Improper installation will cause damage to the helical gearbox. Please familiarize yourself with the entire set of installation instructions before starting installation.**

- 1) Clean all dirt from the surface of the shaft or 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.
- 2) The helical gearbox can be placed in any of five install positions (M1, M3, M4, M5 or M6). Position M2 is not permitted. See **MOUNTING POSITIONS** ([page 3-4](#)) for the definition of mounting positions.
- 3) The helical gearbox should be installed on a stable foundation.  
The installation location should provide good air ventilation for the unit and allow for convenience of oil filling/ draining for proper ongoing unit maintenance.
- 4) Foundation flatness specifications.
  - Mounting footprint length  $\leq 230 - 0.1\text{mm}$
  - $230 < \text{Mounting footprint length} \leq 440 - 0.2\text{mm}$
  - $440 < \text{Mounting footprint length} \leq 500 - 0.4\text{mm}$
  - $500 < \text{Mounting footprint length} \leq \quad - 0.6\text{mm}$
- 5) IronHorse helical gearboxes are designed to be connected to NEMA frame motors. The connection to the motor is a quill style mount. Please note that some flange sizes will extend below the base of the helical gearbox.
- 6) After the installation, please turn the input shaft manually to avoid a dead-lock condition.
- 7) The unit is shipped with a vent plug in the filler location for mounting positions M1 and M3. If required, move the vent plug to the filter location as shown on the following page.
- 8) If the vent plug is white plastic, remove the red pin before operating the gearbox. If it is brass, pull off the rubber strap as shown below.



*Plastic vent plug*

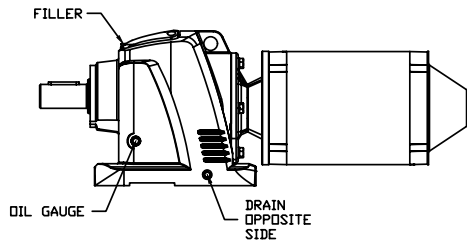


*Brass vent plug*

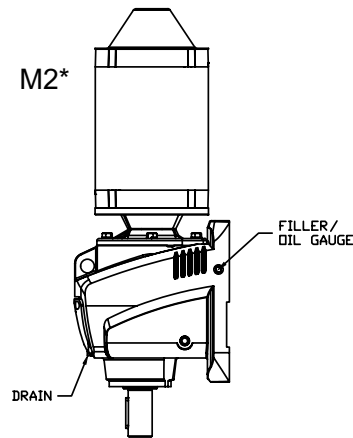
*Brass vent plug - readied for use*

## MOUNTING POSITIONS

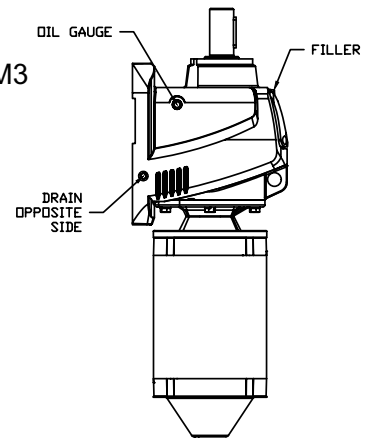
M1



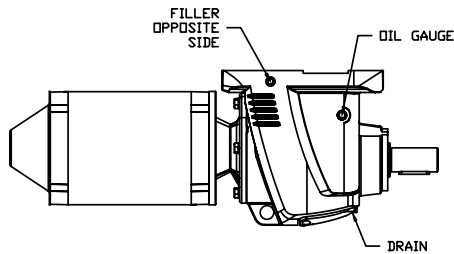
M2\*



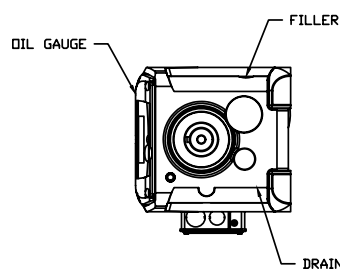
M3



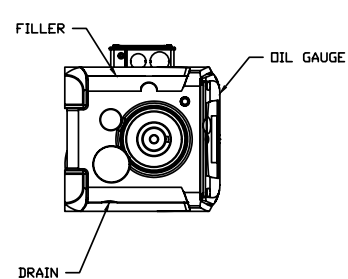
M4



M5



M6



**\*NOTE:** Mounting position M2 is not permitted.

## STARTING UP

- 1) Check oil level before starting up. See the Lubrication section for instructions on proper unit lubrication.
- 2) Run In Procedure - IronHorse helical gearboxes do not require a run in procedure; however, the oil should be changed after the first 300 hours of operation.

## INSPECTION AND MAINTENANCE

**Please check the oil quality and change it regularly.**

- 1) The oil should be changed after the first 300 hours of use. After that, the oil should be changed every 2500 hours or 6 months, whichever occurs first.
- 2) Regularly inspect all seals for leaking. Seal sizes are listed later in this chapter ([page 3-8](#)).
- 3) Listen for excessive 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 3-8](#)).
- 4) Regularly check the breather valve holes of the helical gearbox and make sure all openings are unclogged and free of debris. The exterior of the helical inline unit 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 parts used should be equivalent to the original factory standards. When parts are used, a running test should be conducted without a load before the unit is returned to 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**

- 1) All IronHorse helical gearboxes are initially filled with the proper quantity 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 position and fill or decrease the quantity of oil to the correct fill level specifications. The breather plug should always be located at the highest point above the oil fill level.
- 2) A certain brand and specification of oil is required and unique to a particular helical gearbox. Be sure not to mix different brands and specification types of oil. IronHorse helical gearboxes are shipped with CPC HD320 oil. Oil suggestions for IronHorse units are as follows:

<b>IronHorse Helical Gearbox Lubricant Selection</b>				
<b>Standard Load / Input 600 RPM or Over 600 RPM</b>				
<b>Standard Load &lt; 1.25 service factor (see Chapter 2 for details)</b>				
<b>Gearbox Temperature</b>	<b>CPC</b>	<b>ISO VG</b>	<b>Mobil</b>	<b>Shell</b>
-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
<b>Heavy Load / Input 600 RPM or Over 600 RPM</b>				
<b>Heavy Load &gt; 1.25 service factor (see Chapter 2 for details)</b>				
-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

- 3) Before replacing the oil, the existing oil inside of gearbox should be drained and the unit should be cleaned up before filling with new oil.
- 4) During operation, if the units heats up over 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.

## FILLER / OIL GAUGE / DRAIN PLUG LOCATIONS

All IronHorse helical gearboxes have six (6) filler/oil gauge/drain plugs. The six plugs are located in different locations depending on the actual box size selected. Filler / gauge / drain plug locations, are shown below. Units are shipped configured for an M1 mounting position. Refer to the section **MOUNTING POSITIONS** in this chapter to see the location of the filler / gauge / drain plug locations for each different mounting position. If the mounting position is changed, the oil drain plug should always be placed in the lowest position after a new mounting position is selected.

The **Recommended Lubricant by Box Size and Mounting Position** table in this chapter lists the proper amount of oil for each mounting position. Oil fill amount is listed in liters.

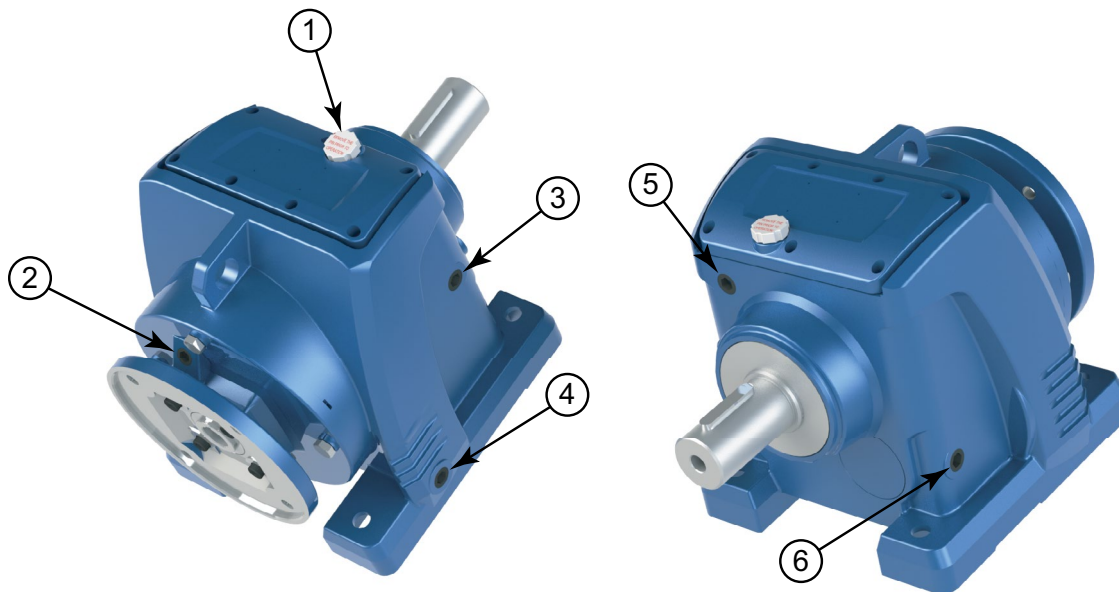
When filling the gearbox with oil remove the oil gauge plug. Add oil until it begins to come out of the oil gauge plug. Replace the oil gauge plug and the fill plug. The gearbox now has enough oil inside.

When changing the oil, it may not be possible to remove all of the existing oil without disconnecting and lifting the unit. If lifting the unit is possible, simply lift the unit with proper lifting equipment, lower the drain plug by tilting the unit sideways, and gently shake the unit until all of the existing oil is removed.

The white cap shown below is a breather plug and should always be located in the filler position on the gearbox. If the gearbox is used in a position other than M1, the breather plug will need to be moved to the filler position after the new mounting is completed.



**NOTE:** *The breather plug should always be placed in the filler position. When filling the gearbox with oil, remove the breather plug, fill the oil and re-install the breather plug.*



**RECOMMENDED LUBRICANT**

**CPC E.P. LUBRICANT HD**

CPC E.P. Lubricants HD are made of the highly refined base oils and special additives, including EP(extreme pressure) additives, anti-oxidation, anti-rust, anti-foamer, etc., with very good metal surface adhesion. These oils also contain sulfur-phosphorus EP additive to form tenacious oil film on metal surfaces that can endure high E.P. and vibration load to prevent gear surface over-heat and serious wear. These oils pass FZG gear test (DIN 51354) with pass load stage 12+.

These oils possess very excellent oxidative stability, and thus can 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 No.	LA82032	LA82068	LA82100	LA82150	LA82220	LA82320	LA82460	LA82680

**RECOMMENDED LUBRICANT AMOUNT BY BOX SIZE AND MOUNTING POSITION**

Mounting Position	Lubricant Amount (Liters)				
	Box Size				
	37	47	67	77	87
<b>M1</b>	0.30	0.70	1.10	1.20	2.30
<b>M3</b>	0.85	1.60	1.60	3.80	6.70
<b>M4</b>	0.95	1.50	2.80	3.60	7.20
<b>M5</b>	0.95	1.50	2.00	3.40	6.50
<b>M6</b>	0.75	1.50	1.80	2.50	6.30



**NOTE:** Oil fill volumes are approximate. To prevent damage to the gearbox fill the gearbox to the correct oil level and recheck after one week of use.

**SEAL SIZES**

<b>IronHorse Helical Inline Gearbox Seal Sizes</b>		
<b>Gearbox Model</b>	<b>Input Seal Size [mm]</b>	<b>Output Seal Size [mm]</b>
<i>HGR-37-xxx-A</i>	30x47x6	35x62x11
<i>HGR-37-xxx-B</i>	40x55x8	35x62x11
<i>HGR-47-xxx-A</i>	30x47x6	40x72x10
<i>HGR-47-xxx-B</i>	40x55x8	40x72x10
<i>HGR-47-xxx-C</i>	45x60x7	40x72x10
<i>HGR-67-xxx-A</i>	30x47x6	50x80x12
<i>HGR-67-xxx-B</i>	40x55x8	50x80x12
<i>HGR-67-xxx-C</i>	45x60x7	50x80x12
<i>HGR-77-xxx-B</i>	40x55x8	55x85x12
<i>HGR-77-xxx-C</i>	45x60x7	55x85x12
<i>HGR-77-xxx-D</i>	55x80x10	55x85x12
<i>HGR-87-xxx-B</i>	40x55x8	65x120x15
<i>HGR-87-xxx-C</i>	45x60x7	65x120x15
<i>HGR-87-xxx-D</i>	55x80x10	65x120x15
<i>HGR-87-xxx-E</i>	65x90x12	65x120x15

**BEARING SIZES**

<b>IronHorse Helical Inline Gearbox Bearing Sizes</b>		
<b>Gearbox Model</b>	<b>Input Bearings (2 required)</b>	<b>Output Bearings (2 required)</b>
<i>HGR-37-xxx-A</i>	6006ZZ	6205 + 6206ZZ
<i>HGR-37-xxx-B</i>	6008ZZ	6205 + 6206ZZ
<i>HGR-47-xxx-A</i>	6006ZZ	6206 + 6207ZZ
<i>HGR-47-xxx-B</i>	6008ZZ	6206 + 6207ZZ
<i>HGR-47-xxx-C</i>	6009ZZ	6206 + 6207ZZ
<i>HGR-67-xxx-A</i>	6006ZZ	6206 + 6208ZZ
<i>HGR-67-xxx-B</i>	6008ZZ	6206 + 6208ZZ
<i>HGR-67-xxx-C</i>	6009ZZ	6206 + 6208ZZ
<i>HGR-77-xxx-B</i>	6008ZZ	6207 + 6208ZZ
<i>HGR-77-xxx-C</i>	6009ZZ	6207 + 6208ZZ
<i>HGR-77-xxx-D</i>	6210ZZ + 6211ZZ	6210 + 6311ZZ
<i>HGR-87-xxx-B</i>	6008ZZ	6210 + 6311ZZ
<i>HGR-87-xxx-C</i>	6009ZZ	6210 + 6311ZZ
<i>HGR-87-xxx-D</i>	6210ZZ + 6211ZZ	6210 + 6311ZZ
<i>HGR-87-xxx-E</i>	6212ZZ + 6213ZZ	6210 + 6311ZZ



## 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 water proof 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 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 for proper oil specifications.

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