



# Installation and Maintenance Manual

## WorldWide Parallel Shaft Helical Speed Reducers

This operation manual includes important information for the installation, assembly, operation and maintenance of the WorldWide Electric Corporation helical inline speed reducer. Please read this manual carefully before you start using this product. Please contact WorldWide Electric's customer service department at 1-800-808-2131 if you have any questions regarding this documentation. Failure to follow the instructions outlined in this manual may result in loss of your right to fulfillment of any claim under limited product warranty and potentially may cause injury to personnel, equipment and/or property, including loss of life. WorldWide Electric Corporation assumes no liability for injury to persons or damage to equipment or property resulting from non-observance of these operating instructions. In such cases, any liability for defects is excluded.

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# Safety Notification

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

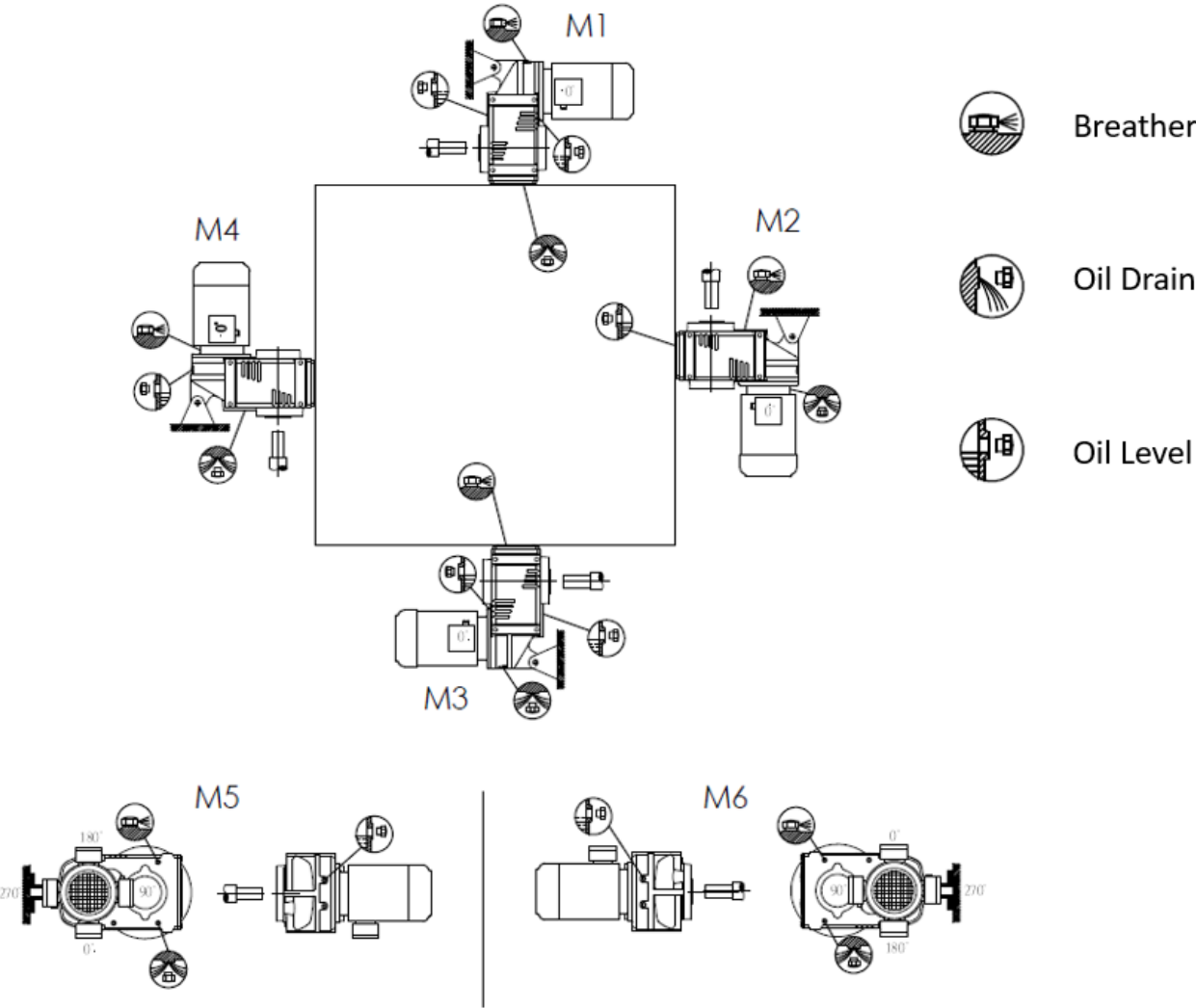
1. Failure to adhere to the instructions in this operating manual may result in severe or fatal injuries. During the operation of this unit, please take all necessary actions to protect personnel from all moving, rotating, and high temperature sections to avoid harm to personnel. There is a risk of burns 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 speed reducer, please check the outside packaging first. If damage is apparent from shipping and transportation, please refuse shipment from the carrier and contact WorldWide Electric customer service immediately for unit replacement. Never install and operate damaged products.
4. Before physically moving the speed reducer, please tighten the eye-bolt as it may have become loose during shipment. The eye-bolt of this reducer is designed to bear the equipment's own weight. Please do not hang other items on it. 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 or energize the unit without the necessary protection covers or housing firmly in place.

# Installation

**Improper installation will cause damage to the speed reducer. 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 speed reducer can be placed in any of six install positions – M1, M2, M3, M4, M5 or M6. Consult factory for this particular mounting position. See MOUNTING POSITIONS for the definition of mounting positions M1-M6.
3. The speed reducer 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. The suggestion of flatness for the foundation is:
  - Max. assembly distance  $\leq 230 - 0.1\text{mm}$
  - $230 < \text{Max. assembly distance} \leq 440 - 0.2\text{mm}$
  - $440 < \text{Max. assembly distance} \leq 500 - 0.4\text{mm}$
  - $500 < \text{Max. assembly distance} \leq - 0.6\text{mm}$
5. WorldWide Electric parallel shaft helical speed reducers are designed to be connected to NEMA frame motors. The connection to the motor is a quill style mount.
6. After the installation, please turn the input shaft manually to avoid a dead-lock condition.
7. Remove the black rubber ring from the vent plug before operating the gear reducer.

# Mounting Positions



# Starting Up

1. Check oil level before starting up. Please check **Lubrication** for further instructions on proper unit lubrication.
2. Run In Procedure - This parallel shaft helical speed reducer does 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. Discontinue use if leaking occurs and replace seals before reuse.
3. During regular operation, check for noise. If noise is present, a bearing may be broken. Discontinue use until bearings are replaced.
4. Regularly check the breather valve holes of the helical inline speed reducer 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 spare parts used should be equivalent to the original factory standards. When spare 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 WorldWide Electric helical inline speed reducers 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 breathing 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 breathing plug should always be located at the highest point above the oil fill level.
2. To verify that the reducer has enough oil, the customer should remove the oil gauge plug while filling the oil. When the customer sees the oil coming out of the oil gauge plug, then they can stop filling the oil and replace the oil fill plug and the fill plug. The reducer now has enough oil inside.
3. A certain brand and specification of oil is required and unique to a particular parallel shaft helical speed reducer. Be sure not to mix different brands and specification types of oil. Oil suggestions for WorldWide Electric units are as follows:

**Selection Table of Lubricant**

***Standard Load / Input 600 RPM or Over 600 RPM***

<b>Temperature (°C)</b>	<b>CPC</b>	<b>ISO VG</b>	<b>Mobil</b>	<b>Shell</b>
-30 ~ -15	HD100	VG100	Mobilgear 627	Omala 100
-15 ~ -3	HD150	VG150	Mobilgear 629	Omala 150
-3 ~ 23	HD220	VG220	Mobilgear 630	Omala 220
23 ~ 40	HD320	VG320	Mobilgear 632	Omala 320
40 ~ 80	HD460	VG460	Mobilgear 634	Omala 460

***Heavy Load / Input 600 RPM or Over 600 RPM***

<b>Temperature (°C)</b>	<b>CPC</b>	<b>ISO VG</b>	<b>Mobil</b>	<b>Shell</b>
-30 ~ -15	HD150	VG150	Mobilgear 629	Omala 150
-15 ~ -3	HD220	VG220	Mobilgear 630	Omala 220
-3 ~ 23	HD320	VG320	Mobilgear 632	Omala 320
23 ~ 40	HD460	VG460	Mobilgear 634	Omala 460
40 ~ 80	HD680	VG680	Mobilgear 636	Omala 680

4. Before replacing the oil, the existing oil inside of reducer should be drained and the unit should be cleaned up before filling with new oil.
5. During the 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.

# Lubrication (Continued)

## Additional information regarding the lubricant used in WorldWide Electric parallel shaft helical speed reducers.

### 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.
- Packages:
  1. In bulk (only for HD320, HD460 and HD680)
  2. 200 liter drum
  3. 19 liter pail (only for HD150, HD220, HD320 and HD460)
- The typical data are listed as follows:

Grade No.	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



# Lubrication (Continued)

## (by Box Size and Mounting Position)

Lubricant (unit: liter)						
Mounting Position	37	47	67	77	87	97
M1	1.10	1.70	3.00	6.00	10.5	19.5
M2	1.35	2.10	4.00	7.50	13.4	22.7
M3	0.80	1.20	2.30	4.50	8.00	12.7
M4	1.40	2.00	3.90	8.20	14.3	25.7
M5	1.10	1.60	3.20	6.30	11.2	20.5
M6	1.10	1.60	3.20	6.30	11.2	20.5

**NOTE:** The oil fill volumes shown are approximate values and cannot be used to correctly set the reducer oil level – **ALWAYS** fill the reducer to the correct oil level plug and recheck after one (1) week of use.

# Storage

**If the parallel shaft helical speed reducer 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 customer knows in advance that the reducer unit will be stored for a long term, please notify WorldWide Electric in advance of purchase. WorldWide Electric can notify its factory and the factory can produce units with special corrosion inhibitors and special packaging for long term storage. If the customer wishes to handle packaging for long term storage by themselves, 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 degrees and 40 degrees Celsius.
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 of this manual for proper oil specifications.

# Troubleshooting

<b>Problem</b>	<b>Reason</b>	<b>Action</b>
1. Overheating	<ol style="list-style-type: none"> <li>1. Overload</li> <li>2. Lubricant oil overfill or shortage</li> <li>3. Improper lubricant oil</li> <li>4. Over-friction on oil seal (lack of lubricant)</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust to proper load</li> <li>2. Add or remove lubricant to proper indication level</li> <li>3. Change lubricant oil</li> <li>4. Apply a little oil at the oil seal</li> </ol>
2. Noise	<ol style="list-style-type: none"> <li>1. Consistent noise: improper gear contact, bearing damaged</li> <li>2. Screaming noise: bearing gap too small, lubricant oil shortage</li> <li>3. Irregular noise: foreign object inserted, bearing damaged</li> </ol>	<ol style="list-style-type: none"> <li>1. Repair gears, replace bearings</li> <li>2. Replace bearings, replace lubricants to proper specification level</li> <li>3. Remove foreign object &amp; replace lubricant oil, replace bearings</li> </ol>
3. Vibration	<ol style="list-style-type: none"> <li>1. Gear friction</li> <li>2. Foreign object in unit</li> <li>3. Bearing worn-out or damaged</li> <li>4. Bolt loose</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace gear</li> <li>2. Remove foreign object &amp; replace lubricant oil</li> <li>3. Replace bearing</li> <li>4. Tighten bolt</li> </ol>
4. Oil leakage	<ol style="list-style-type: none"> <li>1. Oil seal damaged</li> <li>2. Gasket damaged</li> <li>3. Drain plug loose</li> <li>4. Cover or flange loose</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace oil seal</li> <li>2. Replace gasket</li> <li>3. Tighten drain plug</li> <li>4. Tighten bolt</li> </ol>
5. Input and Output shaft cannot drive	<ol style="list-style-type: none"> <li>1. Overhung load causing bound gears</li> <li>2. Bearing damaged</li> <li>3. Foreign object between gears</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust load &amp; replace gears</li> <li>2. Replace bearing</li> <li>3. Remove foreign object, clean inside &amp; replace lubricant oil</li> </ol>
6. Input shaft fails to drive output shaft	<ol style="list-style-type: none"> <li>1. Gear worn-out</li> <li>2. The key connecting gear &amp; output shaft damaged</li> <li>3. Input shaft broken</li> <li>4. Output shaft broken</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace gears</li> <li>2. Replace key</li> <li>3. Replace input shaft</li> <li>4. Replace output shaft</li> </ol>
7. Gear worn-out	<ol style="list-style-type: none"> <li>1. Overload</li> <li>2. Improper lubricant oil</li> <li>3. Lubricant oil shortage</li> <li>4. Temperature too high</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust to proper load</li> <li>2. Change to proper lubricant oil</li> <li>3. Refill lubricant oil</li> <li>4. Improve ventilation</li> </ol>

# Limited Warranty

WorldWide Electric Corporation (The Company) warrants its helical inline speed reducer to be free from defects in materials or workmanship to the original purchaser for a period of two years from the date of sale (invoice).

For this warranty to be effective, this product must be installed, used, and maintained by the original purchaser in accordance with good industry standards. The warranty does not cover normal wear, tear and erosion from use, misuse, abuse, or corrosion.

In the event of failure, it shall be the responsibility of the original purchaser to notify The Company either in writing or by telephone to make arrangements for correction of the problem. The purchaser shall be responsible for transportation charges connected with the return, exchange, or repair of parts. Returns found defective upon inspection by our warranty department or authorized warranty service agent will be replaced free of charge.

The Company shall not be liable for any labor cost connected with the replacement of the equipment, the replacement of the parts or adjustments to the equipment by the purchaser or their contractor without the Company's prior written approval.

The Company, as exclusive remedy under this warranty, shall at its option repair or replace defective items or, if agreed upon, refund the purchase price less reasonable allowance for depreciation in exchange for the product.

**THE COMPANY MAKES NO OTHER WARRANTIES AND ALL IMPLIED OR EXPRESSED WARRANTIES AND REPRESENTATIONS, EXCEPT THAT OF TITLE, ARE DISCLAIMED. ALL IMPLIED WARRANTIES INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR USE BUT NOT LIMITED TO JUST THOSE THAT ARE DISCLAIMED. LIABILITY FOR CONSEQUENTIAL, INCIDENTAL OR SPECIAL DAMAGES AND LOSSES UNDER ANY AND ALL WARRANTIES WHETHER IN CONTRACT, TORT OR OTHERWISE, ARE EXCLUDED TO THE EXTENT EXCLUSION IS PERMITTED BY LAW.**