



ILC-99

C-LINE WORM GEAR SPEED REDUCERS



Installation, Operation, and Lubrication Instructions

PROPER SELECTION

The selection of the appropriate speed reducer for a given application requires that all factors affecting the operation of the unit be given careful consideration. Service factors must be applied to catalog ratings depending on the type of prime mover used, severity of the application and duration of daily service. If you have any questions relative to the suitability of your WINSMITH® speed reducer for your particular application, refer to the selection section of the appropriate WINSMITH catalog, contact your WINSMITH representative or distributor.

PROPER ALIGNMENT

1. The various drive members (motor, speed reducer, couplings, sprockets, sheaves, gears, etc.) should be aligned as accurately as possible to guard against unusual stresses and overloads imposed by misalignment.
2. If a prime mover shaft is to be directly connected to the high speed (input) shaft; or if the slow speed (output) shaft is to be directly connected to the driven shaft, flexible couplings should be used. It should be remembered that even flexible couplings have limited ability to accommodate misalignment. Care must be taken at installation to insure that shaft alignments are within the limits recommended by the coupling manufacturer. Use of a rigid coupling to connect speed reducer shafts to other drive components is not recommended as it is almost impossible to obtain exact alignment between two shafts.
3. A common base plate supporting the motor and reducer will help preserve the original alignment between reducer and motor shafts. If a structural steel base is used, the plate should be at least equal in thickness to the diameter of the bolts used to fasten the speed reducer to the base plate. Also, for sufficient rigidity, the design in general including angle or channel members should be substantial enough to prevent flexing under vibration. After the first week or two of operation all of the bolts and nuts used to fasten the reducer and motor, pedestal, etc., to the base plate should be retightened. Vibration tends to loosen the nuts even if tight initially. Dowelling the motor and speed reducer to the base plate will help insure that alignment is maintained.

LUBRICANT

1. FACTORY FILLING

WINSMITH speed reducers are filled to the proper level prior to shipment with the appropriate grade of oil for operation in an industrial environment. **The oil level should be checked prior to operation, using the oil level plug provided for that purpose.**

2. AMBIENT TEMPERATURE

If ambient temperatures are abnormally low or high, the type of lubricant installed at the factory may be unsuitable. See the chart in this bulletin for extreme temperature lubricant recommendations.

3. INITIAL OIL CHANGE

The oil in a new speed reducer should be drained (using the drain plug provided) at the end of 250 hours of operation. (30 days for 8 hour per day service, 15 days for 16 hour service, 10 days for 24 hour service).

4. OIL CHANGING

When changing oil for any reason, it should be remembered that oils of various types may not be compatible. Therefore, when changing to a different oil, it is recommended that the housing be completely drained and thoroughly flushed with a light flushing oil prior to refilling with the appropriate lubricant. Under normal conditions, after the initial change, the oil should be changed after every 2500 hours of operation, or every six months, whichever occurs first. Under severe conditions (rapid temperature changes, moist, dirty or corrosive environment) it may be necessary to change oil at intervals of one to three months. Periodic examination of oil samples taken from the unit will help establish the appropriate interval. If a

speed reducer is to stand idle for an extended period of time, (such as when used as a spare) it is recommended that the unit be filled completely with oil to protect interior parts from rust and corrosion due to condensation inside the housing. Be sure to drain the oil to the proper level before placing the speed reducer into service.

5. GREASE FITTINGS

Some WINSMITH reducers are equipped with grease fittings to lubricate bearings not adequately lubricated by the oil splash. These fittings should periodically be pressure lubricated with a high quality lithium base NLGI #2 bearing grease compatible with the type of lubricant being used.

6. OIL TEMPERATURE

Speed reducers in normal operation can generate temperatures up to 200°F depending on the type of reducer and the severity of the application (loading, duration of service, ambient temperatures). Excessive oil temperatures may be the result of one or more of the following factors:

A. OVERLOADS

An overload, due to the original selection of a unit too small for the application, or increasing loads on the speed reducer to a point where its rating is exceeded after it has been in service for a period of time. Always check the speed reducer rating when increasing driven loads or increasing the horsepower rating of the motor or other prime mover.

B. OVERFILLING OR UNDERFILLING

If a speed reducer is overfilled with oil, the energy used in churning the excessive oil can result in overheating. If this occurs, shut down the drive, remove the oil level plug and allow oil to drain until oil ceases to drain from the level hole, reinstall the oil level plug, and restart the drive. If the speed reducer is underfilled, the resultant friction can cause overheating. If this occurs, fill the speed reducer to the oil level plug hole.

C. INADEQUATE COOLING

In order to dissipate internally generated heat, the speed reducer must be installed in such a way that air can circulate freely. Tightly confined areas (inside cabinets, etc.) should be avoided. If this is not possible, forced air cooling by means of a separate blower or a fan integral to the speed reducer should be used.

7. OIL RETENTION

A. VENT PLUGS

To prevent loss of oil during shipment, WINSMITH speed reducers are shipped with a brass pin in the vent hole in the filler and vent plug. This pin must be removed before the reducer is put into operation. Failure to remove the brass pin can result in pressure build up which can pump oil through the seals. If the speed reducer is installed in an atmosphere containing exceptional amounts of moisture or dust, a shielded or hooded vent plug should be used.

B. OIL SEALS

Although WINSMITH uses high quality oil seals and precision ground shafts to provide a superior seal contact surface, it's possible that circumstances beyond WINSMITH's control can cause oil seal leakage (damage during shipment or installation, etc.). When replacing a shaft oil seal, using the following suggestions will help to insure leak-free operation and long seal life.

- a. When installing a new seal, wrap the shaft with light shim stock or heavy paper to protect the seal lip from being damaged by a rough shaft or cut by the sharp edge of the keyway.
- b. A sealant should be used between the O.D. of the seal and the I.D. of the bore into which the seal is installed. The seal bore should also be free of any burrs, nicks, or scratches.
- c. Be sure that the seal is not cocked in the seal bore. The outer face of the seal should be flush with the surface into which it is mounted.



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<p>CB*</p> <p>OIL FILLER PLUG OIL LEVEL PLUG OIL DRAIN PLUG</p>	<p>CT FCT MFCT MHCT</p> <p>OIL FILLER PLUG OIL LEVEL PLUG OIL DRAIN PLUG</p>	<p>CV FCV MCV MFCV</p> <p>OIL FILLER PLUG OIL LEVEL PLUG OIL DRAIN PLUG</p>	<p>SF ST FSF FST MST MFSF MFST</p> <p>OIL FILLER PLUG OIL LEVEL PLUG OIL DRAIN PLUG</p>
<p>L ML</p> <p>OIL FILLER PLUG OIL LEVEL PLUG OIL DRAIN PLUG</p>	<p>MCT</p> <p>OIL FILLER PLUG OIL LEVEL PLUG OIL DRAIN PLUG</p>	<p>CBX</p> <p>OIL FILLER PLUG OIL LEVEL PLUG OIL DRAIN PLUG</p>	<p>CTX</p> <p>OIL FILLER PLUG OIL LEVEL PLUG OIL DRAIN PLUG</p>
<p>CVX</p> <p>OIL FILLER PLUG OIL LEVEL PLUG OIL DRAIN PLUG</p>	<p>LX</p> <p>OIL FILLER PLUG OIL LEVEL PLUG OIL DRAIN PLUG</p>	<p>CBD</p> <p>OIL FILLER PLUG OIL LEVEL PLUG OIL DRAIN PLUG</p>	<p>CTD MCTD</p> <p>OIL FILLER PLUG OIL LEVEL PLUG OIL DRAIN PLUG</p>
<p>CVD MCVD</p> <p>OIL FILLER PLUG OIL LEVEL PLUG OIL DRAIN PLUG</p>	<p>SFD STD MSFD MSTD</p> <p>OIL FILLER PLUG OIL LEVEL PLUG OIL DRAIN PLUG</p>	<p>LD</p> <p>OIL FILLER PLUG OIL LEVEL PLUG OIL DRAIN PLUG</p>	<p>MLD</p> <p>OIL FILLER PLUG OIL LEVEL PLUG OIL DRAIN PLUG</p>
<p>CTT SFT</p> <p>OIL FILLER PLUG OIL LEVEL PLUG OIL DRAIN PLUG</p>	<p>CVT</p> <p>OIL FILLER PLUG OIL LEVEL PLUG OIL DRAIN PLUG</p>	<p>MCTT MSTT</p> <p>OIL FILLER PLUG OIL LEVEL PLUG OIL DRAIN PLUG</p>	<p>MCVT</p> <p>OIL FILLER PLUG OIL LEVEL PLUG OIL DRAIN PLUG</p>

*For input speeds below 1160 RPM, the oil level must be raised to lubricate the slow speed bearings.



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Lubricants Worm Gear Reducers

For special applications that involve severe ambient temperature extremes or a seasonal oil requirement, WINSMITH, based on extensive testing and field experience, recommends the use of Mobil SHC synthetic lubricants.

Ambient Temperature	-30 to 15°F	16 to 50°F	51 to 95°F	51 to 95°F	96 to 131°F	96 to 131°F
Final Stage Worm Speed*	up to 2000 FPM	up to 2000 FPM	up to 450 FPM	above 450 FPM	up to 450 FPM	above 450 FPM
ISO Viscosity Grade	220	460	680	460	680	460*
AGMA Lubricant No.	5 S**	#7 Compounded***	#8 Compounded***	#7 Compounded***	8 S**	7 S**

Mobil	SHC 630	600W Super Cylinder	Extra Hecla Super	600W Super Cylinder	SHC 636	SHC 634
American Lubricants	SHC-90W	AGMA #7 Gear Oil	AGMA #8 Gear Oil	AGMA #7 Gear Oil	N/A	N/A
Castrol	Tribol 800/220	Tribol 1105-7C	Tribol 1105-8C	Tribol 1105-7C	Tribol 800/680	Tribol 800/460
Chevron	Tegra 220	Cylinder Oil W460	Cylinder Oil W680	Cylinder Oil W460	Tegra 680	Tegra 460
Conoco	Syncon R & O 220	Inca Oil 460	Inca Oil 680	Inca Oil 460	N/A	Syncon R & O 460
Exxon (Esso)	Teresstic SHP 220	Spartan EP 460	Spartan EP 680	Spartan EP 460	Teresstic SHP 680	Teresstic SHP 460
Fiske Brothers	SPO-MG	SPO-277	SPO-288	SPO-277	N/A	N/A
Shell	Omala RL 220	Valvata J 460	Valvata J 680	Valvata J 460	Omala RL 680	Omala RL 460
Texaco	Pinnacle 220	Vanguard 460	Vanguard 680	Vanguard 460	Pinnacle 680	Pinnacle 460

**synthetic oil
***3% to 10% fatty or synthetic oils or mild EP additives

Lubricant selections are provided by the lubricant manufacturer based on AGMA recommended viscosity grades. Viscosity grades are based on Lubrication Standard ANSI/AGMA 9005-D94.

*The sliding velocity in feet per minute (FPM) for standard ratios is determined by multiplying the speed of the worm in RPM by the factor from the following table. For selecting the proper lubricant, use the speed of the worm in the final stage (input RPM divided by the first stage ratio).

Nominal Ratio	Unit Size														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
5	0.276	0.377	0.414	0.475	0.506	0.582	—	—	—	—	—	—	—	—	—
7.5	0.217	0.276	0.282	0.414	0.425	0.552	0.613	0.590	0.828	0.846	0.846	0.981	—	—	—
10	0.265	0.270	0.273	0.344	0.353	0.540	0.470	0.504	0.613	0.642	0.642	0.828	0.778	0.981	0.992
15	0.210	0.265	0.299	0.398	0.341	0.531	0.577	0.414	0.796	0.928	0.928	0.933	0.744	0.662	0.781
20	0.263	0.264	0.297	0.331	0.313	0.400	0.445	0.406	0.577	0.540	0.540	0.796	0.611	0.933	0.936
25	0.244	0.263	0.247	0.265	0.363	0.569	0.398	0.388	0.531	0.920	0.920	0.663	0.796	0.926	0.928
30	0.208	0.263	0.263	0.394	0.338	0.525	0.569	0.538	0.788	0.594	0.594	0.790	0.857	0.857	0.750
40	0.262	0.262	0.295	0.328	0.308	0.394	0.438	0.438	0.569	0.595	0.595	0.788	0.594	0.920	0.921
50	0.289	0.246	0.230	0.263	0.290	0.386	0.394	0.463	0.525	0.569	0.569	0.657	0.788	0.919	0.919
60	0.207	0.262	0.246	0.257	0.278	0.524	0.386	0.394	0.463	0.525	0.525	0.593	0.918	0.788	0.919



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