

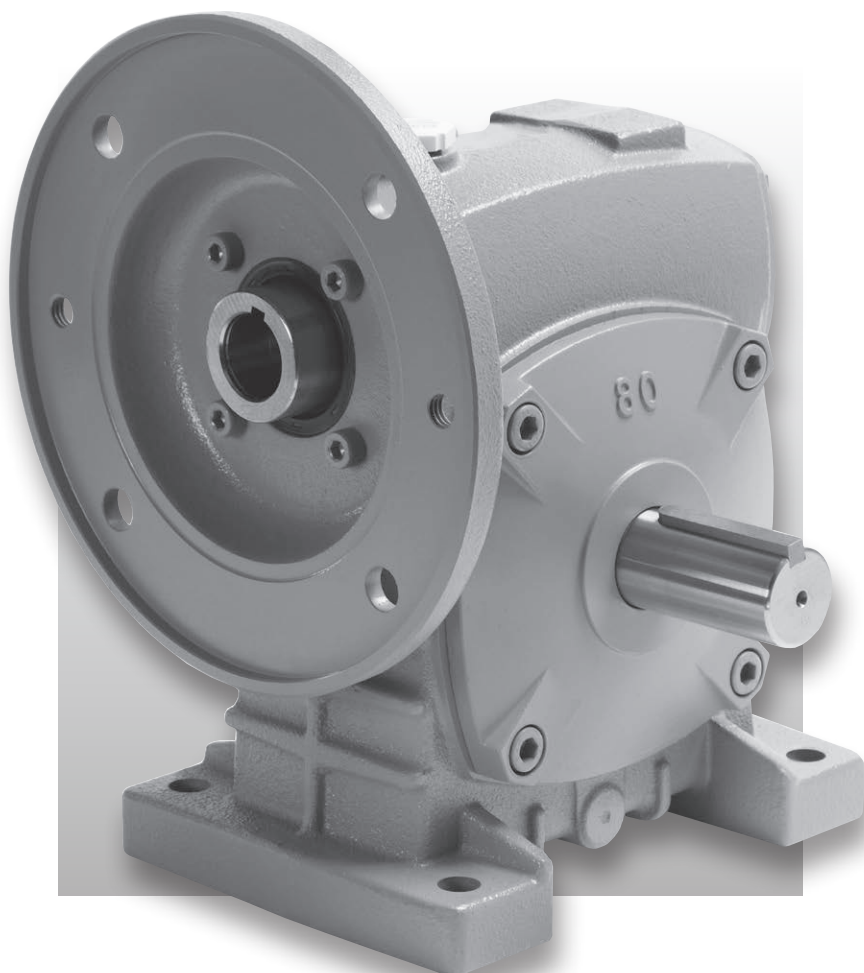


CLEVELAND GEAR COMPANY, Inc

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“WG” SPEED GEAR REDUCER

**Installation, Lubrication &
Service Instructions**



LUBRICANTS AND OIL CAPACITIES

CLEVELAND UNITS ARE SHIPPED DRY AS STANDARD.

A mineral based oil, synthetic oil, or foodgrade oil (H1), is available upon customer request. When shipped dry, before starting the unit, it must be filled to the level indicated and with the grade of oil called for by the application. Any supplier of industrial oil can meet these specifications with a standard product.

Worm gearing has a high slide to roll ratio when compared with other types of gearing. With a high sliding component, it relies heavily on the generation of an oil wedge between the worm and gear.

For most worm gear applications, an AGMA 7 oil is satisfactory. For low speeds, a higher viscosity, AGMA 8 will provide better service. Synthetic lubricants provide a lower co-efficient of friction and better wear characteristics than a straight mineral oil.

NOTE: Viscosity ranges for AGMA Lubricant numbers are identical to those of ASTM 2422.

Extreme pressure oils, (EP oils) are another type of lubricant that uses a surface acting chemistry. Most EP oils use sulfur, phosphorus and/or chlorine additives. When these oils are used with bronze under conditions of high temperature and pressure, the surface acting chemistry can cause damage the surface of the bronze. EP oils should **not** be used with worm gears.

Synthetic lubricants are very common today. Synthetic lubricants provide adequate service over a broader temperature range. They normally have a longer life in service, thereby increasing the oil change interval. They also can reduce wear and friction, increasing the oil change interval, and increasing the life of the gear box.

With the use of synthetic oils, efficiency increases of 10% are often possible. Many companies have found that, due to the advantages of synthetic lubricants, it is actually more cost effective to buy the more expensive oil, even for normal applications.

IDLE TIME

Cleveland units which are to stand idle for a long period of time before being used should be completely filled with oil to prevent corrosion due to internal condensation. Units in intermittent service should be operated for brief periods of time at least once a month to redistribute the oil and thereby protect the bearings and ground parts from rusting.

SPEED

High speeds above 1800 RPM usually require a change in oil level. **Contact Cleveland Gear for information on input speeds in excess of 1800 RPM.**

The following tables are Cleveland Gear's recommendations for worm gear lubricants. A general table such as this cannot cover all possible applications. If your application seems out of the ordinary, please contact the factory.

WORM SPEED R.P.M.	AGMA LUBRICANT NUMBER	
	AMBIENT TEMPERATURE	
	15° TO 50°F	50° TO 125°F
BELOW 600	#7	#8
ABOVE 600*	#7	#7
RECOMMENDED PRODUCT		
AGMA NUMBER	MINERAL	SYNTHETIC
#7	MOBIL 600W SUPER CYLINDER OIL	MOBIL SHC 634
#8	MOBIL 600W EXTRA HECLA SUPER CYLINDER OIL	MOBIL SHC 636
Viscosity Ranges for AGMA Lubricants ^a		
Rust and Oxidation Inhibited Gear Oils	Viscosity Range	Equivalent ISO Grade
AGMA Lubricant No.	mm ² /S (cSt) at 40° C	ISO Number
#7	414 to 506	460
#8	612 to 748	680

^a Extracted from AGMA "Specification-Lubrication of Industrial Enclosed Gear Drives" with the permission of the publisher, The American Gear Manufacturers Association, 1001 N. Fairfax St., Ste 500 Arlington, Virginia 22314.

† For ease of start up, heaters or use of synthetic oil may be required at low temperatures.

* At rubbing speeds over 2,500 fpm, a spray lubrication system and/or synthetic lubricants may be required. Contact the factory for specific recommendations.

OIL LEVEL

The oil level in a reducer can be checked only when it is at rest. It must be maintained at the proper level. Overfilling is to be avoided, as it causes excessive churning losses and may result in overheating.

OIL CAPACITIES. When standard units with oil level sight gauges are installed in standard mounting positions, the user needs simply to add lubricant up to the center of the sight gauge before operation—while the unit is not rotating. These units must be operated with the vented filler caps provided.

Oil capacities will vary when units are placed in special mounting positions. For planning purposes, use the following Lubrication Oil Capacities Tables to find the approximate capacities.

LUBRICATION Cont.

LUBRICATING PROCEDURES: We recommend the following procedures:

1. FILL. The unit should be filled with appropriate oil to the center of the sight gauge BEFORE OPERATING. DO NOT OVERFILL. Excessive oil levels are as undesirable as using too little oil. If a fitting is present, grease it before operation.

2. 100 HOUR FLUSH. After approximately 100 hours of operation, the reducer must be drained, flushed thoroughly with a light oil, and refilled with fresh recommended oil.

3. 2500 HOUR FLUSH. This flushing and refilling should be repeated every 2500 hours.

Extremely severe or dirty conditions, as well as high humidity, will require more frequent oil changes. The use of synthetics can extend the period. At least one filling of the grease fittings between oil changes is recommended on all units equipped with grease fittings. In general, grease fittings are found on units having a vertical shaft, and either one or two fittings are required, depending upon the internal construction.

Single Reduction Oil Capacities, Approximate, for Various Mounting Positions

SIZE	HORIZONTAL MOUNT							
	WT, WTCHS (& WB Ceiling Mount)		WB (& WT, WTCHS Ceiling Mount)		U & UCHS		K & KCHS	
40	3 oz	.10 ltr	—	—	7 oz	.20 ltr	7 oz	.20 ltr
45	—	—	—	—	8 oz	.25 ltr	—	—
50	11 oz	.33 ltr	6 oz	.17 ltr	8 oz	.25 ltr	10 oz	.30 ltr
60	14 oz	.41 ltr	9 oz	.27 ltr	14 oz	.41 ltr	15 oz	.43 ltr
70	1 pt 10 oz	.78 ltr	1 pt 3 oz	.55 ltr	1 pt 7 oz	.67 ltr	1 pt 9 oz	.75 ltr
80	2 pt 7 oz	1.15 ltr	1 pt 9 oz	.73 ltr	2 pt 2 oz	1.00 ltr	3 pt 3 oz	1.50 ltr
100	4 pt 15 oz	2.35 ltr	2 pt 10 oz	1.24 ltr	3 pt 8 oz	1.65 ltr	4 pt 9 oz	2.15 ltr
120	8 pt 13 oz	4.18 ltr	4 pt 6 oz	2.08 ltr	8pt 1 oz	3.82 ltr	8 pt 7 oz	4.00 ltr
135	11 pt 12 oz	5.56 ltr	5 pt 13 oz	2.75 ltr	11pt 4 oz	5.32 ltr	12 pt 1 oz	5.70 ltr
155	14 pt 11 oz	6.95 ltr	8 pt 4 oz	3.90 ltr	11pt 8 oz	5.45 ltr	15 pt 10 oz	7.40 ltr
175	20 pt 1 oz	9.50 ltr	8 pt 11 oz	4.10 ltr	—	—	29 pt 1 oz	13.75 ltr
200	—	—	13 pt 15 oz	6.60 ltr	—	—	35 pt 11 oz	16.88 ltr
225	—	—	20 pt 6 oz	9.63 ltr	—	—	35 pt 15 oz	17.00 ltr

Double Reduction Oil Capacities, Approximate

SIZE	DW & DWCHS				DU & DUCHS			
	PRIMARY		SECONDARY		PRIMARY		SECONDARY	
60	4 oz	.12 ltr	9 oz	.27 ltr	4 oz	.12 ltr	1 pt 3 oz	.57 ltr
70	7 oz	.20 ltr	1 pt 3 oz	.55 ltr	7 oz	.20 ltr	2 pt	.95 ltr
80	8 oz	.25 ltr	1 pt 9 oz	.73 ltr	8 oz	.25 ltr	3 pt 3 oz	1.50 ltr
100	14 oz	.41 ltr	2 pt 10 oz	1.24 ltr	14 oz	.41 ltr	5 pt 11 oz	2.70 ltr
120	1 pt 7 oz	.67 ltr	4 pt 6 oz	2.08 ltr	1 pt 7 oz	.67 ltr	9 pt 14 oz	4.66 ltr
135	2 pt 2 oz	1.00 ltr	5 pt 13 oz	2.75 ltr	2 pt 2 oz	1.00 ltr	12 pt 14 oz	6.10 ltr
155	3 pt 8 oz	1.65 ltr	8 pt 4 oz	3.90 ltr	3 pt 8 oz	1.65 ltr	15 pt 11 oz	7.41 ltr
175	8 pt 1 oz	3.82 ltr	8 pt 11 oz	4.10 ltr	—	—	—	—
200	11 pt 4 oz	5.32 ltr	13 pt 15 oz	6.60 ltr	—	—	—	—
225	11 pt 4 oz	5.32 ltr	20 pt 6 oz	9.63 ltr	—	—	—	—

Recommended lubricants must meet or exceed these standards:			
Ambient Temperature	15° to 50° F (-9° to 10° C)	AGMA 7	cSt@104F (40C): 414-506
	50° to 125° F (10° to 52° C)	AGMA 8	cSt@104F (40C): 612-748

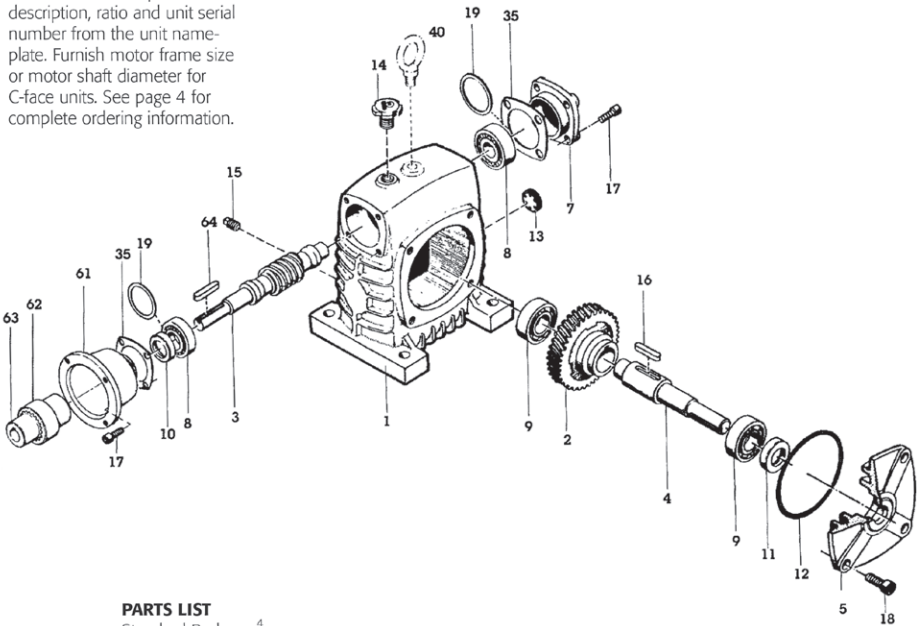


PARTS LIST AND EXPLODED DRAWINGS

WORM TOP (WT & WTC/U & UC)

TO ORDER PARTS

Please furnish complete model description, ratio and unit serial number from the unit name-plate. Furnish motor frame size or motor shaft diameter for C-face units. See page 4 for complete ordering information.



PARTS LIST

Standard Reducer ⁴

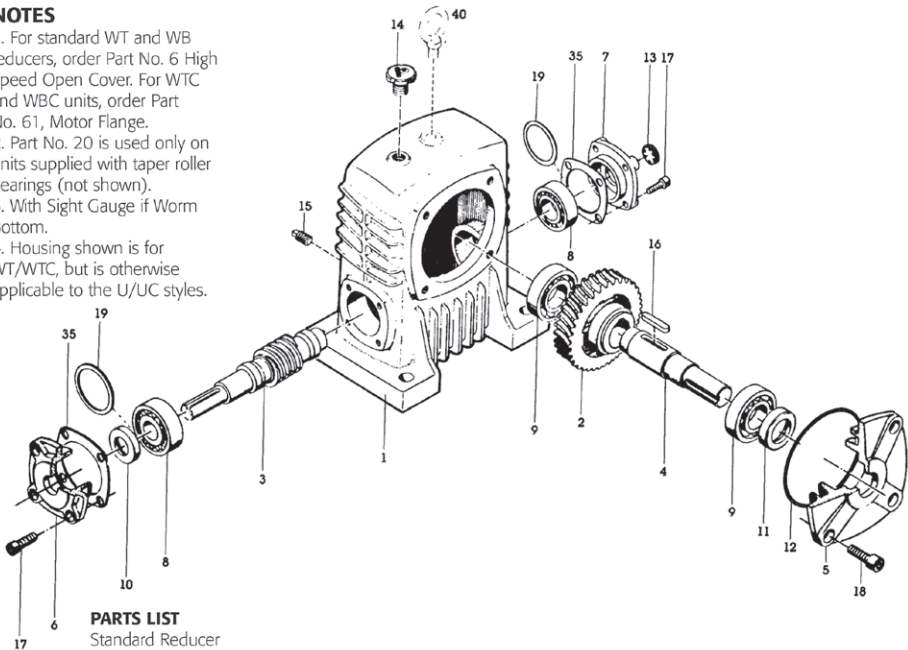
No. PART DESCRIPTION	No. PART DESCRIPTION
1. Housing	15. Plug, Drain
2. Gear, Worm or Worm Wheel	16. Key, Worm Gear & Shaft
3. Wormshaft	17. Cap Screw, High Speed Cover
4. Shaft, Output	18. Cap Screw, Low Speed Cover
5. Cover, Low Speed	19. Shim, High Speed Bearing
6. Cover, High Speed, Open (not shown) ¹	20. Shim, Low Speed Bearing (not shown) ²
7. Cover, High Speed, Closed	35. Gasket, High Speed Cover
8. Bearing, High Speed	40. Eye Bolt (Sizes 100 to 225 only)
9. Bearing, Low Speed	61. Flange, Motor Mounting Adapter ¹
10. Oil Seal, High Speed	62. Reducer Coupling Half (WTC)
11. Oil Seal, Low Speed	63. Motor Coupling Half (WTC)
12. O-ring	64. Input Key
13. Gauge, Oil Level	65. Output Shaft Key (not shown)
14. Plug, Oil Filter	

PARTS LIST AND EXPLODED DRAWINGS Cont.

WORM BOTTOM (WB & WBC)

NOTES

- 1. For standard WT and WB reducers, order Part No. 6 High Speed Open Cover. For WTC and WBC units, order Part No. 61, Motor Flange.
- 2. Part No. 20 is used only on units supplied with taper roller bearings (not shown).
- 3. With Sight Gauge if Worm Bottom.
- 4. Housing shown is for WT/WTC, but is otherwise applicable to the U/UC styles.



PARTS LIST
Standard Reducer

No.	PART DESCRIPTION	No.	PART DESCRIPTION
1.	Housing	15.	Plug, Drain
2.	Gear, Worm or Worm Wheel	16.	Key, Worm Gear & Shaft
3.	Wormshaft	17.	Cap Screw, High Speed Cover
4.	Shaft, Output	18.	Cap Screw, Low Speed Cover
5.	Cover, Low Speed	19.	Shim, High Speed Bearing
6.	Cover, High Speed, Open ¹	20.	Shim, Low Speed Bearing ²
7.	Cover, High Speed, Closed ³	35.	Gasket, High Speed Cover
8.	Bearing, High Speed	40.	Eye Bolt (Sizes 100 to 225 only)
9.	Bearing, Low Speed	61.	Flange, Motor Mounting Adapter (not shown) ¹
10.	Oil Seal, High Speed	62.	Reducer Coupling Half (WBC)
11.	Oil Seal, Low Speed	63.	Motor Coupling Half (WBC)
12.	O-ring	64.	Input Key
13.	Gauge, Oil Level	65.	Output Shaft Key (not shown)
14.	Plug, Oil Filter		

(Sizes 155 - 225 WB units are provided with grease fitting, not shown, for low speed bearings.)



INSTALLATION & OPERATING INSTRUCTIONS, UNIT WEIGHTS

ALL SIZES AND TYPES

Upon receipt of a unit it should be inspected for damage in shipment. Any damage found should be reported to the carrier and a claim made to them at once.

FOUNDATIONS

The importance of a solid foundation for a speed reducer to rest upon cannot be overemphasized. The alignment of both its high and low speed shaft is jeopardized if the unit does not have a firm foundation. The alignment of both high and low speed shafts should be checked after a few weeks operation to be sure the foundation has not settled and thrown them out of line.

Rigid cast iron or welded steel bedplates are of great help in maintaining good alignment. All four feet of the unit are machined at the same time to provide flatness, and the base they are bolted to must be flat also.

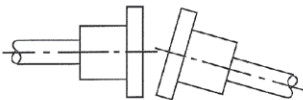
ALIGNMENT

Accurate alignment of both high and low speed shafts is a necessity. Lack of good alignment may cause excessive shaft stresses, overloaded bearings, noise and leaking oil seals. The initial setting of the reducer is, therefore, important and its alignment with the motor and connected machine must be checked **after** it is securely bolted down. Misalignment can be caused later by settled foundation or movement of the connected machine.

Two forms of misalignment, or a combination of them, are possible on each shaft. The effects resulting from the shaft misalignment are evident on the high speed shaft or coupling before they show up on the low speed end of the drive, but the need for good alignment on both shafts cannot be overemphasized.

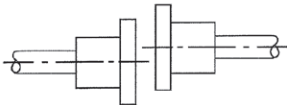
The figures shown illustrate each form of misalignment, greatly exaggerated, and a combination of both can exist as well.

ANGULAR MISALIGNMENT



When correcting coupling misalignment by placing metal shims under a reducer, the angular misalignment should be corrected first. It can be checked by inserting a tapered gauge at 90° positions. When a tapered gauge enters the space between the coupling halves an equal distance at four places 90° apart, the angular misalignment has been removed.

PARALLEL MISALIGNMENT



Parallel misalignment is corrected by placing a straight edge on the outside diameter of the coupling halves. Either the reducer, or the driven machine, must then be moved in a vertical and/or horizontal plane to correct this form of misalignment.

The necessity of good alignment cannot be overemphasized. When possible, dowels should be used to preserve alignment once it is obtained,

MOUNTING COUPLINGS OR SPROCKETS

Most installations can be made with a light driving fit. Any nicks or burrs present should be carefully removed, but no attempt to actually change a diameter by hand filing should be made. Installation of couplings with tighter fits for heavier loads can be obtained by heating the coupling half. The coupling must not be pounded into place without properly backing up the opposite end of the shaft. This can be done on a single shaft extension by removing the plate on the opposite side of the reducer. If this plate is not removed and the shaft properly backed up, the effect of the hammer blows are absorbed by the anti-friction bearing and damage to the rollers or the races will likely result. However, care must be used to reassemble the plate shims in exactly the same manner to avoid disturbing the setting of the gear and the adjustment of the bearing.

Shipping Weights in Pounds (WITHOUT OIL)

	SIZE												
STYLE	40	45	50	60	70	80	100	120	135	155	175	200	225
WT	—	—	13	20	31	47	82	124	168	287	365	—	—
WB	—	—	13	20	32	44	75	117	166	280	360	429	519
WTCHS	—	—	16	21	34	52	91	134	189	295	390	—	—
WTC	—	—	18	27	39	51	89	136	192	303	385	—	—
U	11	14	11	17	31	43	77	115	164	289	360	440	—
UCHS	14	16	13	18	34	49	90	125	171	298	390	—	—
UC	—	—	18	25	36	51	93	128	184	300	380	—	—
DWCHS	—	—	—	28	43	55	93	145	209	—	—	—	—

For weight-critical applications, contact Cleveland Gear for precise unit weights.

