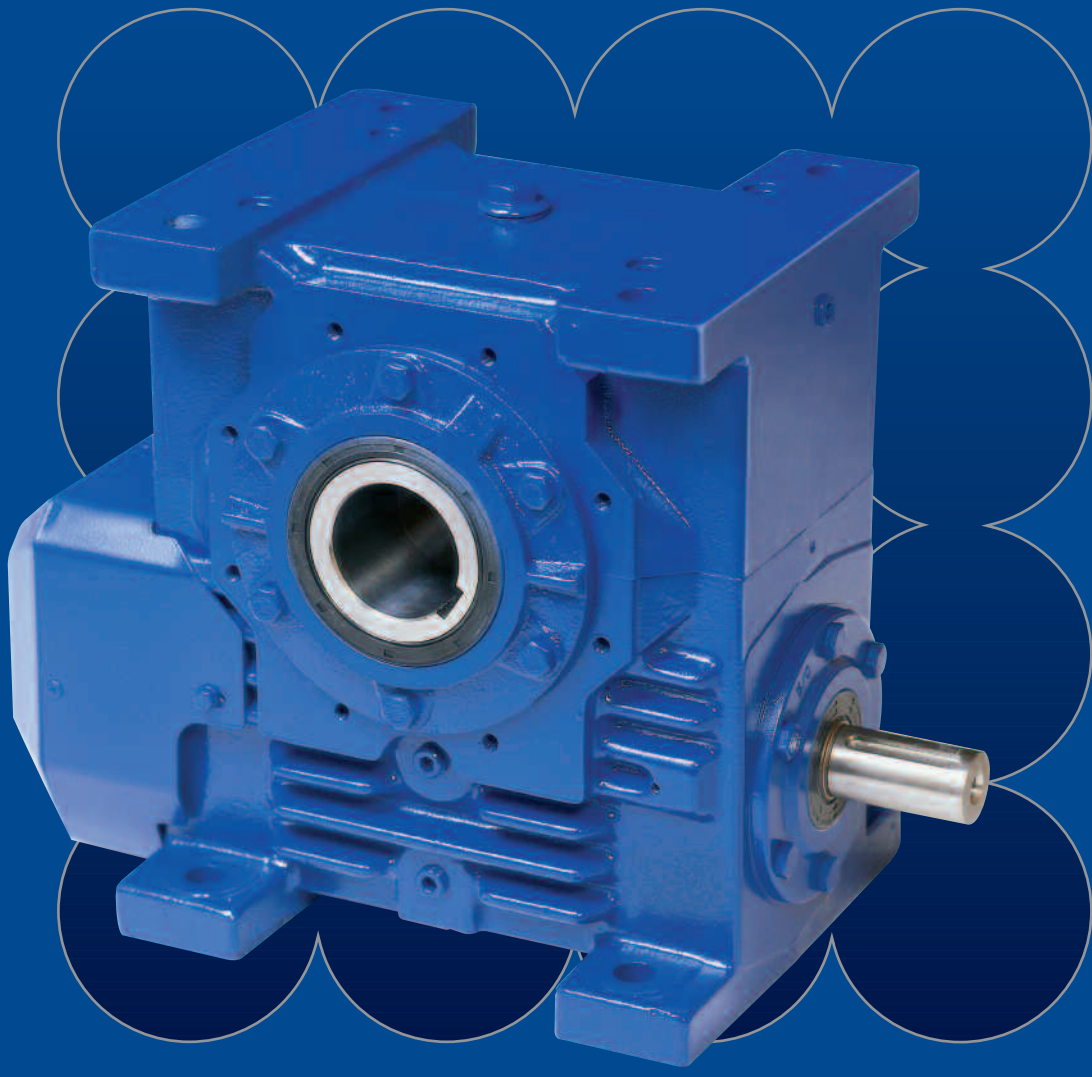
WM Series

Wormgear Units - Metric



RENOLD

Superior Gear Technology

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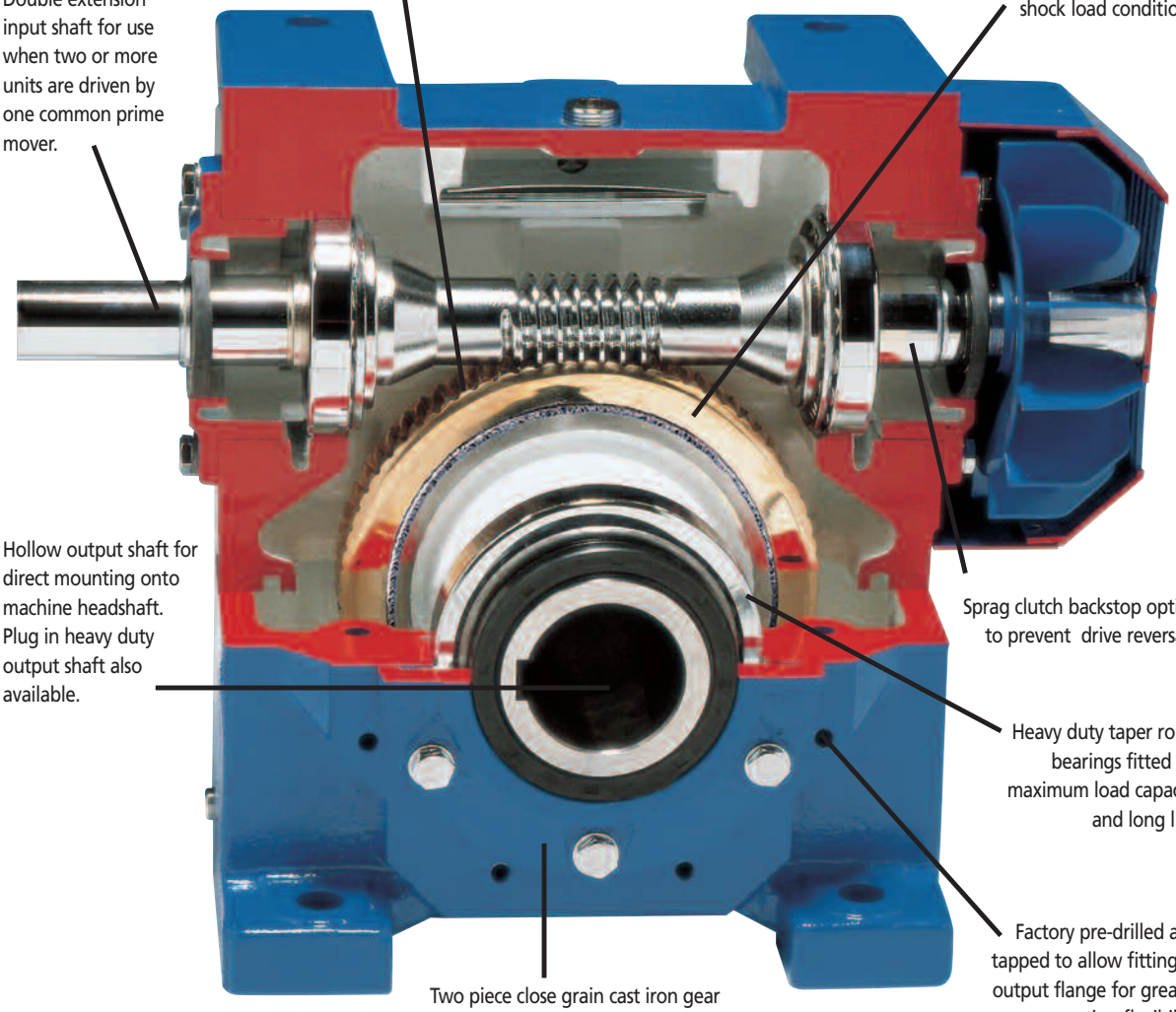
WM Series - Product Specification



The WM Series range of products has been designed and built to a modular form to allow the combination of other Renold products to extend the torque, ratio and speed range. Each unit is designed for use with NEMA and IEC electric motors, with B5 and B14 flanges.

Applications:

- Conveyors
- Mining
- Lumber
- Textiles
- Materials Handling
- Packaging Machinery
- Food Process Machinery
- Water Treatment
- Foundry Equipment

Section of electron beam welded wormwheel rim and centre showing the fusion of the bronze wormwheel rim onto the cast iron centre. This high security fit allows transmission of power under shock load conditions.

Contents

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Introduction

For over 100 years, Renold has played a leading role in the development of worm gearing and perfected the design and manufacture of HOLROYD worm gears, such that today the name HOLROYD is renowned world-wide for the quality and reliability of its products.

Renold WM Series worm gear units are available to satisfy the industrial demand for reliable and efficient speed reducers.

Renold WM Series worm gear units are single reduction and utilize the unique Renold patented electron beam welded wheel rims. Double reduction units are available - contact Renold.

Standard speed reduction ratios range from 5:1 up to 70:1 for single reduction worm gear units.

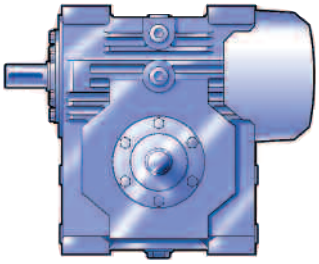
All WM Series worm gear units can be supplied in various standard types and assemblies and are suitable for combining with most of the Renold range of fixed and variable speed products.

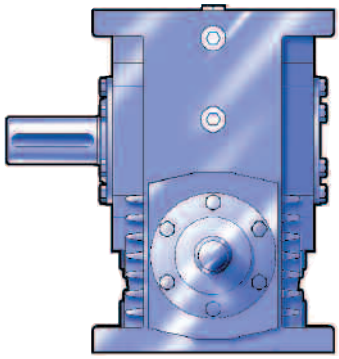
Most of the units included in the WM Series range are suitable for mounting in alternative positions. Available assemblies are detailed for each type of unit and also mounting position variations where applicable.

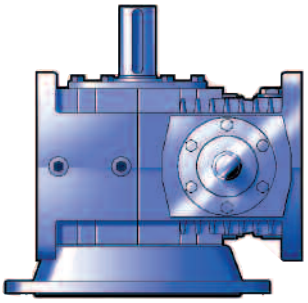
WM Series reducers are supplied with a hollow shaft as standard except for the 9" CRS which has a solid shaft. Plug-in output shafts, both single and double, are available for both standard mount and flange mount.

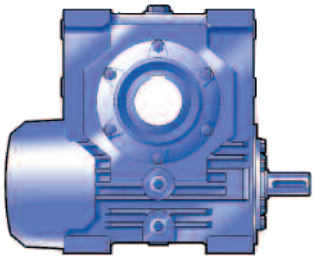
All of the WM Series units can be fitted with standard flange mounted electric motors.

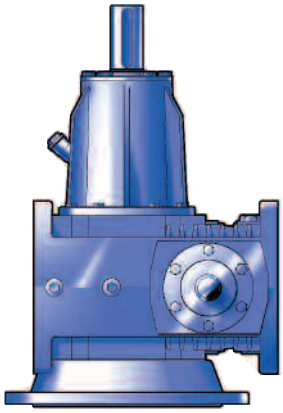
The WM Series units are available from 4" to 9" centre distance and this heavy duty unit range is the result of continuing research and development.











WM Series - Product Specification

Gear Case

The gear cases are of close grained cast iron with all joints and bearing bores accurately machined to ensure oil tightness and precise gear location.

Wormshaft and Wormwheel

The worm is integral with its shaft and manufactured from alloy steel, casehardened on the threads and ground and polished on the thread profiles.

The wormwheel rim is made from bronze complying with BS 1400 PB2-C (centrifugally cast) and secured to the cast iron centre by the electron beam welding process.

The Holroyd gear form used in the WM Series gear units corresponds to British Standard recommendations but, in addition, has an exclusive feature which consists principally of an important modification to the worm threads and wheel teeth which confers additional valuable properties to gear performance. This ensures that our gears will run correctly and transmit true uniform angular velocity when running under all load conditions. The modification also gives a tapered oil entry gap between the teeth, which drags the lubricant between the surfaces and results in more efficient lubrication. Standard worm gears have right-hand threads but left-hand threads can be made to order.

Shafts

Standard shaft extensions are to imperial dimensions, but metric shaft extensions are also available. The output shaft is manufactured in carbon steel, but if required by applicational conditions, can be made from high tensile steel, in single or double extension.

WM Series unit sizes 100mm to 200mm are supplied as hollow output shaft type as standard and all output shafts are plug-in design, single and double extension.

All input shafts in the WM Series range are standard double extension and are metric dimensions at one end and American standard - inch at the other.

Unless otherwise requested, the imperial extension will be the exposed input extension.

Preferred Ratios

Certain gear ratios have been nominated as preferred ratios and are shown in bold on pages 28 to 41. This has been done with a view to providing a competitive lead time.

Bearings

Standard metric taper/roller bearings are fitted throughout the WM Series range of units in both single and double extension shaft options.

Oil Seals

Semi-dual lip oil seals are fitted to all hollow output shaft units and single lip seals are fitted to the input shaft of all unit sizes, the output of WM9 unit range and all agitator unit types.

Dry Well Feature

The WM Series unit sizes 100mm to 900mm can be factory fitted with a 'dry-well' adaption at the output shaft to create a non oil leak unit. The output shaft bearing within the dry well is grease lubricated.
The non leak feature is particularly important on mixer drive applications in food and chemical plants where the unit shaft is vertically down.

Lubrication

Gears and bearings are positively lubricated by oil from the sump in the underdriven and overdriven versions at normal motor speeds. With the vertical and agitator types, grease lubrication is necessary to the wheeline bearings.

For lower speeds it may be necessary to consider grease lubrication of certain bearings and in this instance it is advisable to consult with Renold Engineers. Full lubrication details can be found under the "Installation & Maintenance" section.

Cooling

Maximum heat dissipation by air cooling is carried out by a radial fan directing air over the ribbed gear case. Where applicational circumstances permit, standard units can be supplied without a fan.

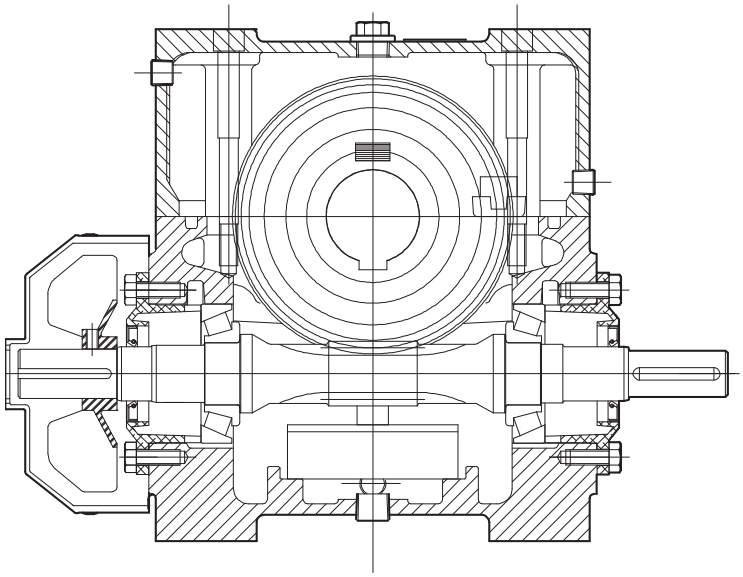
Backstop

Sprag clutch backstops can be fitted to most units to prevent unit run back when required.

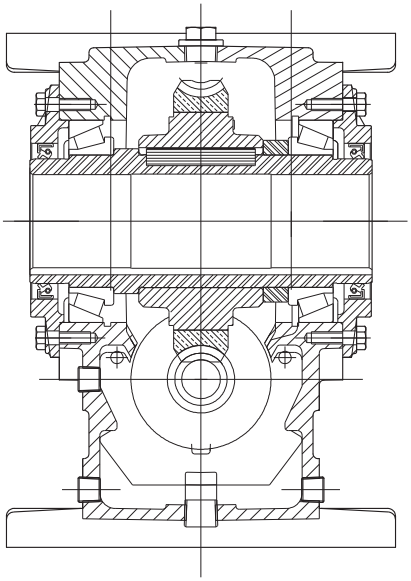
Double Reduction Units

Two stage, double reduction gear units are available with ratios from 75:1 to 4900:1.

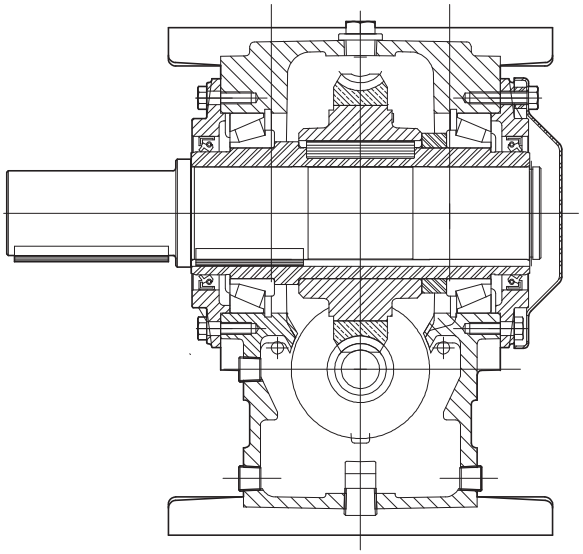
WM Series - Product Specification



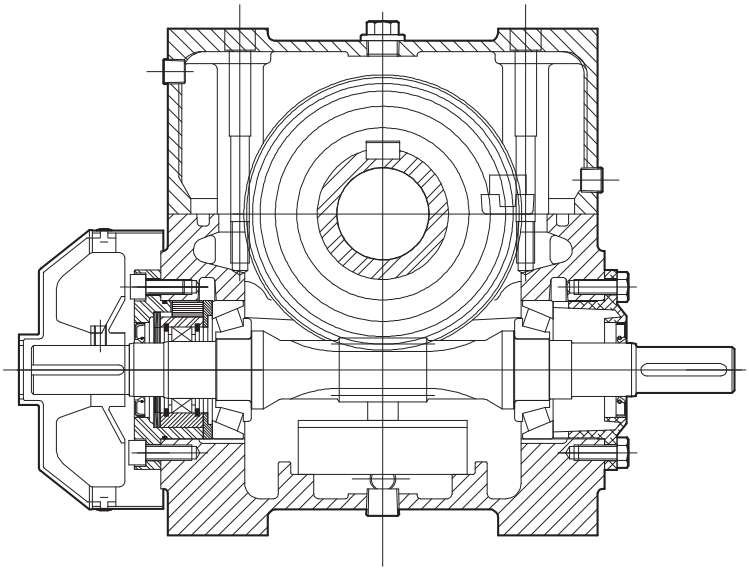
Hollow output shaft unit showing standard American extension input shaft and metric extension at the fan end.



Standard hollow output shaft with semi dual lip oil seal for added oil retention.

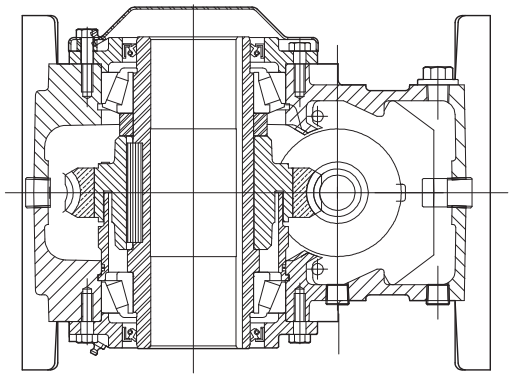


Underdriven unit with standard plug-in output shaft. Single and double extension shafts are available.

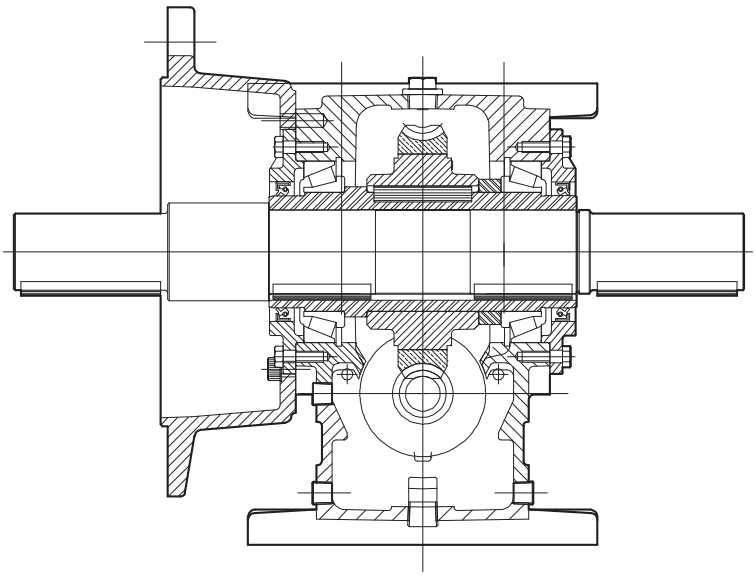


Sprag Clutch, anti run-back assembly fitted to the fan extension end of the input shaft, to prevent unit run back. The Sprag Clutch can be supplied as a kit for retro fitting at any time.

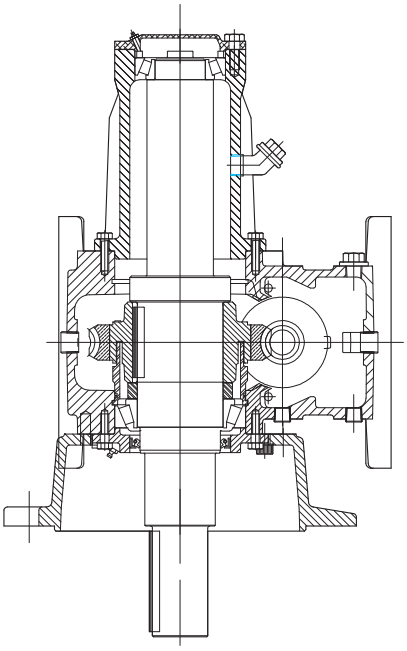
WM Series - Product Specification



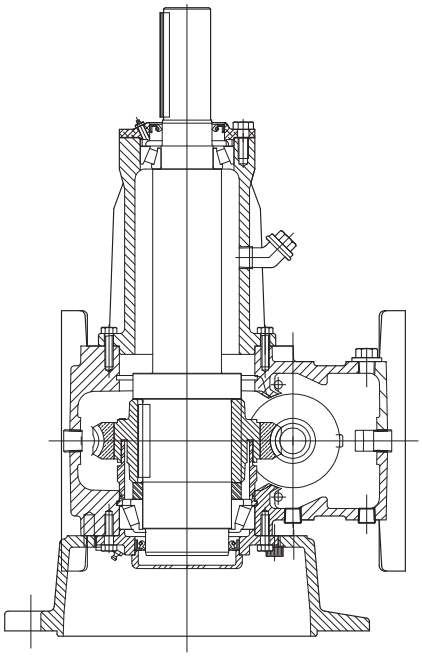
Dry well adaption fitted at the output of the WM Series unit. The non leak feature is particularly important on mixer applications in the food and chemical Industry.



Unit fitted with output location flange and double extension output shaft, one standard extension and one longer than standard compensating for the flange.



WMA - Agitator unit with solid output shaft down. The unit is shown with the dry well feature. The output shaft bearings have a greater bearing span to allow for higher external loads imposed by mixer and agitator blades.



Agitator unit with solid output shaft up, particularly suited for cooling fan drives.

Selection of Worm Gears

To select a worm gear unit the following basic information must be known and, if we are to make the selection, should be submitted in full to our Technical Sales Department.

Power

a) Prime mover, type and output power (HP).
b) Gear unit input and output power required (HP).
c) For input speeds below 250 rev/min consult our Technical Sales Department, giving details of required output torque (lbf.ins) and diameter of driven shaft (ins).

Speed

Gear unit input and output rev/min.

Duty

a) The characteristics of the drive eg. degree of impulsiveness of the driven load.
b) Duration of service in hours/day.
c) Starting load (HP) and number of starts per day.
d) For intermittent duty, reversing or shock loading, state normal power (HP) and frequency.
e) Disposition and details of external loads imposed on input/output shafts.
f) Working conditions, i.e. clean, dusty, moist, abnormal temperatures etc.

If the operating conditions are in any way unusual it is advisable to consult our Technical Sales Department.

Enquiry/Ordering Procedure

At the order or enquiry stage, please quote the catalogue reference, shaft assembly number and nominal ratio or exact ratio if this is important (see tables). Non-standard mounting positions should be indicated with a sketch. Where a double extension wormwheel shaft is required, please state any special requirements regarding alignment of keyways.

Mechanical Rating

The mechanical powers listed are those which the WM Series class units will transmit for 10 hours each day and correspond to a service factor of 1,0. Where non-uniform loading or a working day other than 10 hours is involved, a service factor fd should be applied to the selection power or torque which is taken from Table 2.

High numbers of starts per hour also influence the mechanical selection. Table 3 shows the starts factor fs which should also be applied to the selection power or torque.

For guidance, a comprehensive list of the various load conditions for a number of applications is given in Table 1. When confirming the mechanical selection powers therefore, the rating must be equal to or greater than - calculated power or torque demand x application service factor fd (Table 1 and Table 2) x starts factor fs (Table 3). Ratings based on 10,000 hours.

Efficiencies

The efficiency figures are approximate only and are those that could be expected from a gearbox which is fully run-in and operating under full load with the lubricant at its full working temperature.

For intermittent rating where the lubricant may remain comparatively cool, the efficiency may be somewhat lower due to the increased oil churning losses associated with the higher viscosity of the cool oil.

We shall be pleased to advise on any particular application.

Thermal Rating

The thermal ratings given are those which the gear units will transmit at an ambient temperature of 20°C (68°F), when the heat generated within the gearbox is being dissipated at the same rate. Whilst these ratings can be exceeded under start up conditions, this situation could lead to overheating and subsequent damage if continuously applied.

Thermal torque ratings do not relate to mechanical gear life and are not affected by running time or momentary shock loads.

If the ambient temperature is likely to exceed 20°C (68°F), this situation will have to be taken into account in the selection procedure. This is done by applying the thermal service factor given in Table 4 when calculating the selection output torque.

Eg. Thermal selection torque = continuous torque requirement x thermal service factor ft. Where intermittent running is involved it is possible the thermal limitation can be ignored, such as on a crane or winch application and when this type of operation is being considered; full applicational details should be given to Renold for assessment.

Selection Procedure

The ratings tables for the single reduction wormgear units provide mechanical ratings in terms of input and output power in HP and mechanical and thermal output torque ratings in lbf.ins.

Tables 1 and 2 list the service factors relative to the operational hours each working day and the load classification with regard to the nature of the service. When determining the selection power, the actual power absorbed and not the rating of the prime mover should be used.

The procedure is as follows for single reduction units:-

a) Establish the ratio required by dividing the input speed by the output, choosing the nearest nominal ratio available from tables 8 and 9.

$$\text{Gear ratio} = \frac{\text{Input speed rev/min}}{\text{Output speed rev/min}}$$

b) Determine the load classification from Table 1 and the corresponding mechanical service factor fd from Table 2 and the starts factor fs from Table 3.
c) Multiply the actual power absorbed by the mechanical service factor fd and carefully select the size of unit by comparing this against the mechanical rating appropriate to the ratio and input speed.

Selection Output Torque =
actual output torque x fd x fs

or

$$\text{Selection Output Torque} = \frac{\text{absorbed power} \times 63{,}025 \times fd \times fs}{\text{output speed (rev/min).}}$$

d) For continuous operation, check that the thermal rating is at least equal to the thermal torque requirement. External cooling can be offered to increase thermal rate.

Thermal torque requirement = continuous torque x thermal service factor ft from Table 4.

e) Check the capability of the unit to withstand external loads applied to the output shaft. See Tables 5 and 6.

Nominal and Actual Ratios

Single Reduction

Gear Size	WM100	WM125	WM160	WM200
Nominal Ratio	Actual Ratio			
5	5	5	5.38	5
7.5	*7.25*	*7.25*	*7.80*	*7.20*
10	9.66	9.33	10.25	9.75
12.5	*12.33*	*12*	*13.25*	*12*
15	15.5	15.5	15.33	14.33
20	20.5	20	21.5	20
25	25	24	26	24
30	29	29	32	29
35	*35*	*34*	*37*	*34*
40	39	39	42	39
45	*45*	*44*	*48*	*44*
50	49	44	53	49
60	59	59	63	59
70	69	69	74	69

Preferred Ratios

Preferred ratios have been chosen with a view to providing a competitive lead time , the non preferred ratios have been shown in italics.

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Load Classification by Application

Table 1

Agitators		Sugar (1)	M	Medium duty	M	Individual drives	H	single acting: 1 or 2 cylinders	*
Pure liquids	S	**Dredges**		Skip hoist	M	Reversing	*	double acting: single cylinder	*
Liquids and solids	M	Cable reels	M	**Laundry**		Wire drawing and flattening machine	M	Rotary - gear type	S
Liquids-variable density	M	Conveyors	M	Washers - reversing	M	Wire winding machine	M	Rotary - lobe, vane	S
Blowers		Cutter head drives	H	Tumblers	M	**Mills, rotary type**		**Rubber and plastics industries**	
Centrifugal	S	Jig drives	H	**Line shafts**		Ball (1)	M	Crackers (1)	H
Lobe	M	Manoeuvring winches	M	Driving processing equipment	M	Cement kilns (1)	M	Laboratory equipment	M
Vane	S	Pumps	M	Light	S	Dryers and coolers (1)	M	Mixed mills (1)	H
Brewing and Distilling		Screen drive	H	Other line shafts	S	Kilns other than cement	M	Refiners (1)	M
Bottling machinery	S	Stackers	M	**Lumber industry**		Pebble (1)	M	Rubber calenders (1)	M
Brew kettles-continuous duty	S	Utility winches	M	Barkers, hydraulic, mechanical	M	Rod, plain & wedge bar (1)	M	Rubber mill, 2 on line (1)	M
Cookers-continuous duty	S	**Dry dock cranes**		Burner conveyor	M	Tumbling barrels	H	Rubber mill, 3 on line (1)	S
Mash tubs-continuous duty	S	Main hoist	(2)	Chain saw and drag saw	H	**Mixers**		Sheeter (1)	M
Scale hopper-frequent starts	M	Auxiliary hoist	(2)	Chain transfer	H	Concrete mixers continuous	M	Tyre building machines	*
Can filling machines	S	Boom, luffing	(2)	Craneway transfer	H	Concrete mixers intermittent	M	Tyre and tube press openers	*
Cane knives (1)	M	Rotating, swing or slew	(3)	De-barking drum	H	Constant density	S	Tubers and strainers (1)	M
Car dumpers	H	Tracking, drive wheels	(4)	Edger feed	M	Variable density	M	Warming mills (1)	M
Car pullers	M	**Elevators**		Gang feed	M	**Oil industry**		**Sand muller**	M
Clarifiers	S	Bucket - uniform load	S	Green chain	M	Chillers	M	**Screens**	
Classifiers	M	Bucket - heavy load	M	Live rolls	H	Oil well pumping	*	Air washing	S
Clay working machinery		Bucket - continuous	S	Log deck	H	Paraffin filter press	M	Rotary, stone or gravel	M
Brick press	H	Centrifugal discharge	S	Log haul-incline	H	Rotary kilns	M	Travelling water intake	S
Briquette machine	H	Escalators	S	Log haul-well type	H	**Paper mills**		**Sewage disposal equipment**	
Clay working machinery	M	Freight	M	Log turning device	H	Agitators (mixers)	M	Bar screens	S
Pug mill	M	Gravity discharge	S	Main log conveyor	H	Barker-auxiliaries hydraulic	M	Chemical feeders	S
Compressors		Man lifts	*	Off bearing rolls	M	Barker-mechanical	H	Collectors	S
Centrifugal	S	Passenger	*	Planer feed chains	M	Barking drum	H	Dewatering screws	M
Lobe	M	**Extruders (plastic)**		Planer floor chains	M	Beater and pulper	M	Scum breakers	M
Reciprocating - multi-cylinder	M	Film	S	Planer tilting hoist	M	Bleacher	S	Slow or rapid mixers	M
Reciprocating - single cylinder	H	Sheet	S	Re-saw merry-go-round conveyor	M	Calenders	M	Thickeners	M
Conveyors - uniformly loaded or fed		Coating	S	Roll cases	H	Calenders-super	H	Vacuum filters	M
Apron	S	Rods	S	Slab conveyor	H	Converting machine except		**Slab pushers**	M
Assembly	S	Tubing	S	Small waste conveyor-belt	S	cutters, platers	M	**Steering gear**	*
Belt	S	Blow moulders	M	Small waste conveyor-chain	M	Conveyors	S	**Stokers**	S
Bucket	S	Pre-plasticiers	M	Sorting table	M	Couch	M	**Sugar industry**	
Chain	S	**Fans**		Tipple hoist conveyor	M	Cutters, platers	H	Cane knives (1)	M
Flight	S	Centrifugal	S	Tipple hoist drive	M	Cylinders	M	Crushers (1)	M
Oven	S	Cooling towers		Transfer conveyors	M	Dryers	M	Mills (1)	M
Screw	S	Induced draft	*	Transfer rolls	M	Fell stretcher	M	**Textile industry**	
Conveyors - heavy duty		Forced draft	*	Tray drive	M	Fell whipper	H	Batchers	M
not uniformly fed		Induced draft	M	Trimmer feed	M	Jordans	M	Calenders	M
Apron	M	Large, mine etc.	M	Waste conveyor	M	Log haul	H	Cards	M
Assembly	M	Large, industrial	M	**Machine tools**		Presses	M	Dry cans	M
Belt	M	Light, small diameter	S	Bending roll	M	Pulp machine reel	M	Dryers	M
Bucket	M	**Feeders**		Punch press-gear driven	H	Stock chest	M	Dyeing machinery	M
Chain	M	Apron	M	Notching press-belt drive	*	Suction roll	M	Looms	M
Flight	M	Belt	M	Plate planners	H	Washers and thickeners	M	Mangles	M
Live roll	*	Disc	S	Tapping machine	H	Winders	M	Nappers	M
Oven	M	Reciprocating	H	**Other machine tools**		**Printing presses**	*	Pads	M
Reciprocating	H	Screw	M	Main drives	M	**Pullers**		Range drives	*
Screw	M	**Food industry**		Auxiliary drives	S	Barge haul	H	Slashers	M
Shaker	H	Beef slicer	M	**Metal mills**		**Pumps**		Soapers	M
Crane Drives - not dry dock		Cereal cooker	S	Drawn bench carriage		Centrifugal	S	Spinners	M
Main hoists	S	Dough mixer	M	and main drive	M	Proportioning	M	Tenter frames	M
Bridge travel	*	Meat grinder	M	Pinch, dryer and scrubber		Reciprocating		Washers	M
Trolley travel	*	**Generators - not welding**	S	rolls, reversing	*	single acting:		Winders	M
Crushers		**Hammer mills**	H	Slitters	M	3 or more cylinders	M	Windlass	*
Ore	H	**Hoists**		Table conveyors non-		double acting:			
Stone	H	Heavy duty	H	reversing group drives	M	2 or more cylinders	M		

Service Factors

Table 2 (Service Factor f_D)

Prime mover (Drive input)	Driven machinery characterisitics: Duration Service	Steady load	Medium impulsive	Highly impulsive
Electric, Air & Hydraulic Motors or Steam Turbine (Steady input)	Intermittent - 3hrs/day max	0.90	1.00	1.50
	3 - 10 over 10	1.00	1.25	1.75
		1.25	1.50	2.00
Multi-cylinder I.C. engine (Medium impulsive input)	Intermittent - 3hrs/day max	1.00	1.25	1.75
	3 - 10 over 10	1.25	1.50	2.00
		1.50	1.75	2.25
Single-cylinder I.C. engine (Highly impulsive input)	Intermittent - 3hrs/day max	1.25	1.50	2.00
	3 - 10 over 10	1.50	1.75	2.25
		1.75	2.00	2.50

S = Steady
M = Medium Impulsive
H = Highly Impulsive
* = Refer to Renold
(1) = Select on 24 hours per day service factor only.
(2) = Use service factor of 1.00 for any duration of service.
(3) = Use service factor of 1.25 for any duration of service.
(4) = Use service factor of 1.50 for any duration of service.

Note

Machinery characteristics and service factors listed in this catalogue are a guide only. Some applications (e.g. constant power) may require special considerations. Consult Renold.

Table 3 Factor for Starts/Hours (f_S)

Maximum number of starts per hour	5	50	100	300
Starts Factor f_S	1.0	1.1	1.15	1.2

Table 2 Thermal Service Factor f_T

Ambient °C	10	20	30	40	50	60
Temp °F	50	68	86	105	122	140
Factor f_T	0.87	1.0	1.16	1.35	1.62	1.97

Overhung and Thrust Loads

Output shafts of worm gear units are frequently fitted with a spur pinion, chain pinion or belt pulley causing an overhung load to be imposed on the output shaft and bearings. These loads can generally be sustained by the gear unit; however, if the load is greater than the maximum allowable load for the unit, it may be necessary to either select a larger unit or lessen the effect of the load on the shaft bearings. This can be done in two ways. The pinion can be mounted on a shaft in its own bearings and the shaft coupled to the gear unit; or the wheel shaft may be extended beyond the overhung load and fitted with an outboard bearing. In order to obtain the best possible arrangement for a particular application (where large overhung loads are anticipated) customers are advised to submit details of the load to our Sales Technical Staff for their consideration.

In the interests of good design, the overhung member should be fitted as close as possible to the gear case in order to minimise the stresses and reduce the deflecting moment on the unit.

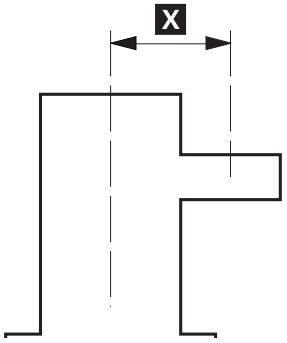
The maximum imposed axial thrust and overhung loads to which the units can be subjected are given in Tables 5 and 6.

Imposed axial thrust loads can also be minimised by the use of flexible couplings on the input and output shafts.

For drives where both imposed thrust and overhung loads are encountered, it is advisable to consult our Technical Sales Staff.

Where a double extension shaft is fitted, the maximum overhung loads listed apply in full to each shaft extension.

Unit Size	Dimension X ins
	Standard Shaft
WM4	6.34
WM5	7.60
WM6	8.58
WM7	9.37
WM8	9.61
WM9	10.55



The overhung load may be calculated by the following formula:

resultant overhung load = (lbf)

$$\frac{P \times 126{,}000 \times F}{D \times S}$$

Where P = Power absorbed at output shaft (HP)

S = Speed of output shaft in rev/min

D = Pitch circle diameter of chain sprocket, spur or helical gear, or belt sheave in ins.

F = Overhung drive application factor as follows:

Chain sprocket	1,00
Spur or helical gear	1,25
Vee sheave	1,50
Flat belt sheave	2,00

Output Shaft Overhung Loads - Single Reduction

Table 5 - Output Shaft Overhung Loads (lbs)

At 1750 rpm input

Ratio	Output Speed	Gear Unit Reference			
		100	125	160	200
5/1	350	2260	2810	2540	5840
7.5/1	233	2650	3410	4062	7210
10/1	175	2940	3790	4510	8050
12.5/1	140	3100	4060	4980	8460
15/1	117	3050	4320	5300	9190
20/1	88	3070	4390	5350	10650
25/1	70	3010	4430	5400	11310
30/1	58	2930	4170	5210	12000
35/1	50	3020	4170	5180	12360
40/1	44	3050	4310	5250	12360
45/1	39	3060	4350	5310	12360
50/1	35	3080	4400	5360	12360
60/1	29	3110	4460	5440	12360
70/1	25	3130	4520	5510	12360

At 1160 rpm input

Ratio	Output Speed	Gear Unit Reference			
		100	125	160	200
5/1	232	2500	2900	2320	5960
7.5/1	155	2970	3820	4530	8000
10/1	116	3090	4250	5130	9038
12.5/1	93	3040	4320	5300	9490
15/1	77	2990	4200	5240	10310
20/1	58	3020	4270	5190	11960
25/1	46	2930	4320	5240	12000
30/1	39	2870	3980	5000	12360
35/1	33	2950	4070	4970	12360
40/1	29	3000	4180	5050	12360
45/1	26	3010	4230	5140	12360
50/1	23	3030	4290	5210	12360
60/1	19	3070	4370	5330	12360
70/1	17	3100	4450	5420	12360

Output Shaft Axial Thrust Loads - Single Reduction

Table 6 - Output Shaft Axial Thrust Loads (lbs)

At 1750 rpm input

Ratio	Output Speed	Gear Unit Reference			
		100	125	160	200
5/1	350	2030	2060	1610	4010
7.5/1	233	2690	3110	2950	6260
10/1	175	3170	3690	3690	7450
12.5/1	140	3510	4010	4200	7940
15/1	117	3840	4380	4730	9020
20/1	88	4490	5240	5770	11140
25/1	70	4770	5760	6390	11950
30/1	58	4800	5950	6768	12000
35/1	50	4950	6460	7220	12360
40/1	44	4950	6920	7710	12360
45/1	39	4950	7200	8230	12360
50/1	35	4950	7420	8640	12360
60/1	29	4950	7420	9380	12360
70/1	25	4950	7420	9600	12360

At 1160 rpm input

Ratio	Output Speed	Gear Unit Reference			
		100	125	160	200
5/1	232	2160	2110	1450	4080
7.5/1	155	2980	3420	3170	6750
10/1	116	3510	4090	4080	8290
12.5/1	93	3900	4440	4620	8820
15/1	77	4300	4880	5240	10030
20/1	58	4800	5880	6460	12000
25/1	46	4950	6480	7170	12360
30/1	39	4950	6680	7820	12360
35/1	33	4950	7200	8020	12360
40/1	29	4950	7420	8710	12360
45/1	26	4950	7420	9280	12360
50/1	23	4950	7420	9600	12360
60/1	19	4950	7420	9900	12360
70/1	17	4950	7420	9900	12360

Installation and Maintenance

Initial running

All units are supplied without oil except for the jPM unit first stage reduction, used on WM Series unit sizes 4,5,6, and 7.

First filling

Single Reduction Units

When installed and before running, the unit should be filled with new lubricant to the correct level as follows.

With the gear stationary, remove the filler and breather plug and oil level plug. Fill until the lubricant level is visible at the indicator (if fitted) or until lubricant overflows from oil level aperture.

Replace and secure both plugs. Care should be taken to avoid overfilling, as this may cause subsequent leakage.

Starting up

All units have been subjected to a short test before despatch to the customer, but it takes many hours running under full load for the gear to attain its highest efficiency. The gear may, if necessary, be put to work immediately on full load, but if circumstances permit, it is better for the ultimate life of the gear to run it in under gradually increasing load attaining the full load after about 20 to 40 hours. Reasonable precautions should, however, be taken to avoid overloads in the early stage of running. Temperature rise on the initial run will be higher than that eventually attained after the gear is fully run in.

Routine maintenance

The oil level in the unit should be regularly maintained and should be checked at least once a month.

To avoid false readings, examination of the oil level should be made with the gear stationary and to maintain free ventilation of the unit under all conditions, the breather hole in the filler plug should be kept clear at all times. In the case of double reduction units, ensure that maintenance requirements given above are applied to both 1st and 2nd stage reduction gears.

Changing oil

The oil should be changed completely at intervals depending upon the working conditions.

Grease lubrication of bearings

Where this feature is included, the bearing caps are fitted with a grease nipple or stauffer lubricator, which should be used to lubricate the bearings.

When mounted with wormshafts vertical, the top bearing requires grease lubrication. Standard units, therefore, need to be modified by the inclusion of a grease nipple and nylos ring adjacent to the top bearing. Customers must advise us of this requirement when placing enquiries and orders.

Couplings and bedplates

All couplings should be carefully fitted and shafts accurately aligned.

To prevent damage to the bearings, coupling half-bodies should not be hammered on to shafts.

Worm gear units and other drive components should be rigidly mounted on firm foundations to prevent movement and vibration which may affect the alignment of the shafts. Suitable bedplates can be supplied if required.

Abnormal ambient temperatures

If the gear unit is to be operated under extremes of temperature or humidity, special oils may be required and recommendations will be made on request.

Storage

All worm gear units stored or left inactive for long periods should be adequately protected, particularly those on exposed sites and those operating in corrosive atmospheres. The following precautions will generally be adequate, but advice on the protection of particular units will be given, if required.

If empty of oil: spray the gear case interior with rust preventative oil compatible with lubricant recommended for service conditions.

If filled with oil: operate at full speed once per month for not less than 10 minutes to ensure liberal coating of all internal parts with oil.

For indefinite storage: completely fill unit with oil ensuring complete submersion of all internal components. Shafts should be occasionally turned by hand. When unit is returned to service, drain and refill with new oil to correct level.

Spare parts

Information relating to spare parts is available on request.

RENOLD WM Series - Lubrication Information

Oil Lubrication

The correct fill of oil for the unit size and mounting position can be found in either the appropriate catalogue or the installation and maintenance guide. Only good quality oils should be used, such as those listed below, as the use of inferior or unsuitable products may cause rapid wear and possible damage to the gearbox. Some EP additives such as Sulphur can attack Bronze especially at operating temperatures above 80˚C and therefore should be avoided.

Oils with three vicosity ranges (Light, medium and heavy) are listed below, the correct choice depends on the application, operating speed, load and temperature. Temperature and speed can often be the main factor as it affects the operating vicosity. If the unit runs below the catalogue rating and operates at a temperature below 60˚C then a light grade oil should be used. Operating at catalogue rating with temperatures up to 100˚C requires a medium grade, and with higher temperatures and loading heavy grade oils should be used. If the unit is operating with gear speeds below 2.5 m/s (500ft/min) then the next higher grade should be used. Using too heavy a grade than required will result in reduced efficiency, too light a grade will result in premature wear, if in doubt ask Renold Gears Technical Department.

Which Oil to Select

There are three main oils Mineral, Synthetic - Polyalphaolefin and Synthetic - Polyglycol. Mineral oils tend to be lower cost, have a shorter life and are less efficient. Synthetic - Polyalphaolefin can operate over a higher temperature range, are more efficient, give higher ratings and have a longer life and as such are preferred. The use of Synthetic - Polyglycol are not recommended without prior discussion with Renold as special paints and seals are required. If necessary a list of recommended food grade oils is available on request.

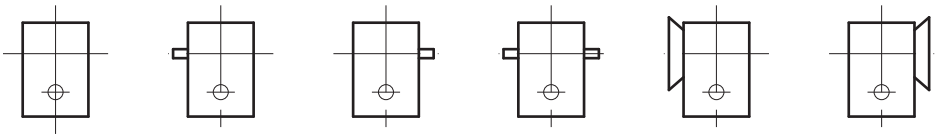
Mineral Oil	Light		Medium		Heavy	
		Temp˚C		Temp˚C		Temp˚C
Mobil Gear	630	-13 to 90	632	-13 to 90	634	-1 to 90
Mobil DTE	BB	-7 to 90	AA	2 to 90	HH	2 to 90
Castrol Optimol BM	220	-9 to 120	320	-9 to 120	460	-9 to 120
Castrol MoLub - Alloy EP	220	-24 to 80	320	-18 to 80	460	-15 to 80
Shell Vitrea	220	-24 to 120	320	-18 to 120	460	-15 to 120
Shell Omala	220	-9 to 80	320	-9 to 80	460	-9 to 80
Esso Teresso	220	-18 to 120	320	-12 to 120	460	-9 to 120
Esso Spartan EP	220	-30 to 80	320	-27 to 80	460	-18 to 80
Petro - Canada Harmony	220	-18 to 120	320	-12 to 120	460	-9 to 120
Petro - Canada Ultima EP	220	-30 to 80	320	-27 to 80	460	-18 to 80

Synthetic (Polyalphaolefin)	Light		Medium		Heavy	
		Temp˚C		Temp˚C		Temp˚C
Mobil Gear SHC	630	-42 to 160	632	-42 to 160	634	-39 to 160
Shell Omala RL	220	-40 to 80	320	-40 to 80	460	-40 to 80
Esso Teresso SHP	220	-42 to 150	320	-36 to 150	460	-30 to 150
Petro - Canada Ultima Synthetic	220	-42 to 160	220	-42 to 160	460	-39 to 160

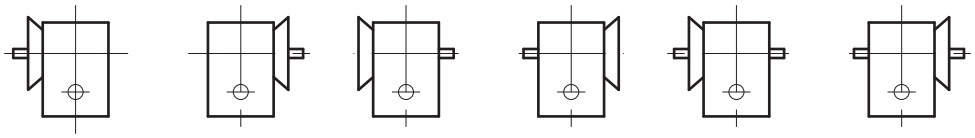
RENOLD

Single Reduction - Mounting & Handing

WMU - Underdriven
WMSM - Shaft Mounted

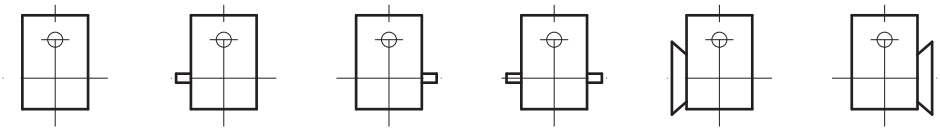


No Sprag backstop fitted.	UA	UC	UE	UG	UJ	UL
Sprag backstop fitted.	UB	UD	UF	UH	UK	UM

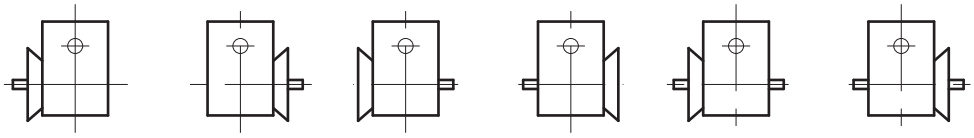


No Sprag backstop fitted.	UN	UQ	US	UU	UW	UY
Sprag backstop fitted.	UP	UR	UT	UV	UX	UZ

WMO - Overdriven

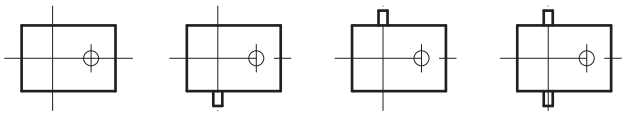


No Sprag backstop fitted.	OA	OC	OE	OG	OJ	OL
Sprag backstop fitted.	OB	OD	OF	OH	OK	OM

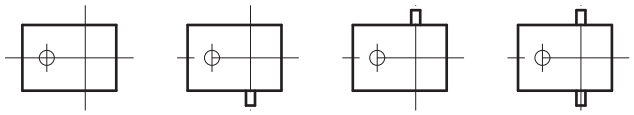


No Sprag backstop fitted.	ON	OQ	OS	OU	OW	OY
Sprag backstop fitted.	OP	OR	OT	OV	OX	OZ

WMU - WMO Suitable For Wall Mounting



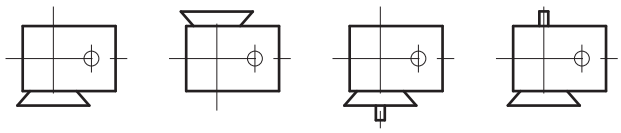
No Sprag backstop fitted.	WA	WC	WE	WG
Sprag backstop fitted.	WB	WD	WF	WH



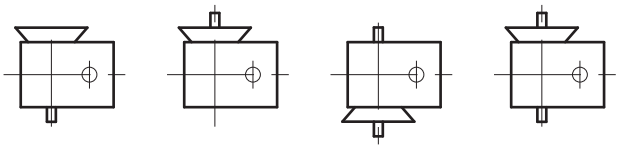
No Sprag backstop fitted.	WS	WL	WN	WQ
Sprag backstop fitted.	WT	WM	WP	WR

Single Reduction - Mounting & Handing

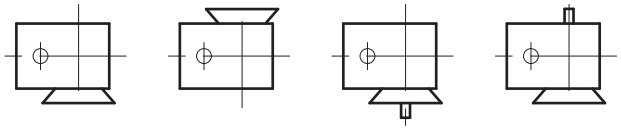
WMV - Vertical



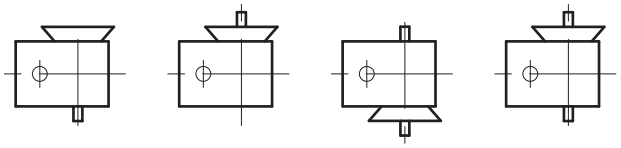
No Sprag backstop fitted.	VA	VC	VE	VG
Sprag backstop fitted.	VB	VD	VF	VH



No Sprag backstop fitted.	VJ	VL	VN	VQ
Sprag backstop fitted.	VK	VM	VP	VR

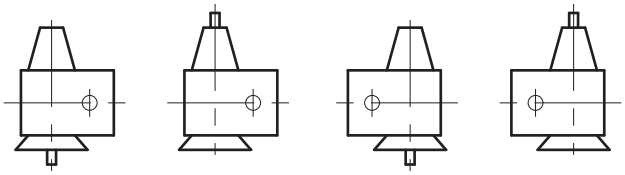


No Sprag backstop fitted.	VS	VU	VW	VY
Sprag backstop fitted.	VT	VV	VX	VZ



No Sprag backstop fitted.	V1	V3	V5	V7
Sprag backstop fitted.	V2	V4	V6	V8

WMA - Agitator



No Sprag backstop fitted.	AA	AC	AE	AG
Sprag backstop fitted.	AB	AD	AF	AH

WM Series - Single Reduction - Selection Data

Synthetic Oils

Nominal ratio: 5/1 Preferred Ratio

Input rpm	Output rpm	Centre Distance Actual Ratio : 1 Gear Ratings	3.94" 5	4.92" 5	6.3" 5.38	7.87" 5
1800	360	Input kW, Thermal	31.6	50.7	76.1	136.7
		Output Torque Nm, Thermal	5233	8471	13696	22857
		Input kW, Mechanical	25.4	44.5	84.4	143.3
		Output Torque Nm, Mechanical	4196	7444	15191	23960
		Efficiency %	95%	96%	96%	96%
1500	300	Input kW, Thermal	27.1	43.0	64.7	116.8
		Output Torque Nm, Thermal	5375	8542	13975	23449
		Input kW, Mechanical	23.0	40.2	75.0	130.4
		Output Torque Nm, Mechanical	4566	7991	16203	26178
		Efficiency %	95%	95%	96%	96%
1200	240	Input kW, Thermal	22.5	35.6	53.3	96.5
		Output Torque Nm, Thermal	5588	8848	14245	24202
		Input kW, Mechanical	20.6	35.7	65.7	116.2
		Output Torque Nm, Mechanical	5123	8855	17538	29136
		Efficiency %	95%	95%	95%	96%
1000	200	Input kW, Thermal	19.6	30.8	45.8	82.8
		Output Torque Nm, Thermal	5766	9181	14689	24928
		Input kW, Mechanical	18.7	32.7	53.6	104.7
		Output Torque Nm, Mechanical	5518	9748	17180	31503
		Efficiency %	94%	95%	95%	96%
750	150	Input kW, Thermal	15.9	24.8	36.7	65.7
		Output Torque Nm, Thermal	6267	9742	15691	26078
		Input kW, Mechanical	15.6	27.4	52.3	90.5
		Output Torque Nm, Mechanical	6140	10774	22334	35946
		Efficiency %	94%	94%	95%	95%

For ratings with input speeds below 750rpm please refer to Renold.

WM Series - Single Reduction - Selection Data

Synthetic Oils

Nominal ratio: 7.5/1 Non Preferred Ratio

Input rpm	Output rpm	Centre Distance / Actual Ratio : 1 / Gear Ratings	3.94" 7.25	4.92" 7	6.3" 7.8	7.87" 7.2
1800	240	Input kW, Thermal	28.1	45.3	69.5	125.8
		Output Torque Nm, Thermal	6717	10493	17954	30301
		Input kW, Mechanical	18.6	31.1	61.6	104.2
		Output Torque Nm, Mechanical	4433	7206	15913	25096
		Efficiency %	95%	95%	95%	96%
1500	200	Input kW, Thermal	24.0	38.5	59.0	106.8
		Output Torque Nm, Thermal	6834	10692	18266	30862
		Input kW, Mechanical	17.1	28.4	56.3	94.2
		Output Torque Nm, Mechanical	4872	7909	17435	27218
		Efficiency %	94%	95%	95%	96%
1200	160	Input kW, Thermal	20.0	31.8	48.4	87.5
		Output Torque Nm, Thermal	7111	10921	18733	31278
		Input kW, Mechanical	15.0	25.4	48.2	84.3
		Output Torque Nm, Mechanical	5355	8718	18681	30138
		Efficiency %	94%	94%	95%	95%
1000	133	Input kW, Thermal	17.4	27.5	41.5	74.8
		Output Torque Nm, Thermal	7366	11335	19100	32073
		Input kW, Mechanical	13.4	22.6	41.5	76.1
		Output Torque Nm, Mechanical	5653	9306	19100	32625
		Efficiency %	93%	94%	94%	95%
750	100	Input kW, Thermal	14.2	22.2	33.2	59.1
		Output Torque Nm, Thermal	8008	12108	20374	33798
		Input kW, Mechanical	11.4	19.2	36.2	63.4
		Output Torque Nm, Mechanical	6424	10431	22181	36250
		Efficiency %	93%	93%	94%	95%

For ratings with input speeds below 750rpm please refer to Renold.

WM Series - Single Reduction - Selection Data

Synthetic Oils

Nominal ratio: 10/1 Preferred Ratio

Input rpm	Output rpm	Centre Distance / Actual Ratio : 1 / Gear Ratings	3.94" 9.66	4.92" 9.33	6.3" 10.25	7.87" 9.75
1800	180	Input kW, Thermal	24.1	38.9	61.6	112.4
		Output Torque Nm, Thermal	7631	11874	20912	36280
		Input kW, Mechanical	16.4	27.1	56.3	86.1
		Output Torque Nm, Mechanical	5176	8287	19093	27779
		Efficiency %	94%	94%	95%	95%
1500	150	Input kW, Thermal	20.5	33.0	52.1	95.0
		Output Torque Nm, Thermal	7700	12087	21221	36791
		Input kW, Mechanical	14.7	24.8	48.2	79.3
		Output Torque Nm, Mechanical	5503	9080	19639	30709
		Efficiency %	93%	94%	95%	95%
1200	120	Input kW, Thermal	17.2	27.3	42.9	77.6
		Output Torque Nm, Thermal	8053	12396	21591	37556
		Input kW, Mechanical	12.8	21.4	41.5	69.6
		Output Torque Nm, Mechanical	6014	9692	20916	33677
		Efficiency %	93%	93%	94%	95%
1000	100	Input kW, Thermal	14.9	23.6	36.7	66.2
		Output Torque Nm, Thermal	8290	12833	22185	38046
		Input kW, Mechanical	11.5	19.3	37.5	61.8
		Output Torque Nm, Mechanical	6432	10507	22671	35497
		Efficiency %	92%	93%	94%	94%
750	75	Input kW, Thermal	12.3	19.2	29.5	52.4
		Output Torque Nm, Thermal	9111	13753	23498	40152
		Input kW, Mechanical	9.7	16.2	30.8	52.5
		Output Torque Nm, Mechanical	7229	11637	24566	40213
		Efficiency %	92%	92%	93%	94%

For ratings with input speeds below 750rpm please refer to Renold.

WM Series - Single Reduction - Selection Data

Synthetic Oils

Nominal ratio: 12.5/1 Non Preferred Ratio

Input rpm	Output rpm	Centre Distance / Actual Ratio : 1 / Gear Ratings	3.94" 12.33	4.92" 12	6.3" 13.25	7.87" 12
1800	144	Input kW, Thermal	20.6	33.2	54.0	97.2
		Output Torque Nm, Thermal	8244	12921	23433	38586
		Input kW, Mechanical	15.0	26.8	48.2	90.5
		Output Torque Nm, Mechanical	6006	10431	20933	35946
		Efficiency %	93%	93%	94%	95%
1500	120	Input kW, Thermal	17.6	28.3	45.6	82.0
		Output Torque Nm, Thermal	8325	13192	23724	38674
		Input kW, Mechanical	13.3	23.9	42.9	81.7
		Output Torque Nm, Mechanical	6312	11141	22328	38510
		Efficiency %	92%	93%	94%	94%
1200	96	Input kW, Thermal	14.7	23.3	37.5	67.0
		Output Torque Nm, Thermal	8738	13452	24162	39496
		Input kW, Mechanical	11.8	20.9	37.4	70.5
		Output Torque Nm, Mechanical	6999	12076	24076	41534
		Efficiency %	92%	92%	93%	94%
1000	80	Input kW, Thermal	12.9	20.2	32.2	57.1
		Output Torque Nm, Thermal	9052	14009	24852	40381
		Input kW, Mechanical	10.6	18.9	32.2	63.4
		Output Torque Nm, Mechanical	7426	13062	24852	44836
		Efficiency %	91%	92%	93%	94%
750	60	Input kW, Thermal	10.6	16.5	25.9	45.2
		Output Torque Nm, Thermal	9823	15049	26361	42139
		Input kW, Mechanical	8.8	15.8	28.1	53.5
		Output Torque Nm, Mechanical	8206	14401	28682	49929
		Efficiency %	90%	91%	92%	93%

For ratings with input speeds below 750rpm please refer to Renold.

WM Series - Single Reduction - Selection Data

Synthetic Oils

Nominal ratio: 15/1 Preferred Ratio

Input rpm	Output rpm	Centre Distance Actual Ratio : 1 Gear Ratings	3.94" 15.5	4.92" 15.5	6.3" 15.33	7.87" 14.33
1800	120	Input kW, Thermal	17.2	28.7	47.2	86.2
		Output Torque Nm, Thermal	8457	14247	23429	40436
		Input kW, Mechanical	13.7	24.3	42.9	76.9
		Output Torque Nm, Mechanical	6751	12083	21299	36109
		Efficiency %	91%	92%	93%	94%
1500	100	Input kW, Thermal	14.6	24.4	39.8	72.6
		Output Torque Nm, Thermal	8613	14540	23722	40901
		Input kW, Mechanical	12.4	21.8	37.5	68.8
		Output Torque Nm, Mechanical	7301	13006	22364	38766
		Efficiency %	91%	92%	93%	94%
1200	80	Input kW, Thermal	12.2	20.2	32.7	59.2
		Output Torque Nm, Thermal	8890	14915	24099	41250
		Input kW, Mechanical	10.9	19.3	33.5	59.3
		Output Torque Nm, Mechanical	7930	14233	24691	41269
		Efficiency %	90%	91%	92%	93%
1000	67	Input kW, Thermal	10.7	17.4	28.1	50.7
		Output Torque Nm, Thermal	9378	15409	24889	42333
		Input kW, Mechanical	9.6	17.1	28.1	53.9
		Output Torque Nm, Mechanical	8433	15124	24889	45088
		Efficiency %	90%	91%	92%	93%
750	50	Input kW, Thermal	8.8	14.2	22.8	40.2
		Output Torque Nm, Thermal	10201	16568	26572	44315
		Input kW, Mechanical	8.1	14.4	25.5	45.1
		Output Torque Nm, Mechanical	9368	16798	29698	49721
		Efficiency %	89%	90%	91%	92%

For ratings with input speeds below 750rpm please refer to Renold.

WM Series - Single Reduction - Selection Data

Synthetic Oils

Nominal ratio: 20/1 Preferred Ratio

Input rpm	Output rpm	Centre Distance Actual Ratio : 1 Gear Ratings	3.94" 20.5	4.92" 20	6.3" 21.5	7.87" 20
1800	90	Input kW, Thermal	14.2	22.9	35.1	63.9
		Output Torque Nm, Thermal	9029	14370	23931	40975
		Input kW, Mechanical	9.9	17.4	34.2	55.4
		Output Torque Nm, Mechanical	6324	10908	23292	35529
		Efficiency %	89%	90%	91%	92%
1500	75	Input kW, Thermal	12.2	19.4	29.7	54.0
		Output Torque Nm, Thermal	9301	14622	24066	41090
		Input kW, Mechanical	9.0	15.9	30.3	48.9
		Output Torque Nm, Mechanical	6847	11980	24499	37236
		Efficiency %	89%	90%	90%	91%
1200	60	Input kW, Thermal	10.2	16.2	24.4	44.2
		Output Torque Nm, Thermal	9601	15083	24662	42059
		Input kW, Mechanical	7.8	13.9	25.2	43.6
		Output Torque Nm, Mechanical	7337	12971	25475	41498
		Efficiency %	88%	89%	90%	91%
1000	50	Input kW, Thermal	9.0	14.1	21.0	37.8
		Output Torque Nm, Thermal	10042	15529	25245	42656
		Input kW, Mechanical	7.0	12.5	21.4	38.9
		Output Torque Nm, Mechanical	7831	13764	25728	43926
		Efficiency %	87%	88%	89%	90%
750	38	Input kW, Thermal	7.4	11.5	17.0	30.0
		Output Torque Nm, Thermal	10864	16766	26923	44675
		Input kW, Mechanical	5.9	10.5	18.8	32.7
		Output Torque Nm, Mechanical	8648	15248	29679	48703
		Efficiency %	86%	87%	88%	89%

For ratings with input speeds below 750rpm please refer to Renold.

WM Series - Single Reduction - Selection Data

Synthetic Oils

Nominal ratio: 25/1 Preferred Ratio

Input rpm	Output rpm	Centre Distance Actual Ratio : 1 Gear Ratings	3.94" 25	4.92" 24	6.3" 26	7.87" 24
1800	72	Input kW, Thermal	10.9	20.5	31.4	57.2
		Output Torque Nm, Thermal	8130	15257	25563	43537
		Input kW, Mechanical	10.2	14.3	26.8	47.9
		Output Torque Nm, Mechanical	7607	10673	21849	36451
		Efficiency %	86%	89%	90%	91%
1500	60	Input kW, Thermal	9.4	17.4	26.5	48.2
		Output Torque Nm, Thermal	8431	15382	25668	43563
		Input kW, Mechanical	9.1	13.0	24.1	43.0
		Output Torque Nm, Mechanical	8215	11453	23335	38868
		Efficiency %	86%	88%	89%	90%
1200	48	Input kW, Thermal	7.8	14.5	21.8	39.4
		Output Torque Nm, Thermal	8631	15973	26117	44471
		Input kW, Mechanical	8.0	11.2	21.4	37.9
		Output Torque Nm, Mechanical	8872	12413	25636	42761
		Efficiency %	85%	88%	88%	90%
1000	40	Input kW, Thermal	6.8	12.6	18.8	33.8
		Output Torque Nm, Thermal	9000	16493	26918	45233
		Input kW, Mechanical	7.2	10.1	18.1	33.8
		Output Torque Nm, Mechanical	9434	13183	25956	45215
		Efficiency %	84%	87%	88%	89%
750	30	Input kW, Thermal	5.6	10.3	15.3	26.8
		Output Torque Nm, Thermal	9647	17807	28893	47328
		Input kW, Mechanical	6.0	8.4	15.8	28.3
		Output Torque Nm, Mechanical	10334	14551	29907	49978
		Efficiency %	82%	86%	87%	88%

For ratings with input speeds below 750rpm please refer to Renold.

WM Series - Single Reduction - Selection Data

Synthetic Oils

Nominal ratio: 30/1 Preferred Ratio

Input rpm	Output rpm	Centre Distance Actual Ratio : 1 Gear Ratings	3.94" 29	4.92" 29	6.3" 32	7.87" 29
1800	60	Input kW, Thermal	10.3	16.6	25.3	53.9
		Output Torque Nm, Thermal	8965	14606	24847	48983
		Input kW, Mechanical	9.5	16.1	26.8	38.2
		Output Torque Nm, Mechanical	8223	14123	26293	34715
		Efficiency %	86%	87%	88%	90%
1500	50	Input kW, Thermal	8.8	14.1	21.4	45.3
		Output Torque Nm, Thermal	9114	14671	24955	49422
		Input kW, Mechanical	8.5	14.3	22.8	34.5
		Output Torque Nm, Mechanical	8719	14924	26514	37637
		Efficiency %	85%	86%	87%	90%
1200	40	Input kW, Thermal	7.5	11.8	17.7	37.0
		Output Torque Nm, Thermal	9553	15191	25439	49885
		Input kW, Mechanical	7.4	12.6	18.8	29.9
		Output Torque Nm, Mechanical	9439	16178	26980	40360
		Efficiency %	84%	85%	86%	89%
1000	33	Input kW, Thermal	6.6	10.2	15.3	31.6
		Output Torque Nm, Thermal	9911	15558	26057	50611
		Input kW, Mechanical	6.6	11.2	17.4	27.0
		Output Torque Nm, Mechanical	10012	17158	29714	43170
		Efficiency %	83%	84%	85%	88%
750	25	Input kW, Thermal	5.5	8.4	12.5	25.3
		Output Torque Nm, Thermal	10791	16991	28009	53428
		Input kW, Mechanical	5.5	9.4	16.3	22.1
		Output Torque Nm, Mechanical	10886	18838	36744	46644
		Efficiency %	81%	83%	84%	87%

For ratings with input speeds below 750rpm please refer to Renold.

WM Series - Single Reduction - Selection Data

Synthetic Oils

Nominal ratio: 35/1 Non Preferred Ratio

Input rpm	Output rpm	Centre Distance / Actual Ratio : 1 / Gear Ratings	3.94" 35	4.92" 34	6.3" 37	7.87" 34
1800	51	Input kW, Thermal	9.1	14.9	23.2	43.1
		Output Torque Nm, Thermal	9333	14976	25700	44978
		Input kW, Mechanical	7.3	13.3	20.6	40.1
		Output Torque Nm, Mechanical	7519	13387	22877	41793
		Efficiency %	84%	85%	86%	88%
1500	43	Input kW, Thermal	7.8	12.7	19.7	36.4
		Output Torque Nm, Thermal	9439	15200	26205	45074
		Input kW, Mechanical	6.6	11.8	18.3	35.7
		Output Torque Nm, Mechanical	8056	14080	24315	44113
		Efficiency %	83%	84%	86%	87%
1200	34	Input kW, Thermal	6.6	10.6	16.3	29.9
		Output Torque Nm, Thermal	9848	15612	26869	45662
		Input kW, Mechanical	5.8	10.4	16.1	30.8
		Output Torque Nm, Mechanical	8644	15391	26407	47075
		Efficiency %	82%	83%	85%	86%
1000	29	Input kW, Thermal	5.8	9.2	14.1	25.6
		Output Torque Nm, Thermal	10244	16166	27424	46932
		Input kW, Mechanical	5.1	9.2	14.3	28.0
		Output Torque Nm, Mechanical	9146	16159	27925	51354
		Efficiency %	81%	82%	84%	86%
750	21	Input kW, Thermal	4.8	7.6	11.4	20.5
		Output Torque Nm, Thermal	11153	17589	28895	48960
		Input kW, Mechanical	4.3	7.8	11.9	23.3
		Output Torque Nm, Mechanical	10019	17956	30289	55616
		Efficiency %	79%	81%	82%	84%

For ratings with input speeds below 750rpm please refer to Renold.

WM Series - Single Reduction - Selection Data

Synthetic Oils

Nominal ratio: 40/1 Preferred Ratio

Input rpm	Output rpm	Centre Distance Actual Ratio : 1 Gear Ratings	3.94" 39	4.92" 39	6.3" 42	7.87" 39
1800	45	Input kW, Thermal	8.2	13.5	20.6	38.6
		Output Torque Nm, Thermal	9122	15447	25667	45096
		Input kW, Mechanical	6.0	10.9	20.8	34.9
		Output Torque Nm, Mechanical	6733	12416	25833	40821
		Efficiency %	82%	84%	85%	86%
1500	38	Input kW, Thermal	7.1	11.5	17.6	32.6
		Output Torque Nm, Thermal	9380	15596	25892	45660
		Input kW, Mechanical	5.5	9.8	18.6	31.1
		Output Torque Nm, Mechanical	7242	13245	27473	43611
		Efficiency %	81%	83%	84%	86%
1200	30	Input kW, Thermal	5.9	9.6	14.6	26.8
		Output Torque Nm, Thermal	9613	16124	26609	46429
		Input kW, Mechanical	4.8	8.6	16.1	27.0
		Output Torque Nm, Mechanical	7763	14313	29294	46730
		Efficiency %	80%	82%	83%	85%
1000	25	Input kW, Thermal	5.2	8.4	12.6	22.9
		Output Torque Nm, Thermal	9970	16724	27205	47075
		Input kW, Mechanical	4.3	7.6	14.2	24.3
		Output Torque Nm, Mechanical	8127	15009	30678	49966
		Efficiency %	78%	81%	82%	84%
750	19	Input kW, Thermal	4.4	7.0	10.3	18.4
		Output Torque Nm, Thermal	11060	17928	29025	49269
		Input kW, Mechanical	3.6	6.4	11.9	20.3
		Output Torque Nm, Mechanical	8996	16573	33548	54592
		Efficiency %	77%	79%	80%	82%

For ratings with input speeds below 750rpm please refer to Renold.

RENOLD

WM Series - Single Reduction - Selection Data

Synthetic Oils

Nominal ratio: 45/1 Non Preferred Ratio

Input rpm	Output rpm	Centre Distance Actual Ratio : 1 Gear Ratings	3.94" 45	4.92" 44	6.3" 48	7.87" 44
1800	40	Input kW, Thermal	7.6	12.7	19.0	34.4
		Output Torque Nm, Thermal	9580	16002	26411	44873
		Input kW, Mechanical	5.3	9.4	14.9	30.7
		Output Torque Nm, Mechanical	6655	11858	20664	39949
		Efficiency %	80%	82%	83%	85%
1500	33	Input kW, Thermal	6.6	10.9	16.1	29.2
		Output Torque Nm, Thermal	9808	16273	26557	45139
		Input kW, Mechanical	4.8	8.5	13.2	27.6
		Output Torque Nm, Mechanical	7112	12707	21861	42592
		Efficiency %	79%	82%	82%	84%
1200	27	Input kW, Thermal	5.6	9.1	13.4	24.1
		Output Torque Nm, Thermal	10324	16762	27227	46034
		Input kW, Mechanical	4.1	7.4	11.6	24.2
		Output Torque Nm, Mechanical	7571	13557	23660	46136
		Efficiency %	78%	80%	81%	83%
1000	22	Input kW, Thermal	5.0	7.9	11.7	20.6
		Output Torque Nm, Thermal	10774	17234	28074	46692
		Input kW, Mechanical	3.7	6.5	10.4	21.7
		Output Torque Nm, Mechanical	8071	14266	25096	49026
		Efficiency %	77%	79%	80%	82%
750	17	Input kW, Thermal	4.2	6.6	9.5	16.5
		Output Torque Nm, Thermal	11723	18842	29784	48511
		Input kW, Mechanical	3.1	5.5	8.7	18.0
		Output Torque Nm, Mechanical	8777	15905	27364	52928
		Efficiency %	75%	78%	78%	80%

For ratings with input speeds below 750rpm please refer to Renold.

WM Series - Single Reduction - Selection Data

Synthetic Oils

Nominal ratio: 50/1 Preferred Ratio

Input rpm	Output rpm	Centre Distance Actual Ratio : 1 Gear Ratings	3.94" 49	4.92" 49	6.3" 53	7.87" 49
1800	36	Input kW, Thermal	7.2	11.5	17.6	31.9
		Output Torque Nm, Thermal	9759	15935	26579	45733
		Input kW, Mechanical	4.6	8.1	16.1	26.4
		Output Torque Nm, Mechanical	6163	11210	24347	37836
		Efficiency %	79%	81%	82%	84%
1500	30	Input kW, Thermal	6.3	9.9	15.0	27.1
		Output Torque Nm, Thermal	10064	16251	26937	46024
		Input kW, Mechanical	4.2	7.4	14.7	24.0
		Output Torque Nm, Mechanical	6665	12078	26456	40852
		Efficiency %	78%	80%	81%	83%
1200	24	Input kW, Thermal	5.4	8.3	12.5	22.4
		Output Torque Nm, Thermal	10569	16594	27614	46989
		Input kW, Mechanical	3.7	6.3	12.3	21.2
		Output Torque Nm, Mechanical	7266	12660	27317	44570
		Efficiency %	77%	78%	80%	82%
1000	20	Input kW, Thermal	4.7	7.2	10.9	19.2
		Output Torque Nm, Thermal	10953	17121	28500	47695
		Input kW, Mechanical	3.2	5.7	10.7	18.9
		Output Torque Nm, Mechanical	7573	13602	28148	46961
		Efficiency %	76%	77%	79%	81%
750	15	Input kW, Thermal	3.9	6.0	8.8	15.4
		Output Torque Nm, Thermal	11782	18529	30179	49879
		Input kW, Mechanical	2.8	4.9	9.6	15.9
		Output Torque Nm, Mechanical	8491	14947	32922	51527
		Efficiency %	74%	75%	77%	79%

For ratings with input speeds below 750rpm please refer to Renold.

WM Series - Single Reduction - Selection Data

Synthetic Oils

Nominal ratio: 60/1 Preferred Ratio

Input rpm	Output rpm	Centre Distance / Actual Ratio : 1 / Gear Ratings	3.94" 59	4.92" 59	6.3" 63	7.87" 59
1800	30	Input kW, Thermal	6.6	10.5	15.8	28.8
		Output Torque Nm, Thermal	10258	16758	27765	47969
		Input kW, Mechanical	3.5	6.1	13.4	19.9
		Output Torque Nm, Mechanical	5411	9784	23529	33132
		Efficiency %	76%	78%	80%	81%
1500	25	Input kW, Thermal	5.6	9.0	13.5	24.4
		Output Torque Nm, Thermal	10412	17052	27805	48727
		Input kW, Mechanical	3.2	5.6	12.1	18.6
		Output Torque Nm, Mechanical	5999	10639	24777	37108
		Efficiency %	75%	77%	78%	81%
1200	20	Input kW, Thermal	4.7	7.5	11.3	20.1
		Output Torque Nm, Thermal	10701	17584	28535	48960
		Input kW, Mechanical	2.8	5.0	10.5	16.5
		Output Torque Nm, Mechanical	6390	11744	26497	40213
		Efficiency %	74%	76%	77%	79%
1000	17	Input kW, Thermal	4.3	6.6	9.8	17.4
		Output Torque Nm, Thermal	11582	18221	29372	50274
		Input kW, Mechanical	2.5	4.4	9.4	14.6
		Output Torque Nm, Mechanical	6768	12271	28165	42114
		Efficiency %	73%	75%	76%	78%
750	13	Input kW, Thermal	3.6	5.5	8.0	13.9
		Output Torque Nm, Thermal	12673	19786	31341	52251
		Input kW, Mechanical	2.1	3.7	7.4	12.2
		Output Torque Nm, Mechanical	7228	13271	28729	45870
		Efficiency %	71%	73%	74%	76%

For ratings with input speeds below 750rpm please refer to Renold.

WM Series - Single Reduction - Selection Data

Synthetic Oils

Nominal ratio: 70/1 Preferred Ratio

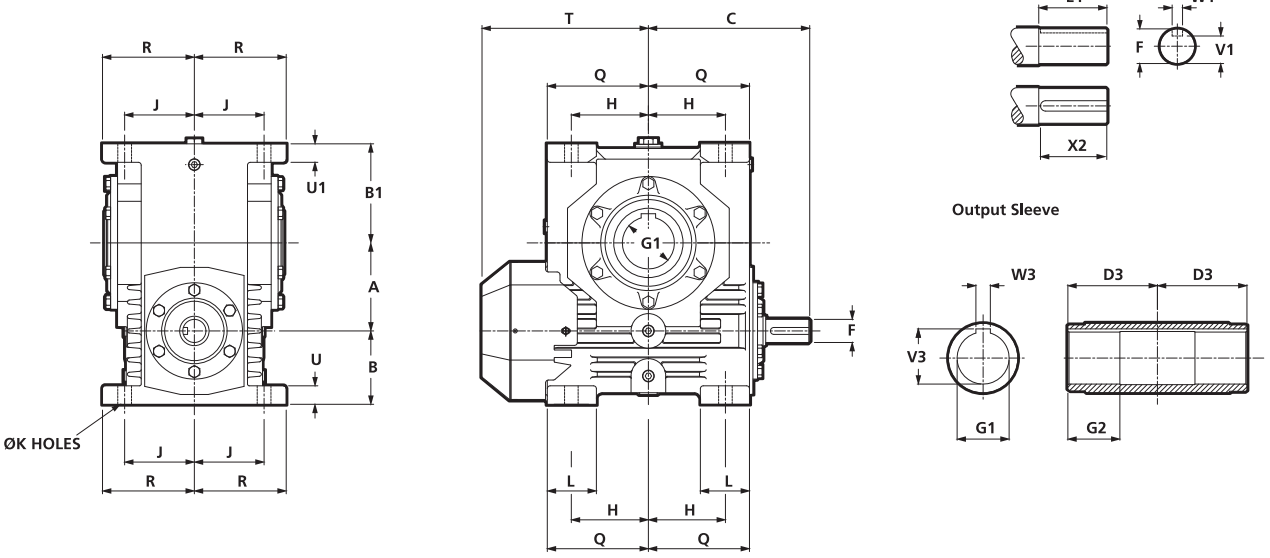
Input rpm	Output rpm	Centre Distance Actual Ratio : 1 Gear Ratings	3.94" 69	4.92" 69	6.3" 74	7.87" 69
1800	26	Input kW, Thermal	5.5	8.8	13.4	24.1
		Output Torque Nm, Thermal	9509	15733	26256	45227
		Input kW, Mechanical	2.8	4.9	12.1	15.9
		Output Torque Nm, Mechanical	4847	8653	23630	29850
		Efficiency %	72%	74%	76%	78%
1500	21	Input kW, Thermal	4.8	7.5	11.4	20.5
		Output Torque Nm, Thermal	9880	15802	26429	45540
		Input kW, Mechanical	2.7	4.5	10.1	14.9
		Output Torque Nm, Mechanical	5434	9560	23319	33069
		Efficiency %	71%	73%	75%	77%
1200	17	Input kW, Thermal	4.0	6.4	9.5	16.9
		Output Torque Nm, Thermal	10147	16699	26859	46271
		Input kW, Mechanical	2.4	4.1	8.6	13.4
		Output Torque Nm, Mechanical	5953	10715	24211	36759
		Efficiency %	70%	72%	73%	76%
1000	14	Input kW, Thermal	3.6	5.6	8.3	14.7
		Output Torque Nm, Thermal	10646	17047	27759	47198
		Input kW, Mechanical	2.1	3.7	7.4	12.1
		Output Torque Nm, Mechanical	6072	11162	24625	38703
		Efficiency %	68%	70%	72%	74%
750	11	Input kW, Thermal	3.1	4.7	6.8	11.8
		Output Torque Nm, Thermal	11736	18400	29600	48984
		Input kW, Mechanical	1.8	3.1	5.8	10.2
		Output Torque Nm, Mechanical	6735	12144	24957	42249
		Efficiency %	66%	68%	70%	72%

For ratings with input speeds below 750rpm please refer to Renold.

RENOLD

WM Series - Speed Reducer - Dimensions (inch)

TYPE WMSM - SHAFT MOUNTED



Size	A	B	B1	C	D	H	J	K	L
WM100	3.94	4.17	4.75	8.86	8.86	4.23	4.04	0.94	2.56
WM125	4.92	4.41	5.75	10.83	10.04	4.92	4.43	0.94	2.95
WM160	6.30	4.92	6.75	12.20	11.61	5.71	4.72	1.10	3.35
WM200	7.87	5.51	8.75	13.50	13.98	6.79	5.22	1.10	3.94

Size	Q	R	R1	T	U	U1	Oil Capacity (approx) Imp. Pints	Weight (approx) lbs
WM100	5.51	4.92	4.92	9.45	0.91	0.98	4.0/4.8	160
WM125	6.50	5.51	5.51	11.10	1.18	1.26	5.8/8.3	260
WM160	6.89	6.10	6.10	12.48	1.26	1.26	7.9/12.5	370
WM200	8.86	6.69	6.69	13.90	1.26	1.50	13.6/25.2	640

*** - Min/Max dependant on mounting positions.**

INPUT SHAFT

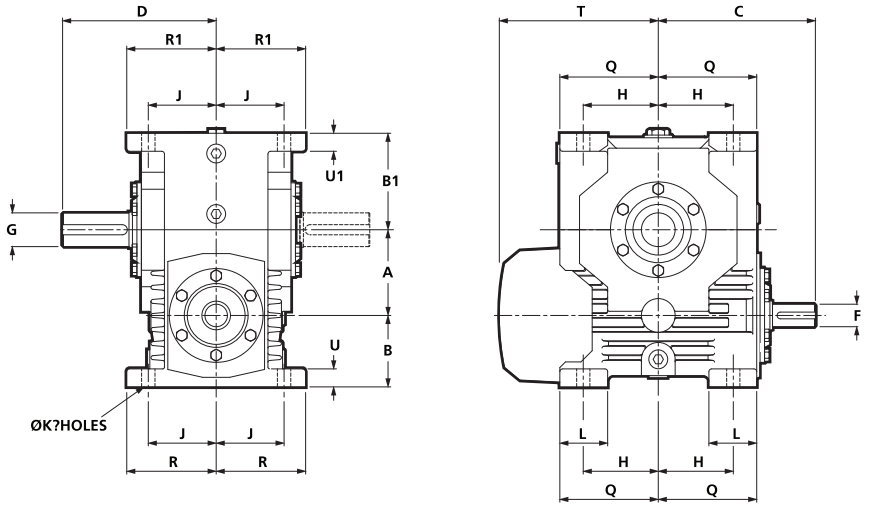
Size	E1	F	V1	W1	X2
WM100	2.36	1.375 1.374	1.201	0.312	2.20
WM125	3.23	1.625 1.624	1.416	0.375	2.875
WM160	4.21	1.875 1.874	1.591	0.5	4.09
WM200	3.82	2.000 1.999	1.718	0.5	3.625

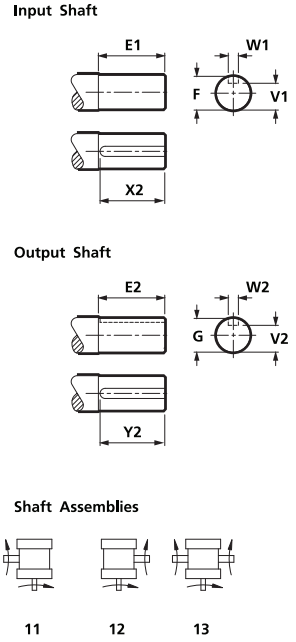
OUTPUT SLEEVE

G1	G2	V3	W3	D3
2.0024 2.0012	2.56	2.161	0.5	4.33
2.5024 2.5012	2.76	2.684	0.625	5.12
3.0024 3.0012	3.54	3.207	0.75	6.10
3.5028 3.5014	4.53	3.762	0.875	6.85

Foot Mounted Worm Gear Units - Single Reduction - Dimensions (mm)

TYPE WMU - UNDERDRIVEN





Size	A	B	B1	C	D	H	J	K	L
WM100	3.94	4.17	4.75	8.86	8.86	4.23	4.04	0.94	2.56
WM125	4.92	4.41	5.75	10.83	10.04	4.92	4.43	0.94	2.95
WM160	6.30	4.92	6.75	12.20	11.61	5.71	4.72	1.10	3.35
WM200	7.87	5.51	8.75	13.50	13.98	6.79	5.22	1.10	3.94

Size	Q	R	R1	T	U	U1	Oil Capacity (approx) Imp. Pints	Weight (approx) lbs
WM100	5.51	4.92	4.92	9.45	0.91	0.98	4.1	160
WM125	6.50	5.51	5.51	11.10	1.18	1.26	5.9	260
WM160	6.89	6.10	6.10	12.48	1.26	1.26	8.1	370
WM200	8.86	6.69	6.69	13.90	1.26	1.50	13.8	640

INPUT SHAFT

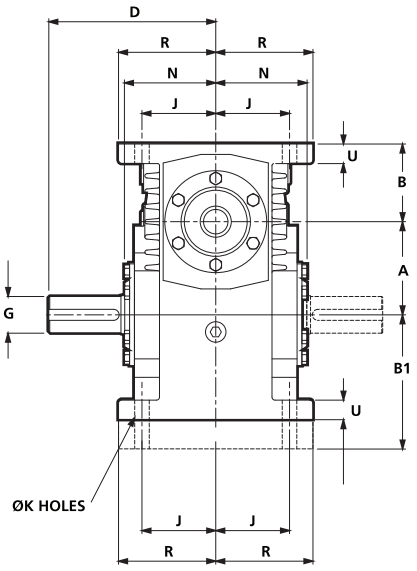
Size	E1	F	V1	W1	X2
WM100	2.36	1.375 1.374	1.201	0.312	2.20
WM125	3.23	1.625 1.624	1.416	0.375	2.875
WM160	4.21	1.875 1.874	1.591	0.5	4.09
WM200	3.82	2.000 1.999	1.718	0.5	3.625

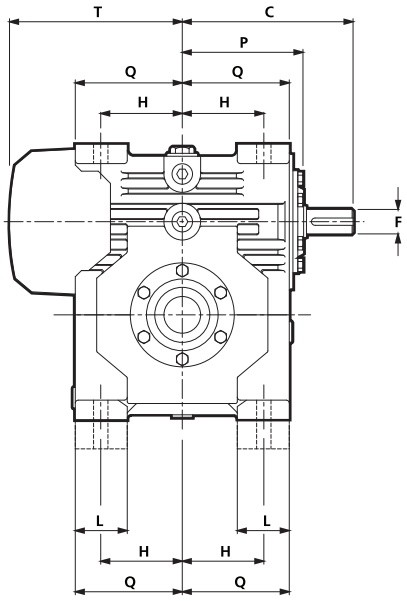
OUTPUT SLEEVE

E2	G	V2	W2	Y2
3.94	2.000 1.999	1.718	0.5	3.94
4.33	2.500 2.499	2.148	0.625	4.33
4.92	3.000 2.999	2.577	0.75	4.92
6.50	3.500 3.499	3.007	0.875	6.50

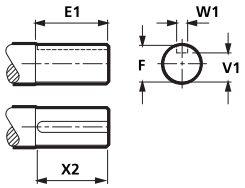
Foot Mounted Worm Gear Units - Single Reduction - Dimensions (mm)

TYPE WMO - OVERDRIVEN

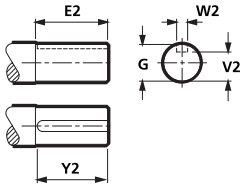




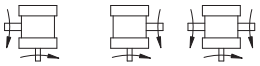
Input Shaft



Output Shaft



Shaft Assemblies



11 12 13

Size	A	B	B1	C	D	H	J	K	L
WM100	3.94	4.17	5.90	8.86	8.86	4.23	4.04	0.94	2.56
WM125	4.92	4.41	7.08	10.83	10.04	4.92	4.43	0.94	2.95
WM160	6.30	4.92	8.34	12.20	11.61	5.71	4.72	1.10	3.35
WM200	7.87	5.51	10.43	13.50	13.98	6.79	5.22	1.10	3.94

Size	Q	R	R1	T	U	U1	Oil Capacity (approx) Imp. Pints	Weight (approx) lbs
WM100	5.51	4.92	4.92	9.45	0.91	0.98	4.1	160
WM125	6.50	5.51	5.51	11.10	1.18	1.26	5.9	260
WM160	6.89	6.10	6.10	12.48	1.26	1.26	8.1	370
WM200	8.86	6.69	6.69	13.90	1.26	1.50	13.8	640

INPUT SHAFT

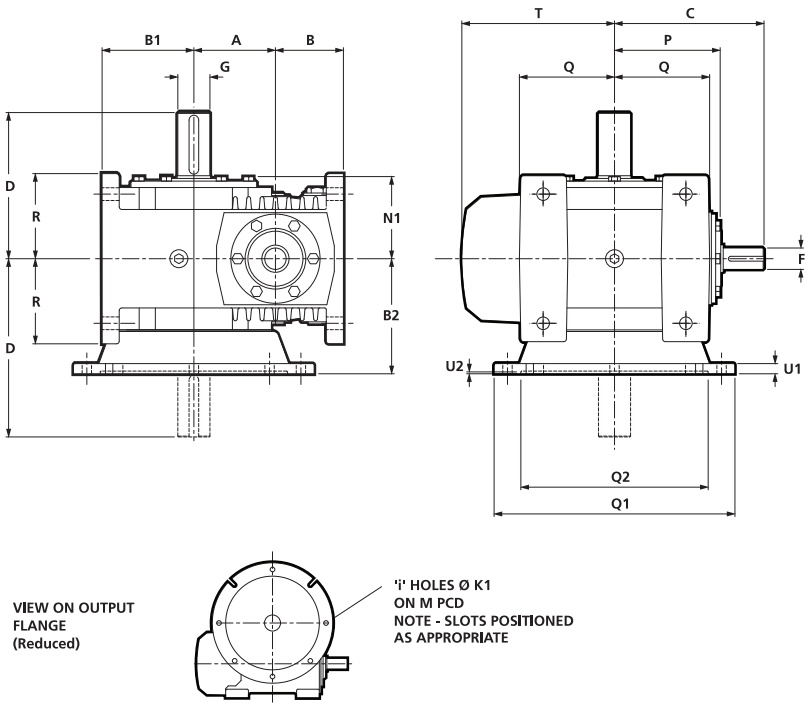
Size	E1	F	V1	W1	X2
WM100	2.36	1.375 1.374	1.201	0.312	2.20
WM125	3.23	1.625 1.624	1.416	0.375	2.875
WM160	4.21	1.875 1.874	1.591	0.5	4.09
WM200	3.82	2.000 1.999	1.718	0.5	3.625

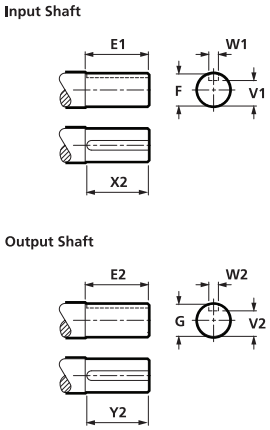
OUTPUT SLEEVE

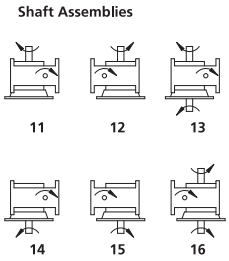
E2	G	V2	W2	Y2
3.94	2.000 1.999	1.718	0.5	3.94
4.33	2.500 2.499	2.148	0.625	4.33
4.92	3.000 2.999	2.577	0.75	4.92
6.50	3.500 3.499	3.007	0.875	6.50

Foot Mounted Worm Gear Units - Single Reduction - Dimensions (mm)

TYPE WMV - VERTICAL







VIEW ON OUTPUT FLANGE (Reduced)

'i' HOLES Ø K1 ON M PCD
NOTE - SLOTS POSITIONED AS APPROPRIATE

Size	A	B	B1	B2	C	D	I	K1	M
WM100	3.94	4.17	5.91	6.30	8.86	8.86	0.15	0.59	10.43
WM125	4.92	4.41	7.09	7.09	10.83	10.04	0.15	0.75	11.81
WM160	6.30	4.92	8.35	7.87	12.20	11.61	0.15	0.75	13.78
WM200	7.87	5.51	10.43	8.35	13.50	13.98	0.31	0.75	15.75

Size	Q	R	Q1	Q2	T	U1	U2	Oil Capacity (approx) Imp. Pints	Weight (approx) lbs
WM100	5.51	4.92	11.81	9.06	9.45	0.63	0.24	4.8	195
WM125	6.50	5.51	13.78	9.84	11.10	0.75	0.276	8.3	295
WM160	6.89	6.10	15.75	11.81	12.48	0.63	0.276	12.5	415
WM200	8.86	6.69	17.72	13.78	13.90	0.94	0.276	25.2	730

INPUT SHAFT

Size	E1	F	V1	W1	X2
WM100	2.36	1.375 1.374	1.201	0.312	2.20
WM125	3.23	1.625 1.624	1.416	0.375	2.875
WM160	4.21	1.875 1.874	1.591	0.5	4.09
WM200	3.82	2.000 1.999	1.718	0.5	3.625

OUTPUT SLEEVE

E2	G	V2	W2	Y2
3.94	2.000 1.999	1.718	0.5	3.94
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6.50	3.500 3.499	3.007	0.875	6.50

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