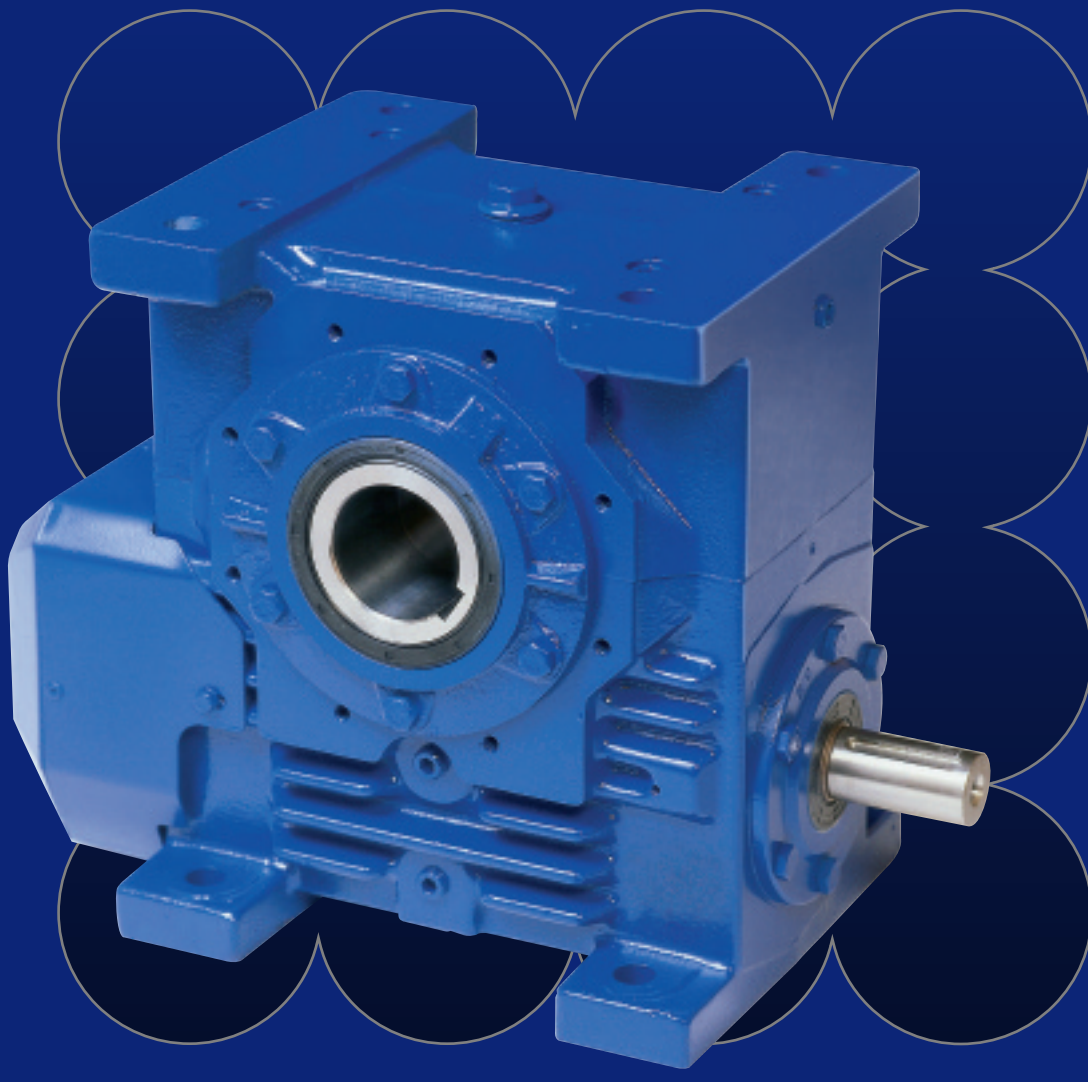
WM Series

Wormgear Units - Metric



RENOLD

Superior Gear Technology

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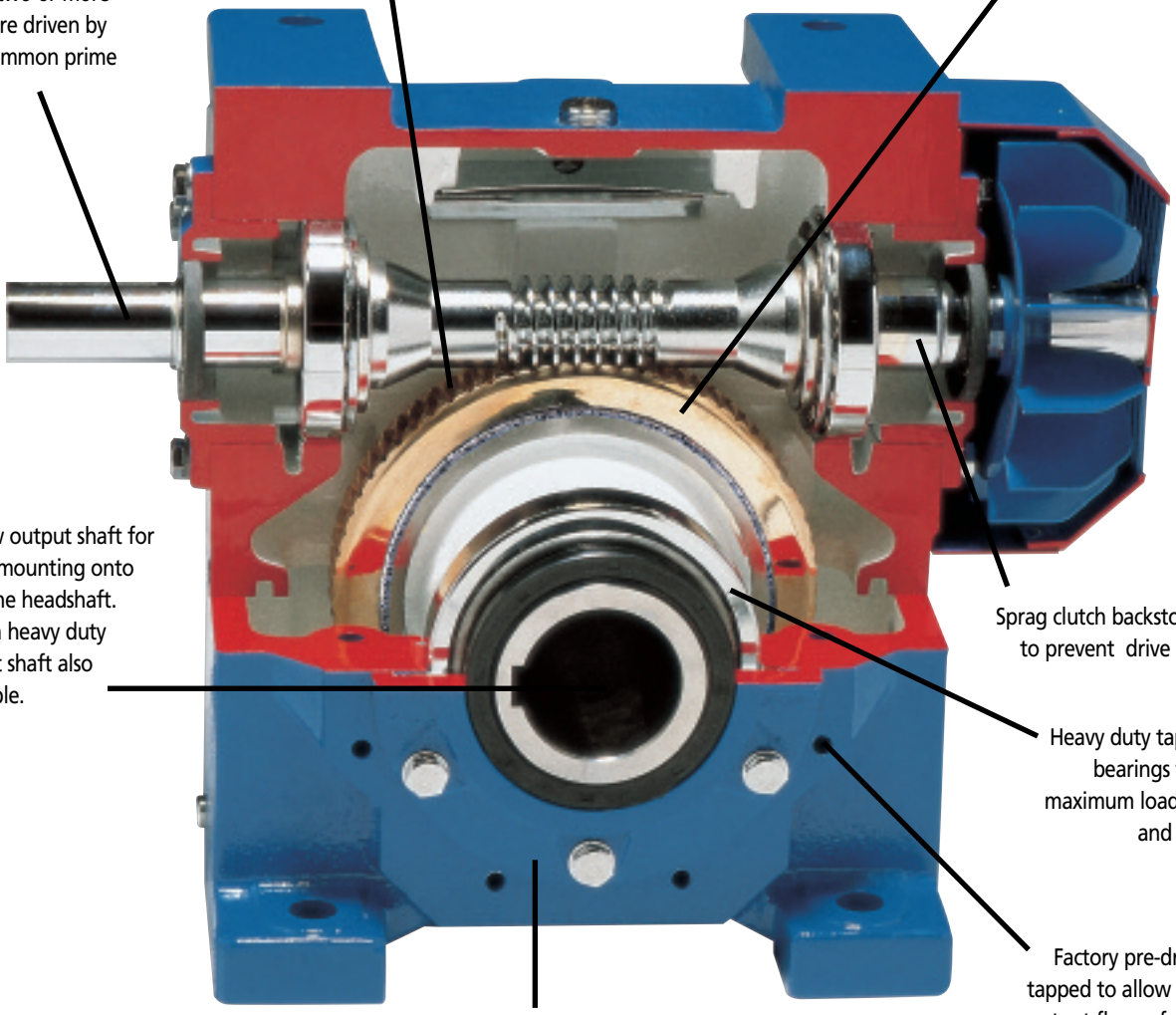
WM Series - Product Features



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 IEC and NEMA electric motors, with B5 and B14 flanges.

Applications:

- Conveyors
- Mining
- Timber
- 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

ATEX Approval Details

ATEX Approval

RENOLD Gears products for operating in potentially explosive atmospheres.

General

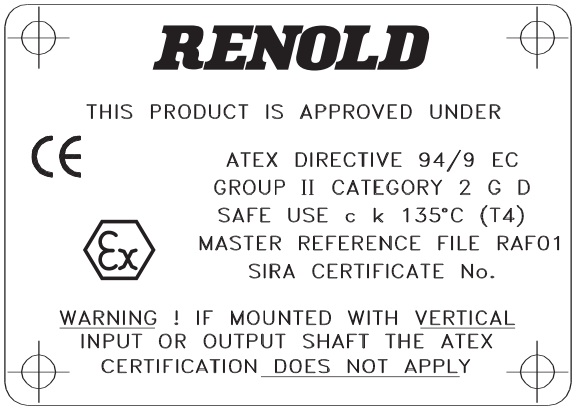
- **RENOLD** Gears units are classified as ATEX Group II Category 2 equipment, which embodies sufficient safeguards to be suitable for use in potentially explosive atmospheres for normal operation and for operation during an expected malfunction.
- It is essential that there is sufficient lubricant to prevent the gears and bearings running 'dry'. Gear units should be inspected daily for signs of oil leakage, overheating or noisy operation.
- Gear units should be cleaned at regular intervals depending on the operating conditions, to ensure that dust coatings never exceed 5mm. Plastic parts should be wiped clean with a damp cloth.
- Oil leaks should be dealt with as quickly as practical. Compound joint faces and shims should be cleaned and thread-locking sealant should be applied to bolts and plugs prior to re-assembly.
- The temperature of any external surfaces must not exceed the permitted maximum of 135°C (T4).
- Higher temperature class T3 is available dependant on unit mounting, ratio and gear type. For further details consult Renold.
- As a general rule, gear units should be mounted with their feet horizontal. For other mountings, particularly with shaft mounted units, consult **RENOLD** Gears.

WARNING: IF MOUNTING WITH VERTICAL INPUT OR OUTPUT SHAFTS, THE ATEX CERTIFICATION DOES NOT APPLY.

Unit Selection

- The gear unit selection procedures must include an additional reliability factor of 1.25 for mechanical ratings and 1.25 for thermal ratings.

ATEX Nameplate



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 metric dimensions, but imperial shaft extensions for units complying with BS3027: 1968 or to suit the requirements of the North American market 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 100 to 200 are supplied as hollow output shaft type as standard. Output shafts are plug-in design, single and double extension.
The Agitator version WMA however uses a solid output shaft construction for maximum strength, particularly when used on mixer applications. 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 metric extension will be the exposed input extension except for those supplied to North America and Canada.

Preferred Ratios

Certain gear ratios have been nominated as preferred ratios. Non preferred ratios are shown in italics on pages 17 to 30. 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.

Dry Well Feature

The WM Series unit sizes 100 to 200 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.

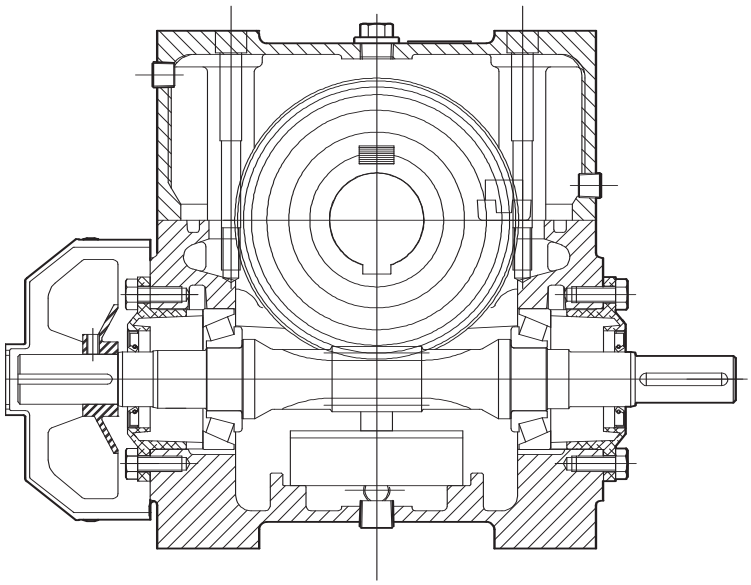
Backstop

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

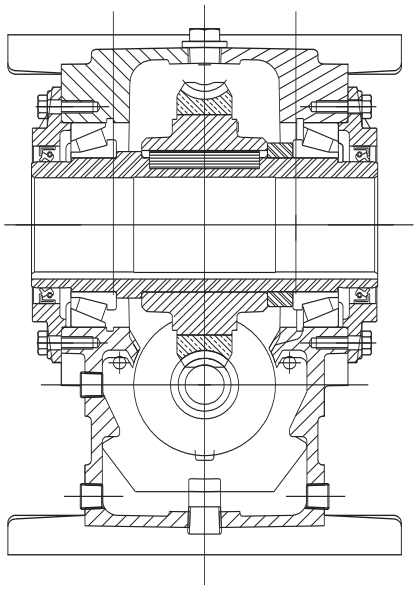
Double Reduction Units

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

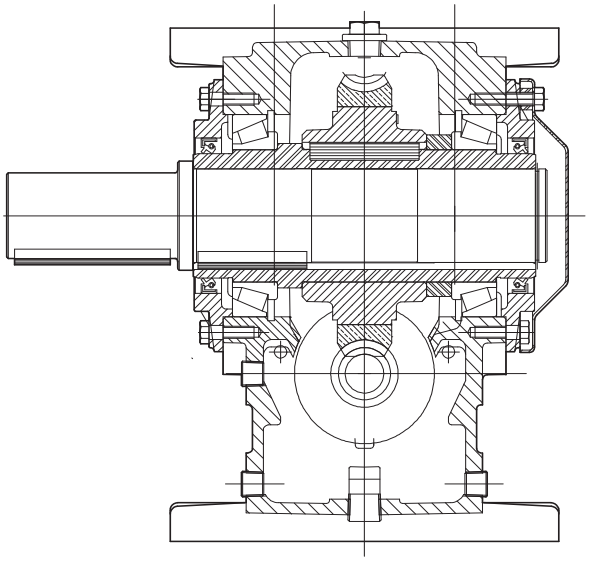
WM Series - Product Design Variations



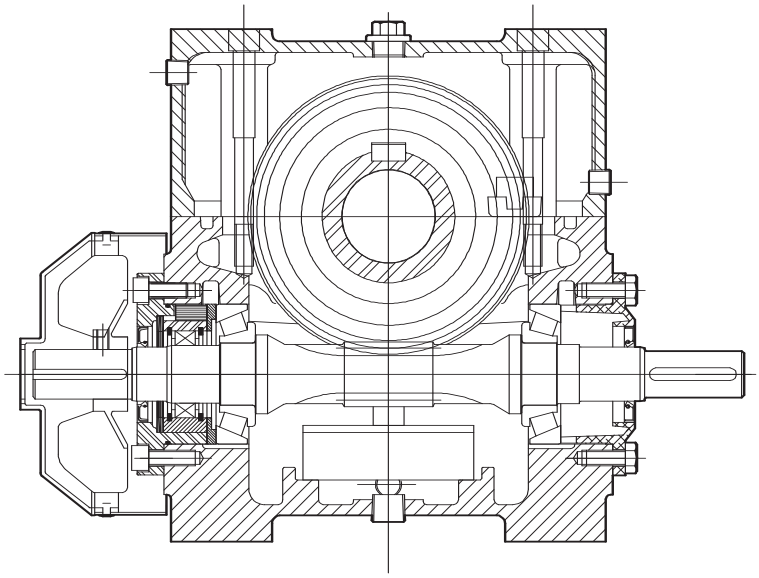
Hollow output shaft unit showing standard metric extension input shaft and American extension at the fan end.



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

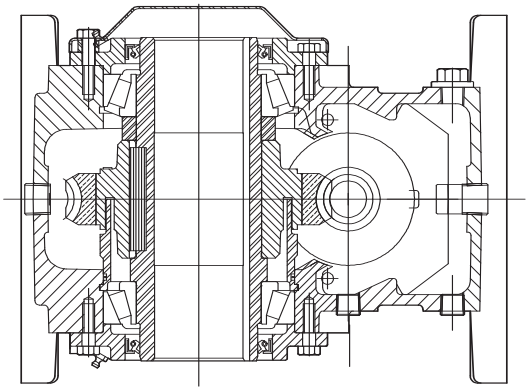


Underdriven unit with standard plug-in output shaft. Single and double extension shafts are available with metric American dimensions.

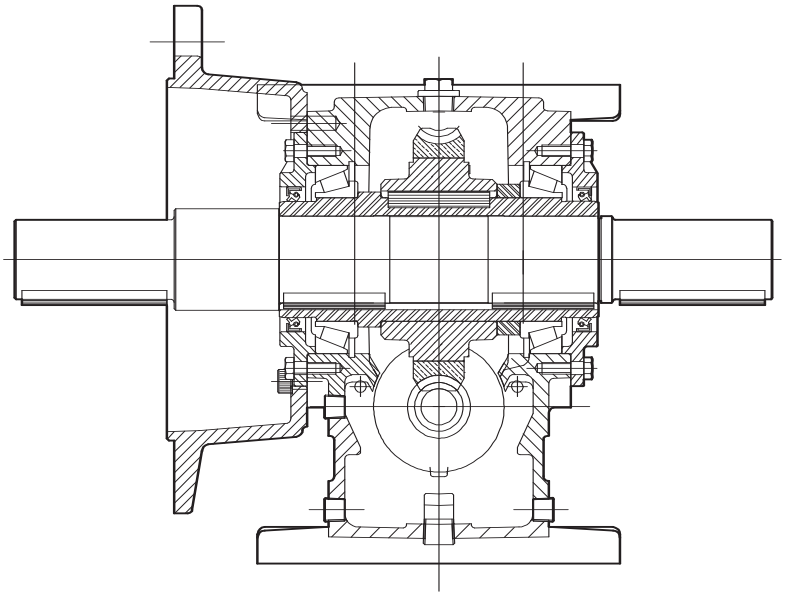


Sprag Clutch, anti run-back assembly fitted to the fan extension end of the input shaft, to prevent unit run back. The Sprag Clutch can be supplied as a kit for retro fitting at any time.

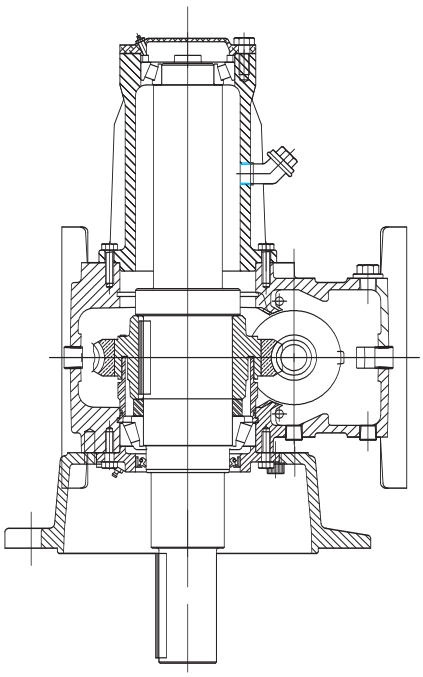
WM Series - Product Design Variations



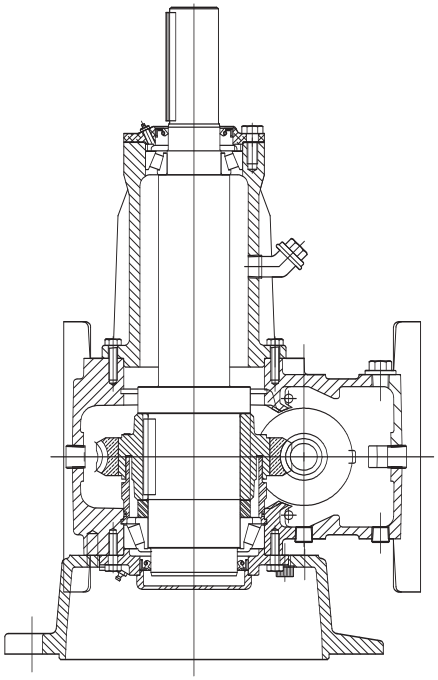
Dry well adaption fitted at the output of the WM Series unit. The non leak feature is particularly important on mixer applications in the food and chemical Industry.



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



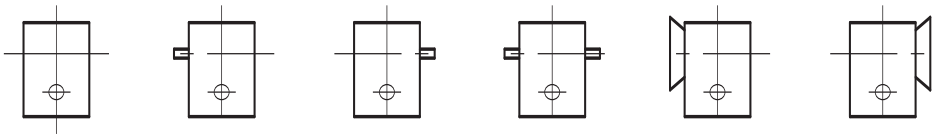
WMA - Agitator unit with output shaft down. The unit is shown with the dry well feature. The output shaft bearings have a greater bearing span to allow for higher external loads imposed by mixer and agitator blades.



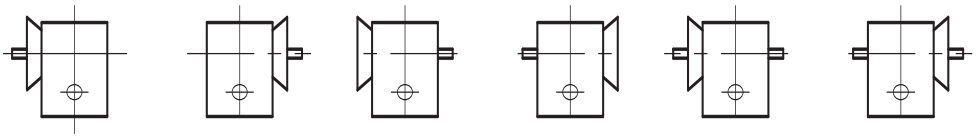
Agitator unit with output shaft up, particularly suited for cooling fan drives.

WM Series - Single Reduction - Mounting & Handing

WMU - Underdriven
WMSM - Shaft Mounted

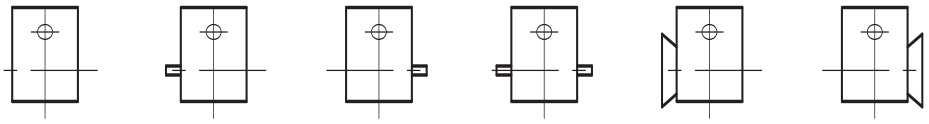


No Sprag backstop fitted.	**UA**	**UC**	**UE**	**UG**	**UJ**	**UL**
Sprag backstop fitted.	**UB**	**UD**	**UF**	**UH**	**UK**	**UM**

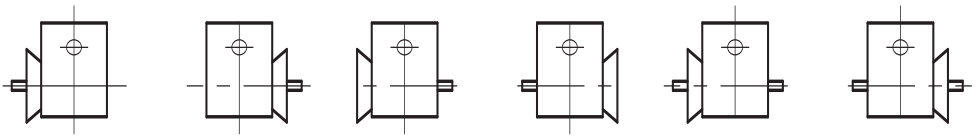


No Sprag backstop fitted.	**UN**	**UQ**	**US**	**UU**	**UW**	**UY**
Sprag backstop fitted.	**UP**	**UR**	**UT**	**UV**	**UX**	**UZ**

WMO - Overdriven

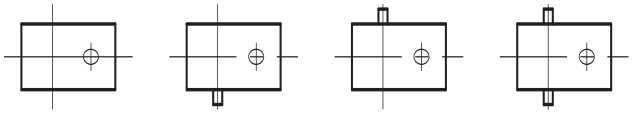


No Sprag backstop fitted.	**OA**	**OC**	**OE**	**OG**	**OJ**	**OL**
Sprag backstop fitted.	**OB**	**OD**	**OF**	**OH**	**OK**	**OM**

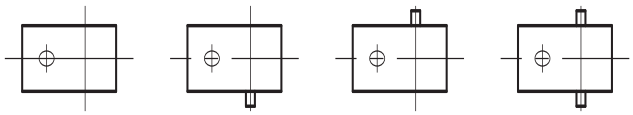


No Sprag backstop fitted.	**ON**	**OQ**	**OS**	**OU**	**OW**	**OY**
Sprag backstop fitted.	**OP**	**OR**	**OT**	**OV**	**OX**	**OZ**

WMU - WMO Suitable For Wall Mounting



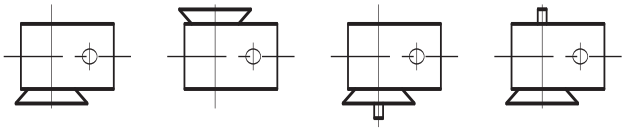
No Sprag backstop fitted.	**WA**	**WC**	**WE**	**WG**
Sprag backstop fitted.	**WB**	**WD**	**WF**	**WH**



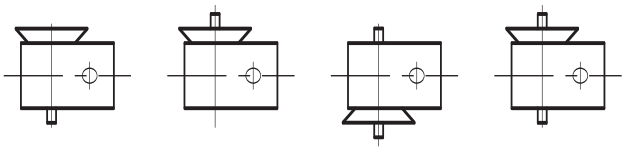
No Sprag backstop fitted.	**WS**	**WL**	**WN**	**WQ**
Sprag backstop fitted.	**WT**	**WM**	**WP**	**WR**

WM Series - Single Reduction - Mounting & Handing

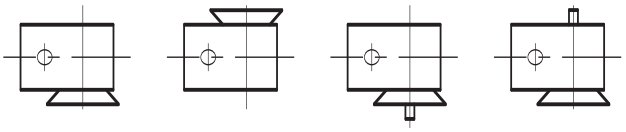
WMV - Vertical



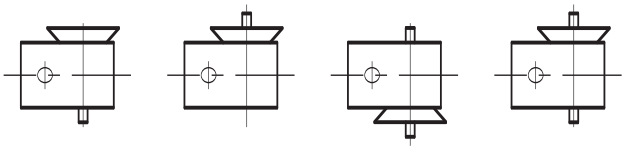
No Sprag backstop fitted.	**VA**	**VC**	**VE**	**VG**
Sprag backstop fitted.	**VB**	**VD**	**VF**	**VH**



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

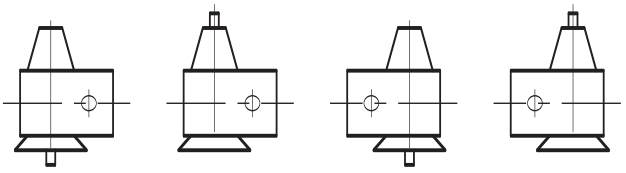


No Sprag backstop fitted.	**VS**	**VU**	**VW**	**VY**
Sprag backstop fitted.	**VT**	**VV**	**VX**	**VZ**



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**

Ordering Procedure - Unit Designation Code

To ensure that the correct 'WM' Series unit is supplied and that your order is processed without delay, please quote the full designation code as detailed below:

Unit Designation Code - Speed Reducer Unit

1	2	3	4	5
WM	100	10	UA	M

1. Unit type - WM Series speed reducer unit
2. Unit size - 100, 125, 160, 200
3. Unit nominal ratio - 5:1, 10:1, 30:1 etc
4. Unit mounting and assembly see pages 8 - 9
5. Unit shaft/bore details M - Metric A - American

Unit Designation Code - Motorised Unit

1	2	3	4	5	6	7	8
MWM	4	10	WA	5.5	4	132	M

1. Unit type - WM Series motorised
2. Unit size - 100, 125, 160, 200
3. Unit nominal ratio - 5:1, 10:1, 30:1 etc
4. Unit mounting assembly. see page 8 - 9
5. Motor power (KW)
6. Motor speed in poles - 4, 6 etc.
7. Motor IEC frame sizes
8. Unit shaft/bore details M - Metric A - American

If a sprag clutch holdback is fitted into the unit, the shaft direction of rotation should be indicated at order stage.

WM Series - Selection Information

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 (kW).

b) Gear unit input and output power required (kW).

c) For input speeds below 250 rev/min consult our Technical Sales Department giving details of required output torque (Nm) and diameter of driven shaft (mm).

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 (kW) and number of starts per day.

d) For intermittent duty, reversing or shock loading, state normal power (kW) 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 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 f_D 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 f_S 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 f_D (table 1 and table 2) x starts factor f_S (table 3). Units rated at 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, 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, 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.

E.g. Thermal selection torque = continuous torque requirement X thermal service factor f_T. 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 kW and mechanical and thermal output torque ratings in Newton Meters.

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 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 7 and 8.

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

b) Determine the load classification from table 1 and the corresponding mechanical service factor f_D, from table 2 and the starts factor f_S from table 3.

c) Multiply the actual power absorbed by the mechanical service factor f_D 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 f_D x f_S

or

$$\text{Selection Output Torque} = \frac{\text{absorbed power} \times 9550 \times f_D \times f_S}{\text{output speed (rev/min)}}$$

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 f_T from table 4.

e) Check the capability of the unit to withstand external loads applied to the output shaft, see tables 5 and 6.

For the selection of units from the double reduction range, the thermal rating is ignored since at the speeds involved only the mechanical rating needs to be considered.

RENOLD

WM Series - 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 not uniformly fed		Forced draft	*	Tray drive	M	Fell whipper	H	Batchers	M
		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 characteristics: Duration Service	Steady load	Medium impulsive	Highly impulsive
Electric, Air & Hydraulic Motors or Steam Turbine (Steady input)	Intermittent -	0.90	1.00	1.50
	3hrs/day max	1.00	1.25	1.75
	3 - 10 over 10	1.25	1.50	2.00
Multi-cylinder I.C. engine (Medium impulsive input)	Intermittent -	1.00	1.25	1.75
	3hrs/day max	1.25	1.50	2.00
	3 - 10 over 10	1.50	1.75	2.25
Single-cylinder I.C. engine (Highly impulsive input)	Intermittent -	1.25	1.50	2.00
	3hrs/day max	1.50	1.75	2.25
	3 - 10 over 10	1.75	2.00	2.50

Table 3 Factor for Starts/Hours (fS)

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

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 Gears.

Table 4 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

IMPORTANT

Units to ATEX approval must be selected with a minimum service factor of 1.25.

WM Series - 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 to 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 over hung loads are anticipated) customers are advised to submit details of the load to our Technical Sales 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.

The overhung load may be calculated by the following formula:

$$\frac{9.55P \times 10^6 \times F \text{ (Newtons)}}{R \times S}$$

Where P = Power absorbed at output shaft (kW)

S = Speed of output shaft in rev/min

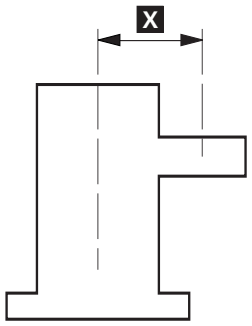
R = Pitch circle radius of chain pinion, spur or helical gear, or belt pulley in mm.

F = Overhung drive application factor as follows:

Chain pinion	1.00
Spur or helical gear	1.25
Vee pulley	1.50
Flat belt pulley	2.00

The overhung load capacities listed in table 5 assume the load is applied mid-way along the output shaft extension, the relevant dimension from the centre line of the unit being as given below.

Unit Size	Dimension mm Standard Shaft
WM100	161
WM125	193
WM160	218
WM200	244



IMPORTANT

Units to ATEX approval must be selected with a minimum service factor of 1.25.

WM Series - Overhung Load Capacities

Table 5: Output Shaft Overhung Load Capacities (in newtons)

At 1450 rev/min input speed

Ratio	Output Speed	Gear Unit Reference			
		WM100	WM125	WM160	WM200
5/1	290	10370	12870	11640	26760
7.5/1	193	12130	15650	18360	33070
10/1	145	13490	17370	20980	36920
12.5/1	116	14200	18630	22830	38790
15/1	97	14000	19820	24320	42150
20/1	73	14100	20140	24550	48830
25/1	58	13790	20320	24750	51880
30/1	48	13560	19140	23910	55000
35/1	41	13830	19410	23770	55000
40/1	36	13970	19760	24060	55000
45/1	32	14040	19940	24360	55000
50/1	29	14110	20160	24570	55000
60/1	24	14250	20470	24960	55000
70/1	21	14340	20730	25290	55000

At 960 rev/min input speed

Ratio	Output Speed	Gear Unit Reference			
		WM100	WM125	WM160	WM200
5/1	192	11480	13280	10630	27340
7.5/1	128	13610	17510	20760	36680
10/1	96	14170	19510	23520	41450
12.5/1	77	13960	19790	24300	43520
15/1	64	13720	19250	24020	47270
20/1	48	13860	19560	23780	54840
25/1	38	13440	19790	24050	55000
30/1	32	13150	18230	22940	55000
35/1	27	13530	18670	22800	55000
40/1	24	13730	19170	23180	55000
45/1	21	13810	19380	23590	55000
50/1	19	13890	19670	23900	55000
60/1	16	14070	20060	24440	55000
70/1	14	14200	20410	24860	55000

Units to ATEX approval must be selected with a minimum service factor of 1.25.

WM Series - Axial Thrust Load Capacities

Table 6: Output Shaft Axial Thrust loads (in newtons)

At 1450 rev/min input speed

Ratio	Output Speed	Gear Unit Reference			
		WM100	WM125	WM160	WM200
5/1	290	9330	9450	7370	18400
7.5/1	193	12340	14270	13520	28700
10/1	145	14530	16900	16940	34180
12.5/1	116	16110	18380	19250	36420
15/1	97	17620	20080	21700	41380
20/1	73	20610	24020	26460	51070
25/1	58	21870	26430	29300	54820
30/1	48	22000	27280	31040	55000
35/1	41	22000	29630	33120	55000
40/1	36	22000	31740	35490	55000
45/1	32	22000	33000	37764	55000
50/1	29	22000	33000	39620	55000
60/1	24	22000	33000	43020	55000
70/1	21	22000	33000	44000	55000

At 960 rev/min input speed

Ratio	Output Speed	Gear Unit Reference			
		WM100	WM125	WM160	WM200
5/1	192	9890	9690	6660	18690
7.5/1	128	13680	15700	14560	30940
10/1	96	16110	18770	18690	38020
12.5/1	77	17900	20370	21180	40450
15/1	64	19730	22400	24030	46020
20/1	48	22000	26960	29630	55000
25/1	38	22000	29710	32880	55000
30/1	32	22000	30640	35850	55000
35/1	27	22000	33000	37250	55000
40/1	24	22000	33000	39940	55000
45/1	21	22000	33000	42564	55000
50/1	19	22000	33000	44000	55000
60/1	16	22000	33000	44000	55000
70/1	14	22000	33000	44000	55000

Units to ATEX approval must be selected with a minimum service factor of 1.25.

WM Series - Exact Ratio

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.

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	100 5	125 5	160 5.38	200 5
1800	360	Input kW, Thermal	23.6	37.8	56.8	102.0
		Output Torque Nm, Thermal	595	963	1556	2597
		Input kW, Mechanical	18.9	33.2	63.0	106.9
		Output Torque Nm, Mechanical	477	846	1726	2723
		Efficiency %	95%	96%	96%	96%
1500	300	Input kW, Thermal	20.2	32.1	48.3	87.2
		Output Torque Nm, Thermal	611	971	1588	2665
		Input kW, Mechanical	17.2	30.0	56.0	97.4
		Output Torque Nm, Mechanical	519	908	1841	2975
		Efficiency %	95%	95%	96%	96%
1200	240	Input kW, Thermal	16.8	26.6	39.8	72.0
		Output Torque Nm, Thermal	635	1005	1619	2750
		Input kW, Mechanical	15.4	26.6	49.0	86.7
		Output Torque Nm, Mechanical	582	1006	1993	3311
		Efficiency %	95%	95%	95%	96%
1000	200	Input kW, Thermal	14.6	23.0	34.2	61.8
		Output Torque Nm, Thermal	655	1043	1669	2833
		Input kW, Mechanical	14.0	24.4	40.0	78.1
		Output Torque Nm, Mechanical	627	1108	1952	3580
		Efficiency %	94%	95%	95%	96%
750	150	Input kW, Thermal	11.9	18.5	27.4	49.0
		Output Torque Nm, Thermal	712	1107	1783	2963
		Input kW, Mechanical	11.7	20.5	39.0	67.5
		Output Torque Nm, Mechanical	698	1224	2538	4085
		Efficiency %	94%	94%	95%	95%

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

Units to ATEX approval must be selected with a minimum service factor of 1.25.

WM Series - Single Reduction - Selection Data

Synthetic Oils

Nominal ratio: 7.5/1 Preferred Ratio

Input rpm	Output rpm	Centre Distance Actual Ratio : 1 Gear Ratings	100 7.25	125 7	160 7.8	200 7.2
1800	240	Input kW, Thermal	21.0	33.8	51.9	93.9
		Output Torque Nm, Thermal	763	1192	2040	3443
		Input kW, Mechanical	13.9	23.2	46.0	77.8
		Output Torque Nm, Mechanical	504	819	1808	2852
		Efficiency %	95%	95%	95%	96%
1500	200	Input kW, Thermal	17.9	28.7	44.0	79.7
		Output Torque Nm, Thermal	777	1215	2076	3507
		Input kW, Mechanical	12.8	21.2	42.0	70.3
		Output Torque Nm, Mechanical	554	899	1981	3093
		Efficiency %	94%	95%	95%	96%
1200	160	Input kW, Thermal	14.9	23.7	36.1	65.3
		Output Torque Nm, Thermal	808	1241	2129	3554
		Input kW, Mechanical	11.2	18.9	36.0	62.9
		Output Torque Nm, Mechanical	608	991	2123	3425
		Efficiency %	94%	94%	95%	95%
1000	133	Input kW, Thermal	13.0	20.5	31.0	55.8
		Output Torque Nm, Thermal	837	1288	2170	3645
		Input kW, Mechanical	10.0	16.8	31.0	56.8
		Output Torque Nm, Mechanical	642	1058	2170	3707
		Efficiency %	93%	94%	94%	95%
750	100	Input kW, Thermal	10.6	16.6	24.8	44.1
		Output Torque Nm, Thermal	910	1376	2315	3841
		Input kW, Mechanical	8.5	14.3	27.0	47.3
		Output Torque Nm, Mechanical	730	1185	2521	4119
		Efficiency %	93%	93%	94%	95%

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

Units to ATEX approval must be selected with a minimum service factor of 1.25.

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	100 9.66	125 9.33	160 10.25	200 9.75
1800	180	Input kW, Thermal	18.0	29.0	46.0	83.9
		Output Torque Nm, Thermal	867	1349	2376	4123
		Input kW, Mechanical	12.2	20.2	42.0	64.2
		Output Torque Nm, Mechanical	588	942	2170	3157
		Efficiency %	94%	94%	95%	95%
1500	150	Input kW, Thermal	15.3	24.6	38.9	70.9
		Output Torque Nm, Thermal	875	1373	2411	4181
		Input kW, Mechanical	10.9	18.5	36.0	59.2
		Output Torque Nm, Mechanical	625	1032	2232	3490
		Efficiency %	93%	94%	95%	95%
1200	120	Input kW, Thermal	12.8	20.4	32.0	57.9
		Output Torque Nm, Thermal	915	1409	2454	4268
		Input kW, Mechanical	9.6	16.0	31.0	51.9
		Output Torque Nm, Mechanical	683	1101	2377	3827
		Efficiency %	93%	93%	94%	95%
1000	100	Input kW, Thermal	11.1	17.6	27.4	49.4
		Output Torque Nm, Thermal	942	1458	2521	4323
		Input kW, Mechanical	8.6	14.4	28.0	46.1
		Output Torque Nm, Mechanical	731	1194	2576	4034
		Efficiency %	92%	93%	94%	94%
750	75	Input kW, Thermal	9.2	14.3	22.0	39.1
		Output Torque Nm, Thermal	1035	1563	2670	4563
		Input kW, Mechanical	7.3	12.1	23.0	39.2
		Output Torque Nm, Mechanical	822	1322	2792	4570
		Efficiency %	92%	92%	93%	94%

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

Units to ATEX approval must be selected with a minimum service factor of 1.25.

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	100 12.33	125 12	160 13.25	200 12
1800	144	Input kW, Thermal	15.4	24.8	40.3	72.5
		Output Torque Nm, Thermal	937	1468	2663	4385
		Input kW, Mechanical	11.2	20.0	36.0	67.5
		Output Torque Nm, Mechanical	683	1185	2379	4085
		Efficiency %	93%	93%	94%	95%
1500	120	Input kW, Thermal	13.1	21.1	34.0	61.2
		Output Torque Nm, Thermal	946	1499	2696	4395
		Input kW, Mechanical	9.9	17.8	32.0	60.9
		Output Torque Nm, Mechanical	717	1266	2537	4376
		Efficiency %	92%	93%	94%	94%
1200	96	Input kW, Thermal	11.0	17.4	28.0	50.0
		Output Torque Nm, Thermal	993	1529	2746	4488
		Input kW, Mechanical	8.8	15.6	27.9	52.6
		Output Torque Nm, Mechanical	795	1372	2736	4720
		Efficiency %	92%	92%	93%	94%
1000	80	Input kW, Thermal	9.6	15.1	24.0	42.6
		Output Torque Nm, Thermal	1029	1592	2824	4589
		Input kW, Mechanical	7.9	14.1	24.0	47.3
		Output Torque Nm, Mechanical	844	1484	2824	5095
		Efficiency %	91%	92%	93%	94%
750	60	Input kW, Thermal	7.9	12.3	19.3	33.7
		Output Torque Nm, Thermal	1116	1710	2996	4789
		Input kW, Mechanical	6.6	11.8	21.0	39.9
		Output Torque Nm, Mechanical	933	1636	3259	5674
		Efficiency %	90%	91%	92%	93%

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

Units to ATEX approval must be selected with a minimum service factor of 1.25.

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	100 15.5	125 15.5	160 15.33	200 14.33
1800	120	Input kW, Thermal	12.8	21.4	35.2	64.3
		Output Torque Nm, Thermal	961	1619	2662	4595
		Input kW, Mechanical	10.2	18.2	32.0	57.4
		Output Torque Nm, Mechanical	767	1373	2420	4103
		Efficiency %	91%	92%	93%	94%
1500	100	Input kW, Thermal	10.9	18.2	29.7	54.2
		Output Torque Nm, Thermal	979	1652	2696	4648
		Input kW, Mechanical	9.2	16.3	28.0	51.4
		Output Torque Nm, Mechanical	830	1478	2541	4405
		Efficiency %	91%	92%	93%	94%
1200	80	Input kW, Thermal	9.1	15.1	24.4	44.2
		Output Torque Nm, Thermal	1010	1695	2738	4688
		Input kW, Mechanical	8.1	14.4	25.0	44.2
		Output Torque Nm, Mechanical	901	1617	2806	4690
		Efficiency %	90%	91%	92%	93%
1000	67	Input kW, Thermal	8.0	13.0	21.0	37.8
		Output Torque Nm, Thermal	1066	1751	2828	4811
		Input kW, Mechanical	7.2	12.8	21.0	40.3
		Output Torque Nm, Mechanical	958	1719	2828	5124
		Efficiency %	90%	91%	92%	93%
750	50	Input kW, Thermal	6.6	10.6	17.0	30.0
		Output Torque Nm, Thermal	1159	1883	3020	5036
		Input kW, Mechanical	6.1	10.7	19.0	33.7
		Output Torque Nm, Mechanical	1065	1909	3375	5650
		Efficiency %	89%	90%	91%	92%

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

Units to ATEX approval must be selected with a minimum service factor of 1.25.

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	100 20.5	125 20	160 21.5	200 20
1800	90	Input kW, Thermal	10.6	17.1	26.2	47.7
		Output Torque Nm, Thermal	1026	1633	2719	4656
		Input kW, Mechanical	7.4	13.0	25.5	41.4
		Output Torque Nm, Mechanical	719	1239	2647	4037
		Efficiency %	89%	90%	91%	92%
1500	75	Input kW, Thermal	9.1	14.5	22.2	40.3
		Output Torque Nm, Thermal	1057	1662	2735	4669
		Input kW, Mechanical	6.7	11.9	22.6	36.5
		Output Torque Nm, Mechanical	778	1361	2784	4231
		Efficiency %	89%	90%	90%	91%
1200	60	Input kW, Thermal	7.6	12.1	18.2	33.0
		Output Torque Nm, Thermal	1091	1714	2802	4779
		Input kW, Mechanical	5.8	10.4	18.8	32.6
		Output Torque Nm, Mechanical	834	1474	2895	4716
		Efficiency %	88%	89%	90%	91%
1000	50	Input kW, Thermal	6.7	10.5	15.7	28.2
		Output Torque Nm, Thermal	1141	1765	2869	4847
		Input kW, Mechanical	5.2	9.3	16.0	29.0
		Output Torque Nm, Mechanical	890	1564	2924	4992
		Efficiency %	87%	88%	89%	90%
750	38	Input kW, Thermal	5.5	8.6	12.7	22.4
		Output Torque Nm, Thermal	1235	1905	3059	5077
		Input kW, Mechanical	4.4	7.8	14.0	24.4
		Output Torque Nm, Mechanical	983	1733	3373	5534
		Efficiency %	86%	87%	88%	89%

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

Units to ATEX approval must be selected with a minimum service factor of 1.25.

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	100 25	125 24	160 26	200 24
1800	72	Input kW, Thermal	8.1	15.3	23.4	42.7
		Output Torque Nm, Thermal	924	1734	2905	4947
		Input kW, Mechanical	7.6	10.7	20.0	35.8
		Output Torque Nm, Mechanical	864	1213	2483	4142
		Efficiency %	86%	89%	90%	91%
1500	60	Input kW, Thermal	7.0	13.0	19.8	36.0
		Output Torque Nm, Thermal	958	1748	2917	4950
		Input kW, Mechanical	6.8	9.7	18.0	32.1
		Output Torque Nm, Mechanical	933	1302	2652	4417
		Efficiency %	86%	88%	89%	90%
1200	48	Input kW, Thermal	5.8	10.8	16.3	29.4
		Output Torque Nm, Thermal	981	1815	2968	5053
		Input kW, Mechanical	6.0	8.4	16.0	28.3
		Output Torque Nm, Mechanical	1008	1411	2913	4859
		Efficiency %	85%	88%	88%	90%
1000	40	Input kW, Thermal	5.1	9.4	14.0	25.2
		Output Torque Nm, Thermal	1023	1874	3059	5140
		Input kW, Mechanical	5.3	7.5	13.5	25.2
		Output Torque Nm, Mechanical	1072	1498	2950	5138
		Efficiency %	84%	87%	88%	89%
750	30	Input kW, Thermal	4.2	7.7	11.4	20.0
		Output Torque Nm, Thermal	1096	2024	3283	5378
		Input kW, Mechanical	4.5	6.3	11.8	21.1
		Output Torque Nm, Mechanical	1174	1654	3398	5679
		Efficiency %	82%	86%	87%	88%

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

Units to ATEX approval must be selected with a minimum service factor of 1.25.

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	100 29	125 29	160 32	200 29
1800	60	Input kW, Thermal	7.7	12.4	18.9	40.2
		Output Torque Nm, Thermal	1019	1660	2824	5566
		Input kW, Mechanical	7.1	12.0	20.0	28.5
		Output Torque Nm, Mechanical	934	1605	2988	3945
		Efficiency %	86%	87%	88%	90%
1500	50	Input kW, Thermal	6.6	10.5	16.0	33.8
		Output Torque Nm, Thermal	1036	1667	2836	5616
		Input kW, Mechanical	6.3	10.7	17.0	25.7
		Output Torque Nm, Mechanical	991	1696	3013	4277
		Efficiency %	85%	86%	87%	90%
1200	40	Input kW, Thermal	5.6	8.8	13.2	27.6
		Output Torque Nm, Thermal	1086	1726	2891	5669
		Input kW, Mechanical	5.5	9.4	14.0	22.3
		Output Torque Nm, Mechanical	1073	1838	3066	4586
		Efficiency %	84%	85%	86%	89%
1000	33	Input kW, Thermal	4.9	7.6	11.4	23.6
		Output Torque Nm, Thermal	1126	1768	2961	5751
		Input kW, Mechanical	5.0	8.4	13.0	20.1
		Output Torque Nm, Mechanical	1138	1950	3377	4906
		Efficiency %	83%	84%	85%	88%
750	25	Input kW, Thermal	4.1	6.3	9.3	18.9
		Output Torque Nm, Thermal	1226	1931	3183	6071
		Input kW, Mechanical	4.1	7.0	12.2	16.5
		Output Torque Nm, Mechanical	1237	2141	4175	5300
		Efficiency %	81%	83%	84%	87%

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

Units to ATEX approval must be selected with a minimum service factor of 1.25.

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	100 35	125 34	160 37	200 34
1800	51	Input kW, Thermal	6.8	11.1	17.3	32.2
		Output Torque Nm, Thermal	1061	1702	2920	5111
		Input kW, Mechanical	5.5	9.9	15.4	29.9
		Output Torque Nm, Mechanical	854	1521	2600	4749
		Efficiency %	84%	85%	86%	88%
1500	43	Input kW, Thermal	5.8	9.5	14.7	27.2
		Output Torque Nm, Thermal	1073	1727	2978	5122
		Input kW, Mechanical	5.0	8.8	13.6	26.6
		Output Torque Nm, Mechanical	915	1600	2763	5013
		Efficiency %	83%	84%	86%	87%
1200	34	Input kW, Thermal	4.9	7.9	12.2	22.3
		Output Torque Nm, Thermal	1119	1774	3053	5189
		Input kW, Mechanical	4.3	7.8	12.0	23.0
		Output Torque Nm, Mechanical	982	1749	3001	5349
		Efficiency %	82%	83%	85%	86%
1000	29	Input kW, Thermal	4.3	6.9	10.5	19.1
		Output Torque Nm, Thermal	1164	1837	3116	5333
		Input kW, Mechanical	3.8	6.9	10.7	20.9
		Output Torque Nm, Mechanical	1039	1836	3173	5836
		Efficiency %	81%	82%	84%	86%
750	21	Input kW, Thermal	3.6	5.7	8.5	15.3
		Output Torque Nm, Thermal	1267	1999	3284	5564
		Input kW, Mechanical	3.2	5.8	8.9	17.4
		Output Torque Nm, Mechanical	1139	2040	3442	6320
		Efficiency %	79%	81%	82%	84%

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

Units to ATEX approval must be selected with a minimum service factor of 1.25.

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	100 39	125 39	160 42	200 39
1800	45	Input kW, Thermal	6.1	10.1	15.4	28.8
		Output Torque Nm, Thermal	1037	1755	2917	5125
		Input kW, Mechanical	4.5	8.1	15.5	26.1
		Output Torque Nm, Mechanical	765	1411	2936	4639
		Efficiency %	82%	84%	85%	86%
1500	38	Input kW, Thermal	5.3	8.6	13.1	24.3
		Output Torque Nm, Thermal	1066	1772	2942	5189
		Input kW, Mechanical	4.1	7.3	13.9	23.2
		Output Torque Nm, Mechanical	823	1505	3122	4956
		Efficiency %	81%	83%	84%	86%
1200	30	Input kW, Thermal	4.4	7.2	10.9	20.0
		Output Torque Nm, Thermal	1092	1832	3024	5276
		Input kW, Mechanical	3.6	6.4	12.0	20.1
		Output Torque Nm, Mechanical	882	1626	3329	5310
		Efficiency %	80%	82%	83%	85%
1000	25	Input kW, Thermal	3.9	6.3	9.4	17.1
		Output Torque Nm, Thermal	1133	1900	3091	5349
		Input kW, Mechanical	3.2	5.7	10.6	18.2
		Output Torque Nm, Mechanical	923	1706	3486	5678
		Efficiency %	78%	81%	82%	84%
750	19	Input kW, Thermal	3.3	5.2	7.7	13.7
		Output Torque Nm, Thermal	1257	2037	3298	5599
		Input kW, Mechanical	2.7	4.8	8.9	15.2
		Output Torque Nm, Mechanical	1022	1883	3812	6204
		Efficiency %	77%	79%	80%	82%

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

Units to ATEX approval must be selected with a minimum service factor of 1.25.

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	100 45	125 44	160 48	200 44
1800	40	Input kW, Thermal	5.7	9.5	14.2	25.7
		Output Torque Nm, Thermal	1089	1818	3001	5099
		Input kW, Mechanical	4.0	7.0	11.1	22.9
		Output Torque Nm, Mechanical	756	1348	2348	4540
		Efficiency %	80%	82%	83%	85%
1500	33	Input kW, Thermal	4.9	8.1	12.0	21.8
		Output Torque Nm, Thermal	1115	1849	3018	5129
		Input kW, Mechanical	3.6	6.3	9.9	20.6
		Output Torque Nm, Mechanical	808	1444	2484	4840
		Efficiency %	79%	82%	82%	84%
1200	27	Input kW, Thermal	4.2	6.8	10.0	18.0
		Output Torque Nm, Thermal	1173	1905	3094	5231
		Input kW, Mechanical	3.1	5.5	8.7	18.0
		Output Torque Nm, Mechanical	860	1541	2689	5243
		Efficiency %	78%	80%	81%	83%
1000	22	Input kW, Thermal	3.7	5.9	8.7	15.4
		Output Torque Nm, Thermal	1224	1958	3190	5306
		Input kW, Mechanical	2.8	4.9	7.8	16.2
		Output Torque Nm, Mechanical	917	1621	2852	5571
		Efficiency %	77%	79%	80%	82%
750	17	Input kW, Thermal	3.1	4.9	7.1	12.3
		Output Torque Nm, Thermal	1332	2141	3385	5513
		Input kW, Mechanical	2.3	4.1	6.5	13.4
		Output Torque Nm, Mechanical	997	1807	3110	6015
		Efficiency %	75%	78%	78%	80%

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

IMPORTANT

Units to ATEX approval must be selected with a minimum service factor of 1.25.

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	100 49	125 49	160 53	200 49
1800	36	Input kW, Thermal	5.4	8.6	13.1	23.8
		Output Torque Nm, Thermal	1109	1811	3020	5197
		Input kW, Mechanical	3.4	6.1	12.0	19.7
		Output Torque Nm, Mechanical	700	1274	2767	4300
		Efficiency %	79%	81%	82%	84%
1500	30	Input kW, Thermal	4.7	7.4	11.2	20.2
		Output Torque Nm, Thermal	1144	1847	3061	5230
		Input kW, Mechanical	3.1	5.5	11.0	17.9
		Output Torque Nm, Mechanical	757	1373	3006	4642
		Efficiency %	78%	80%	81%	83%
1200	24	Input kW, Thermal	4.0	6.2	9.3	16.7
		Output Torque Nm, Thermal	1201	1886	3138	5340
		Input kW, Mechanical	2.8	4.7	9.2	15.8
		Output Torque Nm, Mechanical	826	1439	3104	5065
		Efficiency %	77%	78%	80%	82%
1000	20	Input kW, Thermal	3.5	5.4	8.1	14.3
		Output Torque Nm, Thermal	1245	1946	3239	5420
		Input kW, Mechanical	2.4	4.3	8.0	14.1
		Output Torque Nm, Mechanical	861	1546	3199	5336
		Efficiency %	76%	77%	79%	81%
750	15	Input kW, Thermal	2.9	4.5	6.6	11.5
		Output Torque Nm, Thermal	1339	2106	3429	5668
		Input kW, Mechanical	2.1	3.6	7.2	11.9
		Output Torque Nm, Mechanical	965	1699	3741	5855
		Efficiency %	74%	75%	77%	79%

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

Units to ATEX approval must be selected with a minimum service factor of 1.25.

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	100 59	125 59	160 63	200 59
1800	30	Input kW, Thermal	4.9	7.8	11.8	21.5
		Output Torque Nm, Thermal	1166	1904	3155	5451
		Input kW, Mechanical	2.6	4.6	10.0	14.9
		Output Torque Nm, Mechanical	615	1112	2674	3765
		Efficiency %	76%	78%	80%	81%
1500	25	Input kW, Thermal	4.2	6.7	10.1	18.2
		Output Torque Nm, Thermal	1183	1938	3160	5537
		Input kW, Mechanical	2.4	4.2	9.0	13.9
		Output Torque Nm, Mechanical	682	1209	2816	4217
		Efficiency %	75%	77%	78%	81%
1200	20	Input kW, Thermal	3.5	5.6	8.4	15.0
		Output Torque Nm, Thermal	1216	1998	3243	5564
		Input kW, Mechanical	2.1	3.7	7.8	12.3
		Output Torque Nm, Mechanical	726	1335	3011	4570
		Efficiency %	74%	76%	77%	79%
1000	17	Input kW, Thermal	3.2	4.9	7.3	13.0
		Output Torque Nm, Thermal	1316	2071	3338	5713
		Input kW, Mechanical	1.9	3.3	7.0	10.9
		Output Torque Nm, Mechanical	769	1394	3201	4786
		Efficiency %	73%	75%	76%	78%
750	13	Input kW, Thermal	2.7	4.1	6.0	10.4
		Output Torque Nm, Thermal	1440	2248	3562	5938
		Input kW, Mechanical	1.5	2.8	5.5	9.1
		Output Torque Nm, Mechanical	821	1508	3265	5213
		Efficiency %	71%	73%	74%	76%

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

Units to ATEX approval must be selected with a minimum service factor of 1.25.

WM Series - Single Reduction - Selection Data

Synthetic Oils

Nominal ratio: 70/1 Preferred Ratio

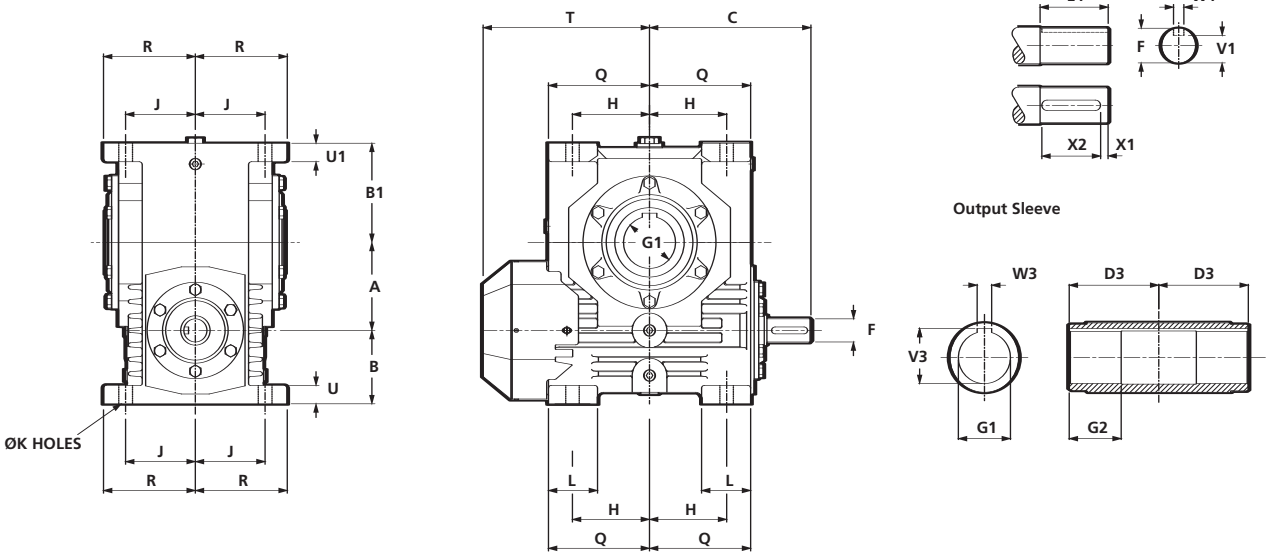
Input rpm	Output rpm	Centre Distance Actual Ratio : 1 Gear Ratings	100 69	125 69	160 74	200 69
1800	26	Input kW, Thermal	4.1	6.6	10.0	18.0
		Output Torque Nm, Thermal	1081	1788	2984	5139
		Input kW, Mechanical	2.1	3.6	9.0	11.9
		Output Torque Nm, Mechanical	551	983	2685	3392
		Efficiency %	72%	74%	76%	78%
1500	21	Input kW, Thermal	3.6	5.6	8.5	15.3
		Output Torque Nm, Thermal	1123	1796	3003	5175
		Input kW, Mechanical	2.0	3.4	7.5	11.1
		Output Torque Nm, Mechanical	618	1086	2650	3758
		Efficiency %	71%	73%	75%	77%
1200	17	Input kW, Thermal	3.0	4.8	7.1	12.6
		Output Torque Nm, Thermal	1153	1898	3052	5258
		Input kW, Mechanical	1.8	3.1	6.4	10.0
		Output Torque Nm, Mechanical	676	1218	2751	4177
		Efficiency %	70%	72%	73%	76%
1000	14	Input kW, Thermal	2.7	4.2	6.2	11.0
		Output Torque Nm, Thermal	1210	1937	3154	5363
		Input kW, Mechanical	1.5	2.8	5.5	9.0
		Output Torque Nm, Mechanical	690	1268	2798	4398
		Efficiency %	68%	70%	72%	74%
750	11	Input kW, Thermal	2.3	3.5	5.1	8.8
		Output Torque Nm, Thermal	1334	2091	3364	5566
		Input kW, Mechanical	1.3	2.3	4.3	7.6
		Output Torque Nm, Mechanical	765	1380	2836	4801
		Efficiency %	66%	68%	70%	72%

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

Units to ATEX approval must be selected with a minimum service factor of 1.25.

WM Series - Single Reduction - Dimensions (mm)

TYPE WMSM - SHAFT MOUNTED



Size	A	B	B1	C	D	H	J	K	L
WM100	100	106	120.7	225	225	107.5	102.5	24	65
WM125	125	112	146.1	275	255	125	112.5	24	75
WM160	160	125	166	310	295	145	120	28	85
WM200	200	140	222.3	343	355	172.5	132.5	28	100

Size	Q	R	R1	T	U	U1	Oil Capacity (approx) Litres*	Weight (approx) Kg
WM100	140	125	125	240	23	25	2.3	74
WM125	165	140	140	282	30	32	3.3	118
WM160	175	155	155	317	32	32	4.5	168
WM200	225	170	170	353	32	38	7.7	290

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

INPUT SHAFT

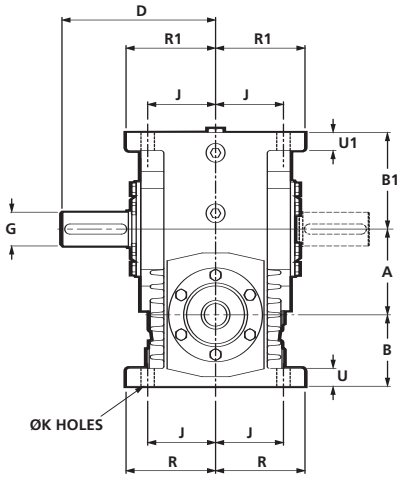
Size	E1	F	V1	W1	X1	X2	Tapped Hole
WM100	60	35k6	30.0	10P9	3	52	M12x25
WM125	82	40k6	35.0	12P9	3	70	M12X25
WM160	107	45k6	39.5	14P9	3	70	M16X36
WM200	97	50k6	44.5	14P9	3	70	M16X36

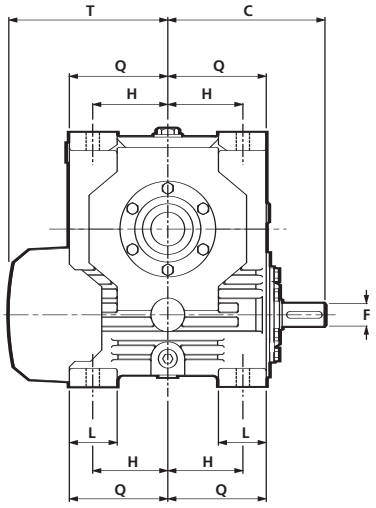
OUTPUT SLEEVE

G1	G2	V3	W3	D3
50f7	65	54	14Js9	110
65f7	70	69.6	18Js9	130
75f7	90	801	20Js9	155
90f7	115	95.6	25Js9	174

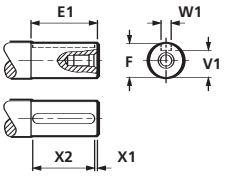
Foot Mounted Worm Gear Units - Single Reduction - Dimensions (mm)

TYPE WMU - UNDERDRIVEN

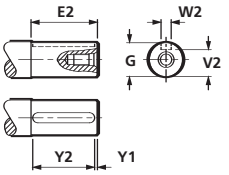




Input Shaft



Output Shaft



Shaft Assemblies

11 12 13

Size	A	B	B1	C	D	H	J	K	L
WM100	100	106	120.7	225	225	107.5	102.5	24	65
WM125	125	112	146.1	275	255	125	112.5	24	75
WM160	160	125	166	310	295	145	120	28	85
WM200	200	140	222.3	343	355	172.5	132.5	28	100

Size	Q	R	R1	T	U	U1	Oil Capacity (approx) Litres*	Weight (approx) Kg
WM100	140	125	125	240	23	25	2.4	80
WM125	165	140	140	282	30	32	3.3	100
WM160	175	155	155	317	32	32	4.5	182
WM200	225	170	170	353	32	38	7.7	312

INPUT SHAFT

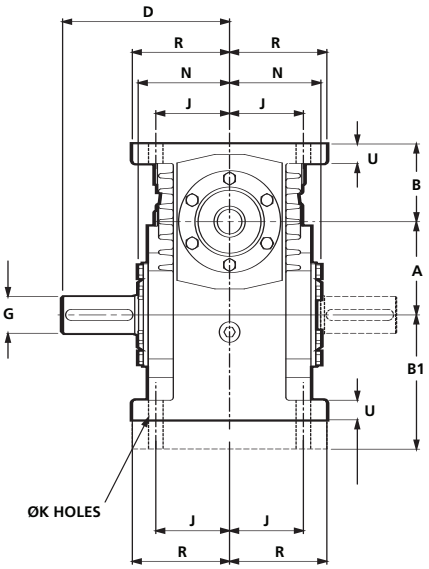
Size	E1	F	V1	W1	X1	X2	Tapped Hole
WM100	60	35k6	30.0	10P9	3	52	M12x25
WM125	82	40k6	35.0	12P9	3	70	M12X25
WM160	107	45k6	39.5	14P9	3	70	M16X36
WM200	97	50k6	44.5	14P9	3	70	M16X36

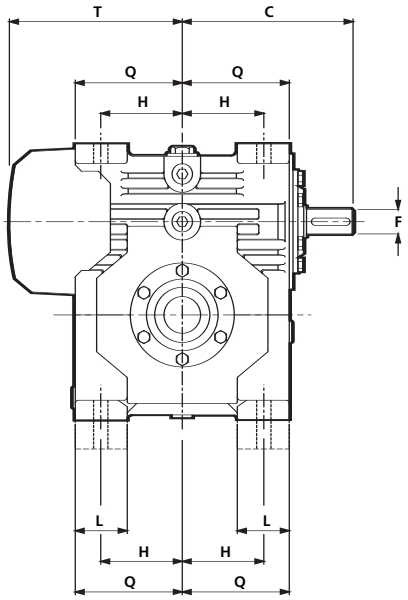
OUTPUT SHAFT

E2	G	V2	W2	Y1	Y2	Tapped Hole
100	50m6	44.5	14P9	3	97	M16x36
110	65m6	58.0	18P9	3	102	M20X43
125	75m6	67.5	20P9	3	117	M20X43
165	90m6	81.0	25P9	3	160	M24X52

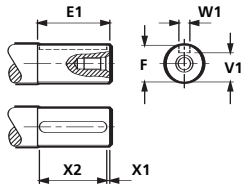
Foot Mounted Worm Gear Units - Single Reduction - Dimensions (mm)

TYPE WMO - OVERDRIVEN

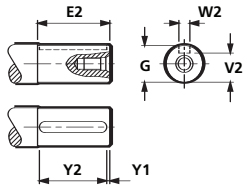




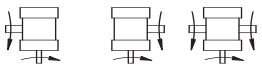
Input Shaft



Output Shaft



Shaft Assemblies



11 12 13

Size	A	B	B1	C	D	H	J	K	L
WM100	100	106	150	225	225	107.5	102.5	24	65
WM125	125	112	180	275	255	125	112.5	24	75
WM160	160	125	212	310	295	145	120	28	85
WM200	200	140	265	343	355	172.5	132.5	28	100

Size	Q	R	R1	T	U	U1	Oil Capacity (approx) Litres*	Weight (approx) Kg
WM100	140	125	125	240	23	25	2.4	80
WM125	165	140	140	282	30	32	3.4	100
WM160	175	155	155	317	32	32	5.4	182
WM200	225	170	170	353	32	38	11.2	312

INPUT SHAFT

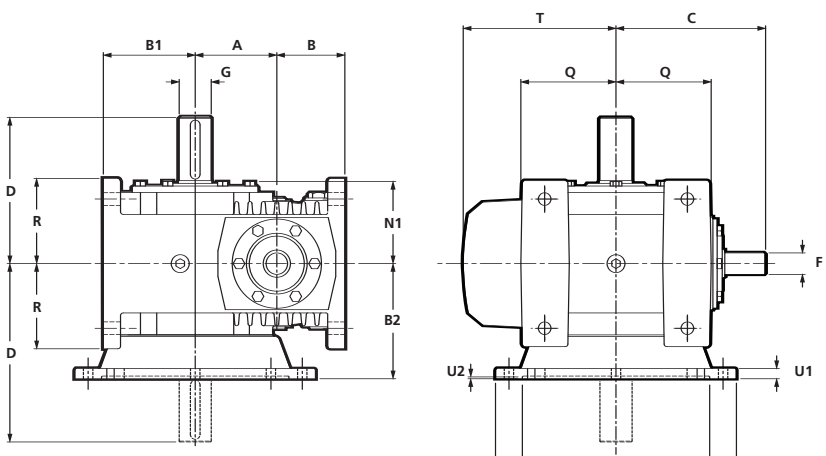
Size	E1	F	V1	W1	X1	X2	Tapped Hole
WM100	60	35k6	30.0	10P9	3	52	M12x25
WM125	82	40k6	35.0	12P9	3	70	M12X25
WM160	107	45k6	39.5	14P9	3	70	M16X36
WM200	97	50k6	44.5	14P9	3	70	M16X36

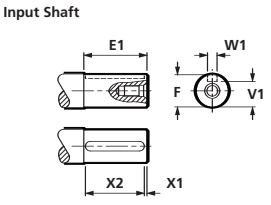
OUTPUT SHAFT

E2	G	V2	W2	Y1	Y2	Tapped Hole
100	50m6	44.5	14P9	3	97	M16x36
110	65m6	58.0	18P9	3	102	M20X43
125	75m6	67.5	20P9	3	117	M20X43
165	90m6	81.0	25P9	3	160	M24X52

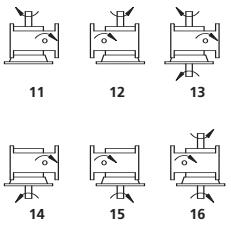
Foot Mounted Worm Gear Units - Single Reduction - Dimensions (mm)

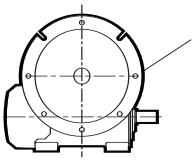
TYPE WMV - VERTICAL





Shaft Assemblies





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	100	106	120.7	160	225	225	4	15	265
WM125	125	112	146.1	180	275	255	4	19	300
WM160	160	125	166	200	310	295	4	19	350
WM200	200	140	222.3	212	343	355	8	19	400

Size	Q	R	Q1	Q2	T	U1	U2	Oil Capacity (approx) Litres*	Weight (approx) Kg
WM100	140	125	300	230	240	16	6	2.7	94
WM125	165	140	350	250	282	19	7	4.7	116
WM160	175	155	400	300	317	16	7	7.1	202
WM200	225	170	450	350	353	24	7	14.3	350

INPUT SHAFT

Size	E1	F	V1	W1	X1	X2	Tapped Hole
WM100	60	35k6	30.0	10P9	3	52	M12x25
WM125	82	40k6	35.0	12P9	3	70	M12X25
WM160	107	45k6	39.5	14P9	3	70	M16X36
WM200	97	50k6	44.5	14P9	3	70	M16X36

OUTPUT SHAFT

E2	G	V2	W2	Y1	Y2	Tapped Hole
100	50m6	44.5	14P9	3	97	M16x36
110	65m6	58.0	18P9	3	102	M20X43
125	75m6	67.5	20P9	3	117	M20X43
165	90m6	81.0	25P9	3	160	M24X52

WM Series - Installation, Maintenance & Storage

Initial Running

All units are supplied without oil.

First Filling

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 visable 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 unit stationary. Maintain free ventilation of the unit under all conditions by ensuring the breather hole in the filler plug is kept clear at all times.

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 onto 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.

External shaft extensions and oil seals can be protected by the use of grease impregnated tape. Full long term storage specification details can be obtained from Renold on request.

Spare Parts

Information relating to spare parts is available on request.

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 viscosity 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 effects the operating viscosity. 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. 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 cheaper, have a lower 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 Alpha ZN	220	-9 to 120	320	-9 to 120	460	-9 to 120
Castrol AlphaMax	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
Kluber Gem	220	-18 to 100	320	0 to 100	460	0 to 100

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
Castrol Alpha T	220	-36 to 80	320	-33 to 80	460	-33 to 80
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

Ratings are calculated at 10,000 hours

Notes

RENOLD Worldwide Sales and Services

ARGENTINA
Bennett Anderson,
Gonzales Y Cia SA, J.Aguero 1817
(1605) Munro
Buenos Aires
Tel: + 54 11 4761 5007/ 3531
Fax: + 54 11 4760 0866

Los Ases Ketten SA,
Avda Gaona 4046,
1407 Buenos Aires
Tel: + 54 116710855
Fax: + 54 116713141

AUSTRALIA
Renold Australia Proprietary Ltd
508-520 Wellington Road,
Mulgrave, Victoria 3170, Mulgrave North
Tel: +61 (0) 3 9262 3333
Fax: +61 (0) 3 9561 8561
Branch Tel: +61 (0) 3 9262 3355
Email: melcag@renold.com.au

Unit 1,
12-18 Victoria Street, Lidcombe,
Sydney, NSW 2141.
Tel: +61 (0) 2 9649 3122
Fax: +61 (0) 2 9646 1295
Email: nswsales@renold.com.au

Unit 10,
31 Boyland Avenue,
Coopers Plains, Brisbane,
Queensland 4108.
Tel: +61 (0) 7 3275 2155
Fax: +61 (0) 7 3875 1779

Corner Orsmond & George Sts.
Hindmarsh, Adelaide,
South Australia 5007.
Tel: +61 (0) 8 8346 9077
Fax: +61 (0) 8 8340 1217

Unit 2,
127 Grandstand Street, Belmont,
Perth, West Australia 6104.
Tel: +61 (0) 8 9479 1388
Fax: +61 (0) 8 9479 1364

Unit 13
56 Industrial Drive,
Mayfield, NSW 2304
Tel: +61 (0) 2 4960 8440
Fax: +61 (0) 2 4960 8455

PO Box 159,
Unanderra, Wollongong, NSW 2526.
Tel: +61 (0) 2 42 621771
Fax: +61 (0) 2 42 621772

Shop B,
247 Ingham Road,
Garbutt, Townsville, QLD 4814.
Tel: +61 (0) 7 4779 5922
Fax: +61 (0) 7 4775 1446

AUSTRIA
Renold GmbH
Rudolf Hausner Gasse 60/1
A-1220 Wien
Austria.
Tel: +43 (0) 1 3303484 0
Fax: +43 (0) 1 3303484 5

BANGLADESH
Brady & Co (Bangladesh) Ltd,
31, Bangabandhu Avenue,
Dhaka-1000
Tel: + 880 2802358
Fax: + 880 2802358

BELGIUM
Renold Continental Ltd
Allée Verte 1,1000 Brussel.
Tel: +32 (0) 2 2011262
Fax: +32 (0) 2 2032210
Email: info@renold.be

CANADA
Renold Canada Ltd
121 Roy Boulevard, Brantford,
Ontario, N3T 5N4
Toll Free: 1-800-265-9970
Tel: +1 519 756 6118
Fax: +1 519 756 1767
Email: inquiry@renoldcanada.com

622 rue De Hull,
Ville La Salle,
Quebec, H8R 1V9.
Toll Free: 1-800-361-1414
Tel: +1 514 367 1764
Fax: +1 514 367 4993

CHILE
Sargent S.A.,
Avda. Presidente Bulnes No 205,
Casilla 166-D,
Santiago - Chile.
Tel: (56 2) 510 3000
Fax: (56 2) 698 3989
Email: secventas@sargentagricola.cl

CHINA
Renold Transmission (Shanghai)
Company Limited
Unit 4A, Block 15
69 XiYa Road
Waigaoqiao Free Trade Zone
Shanghai 200131
Tel: +86 21 5046 2696
Fax: +86 21 5046 2695
Email: sales@renold.cn

COLOMBIA
Transmission de Potencia SA
Carrera 68B No10 - 98
Apartado Aereo 6794
Santafe de Bogato DC
Tel: + 571 2600100
Fax: + 571 2904823

Importadora Casa Sueca Ltda.,
Calle 52, No. 1N-74,
Apartado Aereo 1208, Cali.
Tel: 00 57 2346 4455
Fax: 00 57 2346 4967

CZECH REPUBLIC
Renold GesmbH
Technical Office, Dipl. Ing. R.
Badura,
Jaroslavice 129, CZ-76001 Zlin.
Tel: +42 67 7211074
Fax: +42 67 7211074

DENMARK
Renold A/S,
Skelmarksvej 6, Postboks 90,
2605 Brøndby.
Tel: +45 43 452611
Fax: +45 43 456592
Email: renold@post9.tele.dk

EGYPT
Itaco,
Int'l for Trading & Agency,
P.O. Box 7550, Nasr City, Cairo.
Tel: + 20 2 2718036
Fax: + 20 2 2878089

EL SALVADOR
MVA & Cia
Residencial San Luis,
Avenida 4 #45 Block 2,
San Salvador,
El-Salvador, Central America
Tel: + 503 274 649

FINLAND
Kraftmek Oy,
Hitsaajankatu 9, P.O. Box 36,
FIN-00811 Helsinki
Tel: + 358 9 7557355
Fax: + 358 9 7550414

FRANCE
Brampton Renold,
Zone Industrielle A, Rue de la
Pointe, BP 359, 59473 Seclin Cedex.
Tel: +33 (0) 320 16 29 29
Fax: +33 (0) 320 16 29 00

GERMANY
Arnold & Stolzenberg,
Juliusmühle,
D37574 Einbeck.
Postal address:
PO Box 1635 + 1645
D37557 Einbeck.
Tel: +49 (0) 5562 81248
Fax: +49 (0) 5562 81130
Email: arnoldandstolzenberg
@t-online.de

GREECE
Provatas Engineering
53/47 Dragatsaniou St,
185 - 45 Piraeus.
Tel: + 30 1 4170266
Fax + 30 1 4170253

HOLLAND
Renold Continental Ltd,
Jarmuiden 30c,
1046 AD Amsterdam.
Tel: +31 (0) 20 614 6661
Fax: +31 (0) 20 614 6391
Email: info@renold.nl

HUNGARY
Renold GesmbH
Technical Office, Ing. Havasi Janos,
Ret Utca 25, H-6200 Kiskörös.
Tel: +36 (0) 78 312483
Fax: +36 (0) 78 312484

INDIA
Voltas Limited.,
Machine Tool Division,
Voltas House B, 3rd Floor,
TB Kadam Marg,
Chinchpokli,
Mumbai 400033
Tel: 091 22 370 0829
Fax: 091 22 371 4889
Email: mshaik@voltasltd.com

NORTHERN IRELAND
Henry R. Ayton Ltd,
Derriaghy, Dunmurry, Belfast.
Tel: 01232 618511
Fax: 01232 602436

SOUTHERN IRELAND
Henry R. Ayton Ltd.,
Broomhill Drive, Tallagh, Dublin 24
Tel: + 353 (0) 1 4517922
Fax: + 353 (0) 1 4517922

ISRAEL
Technica J. Bokstein Co. Ltd,
3 Hatrupa Street,
Netanya 42504
Tel: + 972 9 8850505
Fax: + 972 36131074

ITALY
Bianchi Cuscinetti SpA
Via Zuretti, 102, 20125 Milano,
Tel: + 39 02 67861
Fax: + 39 02 66981669

JAMAICA
Masterton Ltd,
21-25 Hanover Street, P.O. Box 73
Kingston.
Tel: + 18 767 540557
Fax: + 18 769 227807

KOREA
S.S. Corporation,
Yeouido, P.O. Box 60, Seoul.
Tel: 00-822-783-6829
Fax: 00-822-784-9322
Email: sslcorp@chollian.net

MALAYSIA
Renold (Malaysia)
LOT 2, Jalan Kecapi 33/2,
Eilte Industrial Park,
Off Jalan Bukit, Kemuning,
40400 Shah Alam, Selangor,
Malaysia.
Tel: + 60 3 5122 9880
Fax: + 60 3 5191 9881
Email: malaysia@renold.com

201, Jalan Simbang,
Taman Perling,
81200 Joho Bharu, Johor, Malaysia.
Tel: + 60 (0) 7 2384152-3
Fax: + 60 (0) 7 2384155
Email: malaysia@renold.com

67A, Jalan Medan Ipoh 6,
Bandar Baru Medan,
31400 Ipoh, Perak
Tel: + 60 (0) 5 548 0059
Fax: + 60 (0) 5 548 0214
Email: malaysia@renold.com

28B Jalan Perai Jaya 3,
Bandar Perai Jaya,13600 Perai,
Penang, Malaysia
Tel: + 604-399 9648
Tel: + 604-399 0648
Fax: + 604-399 5649
Email: malaysia@renold.com

MAURITIUS
Dynamotors Ltd,
P.O. Box 733, Bell Village,
Tel: + 230 2122847/8/9
Fax: + 230 2088348

MEXICO
Accessorios Automotrices y
Rodamientos Industriales,
S.A. de C.V., Calz Legaria 833-A
Col Irigacion, Mexico DF 11500
Tel: + 52 5 395 6300
Fax: + 52 5 395 6370

RENOLD Worldwide Sales and Services

NEW ZEALAND
Renold New Zealand,
594 Rosebank Road,
Avondale, Auckland.

Postal Address:
PO Box 19460,
Avondale, Auckland.
Tel: + 64 (0) 9 828 5018
Fax: + 64 (0) 9 828 5019
Email: aksales@renold.co.nz

Christchurch Branch Office,
32 Birmingham Drive, Christchurch,
PO Box 9006, Christchurch,
Tel: + 64 03 338 2169
Fax: + 64 03 338 8663

NORWAY
G. Heier A/S,
Postal Address: Postboks 6615,
Rodelokka, 0502 Oslo, Norway.
Office Address: Thv, Meyersgt.
7, Oslo.
Tel: + 47 232 34230
Fax: + 47 232 34242

PAKISTAN
Brady & Co. of Pakistan Ltd,
Shernaz House, P.O. Box 4453,
West Wharf Road, Karachi 2.
Tel: + 92 21.2310367/201712
Fax: + 92 21.2313376/2313378

PERU
Corporacion Basco S.A.C.
Av. Argentina 1165,
Lima 1, RUC 25776186.
Tel: + 51 1 4336633
Fax: + 51 1 4313188

PORTUGAL
Harker, Sumner, S.A.
Zona Industrial Maia 1 - Sector X
4475 - 132 Gemunde - Maia
Portugal.
Tel: + 351 229 4478 090
Fax: + 351 229 4478 098
E-mail: accionamantos.ind@harker.pt

SINGAPORE
Renold Transmission Limited
63 Hillview Avenue, #07-13,
Lam Soon Industrial Building,
Singapore 669569.
Tel: + 65 6760 2422
Fax: + 65 6760 1507
E-mail: renold@mbox5.singnet.com.sg

SOUTH AFRICA
Renold Croft (Pty) Limited,
Corner Liverpool and Bolton Streets,
Nestadt Industrial Sites, Benoni, 1501
Postal Address: Private Bag x 030,
Benoni, 1500.
Tel: + 27 (0) 11 747 9500
Fax: + 27 (0) 11 747 9505
E-mail: renold@iafrica.com

P.O. Box 2661, Witbank 1035,
Mpumalanga,
Republic of South Africa.
Tel: +27 (0) 13 692 7760
Fax: +27 (0) 13 697 0546
Email: renoldwit@worldonline.co.za

SPAIN
Brown Pestell,
Ctra N-11 Lm. 599.5 Nave 5,
08780 Palleja, Barcelona.
Tel: + 34 93 6630740
Fax: + 34 93 6632057

SWEDEN
Renold A/S
Skelmarksvej 6, Postboks 90
2605 Brøndby
Denmark.
Tel: + 45 43 452611
Fax: + 45 43 456592
E-mail: renold@post9.tele.dk

SWITZERLAND
Renold (Switzerland) Gmbh,
Ringstrasse 16, Postfach 1115
CH-8600 Dübendorf 1.
Tel: + 41 (0) 1 824 8484
Fax: + 41 (0) 1 824 8411
E-mail: info@renold-gmbh.ch

Route De Prilly 25,
CH-1023 Crissier.
Tel: + 41 (0) 21 632 9460
Fax: + 41 (0) 21 632 9475
E-mail: crissier@renold-gmbh.ch

THAILAND
United Power Engineering Co Ltd
4 Soi Sukhumvit 81 (Siripot)
Sukhumvit Road
Bangjak, Phrakhanong
Bangkok 10260.
Tel: + 66 2 7425366
Fax: + 66 2 7425379

TRINIDAD
Tracmac Engineering Ltd,
P.O. Box 945, Port of Spain,
Trinidad, West Indies.
Tel: + 1 665 460 1532
Fax: + 1 868 671 0012

TURKEY
Glengo Ithalat Ihracat Mumessillik
AS,
Gungoren Cad. No. 35 Bagcilar,
34560
Bakirkoy, Istanbul.
Tel: + 90 212 4613970
Fax: + 90 212 4613972
www.glengo.com.tr

UNITED KINGDOM
Renold Gears
Holroyd Gears Works, Milnrow,
Rochdale OL16 3LS
Tel: +44 (0) 1706 751000
Fax: +44 (0) 1706 751001
E-mail: sales@gears.renold.com
Web: www.renold.com

Renold Clutches & Couplings
Wentloog Corporate Park,
Newlands Road,
Cardiff CF3 2EU, Wales
Tel: + 44 (0) 29 20792737
Fax: + 44 (0) 29 20793004
(Sales):+ 44 (0) 29 20791360
E-mail: couplings@cc.renold.com
Web: www.renold.com

Renold Hi-Tec Couplings
112 Parkinson Road
Halifax HX1 3QH
Tel: +44 (0) 1422 255000
Fax: +44 (0) 1422 320273
E-mail: sales@hitec.renold.com
Web: www.renold.com

Holroyd
Harbour Lane North, Milnrow,
Rochdale, OL16 3LQ.
Tel: +44 (0) 1706 526 590
Fax: +44 (0) 1706 353 350
E-mail: info@holroyd.com
Web: www.holroyd.com

Renold Chain
UK Sales, Horninglow Road,
Burton upon Trent,
Staffordshire, DE14 2PS.
Tel: +44 (0) 1283 512 940
Fax: +44 (0) 1283 512 628
E-mail: enquiry@renold.com

USA
Renold Inc
Bourne Street, PO Box A, Westfield,
New York, 14787-0546
Tel: + 1 716 326 3121
Fax: + 1 716 326 6121
E-mail: renold@cecomet.net

VENEZUELA
Equipos Y Acessorios Astral CA,
Apartado 1651 Valencia.
Tel: + 584 1 332042
Fax: + 584 1 345641

WEB
www.renold.com

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AUSTRALIA
Melbourne (Victoria)
Tel + 61 (03) 9262 3333
Fax + 61 (03) 9561 8561
also at: Sydney, Brisbane, Adelaide, Perth, Newcastle, Wollongong, Townsville.

AUSTRIA
Vienna
Tel + 43 (0) 13303484-0
Fax + 43 (0) 13303484-5
also at: Kiskörös (Hungary), Jaroslavice (Czech Republic).

BELGIUM
Brussels
Tel + 32 (0) 2 201 1262
Fax + 32 (0) 2 203 2210

CANADA
Brantford (Ontario)
Tel + 1 519 756 6118
Fax + 1 519 756 1767
also at: Montreal.

CHINA
Shanghai
Tel + 21 5046 2696
Fax + 21 5046 2695

DENMARK
Bröndby (Copenhagen)
Tel + 45 43 45 26 11
Fax + 45 43 45 65 92

FRANCE
Seclin
Tel + 33 (0) 320 16 29 29
Fax + 33 (0) 320 16 29 00

GERMANY
Einbeck
Tel + 49 (0) 5562 81248
Fax +49 (0) 5562 81130
also at: Hamburg, Bielefeld, Düsseldorf, Frankfurt, Kornwestheim, Berlin.

KOREA
Seoul
Tel + 822 783 6829
Fax +822 784 9322

MALAYSIA
Selangor Darul Ehsan
Tel + 60 3-5191 9880
Fax + 60 3-5191 9881
also at: Johor Bharu, Ipoh, Penang.

NETHERLANDS
Amsterdam
Tel + 31 206 146661
Fax + 31 206 146391

NEW ZEALAND
Auckland
Tel + 64 9 828 5018
Fax + 64 9 828 5019
also at: Christchurch.

SINGAPORE
Singapore
Tel + 65 6760 2422
Fax + 65 6760 1507

SOUTH AFRICA
Benoni
Tel + 27 11 747 9500
Fax + 27 11 747 9505
also at: Witbank.

SWEDEN
Bröndby (Copenhagen)
Tel + 45 43 45 26 11
Fax + 45 43 45 65 92

SWITZERLAND
Dübendorf (Zürich)
Tel + 41 (1) 824 8484
Tel + 41 (1) 824 8411
also at: Crissier (Lausanne).

UK
Renold Gears, Rochdale
Tel + 44 (0) 1706 751000
Fax + 44 (0) 1706 751001
e-mail : gears.sales@renold.com

USA
Westfield NY
Tel + 1 716 326 3121
Fax + 1 716 326 6121

WEB
www.renold.com

E-MAIL
e-mail : gears.sales@renold.com

For other country distributors please contact Renold UK.

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