

RENOLD

SMXtra

SHAFT MOUNTED HELICAL UNIT



INSTALLATION & MAINTENANCE GUIDE



April 2011

INSTALLATION & MAINTENANCE GUIDE

IMPORTANT INFORMATION YOU MUST READ

Product Safety Information of *RENOLD* Gear Products

Important Notes

Always isolate the power source from the drive or the equipment.
Always wear protective clothing, safety glasses, hats, gloves, ear protectors and safety shoes as warranted by the circumstances.
Always ensure tools are in good working condition and use as directed by the manufacturer.
Loosen all tension devices.
Ensure that the correct lubrication is used prior to commissioning.

Customers are reminded that when purchasing any technical product for use at work (or otherwise), any additional or up-to-date information and guidance, which it has not been possible to include in the publication, should be obtained from your local sales office in relation to the suitability and the safety and proper use of the product.

All relevant information and guidance must be passed on by you to the person engaged in, or likely to be affected by or responsible for the use of the product.

Potential Hazards

There are a number of hazards that must be avoided when installing, maintaining and repairing Renold Gear units. The following are suggested safety guides when undertaking any of the above.

Hot surfaces and lubricants.

After prolonged running, a gear unit can generate high temperatures and can create surface temperatures that could burn the skin. Do not drain the oil from a gear unit that has been run for a prolonged period because the oil will be hot and could burn the skin. Allow the oil to cool, prior to draining.

Fire and Explosions.

A gear unit creates an oil mist or vapour internally after prolonged running and can be a fire and explosion risk if a naked flame is in close proximity. Allow the unit to cool prior to opening the unit. Flames or high running temperatures can burn or melt rubber compounds and melt plastic compounds and produce dangerous fumes. These compounds should be avoided until cool and then handled with protective gloves.

Guards

All rotating parts must be guarded with suitable guards, secured to the gear unit or machine frame.

Lifting

Lifting lugs or lifting points to suit eyebolts are provided on all Renold gear units. These must be used at all times.

Noise

Gear units run at high speed can create noise levels damaging to hearing. Ear protectors should be worn if there is a possibility of prolonged exposure to these conditions.

Lubrication.

The Installation & Maintenance Guide include the various types and quantities/ types of oils to be used in Renold gear units. These must be followed at all times.

Electrical Equipment

Follow all associated manufacturers instructions and always isolate all electrical equipment prior to carrying out any work.

Holdback/ Backstops

Failure of a backstop when fitted to the gear unit could result in personnel injury and machine damage. Secondary back-up systems must be provided.

Installation Maintenance and Storage.

Full Installation & Maintenance instructions are included in this document. Failure to follow the instructions could result in failure of the gear unit and / or damage to the equipment onto which it is being installed.

Short and long term storage instructions have been included in this Installation & Maintenance Guide.

General

All information contained in this document is subject to change without notice.

The right is reserved to make modifications to the product to meet manufacturing conditions and/or developments (for example in design or materials)
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1. UNIT DESIGNATION CODE

If further information of after sales service is required, please have the following information at hand.

- Order No.
- Unit Designation Code

Examples**SXM01040P05**

SX	Gear unit with no Sprag clutch backstop fitted
M	Metric or A – American shafts
01	Gear size (sizes 1 to 12)
040	Bore size 40mm (000 taper bore unit - no bush)
P -	P = parallel bore B = parallel sleeve bushed bore T = taper clamping sleeve bush
05	Ratio (5:1, 13:1, 20:1, 25:1 metric) (15:1 American)

SSM01035B05

SS Gear unit with Sprag backstop fitted
All other details as above.

2. GENERAL INFORMATION

The SMXtra gear units comprise of 12 sizes ranging from size 1 to 12. Rated up to 173 kW in a ratio range from 5:1 up to 25:1, SMXtra offers a wide selection of mounting options and accessories to suit a wide and diverse market.

The instructions which follow are to help you achieve the recommended installation procedure, ensuring optimum performance, satisfaction and life from your Renold Gears SMXtra gear unit.

Prior to despatch, all units are tested and checked to ensure that they comply with the highest standards required by our company. Also, a great deal of care is taken in the quality of packing and transport arrangements, ensuring that the unit reaches its final destination in its original condition.

Renold Gears hopes that the supplied unit will fully meet your expectations.

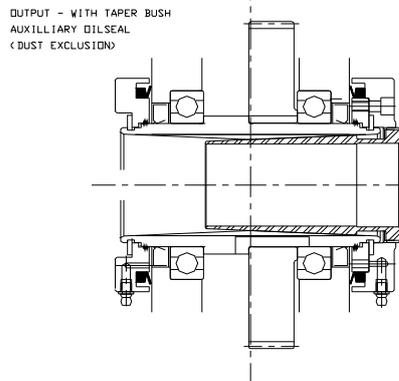
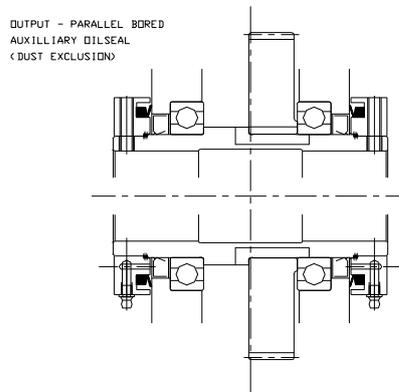
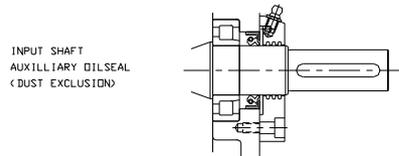
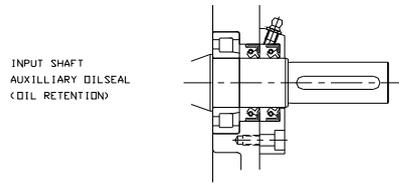
3. WEATHER PROTECTION

3.1 All SMXtra units are protected to a standard capable of withstanding normal weather conditions. Where it is probable that the unit will be subjected to adverse weather conditions, or where it is to be left inactive for a long period of time, our sales team should be notified when the order is placed so that the unit can be provided with the appropriate protection.

3.2 ENHANCED SEAL

Enhanced seal is available to protect the unit against dust and moisture in hostile running environments and to provide additional security to prevent the ingress of oil into sensitive environments such as the food industry.

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ENHANCED SEALING FOR SMX SERIES SHAFT MOUNTED GEAR UNIT

4. PRE-INSTALLATION

4.1 PLUG POSITIONS

SMXtra gear units are fitted with oil breather, oil level and drain plugs. The units are designed for mounting in any of the positions shown in Appendix A. Using the diagrams provided, ensure that the plugs are in the correct position for the intended mounting position.

If required, a breather containing a filter can be ordered, for use where conditions could lead to dirt or water penetration of the breather.

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4.2 FIXING SURFACES

Before starting to install the SMXtra unit, any areas which are used to locate or have fittings attached to them, must be cleaned to remove any dirt, paint or grease which may be present. The same precautions must be taken with any other equipment being assembled. Cleansing the mating faces of the gear unit and its fitting area will ensure that the unit sits flat on the mounting area. This will in turn aid the necessary alignment of the gear unit.

5. INSTALLATION

NOTE: *Units are supplied without oil.*

5.1 FITTING OF COMPONENTS ONTO INPUT/OUTPUT SHAFTS

Components which are to be fitted to either the input or output shaft of the gear unit (e.g. pulleys, sprockets, etc.) may be fitted using one of the following methods.

NOTE: *Do not strike the component onto the shaft with a mallet, as this could damage the support bearings.*

- The component can be heated using an appropriate method, expanding the bore. The part can then be dropped, lightly tapped, or jacked onto the shaft, depending on the fit of the item.
- The component may be applied to the shaft using a screw jack method which locates in the tapped hole situated in the end of the shaft. Please refer to Appendix B for the tapped hole dimensions relative to the size of shaft.

NOTE: *Gear units supplied for the American market will have shaft diameters to a nominal imperial size. A tapped hole will not be present in the end of the shaft.*

- Install pulley on gearbox input shaft as close to the reducer as possible. Failure to do this will cause excess loads in the input shaft bearings and could cause their premature failure.

Install motor and vee belt drive with the belt pull at approximately 90° to the centre line between driven and input shafts. This will permit tensioning of the vee belt drive with the torque arm, which should preferably be in tension. If output hub runs anti-clockwise, torque arm should be positioned to the right.

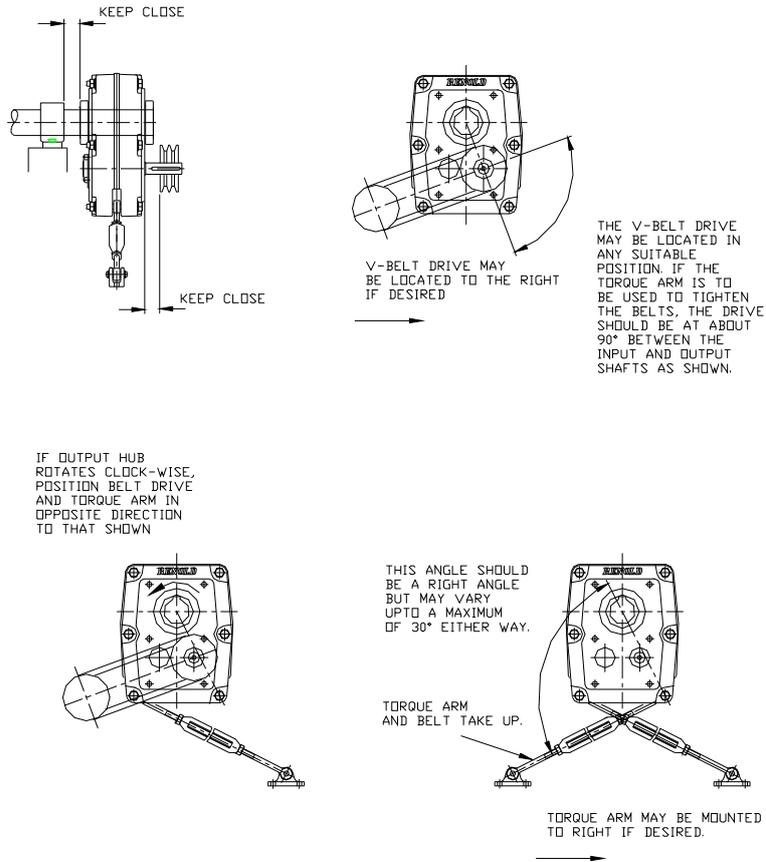
5.2 FITTING OF UNIT ONTO DRIVEN SHAFT

- Install torque-arm fulcrum on a rigid support so that the torque-arm will be at approximately right angles to the centre line through the driven shaft and the torque-arm case bolt. Make sure there is sufficient take up in the turn-buckle for belt tension adjustment. For reversible and/or heavy duty drives we recommend two torque arms in opposite directions.

TORQUE ARM BOLT TIGHTENING TORQUES

Reducer Size	1&2	3&4	5	6,7,8&9	10,11&12
Torque Nm	30	50	100	160	350
Torque lb. Ft.	22	37	74	118	258

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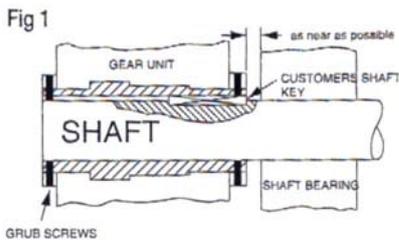


5.3 ASSEMBLY ON DRIVEN SHAFT PARALLEL BORED SLEEVE

- Where the shaft diameter is the same as the maximum (sleeve) bore of the gear unit, no bush is required. Where the shaft diameter is smaller than the sleeve bore, bushes are supplied. For a small amount of make-up, these are split bushes.
- For larger differences of diameter, solid bushes are used. The method of assembly differs in each case, and is described below. When fitted, the shaft must pass through the full width of the unit.

5.4 UNIT FITS DIRECT ON SHAFT

- No bushes required. Fit key in the shaft keyway. Mount the gear on to shaft in the required position, as near as is practicable to the shaft bearing. Secure by tightening the four collar grub screws. One must secure on to the shaft key, and the other three direct on to the shaft as shown in fig 1.



INSTALLATION & MAINTENANCE GUIDE**5.5 SHAFT SLIGHTLY SMALLER THAN SLEEVE OF GEAR UNIT**

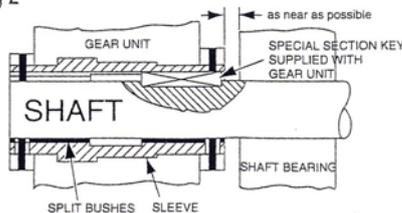
Bushes required.

Two split bushes are supplied with each gear unit, and also special section key which fits the customer's shaft keyway, one split bush and into the keyway of the gear unit sleeve. Insert the two bushes on to the gear unit sleeve, aligning the split of both bushes with the sleeve keyway. Locate by screwing 2 collar grub screws finger tight into the holes provided in the ends of the bushes. Fit the special section key which we have supplied into the shaft keyway.

Note that the special section key can be located in either split bush. Mount the gear unit in the desired position on the shaft, as near to the shaft bearing as is practicable, and make sure that the shaft key is correctly located in relation to one split bush only. Secure by tightening all four collar grub screws.

One must bear on to the special section shaft key, one direct on to the shaft through the split in the bush, and the other two through the holes in the sleeve and bush direct on to the shaft, as illustrated in fig 2.

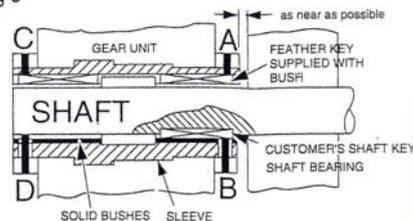
Fig 2

**5.6 SHAFT SMALLER THAN SLEEVE OF GEAR UNIT**

Bushes required.

Two solid bushes are supplied with each gear unit, each with a feather key to locate it to the gear unit sleeve. The shaft key is normally provided by the customer, and should only be long enough to locate one bush. Insert the bushes into the gear unit sleeve, complete with the feather keys which we supply. Locate by screwing 2 collar grub screws finger tight into the holes provided in the ends of the bushes. Fit the shaft key (provided by the customer) into the shaft keyway with good side fitting. Note that the length of this key should be such that location is made in one solid bush only. Either bush can be keyed. Mount the gear unit in the desired position on the shaft, as near as is practicable to the shaft bearing, and make sure that the key is correctly located in relation to one solid bush only. Secure by tightening all four collar grub screws.

Fig 3



Two screws "A" and "C" should bear on to the feather keys in the bushes, one "B" should bear on to the shaft key provided by the customer, and the fourth "D" should go through the hole in the solid bush and bear on to the shaft, as illustrated in fig 3.

5.7 ASSEMBLY ON DRIVEN SHAFT – TAPER CLAMPING SLEEVE AND BUSH

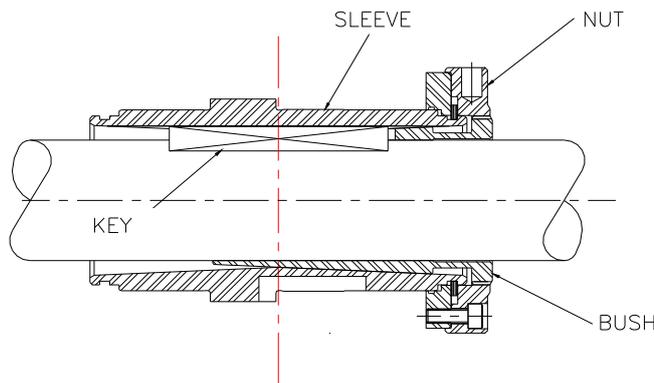
One bush required

One key supplied. Additional key may be required. See table 5.8.

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If one key only required, fit supplied key into shaft keyway.
 If two keys required, fit supplied key into bush external keyway, and additional key into shaft keyway.
 Insert bush into gear unit sleeve.
 Turn nut anti-clockwise to engage threads.
 Mount the gear unit in the desired position on the shaft.
 Turn nut anti-clockwise to move bush into sleeve.
 Lock unit onto shaft by striking end face of bush (with suitable tool to avoid damage).
 Tighten nut to lock sleeve onto shaft. (see table below for tightening torques).
 If the shaft diameter is towards the bottom of the tolerance range, the last two operations may need repeating.
 To release unit from shaft, rotate nut clockwise.

Unit	Locknut tightening torque (Nm)	Unit	Locknut tightening torque (Nm)
1	200	6	1200
2	285	7	2170
3	420	8	2980
4	480	9	2600
5	960	10	3840



5.8 BORE, BUSH & TAPER CLAMPING SLEEVE SHAFT SPECIFICATION

Size	Standard Sleeve Bore	Parallel Reducing Bush Bore	Alternative Sleeve Bore	Taper Clamping Bush Bore	Alternative Size Taper-Clamping Bush Bores
1	30	35* 32* 25 20	40	30	25 20†
2	40	45* 42* 35 32 30	50	40	35 30 25†
3	50	45* 42* 40 38	55	50	45 40 35†
4	55	60* 50* 45 42	65	55	50 45 40†
5	65	70* 60* 55 50	75	65	60 55 50 45†
6	75	80* 70* 65* 60	85	75	70 65 60 55†
7	85	95* 90* 80* 75 70	100	85	80 75 70 65† 60†
8	100	110* 95* 90	120	100	90 80† 75† 70†
9	120	110* 100* 95* 90		120	100 90† 80† 70†

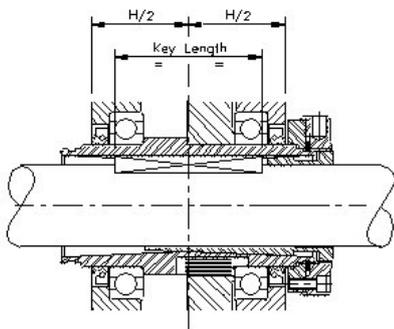
Inch bore sizes are available.

Parallel bore reducing bushes are available with alternative sleeve bore unit only.

Size	Max. Sleeve Bore	Alternative Sleeve Bore	Taper - Clamping Bush Bore	Alternative Size Taper-clamping Bush Bores
10	125	Bored to customer requirements Consult Renold Gears	125	100 90 80
11	150		N/a	
12	190		N/a	

Sleeve and Bush Bores to F7 limits.
 Recommended shaft tolerance j7.
 Keyways to B. S. 4235 for metric shafts and B. S. 46 for inch shafts
 Taper clamping sleeves are suitable for shafts to h11 tolerances.
 Keys are supplied for sleeve to bush.
 * Non-standard shaft keys supplied for bushes marked *.
 † Non-standard shaft keys supplied for taper clamping bushes marked †.

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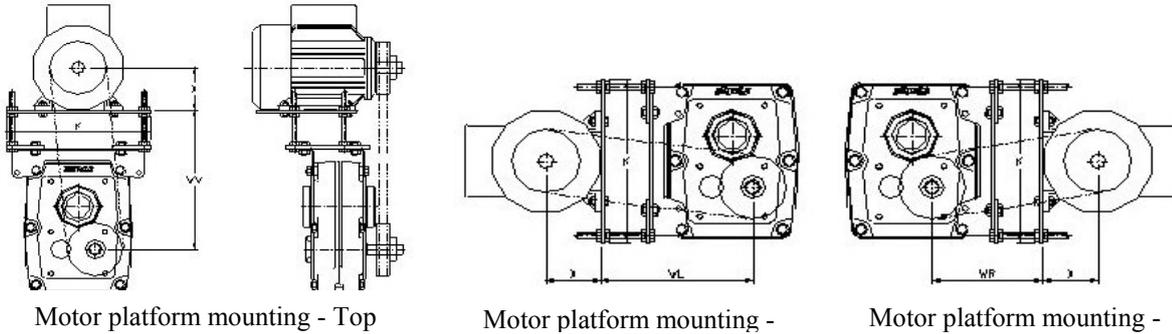
SM	H/2	Key length Both Ends Rounded
1	52	70
2	54	70
3	59	90
4	65	100
5	74.5	100
6	86	120
7	95	140
8	98.5	150
9	106	160
10	111	160

Metric Shaft Ø	Key
20	6 X 6
25	8 X 7
30	8 X 7
32	10 X 8
35	10 X 8
38	10 X 8
40	12 X 8
42	12 X 8
45	14 X 9
50	14 X 9
55	16 X 10
60	18 X 11
65	18 X 11
70	20 X 12
75	20 X 12
80	22 X 14
85	22 X 14
90	25 X 14
95	25 X 14
100	28 X 16
110	28 X 16
120	32 X 18
125	32 X 18

Keyways on shafts should be machined to standard depths appropriate to the key size shown against the shaft diameter.

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5.9 MOTOR MOUNTING PLATFORMS



Motor platform mounting - Top

Motor platform mounting -

Motor platform mounting -

Size	Motor Frame Sizes	K	WL		WV		WR	
		Max	Min	Max	Min	Max	Min	Max
1	D71 D80 D90S D90L D100L	284	165	246	202	283	112	193
2	D71 D80 D90S D90L D100L D112M	284	197	277	242	322	131	211
3	D71 D80 D90S D90L D100L D112M	332	223	302	286	365	148	217
4	D132S D132M	332	227	320	290	283	152	235
	D71 D80 D90S D90L D100L D112M		241	320	311	390	152	231
5	D80 D90S D90L D100L D112M	392	261	340	336	415	162	241
	D132S D132M D160M D160L		265	358	340	433	166	259
6	D90S D90L D100L D112M	440	289	367	370	448	175	253
	D132S D132M D160M D160L		293	385	374	468	179	271
	D180M D180L		299	417	380	498	185	303
7	D90L D100L D112M	490	330	408	397	475	154	232
	D132S D132M D160M D160L		334	426	401	493	158	250
	D180M D180L		340	458	407	525	164	282
	D200L		346	513	413	580	170	337
8	D100L D112M	550	394	472	561	639	242	320
	D132S D132M D160M D160L		398	490	565	657	246	338
	D180M D180L		404	522	571	689	252	370
	D200L D225S D225M		410	577	577	744	258	425
9	D132S D132M D160M D160L	550	428	520	598	690	247	339
	D180M D180L		434	552	604	722	253	371
	D200L D225S D225M		440	607	610	777	259	426
10	D132S D132M D160M D160L	550	473	565	630	722	275	367
	D180M D180L		479	597	636	754	281	399
	D200L D225S D225M		485	652	642	809	287	454

Belt Drive Minimum Centre Distance = W (min) + X + Y

X = Motor Frame Size (e.g. X = 90 for a D90S or D90L)

Y = Belt Fitting Allowance = 20mm for SPZ, 25mm for SPA, 30mm for SPB and 50mm for SPC belts.

Motors larger than those listed above for each size are not suitable for this arrangement and should be mounted independently.

Motor Mounting

The Renold SMXtra motor platform provides a rigid base designed to accept a wide range of motor frame sizes.

Available in all unit sizes, the motor platform has sufficient adjustment available to ensure a standard belt can be fitted and re-tensioned as required during its working life.

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5.10 INSTALLING GEAR UNITS FITTED WITH SPRAG BACKSTOP

TO INSTALL BACKSTOP – Use positions 1 and 2 only in 6.2

If reducer is filled with oil, drain off oil before proceeding further. Remove backstop cover and gasket. Determine direction of required shaft rotation. The shaft is free to rotate in the direction of the arrow marked on the backstop cage. If the opposite direction of rotation is required, turn the backstop and outer race end for end. Feed the assembly into the housing, rotating the shaft in its free direction. When the outer race is fully home rotate the shaft in its backstopping direction, if the assembly is correct the outer race will now rotate with the shaft, use this to align the keyways. Slide in key, replace gasket and cover and refill reducer with correct grade of oil.

IMPORTANT

When pressing the backstop into the housing it is important not to hammer the assembly at any time. The assembly may be tapped gently if necessary.

6. LUBRICATION

NOTE: Units are supplied without oil unless requested when the order for the gear unit is placed.

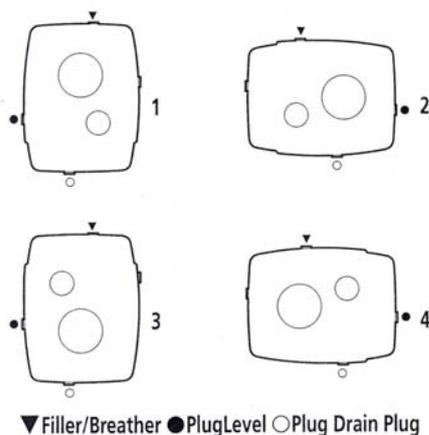
6.1 GEAR UNIT LUBRICATION REQUIREMENTS

If an initial first filling of oil is required to be supplied alongside the gear unit, Renold Gears will supply the recommended lubricant in the correct quantity for the mounting position. The lubricant will be supplied in oil containers separate to the gear unit.

Where the first filling of oil is to be carried out by the customer, a recommended grade of lubricant should be used. (Refer to Appendix C.) Use the tables as a guide to the quantity of lubricant required dependant upon the gear units mounting position and application.

6.2 LUBRICATION QUANTITIES

Use the tables below as a guide to the quantity of lubricant required dependant upon the gear units mounting position and application.



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OIL QUANTITIESOil Quantities (Litres)
Mounting Position

Unit Size	1	2	3	4
SMX1	0.5	0.5	0.4	0.5
SMX2	0.8	0.9	0.7	0.9
SMX3	1.1	1.4	1.2	1.4
SMX4	1.6	2.0	1.8	2.0
SMX5	2.4	3.0	2.4	3.0
SMX6	3.4	4.6	3.0	4.6
SMX7	5.1	7.2	5.4	7.6
SMX8	7.1	14.7	8.9	15.0
SMX9	11.0	20.0	13.0	21.0
SMX10	15.0	22.0	17.0	23.0
SMX11	23.0	38.0	28.0	39.0
SMX12	33.0	53.0	41.0	53.0

6.3 RECOMMENDED LUBRICANTS

A list of the approved lubricants is included in Appendix E of this manual.

6.4 APPLYING LUBRICATION TO THE GEAR UNIT

NOTE: *Care should be taken to avoid overfilling the gear unit.*

When the gear unit has been installed, the unit must be filled with oil before running, using the following procedures:-

- I. Refer to the table in Appendix C to find a recommended lubricant type for the gear unit.
- II. Refer to the table in Section 6.2 for a guide to the quantity of lubricant which will be necessary for the filling process.
- III. Remove the filler/breather and oil level plugs from the gear unit. (See Appendix A for plug identification for the relevant mounting position.)
- IV. Fill the unit using the filler/breather plug opening until the lubricant is at the same height as the bottom of the threads or overflowing at the oil level aperture.
- V. Wait for a full minute to ensure that the lubricant level is static, and if necessary top up to the required level.
- VI. When the lubricant has settled at the correct level, replace and secure both the oil level and oil breather/filler plugs.

6.5 DRAINING LUBRICATION FROM THE GEAR UNIT

NOTE: *Do not run the unit without lubrication.*

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WARNING: *Do not drain lubrication out of the gear unit immediately after running. Oil temperatures can typically reach 90° C and higher. Allow the lubricant to cool to ambient temperature before draining, to minimise the risk of injury.*

- I. Ensure that the gearing is stationary.
- II. Place a suitable container underneath the drain plug of the unit.
- III. Remove the oil filler/breather plug from the gear unit.
- IV. Remove the oil drain plug from the gear unit.
- V. When the unit is fully drained of lubricant, replace and secure the oil drain plug.
- VI. Refill the gear unit using the technique described in Section 6.4

7. RUNNING-IN OF GEAR UNITS

Prior to despatch, all units are subjected to a short running-in period. However, many hours of running under full load are required for the unit to attain its maximum efficiency.

Where necessary, the gear unit may be put to work immediately; but where possible it is advantageous, with regards to the overall life of the gear unit, for the gearbox to be run in under gradually increasing loads, until full load is attained after a period between approximately 20 to 40 hours.

Reasonable precautions should be taken to assure that overloads do not occur during the early stages of running the gear unit.

8. GEAR UNIT ROUTINE MAINTENANCE

8.1 PERIODIC INSTRUCTIONS

The main inspections which are required for the gear unit are as follows:-

- I. The oil level in the unit should be checked weekly. To avoid false readings the level should be checked with the gears stationary. When necessary, top up to the required level, using the same lubricant that is already being used in the unit. Refer to Section 6.4 for the correct filling and topping up procedure.
- II. The filler/breather plug must be examined at least once a month to ensure that the breather hole is free from dirt or grease. Clean if required.
- III. Check for any lubricant leaking from the unit. Leakage from any of the plugs in the unit can be solved by removing the plug (drain the unit if necessary), add a suitable sealing medium to the threads of the plug, and re-fit the plug to the gear unit. If leaking is apparent from any other location, please note the position and contact your nearest outlet (Addresses are displayed on the back cover.)

8.2 ENHANCED SEALING

SMXtra units are available with an enhanced seal feature which provides extra unit protection when being used in a hostile environment. The enhanced seal feature is designed to be a grease barrier between the contaminated atmosphere and the gear unit oil seals. The enhanced seal design as shown in 3.2 is available as follows:-

I. Dust Exclusion on Input and Output

To maintain the grease barrier, clean grease should be pumped into the seal labyrinth by means of a grease gun. The purging of contaminated grease should be carried out

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every 1000 hours or on a time scale dictated by the amount of atmospheric contamination and high ambient temperatures.

When grease appears from the enhanced seal, all contaminated grease should be wiped away with a clean cloth.

II. Oil Retention on the Input (only)

Input shaft – A small amount of grease should be held captive between the inner and outer oil seals providing a grease barrier and lubrication to the outer lip of the oil seal. A small amount of new grease should be pumped into the grease point every 1000 hours depending on shaft speed and external conditions.

8.3 RENEWING THE LUBRICANT

Note: *A gear units first filling of lubrication should be changed after 200 hours to remove any loose material produced during the bedding-in of the gears.*

Subsequent oil changes will depend upon the working conditions, giving consideration both to the loading of the gear unit and also to the environment where the unit is located. For example a dust laden atmosphere would require frequent monitoring and oil changes. As a guide, it is recommended to change the lubrication at 12 monthly intervals, under normal running conditions. Regular lubricant changes are essential to maintain the efficiency of the gear unit. If there is any doubt, then please contact your oil supplier. All major suppliers of lubricants offer a free advisory service.

9. VEE BELT TENSIONING

Most vee belt manufacturers recommend a 16mm deflection at mid span to indicate correct tension in the belts. After the first 30 minutes running, the belts should be retensioned by the unit torque arm or motor platform screws.

Over tensioning of the belts can cause excessive loads on the input bearings and premature failure may result.

10. STORING THE GEAR UNIT

Gear units which are to be stored or left inactive for long periods of time should be adequately protected, particularly those units situated on exposed sites and/or operating in corrosive or salty atmospheres.

The following precautions will generally be adequate for protecting the unit, but advice concerning the protection of particular units can be given if required.

10.1 SHORT TERM STORAGE (UP TO 12 MONTHS)

- I. The location should be free from vibration, otherwise brinelling could take place, particularly between bearing rolling elements and raceways, leading to noisy operation and early failure in service. Wherever possible, the shafts of the unit should be rotated at least once a week, by hand if necessary, to prevent brinelling.
- II. All external finish machined and unprotected surfaces should be spray coated with a anti-corrosion rust inhibitor.
- III. After spraying, all shafts should be wrapped in anti-corrosion rust inhibitor paper.
- IV. Where the unit is empty of oil, spray the gearcase interior with rust preventative oil, which is compatible with the recommended lubricant.
- V. Where the unit is filled with oil, operate at full speed once per month for not less than 10 minutes, to ensure that all of the internal components receive a liberal coating of oil.

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10.2 LONG TERM STORAGE (FROM 12 MONTHS UP TO 2 YEARS)

- I. The location should be free from vibration, otherwise brinelling could take place, particularly between bearing rolling elements and raceways, leading to noisy operation and early failure in service. Wherever possible, the shafts of the unit should be rotated at least once a week, by hand if necessary, to prevent brinelling.
- II. Apply Denso paste and tape to all external finish machined and unprotected surfaces, including shaft extensions, ensuring full coverage to lip of oilseal.
- III. Completely fill the unit with oil, ensuring complete submersion of all internal components. When the unit is returned to service, drain and refill with new lubricant to the correct level (Sections 6.4 & 6.5).

Gear units can be prepared by Renold Gears for long term storage provided that this requirement is stipulated on the order before delivery. Gear units will not be filled with oil, therefore the interior of the unit would be sprayed with rust preventative oil.

11. SPARE PARTS

Information relating to spare parts can be obtained from the distributor of the unit.

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12. ATEX APPROVAL

Renold Gears products for operating in potentially Explosive Atmospheres.

12.1 GENERAL

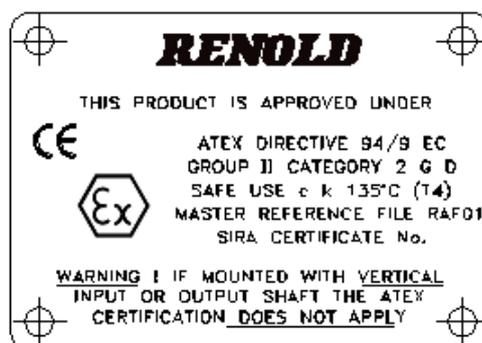
- Renold Gears units are classified as ATEX Group II Category 2 equipment, which embodies sufficient safeguards to be suitable for use in potentially explosive atmospheres for normal operation and for operation during an expected malfunction.
- It is essential that there is sufficient lubricant to prevent 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.

12.2 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.

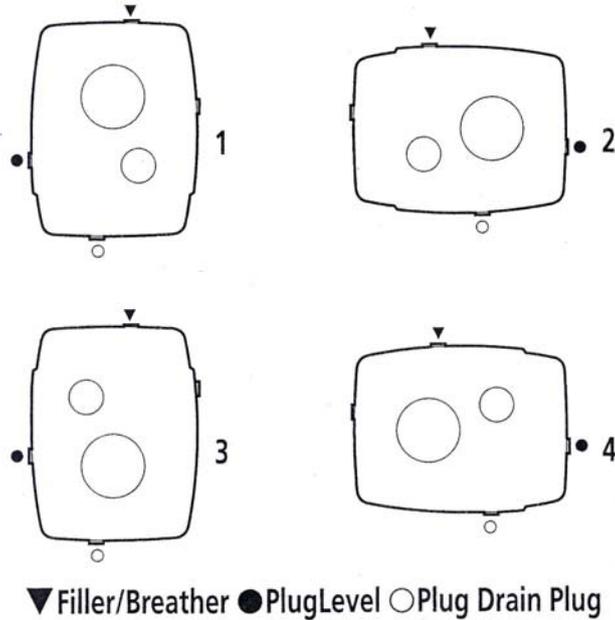
12.3 ATEX NAMEPLATE.



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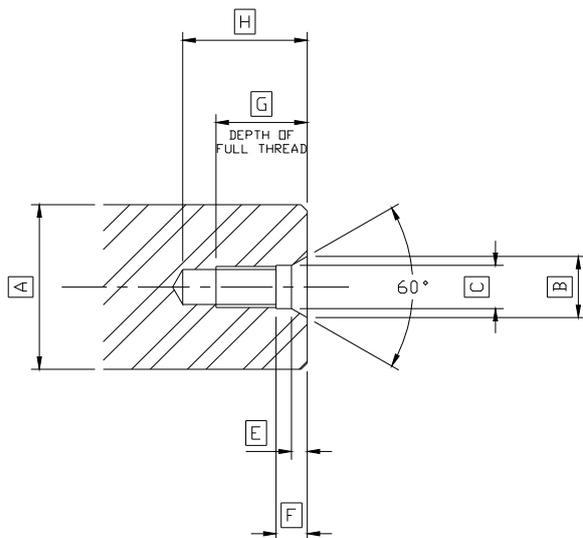
Appendix A

HELICAL SHAFT MOUNTED GEAR UNIT MOUNTING CODES AND PLUG POSITIONS



Appendix B

SHAFT END TAPPED HOLE DETAIL



A' SHAFT DIA ABOVE	UP TO & INCLUDING	B	C	E	F	G +2 -0	H (MIN)	TAP
13	16	8.1	5.3	2.4	4	12.5	17	M5x0.8-6H
16	21	9.6	6.4	2.8	5	16	21	M6x1.0-6H
21	24	12.2	8.4	3.3	6	19	25	M8x1.25-6H
24	30	14.9	10.5	3.8	7.5	22	30	M10x1.5-6H
30	38	18.1	13	4.4	9.5	28	37.5	M12x1.75-6H
38	50	23	17	5.2	12	36	45	M16x2.0-6H
50	85	28.4	21	6.4	15	42	53	M20x2.5-6H
85	140	34.2	25	8	18	50	63	M24x3.0-6H
140	225	40.4	31	11	21	60	75	M30x3.5-6H

DIMENSIONS IN MILLIMETRES

* FOR SIZES 10-13 DIA. SHAFT
TO BE USED WITH FEATHER KEYWAY ONLY

SIZES UP TO 130 DIA. SHAFT
IN ACCORDANCE WITH DIN 322 SHEET 2 (OCTOBER 1970)

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Appendix C

RECOMMENDED LUBRICANTS

When installed and before running, the unit should be filled with new lubricant to the correct level (see Section 6.4)

A first filling of oil is available from Renold Gears at the time of supplying the unit. To ensure that the correct grade and quantity of lubricant is obtained, we strongly recommend this service. This is a synthetic type lubricant and must be used to obtain the maximum performance from the gear unit.

NOTE: *The power ratings listed in the SMXtra catalogue are those which the unit will produce only when the preferred Renold lubricant is used.*

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.

Oils with three viscosity ranges (Light, medium and heavy) are listed below, the correct choice depends on the application operating speed, load and temperature. Operating temperature and speed can often be the main factor as they effect 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 require medium grade.

Using too heavy a grade oil than required will result in reduced efficiency, too light a grade will result in premature wear, if in doubt ask Renold Gears Technical Department. Heavy grade oils are shown for reference only.

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 and have a longer life. The use of EP additives in oil where applicable can improve the performance and therefore are recommended.

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.

If a Sprag Clutch backstop is fitted internally to the gear unit, oils with EP type additives must not be used.

The oils marked * in the following tables are all suitable for use with Sprag Clutch backstops.

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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 Gear XMP	220	-13 to 100	320	-13 to 100	460	-1 to 100
Castrol Alpha ZN *	220	-9 to 120	320	-9 to 120	460	-9 to 120
Castrol Alpha SP	220	-21 to 120	320	-21 to 120	460	-6 to 120
Castrol AlphaMax	220	-24 to 120	320	-18 to 120	460	-15 to 120
Shell Vitrea *	220	-24 to 120	320	-18 to 120	460	-15 to 120
Shell Omala F	220	-9 to 120	320	-9 to 120	460	-9 to 120
Shell Omala	220	-9 to 120	320	-9 to 120	460	-9 to 120
Esso Tresso *	220	-18 to 120	320	-12 to 120	460	-9 to 120
Esso Spartan EP	220	-30 to 120	320	-27 to 120	460	-18 to 120
Kluberoil GEM 1 *	220	-18 to 100	320	0 to 100	460	0 to 100

Oils specifications can vary world wide therefore it may be necessary to check locally with your oil supplier.

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
Mobil Gear SHC XMP	220	-42 to 160	320	-42 to 160	460	-39 to 160
Castrol Alpha EP	220	-42 to 150	320	-36 to 150	460	-20 to 150
Castrol Alpha T *	220	-36 to 150	320	-33 to 150	460	-33 to 150
Shell Omala HD	220	-40 to 150	320	-40 to 150	460	-40 to 150
Shell Omala RL *	220	-40 to 80	320	-40 to 80	460	-40 to 80
Esso Spartan Synthetic EP	220	-27 to 120	320	-27 to 120	460	-18 to 120
Esso Teresso SHP	220	-42 to 150	320	-36 to 150	460	-30 to 150
Klubersynth EG 4	220	-30 to 160	320	-30 to 160	460	-25 to 160

Oils specifications can vary world wide therefore it may be necessary to check locally with your oil supplier.

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IMPORTANT INFORMATION YOU MUST READ

Product Safety Information of *RENOLD* Gear Products

Important Notes

Always isolate the power source from the drive or the equipment.
Always wear protective clothing, safety glasses, hats, gloves, ear protectors and safety shoes as warranted by the circumstances.
Always ensure tools are in good working condition and use as directed by the manufacturer.
Loosen all tension devices.
Ensure that the correct lubrication is used prior to commissioning.

Customers are reminded that when purchasing any technical product for use at work (or otherwise), any additional or up-to-date information and guidance, which it has not been possible to include in the publication, should be obtained from your local sales office in relation to the suitability and the safety and proper use of the product.

All relevant information and guidance must be passed on by you to the person engaged in, or likely to be affected by or responsible for the use of the product.

Potential Hazards

There are a number of hazards that must be avoided when installing, maintaining and repairing Renold Gear units. The following are suggested safety guides when undertaking any of the above.

Hot surfaces and lubricants.

After prolonged running, a gear unit can generate high temperatures and can create surface temperatures that could burn the skin. Do not drain the oil from a gear unit that has been run for a prolonged period because the oil will be hot and could burn the skin. Allow the oil to cool, prior to draining.

Fire and Explosions.

A gear unit creates an oil mist or vapour internally after prolonged running and can be a fire and explosion risk if a naked flame is in close proximity. Allow the unit to cool prior to opening the unit. Flames or high running temperatures can burn or melt rubber compounds and melt plastic compounds and produce dangerous fumes. These compounds should be avoided until cool and then handled with protective gloves.

Guards

All rotating parts must be guarded with suitable guards, secured to the gear unit or machine frame.

Lifting

Lifting lugs or lifting points to suit eyebolts are provided on all Renold gear units. These must be used at all times.

Noise

Gear units run at high speed can create noise levels damaging to hearing. Ear protectors should be worn if there is a possibility of prolonged exposure to these conditions.

Lubrication.

The Installation & Maintenance Guide include the various types and quantities/ types of oils to be used in Renold gear units. These must be followed at all times.

Electrical Equipment

Follow all associated manufacturers instructions and always isolate all electrical equipment prior to carrying out any work.

Holdback/ Backstops

Failure of a backstop when fitted to the gear unit could result in personnel injury and machine damage. Secondary back-up systems must be provided.

Installation Maintenance and Storage.

Full Installation & Maintenance instructions are included in this document. Failure to follow the instructions could result in failure of the gear unit and / or damage to the equipment onto which it is being installed.

Short and long term storage instructions have been included in this Installation & Maintenance Guide.

General

All information contained in this document is subject to change without notice.

The right is reserved to make modifications to the product to meet manufacturing conditions and/or developments (for example in design or materials)

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WORLDWIDE SALES AND SERVICES

AUSTRALIA

Melbourne (Victoria)
TEL: +61 (0) 3 9262 3333
FAX: +61 (0) 3 9561 8561
EMAIL: melcag@renold.com.au

AUSTRIA

Vienna
TEL: +43 (0) 1 3303484 0
FAX: +43 (0) 1 3303484 5
EMAIL: office@renold.at

BELGIUM

Gent
TEL: +32 (0) 9 242 95 50
FAX: +32 (0) 9 242 95 59
EMAIL: info@renold.be

CANADA

Brantford (Ontario)
TOLL FREE: 1-800-265-9970
TEL: +1 519 756 6118
FAX: +1 519 756 1767
EMAIL: inquiry@renoldcanada.com

CHINA

Shanghai
TEL: +86 21 5046 2696
FAX: +86 21 5046 2695
EMAIL: sales@renold.cn

CZECH REPUBLIC

Zlin
TEL: +42 (0) 606 727 811
FAX: +42 (0) 577 240 324
EMAIL: renold.zlin@volny.cz

DENMARK

Hvidovre
TEL: +45 43 452611
FAX: +45 43 456592
EMAIL: infor@renold.com

FRANCE

Seclin
TEL: +33 (0) 320 16 29 29
FAX: +33 (0) 320 16 29 00
EMAIL: contact@brampton-renold.com

GERMANY

Mechernich
TEL: +49 2256 959074
FAX: +49 2256 959169
EMAIL: renold.deutschland@renold.com

HOLLAND

Amsterdam
TEL: +31 (0) 20 614 6661
FAX: +31 (0) 20 614 6391
EMAIL: info@renold.nl

KOREA

Seoul
TEL: 00-822-783-6829
FAX: 00-822-784-9322
EMAIL: sslcorp@chollian.net

MALAYSIA

Selangor Darul Ehsan
TEL: +60 3-5122 7880
FAX: +60 3 5122 7881

NEW ZEALAND

Auckland
TEL: +64 (0) 9 828 5018
FAX: +64 (0) 9 828 5019
EMAIL: aksales@renold.co.nz

SINGAPORE

TEL: +65 6760 2422
FAX: +65 6760 1507
EMAIL: sales@renold.sg

SOUTH AFRICA

Benoni
TEL: +27 (0) 11 747 9500
FAX: +27 (0) 11 747 9501
EMAIL: renold@iafrica.com

SPAIN

Barcelona
TEL: +34 93 638 05 58
FAX: +34 93 638 05 58
EMAIL: renold@renold-hitec.com

SWEDEN

Hvidovre
TEL: +45 43 452611
FAX: +45 43 456592
EMAIL: infor@renold.com

SWITZERLAND

Dubendorf
TEL: +41 (0) 44 824 8484
FAX: +41 (0) 44 824 8411
EMAIL: duebendorf@renold.com

USA

Westfield, NY
TEL: +1 716 326 3121
FAX: +1 716 326 6121
EMAIL: ainfo@renoldajax.com

RENOLD Gears
Holroyd Gear Works
Station Road
Milnrow
Rochdale
Lancashire, OL16 3LS
England

TEL: +44 (0) 1706 751000
FAX: +44 (0) 1706 751001
EMAIL: gears.sales@renold.com
WEB: www.renold.com