

SMX^{tra}

Shaft mounted helical gear units



RENOLD
Superior Gear Technology

www.renold.com

RENOLD SMX^{tra} - Product Features

Hardened and profile ground helical gears for maximum power transmission, smooth operation and long life, with maximum efficiency.

Parallel and taper bore output options available, allowing easy removal for replacement or repair.

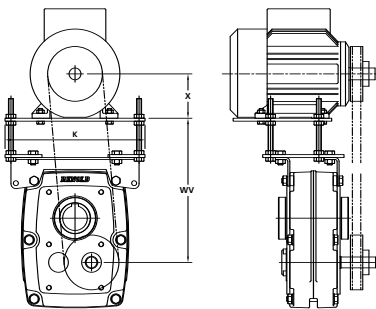
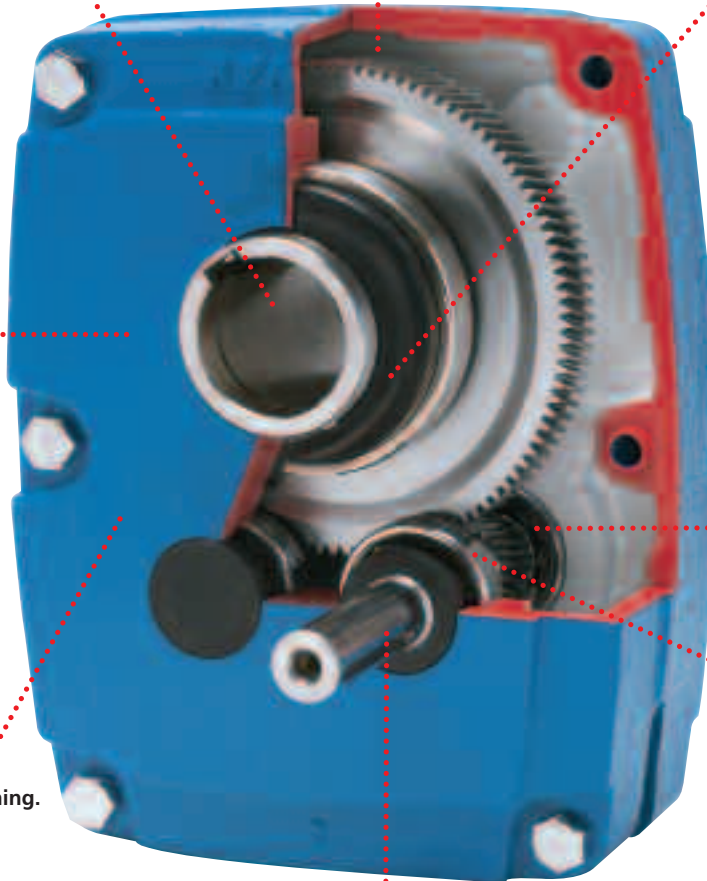
Enhanced seal options on input and output for use in hostile environment applications.

Fully machined face on both sides of the gear unit for face mounting options.

Sprag clutch backstop option to prevent drive reversal.

Close grain cast iron gear case giving robust strength, quiet and vibration free running.

High capacity heavy duty roller bearings for trouble free operation and maximum load carrying capacity.

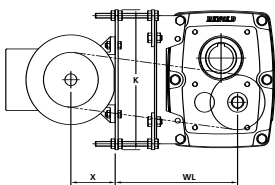


Motor platform mounting - Top

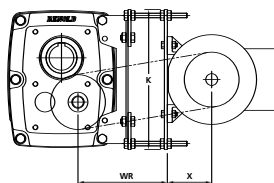
Heavy duty input shaft manufactured in high tensile alloy steel, suitable for all overhung load conditions.



Taper clamping bush with locking nut.



Motor platform mounting - Left



Motor platform mounting - Right

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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



RENOLD SMX^{tra} - General Specification

The **RENOLD SMX^{tra}** range of helical shaft mounted units comes from the same family as **RENOLD**, PM Series, TW and Carter units sharing their enviable reputation for quality and service.

SMX^{tra} units are available as single and double reduction and offer Gear Ratios up to 25:1, with a full power range from 2.0kW to 235kW.

Hardened, profile ground single helical gears and high capacity bearings ensure maximum power transmission, maximum load carrying capacity and longer life.

SMX^{tra} gear units are ideal for heavy duty hostile environments and provide an ideal drive for many different types of machinery. Mounted directly on the driven machine shaft they eliminate completely all alignment problems, as there is no need for base plates, slide rails, support structures and couplings.

The range of output speeds, between 10 and 400 rev/min, is obtained by selecting the appropriate shaft mounted unit in association with a primary V belt drive and a 4 pole motor.

Torque reaction is normally restrained by the standard torque arm which also allows easy adjustment of input V belt drives.

When required however, torque action can be restrained by bolting the gear unit directly onto the driven machine frame. In such cases the standard torque arm will not be supplied but an alternative motor mounting platform (allowing necessary V belt adjustment) can be provided. Details of motor mountings are shown on page 20.

Sprag Clutch Backstop

As a means of preventing driven mechanisms from running back, it is possible for all units to be supplied with a Sprag Clutch Backstop.

Gear Case

The gear case, of sturdy construction, is made from high quality close grained cast iron, a tough durable metal of good surface finish, accurately machined and bored using state-of-the-art CNC machinery centres, ensuring the gears stay in perfect mesh.

Gears

All gears are single helical form, precision cut from alloy case-hardening steel, hardened and profile ground to a high degree of accuracy to ensure maximum mechanical efficiency and quietness of operation.

Bearings

High quality metric ball and roller bearings are fitted, which adequately provide for the loads involved. Roller bearings are fitted on unit size 10 throughout.

Lubrication

A positive lubrication system ensures a continuous flow of oil onto the gears and bearings. Oil filler/breather level and drain plugs are provided. Efficient oil seals are provided on input shaft and output sleeve.

Output Bore Options

The **SMX^{tra}** unit is available with a standard parallel output bore and alternative bore options, see page 16. When smaller bores are required, reducer bushes will be used.

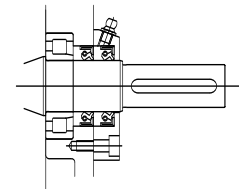
Taper Clamping bore fittings are also available with a single taper bush and a double taper sleeve bore, allowing the taper bush to be fitted from either side of the unit.

See page 16 for bore size options.

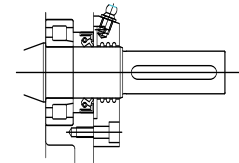
Enhanced Seal

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.

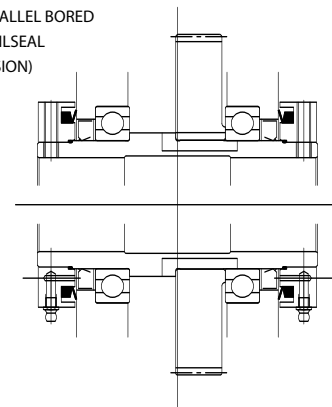
INPUT SHAFT
AUXILLIARY OILSEAL
(OIL RETENTION)



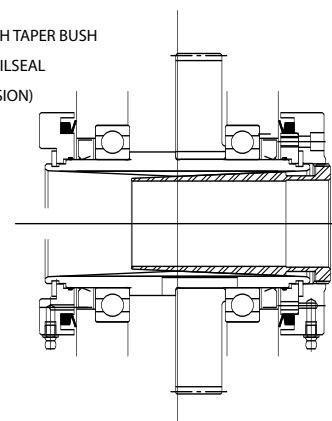
INPUT SHAFT
AUXILLIARY OILSEAL
(DUST EXCLUSION)



OUTPUT - PARALLEL BORED
AUXILLIARY OILSEAL
(DUST EXCLUSION)



OUTPUT - WITH TAPER BUSH
AUXILLIARY OILSEAL
(DUST EXCLUSION)

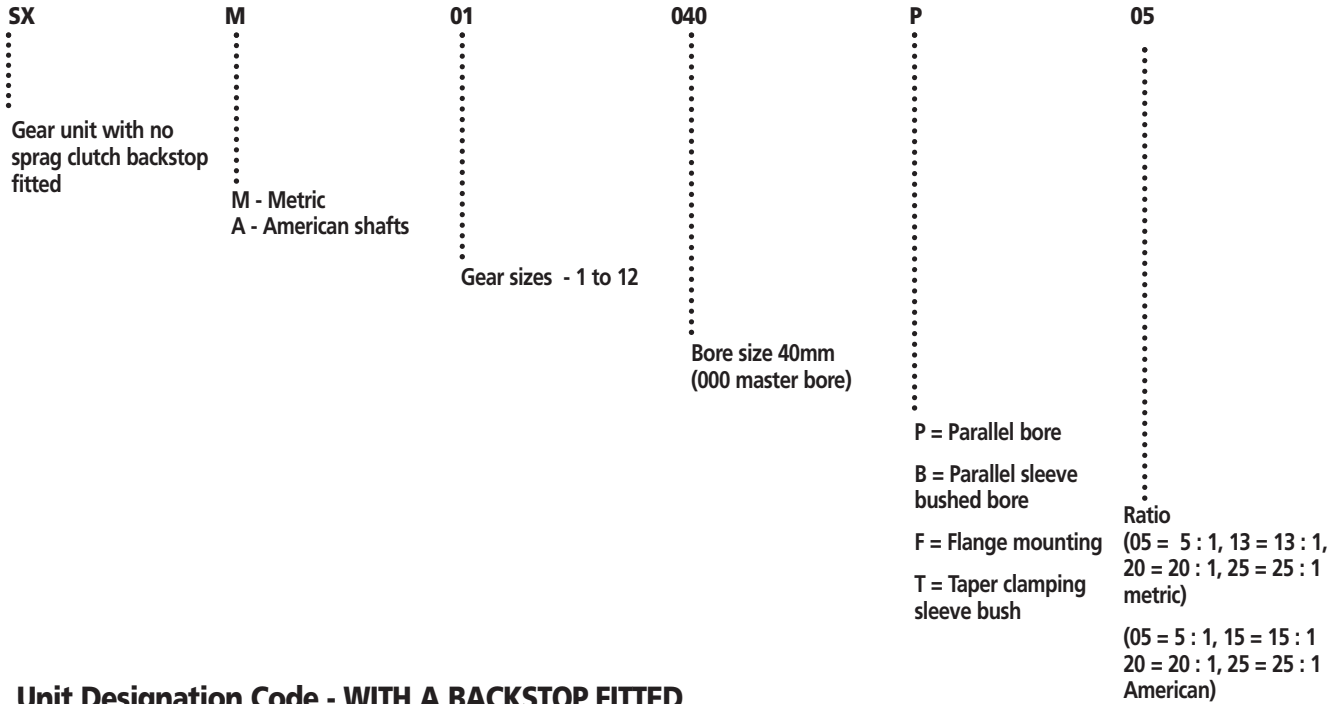


ENHANCED SEALING FOR SMX SERIES SHAFT MOUNTED GEAR UNITS

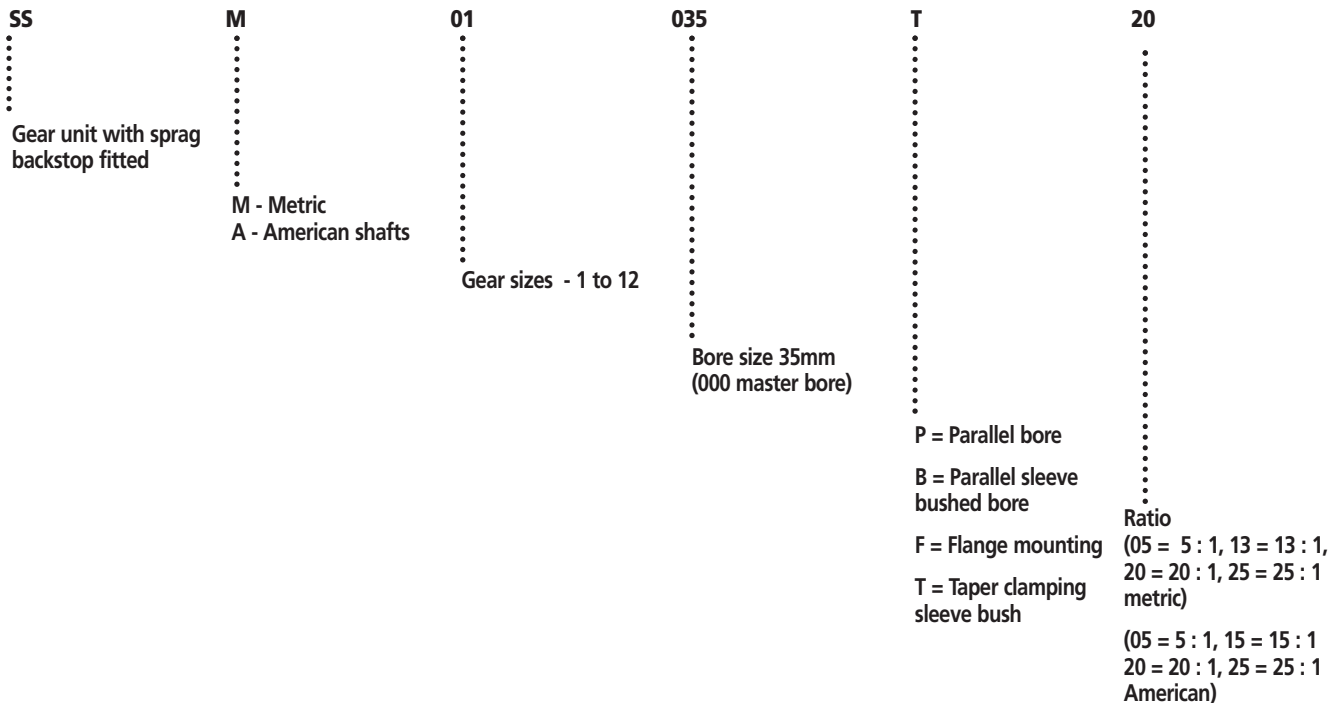
RENOLD SMX^{tra} Ordering Procedure - Unit Designation Code

To ensure that the correct **SMX^{tra}** Series unit is supplied and that your order is processed without delay, please quote the full designation code as detailed below:

Unit Designation Code - NO BACKSTOP FITTED



Unit Designation Code - WITH A BACKSTOP FITTED



Selection of **RENOLD SMX^{tra}** Units

Selection Procedure

1. Determine required output speed.
2. Determine power absorbed by driver machine.

$$\text{Absorbed power (kW)} = \frac{\text{Absorbed torque (Nm)} \times \text{Machine speed (rev/min)}}{9550}$$
3. Determine service factor from table 2.
4. Multiply absorbed power by the service factor to obtain the selection power.
5. Using the table on page 9, select the smallest unit that is capable of transmitting the selection power at the required output speed.
6. Primary belt drives can be selected from the pages 10 to 13 by reading across from the appropriate output speed for the size of gear box determine at step 5.
7. Complete V belt drives can be supplied incorporating standard belts to B.S. 3790 to meet any reasonable centre distance. The required centre distance between motor and gear unit input shaft should be stated on order or enquiry.

Enquiry

A torque of 775 Nm is required to drive an inclined conveyor headshaft at 60 revs/min. The conveyor is non-uniformly fed and will be operated for 8 hours/day. A 5.5 kW electric motor is the prime mover.

$$\text{Absorbed power} = 775 \times 60 / 9550 = 4.87 \text{ kW}$$

Service factor for 8 hrs/day, medium impulsive drive 1.25

$$\text{Selection power} = 4.87 \times 1.25 = 6.09 \text{ kW}$$

From page 9, at 60 revs/min a size 4 **SMX^{tra}** double reduction gear at 9.41 kW is the smallest unit for the application.

The tables on page 11 can be used to select the gear ratio and belt drive:-

A size 4 **SMX^{tra}** unit 20:1 ratio, at 60 revs/min would require a 125mm motor pulley driving a 150mm gear unit pulley using two SPA belts.

It is possible that this application would require a unit fitted with a hold-back device.

The selected unit, fitted with a sprag clutch, will be size 4, suitable for mounting on a 55mm shaft, having a parallel bored sleeve, and be of 20:1 ratio. Order code SSM04055P20.

Service Factors

Table 2

Prime mover (Drive input)	Duration of Service hours/day	Driven machinery characteristics		
		Steady	Medium impulsive	Highly impulsive
Electric motor (Steady input)	Intermittent- 8hrs/day max	0.90	1.00	1.25
	8 - 16	1.00	1.25	1.50
	over 16	1.25	1.50	2.00
Multi-cylinder I.C. engine (Medium impulsive input)	Intermittent- 8hrs/day max	1.10	1.35	1.90
	8 - 16	1.25	1.50	2.00
	over 16	1.50	1.75	2.25
Single-cylinder I.C. engine (Highly impulsive input)	Intermittent- 8hrs/day max	1.35	1.65	2.00
	8 - 16	1.50	1.75	2.25
	over 16	1.75	2.00	2.50



IMPORTANT

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



It is the responsibility of the system designer to ensure that the application of the Gear Unit does not endanger the other constituent components in the system. Service factors given are an initial selection guide.



Rotating equipment must be provided with a suitable guard before operating or injury may result.

Load Classification by Application

Table 1

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

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.



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

Belt Drive - 1440 Revs/Min Motor Speed

Size 10

Nom Ratio	Nom Output rpm	Pulley Ratio	Pulley Dia		Belt No	Belt Size	
			Motor	Gear			
25	10	5.63	112	630	4	SPA	
	12	5.04	125	630	4	SPA	
	14	4.00	125	500	5	SPA	
	16	3.57	140	500	5	SPA	
	18	3.33	150	500	5	SPA	
	20	2.94	170	500	4	SPB	
	22	2.78	180	500	4	SPB	
	24	2.50	200	500	4	SPB	
	26	2.22	180	400	4	SPB	
	28	2.11	190	400	4	SPB	
	30	2.00	200	400	4	SPB	
	32	1.89	212	400	4	SPB	
	34	1.79	224	400	4	SPB	
	36	1.69	236	400	4	SPB	
	38	1.60	250	400	4	SPB	
	40	1.49	212	315	5	SPB	
	42	1.42	250	355	4	SPB	
	44	1.33	236	315	5	SPB	
46	1.27	236	300	4	SPC		
48	1.25	224	280	5	SPC		
50	1.19	236	280	5	SPB		
52	1.13	265	300	4	SPC		
54	1.12	250	280	5	SPB		
56	1.06	265	280	4	SPC		
20	58	1.26	250	315	5	SPC	
	60	1.20	250	300	5	SPC	
	62	1.19	265	315	4	SPC	
	64	1.13	265	300	4	SPC	
	13	66	1.61	280	450	4	SPC
		68	1.59	315	500	4	SPC
70		1.52	280	425	4	SPC	
72		1.50	300	450	4	SPC	
74		1.48	425	630	3	SPC	
76		1.43	315	450	4	SPC	
78		1.40	400	560	3	SPC	
80		1.35	315	425	4	SPC	
85		1.26	250	315	6	SPC	
90		1.20	280	335	5	SPC	

Size 11

Nom Ratio	Nom Output rpm	Pulley Ratio	Pulley Dia		Belt No	Belt Size	
			Motor	Gear			
25	10	5.71	140	800	4	SPB	
	14	4.21	190	800	4	SPB	
	16	3.71	170	630	4	SPB	
	18	3.32	190	630	4	SPB	
	20	2.97	212	630	4	SPB	
	22	2.64	212	560	4	SPB	
	24	2.50	200	500	5	SPB	
	26	2.25	200	450	5	SPB	
	28	2.12	212	450	5	SPB	
	30	2.00	250	500	5	SPB	
	32	1.80	250	450	5	SPB	
	36	1.61	280	450	5	SPB	
	38	1.51	265	400	4	SPC	
	40	1.49	335	500	3	SPC	
	42	1.42	300	425	4	SPC	
	44	1.34	280	375	4	SPC	
	46	1.27	280	355	4	SPC	
	48	1.20	250	300	5	SPC	
	50	1.19	265	315	5	SPC	
	52	1.13	280	315	5	SPC	
	54	1.07	280	300	5	SPC	
	56	1.05	300	315	5	SPC	
	20	58	1.20	355	425	4	SPC
		60	1.18	300	355	6	SPC
62		1.13	355	400	4	SPC	
13		64	1.70	280	475	5	SPC
		66	1.67	300	500	5	SPC
		68	1.61	280	450	6	SPC
	70	1.58	355	560	4	SPC	
	72	1.51	315	475	5	SPC	
	74	1.49	335	500	5	SPC	
	76	1.43	315	450	5	SPC	
	78	1.41	355	500	5	SPC	
	80	1.35	315	425	6	SPC	
	85	1.27	315	400	6	SPC	
90	1.20	355	425	6	SPC		

Size 12

Nom Ratio	Nom Output rpm	Pulley Ratio	Pulley Dia		Belt No	Belt Size	
			Motor	Gear			
25	10	5.88	170	1000	5	SPB	
	12	5.00	200	1000	4	SPB	
	14	4.24	236	1000	4	SPB	
	16	3.77	212	800	5	SPB	
	18	3.39	236	800	5	SPB	
	20	3.02	265	800	4	SPC	
	22	2.67	236	630	6	SPB	
	24	2.50	224	560	6	SPC	
	26	2.25	280	630	6	SPB	
	28	2.12	250	530	5	SPC	
	30	2.00	315	630	4	SPC	
	32	1.87	300	560	5	SPC	
	34	1.77	300	530	5	SPC	
	36	1.67	300	500	5	SPC	
	38	1.58	355	560	5	SPC	
	40	1.51	315	475	5	SPC	
	42	1.43	315	450	5	SPC	
	44	1.34	335	450	5	SPC	
	46	1.33	400	530	4	SPC	
	48	1.25	400	500	5	SPC	
	50	1.20	355	425	5	SPC	
	52	1.13	375	425	5	SPC	
	54	1.12	335	375	6	SPC	
	20	56	1.07	375	400	6	SPC
58		1.25	400	500	5	SPC	
60		1.20	375	450	6	SPC	
62		1.19	400	475	5	SPC	
13		64	1.68	375	630	6	SPC
		66	1.67	300	500	8	SPC
	68	1.58	355	560	6	SPC	
	70	1.58	400	630	6	SPC	
	72	1.49	375	560	6	SPC	
	76	1.42	335	475	8	SPC	
	78	1.40	400	560	6	SPC	
	80	1.33	400	530	6	SPC	
	85	1.27	355	450	8	SPC	
	90	1.20	375	450	8	SPC	

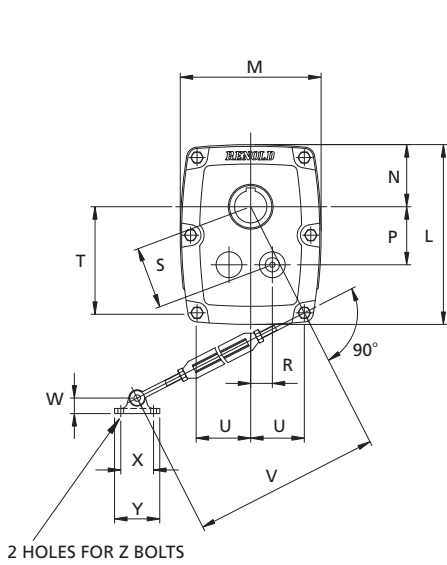
MINIMUM PULLEY DIAMETERS on unit input shaft

Ratios Size	13/1 to 25/1					
	OUTPUT SPEED					
	10	20	40	60	80	100
1	80	80	80	80	90	100
2	80	80	90	90	90	100
3	100	100	100	100	140	140
4	100	100	125	160	160	180
5	118	118	160	160	160	180
6	125	125	160	180	200	236
7	1160	180	224	224	250	300
8	180	200	224	250	300	300
9	200	224	250	300	335	355
10	200	224	250	280	315	315
11	250	280	355	400	400	-
12	300	355	400	400	400	-

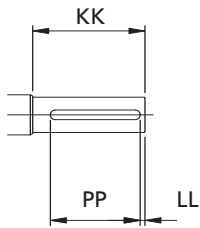
Ratios Size	5/1						
	OUTPUT SPEED						
	100	150	200	250	300	350	400
1	236	200	140	125	125	132	140
2	280	280	200	200	180	160	150
3	280	250	200	200	180	160	150
4	280	250	200	180	180	160	160
5	450	355	300	250	224	224	250
6	400	315	280	250	250	250	250
7	500	400	315	280	280	280	250
8	500	500	425	355	315	300	280
9	500	500	450	400	375	355	315

Speed over 30m/s. Check the pulley specification.

RENOLD SMX^{tra} Dimensions (mm)

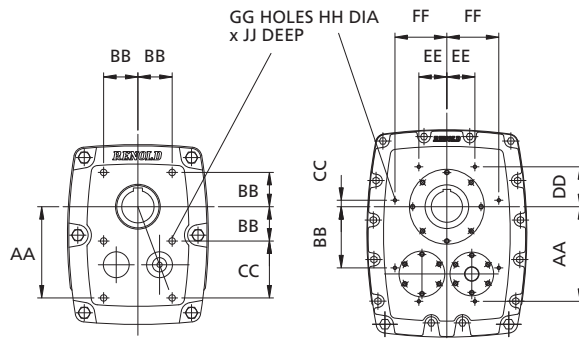


SHAFT MOUNTED



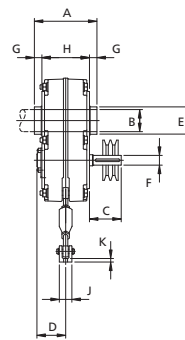
TAPPED HOLE QQ DIA x RR DEEP

INPUT SHAFT

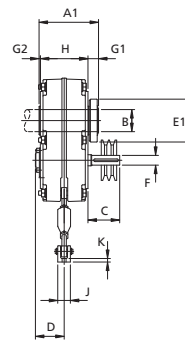


FLANGE MOUNTED
SIZES 1-10
SIZES 1-9

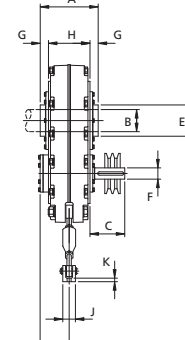
SHAFT &
FLANGE MOUNTED
SIZES 11-12
SIZES 10-12



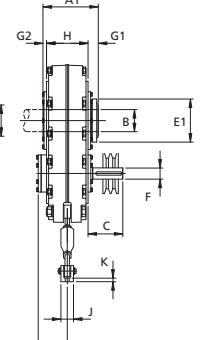
OUTPUT SLEEVE
PARALLEL BORE



OUTPUT SLEEVE
FOR TAPER BUSH
(BUSH CAN BE FITTED
EITHER SIDE OF GEARCASE
-POSITION 'F' SHOWN)



OUTPUT SLEEVE
PARALLEL BORE



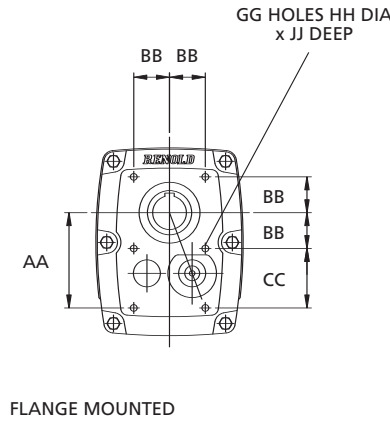
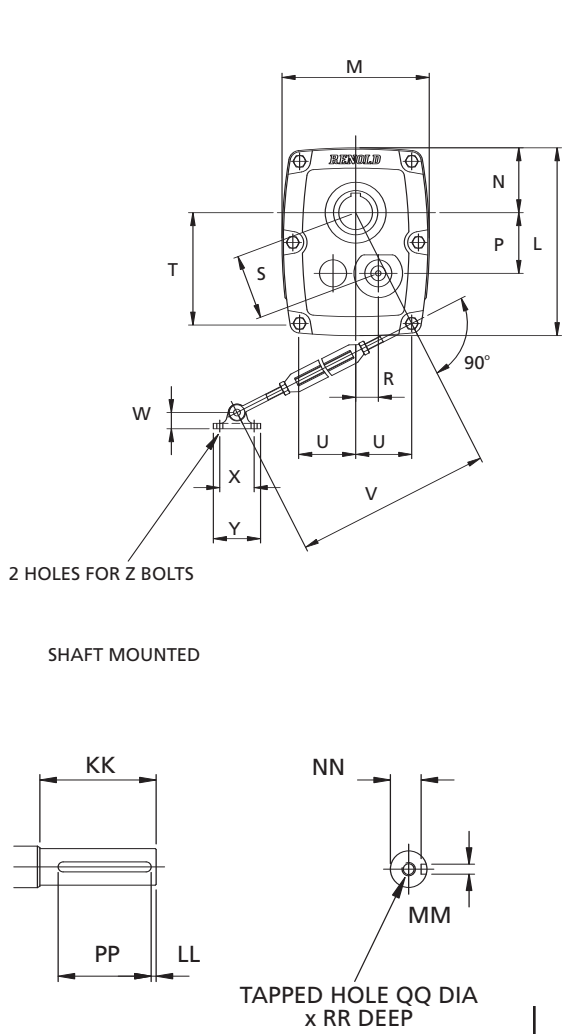
OUTPUT SLEEVE
FOR TAPER BUSH
(BUSH CAN BE FITTED
EITHER SIDE OF GEARCASE
-POSITION 'F' SHOWN)

Size	A	A1	B		C	D		E	E1	F	G	G1	G2	H	J	K	
			Max	Min		No Backstop	Backstop Fitted										
1	134	150			63	60	60	53	87	19	j6	15	29	17	104	29	8
2	142	155			72	66	66	63	97	22	j6	17	29.5	17.5	108	29	8
3	152	167			77	69	69	73	110	25	j6	17	30.5	18.5	118	35	10
4	170	183			85	76	76	83	120	28	j6	20	32.5	20.5	130	35	10
5	189	209			90	88	88	97	144	32	k6	20	37.5	22.5	149	41	13
6	212	237			105	107	107	107	155	42	k6	20	40	25	172	52	14
7	242	259			115	115	115	127	167	48	k6	26	42	27	190	52	14
8	257	268			135	119	119	145	194	55	m6	30	43	28	197	76	21
9	274	285			170	130	130	165	220	60	m6	31	44.5	28.5	212	76	21
10	310	327			186	126	155	165	230	60	m6	44	62	43	222	110	25
11	356	-			219	146	-	210	-	65	m6	47	-	-	262	110	25
12	406	-			250	168	-	265	-	85	m6	53	-	-	300	110	25

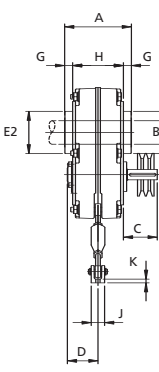
SEE TABLE
ON PAGE 16

Size	L	M	N	P	R	S	T	U	V		W	X	Y	Z	AA	BB	CC	DD	EE	FF	GG	HH	JJ	KK	LL	MM	NN	PP	QQ	RR
									max	min																				
1	236	188	82	75.2	26.8	79.8	137	70	500	350	24	50	70	M8	115	40	75	-	-	-	6	M8	12	50	2	6	15.5	45	M6	16
2	278	218	96	89.8	33.5	95.8	164	83	500	350	24	50	70	M8	141	53	88	-	-	-	6	M10	15	56	3	6	18.5	50	M8	19
3	336	258	117	111.3	37.8	117.5	198	95	650	500	28	65	89	M10	167.5	61.5	106	-	-	-	6	M12	18	60	5	8	21	50	M10	22
4	378.5	282	130	124.2	44.6	132	227	106	650	500	28	65	89	M10	199	77	122	-	-	-	6	M12	18	70	4	8	24	63	M10	22
5	420	318	145	136.9	49.6	145.6	251	121	750	600	35	75	108	M12	216	82	134	-	-	-	6	M16	24	70	4	10	27	63	M12	28
6	474	370	164	156	56.8	166	282	135	750	600	40	90	133	M16	239	89	150	-	-	-	6	M16	24	90	5	12	37	80	M16	36
7	550	434	195	189.7	63.5	200	322	165	750	600	40	90	133	M16	277	115	162	-	-	-	6	M20	29	90	5	14	42.5	80	M16	36
8	699	542	254	256	76	267	402	208	910	760	57	115	178	M20	354	160	194	-	-	-	6	M20	29	110	5	16	49	100	M20	42
9	789	568	281	265	90.5	280	462	213.5	910	760	57	115	178	M20	395	165	230	-	-	-	6	M20	31	140	5	18	53	125	M20	42
10	841	642	298	282.1	99	299	486	242	950	800	75	180	240	M24	428	180	248	-	-	-	6	M20	27	155	5	18	53	140	M20	42
11	997	770	370	323.5	120	345	565	298	950	800	75	180	240	M24	455	294	34	195	135	250	8	M16	27	180	5	18	58	170	M20	42
12	1139	880	410	373	133	396	657	340	950	800	75	180	240	M24	535	280	-40	215	130	315	8	M16	27	210	5	22	76	195	M20	42

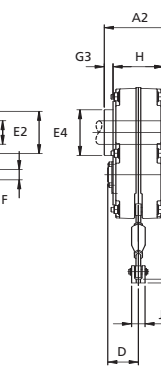
RENOLD SMX^{tra} Dimensions (mm) with Enhanced Seals



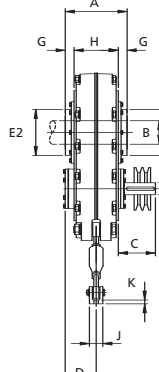
SIZES 1-9



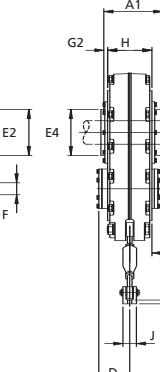
SIZES 1-9



SIZE 10



SIZE 10



Size	A	A2	B		C	D		E2	E3	E4	F	G	G1	G3	H	J	K	
			Max	Min		No Backstop	Backstop Fitted											
1	148	154	SEE TABLE ON PAGE 16		63	60	60	94	87	101	19	j6	22	29	21	104	29	8
2	154	159			72	66	66	110	117	122	22	j6	23	29.5	21.5	108	29	8
3	164	170.5			77	69	69	120	130	135	25	j6	23	30.5	22	118	35	10
4	185	185			85	76	76	135	145	150	28	j6	27.5	32.5	22.5	130	35	10
5	204	209			90	88	88	153	163	165	32	k6	27.5	37.5	22.5	149	41	13
6	226	237			105	107	107	157	176	176	42	k6	27	40	25	172	52	14
7	248	259			115	115	115	183	189	193	48	k6	29	42	27	190	52	14
8	263	268			135	119	119	205	216	218	55	m6	33	43	28	197	76	21
9	278	285			170	130	130	225	242	242	60	m6	33	44.5	28.5	212	76	21
10	318	327			186	126	155	233	238	238	60	m6	48	62	43	222	110	25

Size	L	M	N	P	R	S	T	U	V		W	X	Y	Z	AA	BB	CC	GG	HH	JJ	KK	LL	MM	NN	PP	QQ	RR
									max	min																	
1	236	188	82	75.2	26.8	79.8	137	70	500	350	24	50	70	M8	115	40	75	6	M8	12	50	2	6	15.5	45	M6	16
2	278	218	96	89.8	33.5	95.8	164	83	500	350	24	50	70	M8	141	53	88	6	M10	15	56	3	6	18.5	50	M8	19
3	336	258	117	111.3	37.8	117.5	198	95	650	500	28	65	89	M10	167.5	61.5	106	6	M12	18	60	5	8	21	50	M10	22
4	378.5	282	130	124.2	44.6	132	227	106	650	500	28	65	89	M10	199	77	122	6	M12	18	70	4	8	24	63	M10	22
5	420	318	145	136.9	49.6	145.6	251	121	750	600	35	75	108	M12	216	82	134	6	M16	24	70	4	10	27	63	M12	28
6	474	370	164	156	56.8	166	282	135	750	600	40	90	133	M16	239	89	150	6	M16	24	90	5	12	37	80	M16	36
7	550	434	195	189.7	63.5	200	322	165	750	600	40	90	133	M16	277	115	162	6	M20	29	90	5	14	42.5	80	M16	36
8	699	542	254	256	76	267	402	208	910	760	57	115	178	M20	354	160	194	6	M20	29	110	5	16	49	100	M20	42
9	789	568	281	265	90.5	280	462	213.5	910	760	57	115	178	M20	395	165	230	6	M20	31	140	5	18	53	125	M20	42
10	841	642	298	282.1	99	299	486	242	950	800	75	180	240	M24	428	180	248	6	M20	27	155	5	18	53	140	M20	42

RENOLD SMX^{tra} Standard Output Sleeve and Bush Bores

Size	Standard Sleeve Bore	Parallel Reducing Bushes	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 40	65	55	50 45 42 [*]
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	Maximum 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	

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.

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.

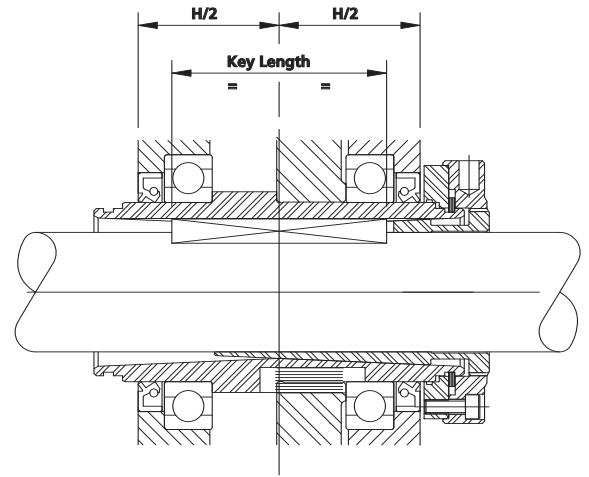
Taper clamping sleeves are suitable for shafts to h11 tolerances.

Keys are supplied for sleeve to bush.

Non-standard shaft keys supplied for parallel reducing bushes marked *.

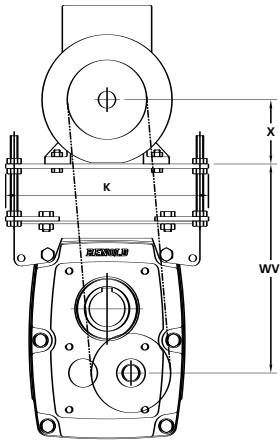
Non-standard shaft keys supplied for taper clamping bushes.

Standard section key is also required for bore marked *.

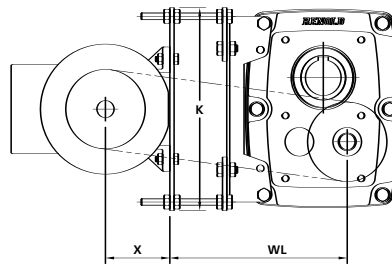
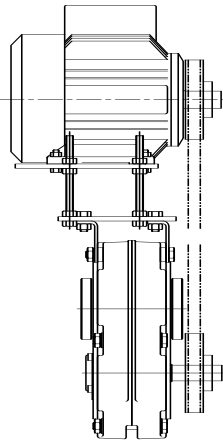


Size	H/2	Key Length Both Ends Rounded
1	52	70
2	54	70
3	59	90
4	65	100
5	74.5	100
6	86	120
7	95	140
8	98.5	150
9	106	160
10	111	160

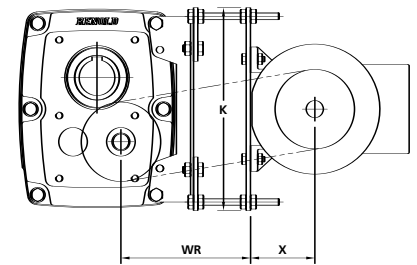
RENOLD SMX^{tra} Platform Mounted



Motor platform mounting - Top



Motor platform mounting - Left



Motor platform mounting - Right

Size	Motor Frame Sizes	K		WL		WV		WR	
		max	min	max	min	max	min	max	min
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	
	D132S D132M		227	320	290	383	152	235	
4	D71 D80 D90S D90L D100L D112M	332	241	320	311	390	152	231	
	D132S D132M		245	338	315	408	156	249	
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 motor).

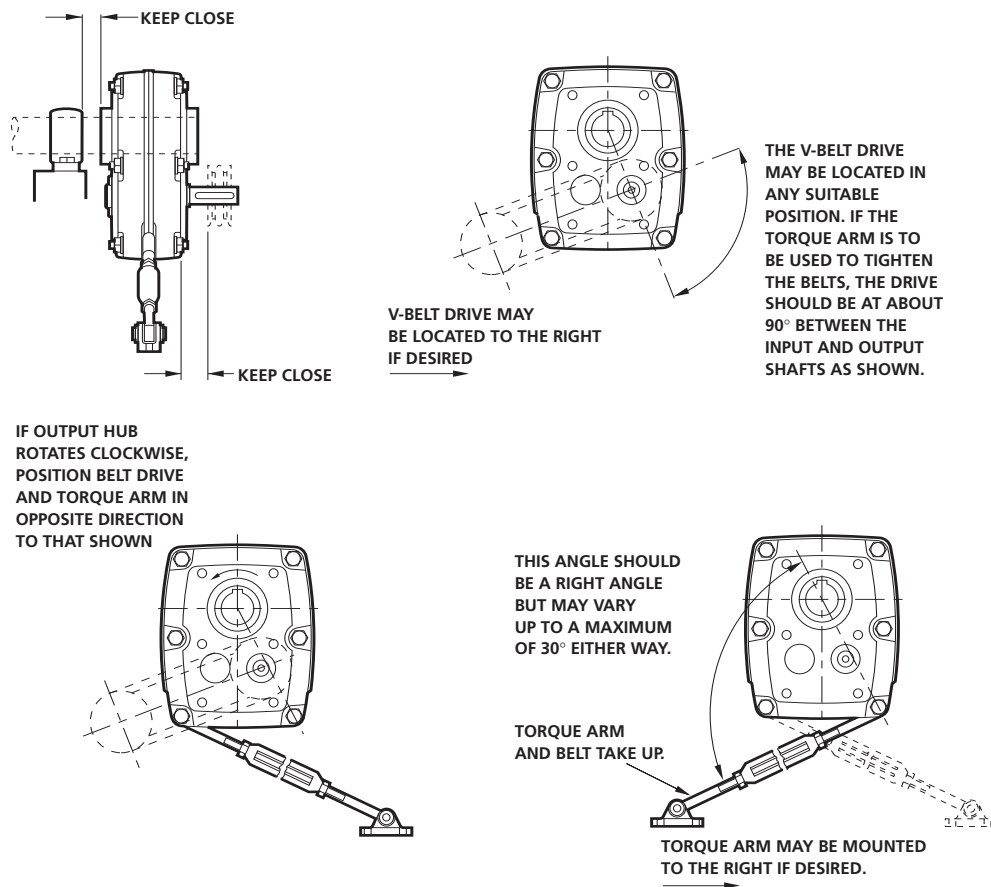
Y = Belt Fitting Allowance = 20mm for SPZ, 25mm for SPA, 30mm for SPB and 50mm for SPC belts.

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

Motor Mounting

The **RENOLD SMX^{tra}** motor platform provides a rigid base designed to accept a wide range of motor frame sizes.

Available in 10 sizes, the motor platform had sufficient adjustment available to ensure a standard belt can be fitted and re-tensioned as required during its working life.



Torque Arm

Bolt Tightening Torques

Reducer Size	1 & 2	3 & 4	5	6 to 9	10 to 12
Torque Nm	30	50	100	160	350
Torque lb. ft.	22	37	74	118	258

Installation

Complete instructions on the current installation and maintenance of **SMX^{tra}** units are sent with each unit supplied and additional copies are available on request.

Satisfactory performance depends on proper installation, lubrication and maintenance.

Therefore it is important that the instructions in the installation leaflet are followed carefully.

Taper Clamping Sleeve

One bush supplied.

The method of assembly differs in each case. Full details are included in installation instructions.

1. Assembly on Driven Shaft Parallel Bored

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.

- 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 wedge belt drive with the belt pull at approximately 90° to the centre line between driven and input shafts. This will permit tensioning of the wedge 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.
- 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.

Unit Weights and Oil Quantities

Lubrication

SMX™ Units are supplied without oil and should be filled before running with a recommended lubricant to the correct level dependant on the mounting position.

If backstop fitted mount in position 1 or 2 only.

First Filling

Remove the taper plugs from the filler/breather and level positions as shown in the diagram.

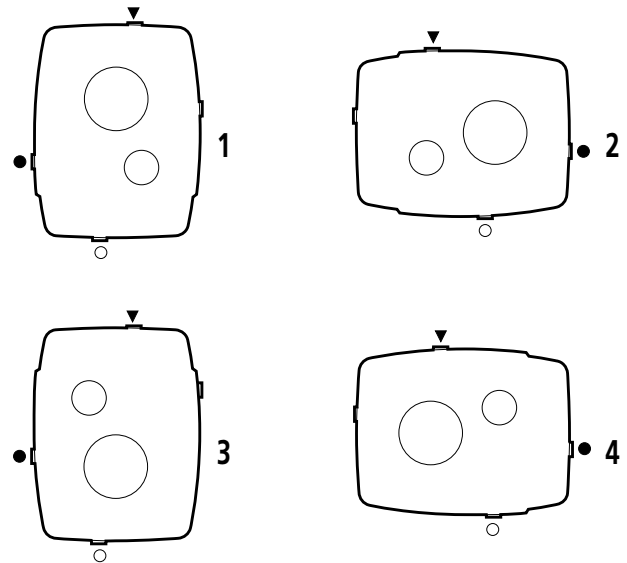
Fill until the lubricant overflows the oil level aperture.

Replace the level taper plug. Fit the filler/breather plug (supplied loose).

Synthetic Lubricants

Certain approved synthetic lubricants are suitable for use in

SMX™ gear units - consult a Renold engineer.



▼ Filler/Breather ● Plug Level ○ Plug Drain Plug

Recommended Oils

ISO Viscosity Grade - EP Mineral Oil.

Unit Ratio Output RPM	5/1		13/1 to 25/1	
	100 - 200	201 - 400	10 - 40	41 - 120
Ambient Temp °C				
ISO Viscosity Grade				
-10 to 10	150	150	150	150
5 to 25	320	320	460	320
20 to 40	460	460	680	460

OIL QUANTITIES

Unit Size	Oil Quantities (Litres) Mounting Position			
	1	2	3	4
1	0.5	0.5	0.4	0.5
2	0.8	0.9	0.7	0.9
3	1.1	1.4	1.2	1.4
4	1.6	2.0	1.8	2.0
5	2.4	3.0	2.4	3.0
6	3.4	4.6	3.0	4.6
7	5.1	7.2	5.4	7.6
8	7.1	14.7	8.9	15.0
9	11.0	20.0	13.0	21.0
10	15.0	22.0	17.0	23.0
11	23	38	28	39
12	33	53	41	53

UNIT WEIGHT (KGS)

Unit Size	UNIT RATIO	
	5:1	13:1 to 25:1
1	15.8	16.8
2	22.0	23.4
3	33.5	35.7
4	44.0	48.0
5	67.0	72.0
6	98.0	106
7	165	175
8	253	270
9	300	320
10	-	415
11	-	670
12	-	960

Oil Recommendations

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. 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 medium grade.

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. 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 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 Gear XMP	220	-13 to 100	320	-13 to 100	460	-1 to 100
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 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 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

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
Esso Spartan Synthetic EP	220	-27 to 120	320	-27 to 120	460	-18 to 120
Klubersynth EG 4	220	-30 to 160	320	-30 to 160	460	-25 to 160

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

Oil Recommendations

The oils shown below are all suitable for use with Sprag Clutch backstops

	Light		Medium		Heavy	
Mineral Oil	Temp °C		Temp °C		Temp °C	
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
Shell Vitrea	220	-24 to 120	320	-18 to 120	460	-15 to 120
Esso Teresso	220	-18 to 120	320	-12 to 120	460	-9 to 120
Kluberoil GEM 1	220	-18 to 100	320	0 to 100	460	0 to 100

	Light		Medium		Heavy	
Synthetic (Polyalphaolefin)	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

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