



POWER JACKS

manufacturers of precision screw jacks, actuators and gearboxes

Group

**SPIRAL BEVEL GEARBOXES
RANGE "N"**

**SPARES LIST &
MAINTENANCE
INSTRUCTIONS**

Manual: MM-SBG(N)-E-02

SUPPLIED BY: POWER JACKS LIMITED



SPIRAL BEVEL GEARBOXES RANGE “N”

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1. Unit Details

It is worthwhile noting down the nameplate numbers on this unit and keeping them in a safe place as they will be required if spares need to be ordered and some installations may not allow access to the unit once installed or the name plate maybe obscured.



Serial Number	
Model Number	
Power Jacks Sales Order No	



SPIRAL BEVEL GEARBOXES RANGE “N”

2. Power Ratings

2.1 Range N – Gearbox Power Ratings

Gear Unit	Ratio	Power Ratings at given Input Speeds (rev min ⁻¹)																							
		10		50		100		250		500		750		1000		1500		200		2500		3000			
		kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm		
Series 35	1:1	0.1	94	0.4	75	0.8	75	1.7	64	3.1	58	4.3	54	5.4	51	7.4	46	8.9	42	8.9	33	10.4	32		
	1.5:1	0.04	56	0.2	56	0.4	56	0.7	39	1.4	39	2.1	39	26	37	3.7	35	4.7	33	4.7	26	5.6	26		
	2:1	0.03	56	0.12	45	0.2	37	0.5	37	0.9	34	1.2	30	1.6	30	2.2	27	2.9	27	2.9	22	3.6	22		
	3:1	0.01	28	0.03	17	0.06	17	0.15	17	0.31	17	0.45	17	0.6	17	0.9	17	1.2	17	1.3	15	1.6	15		
Series 37	1:1	0.2	187	1.0	187	2.0	187	4.3	161	7.7	144	10.8	135	13.6	127	18.5	115	22.6	106	26.3	98	30.6	95		
	1.5:1	0.1	140	0.5	140	0.8	112	1.9	107	3.5	98	5.0	94	6.4	90	9.0	84	11.5	81	14.3	80	17.0	80		
	2:1	0.1	187	0.3	112	0.6	112	1.3	97	2.5	94	3.5	87	4.5	84	6.4	80	8.1	76	10.1	76	12.0	75		
	3:1	0.03	84	0.11	62	0.2	56	0.5	56	0.8	45	1.2	45	1.5	42	2.1	39	2.8	39	3.5	39	4.2	39		
	4:1	0.01	37	0.06	45	0.1	37	0.2	30	0.4	30	0.6	30	0.8	30	1.2	30	1.5	28	1.9	28	2.25	28		
Series 38	1:1	0.5	468	2.5	468	5.0	468	11.7	438	21.2	397	29.9	373	38	356	52.6	328	65.1	305	76.6	287	-	-		
	1.5:1	0.2	281	0.9	253	1.6	225	3.4	191	6.1	171	8.7	163	11.1	156	15.5	145	19.4	136	23.6	133	27.6	129		
	2:1	0.3	562	0.6	225	1.2	225	2.6	195	4.8	180	6.9	172	9.0	168	12.8	160	16.6	155	20.6	154	24.6	153		
	3:1	0.1	281	0.3	168	0.5	140	1.2	135	2.2	124	3.1	116	4.0	112	5.7	107	7.5	105	9.4	106	11.2	105		
	4:1	0.03	112	0.13	97	0.23	86	0.7	105	0.9	67	1.3	65	1.7	64	2.4	60	3.2	60	4.0	60	4.8	60		
Series 39	1:1	1.0	936	5.0	936	9.8	917	22.2	831	38.6	723	52.0	649	62.9	589	77.2	482	-	-	-	-	-	-		
	1.5:1	0.34	477	1.7	477	3.4	477	9.0	505	18.9	531	29.2	547	39.9	560	61.5	576	283	584	105	590	-	-		
	2:1	0.5	936	2.0	749	3.6	674	7.9	591	14.5	543	20.7	517	26.6	498	38.0	474	49.5	463	62.8	470	76.3	476		
	3:1	0.2	562	0.8	449	1.4	393	3.2	359	5.9	331	8.4	314	10.9	306	15.6	292	20.5	288	25.4	285	30.3	284		
	4:1	0.1	374	0.4	299	0.7	262	1.74	261	2.9	217	4.2	210	5.4	202	7.7	192	10.2	191	12.7	190	15.3	191		
Series 40	1:1	3.3	3088	16.2	3032	31.8	2976	74.3	2781	126	2358	166	2071	194	1816	-	-	-	-	-	-	-	-		
	1.5:1	1.9	2667	8.9	2499	16.3	2288	36.4	2044	65.6	1842	90.8	1700	112	1572	145	1357	-	-	-	-	-	-		
	2:1	1.5	2808	6.8	2546	12.5	2340	28	2096	52.0	1947	74.8	1867	96.7	1810	139	1735	181	1694	226	1692	-	-		
	3:1	0.7	1965	2.6	1460	4.5	1263	10.3	1157	19.2	1078	27.8	1041	36.1	1014	52.0	973	68.3	959	85.2	957	102	955		
	4:1	0.4	1497	1.5	1123	2.8	1048	6.9	1033	11.7	876	16.9	844	21.9	820	31.6	789	42.1	788	52.5	786	62.8	784		

Ratings within the bordered area – check thermal limit!



SPIRAL BEVEL GEARBOXES RANGE “N”

3. General Instructions

3.1 Installation and Maintenance Recommendations

3.1.1 Installation

1. Select a gearbox, which has a rated capacity greater than the input power
2. **Gear units are shipped dry** and are fitted with a warning label
3. Check your gear unit for damage during shipment
4. Take care when fitting couplings; a blow on a shaft end can cause gear overmeshing.
5. Shaft alignment is critical, check on installation

3.1.2 Oil Levels

The information given below assumes that the gear unit is positioned with all shafts in a horizontal plane.

For input speeds up to 1500 RPM the oil level in the gear unit should be maintained just below the centerline of the shafts. A sight glass or level plug is provided for level indication.

A change of oil may be required for speeds of 1500 RPM or above, and Neeter Drive should be consulted.

For input speeds of 250 RPM or below grease lubrication should be used.

Important Neeter Drive should be advised when a gear unit is installed with a shaft positioned vertically.

3.1.3 Case Temperature

Bevel gear units will operate with a maximum case temperature of 80°C. If this temperature is exceeded Neeter Drive should be consulted.

3.1.4 Maintenance Instructions

A new gear unit should be drained after 100 hours of operation and cleaned using a light flushing oil. After this the gear unit oil should be changed every six months or 2500 operating hours. Where severe operating conditions are encountered more frequent oil changes are advised.

The gear unit should be warm when an oil change is undertaken. Check oil levels regularly.

Warning: The case temperature must not exceed 80°C (see case temperature)



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4. Recommended Lubricants

4.1 Oil Specification

Ambient Temperature	Gear Oil	
Below +5°C	ISO 150	Mobilgear 629 or equivalent
+5°C to +40°C	ISO 220	Mobilgear 630 or equivalent
Above +40°C	ISO 320	Mobilgear 320 or equivalent

4.1.1 Fill Quantities (average)

Series No.	35	37	38	39	40
Litres	0.14	0.29	0.75	1.71	3.27
Pints	0.24	0.50	1.32	3.00	5.75

4.1.1 Grease Nipple / Grease filled units

Use EP1 Grease e.g. Mobilux EP1 or equivalent.

4.1.3 Spares

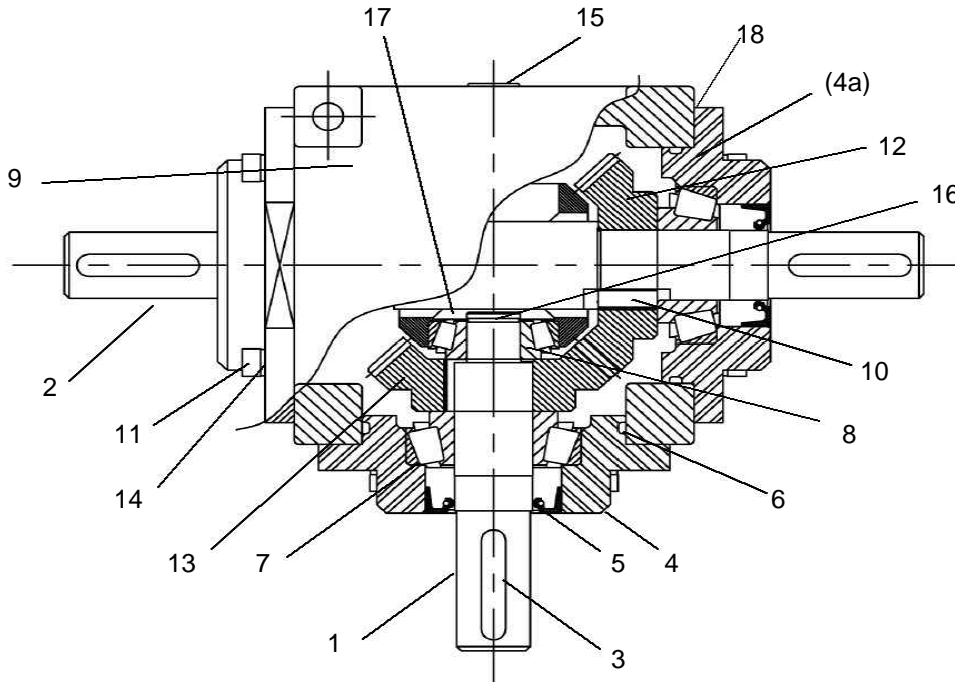
When ordering spares always specify the part number and serial number stamped on the nameplate.



SPIRAL BEVEL GEARBOXES RANGE “N”

5. General Assembly & Parts List

5.1 General arrangement – Ratio 1:1 & 1.5:1



5.1.1 Parts List - Ratio 1:1 & 1.5:1

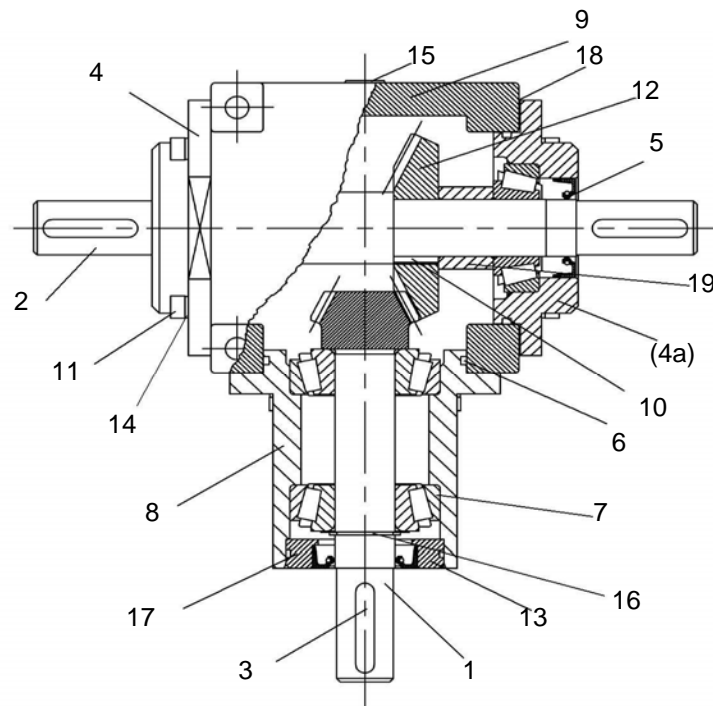
Item No	Description	2 way / 2 way reverse	3 way	3 way reverse	4 way
		Qty	Qty	Qty	Qty
1	Input Shaft	1	1	2	2
2	Output shaft	1	1	1	1
3	External Shaft Key	2	3	3	4
4	Shaft End Cap	2	3	3	4
4a	Blank Cover	1	0	1	0
5	Oil Seal	2	3	3	4
6	O Ring	3	3	4	4
7	Outer Bearing	3	3	4	4
8	Inner Bearing	1	1	2	2
9	Gear Case	1	1	1	1
10	Internal Key	2	2	3	3
11	Set Screw*	12	12	16	16
12	Mitre Gear – Left hand	1	1	2	2
13	Mitre Gear – Right hand	1	1	1	1
14	Spring Washer*	12	12	16	16
15	Oil Fill / Drain Plug	3	3	3	2
16	Circlip	1	1	2	2
17	Shim	4	4	8	8
18	Gaskets -various thickness	8	8	12	14

* Exact number depending upon unit size – please consult Neeter Drive



SPIRAL BEVEL GEARBOXES RANGE “N”

5.2 General arrangement – Ratio 2:1 and above and Hollow output shaft



5.2.1 Parts List - Ratio 2:1 and above and hollow output shaft

Item No	Description	2 way /	3 way	3 way reverse	4 way
		2 way reverse			
		Qty	Qty	Qty	Qty
1	Pinion Shaft	1	1	1	2
2	Output shaft	1	1	2	1
3	External Shaft Key	2	3	3	4
4	Through Cover	1	2	0	2
4a	Blank Cover	1	0	0	0
5	Oil Seal	2	3	3	4
6	O Ring	3	3	3	4
7	Bearing	4	4	6	6
8	Extended Input Housing	1	1	3	2
9	Gear Case	1	1	1	1
10	Internal Key	1	1	2	1
11	Set Screw*	12	12	12	16
12	Output Gear	1	1	2	1
13	Oil Seal Retainer	1	1	3	2
14	Spring Washer*	12	12	12	16
15	Oil Fill / Drain Plug	3	3	3	2
16	Circlip	1	1	3	2
17	O Ring (oil seal retainer)	1	1	3	2
18	Gaskets -various thickness	8	8	12	14
19	Spacer	1	1	0	2

* Exact number depending upon unit size – please consult Neeter Drive



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5.3 Motor mounting flange units.

Motor mounting flange units share common components with the units detailed in 5.2, however the motor flange and input pinion are different and vary on every unit dependant upon ratio and flange size / style. For a parts list of items in a motor-flanged unit please contact Neeter Drive with the unit model number and serial number.

6. Disassembly / Assembly Instructions

6.1 Ratio 1:1 and 1.5:1

- 6.1.1 Remove oil fill / drain plugs (15) and drain oil from unit
- 6.1.2 Remove external shaft keys (3) and ensure no sharp edges remain around keyways
- 6.1.3 Remove set screws (11) from input shaft end cap (4)
- 6.1.4 Slide off end cap (4), taking care not to damage oil seal (5)– it is recommend that all oil seals (5) and “O”-rings (6) are replaced.
- 6.1.5 Remove gaskets (18) and retain for reassembly
- 6.1.6 Lift out input gear (1) sub assembly
- 6.1.7 To disassemble input gear (1) sub assembly remove circlip (16) if fitted, and remove bearings (7). The gear (13) is pressed onto the shaft and will need to be pressed off, care must be taken not to damage shaft. On some units the 1.5:1 ratio input gear (13) and shaft (1) are integral – this can be seen upon removal of the bearings.
- 6.1.8 Remove end caps (4) from each side of the output shaft (2) as detailed in 6.1.4 above
- 6.1.9 Remove gaskets (18), noting the amount and colours and retain for reassembly
- 6.1.10 Note which end the gear (12) sits inside the case (9), as this will affect the shaft rotation.
- 6.1.11 Remove bearing (7) from the end opposite to the one where the gear (12) is fitted.
- 6.1.12 Slide out output gear (12) sub assembly
- 6.1.13 To disassemble output gear (12) sub assembly remove bearing (7) behind gear (12). The gear (12) is pressed onto the shaft (2) and will need to be pressed off, care must be taken not to damage shaft.
- 6.1.14 If needed – remove inner bearing cup (8) and steel shims, retain shims for later use.
- 6.1.15 Clean and check all parts for damage or excessive wear and replace where necessary, paying special attention to seals (5) and “O” rings (6).



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- 6.1.16 Assemble the input shaft (1)– do not fit into gear case (9) yet.
- 6.1.17 Assemble the gear assembly onto one end of output shaft (2)
- 6.1.18 Put output shaft (2) into gear case (9), ensuring it is in the same place as when disassembled and fit rear bearing (7).
- 6.1.19 Fit shaft end cap (4) this is a blank cover for 2 way and 2 way reverse units or bored out cover for 3 way units.
- 6.1.20 When fitting the shaft end cap (4) replace the same amount and colour of gaskets as removed from disassembly.
- 6.1.21 Bolt on shaft end cap (4).
- 6.1.22 Fit other shaft end cap (4) using the gaskets (18) removed – as detailed above.
- 6.1.23 Bolt on shaft end cap (4) – when fitting this cover, avoid putting extensive pre-load onto the bearings (7), if necessary fit extra gaskets (18).
- 6.1.24 Ensure the shaft assembly turns freely and smoothly.
- 6.1.25 Fit centre bearing cup (8), ensuring the steel shims are fitted behind it.
- 6.1.26 Place the input gear (1) sub assembly into the case (9).
- 6.1.27 Fit shaft end cap (4) replace gaskets as detailed in 6.1.20 above, do not over tighten shaft end cap (4) damaging bearings
- 6.1.28 Rotate the shafts (1 & 2) to ensure they rotate freely and smoothly
- 6.1.29 If too tight or too much backlash then the assembly will need to be adjusted using additional gaskets (18) under the input shaft end cap (4) and “gear side” shaft end cap (4) on the output and removal of gaskets (18) from the rear cover end.
- 6.1.30 Check gear unit backlash. The backlash is measured in minutes of arc, measured on the output shaft (d_2), by locking input shaft (d_1) Backlash figures are detailed in the table in 6.1.31 below.

6.1.31 Backlash figures

Series	35		37		38		39		40	
Ratio	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
1:1	12	24	16	21	13	20	12	16	9	13
1.5:1	10	20	13	22	10	17	10	13	8	11
2:1	9	18	8	15	9	16	7	10	7	10
3:1	9	18	7	13	8	14	7	10	7	10
4:1	--	--	6	12	8	14	7	10	7	10

6.2 Ratio 2:1 and above, hollow output shafts and motor mounting flanged units

- 6.2.1 Procedure as above for output side. Input side (extended housing / motor mounting flange) is very similar to the output side using gaskets to adjust the position of the gears. Assembling the output into the case first, followed by the input sub assembly.



SPIRAL BEVEL GEARBOXES RANGE “N”

7. Warranty

7.1 Limitation of Responsibility

The ratings given in this manual were compiled using standard engineering procedures. The ratings are designed to guide the customer in the selection of a unit. We do not guarantee the ratings in specific applications. Prototype testing of every application is recommended before production. Our engineering facilities are available for consultation at all times. Please ask us for assistance with linear motion and drive application problems. This manual is designed to assist in the selection of a suitable linear motion or power transmission product for economical, long and trouble free service.

Due to Power Jacks policy of continuous improvement, designs may be subject to change without notice. Please ask for certified drawings.

7.2 Warranty

Subject to the condition stated herein, Power Jacks will repair or replace, without charge, any parts proven to Power Jacks satisfaction to have been defective in material or workmanship. Claims must be made within one year after date of shipment. Power Jacks will not repair or replace any parts that have become inoperative because of improper maintenance, eccentric loading, overloading, chemical or abrasive action, excessive heat, or other abuse. Equipment which has been altered or modified by anyone without Power Jacks authorisation, is not warranted by Power Jacks. EXCEPT AS STATED HEREIN, POWER JACKS MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

WARNING: The equipment shown in this manual is intended for industrial use only and should not be used to lift support, or otherwise transport people unless you have a written statement from Power Jacks Limited which authorises the specific unit as used in your application for moving people.

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We reserve the right to alter details and specifications without notice.

Since special circumstances may affect the equipment's operation, users should consult **POWER JACKS LIMITED** at the address shown, or take other skilled engineering advice. It is recommended that the application design load is conspicuously displayed.

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