



POWER JACKS

**SPIRAL BEVEL GEARBOXES
RANGE "N"**

**SPARES LIST &
MAINTENANCE
INSTRUCTIONS**

Manual: MM-SBG(N)-E-02.2

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 | | 2000 | | 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)

SPIRAL BEVEL GEARBOXES RANGE “N”

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.

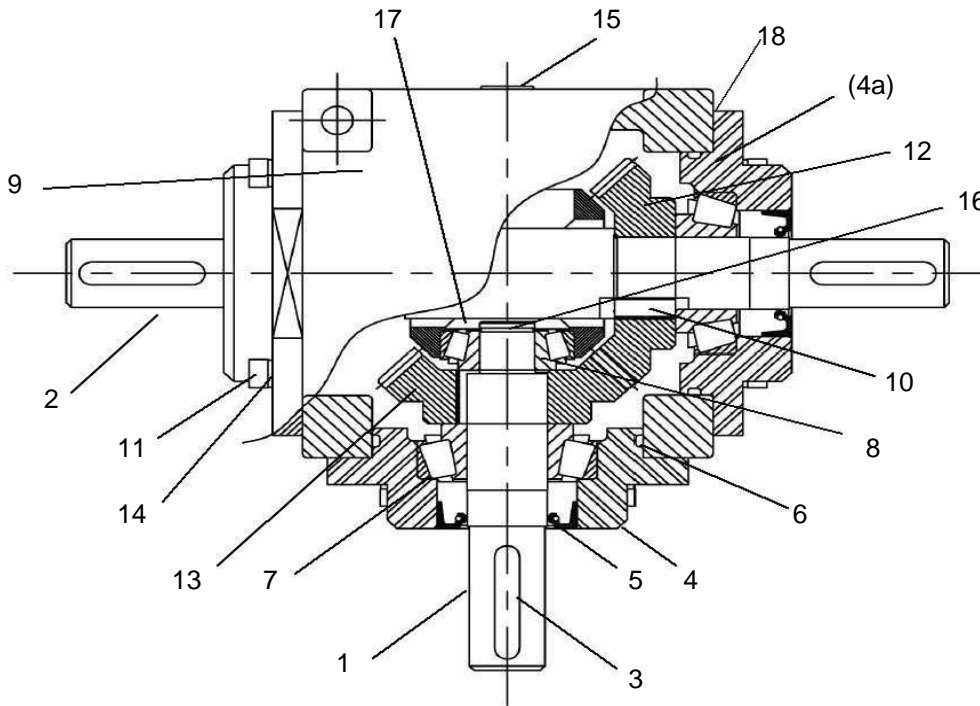
4.1.3 Spares

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

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5. General Assembly & Parts List

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



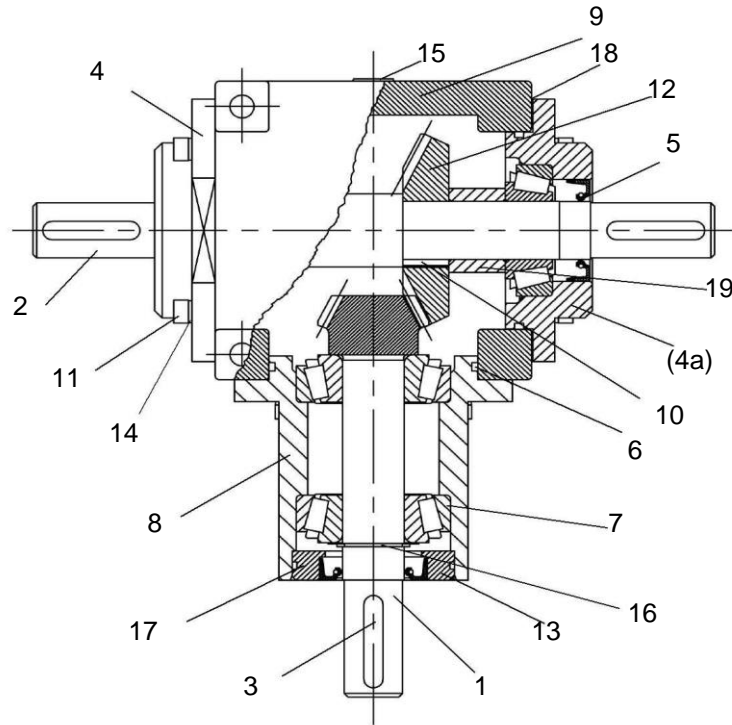
5.1.1 Parts List - Ratio 1:1 & 1.5:1

| Item No | Description | 2 way / | 3 way | 3 way reverse | 4 way |
|---------|----------------------------|---------------|-------|---------------|-------|
| | | 2 way reverse | 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 / 2 way reverse | 3 way | 3 way reverse | 4 way |
|---------|----------------------------|--------------------------|-------|---------------|-------|
| | | 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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