

**INSTALLATION & MAINTENANCE**

**SERIES A**

**DAVID BROWN**  
R A D I C O N

**SERIES A MID RANGE**

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**IMPORTANT****Product Safety Information**

**General** - The following information is important in ensuring safety. It **must** be brought to the attention of personnel involved in the selection of David Brown Radicon Limited power transmission equipment, those responsible for the design of the machinery in which it is to be incorporated and those involved in its installation, use and maintenance.

David Brown power transmission equipment will operate safely provided it is selected, installed, used and maintained properly. As with any power transmission equipment **proper precautions must** be taken as indicated in the following paragraphs, to ensure safety.

**Potential Hazards** - these are **not** necessarily listed in any order of severity as the degree of danger varies in individual circumstances. It is important therefore that the list is studied in its entirety:-

- 1) Fire/Explosion
  - (a) Oil mists and vapour are generated within gear units. It is therefore dangerous to use naked lights in the proximity of gearbox openings, due to the risk of fire or explosion.
  - (b) In the event of fire or serious overheating (over 300°C), certain materials (rubber, plastics, etc.) may decompose and produce fumes. Care should be taken to avoid exposure to the fumes, and the remains of burned or overheated plastic/rubber materials should be handled with rubber gloves.
- 2) Guards - Rotating shafts and couplings must be guarded to eliminate the possibility of physical contact or entanglement of clothing. It should be of rigid construction and firmly secured.
- 3) Noise - High speed gearboxes and gearbox driven machinery may produce noise levels which are damaging to the hearing with prolonged exposure. Ear defenders should be provided for personnel in these circumstances. Reference should be made to the Department of Employment Code of Practice for reducing exposure of employed persons to noise.
- 4) Lifting - Where provided (on larger units) only the lifting points or eyebolts must be used for lifting operations (see maintenance manual or general arrangement drawing for lifting point positions). Failure to use the lifting points provided may result in personal injury and/or damage to the product or surrounding equipment. Keep clear of raised equipment.
- 5) Lubricants and Lubrication
  - (a) Prolonged contact with lubricants can be detrimental to the skin. The manufacturer's instruction must be followed when handling lubricants.
  - (b) The lubrication status of the equipment must be checked before commissioning. Read and carry out all instructions on the lubricant plate and in the installation and maintenance literature. Heed all warning tags. Failure to do so could result in mechanical damage and in extreme cases risk of injury to personnel.
- 6) Electrical Equipment - Observe hazard warnings on electrical equipment and isolate power before working on the gearbox or associated equipment, in order to prevent the machinery being started.
- 7) Installation, Maintenance and Storage
  - (a) In the event that equipment is to be held in storage, for a period exceeding 6 months, prior to installation or commissioning, David Brown Radicon Limited must be consulted regarding special preservation requirements. Unless otherwise agreed, equipment must be stored in a building protected from extremes of temperature and humidity to prevent deterioration.  
  
The rotating components (gears and shafts) must be turned a few revolutions once a month (to prevent bearings brinelling).
  - (b) External gearbox components may be supplied with preservative materials applied, in the form of a "waxed" tape overwrap or wax film preservative. Gloves should be worn when removing these materials. The former can be removed manually, the latter using white spirit as a solvent.  
  
Preservatives applied to the internal parts of the gear units do not require removal prior to operation.
  - (c) Installation must be performed in accordance with the manufacturer's instructions and be undertaken by suitably qualified personnel.
  - (d) Before working on a gearbox or associated equipment, ensure that the load has been removed from the system to eliminate the possibility of any movement of the machinery and isolate power supply. Where necessary, provide mechanical means to ensure the machinery cannot move or rotate. Ensure removal of such devices after work is complete.
  - (e) Ensure the proper maintenance of gearboxes in operation. Use only the correct tools and David Brown Radicon Limited approved spare parts for repair and maintenance. Consult the Maintenance Manual before dismantling or performing maintenance work.
- 8) Hot Surfaces and Lubricants
  - (a) During operation, gear units may become sufficiently hot to cause skin burns. Care must be taken to avoid accidental contact.
  - (b) After extended running the lubricant in gear units and lubrication systems may reach temperatures sufficient to cause burns. Allow equipment to cool before servicing or performing adjustments.
- 9) Selection and Design
  - (a) Where gear units provide a holdback facility, ensure that back-up systems are provided if failure of the holdback device would endanger personnel or result in damage.
  - (b) The driving and driven equipment must be correctly selected to ensure that the complete machinery installation will perform satisfactorily, avoiding system critical speeds, system torsional vibration, etc.
  - (c) The equipment must not be operated in an environment or at speeds, powers, torques or with external loads beyond those for which it was designed.
  - (d) As improvements in design are being made continually the contents of this catalogue are not to be regarded as binding in detail, and drawings and capacities are subject to alterations without notice.

The above guidance is based on the current state of knowledge and our best assessment of the potential hazards in the operation of the gear units.

Any further information or clarification required may be obtained by telephoning or writing to:

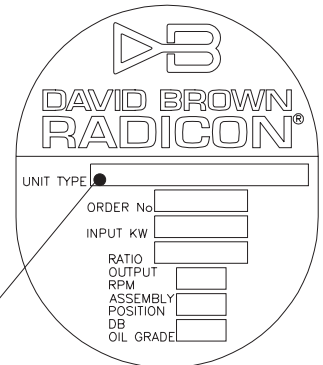
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## 1 UNIT IDENTIFICATION

When requesting further information, or service support quote the following information from the nameplate:

- Unit Type
- Order Number



EXAMPLE    1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20  
A 1 2 5 2 7 . 5 W R C - 1 - - - - - - - - -

### 1 - SERIES A

RANGE A

### 2 - 4 SIZE OF UNIT

eg 1 2 5

### 5 - REVISION VERSION

2 ETC

### 6,7,8 - NOMINAL OVERALL RATIO

eg 7 . 5  
5 0 .

### 9 - UNIT VERSION

- W - STD UNIT MACHINED FACE ON LEFT\*\*
- Y - STD UNIT MACHINED FACE ON RIGHT\*\*
- F - STD UNIT WITH OUTPUT FLANGE ON LEFT\*\*
- H - STD UNIT WITH OUTPUT FLANGE ON RIGHT\*\*
- B - STD UNIT MACHINED FACE ON LEFT\*\* WITH BASE MOUNTED FEET
- D - STD UNIT MACHINED FACE ON RIGHT\*\* WITH BASE MOUNTED FEET
- A - AGITATOR UNIT
- C - COOLING TOWER UNIT
- T - STD UNIT WITH BANJO T/A ON LEFT\*\*
- X - STD UNIT WITH BANJO T/A ON RIGHT\*\*

### 10 - TYPE OF UNIT

- R - REDUCER UNIT - SINGLE REDUCTION
- D - REDUCER UNIT - DOUBLE REDUCTION
- M - MOTORISED - DOUBLE REDUCTION ONLY
- G - UNIT TO ALLOW FITTING OF NON DB RADICON MOTOR
- A - UNIT TO ALLOW FITTING OF NEMA MOTOR

\*\* LOOKING ON INPUT SHAFT MOUNTING POSITION 1 (See page 10 for unit handings)

### 20 - ADDITIONAL FEATURES

PAINT, LUBRICANT, DOUBLE OIL SEAL, HOLD BACK ETC

eg - F

### 19 - MOTOR REQUIRED

eg - A

FOR R OR G TYPES WITHOUT MOTOR ENTER -

FOR SLOW SPEED APPLICATIONS WHERE GREATER OIL QUANTITIES ARE REQUIRED

ENTER D

### 18 - NO OF MOTOR POLES

2 4 6 OR 8  
 FOR R OR G TYPE ENTER -

### 15,16,17 - GEARED MOTOR

MOTOR POWER REQUIRED

eg . 7 5

FOR R OR G TYPE ENTER - - -

### 13,14 - MOUNTING POSITION

eg 1 2

### 12 - MOTOR ADAPTOR FOR G OR A TYPE UNIT

FOR ALL OTHER TYPES ENTER -

### 11 - OUTPUT SHAFT

- C - STANDARD SINGLE EXTENSION ON LEFT \*\*
- E - STANDARD SINGLE EXTENSION ON RIGHT \*\*
- D - STANDARD DOUBLE EXTENSION
- F - REDUCED DIA SINGLE EXTENSION ON LEFT \*\*
- J - REDUCED DIA SINGLE EXTENSION ON RIGHT \*\*
- G - REDUCED DIA DOUBLE EXTENSION
- H - STANDARD SHAFT MOUNTED
- N - NEMA SINGLE EXTENSION ON LEFT \*\*
- B - NEMA SINGLE EXTENSION ON RIGHT \*\*
- P - NEMA DOUBLE EXTENSION
- Q - NEMA REDUCED DIA SINGLE EXTENSION ON LEFT \*\*
- T - NEMA REDUCED DIA SINGLE EXTENSION ON RIGHT \*\*
- R - NEMA REDUCED DIA DOUBLE EXTENSION
- A - NEMA SHAFT MOUNTED

FOR AGITATOR COOLING TOWER ENTER -

## **2 GENERAL INFORMATION**

The following instructions will help you achieve a satisfactory installation of your David Brown Radicon Series A unit, ensuring the best possible conditions for a long and trouble free operation.

All units are tested and checked prior to despatch, a great deal of care is taken in packing and shipping arrangements to ensure that the unit arrives at the customer in the approved condition.

Series A gear units will perform satisfactorily if subjected to full load immediately after installation. However, optimum performance is best achieved by a process of gradual load increments, up to the full value, over the first 50 hours or so of their working life. During these early stages of running, sensible precautions should be taken to avoid overloads.

The gear unit operating temperature may be higher during this period of run-in. A progressive reduction in temperature may occur over many hours until the unit has reached its highest efficiency.

## **3 FITTING OF COMPONENTS TO EITHER THE UNIT INPUT OR OUTPUT SHAFT**

The input or output shaft extension diameter tolerance is to ISO tolerance k6 (for shaft diameter  $\leq 50\text{mm}$ ) and m6 (for shaft diameter  $> 50\text{mm}$ ) and the fitted components should be to ISO tolerance M7 (for bore diameter  $\leq 50\text{mm}$ ) and K7 (for bore diameter  $> 50\text{mm}$ ).

- Items (such as gears, sprockets, couplings etc) should not be hammered onto these shafts since this would damage the shaft support bearings.
- The item should be pushed onto the shaft using a screw jack device fitted into the threaded hole provided in the end of the shaft.
- Items being fitted may be heated to 80/100°C to aid assembly further.

### THREADED HOLE DETAILS

UNIT SIZE	INPUT SHAFT (SINGLE REDUCTION)	INPUT SHAFT (DOUBLE REDUCTION)	OUTPUT SHAFT
A1002	M12 x 25 mm deep	-	M16 x 36 mm deep
A1252	M12 x 25 mm deep	-	M20 x 43 mm deep
A1602	M12 x 25 mm deep	-	M20 x 43 mm deep
A2002	M12 x 25 mm deep	M12 x 25 mm deep (M8 x 19 mm deep motorised)	M24 x 52 mm deep

## **4 WEATHER PROTECTION OF UNIT**

All Series A units are provided with protection against normal weather conditions. Where units are to operate in extreme conditions, or where they are to stand for long periods without running, eg during plant construction, we should be notified when ordering so that arrangements for adequate protection can be made.

## **5 INSTALLATION**

### **5.1 MOTORISED AND REDUCERS**

- Sizes A1002, 1252, 1602 and 2002 single reduction will be oil filled by client.
- Sizes A1002, 1252, and 1602 double reduction, primary unit will be factory filled for life with synthetic lubricant, secondary unit will be filled by client.
- Size A2002 double reduction, primary and secondary unit will be oil filled by client.

If the unit is to be mounted in a different position to that originally intended then the amount of lubricant in the unit will require amending

- See Appendix 1 of this document for the revised quantities
- See Appendix 1 for the methodology for doing this.

### **5.2 FIXING TO CUSTOMER EQUIPMENT**

Fixing the Gear Head flange facing or feet to the customer equipment use set screws to ISO grade 8.8 minimum.

Torque tighten to:-

Set Screw Size	Tightening Torque
M16	200 Nm
M20	350 Nm
M24	610 Nm

### **5.3 MOTOR CONNECTIONS**

#### **TO MAINS**

Connection of the electric motor to the mains supply should be made by a qualified person. The current rating of the motor will be identified on the motor plate, and correct sizing of the cables to electrical regulations is essential.

#### **MOTOR TERMINAL CONNECTION**

Circuit diagrams for the correct wiring of the motor terminal box are included as Appendix 2 of this document if the motor is of David Brown Radicon plating. Alternatively if the motor is supplied separately or if fitted with a motor from a different manufacturer, then this should have appropriate documentation provided with it.

#### **BRAKE MOTOR CONNECTION**

Installation of the David Brown Radicon Brake Motor is covered in Appendix 3.

## 5.4 FOOT-MOUNTED UNITS

The following procedure is recommended for all foot mounted units.

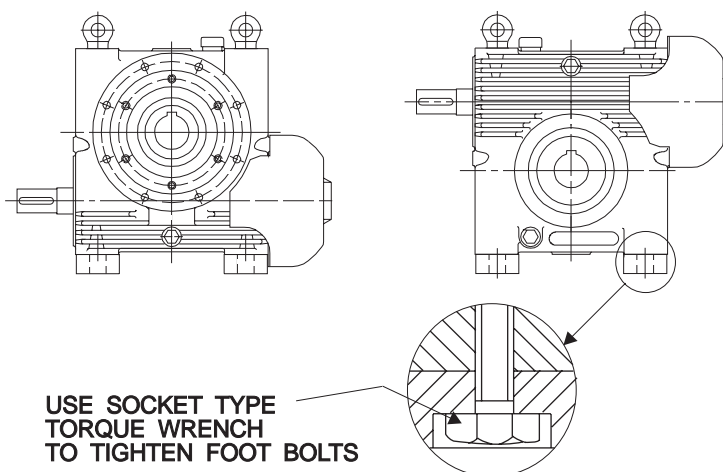
Foot mounted units are supplied either as free standing units, or if required, mounted on a standard baseplate with a foot mounted motor correctly aligned and connected by a David Brown Radicon flexible coupling.

- a) Clean shaft extensions and ventilator when fitted.
- b) Secure unit, or baseplate if fitted to a rigid foundation using heavy duty bolts to ISO grade 8.8 minimum.
- c) Ensure baseplate is not distorted  
Note: Units not supplied on baseplates should if possible be mounted on the same bedplate as the prime mover.
- d) Align unit (see Appendix 5)  
Note: It is important to ensure when aligning unit on baseplate that all machined mounting points are supported over their full area.  
If steel packings are used these should be placed either side of the foundation bolt as close as possible. During the final bolting ensure the unit or baseplate is not distorted this will cause strains in the gear case resulting in errors of alignment of shafts and gearing.
- e) For units mounted on bedplates after alignment select any two diagonally opposite feet, drill ream and dowel in position.
- f) Fit guards in accordance with the factory acts.
- g) Check motor wiring for correct direction of rotation this is important when a holdback device is fitted.
- h) Fill gear unit with oil as detailed in Section 6.

## 5.5 FITTING FEET ON UNITS MOUNTED IN POSITIONS 1 AND 2

Series A mid range units are fitted with detachable feet in mounting positions 1 and 2. These are normally factory fitted to clients specification, but if for any reason the feet are supplied separately, or dismantling is necessary after supply, they should be re-fitted and torque tightened to the following settings.

<b>TIGHTENING TORQUES FOR FEET BOLTS</b>			
SIZE	Nm	lbf.in	Bolt Size
A1002	350	3097	M20
A1252	350	3097	M20
A1602	610	5400	M24
A2002	610	5400	M24



## 5.6 REPLACEMENT OF OIL SEALS

1. Clean and drain the unit.
2. Remove the holding screws and withdraw cover.  
NOTE: Take care not to damage the shims and do not alter the shaft position. Check for burrs or scratches on the shaft which could damage the new seal.
3. Tap the old seal out of the housing or cover using an appropriate sized drift.
4. Ensure that joint faces and shims are clean and position the shims in the cover.
5. Coat joint faces of cover and case with a good jointing compound, replace oil catcher and tighten screws.
6. Smear oil seals with grease (See Appendix 4).
7. Fit replacement seal on a seal guide, slide it along the shaft and press the seal into the housing or cover.
8. Fill with the correct amount of an approved lubricant, see Appendix 1.

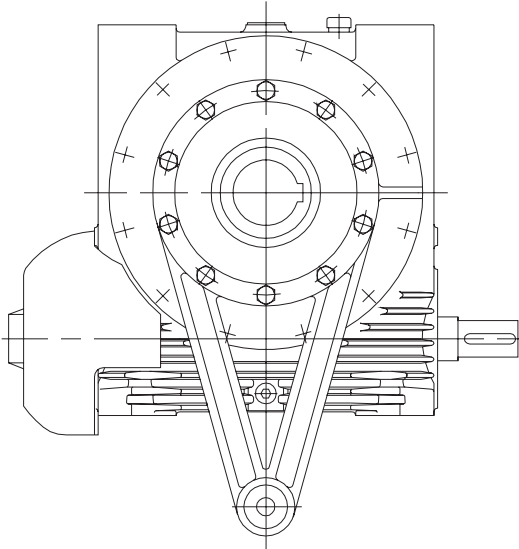
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## 5.7 SHAFT MOUNTED UNITS

The following procedure is recommended for all shaft and foot/shaft mounted units.

- Clean shaft extensions, bore and ventilator when fitted.
- Locate in position, using the most convenient method available see Appendix 6, ensuring it is as close as possible to the bearing on the driven machine.
- Secure unit onto the shaft using chosen method from Appendix 6.
- Fit torque arm to the side of the unit adjacent to the driven machine where possible, as detailed below.

Note: Unless specified otherwise, the torque arm will be supplied loose.



### FOR SIZES A1002, A1252, A1602 and A2002

- Clean torque arm & bearing housing facings with Lowtox or Loctite 7061.
- Fit torque arm as shown (unless order states otherwise) with bolts provided

Torque to:

Unit Size	Bolt Size	Torque
A1002, A1252	M12	85 Nm
A1602, A2002	M16	200 Nm

- Anchor case to a secure point by means of the torque arm.
- Fit guards in accordance with the factory acts.
- Check motor wiring for correct direction of rotation, this is important when a holdback device is fitted.
- Fill gear unit with oil (if not factory filled) as detailed in Section 6.

## 5.8 HOLDBACKS

NOTE: Oils containing E.P. additives must not be used on Radicon units fitted with holdback devices without prior agreement with the oil manufacturer. These oils may severely affect the antifriction properties of the device and therefore reduce its efficiency.

When it becomes necessary to replace the Sprag Holdback where fitted, it is essential to check that the shaft meets with the following requirements.

- The shaft diameter must be within the tolerances shown below.

UNIT SIZE	1002	1252	1602	2002
Shaft Diameter. ( mm )	38.1000	49.7281	54.7726	54.7726
	38.0873	49.7154	54.7599	54.7599

- Surface hardness must be HV30 650 - 750.
- Surface finish must be .3 - .5  $\mu$ m CLA.
- Taper must not exceed .003 mm. per cm.
- If there is any doubt as to whether the shaft complies with these requirements it should be replaced or returned to David Brown Radicon for examination and/or reconditioning.

NOTE: Excessively worn shaft bearings can also have an adverse effect on the operation of direct mounted clutches and such bearings should be replaced.

Holdbacks **MUST NOT** be fitted to units mounted in the overdriven ( 2 ) position due to potential lubricant starvation. For units in this position external anti-runback devices are recommended - refer to David Brown Radicon.

## 6 LUBRICATION AND MAINTENANCE

### 6.1 LUBRICATION

- Sizes A1002, 1252, 1602 and 2002 single reduction will be oil filled by client.
- Sizes A1002, 1252, and 1602 double reduction, primary unit will be factory filled for life with synthetic lubricant, secondary unit will be filled by client.
- Size A2002 double reduction, primary and secondary unit will be oil filled by client.

### 6.2 PERIODIC INSPECTION

- Check oil level every 1000 hours or 2 months whichever is sooner and if necessary top up with the recommended grade of lubricant.
- Add two shots of grease monthly to units having grease lubricated bearings.

### 6.3 OIL CHANGES

On all sizes regular oil changes are essential and the following factors should be used to determine the frequency at which these are carried out.

- Oil temperature - unit operating under load.
- Type of oil.
- Environment - humidity, dust, etc.
- Operating conditions - shock, loading, etc.

At elevated temperatures the effective life of the oil is very much reduced. This is most pronounced with oils containing fatty and E.P. additives. To prevent damage to the unit through lubricant breakdown the oil should be renewed as detailed in the following table:

UNIT OPERATING TEMPERATURE °C	RENEWAL PERIOD		
	SYNTHETIC OIL		
65 or less	26000 HOURS	OR	3 YEARS
70	26000 HOURS	OR	3 YEARS
75	22000 HOURS	OR	3 YEARS
80	15000 HOURS	OR	3 YEARS
85	10500 HOURS	OR	3 YEARS
90	7500 HOURS	OR	2 1/2 YEARS
95	6000 HOURS	OR	2 YEARS
100	4500 HOURS	OR	18 MONTHS
<b>NB: INITIAL FILL OF OIL SHOULD BE CHANGED IN A NEW GEAR UNIT AFTER 1000 HOURS OPERATION OR ONE YEAR OR HALF THE ABOVE LIFE WHICHEVER IS THE SOONEST</b>			

**Note:**

Figures quoted are for oil temperatures when the unit has attained normal running temperature when operating under load. These figures are based on normal running but where conditions are particularly severe it may be necessary to change the oil more frequently. When changing lubricant, if same lubricant is not used then unit must be flushed out and filled only with one type of lubricant.

### 6.4 LUBRICANT QUANTITY

The quantity of lubricant required by size and mounting position is given in Tables 1 and 2, Appendix 1. A diagram showing mounting position designations is also included in Appendix 1.

### 6.5 APPROVED LUBRICANTS

Table 5 Appendix 1 gives the lubricants approved for use in the gear unit.

### 6.6 APPROVED GREASES

Appendix 4 gives the greases approved for use in the unit.

### 6.7 CLEANING

With the drive stationary periodically clean any dirt or dust from the gear unit and the electric motor cooling fins and fan guard to aid cooling.

## 7 NOISE

The range of Series A product satisfies a noise (sound pressure level) of 85 dB(A) or less when measured at 1 metre from the unit surface.

Measurements taken in accordance with B.S.7676 Pt1 : 1993 (ISO 8579-1 : 1993).

Any further information or clarification required may be obtained by contacting:-

David Brown Radicon Ltd  
Park Gear Works  
Huddersfield  
England HD4 5DD  
Telephone: 01484 422180

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### TO CHANGE LUBRICANT

- 1) Remove oil drain plug
- 2) Allow oil to drain
- 3) Replace drain plug
- 4) Refill through vent / filler plug up to the level marked on the dipstick

The Series A Mid Range units are despatched without oil (see section 6.1) and must be filled with the correct grade of lubricant to the correct level before starting. The David Brown Radicon oil grade is stamped on the name plate and the oil level marked on the dipstick. These are determined from the operating speed of the gear unit and the ambient temperature range, which if not given when ordering will be assumed to be 1450 rev / min input and ambient temperature range 0 to 35°C. Oil grades and oil level should therefore always be checked before installation. To determine the David Brown oil grade refer to tables 3 and 4. To determine the oil capacity refer to tables 1 and 2. Oil capacities are only approximate and units should be filled to the levels marked on the dipstick. Do not overfill as excess will cause overheating and leakage.

When changing lubricant, if same lubricant is not used then the unit must be flushed out and filled with one type of lubricant.

**TABLE 1 LUBRICANT QUANTITY (Litres) SINGLE REDUCTION**

David Brown Mounting Position See Page 9	Size of Unit			
	1002	1252	1602	2002
1	1.8 (2.3)	3.2 (4.1)	5.4 (7.9)	8.0 (12)
2	2.0 (3.3)	4.0 (6.6)	7.0 (13)	11.4 (21.5)
3 & 4	1.7 (2.1)	3.6 (3.7)	6.6 (7.8)	10 (11.5)
5, 6 & Cooling Tower	REFER TO DAVID BROWN RADICON			
Agitator	1.8 (2.1)	3.8 (4.0)	6.7 (7.4)	9.2 (10.7)

Figures in brackets refer to: - Mounting position 1 with output shaft speed of 100rev/min and below (A1002 & A1252), or 150rev/min and below (A1602 & A2002) } - enter D in column 19  
 - Mounting positions 2, 3 and 4 with input shaft speed of 600rev/min and below

**TABLE 2 LUBRICANT QUANTITY (Litres) DOUBLE REDUCTION**

David Brown Mounting Position See Pages 9 & 11		Unit stage	Size of Unit				
Secondary unit	Primary unit		1002	1252	1602	2002 Reducer	2002 Motorised
1	1 and 5	Primary	*	*	*	1.8 (2.3)	3.8
	2 and 8	Primary	*	*	*	†	6.5
	3 and 7	Primary	*	*	*	2.0 (3.3)	4.4
	4 and 6	Primary	*	*	*	†	4.4
		Secondary	2.3	4.1	7.9	12	12
2	1 and 5	Primary	*	*	*	1.8 (2.3)	3.8
	2 and 8	Primary	*	*	*	†	6.5
	3 and 7	Primary	*	*	*	2.0 (3.3)	4.4
	4 and 6	Primary	*	*	*	†	4.4
		Secondary	3.3	6.6	13.0	21.5	21.5
3 & 4	1 and 5	Primary	*	*	*	1.8 (2.3)	3.8
	2 and 8	Primary	*	*	*	†	6.5
	3 and 7	Primary	*	*	*	2.0 (3.3)	4.4
	4 and 6	Primary	*	*	*	†	4.4
		Secondary	2.1	3.7	7.8	11.5	11.5
5 & 6	1 and 5	Primary	REFER TO DAVID BROWN RADICON				
	2 and 8	Primary					
	3 and 7	Primary					
	4 and 6	Primary					
		Secondary					

† Refer to David Brown Radicon \* No oil required factory filled with lubricant  
 Figures in brackets are for the primary units with an output speed 100 rev / min and below.

**TABLE 3 OIL GRADES**
**SINGLE REDUCTION UNITS, DOUBLE REDUCTION WORM/  
WORM, SECONDARY UNITS SIZES 1002, 1252, AND 1602**

Ambient Temperature	Wormshaft speed *		
	Above 750 rev/min	750 rev/min - 300 rev/min	Below 300 rev/min
-30 to 20°C	4G	5G	6G
0 to 35°C	5G	6G	7G
20 to 50°C	6G	7G	8G

**TABLE 4 OIL GRADES**
**TRIPLE REDUCTION HELICAL/WORM/WORM SIZE 2002  
DOUBLE REDUCTION WORM/WORM SIZE 2002**

Ambient Temperature	Wormshaft speed *		
	Above 1800 rev/min	1800 rev/min - 500 rev/min	Below 500 rev/min
-30 to 20°C	4G	5G	6G
0 to 35°C	5G	6G	7G
20 to 50°C	6G	7G	8G

\* The secondary wormshaft speed for the worm/worm units can be calculated using the primary unit ratios given in the Series A Mid Range full technical catalogue

**TABLE 5 APPROVED LUBRICANTS**

\* Only one grade available hence no grade designation

**TYPE G - POLYGLYCOL BASE SYNTHETIC**

LUBRICANT SUPPLIER	LUBRICANT RANGE NAME	DAVID BROWN GRADE No				
		4G	5G	6G	7G	8G
Batoyle Freedom Group	Helicol W	* (-15)				
Boxer Services Limited	Boxergear W	150 (-15)	220 (-31)	320 (-31)	460 (-28)	
BP Oil International Limited	Enersyn SG-XP		220 (-31)		460 (-34)	680 (-28)
Caltex	Synlube CLP	150 (-37)	220 (-34)	320 (-31)	460 (-28)	680 (-31)
	Synthetic Gear Lubricant	* (-25)				
Carl Bechem GmbH	Berusynth EP	150 (-26)	220 (-25)	320 (-25)	460 (-25)	680 (-28)
Castrol International	Alphasyn PG	150 (-34)	220 (-34)	320 (-31)	460 (-28)	
Esso/Exxon	Glycolube	150 (-25)	220 (-25)	320 (-25)	460 (-23)	
Fina	Cirkan S	150 (-40)	220 (-43)	320 (-43)	460 (-37)	
	Giran S	150 (-49)	220 (-46)	320 (-43)	460 (-40)	
Fuchs Lubricants (UK) Plc	Renogear PGW	120 (-23)				
Fuchs Mineraloelwerke GmbH	Renolin PG	150 (-34)	220 (-34)	320 (-34)	460 (-34)	680 (-28)
Inspec UK	Breox Worm Gear Lube	65 (-25)				
	Breox Industrial Lubricant Sw	150 (-25)	220 (-25)	320 (-25)	460 (-23)	
	Breox Oil Soluble Industrial Lub		220 (-23)			
Klüber Lubrication	Klübersynth GH6	150 (-30)	220 (-25)	320 (-25)	460 (-20)	680 (-20)
Kuwait Petroleum International	Q8 Gade		220 (-22)	320 (-22)	460 (-22)	
Mobil Oil Company Limited	Glygoyle	22 (-25)	30 (-22)	HE320 (-37)	HE460 (-35)	
Optimol Ölwerke GmbH	Optiflex A	150 (-31)	220 (-28)	320 (-28)	460 (-28)	680 (-28)
Shell Oils	Tivela	SA (-25)	SB (-25)	SC (-25)	SD (-23)	
Texaco Limited	Synlube CLP	150 (-37)	220 (-34)	320 (-31)	460 (-28)	680 (-31)
Tribol, Molub-Alloy	Tribol 800	150 (-37)	220 (-27)	320 (-25)	460 (-25)	680 (-25)

Number in brackets indicates recommended minimum operating temperature (°C)

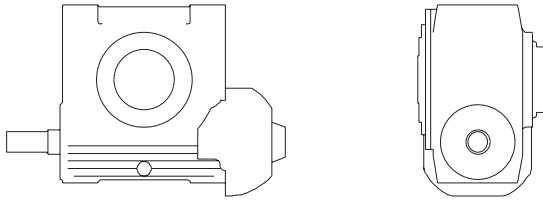
**NOTE:** These lubricants should not be used in units fitted with trailing sprag holdback devices without prior agreement with the manufacturer or David Brown Radicon Applications Department; the additives, or the base fluids may modify the coefficient of friction which these devices depend on.

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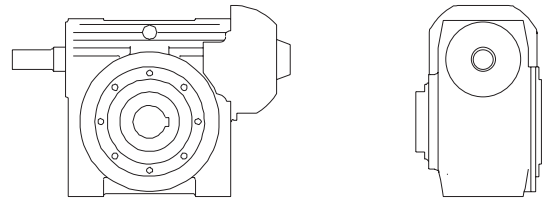
**DOUBLE OUTPUT SHAFTS ARE AVAILABLE FOR ALL MOUNTING POSITIONS**

**COLUMN 13 ENTRY**

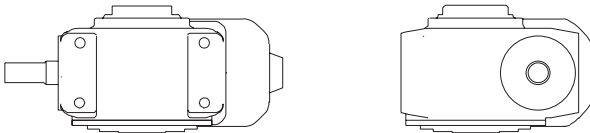
**MOUNTING 1**



**MOUNTING 2**

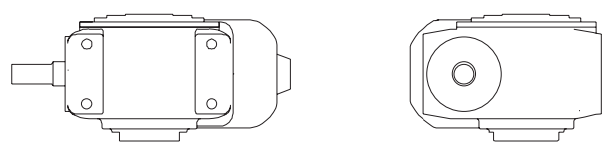


**MOUNTING 3**



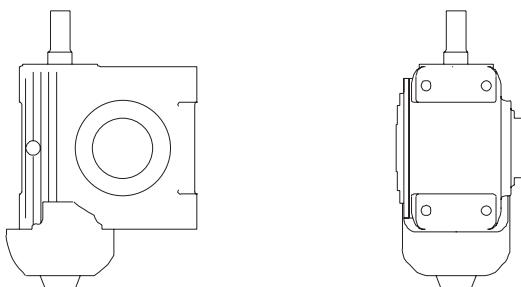
**MACHINED FACE ALWAYS AT BOTTOM**

**MOUNTING 4**

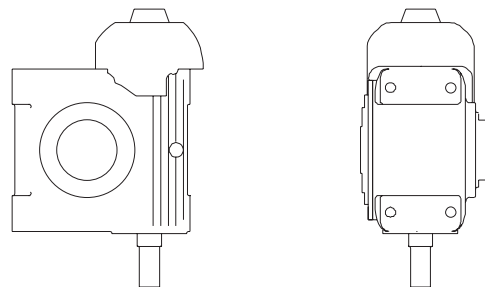


**MACHINED FACE ALWAYS AT TOP**

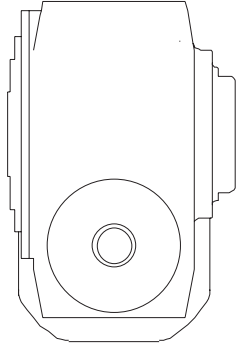
**MOUNTING 5**



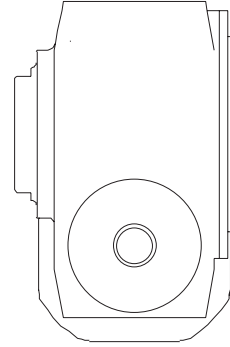
**MOUNTING 6**



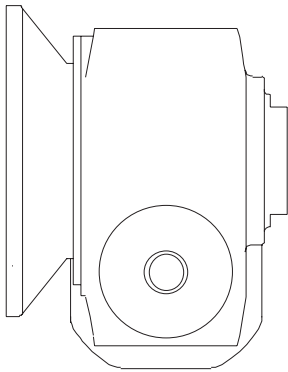
### COLUMN 9 ENTRY - UNIT VERSION



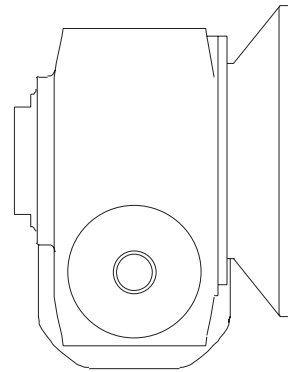
**W** STANDARD UNIT WITH  
MACHINED FACE ON LEFT



**Y** STANDARD UNIT WITH  
MACHINED FACE ON RIGHT

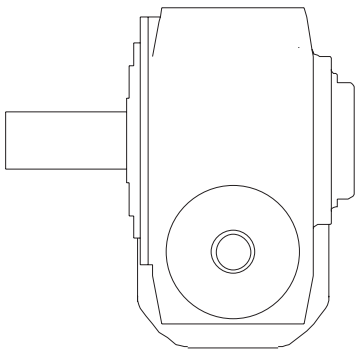


**F** STANDARD UNIT WITH  
OUPUT FLANGE ON LEFT

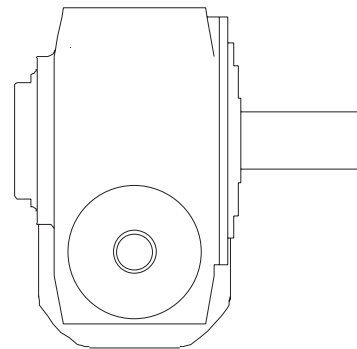


**H** STANDARD UNIT WITH  
OUPUT FLANGE ON RIGHT

### COLUMN 11 ENTRY - OUTPUT SHAFT

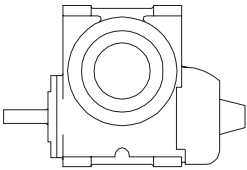
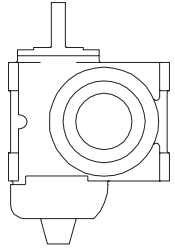
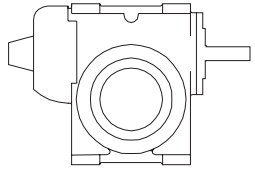
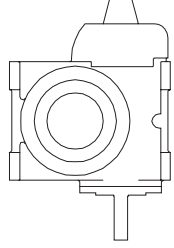
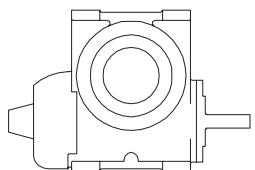
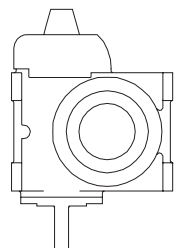
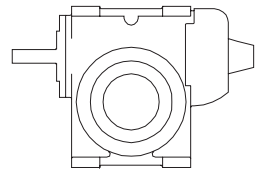
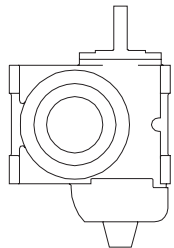


**C** STANDARD UNIT WITH  
OUTPUT SHAFT ON LEFT



**E** STANDARD UNIT WITH  
OUTPUT SHAFT ON RIGHT

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COLUMN 14 ENTRY		COLUMN 14 ENTRY	
1		2	
3		4	
5		6	
7		8	

FOR SINGLE REDUCTION ENTER



SIZE 2002 MOTORISED, ONLY MOUNTING POSITIONS 1, 2, 3 AND 4 ARE AVAILABLE

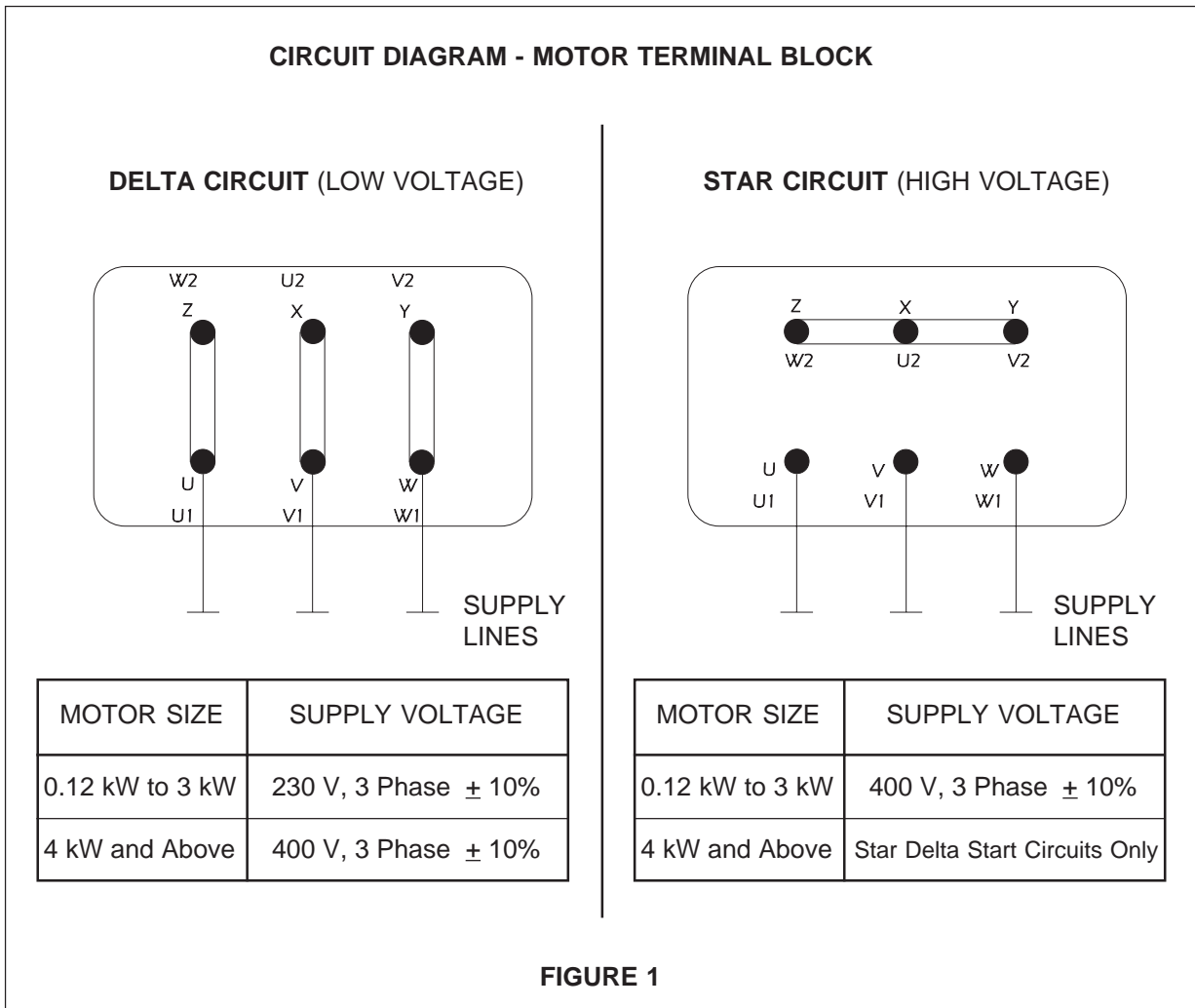
### THREE PHASE INDUCTION MOTOR INSTALLATION

#### CONNECTION TO MAINS POWER SUPPLY

- Connection of the electric motor to the mains supply should be done by a qualified person.
- Connect motor terminals in accordance with the diagram inside the terminal box cover. (Also identified in Fig. 1 on this sheet).

Note: It is important that the mains supply details are checked against the nameplate data and that they are connected as indicated on the nameplate. The correct sizing of the cables to electrical regulations is essential.

- To change the direction of rotation of the electric motor, one of the three main line terminals should be changed with the other.
- Connect the earth conductors to the marked earth terminals.



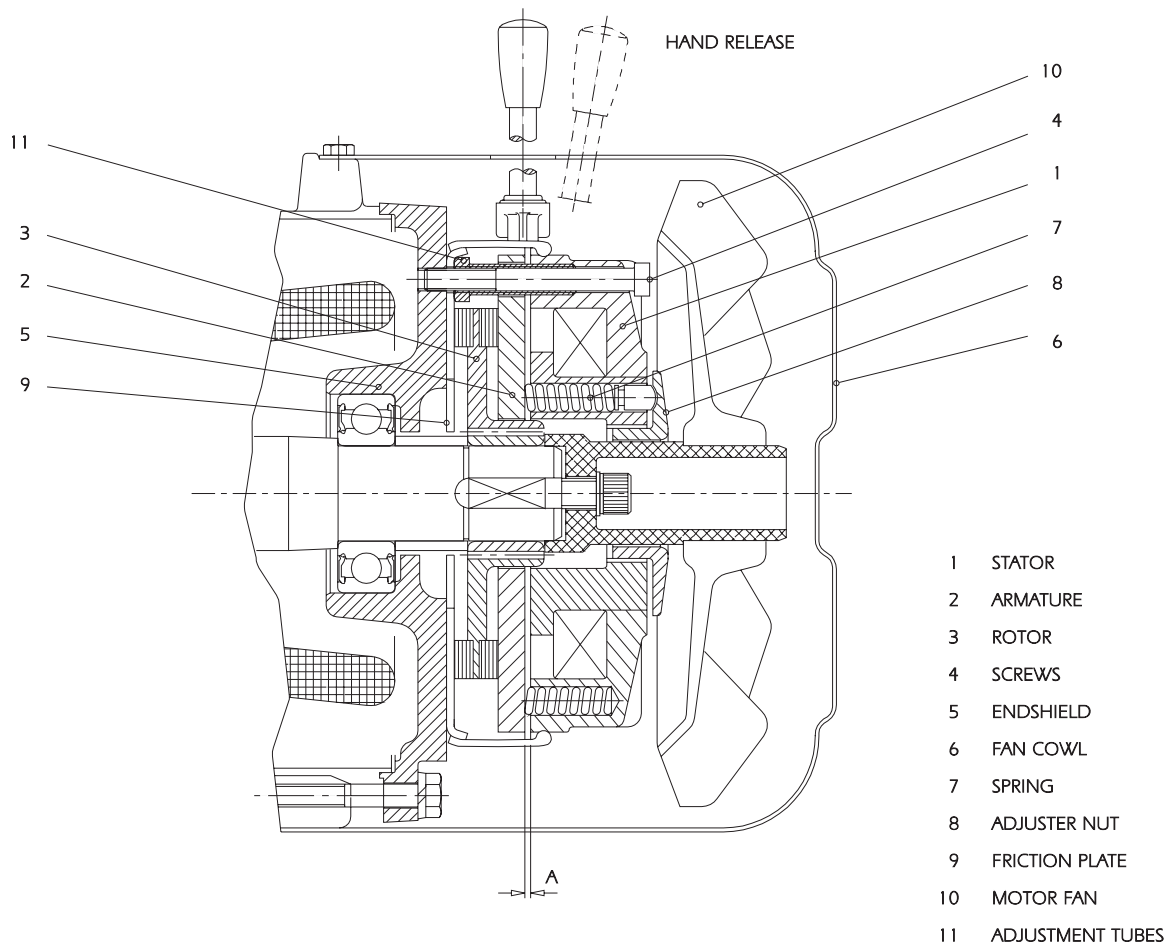
NOTE: This instruction only applies to David Brown Radicon plated motors. Motors fitted by the customer or requested by the customer of David Brown Radicon from a different manufacturer will have separate documentation provided with it.



### MAINTENANCE (BRAKE)

To maintain safety and efficient brake action, regular brake inspections are essential. Generally, a three monthly interval is adequate.

**NOTE:** More frequent inspections should be made for arduous applications (particularly cranes, hoists, lifts or high inertia drives).



**FIGURE 5**

### CHECKS AND ADJUSTMENTS (Fig 5)

**NOTE:** To access the brake for inspection remove fan cowl (6), any adjustment may require the removal of the motor fan (10) also.

- 1 Check the brake is free of oil, grease and excess dust.
- 2 Check the maximum air gap 'A' (Fig 5), this must not be exceeded. Use a feeler gauge and check in three positions, ensuring the gap is even (see table 1).

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Where adjustment is needed, slacken screws (4) and reset the gap by turning adjustment tubes (11). Re-tighten screws (4) to the correct torques in table 1.

- 3 At the same time as 2, check that the rotor (3) has not worn below the minimum thickness (see table 1)
- 4 If the brake is fitted with a hand release, check the hand release air gap 'U' (Fig 6, and table 1). This is a minimum figure, do not allow smaller settings. To reset this gap tighten the hexagonal hand release nuts (15).

### TORQUE ADJUSTMENT

The brake is supplied with nominal torque (table 1) set at the factory. This torque can be reduced by unscrewing the torque nut (8) (Fig 5) using a 'C' spanner to approximately 60% of nominal torque. Torque reduction steps identified in table 1.

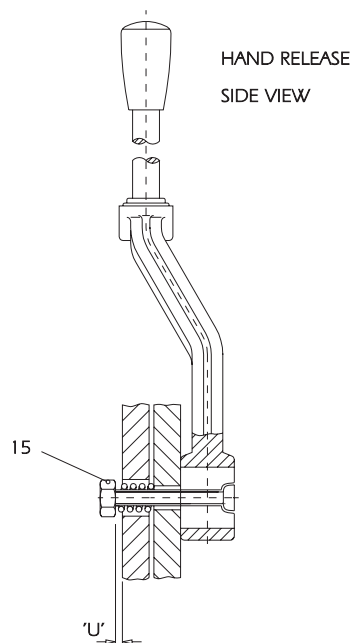


FIGURE 6

TABLE 1

MOTOR FRAME SIZE		63	71	80	90	100/112	132
BRAKE SIZE		06	06	08	10	12	14
BRAKE TORQUE	Nm	2.85	4	8	16	32	60
A	mm	0.2	0.2	0.2	0.2	0.3	0.3
A max	mm	0.5	0.5	0.5	0.5	0.75	0.8
ROTOR BRAKE DISC MIN THICKNESS	mm	4.3	4.3	5.3	7.3	6	6.6
HAND RELEASE CLEARANCE 'U'	mm	1	1	1	1	1	1
BRAKE TORQUE REDUCTION/STEP	Nm	0.2	0.2	0.4	0.6	1.2	1.6
ASSEMBLY KIT BOLTS TIGHTENING TORQUE	Nm	3	3	6	10	10	25

SUPPLIER	LUBRICANT RANGE	ALLOWABLE OPERATING TEMPERATURE RANGE °C	
		ABOVE	TO
BP Oil International Limited	Energrease LS-EP	-30	130
Caltex	Multifak EP	0	120
Castrol International	LMX Grease	-40	150
	Spheerol AP	-30	110
	Spheerol EPL	-10	120
Klüber Lubrication	Klüberlub BE 41-542	-20	140
Mobil Oil Company Limited	Mobilgrease XHP	-15	150
	Mobilith SHC	-20	180
Omega Manufacturing Division	Omega 85	-40	230
Optimol Ölwerke GmbH	Longtime PD	-45	140
Shell Oils	Albida RL	-20	150
	Alvania EP B	-20	120
	Nerita HV	-30	130
Texaco Limited	Multifak All Purpose EP	-30	140

**Notes:**

- 1) All the above greases are NLGI grade 2.
- 2) Refer to David Brown Radicon Application Engineers if the unit is operating in an ambient temperature outside the range of -30°C to 50°C.

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### SHAFT ALIGNMENT

Errors of alignment fall into categories of angularity (see figure 1) and eccentricity (see figure 2), or a combination of both.

Errors of angularity should be checked for and corrected before errors of eccentricity

Alignment in accordance with the following procedure will ensure vibration levels meeting those set out in ISO 10816 Part 1.

#### Errors of Angularity

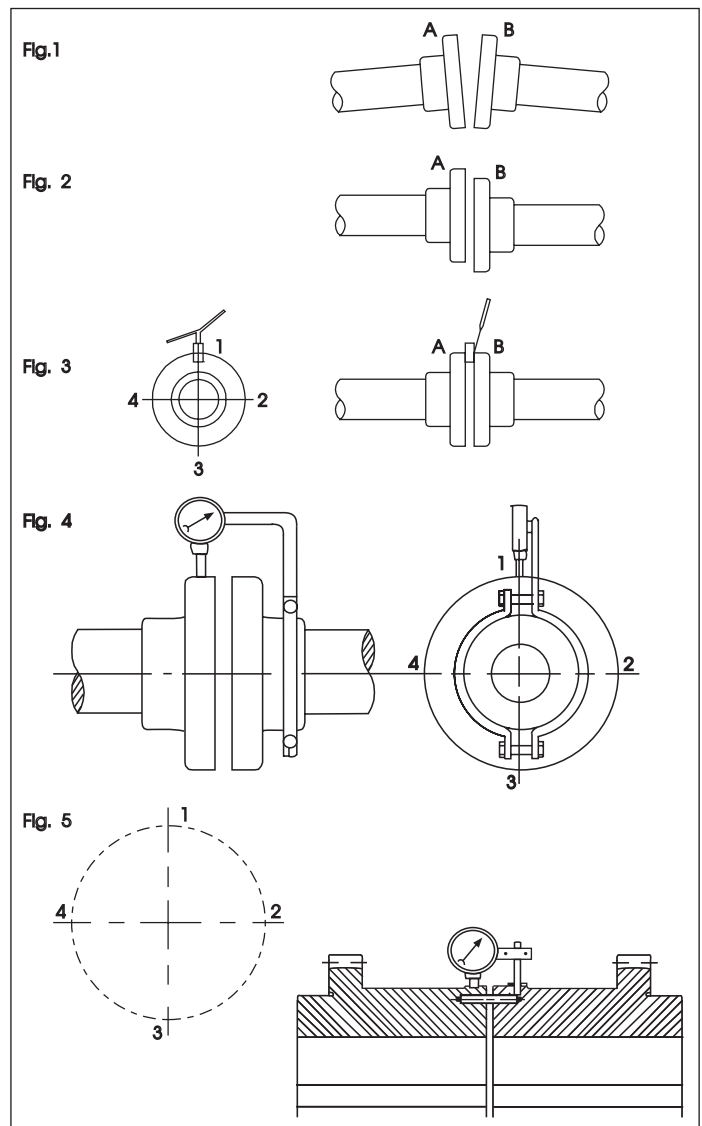
If the faces are perfectly true, the angularity can be checked by keeping both shafts stationary and taking measurements with a block gauge and feelers at the four points 1, 2, 3 and 4 as shown in figure 3. The difference between the readings 1 and 3 will give the error of alignment in the vertical plane over the length of the shaft equal to the diameter of the coupling flanges, and from this the difference in the relative heights of the feet of the motor or other connected machine can be found by proportion. Similarly the difference between the readings 2 and 4 gives the amount of sideways adjustment necessary to correct any errors of alignment in the horizontal plane.

Generally, however, the coupling faces will not be absolutely true and whilst any errors so found could be allowed for in checking angularity by the stationary method an easier method presents itself. This consists in marking the points 1 on both "A" and "B" and rotating both half couplings, keeping the marked points together. By taking measurements each quarter-revolution the errors in the vertical and horizontal planes are again found.

The permitted angularity error is as follows

TYPE OF COUPLING	ALLOWABLE GAP (G) (mm)
Flexible coupling with rubber elements or Double engagement gear type couplings	$G = 0.002 D$
Single engagement gear type coupling	$G = 0.001 D$
Rigid coupling	$G = 0.0005 D$

NOTE: D is the diameter (mm) at which the gap is measured.



NOTE: Check the alignment after running the unit until it has attained its normal working temperature. Any discrepancies can then be rectified.

### Errors of Eccentricity

The procedure for measuring eccentricity is precisely analogous to that used for angularity. In this case, however, the measurements are taken in a radial direction and the most convenient and accurate means of doing this utilises a dial indicator suitably clamped to one half coupling, and bearing on the hub or flange of the other, as shown in figures 4 and 5 on page 17.

Care must, however, be taken to ensure the support for the dial indicator is sufficiently rigid to prevent the weight of the indicator from causing deflection and, in consequence, inaccurate readings. Extra care should be taken where taper roller bearings are fitted to ensure that alignment is checked with shafts in mid-point position and a final check made with the unit at operating temperature.

The permitted eccentricity error which can be accommodated in addition to that of the angularity error is as follows :-

<b>TYPE OF COUPLING</b>	<b>UNIT SIZE</b>	<b>ALLOWABLE ECCENTRICITY (mm)</b>
Flexible rubber element	1002 and 1252	0.100
	1602 and 2002	0.125
Gear type	1002 and 1252	0.050
	1602 and 2002	0.075
Rigid	1002 and 1252	0.025
	1602 and 2002	0.030

### **SPECIAL NOTE CONCERNING RIGID COUPLINGS**

In lining up elements involving rigid couplings it is important that no attempt is made to correct errors of alignment or eccentricity greater than those above by tightening of the coupling bolts (This applies when the system is cold or at operating temperature). The result is mis-alignment and the setting up of undue stresses in the shaft, coupling and bearings. This will be revealed by the springing apart of the coupling faces if the bolts are slackened off. A check on the angularity of a pre-assembled job, after bolting down, can be obtained in the case of rigid couplings by slackening off the coupling bolts, when any mis-alignment will cause the coupling faces to spring apart. This check may not, however, reveal any strains due to eccentricity owing to the constant restraint imposed by the spigot.

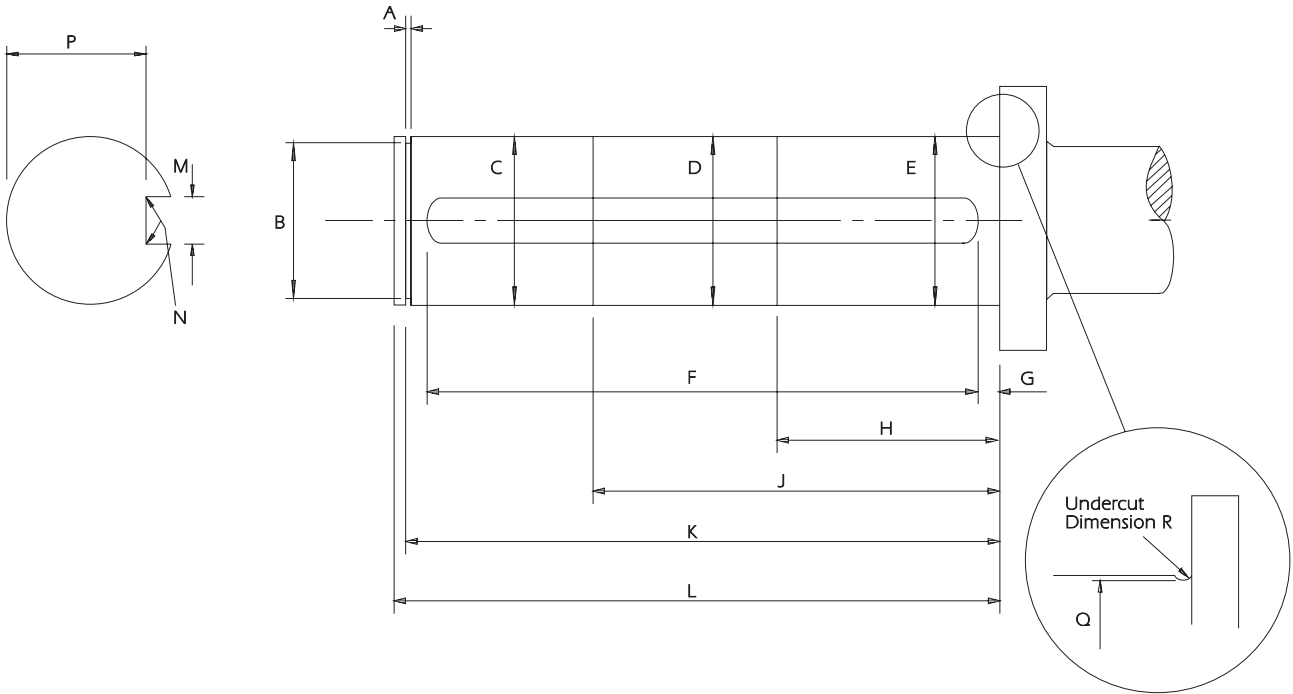
### **SERIES X COUPLINGS**

David Brown Radicon Limited, produce standard flexible couplings to cover the complete range of Radicon units as follows:

- NYLICON couplings, type 600 designed for fractional and small power drives up to a maximum torque of 465 Nm.
- CONE RING couplings, type 611, 612, 613 and 614 designed for medium or heavy duty use. They are of the pin and bush type with bore sizes from 19 to 170 mm diameter.
- GEAR TYPE couplings, types 621, 622 and 623 of single and double engagement types covering flange and sleeve designs. Hardened hubs are profile ground, fully crowned and chamfered. External dimensions are metric.
- RIGID TYPE couplings, type 629 with bore sizes up to 280 mm diameter.

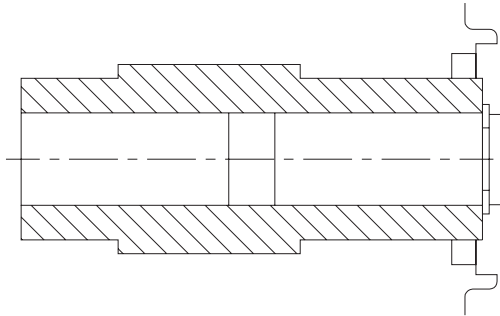
9509

### SHAFT MOUNT UNITS CUSTOMER SHAFT DETAIL

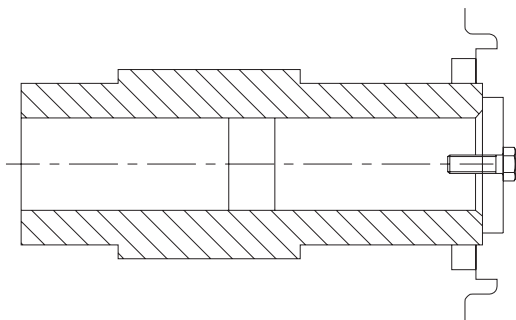


SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R
<b>A1002</b>	2.29	47.00	50.000	49.62	50.000	186.5	7	70	130	202.15	207	13.982	0.9R	44.50	48.0	1.2R
	2.15	46.70	49.975	49.38	49.975	186.0				202.10		13.939	0.7R	44.30		
<b>A1252</b>	2.79	62.00	65.000	64.62	65.000	226.5	7	85	155	242.65	248	17.982	0.9R	58.00	62.5	1.2R
	2.65	61.70	64.970	64.38	64.970	226.0				242.60		17.939	0.7R	57.80		
<b>A1602</b>	2.79	72.00	75.000	74.62	75.000	261.5	7	95	180	277.65	283	19.978	0.9R	63.50	73.0	1.2R
	2.65	71.70	74.970	74.38	74.970	261.0				277.60		19.926	0.7R	63.20		
<b>A2002</b>	3.33	86.50	90.000	89.62	90.000	281.5	7	105	190	298.15	304	24.978	1.5R	81.00	88.0	1.2R
	3.15	86.15	89.965	89.38	89.965	281.0				298.10		24.926	1.25R	80.80		

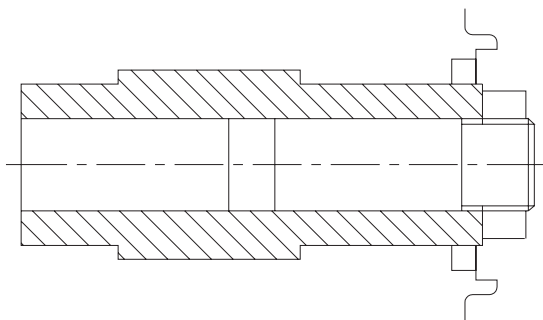
**SHAFT MOUNT UNITS  
ALTERNATIVE SHAFT FIXING METHODS**



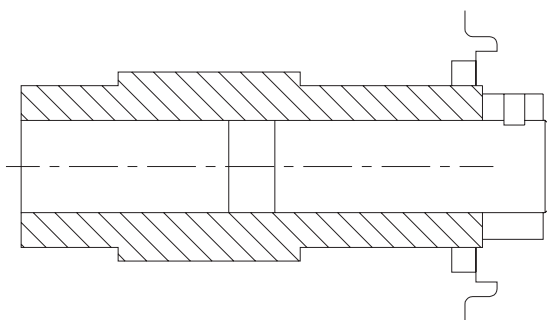
SHAFT MOUNT UNITS RETAINED WITH A  
CIRCLIP



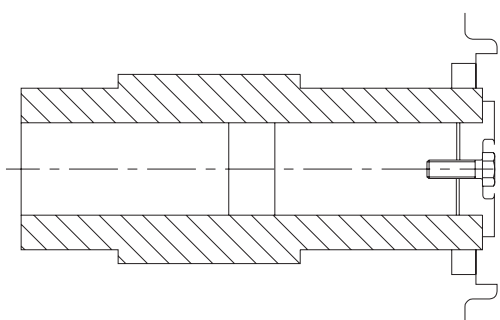
SHAFT MOUNT UNITS RETAINED WITH A  
BOLT AND PLATE



SHAFT MOUNT UNITS RETAINED WITH A  
LOCKNUT



SHAFT MOUNT UNITS RETAINED WITH A  
COLLAR AND GRUBSCREW



SHAFT MOUNT UNITS RETAINED WITH A  
RECESSED PLATE AND BOLT