

INSTALLATION & MAINTENANCE

SERIES X

DAVID BROWN
R A D I C O N

CONE RING COUPLING
(STANDARD & BRAKE DRUM TYPES)

RMB Engineering Services Ltd

Union Street, West Bromwich B70 6BP U.K.

Tel +44 (0) 121 500 1910 Fax +44 (0) 121 500 1911

e-mail: sales@rmbgroup.co.uk

web site: www.rmbgroup.co.uk

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:

1.0 INSTALLATION PROCEDURE

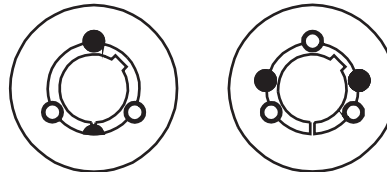
1.1 INSTALLATION OF THE HUBS (Parallel Bores)

- a) Ensure all parts are clean and free from grit.
- b) Check key fit in both shaft and hubs.
- c) Install each coupling half on its shaft, the half containing the rubber elements on the driven shaft. For press fits apply Tallow to the hub bores and shafts, ensure the hubs are square with the shafts and the keyways are in line before pressing on.
- d) Set gap between coupling halves (table 2, page 4).
- e) Adjust for acceptable shaft alignment as per section 1.3.

Note: use metal shim strips under feet as packing to achieve adjustments.

1.2 INSTALLATION AND REMOVAL OF HUBS WITH TAPER BUSHES

TAPER - LOCK R



1.2.1 TO INSTALL


- a) Remove the protective coating from the bore and outside of bush, and bore of hub. After ensuring that the mating tapered surfaces are completely clean and free from oil or dirt, insert the bush in the hub so that the holes line up.
- b) Sparingly oil the thread and point of grubscrews, or thread and under head of capscrews. Place the screws loosely in the holes tapped in the hub, shown thus in the diagram .
- c) Clean the shaft. If a key is to be fitted place it in the shaft keyway before fitting the bush. It is essential that it is a parallel key and side fitting only, and has top clearance.
- d) Fit the hub and bush to the shaft as one unit, and locate in position desired, remembering that the bush will nip the shaft first and then the hub will be slightly drawn on to the bush.
- e) Using a hexagon wrench (Allen key) tighten the screws gradually and alternately until all are pulled up very tightly.

TABLE 1 TIGHTENING TORQUE

COUPLING SIZE		01	03	05	07	08	09	10
SCREW DETAILS	QUANTITY	2	2	2	2	3	3	3
	SIZE BSW	1/4"	3/8"	1/2"	5/8"	1/2"	3/4"	7/8"
TIGHTENING TORQUE (Nm)		5.6	20	50	90	115	190	270

- f) Hammer against the large end of the bush using a block or sleeve to prevent damage. The screws will now turn a little more. Repeat this alternate hammering and screw tightening once or twice to achieve maximum grip on the shaft, particularly necessary if a key is not fitted.
- g) After the drive has been running under load for a short time, stop and check tightness of screws.
- h) Fill the empty holes and screw heads with grease to exclude dirt.

1.2.2 TO REMOVE

- a) Slacken all screws by several turns. Remove one (size 08 to 10, remove two) and insert it (them) into the jacking off holes shown thus ● in diagram, after oiling thread and point of grub screws or thread and under head of cap screws.
- b) Tighten the screw(s) until the bush is loosened in the hub and the assembly is free on the shaft.
- c) Remove the assembly from the shaft.

1.3 SHAFT ALIGNMENT

- a) Check shaft alignment as follows:-

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.

- b) 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 (Fig 3a method for standard couplings, and 3b and 3c are methods for the brake drum type coupling). 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 allowable gap for 5 minutes angular misalignment is given in table 2, page 4.

- c) 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 figure 4 (Fig 4a for standard coupling, and 4b for the brake drum type coupling).

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 allowable gap for a parallel offset to 5 minutes angular misalignment is given in table 2, page 4.

Figure 1

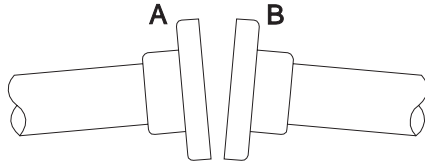


Figure 2

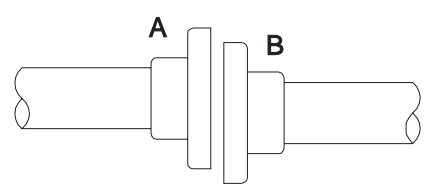
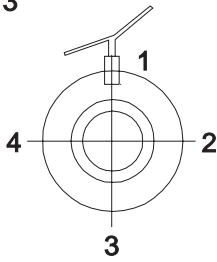
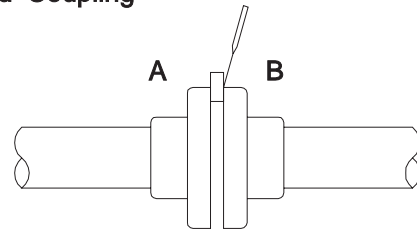


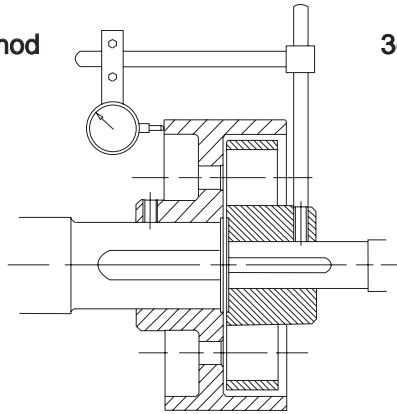
Figure 3



3a) Standard Coupling



3b) Clock Gauge Method
for Brake Drum
Coupling



3c) Gauge Method for
Brake Drum Coupling

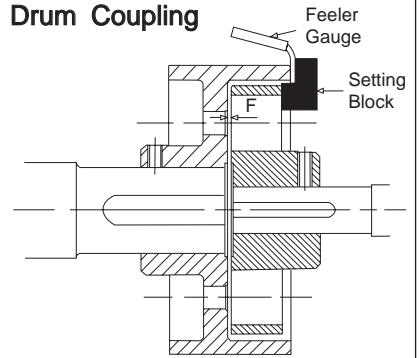
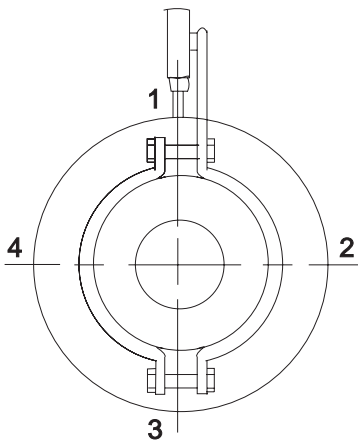
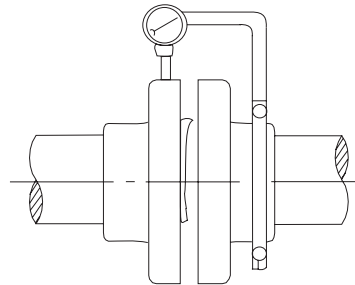


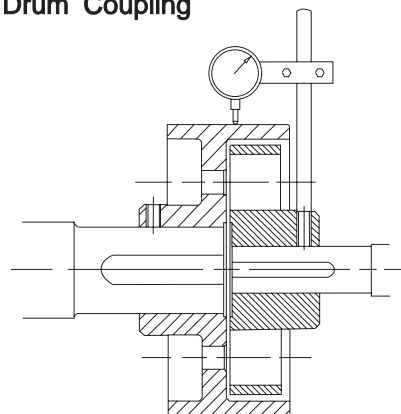
Figure 4



4a) Standard Coupling



4b) Brake Drum Coupling



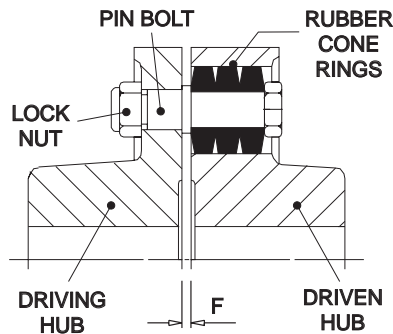


TABLE 2 ALLOWABLE GAP & ERROR

COUPLING SIZE	GAP F (mm)	ANGULAR MISALIGNMENT		PARALLEL MISALIGNMENT	
		mm	INCHES	mm	INCHES
01	3	0.195	0.0077	0.022	0.0009
02	3	0.214	0.0084	0.022	0.0009
03	3	0.249	0.0098	0.030	0.0012
04	3	0.281	0.0111	0.030	0.0012
05	3	0.313	0.0123	0.030	0.0012
06	3	0.369	0.0145	0.055	0.0022
07	3	0.406	0.0160	0.055	0.0022
08	3	0.480	0.0189	0.055	0.0022
09	6	0.540	0.0212	0.078	0.0031
10	6	0.609	0.0240	0.078	0.0031
11	6	0.665	0.0262	0.078	0.0031
12	6	0.775	0.0305	0.078	0.0031

Note: Each of the allowable misalignments are equivalent to an angular misalignment of 5 minutes leaving 50 minutes for misalignment due to thermal growth between the driving and driven machines or distortion of the machines and or foundation under load.

1.4 PIN AND CONE INSTALLATION

- a) Ensure that all parts are clean and free from grit.
- b) Apply silicon grease to rubber cone rings outer diameter. Recommended greases are
 - (i) Shell Silicone Grease
 - (ii) Dow Corning
 or (iii) Rocol MX66 Silicone Grease.
- c) Align driving and driven half coupling pin holes and insert pin/cone assemblies and torque tighten to the tightening torque given in table 3.

TABLE 3 PIN BOLT TIGHTENING TORQUES

COUPLING SIZE	01 AND 02	03, 04 AND 05	06, 07 AND 08	09, 10, 11 AND 12
TIGHTENING TORQUE (Nm)	15	25	115	200

2.0 MAINTENANCE

2.1 CONE RING INSPECTION

The maintenance required is to inspect the rubber cone ring periodically (every 6 months) for the amount of wear. If the wear on the outside diameter of the cone ring is greater than that recommended in table 4 then it is David Brown's recommendation that the cones be changed.

TABLE 4 CONE AND PIN DETAILS

		COUPLING SIZE											
		01	02	03	04	05	06	07	08	09	10	11	12
NOMINAL CONE RING DIAMETER AS NEW (mm)		28.2		38.1			50.8			63.5			
RECOMMENDED ALLOWABLE REDUCTION IN DIAMETER (mm)		0.80	0.95	1.05	1.25	1.40	1.60	1.80	2.2	2.45	2.75	3.1	3.6
NUMBER OF PINS	X611 & X613	6	8	6	8	10	8	10	12	10	12	14	18
	X612 & X614	3	4	3	4	5	4	5	6	5	6	7	9
NUMBER OF CONE RINGS PER PIN		3					4						
CONE RING PART NUMBER		32213-9-102		32213-9-103			32213-9-104			32213-9-105			
PIN ASSEMBLY PART NUMBER		41111-2-024		41111-2-025			41111-2-026			41111-2-027			

2.2 ALIGNMENT CHECK

With the pins removed an alignment check in accordance with Section 1.3 should be carried out.

2.3 REPLACEMENT OF THE CONES

Two options are available:-

- i) Purchase new cone rings to fit onto the existing pins
- or ii) Purchase of new pin and cone assemblies (part numbers given in table 4 for both).

If option 1 is adopted then pin should be thoroughly cleaned and the shank upon which the cones are seated coated with silicone grease before fitting the new cones. The pin assemblies are then fitted back into the coupling as detailed in section 1.4.