

# Instruction manual

Rathi RB: Pin and Bush couplings **B – FLEX**  
Instructions for mounting and maintenance



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## Notes and symbols in these operating instructions

Please note: equivalent to operating instructions the terms, manual or installation instructions can be used, or only instructions. All terms have the same meaning and may be used where adequate.

### Legal Notes

#### Warning-notes

This instruction manual uses notes which have to be observed by the user and service personal during installation and maintenance to avoid material damage or even injuries. Personal handling the equipment should read the instructions carefully und need to understand all points to prevent

accidents. Notes for personal safety are marked clearly with either  or .

These signs are marking the points which need special attention in regard to safety or prevention of potential explosion risk.

Further information are either in bold or different color to attract attention.



This symbol is a warning to a potential risk of explosion

The instructions need to be observed to avoid the risk of explosion damage.



This symbol indicates the risk of personal injury. Not observing the points mentioned marked with this symbol bear the risk that persons can be hurt.

**STOP:** This warning means it could create damage to the product if the instructions are not observed.

**NOTE:** An important information in the instruction manual starts with the bold word **NOTE**. Not observing the note could lead to undesirable results or conditions.

If there are more than one hazard, the symbol for the most serious hazard is used.

#### Qualified personal

All handling of the product shall be made by qualified personal. General safety regulations for the work in and with machines need to be observed. All work on the coupling demand that the machine in which the coupling shall be installed or is installed shall be switched off and the undesired restart is not possible.

## Intended use of the coupling

The intended use of the coupling is to connect in- and output of a power transmission drive with each other, in most cases these are two shafts. For Stationary Application Additional equipment like brake drums, torque limiter, etc. can be added to the couplings and will not change the intended use. The coupling compensates within the technical limits misalignment and dampens shock loads or vibrations.

## Trademarks

All designations indicated with the registered trademark ® are in the ownership of the company owning the registration.

## Exclusion of liability

The content of the instruction manual is carefully checked and all instructions are in compliance with the current state of the design and material. Nevertheless it is possible that mistakes are not found or corrected in the current version of the manual. We will update the manual regular and publish in the internet on the web page [www.rathi-europe.com](http://www.rathi-europe.com). If a mistake becomes known to you, please inform Rathi by mail at [sales@rathi-europe.com](mailto:sales@rathi-europe.com). We don't warrant that the instructions are complete and cover all thinkable points for the instruction and operation of the coupling. If an information is missing please contact us.

## Manufacturer declaration in conformance to EC Machine directive 2006/42/EC

Rathi couplings must be treated as components in the sense of the EC machine directive 2006/42/EC.

A separate declaration of incorporation is available on request.

Information for safe use, installation, start up and operation can be found in this manual.

## Technical data

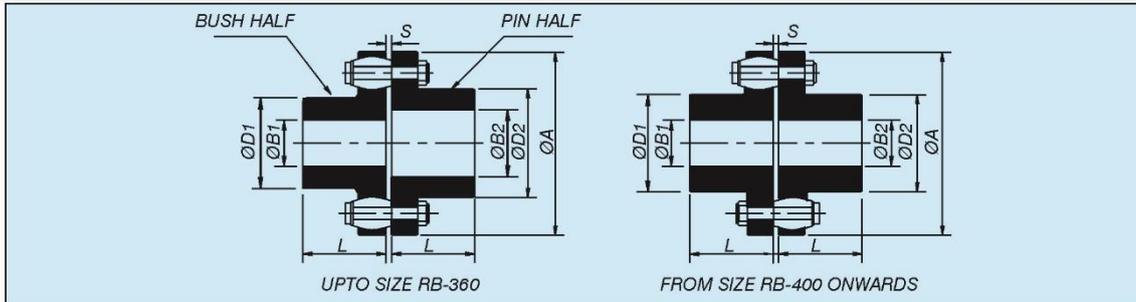
The instructions are for horizontal use of the couplings, with shaft-hub connection with cylindrical bores, with parallel keyways, or with shrink fit. In case a vertical mounting or inclined arrangement is needed please contact Rathi for specific details and instructions of operation. Splined bores to Din 5480 are optional available. Please contact Rathi.

The Rathi couplings are useable in potential explosive areas. The couplings need to be marked with the CE and EX marking if used in this area.



Coupling not marked with the CE and EX marking shall not be used in potential explosive areas.

If a specific drawing is issued for the application, this drawing will content additional information and need to be considered as part of the instruction manual. Information given on the drawing are overriding the general information of the manual if they are covering the same points. The drawing and the manual shall be available to the user of the coupling.



### TECHNICAL DATA

Coupling Size	kW at 100 RPM	Troque Nm	Max. Speed rpm	Min. Bore	Max. Bore		ØA	ØD1	ØD2	L	S	Wt. in kg.	M.I.(WR <sup>2</sup> ) in kgm <sup>2</sup>	Max. Misalignment (±)		
					ØB1	ØB2								Axial (mm)	Radial (mm)	Angular
RB-105-3	1.0	95	7200	11	30	32	105	48	50	45	2-6	2	0.0030	2	0.3	1°
RB-116-4	1.5	146	6100	12	39	42	116	60	68	45	2-6	2.6	0.0050	2	0.3	1°
RB-125-4	1.7	166	5500	14	45	50	125	68	78	50	2-6	3.1	0.0070	2	0.4	1°
RB-144-6	3.3	318	4900	18	50	60	144	82	91	55	2-6	4.3	0.012	2	0.4	1°
RB-162-6	5.5	525	4500	22	60	65	162	89	100	60	2-6	7.5	0.030	2	0.4	1°
RB-178-6	6.7	643	3800	24	70	75	178	105	115	70	2-6	10	0.040	2	0.5	1°
RB-198-10	13	1248	3400	28	80	90	198	124	135	80	2-6	13	0.062	2	0.5	1°
RB-228-11	21	2050	3000	28	90	100	228	133	146	90	4-10	18	0.100	3	0.6	1°
RB-252-12	32	3069	2700	38	105	115	252	156	167	100	4-10	24	0.17	3	0.6	1°
RB-285-11	48	4552	2400	48	115	125	285	170	186	110	4-10	35	0.31	3	0.7	1°
RB-320-12	64	6099	2100	55	125	135	320	196	212	125	4-10	51	0.53	3	0.7	1°
RB-360-11	93	8900	1900	65	135	150	360	212	232	140	4-12	73	1.02	4	0.9	1°
RB-400-10	126	12051	1700	75	160	160	410	230	230	160	4-12	101	1.70	4	1.1	1°
RB-450-12	195	18602	1500	85	180	180	450	260	260	180	4-12	137	2.90	4	1.1	0.5°
RB-500-14	270	25802	1350	95	200	200	500	290	290	200	4-12	180	4.70	4	1.1	0.4°
RB-560-10	325	31003	1200	95	225	225	560	320	320	220	4-8	278	10.70	2	1.5	0.3°
RB-630-12	440	41998	1050	100	250	250	630	355	355	240	4-8	365	17.4	2	1.5	0.3°
RB-710-12	785	75000	950	100	260	260	710	385	385	260	5-9	516	33	2	1.8	0.3°
RB-800-14	1047	100000	850	100	280	280	800	420	420	290	5-9	691	53	2	1.8	0.3°
RB-900-16	1623	154998	750	100	305	305	900	465	465	320	5-9	927	86	2	1.8	0.3°
RB-1000-18	2042	194997	680	125	320	320	1000	515	515	350	5-10	1224	142.8	2	2	0.1°
RB1120-18	2827	269997	600	135	350	350	1120	560	560	380	6-11	1584	231	2	2.2	0.1°
RB-1250-20	3613	344997	550	150	380	380	1250	610	610	420	6-11	2070	367.5	2	2.4	0.1°
RB-1400-20	5550	529999	490	175	440	440	1400	700	700	480	6-12	3060	693	2	2.7	0.1°
RB-1600-24	7854	749995	430	200	480	480	1600	770	770	540	6-12	3960	1155	2	3	0.1°
RB-1800-22	10210	974996	380	225	540	540	1800	870	870	600	8-16	5760	2205	2	3.4	0.1°
RB-2000-26	13614	1299997	340	250	600	600	2000	960	960	660	8-16	7020	3255	2	3.8	0.1°

● PH = Pin Half (Drive) upto size 360      ● BH = Bush Half (Driven) upto size 360

### SPARE PARTS

Coupling SIZE	Pin Half Part No.	Bush Half Part No.	Pin + Washer Part No.	Bush Part No.	No. Of Pin-Bush Assy./Coupling	Nut Size
RB-105-3	RB-105-3/1	RB-105-3/2	RB/P-2	RB/B-2	3	M8
RB-116-4	RB-116-4/1	RB-116-4/2	RB/P-2	RB/B-2	4	M8
RB-125-4	RB-125-4/1	RB-125-4/2	RB/P-2	RB/B-2	4	M8
RB-144-6	RB-144-6/1	RB-144-6/2	RB/P-2	RB/B-2	6	M8
RB-162-6	RB-162-6/1	RB-162-6/2	RB/P-3	RB/B-3	6	M10
RB-178-6	RB-178-6/1	RB-178-6/2	RB/P-3	RB/B-3	6	M10
RB-198-10	RB-198-10/1	RB-198-10/2	RB/P-3	RB/B-3	10	M10
RB-228-11	RB-228-11/1	RB-228-11/2	RB/P-4	RB/B-4	11	M14
RB-252-12	RB-252-12/1	RB-252-12/2	RB/P-4	RB/B-4	12	M14
RB-285-11	RB-285-11/1	RB-285-11/2	RB/P-5	RB/B-5	11	M16
RB-320-12	RB-320-12/1	RB-320-12/2	RB/P-5	RB/B-5	12	M16
RB-360-11	RB-360-11/1	RB-360-11/2	RB/P-6	RB/B-6	11	M20
RB-400-10		RB-400-10	RB/P-7	RB/B-7	10	M20
RB-450-12		RB-450-12	RB/P-7	RB/B-7	12	M20
RB-500-14		RB-500-14	RB/P-7	RB/B-7	14	M20
RB-560-10		RB-560-10	RB/P-8	RB/B-8	10	M36
RB-630-12		RB-630-12	RB/P-8	RB/B-8	12	M36
RB-710-12		RB-710-12	RB/P-9	RB/B-9	12	M42
RB-800-14		RB-800-14	RB/P-9	RB/B-9	14	M42
RB-900-16		RB-900-16	RB/P-9	RB/B-9	16	M42

**NOTES** - \* All dimensions are in mm. Unless otherwise specified.

\* Weight & inertia figures are at maximum bores.

\* Each coupling is capable of withstanding maximum torque of 3 times of nominal torque for short durations such as during start up.

\* For vertical installation contact RATHI.

- In view of our constant endeavour to improve quality of our products, we reserve the right to alter or change Specifications without prior notice.
- This document is the intellectual property of rathi transpower pvt. Ltd. And subject to copyright.

## Other designs

Rathi RB couplings are available with brake drums, brake discs, special flanges and for vertical mounting. Please contact Rathi sales to get specific instructions for this products.

## Flexible Elements

The Rathi Buffers are available in different materials.

The standard is Natural Rubber, optional Polyurethane (PU) or Hytrel (HY) is available.

With PU or HY the nominal torque values are increased and the softness of the material is reduced.

Buffers may be stored in a dry area for up to 5 years if not in direct sun light or artificial light with high ultraviolet content, or high temperatures

Buffers should not come in direct contact with aggressive media.

Buffers must not be heated up during fitting of the hubs.

Buffers must be replaced in sets, only identical buffers may be used in one set for a coupling.

## Standard material

Material of construction	
Component	Material
Pin and Bush half size RB 105 – RB 500	Cast Iron GG 250
RB 560 – RB 2000	Cast Iron GG 300
Pin	EN 8D
Bush	Natural Rubber / PU / HY
NYLOCK Nut	STD

Ratings given in the catalogue are for NR

## Torsional stiffness

B-Flex couplings use a set of resilient barrel shaped buffers. These buffers provide varying torsional stiffness characteristics.

Torsional stiffness is the property of flexible couplings which enables the coupling to absorb shocks and vibrations. A variable torsional stiffness adapts better to the various load conditions during the usage of the machine. Softer start und increase hardness closer to the highest possible torque transmission makes this coupling type universal useable for start-stop applications and reversing use. The barrel shape of the buffers allow higher flexibility at lower load and higher stiffness at higher load.

The following table give the torsional stiffness at nominal torque.

Torsional stiffness for standard B-Flex Couplings	
Coupling size	Torsional stiffness in Nm/rad
RB 105	25.9
RB 116	56.3
RB 125	79
RB 144	146
RB 162	170
RB 178	266
RB 198	443
RB 228	637
RB 252	1077
RB 285	1112
RB 320	1664
RB 360	2416
RB 400	3010
RB 450	5238
RB 500	8084
RB 560	9916
RB 630	15056
RB 710	25616
RB 800	38019
RB 900	65984
RB 1000	On request
RB 1120	On request
RB 1250	On request
RB 1400	On request
RB 1600	On request
RB 1800	On request
RB 2000	On request

## Power and torque rating

### For Natural Rubber Bush

Coupling size	Nominal torque (NR)	Power kW / 100 rpm	Power kW / 1500 rpm
RB 105	95	1	15
RB 116	146	1.5	22,5
RB 125	166	1.7	25.5
RB 144	318	3.3	49.5
RB 162	525	5.5	82.5
RB 178	643	6.7	100.5
RB 198	1248	13	195
RB 228	2050	21	315
RB 252	3069	32	480
RB 285	4552	48	720
RB 320	6099	64	960
RB 360	8900	93	1395
RB 400	12051	126	1890
RB 450	18602	195	2925
RB 500	25802	270	4050
RB 560	31003	325	4875
RB 630	41998	440	6600
RB 710	75000	785	11775
RB 800	100000	1047	15705
RB 900	154998	1623	24345
RB 1000	194997	2042	30630
RB 1120	269997	2827	42405
RB 1250	344997	3613	54195
RB 1400	529999	5550	83250
RB 1600	749995	7854	117810
RB 1800	974996	10210	153150
RB 2000	1299997	13614	204210

Each coupling is able to withstand for a short time (during start up or on shock load) up to 3 times the nominal torque value

## Service conditions

The coupling is suitable for service in accordance with directive 94/9/EC:

- Equipment Group II (use above ground) of categories 2 and 3 for areas where there are explosive gas, vapour, mist, air mixtures as well as for areas where dust can form explosive atmospheres.
- The permissible temperature classes and / Or maximum surface temperatures are assigned as a function of the maximum ambient temperature occurring in the immediate vicinity of the coupling.

### Temperature classes

Ambient Temp.	Temperature Class	Max. surface temp.
Max. 80 °C	T 4	< 108 °C
Max. 50 °C	T 5	< 80 °C
Max. 40 °C	T 6	< 68 °C

- Equipment group I (underground applications) of the category M2
- Explosion group IIA or IIB in case of electrical insulating option



If brake drums are used as additional equipment, the module supplier is responsible for the conformity of the brake with the EX regulations and the applicable directive. The brake drum could add additional hazard like hot surface and / or electrostatic charges which could lead to danger of ignition.

For usage below ground in potential explosive areas, the couplings must only be used with electric motors, which can be switched off on occurring of an explosive atmosphere.

The machines connected by the coupling must be earthed by an leakage resistance of < 10 Mega Ohm

If coated couplings are used in potential explosive areas, the requirements made of the conductivity of the coating and the limitation on the thickness of the coat applied must be observed in accordance with DIN EN 13463-1. Where coatings have a thickness of < 200µm, no electrostatic charge is to be expected.

## Fitting

The couplings are supplied either with pilot bores or with finished bores.

If finished bores are made by Rathi, the standard tolerance is H7 for the bore and JS9 for the keyway.

If the finish bore and keyway has to be added by the customer the following steps need to be observed:

If the coupling half is supplied with fitted pins and buffers, those need to be removed first.

Remove preserving material and grease from the hub.

Clamp the hub on the outside of the flange and align.

Machine the finish bore, observe max. bore values given in the technical data sheet in front of the manual.

We recommend to use following tolerance combinations

Description	Push fit		Press fit		Interference fit		
Shaft tolerance	j 6	h 6	h 6	k 6	m 6	n 6	h 6
Bore tolerance	H7	J7	K7	H7	H7	H7	M7

The Push and press fit is not recommended for reversing applications. Use interference fit for those.



If those tolerance pairs are not observed there is a risk of parts been damaged and fragments flying during usage. The coupling would than become an explosion hazard.

## Marking of the coupling for use in potential explosives zones.

Couplings which are ordered for use in potential explosive zones (ATEX certification) have the following marking.



B Flex  
CE Ex II 2GD -30°C + 80 °C

The marking is in one or two lines.

If the coupling was supplied pilot bored, we would add the CE marking only if the customer has confirmed that he is taking the responsibility and liability for the correct bores and tolerance pairs.

## Installation

Make sure that before the installation is started all persons involved are aware of the instructions and have those understood.

Check the package whether there is any visible damage, and check the coupling for damages.

During transport and handling of the coupling the relevant safety instructions and environmental regulations must be complied at all times.

Make sure that suitable handling and lifting equipment is used.

If the coupling has to be stored, it need to be stored in a dry environment. The buffers shall not be stored in sun light or artificial light with high ultraviolet content.

Damaged parts shall never be installed.

Before putting the machine in duty, the coupling must be covered by a suitable device to avoid undesired touching during rotation.

Also during test runs the safety instructions shall be observed and the cover shall be installed.

Work on the coupling is only allowed during stand still of the machine. The machine main switch shall be turned off and clearly marked that service work is going on.

The usage of safety gloves, shows and glasses should be mandatory.

If spares are used, then only original parts from Rathi are allowed to be used, otherwise there is no warranty on the coupling.

If there are any questions, please contact Rathi sales and service department.

## Axial fixation of the hubs.

The hubs need to be axial kept in position after fitting.

The axial fixation can be done with central washers and bolts or with the set screws in the hub.

The set screw is normally located at the keyway.

Set screws are of the DIN 916 specification

### Tightening torques for the set screws

Set screw size	Tightening torque Nm	Wrench width
M6	4	3
M8	8	4
M10	15	5
M 12	25	6
M16	70	8
M 20	130	10
M24	230	12
M 30	470	14

Tightening torque apply to bolts with untreated surfaces, which are not or only lightly oiled

The use of lubricant paint or other lubricant which reduces the friction coefficient is not allowed.

Use for the torque tightening a wrench with an accuracy of +/- 5%

### Bolt tightening torque for Pins

Coupling size	Bolt size	Tightening torque Nm
RB-105 – RB 144	M8	12
RB 162 – RB 198	M10	24
RB 228 – RB 252	M14	66
RB 285 - RB 32	M16	99
RB 360 – RB 500	M 20	193
RB 560 – RB 630	M36	1128
RB 710 – RB 900	M42	1791
RB 1000 – RB 2000	Information on drawings	

### Balancing

The balancing quality is to be specified with the application. The min. balancing quality to DIN ISO 1940 is G16

The shaft shall be balanced to DIN ISO 8821.

If balancing bores are brought into the hub, the load bearing capacity shall not be reduced. The balancing bores must be applied on a large radius with sufficient distance to the buffer bores, bolt bores and the outer circumference.

## Placing the hub on the shaft

Placing the hubs with cylindrical bores and keyways on the shafts.

Unscrew the set screws

Clean the holes and shaft ends.

Coat the bores of the coupling parts and the shafts with mounting paste.

NOTE: Coupling parts with tapered bore and parallel keyway connection must be fitted in cold condition and secured with suitable end plates, without drawing the coupling parts further onto the taper (fitting dimension = 0)

To place the coupling part with cylindrical bore the coupling hubs can be heated up to 150°C. Observe that the pins and bushes need to be removed first.



When heated parts are mounted they build a potential ignition source. Make sure that during working with the heated parts, there is no potential explosive atmosphere.

Axial securing of the parts could be made using the set screws with tightening the screws using above table. The fixation with means of end plates and shaft bolts is preferred.

When set screws are used check that the set screw is not sticking out of the bore after tightening. This is a potential risk for injuries.



If the set screws are overtightened there is a risk for damage of the parts and parts could fly out.

If the parts are equipped with oil tight fitting, observe the information on the drawing for the max. pressure at fitting.

The hubs shall be moved smartly into the position specified on the dimensional drawing and fixed in position.

If heat is used during assembly observe the above note about potential hazard.

After the parts are in position and cooled down fill the oil channels with clean oil and seal the plugs.

## Alignment

The max. permissible misalignment values are given in the technical data at the beginning of the manual. Those are values which shall not be used during the installation. Target during the installation need to be min. misalignment values.

Check the axial, angular and radial values carefully before setting the coupling into operation.

We recommend the usage of laser alignment to reach the best possible values.

Misalignment compensation in the operating coupling reduces the life time of the buffers and components. If the misalignment values are high they are producing restorative forces in the components, which product stress in the machine parts. Seals, bearings or other parts could be damaged.

Please note that the permissible amount of misalignment is given for speed values of 1500 rpm, or max. speed at higher sizes, if lower as 1500 ( **Refer specification sheet** )

If the speed is higher than the allowable values need to be reduced.

If the speed is lower than the values can be increased.

Contact Rathi for details, giving the operation speed.

## Start up

After the hubs are in position, axially fixed, bolts are checked for been tight, and the buffers and pins are mounted, **the cover around the coupling need to be installed.**

Now the machine can be started.

Check whether the machine is running smooth without vibrations.

If vibrations are obvious, stop the machine and recheck the alignment.

Check connected parts whether they are fixed or lose before restarting the machine.

Observe that during start up under load conditions the startup torque could be substantial higher as the normal running torque. If the overload is too high it could cause damage to the coupling or other parts. In case of the overload breaking, parts might be flying out, causing additional damage or injury.

If the overload can't be avoided, suitable protection devices like torque limiter shall be used. Contact Rathi for further information.

## Faults, reasons and remedy.

Possible cause of faults:

Changing of the alignment:

- Loose foundation bolts or base of the machine
- Coupling wear
- Axial fixation not sufficient
- Bearing problem at the shafts of the rotating equipment.

Remedy.

Fix lose bolts.

Change worn parts

Set alignment to the best possible values before restart.

- Incorrect use  
The coupling shall only be used for the intended usage.

### Frequent faults:

- Important information for selection of the correct size or environmental are not communicated
- System torque too high
- System speed too high
- Application factor not selected correct, causing too small sizes
- Aggressive chemicals causing corrosion or damage
- Ambient temperature too high
- Finish bores tolerance are not in accordance with recommended match at the shaft
- Keyway is not made to tolerance fit
- The max. capacity of the hub shaft connection is not appropriate to transmit the torque
- Dynamic load conditions are not taken into consideration
- Operation conditions are changed against original design and selection
- Critical vibrations are causing problems
- Fatigue torque load too high
- During the installation the parts are mixed up with other couplings
- During installation the buffers are heated with the hubs.
- The surfaces had not been cleaned during installation.
- The foundations are not correctly bolted or the machine base is too weak.
- Buffers are not fitted
- The coupling guard is not sufficient
- No original spare parts are used
- Fault indications like vibrations or noise is not observed.
- Alignment values are not observed.

## Recommended spare parts

The wearing parts are the pin and bush parts.

The lifetime of the elements depend on the amount of misalignment compensation and the ambient conditions. Because it is not possible to predict the exact lifetime of the elements, a spare set should be hold on stock at critical applications.

## Contact address

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