



Bulk Solids Handling Equipment

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INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS TYPE HD, HDG, BS AND BSG ROTARY VALVES

Rota Val Ltd HD, HDG, BS and BSG rotary valves are designed to control flow in dry solids metering and pneumatic conveying systems operating under negative or positive pressure differentials. Close manufacturing tolerances and a wide range of interchangeable components and design features allow each valve to be supplied to match a particular application: the valve should not be used for any other duty **WITHOUT CONSULTING OUR TECHNICAL SALES DEPARTMENT.**

HEALTH AND SAFETY

The valve contains moving parts that can be injurious: it is the responsibility of the system installer / user to ensure the safe installation and operation of the valve. In particular it must be adequately protected and guarded, in compliance with local Health and Safety Regulations. The motor must be isolated before any maintenance or adjustment is carried out: do not operate the valve with the drive guard, or any other part of the valve, removed. Only competent persons must be used to maintain the valve.

IT IS THE RESPONSIBILITY OF THE PURCHASER/USER OF THIS EQUIPMENT TO ENSURE THAT THESE HEALTH AND SAFETY INSTRUCTIONS ARE PASSED ON TO THOSE PERSONS LIKELY TO BE AT RISK

IMPORTANT: ALWAYS QUOTE VALVE SERIAL No. IF FURTHER INFORMATION OR SPARE PARTS ARE REQUIRED.

RESIDUAL HAZARDS

The valve is intended for installation in fully enclosed pipework, when installed the pipework will prevent access to the moving parts. The valve must not be used if either connection remains unconnected.

Deterioration of the gland seals can lead to leakage along the shaft and there will be some product retention in the housing when the valve is disassembled for maintenance purposes. Proper provision for dealing with any potential leakage of the conveyed material must be made.

NOISE

The noise generated by the valve is insignificant compared to the motor and gearbox under normal conditions. Any significant noise generation, is an indication of product build up, trapped particles or mechanical failure and as such can be addressed (see operation and commissioning)

HANDLING

The valve should remain in its packaging until ready for assembly into the system and, as such, it may be moved using equipment fit for the purpose such as pallet trucks or fork lift trucks. Weight details are given below.

Valve inlet Size (mm)	Weights (kg)						
	HD CI or SS	BS CI or SS	HD AL.	BS AL.	Rotor CS or SS	End Cover CI or SS	End Cover AL.
50	35				4	5	2
100	40				7	7	3
125	48				8	9	3.5
150	55	58	40		11	11	4
200	100	108	51		16	17	6
250	150	139	95		25	30	11
300	190	196	115		32	41	16
400	380	358	178		58	72	27
450	570	423		199	93		
500	750						
600	910	1006			206	194	74
750	1420						

Fig 1 HD/BS Weights

Valve inlet Size (mm)	Weights (kg)						
	HDG CI or SS	BSG CI or SS	HDG AL.	BSG AL.	Rotor CS or SS	End Cover CI or SS	End Cover AL.
125/150	55	58	40		11	11	4
150/200	100	108	51		16	17	6
200/250	150	139	95	96	25	30	11
250/300	190	196	115		32	41	16
300/380	380	358	178		58	72	27
400/450	570	423	310	199	93		
450/500	750						

Fig 2 HDG/BSG Weights

Prior to installation remove all packaging. The valve may be lifted by attaching eye bolts, slings or forks under or around the top flange or slings through the bearing housings (avoiding contact with the rotor shaft). Do not lift using gearbox, motor or by any guard.

INSTALLATION

- 1.1 Check the valve externally for damage and internally for foreign objects. Install the valve using compressible gaskets on all flanges; the valve body must not be stressed or used to support ancillary equipment (Fig 3). All valve types must be installed the correct way up, ie, the nameplate will be the right way up and the gearbox will be on the left, viewed from the drive end. BS and BSG valves may be installed in the conveying line with the flow in either direction (Fig 4). Air purge shaft seals (if fitted) must be connected to a regulated clean dry air supply at a pressure of 0.13 to 0.33 bar (2 to 5 p.s.i.) above the maximum static pressure in the valve. Side vent ports (optional) must be connected to suitable pipework, or remain plugged. **Do not allow the valve to be used without plugs or pipe securely attached.**

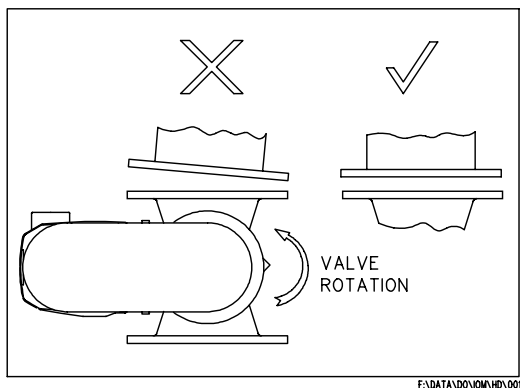


Fig 3

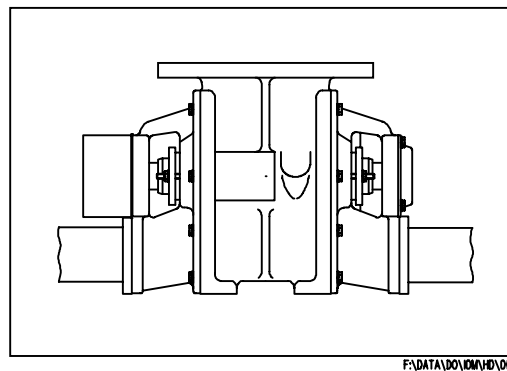


Fig4

- 1.2 The motor must be connected to a suitable electrical supply in accordance with the manufacturer's nameplate/operation and maintenance instructions. Check that the Geared Motor Unit is filled with lubricant, in accordance with the manufacturer's instructions. Top up or fill as necessary. Check that the valve rotates in the correct direction, ie, normally anticlockwise, viewed from the drive end, unless indicated otherwise (check arrow attached to guard or bearing housing). The valve is now correctly installed.
- 1.3 Run the valve empty for one hour to run in the gland packing: lightly tighten the gland followers **do not overtighten** (std. packing only) Failure to run in the packing can result in reduced performance and shortened service life. The valve is now ready for use.

OPERATION AND COMMISSIONING

- 2.1 The speed has been set at our factory for the duty and throughput required, some small variation in speed may be necessary and this can be accomplished by changing the sprocket ratio.
- 2.2 The valve performance is related to the performance of the system; major variations from the specified throughput will require thorough investigation. The features relating to loss of throughput are;
- Incomplete filling of pockets - this may be caused by dilution and/or retardation of product, above the valve due to increased pressure differential, excessive gas purge flow or worn valve/blade tips.
 - Incomplete discharge of the pockets which may result from excessive moisture in the product.
 - Loss of valve speed.
- 2.3 Excessive noise generation or vibration emanating from the valve (in the form of regular pulses, resonance or squealing) may be due to;
- Product build up in the bore.
 - Trapped particles around the vane or end disc.
 - Mechanical failure such as bearing deterioration.

In all cases the valve must be disassembled to ascertain the cause.

Note: Any attempt to dismantle the valve will invalidate the warranty.

MAINTENANCE

- 3.1 Isolate all electric and pneumatic connections before proceeding.
- 3.2 Rota Val Ltd HD, HDG, BS and BSG rotary valves are designed to require minimum maintenance, however, regular attention in accordance with the following instructions will prolong valve life.

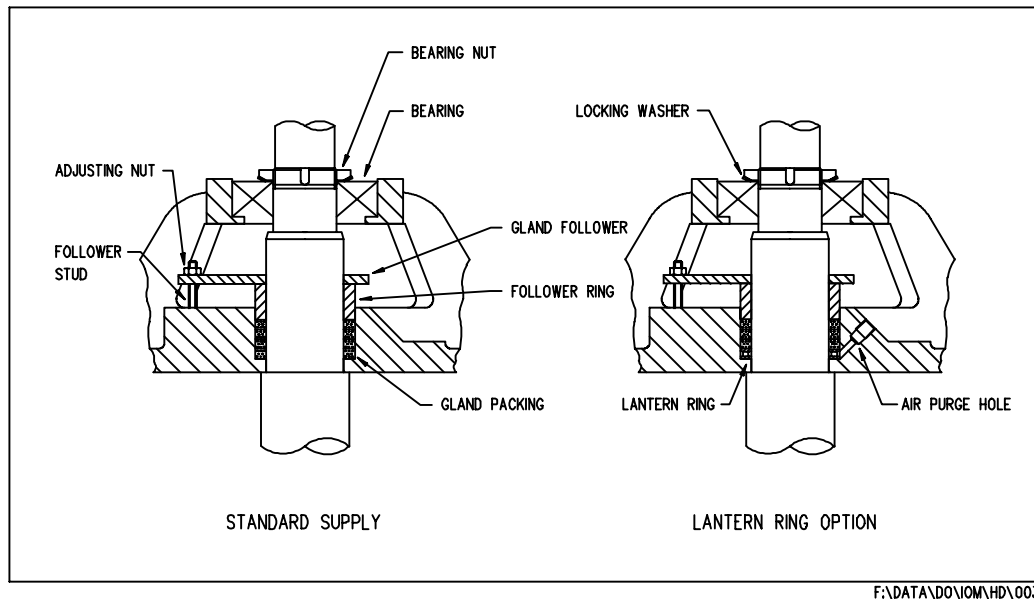


Fig 5

BEARINGS

- 3.3 Std. bearings are grease packed and sealed for life, no maintenance being necessary. Bearings should be checked for wear and damage every 3 months or 2,500 hours and replaced if necessary. Replace every 12 months or 10,000 hours. (See DISMANTLING and REASSEMBLY).
- 3.4 High temperature bearings consist of a bush and thrust washer: these must be checked for wear and excessive rotor end float every 3 months or 2,500 hours and replaced if necessary. Replace every 12 months to 10,000 hours. (See DISMANTLING and REASSEMBLY).

SHAFT SEALS

- 3.5 Std. sealing arrangement is woven acrylic gland packing. Check seal tightness weekly, it is important that the followers are not overtightened, as this will give rise to excessive torque loads on the rotor shaft. Leakage through this type of seal can only be cured by repacking with new material. Prolonged leakage may lead to premature bearing failure.
- 3.6 Chevron type seals. These are not adjustable and leakage can only be cured by replacement.
- 3.7 Other seal arrangements are available, separate supplementary instructions will apply if an alternative type is fitted. If in doubt contact our technical sales department.

AIR PURGE

- 3.8 Ensure that the air passages to the lantern ring do not become blocked by maintaining air pressure to the seals whenever the conveying line is pressurised.

CHAIN DRIVE (where applicable)

- 3.9 Isolate all electric and pneumatic connections before removing guard.

Chain tension should be checked and adjusted at monthly intervals. The drive guard cover will have to be removed, adjustment is by nuts and studs under the geared motor unit. The tension is correct when up and down movement is equal to the pitch, it should not be allowed to exceed 3 pitches before adjustment. Lubricate with a suitable chain grease.

GEARED MOTOR UNITS

- 3.10 All gear units are proprietary and are to be maintained in accordance with the manufacturer's instructions.

REFURBISHING

- 4.1 Wear and tear within the rotary valve is always uneven. However, if valves are fitted with replaceable adjustable blades, some temporary improvement of performance may be achieved by readjustment (see paragraph 7.7).

DISMANTLING

- 5.1 Isolate all electric and pneumatic connections before proceeding.
- 5.2 Rota Val Ltd valves require normal fitting skills and no special tools. All parts of the valve must be handled with extreme care to prevent accidental damage, which could render the valve unserviceable.
- 5.3 Item numbers refer to Fig 7.
- 5.4* Remove drive guard cover (8) and fixing (32).
- 5.5* Slacken adjusting nuts (33), remove chain, sprockets and rotor key (19 to 23). Sprockets are normally fitted with taperlock bushes. Pilot bore sprockets are secured by a grub screw.
- 5.6* Remove drive guard plate (7, 9 & 10), G.M.U. (15) and mounting plate (6, 29 & 36).
- 5.7 Remove the bearing cover from the non-drive end (13, 14 & 17).
- 5.8 Remove bearing nuts and washers (13 & 14).
- 5.9 Remove gland follower nuts (34) and end cover fixings (28 & 38).
- 5.10 Certain valve types/sizes are fitted with tapped holes in each end cover (2); withdraw the end cover using suitable fixings; where this option is not available, the end cover may be removed using external bearing pullers around the bearing housing, taking care not to damage the end of the rotor shaft.
- 5.11 Pull the end covers (2) off the rotor (3) and remove the rotor from the body (1).
- 5.12 The bearings and gland packing can now be removed from the end covers.

* As applicable, where fitted.

INSPECTION

- 6.1 Check the body, rotor and end cover faces for scoring; ease any high spots or rough patches with emery cloth or a smooth file.
- 6.2 Some replaceable blade rotors may be fitted with chamfered blades, or serrated scraper blades: note the orientation of the chamfer before removal from the rotor.
- 6.3 Depending on the amount of wear the blades can be adjusted or new ones fitted.
- 6.4 Check seal area and bearing journals for wear.
- 6.5 Any serious damage in the above areas will impair valve efficiency; if in doubt consult our technical sales department.
- 6.6 Renew bearings and seals.

REASSEMBLY

- 7.1 Ensure all surfaces are clean, free from burrs and accidental damage.
- 7.2 It is vital that the bearings are pressed home against the shoulders in the end cover bearing housings; take care not to damage the bearing seals.
- 7.3 Assemble blades or tips to rotor if a replaceable rotor is used. Note; they must be fitted to the leading edge of the vane.
- 7.4 Slide the rotor into the body, being careful not to allow the vanes to dig into the body. Check also that the rotor drive shaft exits at the same side as the gearbox output shaft.
- 7.5 Slide the end covers onto the rotor, noting that the gland ring and follower must also be assembled at this stage; for chevron seals the packing must also be assembled. Tighten the end cover fixings evenly until both covers are fully home.
- 7.6* Fixed Vane Rotor: Assemble the tab washers and bearing nuts to the rotor, (in addition to thrust bearing and thrust washer for plain bearings), tighten by hand at the non-drive end until the rotor vanes lightly contact the end cover. Measure clearance at drive-end with feeler gauges, slacken the non-drive end nut and use the drive end nut to divide the clearance equally between ends. Both nuts should be pulled up to the bearing with equal feelers between the rotor and end cover at both ends. Back off both nuts by one notch until the rotor turns freely without axial movement and finally check the clearances. Lock both tab washers, (on plain bearings the tab washers also lock into the thrust washers).
- 7.7* Replaceable Rigid Blade Rotor: Assemble the tab washers and bearing nuts to the rotor, tighten by hand at the non-drive end until the rotor hub lightly contacts the end cover. Push the blades towards the non-drive end cover and downwards. Nip up the blade end fixings. Centralise the rotor as above (7.6) measuring clearance at the hub only. Place a feeler equal to the clearance at each end of one blade, pull the blade up to contact the body and nip up remaining fixings on that blade. Tap the blade down until the required radial clearance is achieved, tighten all fixings. Remove the feelers recheck clearances and check that the rotor rotates freely. Repeat for the remaining blades.
- 7.8* Flexible Blade Rotor: Assemble and centralise as (7.7), clamp plates are fitted to apply uniform pressure to the blades: tighten to give a light interference between the blades and the internal surfaces of the valve.
- 7.9* Closed rotor: Set the rotor central within the valve throat.
- 7.10* Closed replaceable tip rotor: Set the rotor central within the valve throat. Set tips radially as in (7.7 or 7.8).

FOR ROTOR CLEARANCES: REFER TO PLATE ON VALVE HOUSING

- 7.11 IF THE ROTOR SHOWS ANY SIGNS OF BODY CONTACT, INDICATED BY A RINGING SOUND OR RESISTANCE WHEN THE ROTOR IS TURNED BY HAND, CHECK FOR FOREIGN BODIES IN THE VALVE AND RECHECK ASSEMBLY AS ABOVE (sections 6 & 7).
- 7.12 Fit the gland packing as shown below and ensure the joints are staggered. Tighten up the gland adjusting nuts evenly and moderately until it just becomes difficult to turn the rotor by hand. Assemble the remaining valve components, except the drive guard cover, check that the sprockets and chain are in line. Carry out all procedures indicated under INSTALLATION (section 1) including G.M.U. lubrication. Replace the drive guard cover.

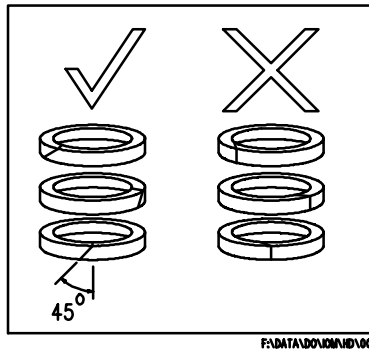


Fig 6

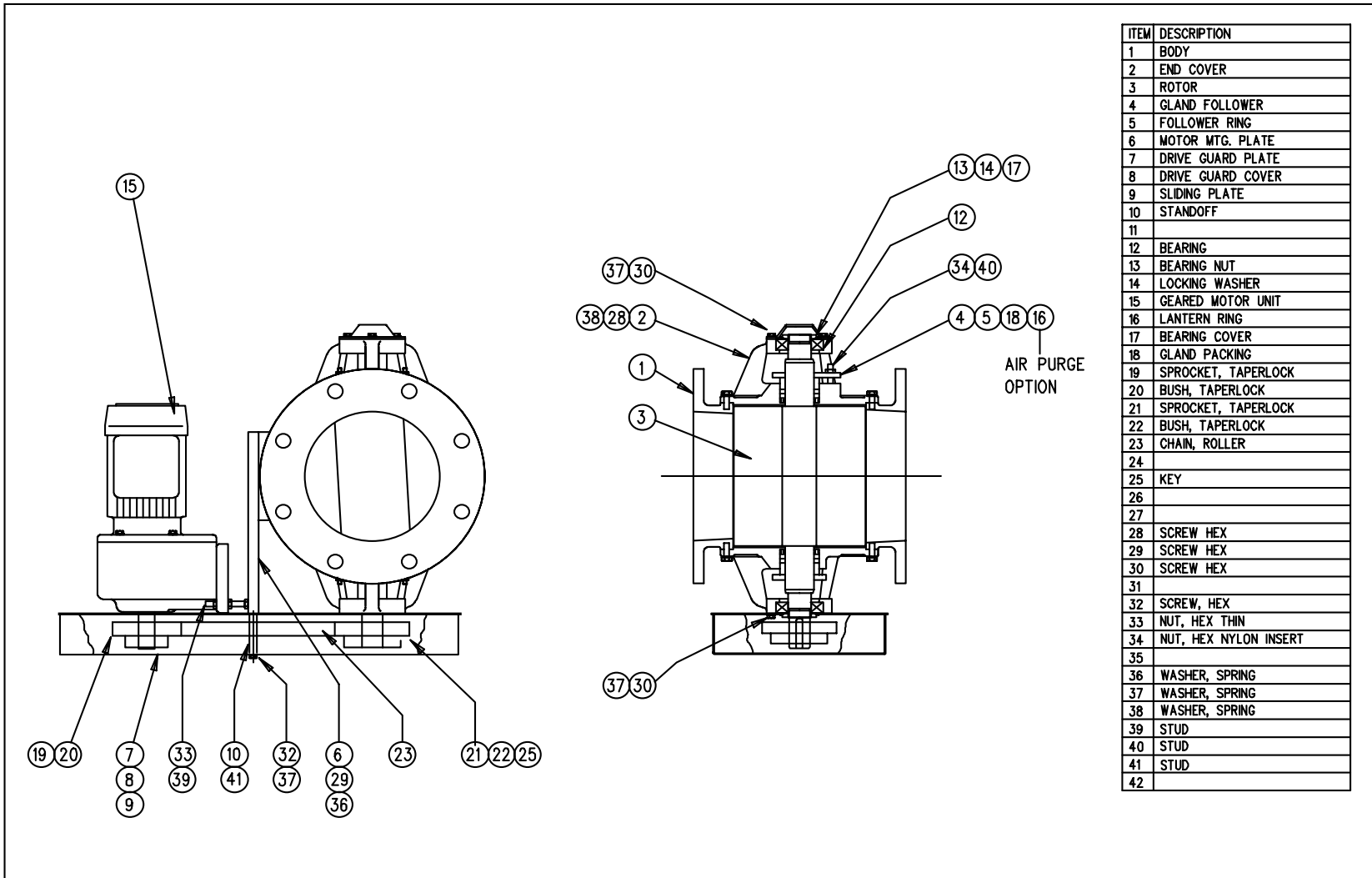
7.13 Carry out all the procedures indicated under OPERATION AND COMMISSIONING (section 2).

*--As applicable, where fitted

DISPOSAL

The valve may be removed as described in ‘Handling’. The parts list describes the material content of the valve and components may be recycled, reused or destroyed as dictated by local or national regulations.

ITEM NO.	DESCRIPTION	MATERIAL SPECIFICATIONS		
		CI/CS	AL/SS	SS/SS
1	BODY	GREY CAST IRON	CAST ALUMINIUM ALLOY	CAST STAINLESS STEEL Gr 304
2	END COVER	GREY CAST IRON	CAST ALUMINIUM ALLOY	CAST STAINLESS STEEL Gr 304
3	ROTOR	LOW CARBON STEEL	STAINLESS STEEL Gr316	STAINLESS STEEL Gr316
4	GLAND FOLLOWER	LOW CARBON STEEL	STAINLESS STEEL	STAINLESS STEEL
5	FOLLOWER RING	LOW CARBON STEEL	STAINLESS STEEL	STAINLESS STEEL
6	MOTOR MOUNTING PLATE	LOW CARBON STEEL	LOW CARBON STEEL	LOW CARBON STEEL
7	DRIVE GUARD PLATE	LOW CARBON STEEL	LOW CARBON STEEL	LOW CARBON STEEL
8	DRIVE GUARD COVER	LOW CARBON STEEL	LOW CARBON STEEL	LOW CARBON STEEL
9	SLIDING PLATE	LOW CARBON STEEL	LOW CARBON STEEL	LOW CARBON STEEL
10	STANDOFF	LOW CARBON STEEL	LOW CARBON STEEL	LOW CARBON STEEL
11				
12	BEARING	SKF	SKF	SKF
13	BEARING NUT	SKF	SKF	SKF
14	LOCKING WASHER	SKF	SKF	SKF
15	GEARED MOTOR UNIT	REFER MANUFACTURERS INSTRUCTIONS	REFER MANUFACTURERS INSTRUCTIONS	REFER MANUFACTURERS INSTRUCTIONS
16	LANTERN RING	PHOSPHOR BRONZE	PHOSPHOR BRONZE	PHOSPHOR BRONZE
17	BEARING COVER	ABS or LOW CARBON STEEL	ABS	ABS or STAINLESS STEEL
18	GLAND PACKING	POLYACRYLIC / PTFE	POLYACRYLIC / PTFE	POLYACRYLIC / PTFE
19	SPROCKET, TAPERLOCK	CARBON STEEL / CAST IRON	CARBON STEEL / CAST IRON	CARBON STEEL / CAST IRON
20	BUSH, TAPERLOCK	CARBON STEEL / CAST IRON	CARBON STEEL / CAST IRON	CARBON STEEL / CAST IRON
21	SPROCKET, TAPERLOCK	CARBON STEEL / CAST IRON	CARBON STEEL / CAST IRON	CARBON STEEL / CAST IRON
22	BUSH, TAPERLOCK	CARBON STEEL / CAST IRON	CARBON STEEL / CAST IRON	CARBON STEEL / CAST IRON
23	CHAIN, ROLLER	CARBON STEEL	CARBON STEEL	CARBON STEEL
24				
25	KEY	LOW CARBON STEEL	LOW CARBON STEEL	LOW CARBON STEEL
26				
27				
28	SCREW HEX	ALLOY STEEL	STAINLESS STEEL	STAINLESS STEEL
29	SCREW HEX	ALLOY STEEL	ALLOY STEEL	ALLOY STEEL
30	SCREW HEX	ALLOY STEEL	STAINLESS STEEL	STAINLESS STEEL
31				
32	SCREW HEX	ALLOY STEEL	ALLOY STEEL	ALLOY STEEL
33	NUT, HEX THIN	ALLOY STEEL	ALLOY STEEL	ALLOY STEEL
34	NUT, HEX	ALLOY STEEL, NYLON INSERT	STAINLESS STEEL NYLON INSERT	STAINLESS STEEL NYLON INSERT
35				
36	WASHER, SPRING	ALLOY STEEL	ALLOY STEEL	ALLOY STEEL
37	WASHER, SPRING	ALLOY STEEL	ALLOY STEEL	ALLOY STEEL
38	WASHER, SPRING	ALLOY STEEL	STAINLESS STEEL	STAINLESS STEEL
39	STUD	ALLOY STEEL	ALLOY STEEL	ALLOY STEEL
40	STUD	STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL
41	STUD	ALLOY STEEL	ALLOY STEEL	ALLOY STEEL
42				



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Fig 7