

ENGINEERED FOR TONNAGE

South African Company Est. 1976

UNBALANCED MOTORS: JUD SERIES USER MANUAL

	UNBALANCED MOTORS: JUD SERIES USER MANUAL	Document No.	M-ENG-02
		Revision	05
		Date	05/2022

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1 Introduction

This user manual is prepared by KWATANI (Pty) Ltd., the original equipment manufacturer (OEM) of Kwatani unbalanced motors (JUD). It contains all the relevant specifications and instructions for the user to ensure optimal performance of the product.

2 Warranty

KWATANI warrants that the product shall be free of defects caused by defective material and/or workmanship for a period of 12 months from the date of installation or 18 months from the date of dispatch from KWATANI's works, whichever occurs first, subject to the unbalanced motor being transported, stored, installed and operated in accordance with this user manual.

Should a KWATANI unbalanced motor become defective before the expiry of this warranty, KWATANI reserves the right to repair or to replace the unbalanced motor or components thereof. The customer's exclusive remedy and KWATANI's sole obligation under this warranty shall be limited to such repair or replacement. The warranty is conditional upon receipt of a formal written notice from the customer of any defect within a reasonable period of time after the defect is discovered, or within a period within which, with reasonable care, it should have been discovered, but in no event more than 7 (seven) days after the date the defect was discovered or should have been discovered.

In no event shall KWATANI's liability for such a defect or non-conforming products or components thereof exceed the purchase price thereof.

KWATANI shall only accept for inspection and failure analysis any defective unbalanced motor that meets each of the three of the following criteria:

- I. The defective unbalanced motor failed within the warranty period set out above;
- II. The customer informed KWATANI in writing of the defect within the maximum time permitted for notification of defects as set out above;
- III. The customer returned the defective unbalanced motor to KWATANI, accompanied by documentation stating the unbalanced motor type, serial number, delivery and installation date, all relevant maintenance records, and a complete description of the defect and/ or failure.

Upon the receipt of the defective unbalanced motor, KWATANI shall inspect the returned unbalanced motor for the cause of the failure and provide the customer with an official written report, to the extent reasonably possible, and detailing the cause of failure. If a defect has arisen and a valid claim was received by KWATANI within the warranty period, at its own discretion KWATANI will repair or replace the unbalanced motor free of charge. KWATANI will be responsible for the repair costs, the costs of any replacement components, transport and packing from/ to the customer's address as stated on the original purchase order relating to the sale of the product.

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KWATANI warrants the replacement of a defective unbalanced motors or component parts used in the reconditioning of the defective unbalanced motor under this warranty against defects in materials and workmanship from the date of the replacement or repair for six (6) months after dispatch or for the remaining portion of the original product's warranty, whichever provides longer coverage. When a defective unbalanced motor or component is replaced or reconditioned, the new replacement or reconditioned unbalanced motor becomes the customer's property and the original defective unbalanced motor becomes KWATANI's property.

This warranty does not:

- I. apply and shall be void with respect to the unbalanced motor operated in excess of rated capacity or otherwise not in accordance with KWATANI's installation, maintenance, and operating procedure, or to products repaired or altered by a third party, other than by KWATANI to unbalanced motor(s) where the name plate or serial number has been removed or defaced, or unbalanced motor(s) which were subjected to abuse, negligence, misuse, misapplication, accident, damages by circumstances beyond KWATANI's control, improper installation (if by a third party other than KWATANI), to improper operation, maintenance or storage, or to other than normal use or service and excludes fair wear and tear,
- II. apply to products or components not manufactured by or for KWATANI. With respect to products or components not manufactured by KWATANI, KWATANI's warranty obligations shall in all respects conform and be limited to the warranty actually extended to KWATANI by its suppliers, but in no event shall KWATANI's obligations be greater than those provided under KWATANI's warranty set forth in this section,
- III. include responsibility for loss of profits or consequential damages, whether direct or indirect sustained as a result of unbalanced motor(s) supplied or installed by KWATANI, being defective or not conforming to specification, or as a result of late delivery or installation, or failure to deliver or install, or any other causes whatsoever.

THE FOREGOING WARRANTIES ARE IN LIEU OF ALL OTHER EXPRESS AND IMPLIED WARRANTIES (EXCEPT TITLE), INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. NO EMPLOYEE, REPRESENTATIVE, OR AGENT OF KWATANI OTHER THAN A DULY AUTHORISED OFFICER OF KWATANI IS AUTHORISED TO ALTER OR MODIFY ANY PROVISION OF THIS SECTION OR TO MAKE ANY GUARANTEE, WARRANTY, OR REPRESENTATION, EXPRESS OR IMPLIED, ORALLY OR IN WRITING, WHICH IS CONTRARY TO THE FOREGOING.

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Any description of the products, whether in writing or made orally by KWATANI, specifications, reports, drawings, diagrams, engineering sheets or similar materials used in connection with customer's order are for the sole purpose of identifying the products and shall not be construed as an express warranty. Any suggestions by KWATANI or KWATANI's employees, representatives, or agents regarding use, application or suitability of the products shall not be construed as an express warranty unless confirmed to be such in writing by KWATANI's authorised officer.

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3 Safety

KWATANI assumes no liability for non-compliance to safety regulations and accident-prevention prescriptions described below. Furthermore, KWATANI assumes no responsibility for damage caused by improper use of the product or by unauthorised modifications.

The unbalanced motor is designed and built with the latest state of the art technology and is safe and reliable to operate. If, however, the unbalanced motor is connected, operated or serviced by persons without the required electrical skills and/ or qualifications, it may be dangerous to operate electric motors.

The person in charge of maintenance and repair operations of the unbalanced motor has to be a qualified and trained technician. The responsible person must ensure that safety is not impaired when working with the unbalanced motor, in particular during installation, connecting the drive motor, adjustment of the fly- weights and maintenance.

The user must ensure that each person in charge of installation, operation and maintenance of the unbalanced motor has read and fully understands these operating instructions before commencing any work on this equipment.

Before using the product:

- Check the integrity of the unbalanced motor installation and the machine to which it is fitted. Check the normal functioning of all moving parts and that they are free of any obstruction and that no components are damaged or broken. Damaged or broken components must be repaired or replaced by the OEM. If this is not done, the equipment might be unsafe to use.
- The unbalanced motor must never be operated without safety covers, as this can lead to severe injury and/or physical damage.
- Use OEM supplied bolts and re-torque at specified intervals.
- Maintenance and fly-setting-adjustments on the unbalanced motor must only be performed when the unit is completely stationary and the power supply is locked out. Before starting maintenance work, ensure that the unbalanced motor cannot be switched on accidentally by unauthorised persons.
- The electrical connection must be adequately secured. On the unbalanced motor, damaged insulation of an electrical cable or a missing terminal box cover can pose a life-threatening danger by electric shock.
- When an unbalanced motor is stopped, be aware that it may have reached high temperatures.

4 Receipt and storage

Each unbalanced motor is tested and inspected on completion. Whilst every care is taken during transit they should be inspected on receipt and any defects immediately reported to the carrier and supplier. When not for immediate use, they can be stored for up to two years if kept in a clean, dry and temperate atmosphere, free from vibration. After more than 2 years of storage the bearing grease should be replaced before the motor is used. Motors must be stored on soft surface to protect the mounting surfaces from damage and isolate the motor from environmental vibrations.

5 Installation guidance notes

5.1 Mechanical

Inspect unbalanced motor for any physical damage and check that rotor shaft rotates freely. Remove paint masking stickers from motor mounting holes. ALL mounting surfaces MUST be flat and be free of paint, dirt and scale. Fixing bolts should be tightened as recommended below and tightness checked after initially running the unbalanced motor for 2 or 3 days. Bolts and nuts should not be re-used. Please ensure there is at least 80mm of clearance between the unbalanced motor and any surrounding static structure.

IMPORTANT - GAPS BETWEEN THE UNBALANCED MOTOR FOOT AND MATING SURFACES AND INCORRECT MOUNTING BOLT TIGHTNESS WILL CAUSE BOLT BREAKAGE AND DAMAGE TO THE UNBALANCED MOTOR.

Most important, remove any paint, dirt or scale from all mating surfaces. Fit EN19T KWATANI washers under the bolt head and nut as shown in *Figure 1* below. Pre-tighten until all mating surfaces are in contact and torque the bolts. **Only use a calibrated torque wrench or torque multiplier.**

5.2 Fastener assembly

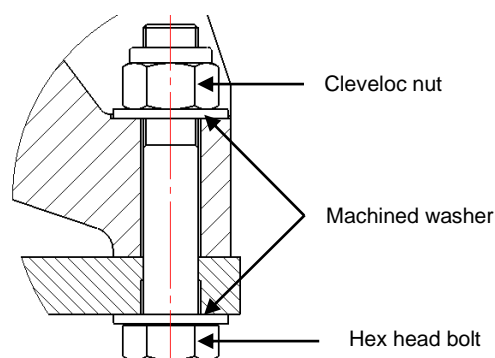


Figure 1

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5.3 Fastener specification

Refer to the Kwatani Bolt Torque Specification, document number F-ASSY-08.

Description	Material grade/ class	DIN	ISO
Hex head bolt, partially threaded, cold rolled thread	8.8	931	4014
Socket head cap screws	8.8	912	4762
Through hardened washer	8	125 Form B	7090
Cleveloc nut	8	980 Form V	7042

Table A

Ensure bolt threads are cleaned with thinners and a brush before use.

Mounting fasteners (Hex head bolts, Gr. 8.8)		Covers: Fly-weights, terminal box (Socket head cap screw Gr. 8.8)	
Size	Torque [Nm]	Size	Torque [Nm]
M16	274	M6	6
M20	527	M8	25
M24	898		
M30	1742		
M36	2990		

Table B

Table B: The torques are guideline values for metric standard threads as per DIN 13 and head dimensions as per DIN 931. They mean using the bolt's limit of elasticity up to 85%. Specified torque values apply to clean blank threads and is dry torque values with a coefficient of friction of 0.2.

5.4 Electrical

Check insulation resistance and if less than 1 megohm [MΩ] DO NOT USE, consult a qualified electrician. A flexible cable and suitable cable gland must be used to connect between the unbalanced motor and supply junction box. The cable gland shall comply with EN60079-0 and have an IP rating equal to or better than IP66. The supply must be suitably fuse protected.

A 4 core cable is to be used with flexible conductors type 50/0.25 (JUD 214 - JUD 294), 56/0.30 (JUD 324 - JUD 384) and 80/0.40 (JUD 404). Thermistors are fitted as a standard and require a 2 core cable with flexible conductor's type 30/0.25.

Flexible conductors must be terminated with insulated crimp on ring terminals or ring terminals fitted with insulating sleeves for L1, L2, L3 and earth. Plain soldered ends should be used for thermistor connections T1 and T2. If thermistors are not required, leave the blanking plug in the cable entry hole.

Starting can be direct on line or via a VSD for a soft start. Each unbalanced motor **MUST BE INDIVIDUALLY PROTECTED** against overload.

NOTE: When operating unbalanced motors at speeds above pole speed, the fly-weight setting **MUST** be reduced or **DAMAGE WILL OCCUR**, see *Table E on page 12* for correct percentage reduction.

Voltage range

The voltage range data in *Table D on page 10* is served by two distinct windings thus:

Winding group 03: 525V 50Hz (Star Connection)

Winding group 28: 400/ 690V 50Hz (Delta / Star Connection)

UNBALANCED MOTOR TERMINAL BOX field connection 3 Phase, 50 Hertz

DELTA [Δ]

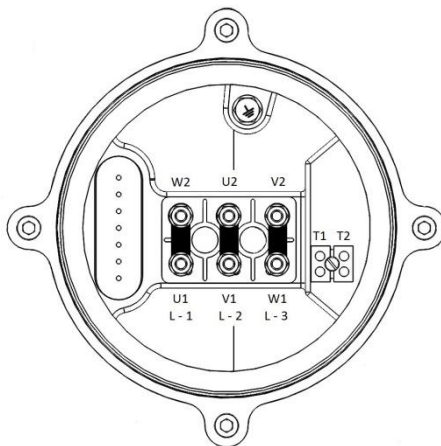


Figure 2

STAR [Y]

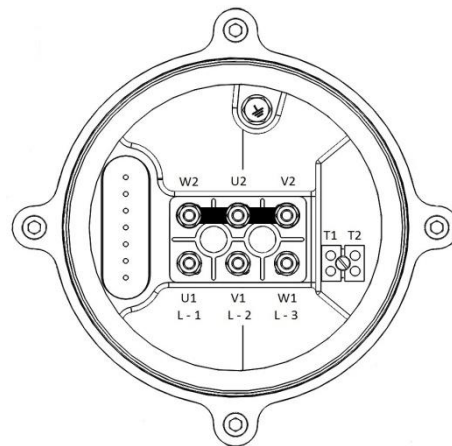


Figure 3

6 Fly- weight adjustment

When adjusting the fly-weights, un-tighten the screw in the OUTER weight only. Adjust the outer weight to the required unbalance force (indicated on the unbalance percentage label) and re-tighten screw. Adjust opposite outer weight of the same motor to the same percentage.

IT IS IMPORTANT THAT BOTH THE OUTER WEIGHTS ARE IN LINE/ HENCE ADJUSTED TO THE SAME OUTPUT FORCE. Use Property Class Grade 8.8 bolts; see *Table C* below for torque settings.

(Clamp screws not lubricated).

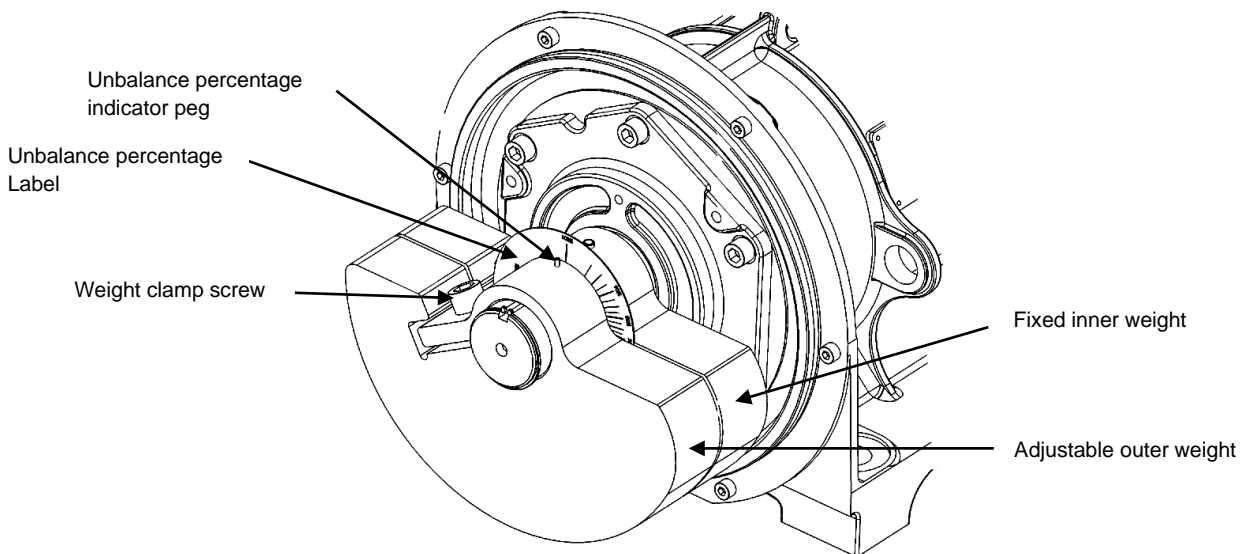
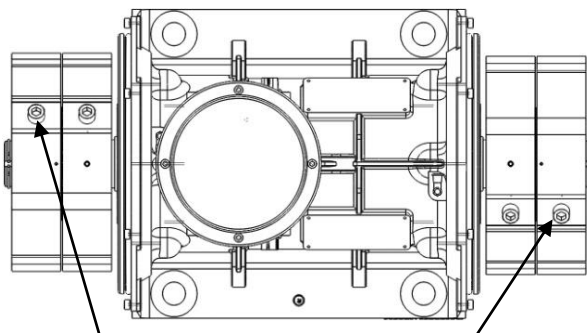


Figure 4



See position of fly-weights and clamp bolts

Figure 5

Socket cap screw/ setscrew (Gr. 8.8)	
Size	Torque [Nm]
M8	27
M12	96
M16	176

Dry torque values

Table C

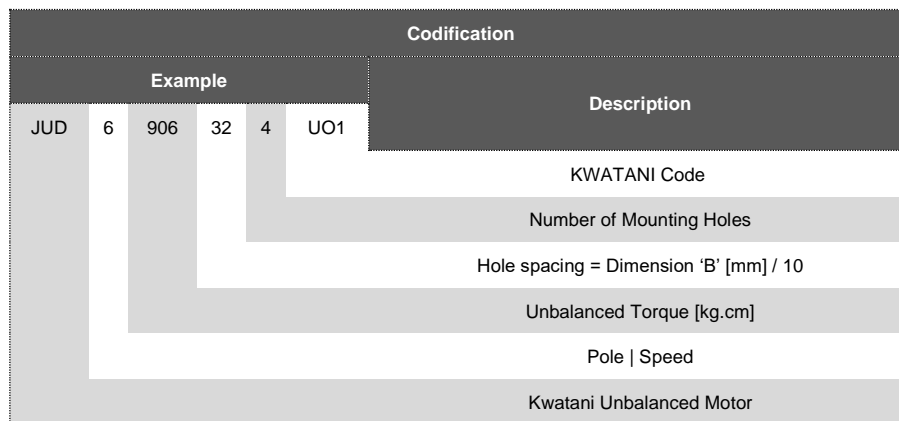
7 Dimensions and technical data

DESCRIPTION	MECHANICAL SPECIFICATION				ELECTRICAL SPECIFICATION							
	Centrifugal Force		**Working Moment	Mass	Power [kW]		Full Load Current [A]			Starting Current [A]		
	[kg]	[kN]	[Kg.cm]	[Kg]	Input	Output	400V *Δ28	690V *Y28	525V *Y03	400V *Δ28	690V *Y28	525V *Y03
4 POLE 1470rpm 50Hz												
JUD 4/100 214 UO1	1159	11.37	100	56	0.68	0.5	1.43	0.83	1.14	9.4	5.5	7
JUD 4/140 274 UO1	1623	15.92	140	88	1.33	1.15	2.62	1.51	2.1	25	14.5	19
JUD 4/200 274 UO1	2318	22.74	200	93	1.33	1.15	2.62	1.51	2.1	25	14.5	19
JUD 4/300 274 UO1	3542	34.75	300	132	2.15	1.8	3.86	2.23	2.89	33	19.3	24.3
JUD 4/210 294 UO1	2434	23.88	210	114	1.33	1.15	2.62	1.51	2.1	25	14.5	19
6 POLE 980rpm 50Hz												
JUD 6/190 214 UO1	979	9.6	190	67	0.75	0.51	1.7	0.99	1.33	7.4	4.3	5.6
JUD 6/270 274 UO1	1391	13.64	270	98	1.17	0.9	3.2	1.85	2.5	16	9.3	12
JUD 6/470 294 UO1	2421	23.75	470	140	2.29	1.8	5.4	3.1	4.3	27	15.6	20
JUD 6/570 294 UO1	2936	28.8	570	148	2.29	1.8	5.4	3.1	4.3	27	15.6	20
JUD 6/763 324 UO1	3930	38.56	763	201	2.69	2.31	6.9	4	5.5	49	28	35
JUD 6/906 324 UO1	4667	45.78	906	210	2.69	2.31	6.9	4	5.5	49	28	35
JUD 6/1140 384 UO1	5872	57.61	1140	267	4.53	4	9.3	5.3	7.4	64	37	49
JUD 6/1400 404 UO1	7212	70.75	1400	347	6.0	5.5	13.3	7.7	10.2	83	48	64
JUD 6/1750 404 UO1	9014	88.43	1750	366	6.0	5.5	13.3	7.7	10.2	83	48	64
JUD 6/2050 404 UO1	10560	103.59	2050	381	6.0	5.5	13.3	7.7	10.2	83	48	64
8 POLE 735rpm 50Hz												
JUD 8/1800 384 UO1	5215	51.16	1800	312	3.78	3.3	9.5	5.5	7.6	55	32	44

**Working moment = 2x static moment

Table D

See Voltage Range, Figure 2 and Figure 3 for star/ delta connection diagrams on page 8.
Table D above shows the full load and starting currents in amps (Winding groups 03 & 28) for a maximum ambient temperature of 40°C.



DIMENSIONS [mm]													
A	B	C	ØD	E	F	G	H	ØI	ØJ	K	L	M	N
125	210	50	17	180	248	503	117	220	248	132	241	270	M20x1.5-6H
250	270	51	22	300	320	530	152.5	284	313	100	313	332	M20x1.5-6H
250	270	51	22	300	320	530	152.5	284	313	100	313	332	M20x1.5-6H
250	270	51	26	305	325	677	156	294	330	151	321	335	M20x1.5-6H
280	290	51	26	335	345	677	156	294	330	151	321	335	M20x1.5-6H
125	210	50	17	180	248	503	117	220	248	132	241	270	M20x1.5-6H
250	270	51	22	300	320	530	152.5	284	313	100	313	332	M20x1.5-6H
280	290	51	26	335	345	677	156	294	330	151	321	335	M20x1.5-6H
280	290	51	26	335	345	677	156	294	330	151	321	335	M20x1.5-6H
315	320	58	26	375	380	738	175	331	374	165	362	365	M25x1.5-6H
315	320	58	26	375	380	738	175	331	374	165	362	365	M25x1.5-6H
335	380	63	33	415	450	838	203	388	430	192	418	418	M25x1.5-6H
385	400	88	33	465	470	838	223	428	470	167	458	462	M32x1.5-6H
385	400	88	33	465	470	838	223	428	470	167	458	462	M32x1.5-6H
385	400	88	33	465	470	838	223	428	470	167	458	462	M32x1.5-6H
335	380	63	33	415	450	838	203	388	430	192	418	418	M25x1.5-6H

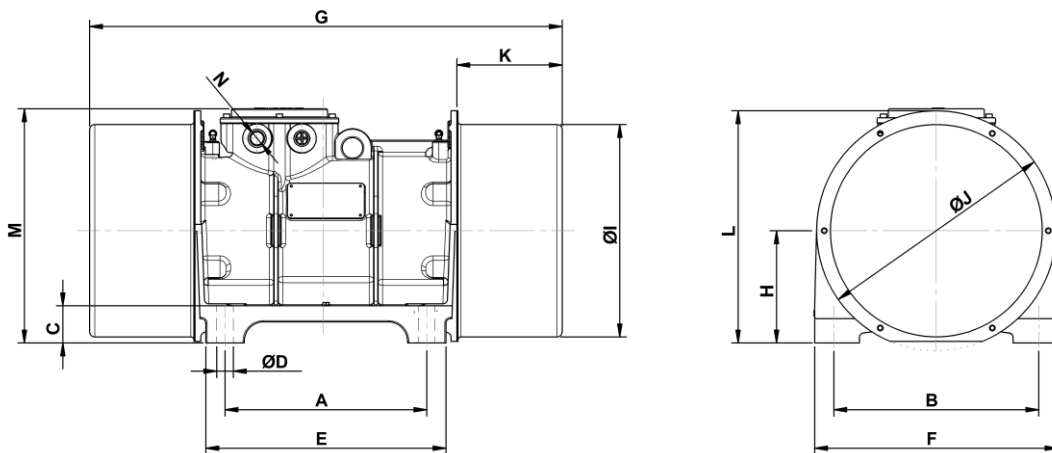


Figure 6

L – Top of cover
M – Top of terminal box

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8 Use of unbalanced motors above pole speeds

Force must be reduced by setting the fly-weights back. *Table E below* gives the maximum allowed speed for various percentages of full centrifugal force.

Fly- weight Setting at % of full centrifugal force	Frequency [Hz]	Unbalanced motors speed [rpm]		
		4 POLE	6 POLE	8 POLE
100	50	1470	980	735
90	52.7	1518	1012	759
80	55.9	1610	1073	805
70	59.8	1721	1147	861
60	64.5	1859	1239	923
50	70.7	2036	1358	1018
40	79	2277	1518	1138
30	91.3	2629	1753	1315
20	112	3220	2147	1613
10	158	4554	3036	2275

Table E

Guideline values of maximum speeds are grease limiting speed x 2.2 for roller bearings. Grease limiting speeds are given in *Table G on page 13*. Consult our Technical Department for further information.

9 Maintenance

All unbalanced motors have grease nipples fitted as standard. Ensure that they are clean prior to re-lubrication to prevent contamination.

The recommended grease is Esso Unirex N3. If mixing of grease is unavoidable, use only Lithium complex alternatives of consistency 2 or 3.

Over greasing causes overheating of the bearings and must be avoided. Grease cavities should never be filled above one third of their capacity and bearing cap assemblies should be removed occasionally to clean out excess grease. Old grease should periodically be removed and the bearings cleaned and repacked with new grease.

Re-lubrication intervals are based on continuous operation in ambient temperature up to 20°C and should be reduced as follows for increases in ambient temperature 25°C x 0.8, 30°C x 0.65, 35°C x 0.5, 40°C x 0.4. Above 40°C consult our Technical Department.

Data is provided as a guide only and intervals should be shortened/ lengthened based on service experience with the particular application. If an alternative Lithium based grease is to be used, the grease and greasing intervals is subject to confirmation by the grease manufacturer. The greasing intervals and amounts must be tailored to suit the grease and the conditions of use. Following the greasing instructions on page 13, using other types of grease is not advisable and advice should be sought from the grease manufacturer.

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9.1 Greasing instructions and re-lubrication chart per bearing:

Type	Re-lubrication intervals (Hours)	Grease quantities (Initial)	Grease quantities (re-lubrication)
	50Hz	Grams [g]	Grams [g]
4 POLE 1470rpm 50Hz			
JUD 4/100 214 UO1	3900	17	7
JUD 4/140 274 UO1	3500	30	13
JUD 4/200 274 UO1	3500	30	13
JUD 4/300 274 UO1	3000	40	18
JUD 4/210 294 UO1	3000	40	18
6 POLE 980rpm 50Hz			
JUD 6/190 214 UO1	5800	17	7
JUD 6/270 274 UO1	6000	30	15
JUD 6/470 294 UO1	5000	40	20
JUD 6/570 294 UO1	5000	40	20
JUD 6/763 324 UO1	4800	60	26
JUD 6/906 324 UO1	4800	60	26
JUD 6/1140 384 UO1	4200	90	30
JUD 6/1400 404 UO1	3000	160	54
JUD 6/1750 404 UO1	3000	160	54
JUD 6/2050 404 UO1	3000	160	54
8 POLE 735rpm 50Hz			
JUD 8/1800 384 UO1	6000	90	30

Table F

BEARING TYPES: It is important that full designation is quoted to ensure that all special features are incorporated.

Type	Bearing prefix	Bearing references		Grease limiting speed [rpm]
		FAG	SKF	
4 POLE 1470rpm 50Hz				
JUD 4/100 214 UO1	NJ 2307E	TVP2 C3	CP C3	7000
JUD 4/140 274 UO1	NJ 2309E	TVP2 C3	CP C3	5600
JUD 4/200 274 UO1	NJ 2309E	TVP2 C3	CP C3	5600
JUD 4/300 274 UO1	NJ 2311E	TVP2 C3	CP C3	4800
JUD 4/210 294 UO1	NJ 2311E	TVP2 C3	CP C3	4800
6 POLE 980rpm 50Hz				
JUD 6/190 214 UO1	NJ 2307E	TVP2 C3	CP C3	7000
JUD 6/270 274 UO1	NJ 2309E	TVP2 C3	CP C3	5600
JUD 6/470 294 UO1	NJ 2311E	TVP2 C3	CP C3	4800
JUD 6/570 294 UO1	NJ 2311E	TVP2 C3	CP C3	4800
JUD 6/763 324 UO1	NJ 2313E	TVP2 C3	CP C3	4000
JUD 6/906 324 UO1	NJ 2313E	TVP2 C3	CP C3	4000
JUD 6/1140 384 UO1	NJ 2315E	TVP2 C3	CP C3	3400
JUD 6/1400 404 UO1	NJ 2320E	TVP2 C3	CP C3	2400
JUD 6/1750 404 UO1	NJ 2320E	TVP2 C3	CP C3	2400
JUD 6/2050 404 UO1	NJ 2320E	TVP2 C3	CP C3	2400
8 POLE 735rpm 50Hz				
JUD 8/1800 384 UO1	NJ 2315E	TVP2 C3	CP C3	3400

Table G

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10 Fault finding

10.1 Unbalanced motor does not start or fails to run

Provided that power supply voltage is present at the unbalanced motor terminal box check the following:

- Supply voltage is correct and isolator is operating correctly.
- All three phases of supply voltage are connected and the brass link(s) in the unbalanced motor terminal box are fitted and in the correct position for star or delta connection.
- Unbalanced motor is clear of “earth” faults and the stator winding is not open circuit in any one phase and no short circuits exist between adjacent turns.
- Unbalanced motor is not overloaded electrically or mechanically (*See 10.2*)

10.2 Unbalanced motor current exceeds rated full load current or overheats

Check:

- That unbalanced motor mounting bolts are correctly tightened and there is no damage to the end covers, preventing weights rotating.
- Bearings are not partially seized or over greased.
- Grease decay in the case of extended storage period (*see Receipt and storage on page 6*)

10.3 Unbalanced motor noisy

Note:

Due to the increased radial clearance in the bearings, it is normal for unbalanced motors to emit a certain amount of noise and they should not be compared with standard electric motors.

Check:

- That there are no loose parts on the unbalanced motor.
- End covers are not damaged and preventing weights from rotating.
- Noise is not due to bearing failure.
- That the unbalance motor mounting bolts are correctly tightened.

10.4 Unbalanced motor/s does/ do not attain synchronous speed

Check:

- That the unbalanced motor is not wrongly connected (star instead of delta)
- Supply voltage and supply frequency are not too low.
- Unbalanced motor is not overloaded or partially seized.

11 Spare parts

ARRANGEMENT OF STANDARD JUD SERIES UNBALANCED MOTORS SHOWING BREAKDOWN OF MAJOR COMPONENTS FOR SPARES

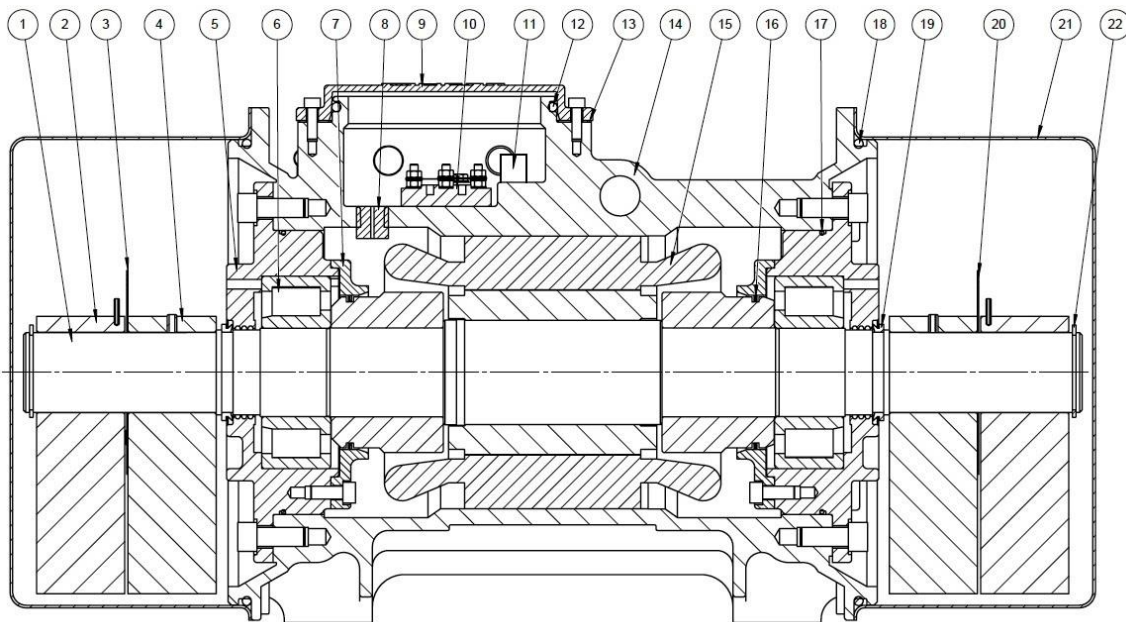


Figure 7

ITEM No.	DESCRIPTION	QTY.	ITEM No.	DESCRIPTION	QTY.
1	SHAFT ASSEMBLY	1	12	O-RING	1
2	OUTER FLY-WEIGHT	2	13	TERMINAL BOX LID GASKET	1
3	LEFT HAND FORCE LABEL	1	14	STATOR FRAME	1
4	INNER FLY-WEIGHT	2	15	STATOR UNIT	1
5	BEARING HOUSING	2	16	LAMINAR RING	2
6	ROLLER BEARING	2	17	O-RING	2
7	BEARING CAP	2	18	O-RING	2
8	TERMINAL BOX APERTURE SLEEVE	1	19	V-RING SEAL	2
9	TERMINAL BOX LID	1	20	RIGHT HAND FORCE LABEL	1
10	TERMINAL BLOCK ASSEMBLY	1	21	END COVER	2
11	2 WAY TERMINAL BLOCK	1	22	EXTRENAL CIRCLIP	2

Table H

All Hex head screws, bolts and Socket cap screws are grade 8.8

Quote vibrator type, serial number, voltage, together with parts description when ordering spares.

Shaft end float	Type	JUD 214-274	JUD 294	JUD 324	JUD 384-404
	End float (mm)		0.35-1.32	0.45-1.48	0.5-1.7

Table I

	UNBALANCED MOTORS: JUD SERIES USER MANUAL	Document No.	M-ENG-02
		Revision	05
		Date	05/2022

12 Revision history

Revision	Date	Description
0	10/ 2015	First Issue.
1	10/2015	Page 8, figure 2 and 3 swapped around. Star and Delta figures incorrect.
2	09/2016	Wording changed/ updated form JOEST KWATANI to KWATANI.
3	11/2016	Wording changed, figure 1, Joest Kwatani washer to Machined washer.
4	08/2021	Updated torque values to 85% of proof load with prevailing torque, alternative grease intervals.
5	04/2022	JUD 4/300 274 UO1 motor added

The information contained in this booklet is issued as a guide and is not intended to be definitive. No legal liability shall attach to KWATANI (Pty) Ltd in connection with the use of this user manual.

Users of the machine are reminded that all work must comply with existing regulations imposed by statute or by regulatory authorities, and it is the user's responsibility to ensure compliance with such Regulations.

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