KRAMP

Installation, operation, maintenance and safety manual

LOW VOLTAGE MOTORS

rev. 01

ENGLISH

KRAMP

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1. GENERAL SAFETY WARNING

NOTE
These instructions must be followed to ensure safe and proper installation, operation and maintenance of the machine. They should be brought to the attention of anyone who installs, operates or maintains the machine or associated equipment. The machine is intended for installation and use by qualified personnel, familiar with health and safety requirements and national legislation. Ignoring these instructions may invalidate all applicable warranties.

Safety equipment necessary for the prevention of accidents during installation and maintenance during operation must comply with national regulations in force in the country of installation.

⚠ WARNING!
Controls for emergency stop must be equipped with restart lockout devices, after an emergency stop, start command can take effect only after intentionally reset of the lockout devices.

⚠ WARNING!
Electric motors are components with dangerous parts under tension and moving parts during operation.

Improper use, protections removal without having proceeded to disconnect the power supply line, disconnect the protective devices, not make periodic inspections or maintinance, can be cause serious damage.

1.1 Declaration of Conformity

Motor is manufactured in compliance with the international standard IEC 34-1 (EN 60034-1) and to following European Directives:

Low Voltage Directive (LVD) 2014/35/UE
Electromagnetic Compatibility Directive (EMC) 2014/30/UE regarding the intrinsic characteristics to emission and immunity levels.

Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)

2002/95/EC
The captioned motors are also in compliance with the “Machinery Directive” 98/37/EC(amended by 2006/42/EC), assuming for this, that the motor component may not be put into service before the machine in which it will assembled, has been declared to be in compliance with the Directive provisions.

When operating the motor, it is necessary to assure that the Standard EN 60204-1 and the installation and safety instructions of the manufacturer’s operating handbook are observed. Conformity declaration can be supplied when requested.

1.2 Validity

The instructions are valid for the following KRAMP electrical machine types, in both motor and generator operation.
Series: MS1/MS2 (TM), MSB, MSD, MSC/MYC, MSV (TMV), MYV, T1A,T2A,T3A,TXA
Series: MY/MYT, ML, MC
Series: Y/Y2 (TM), YC, T1C (TM), T2C (TM/TCF), T3C (TCF), TCI/TCP, TG,TXC in frame sizes 56-500

2. HANDLING

2.1 Reception check

Immediately upon receipt check the motor for external damage (e.g. shaft-ends and flanges and painted surfaces) and if found, inform the forwarding agent without delay.

Check all rating plate data, especially voltage and winding connection (star or delta). The type of bearing is specified on the catalogue of all motors.

2.2 Transportation and storage

The motor should always be stored indoors (above -20°C), in dry, vibration free and dust free conditions. During transportation, impact and humidity should be avoided. In other conditions, please contact KRAMP.

Unprotected machined surfaces (shaft-ends and flanges) should be treated against corrosion.

It is recommended that shafts are rotated periodically by hand to prevent grease migration.

Anti-condensation heaters, if fitted, are recommended to be used to avoid water condensing in the motor.

The motor must not be subject to any external vibrations at standstill so as to avoid causing damage to the bearings.

Motors fitted with cylindrical-roller and/or angular contact bearings must be fitted with locking devices during transport.

2.3 Lifting

All KRAMP motors above 25 kg are equipped with lifting lugs or eyebolts.
Only the main lifting lugs or eyebolts of the motor should be used for lifting the motor. They must not be used to lift the motor when it is attached to other equipment.

Lifting lugs for auxiliaries (e.g. brakes, separate cooling fans) or terminal boxes must not be used for lifting the motor.

Motors with the same frame may have a different center of gravity because of different output, mounting arrangements and auxiliary equipment. Damaged lifting lugs must not be used. Check that eyebolts or integrated lifting lugs are undamaged before lifting.
Lifting eyebolts must be tightened before lifting. If needed, the position of the eyebolt can be adjusted using suitable washers as spacers.

Ensure that proper lifting equipment is used and that the sizes of the hooks are suitable for the lifting lugs.

Care must be taken not to damage auxiliary equipment and cables connected to the motor.

2.4 Machine weight

The total machine weight can vary within the same frame size (center height) depending on different output, mounting arrangement and auxiliaries.

The following table shows estimated maximum weights for machines in their basic versions as a function of frame material.

Frame size	Aluminium Weight kg	Cast iron Weight kg
56	4	
63	5	
71	7	
80	11	19
90	18	27
100	28	38
112	36	50
132	64	84
160	98	147
180	128	195
200	158	270
225		320
250		427
280		667
315		1270
355		1850
400		3000
450		3800
500		5300

3. INSTALLATION AND COMMISSIONING

⚠ WARNING!
Disconnect and lock out before working on the motor or the driven equipment.

3.1 General

All rating plate values must be carefully checked to ensure that the motor protection and connection will be properly done.

⚠ WARNING!
In case of motors mounted with vertical shaft and water or liquids are expected to go down along the shaft, the user must take preventative actions

Remove transport locking if employed. Turn shaft by hand to check free rotation if possible.

Motors equipped with roller bearings:
Running the motor with no radial force applied to the shaft may damage the roller bearing.

Motors equipped with angular contact bearing:
Running the motor with no axial force applied in the right direction in relation to the shaft may damage the angular contact bearing.

⚠ WARNING!
For machines with angular contact bearings the axial force must not by any means change direction.

Motors equipped with regreasing nipples:
When starting the motor for the first time, or after long storage, apply the specified quantity of grease.

For details, see section “5.2.2 Motors with greasable bearings“.

3.2 Insulation resistance check

Measure insulation resistance before commissioning and when winding dampness is suspected.

⚠ WARNING!
Disconnect and lock out before working on the motor or the driven equipment.
Insulation resistance, corrected to 25°C, must exceed the reference value, i.e. 100 MΩ (measured with 500 or 1000 V DC). The insulation resistance value is halved for each 20°C rise in ambient temperature.

⚠ WARNING!
The motor frame must be grounded and the windings should be discharged against the frame immediately after each measurement to avoid risk of electrical shock.

If the reference resistance value is not attained, the winding is too damp and must be oven dried. The oven temperature should be 90°C for 12-16 hours followed by 105°C for 6-8 hours.

Drain hole plugs, if fitted, must be removed and closing valves, if fitted, must be opened during heating. After heating, make sure the plugs are refitted.
Even if the drain plugs are fitted, it is recommended to disassemble the end shields and terminal box covers for the drying process.

Windings drenched in seawater normally need to be rewound.

3.3 Foundation

The end user has full responsibility for preparation of the foundation.

Metal foundations should be painted to avoid corrosion.

Foundations must be even, and sufficiently rigid to withstand possible short circuit forces. They must be designed and dimensioned to avoid the transfer of vibration to the motor and vibration caused by resonance.

3.4 Balancing and fitting coupling halves and pulleys

As standard, balancing of the motor has been carried out using half key.

Coupling halves or pulleys must be balanced after machining the keyways. Balancing must be done in accordance with the standard balancing method specified for the motor.

Coupling halves and pulleys must be fitted on the shaft by using suitable equipment and tools which do not damage the bearings and seals.

Never fit a coupling half or pulley by hammering or by removing it using a lever pressed against the body of the motor.

3.5 Mounting and alignment of the motor

Ensure that there is enough space for free airflow around the motor. Minimum requirements for free space behind the motor fan cover should be achieved.

Correct alignment is essential to avoid bearing, vibration and possible shaft failures.

Mount the motor on the foundation using the appropriate bolts or studs and place shim plates between the foundation and the feet.

Align the motor using appropriate methods.
If applicable, drill locating holes and fix the locating pins into position.

Re-check the alignment after final tightening of the bolts or studs.

3.6 Slide rails and belt drives

Fasten the motor to the slide rails as shown in Figure 2.
Place the slide rails horizontally on the same level.

Check that the motor shaft is parallel with the drive shaft. Belts must be tensioned according to the instructions of the supplier of the driven equipment.

⚠ WARNING!
Excessive belt tension will damage bearings and can cause shaft damage.

3.7 Cabling and electrical connections

The terminal box on standard single speed motors normally contains six winding terminals and at least one earth terminal.

In addition to the main winding and earthing terminals, the terminal box can also contain connections for thermistors, heating elements or other auxiliary devices.

Suitable cable lugs must be used for the connection of all main cables. Cables for auxiliaries can be connected into their terminal blocks as such.

Machines are intended for fixed installation only. If not otherwise specified, cable entry threads are metric. The IP-class of the cable gland must be at least the same as those of the terminal boxes.
Unused cable entries must be closed with blanking elements according to the IP class of the terminal box.

The degree of protection and diameter are specified in the documents relating to the cable gland.

⚠ WARNING!
Use appropriate cable glands and seals in the cable entries according to the type and diameter of the cable.

Earthing must be carried out according to local regulations before the machine is connected to the supply voltage.

Ensure that the motor protection corresponds to the environment and weather conditions; for example, make sure that water cannot enter the motor or the terminal boxes.

The seals of terminal boxes must be placed correctly in the slots provided, to ensure the correct IP class.

3.7.1 Connections for different starting methods

The terminal box on standard single speed motors normally contains six winding terminals and at least one earth terminal.
This enables the use of DOL- or Y/D–starting. See Figure 1.
For two-speed and special motors, the supply connection must follow the instructions inside the terminal box or in the motor manual.

The voltage and connection are stamped on the terminal box cover.

Direct-on-line starting (DOL):

Y or D winding connections may be used.

For example, 690 VY, 400 VD indicates Y-connection for 690 V and D-connection for 400 V.

⚠ WARNING!
from 10KW Start/Delta (Y/D) starting is recommended Star/Delta starting (Y/D):

The supply voltage must be equal to the rated voltage of the motor when using a D-connection.

Remove all connection links from the terminal block.

3.7.2 Connections of auxiliaries

If a motor is equipped with thermistors or other RTDs (Pt100, thermal relays, etc.) and auxiliary devices, it is recommended they be used and connected by appropriate means.

Maximum measuring voltage for the thermistors is 2.5 V. Maximum measuring current for Pt100 is 5 mA. Using a higher measuring voltage or current may cause errors in readings or damage the system.

3.8 Terminals and direction of rotation

The shaft rotates clockwise when viewing the shaft face at the motor drive end, and the line phase sequence L1, L2, L3 is connected to the terminals as shown in Figure 1.

To alter the direction of rotation, interchange any two connections on the supply cables.
If the motor has a unidirectional fan, ensure that it rotates in the same direction as the arrow marked on the motor.

4. OPERATION

4.1 Use

The motors are designed for the following conditions unless otherwise stated on the rating plate.

- Normal ambient temperature limits are -20°C to +40°C.
- Maximum altitude 1000 m above sea level.
- Tolerance for supply voltage is ±5% and for frequency ±2% according to EN / IEC 60034-1 (2004).

⚠ WARNING!
Ignoring any of given instructions or maintenance of the apparatus may jeopardise the safety and thus prevents the use of the machine.

4.2 Cooling

Check that the motor has sufficient airflow. Ensure that no nearby objects or direct sunshine radiate additional heat to the motor.

For flange mounted motors (e.g. B5, B35, V1), make sure that the construction allows sufficient air flow on the outer surface of the flange.

4.3 Safety considerations

The machine is intended for installation and use by qualified personnel, familiar with health and safety requirements and national legislation.

Safety equipment necessary for the prevention of accidents at the installation and operating site must be provided in accordance with local regulations.

⚠ WARNING!
Do not carry out work on motor, connection cables or accessories such as frequency converters, starters, brakes, thermistor cables or heating elements when voltage is applied.

Points to observe

1. Do not step on the motor.

2. The temperature of the outer casing of the motor may be too hot to touch during normal operation and especially after shut-down.

3. Some special motor applications require special instructions (e.g. using frequency converter supplies).

4. Be aware of rotating parts of the motor.

5. Do not open terminal boxes while energised., for single phase motors pay attention that the capacitor may discharge even when the line supply is disconnected.

5. MAINTENANCE

⚠ WARNING!
Voltage may be connected at standstill inside the terminal box for heating elements or direct winding heating.

⚠ WARNING!
The capacitor in single-phase motors can retain a charge that appears across the motor terminals, even when the motor has reached standstill.

⚠ WARNING!
A motor with frequency converter supply may energise even if the motor is at standstill.

5.1 General inspection

1. Inspect the motor at regular intervals, every 3 months is recommended or at least once a year. The frequency of checks dependson, for example, the humidity level of the ambient air and on the local weather conditions. This can initially be determined experimentally and must then be strictly adhered to.

2. Keep the motor clean and ensure free ventilation airflow. If the motor is used in a dusty environment, the ventilation system must be regularly checked and cleaned.

3. Check the condition of shaft seals (e.g. V-ring or radial seal) and replace if necessary.

4. Check the condition of connections and mounting and assembly bolts.

5. Check the bearing condition by listening for any unusual noise, vibration measurement, bearing temperature, inspection of spent grease or SPM bearing monitoring. Pay special attention to bearings when their calculated rated life time is coming to an end.

When signs of wear are noticed, dismantle the motor, check the parts and replace if necessary. When bearings are changed, replacement bearings must be of the same type as those originally fitted. The shaft seals have to be replaced with seals of the same quality and characteristics as the originals when changing bearings.

In the case of the IP 55 motor and when the motor has been delivered with a plug closed, it is advisable to periodically openthe drain plugs in order to ensure that the way out for condensation is not blocked and allows condensation to escape from the motor. This operation must be done when the motor is at a standstill and has been made safe to work on.

5.2 Lubrication

⚠ WARNING!
Beware of all rotating parts!

⚠ WARNING!
Grease can cause skin irritation and eye inflammation. Follow all safety precautions specified by the grease manufacturer.

Bearing types are specified in the respective product catalogues.

Reliability is a vital issue for bearing lubrication intervals. KRAM uses mainly the L1-principle (i.e. that 99% of the motors are certain to make the life time) for lubrication.

⚠ WARNING!
Due to the occurrence as described below, may manifest moderate grease, or grease components in liquid form,leakage from the bearings;as a result of the

regreasing operations, in the first hours of motor operation, when the motor work out of the nominal conditions, in case of use, in maintinace operation, non compliant greases respect those indicated by the manufacturer.

These grease leakage should be monitored during the periodic motor inspection, any leakage should be cleaned with care and caution to avoid damage to the environment. Persistenceof these leaks should be avoided because it indicates that the motor operates out to the nominal conditions, or that have been used, during maintinance operations, not complying grease.

5.2.1 Machines with permanently greased bearings

Bearings are usually permanently greased bearings of 1Z, 2Z, 2RS or equivalent types.

As a guide, adequate lubrication for sizes up to 200 can be achieved for the following duration, according to L10, until 200 size.
Duty hours for permanently greased bearings at ambient temperatures of 25 and 40° C are:

LUBRICATION INTERVALS ACCORDING TO L10 PRINCIPLE								
Frame Size	Poles	Duty hours at 25°C	Duty hours at 40°C		Frame Size	Poles	Duty hours at 25°C	Duty hours at 40°C
56-63	2-8	40000	40000		132	4-8	40000	40000
71	2	40000	40000		160	2	40000	36000
71	4-8	40000	40000		160	4-8	40000	40000
80-90	2	40000	40000		180	2	38000	38000
80-90	4-8	40000	40000		180	4-8	40000	40000
100-112	2	40000	32000		200	2	27000	27000
100-112	4-8	40000	40000		200	4-8	40000	40000
132	2	40000	27000					
*Data valid at 50 Hz, for 60 Hz reduce values for 20 %.								

⚠ WARNING!
These values are valid for permitted load values given in the product catalogue. Depending on application and load conditions, see the applicable product catalogue or contact KRAMP. Data above reported will be in compliance with item 5.2, and are referred at the following motor working conditions, ambient temperature 25°C, max bearing working temperature 80°C. Medium bearing lifetime value showed should be halved for each increment of 15°C of the ambient temperature.

⚠ WARNING!
With the aim to keep the stated average lifetime it is important to perform periodical inspections on the motor, in order to prevent temperature increases on the bearings due to eventual dirt accumulating on the motor housing or on the ventilation system.

In the event of motors driven by frequency converter, the stated average lifetime may need to be reduced by 25%. Operation hours for vertical motors are half of the above values.

5.2.2 Motors with greasable bearings

⚠ WARNING!
During the first start or after a bearing lubrication a temporary temperature rise may appear, approximately 10 to 20 hours.

Lubrication intervals are driven in accordance to the following motor parameters:

1) horizontal mounting position B3

2) ambient temperature 25°C
3) max bearing working temperature 80°C

4) motor operating condition in line with the nominal parameter reported in the motor name plate, like speed,power,etc.

⚠ WARNING!
Bearings lifetime values below reported, are valid for permitted load values given in the product catalogue. Depending on application and load conditions, see the applicable product catalogue or contact KRAMP. Data above reported will be in compliance with item 5.2, and are referred at the following motor working conditions, ambient temperature 25°C, max bearing working temperature 80°C. Medium bearing lifetime value showed should be halved for each increment of 15°C of the ambient temperature.

⚠ WARNING!
With the aim to keep the stated average lifetime it is important to perform periodical inspections on the motor, in order to prevent temperature increases on the bearings due to eventual dirt accumulation on the motor housing or on the ventilation system.
In the event of motors driven by frequency converter, the stated average lifetime may need to be reduced by 25%.

Operation hours for vertical motors are half of the above values.

A. Manual lubrication

Greasing while the motor is running

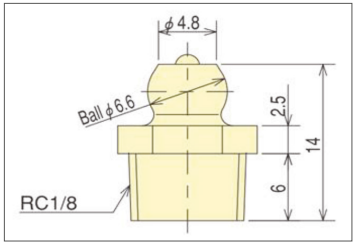
– Remove grease outlet plug, located down in the front shield/flange and in the rear shield.
– Be sure that the lubrication channel located on the front shield/flange (DE side) and on the rear shield (NDE side) is open
– Inject the specified amount of grease into the bearing.
– Let the motor run for 1–2 hours to ensure that all excess grease is forced out of the grease outlet plug. Close the grease outlet plug.“

Regreasing while the motor is at a standstill

If it is not possible to regrease the bearings while the motors are running, lubrication can be carried out while the machine is at a standstill, repeat the instruction for greasing while the motor running, with the described below variants:

- In this case use only half the quantity of grease and then run the motor for a few minutes at full speed.
- When the motor has stopped, apply the rest of the specified amount of grease to the bearing.
- After 1-2 running hours close the grease outlet plug.

Greasing nipple dimension (mm)



B. Automatic lubrication

The grease outlet plug must be removed permanently with automatic lubrication.

KRAMP recommends only the use of electromechanical systems.

The amount of grease per lubrication interval stated in the table should be multiplied by four if an automatic regreasing system is used.
When 2-pole motors are automatically regreased, the note concerning lubricant recommendations for 2-pole motors in the Lubricants chapter should be followed.

5.2.3 Lubrication intervals and amounts

As a guide, adequate lubrication for motors with greasable bearings can be achieved for the following duration, according to L1. For duties with higher ambient temperatures please contact KRAMP. The formula to change the L1 values roughly to L10 values: L10 = 2.7 x L1.

⚠ WARNING!
Lubrication intervals for vertical machines are half of the values shown in the table below.

The lubrication intervals are based on an ambient temperature +25°C. An increase in the ambient temperature raises the temperature of the bearings correspondingly. The values should be halved for a 15°C increase and may be doubled for a 15°C decrease.

⚠ WARNING!
The maximum operating temperature of the grease and bearings, +110°C, must not be exceeded. The designed maximum speed of the motor must not be exceeded.

Lubrication intervals according to L1 principle

Frame size	Amount of grease g/bearing	kW	3600 rpm	3000 rpm	kW	1800 rpm	1500 rpm	kW	1000 rpm	kW	500-900 rpm
Ball bearings -- Lubrication intervals in duty hour											
112	10	all	10.000	13.000	all	18.000	21.000	all	25.000	all	28.000
132	15	all	9.000	11.000	all	17.000	19.000	all	23.000	all	26.500
160	25	≤18.5	9.000	12.000	≤15	18.000	21.500	≤11	24.000	all	24.000
160	25	>18.5	7.500	10.000	>15	15.000	18.000	>11	22.500	all	24.000
180	30	≤22	7.000	9.000	≤22	15.000	18.500	≤15	24.000	all	24.000
180	30	>22	6.000	8.500	>22	14.000	17.000	>15	21.000	all	24.000
200	40	≤37	5.500	8.000	≤30	14.500	17.500	≤22	23.000	all	24.000
200	40	>37	3.000	5.500	>30	10.000	12.000	>22	16.000	all	20.000
225	50	≤45	4.000	6.500	≤45	13.000	16.500	≤30	22.000	all	24.000
225	50	>45	1.500	2.500	>45	5.000	6.000	>30	8.000	all	10.000
250	60	≤55	2.500	4.000	≤55	9.000	11.500	≤37	15.000	all	18.000
250	60	>55	1.000	1.500	>55	3.500	4.500	>37	6.000	all	7.000
280	60	all	2.000	3.500	-	-	-	-	-	-	-
280	60	-	-	-	all	8.000	10.500	all	14.000	all	17.000
280	35	all	1.900	3.200	-	-	-	-	-	-	-
280	40	-	-	-	all	7.800	9.600	all	13.900	all	15.000
315	35	all	1.900	3.200	-	-	-	-	-	-	-
315	55	-	-	-	all	5.900	7.600	all	11.800	all	12.900
355-500	35	all	1.900	3.200	-	-	-	-	-	-	-
355-500	70	-	-	-	all	4000	5.600	all	9.600	all	10.700

Lubrication intervals according to L1 principle

Frame size	Amount of grease g/bearing	kW	3600 rpm	3000 rpm	kW	1800 rpm	1500 rpm	kW	1000 rpm	kW	500-900 rpm
Roller bearings -- Lubrication intervals in duty hour											
160	25	≤18.5	4.500	6.000	≤15	9.000	10.500	≤11	12.000	all	12.000
160	25	>18.5	3.500	5.000	>15	7.500	9.000	>11	11.000	all	12.000
180	30	≤22	3.500	4.500	≤22	7.500	9.000	≤15	12.000	all	12.000
180	30	>22	3.000	4.000	>22	7.000	8.500	>15	10.500	all	12.000
200	40	≤37	2.750	4.000	≤30	7.000	8.500	≤22	11.500	all	12.000
200	40	>37	1.500	2.500	>30	5.000	6.000	>22	8.000	all	10.000
225	50	≤45	2.000	3.000	≤45	6.500	8.000	≤30	11.000	all	12.000
225	50	>45	750	1.250	>45	2.500	3.000	>30	4.000	all	5.000
250	60	≤55	1.000	2.000	≤55	4.500	5.500	≤37	7.500	all	9.000
250	60	>55	500	750	>55	1.500	2.000	>37	3.000	all	3.500
280	60	all	1.000	1.750	-	-	-	-	-	-	-
280	70	-	-	-	all	4.000	5.250	all	7.000	all	8.500
280	35	all	900	1.600	-	-	-	-	-	-	-
280	40	-	-	-	all	4.000	5.300	all	7.000	all	8.500
315	35	all	900	1.600	-	-	-	-	-	-	-
315	55	-	-	-	all	2.900	3.800	all	5.900	all	6.500
355-500	35	all	900	1.600	-	-	-	-	-	-	-
355-500	70	-	-	-	all	2.000	2.800	all	4.800	all	5.400

5.2.4 Lubricants

WARNING

Do not mix different types of grease.
Incompatible lubricants may cause bearing damage.
When greasing, use only special ball bearing grease with the following properties:
- good quality grease with lithium complex soap and with mineral- or PAO-oil
- base oil viscosity 100-160 cST at 40°C
- consistency NLGI grade 1.5 - 3*
- temperature range -30°C - +110°C, continuously.

*) For vertical mounted motors or in hot conditions a stiffer end of scale is recommended.
The above mentioned grease specification is valid if the ambient temperature is above -30°C or below +55°C, and the bearing temperature is below 110°C.
Grease with the correct properties is available from all the major lubricant manufacturers.
Admixtures are recommended, but a written guarantee must be obtained from the lubricant manufacturer, especially concerning EP admixtures, that admixtures do not damage bearings or the properties of lubricants at the operating temperature range.

WARNING!

Lubricants containing EP admixtures are not recommended in high bearing temperatures in frame sizes 280 to 355.
The following high performance greases can be used:

- Esso Unirex N2 or N3 (lithium complex base)
- Mobil Mobilith SHC 100 (lithium complex base)
- Shell Albida EMS 2 (lithium complex base)
- Klüber Klüberplex BEM 41-132 (special lithium base)
- FAG Arcanol TEMP110 (lithium complex base)
- Lubcon Turmogrease L 802 EP PLUS
- Total Multiplex S 2 A (lithium complex base)

NOTE!
Always use high speed grease for high speed 2-pole machines where the speed factor is higher than 480,000 (calculated as Dm x n where Dm=average bearing diameter, mm; n=rotational speed, r/min).
The following greases can be used for high speed cast iron motors but not mixed with lithium complex greases:

- Klüber Klüber Quiet BQH 72-102 (polyurea base)
- Lubcon Turmogrease PU703 (polyurea base)

If other lubricants are used:

Check with the manufacturer that the qualities correspond to those of the above mentioned lubricants.

WARNING!

Lubrication intervals listed above, are based on the use of high-performance greases such as those listed above, the use of other types of grease can reduce the lubrication intervals listed

6. AFTER SALES SUPPORT

6.1. Spare parts

When ordering spare parts, the motor serial number, full type designation and product code, as stated on the rating plate, must be specified.

For more information, please visit our web site:
www.kramp.com

6.2 Rewinding

Rewinding should always be carried out by qualified repair shops.
Contact KRAMP before rewinding the motors.

6.3 Bearings

Special care should be taken with the bearings. These must be removed using pullers and fitted by heating or using special tools for the purpose.

For more details on how replace the bearings, please contact KRAMP.
Bearings type mounted on the motor can't be changed.

⚠ WARNING!
Unless expressly authorised by the manufacturer, any repair by the end user will void the warranty and any responsability of the manufacturer on the motor conformity.

7. ENVIRONMENTAL REQUIREMENTS

7.1 Noise levels

Most of KRAMP's motors have a sound pressure level not exceeding 80 dB(A) at 50 Hz.

Values for specific machines can be found in the relevant product catalogues. At 60 Hz sinusoidal supply the values are approximately 4 dB(A) higher compared to 50 Hz values in product catalogues.

8. TROUBLESHOOTING

These instructions do not cover all details or variations in equipment nor provide for every possible condition to be met in connection with installation, operation or maintenance.

Motor troubleshooting chart

Your motor service and any troubleshooting must be handled by qualified persons who have proper tools and equipment.

TROUBLE	CAUSE	SOLUTION
Motor fails to start	Blown fuses	Replace fuses with proper type and rating
	Overload trips	Check and reset overload in starter
	Improper power supply	Check to see that power supplied agrees with motor rating plate and load factor
	Improper line connections	Check connections against diagram supplied with motor
	Open circuit in winding or control switch	Indicated by humming sound when switch is closed. Check for loose wiring connections. Also ensure that all control contacts are closing
	Mechanical failure	Check to see if motor turn freely. Check bearings and lubrication
	Short circuited stator	Indicated by blown fuses. Motor must be rewound
	Poor stator coil connection	Remove end shields, locate fault
	Rotor defective	Look for broken bars or end rings
	Motor may be overloaded	Reduce load
Motor stalls	One phase may be open	Check lines for open phase
	Wrong application	Change type or size,consult equipment supplier
	Overload	Reduce load
	Low voltage	Ensure the rating plate voltage is maintained,check connection
	Open circuit	Fuses blown, check overload relay, stator and push buttons
Motor runs and then dies down	Power failure	Check for loose connections to line, to fuses and to control

TROUBLE	CAUSE	SOLUTION
Motor does not come up to nominal speed	Not applied properly	Consult equipment supplier for proper type
	Voltage too low at motor terminals because of line drop	Use higher voltage or transformer terminals or reduce load, check connections, check conductors for proper size
	Starting load too high	Check the start load of the motor
	Broken rotor bars or loose rotor	Look for cracks near the rings,a new rotor may be required, as repairs are usually temporary
	Open primary circuit	Locate fault with testing device and repair
Motor takes too long to accelerate and/ or draws high current	Excessive load	Reduce load
	Low voltage during start	Check for high resistance,make sure that adequate cable size is used
	Defective squirrel cage rotor	Replace with new rotor
	Applied voltage too low	Correct power supply
Wrong rotation direction	Wrong sequence of phases	Reverse connections at motor or at switchboard
Motor overheats while running	Overload	Reduce load
	Frame or ventilation openings may be full of dirt and prevent proper ventilation of motor	Open vent holes and check for a continuous stream of air from the motor
	Motor may have one phase open	Check to make sure that all leads are well connected
	Grounded coil	Motor must be rewound
	Unbalanced terminal voltage	Check for faulty leads, connections and transformers

TROUBLE	CAUSE	SOLUTION
Motor vibrates	Motor misaligned	Realign
	Weak support	Strengthen base
	Coupling out of balance	Balance coupling
	Driven equipment unbalanced	Balance driven equipment
	Defective bearings	Replace bearings
	Bearings not in line	Repair motor
	Balancing weights shifted	Rebalance motor
	Contradiction between balancing of rotor and coupling (half key-full key)	Rebalance coupling or motor
	Polyphase motor running single phase	Check for open circuit
	Excessive end play	Adjust bearing or add shim.
Scraping noise	Fan rubbing end shield of fan cover	Correct fan mounting,
	Loose on bedplate	Tighten holding bolts
Noisy operation	Air gap not uniform	Check and correct end shield fits or bearing fits
	Rotor unbalanced	Rebalance rotor
Hot bearings	Bent or sprung shaft	Straighten or replace shaft
	Excessive belt pull	Decrease belt tension
	Pulleys too far away from shaft shoulder	Move pulley closer to motor bearing
	Pulley diameter too small	Use larger pulleys
	Misalignment	Correct by realighment of the drive
	Insufficient grease	Maintain proper quality and amount of grease in bearing
	Deterioration of grease or lubricant contaminated	Remove old grease, wash bearings and replace the grease with new grease
	Excess lubricant	Reduce quantity of grease, bearing should not be more than half full
	Overload bearing	Check alignment, side and end thrust
	Broken ball or rough races	Replace bearing, clean housing thoroughly first

9. RECYCLE POLICY

Recycling
When disposing electric motors, the applicable national regulations must be observed.

The main components used are cast iron (housing), steel (shaft, stator and rotor core, small parts), aluminium (housing, rotor), copper (coils), plastics (insulation materials such as polyamide, polypropylene, etc.), elastomers and asbestos-free sealing materials.

Old motors out of operation, our brand, KRAMP European sales network will accept the motors to be recycled free of charge.

Figure 1 - Connection Diagram

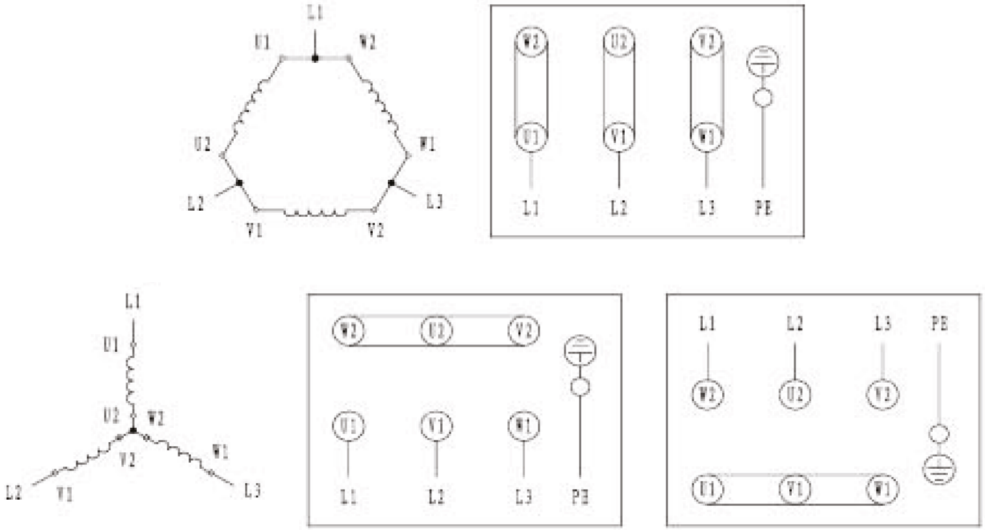
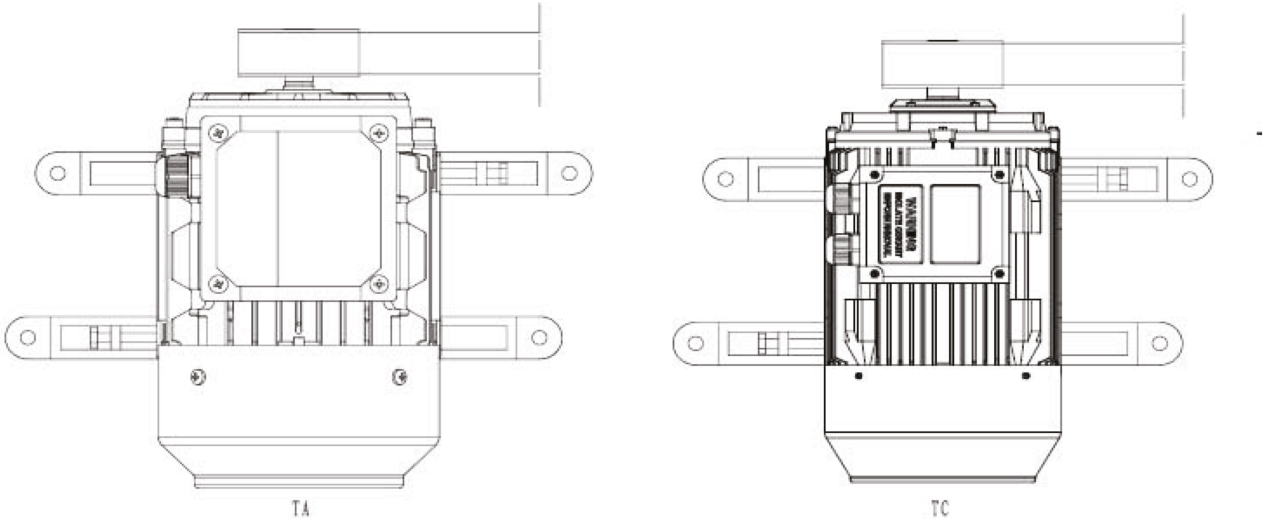


Figure 2 - Belt Drive



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