Operation manual

HELMKE plus

Frame sizes 63 to 400

IP55 in cast iron

Internet
http://www.helmke.de

Table of content

H-plus cast iron induction motors DOR 63. .400

Operation manual

1. General Note

	The data and recommendations specified in all the instructions supplied, and in all other related instructions, must always be observed in order to avoid hazardous situations and the risk of possible injury or damage. These instructions are augmented by supplementary instructions (yellow), which contain additional information on the safety measures for electrical machines and devices. The latter instructions thus augment all submitted instructions and all other related instructions. Furthermore, the pertinent national, local and plant-specific regulations and requirements should be kept in mind! Special designs and other versions may vary in technical details! If in doubt, be sure to contact the manufacturer, quoting the type designation and serial number, or have maintenance work done by one of HELMKE Service Centres.

2. Description

2.1. Application

The motors are suitable for operation in dusty and damp environments. The insulation is tropicalized. If they are properly stored or installed outdoors, special weatherproofing measures are not usually required.

2.2. Construction and mode of operation

The H-plus motors are standardly self-ventilated with own fans. In addition to that the H-plus motors are optionally either without an own fan (such as fan motors with cooling by means of a separate fan arranged on the shaft end) or with external cooling. The feet on foot-mounted motors are cast integrally with the motor casing or they can be optionally bolted onto the casing. Where motors with brake are concerned, take into consideration also the brake operating instructions! These instructions are valid in addition to the operating instructions of the given motor type.

3. Operation

	Before starting any work on the machine, be sure to isolate it from the power supply.

3.1. Transport, storage

The motors should always be lifted at both lifting eyes during transport!

	For lifting machine sets (such as built- on gearboxes, fan units), always use the lifting eyes or lifting pegs provided! Machine sets may not be lifted by suspending the individual machines! Check the lifting capacity of the hoist!

If, after delivery, the motors are stored for more than 3 years under favorable conditions (kept in a dry place free from dust and vibration) prior to commissioning, the bearings should be regreased. Under unfavorable conditions, this period is considerably shorter. If necessary, the insulation resistance of the winding should be checked, see Section 3.5.

3.2. Installation

After installation, screwed-in lifting eyes should either be removed or tightened down!

In the case of motors with shaft end facing upwards or downwards (e.g. IMV5, IMV6), measures must be taken to ensure that no water can penetrate into the upper bearing.

In the case of terminal boards with 6 terminals, the top part of the terminal box can be turned through 4 x 90 degrees.

Quiet running
Stable foundations or mounting conditions, exact alignment of the motors and a well-balanced transmission element are essential for quiet vibration-free running. If necessary, shims should be inserted under the motor feet to prevent strain, or the whole rotor and transmission element should be balanced.

3.3. Balancing, transmission elements

A suitable device should always be used for fitting and removing the transmission elements (coupling halves, pulleys, pinions). As standard, the rotors are dynamically balanced with the half feather key inserted. The type of balance is marked on the drive end of the shaft (shaft end face):

- H = balanced with half feather key
- F = balanced with whole feather key

When fitting the transmission element, keep the type of balance in mind!

If necessary, re-balancing should be carried out, e.g. the part of the feather key that protrudes from the transmission element and above the shaft surface should be cut back.

	The usual measures should be taken to guard transmission elements from touch.

If a motor is started up without transmission element attached, the feather key should be secured to prevent it being thrown out.

3.4. Electrical connection

Check to see that system voltage and frequency agree with the data given on the rating plate. Voltage or frequency deviations of ±5% from the rated values are permitted without the necessity of derating the output. Connection and arrangement of the terminal links must agree with the diagram provided in the terminal box. Connect the earthing conductor to the terminal with the marking ⏚.

Wherever terminal clips are used (for example, to DIN 46282), arrange the conductors so the clips are virtually level, i.e. not tilted when tightened. This method of connection means that the ends of single conductors must be bent in the shape of a U or be fitted with a cable lug. This also applies to the green-yellow protective earthing conductor and the outer earthing conductor. Please refer to ***Table 1*** and ***Table 2*** for tightening torques for terminal bolts and nuts (except for terminal strips).

Pay attention to the earthing when installing drives with IGBT converters; especially make sure that there is no potential difference between the drive aggregate, engine and converter. Make sure that the cables are correctly installed and that the earth connection has minimum induction.

3.5. Checking the insulation resistance

The insulation resistance of the windings must be measured prior to initial startup of the machine, after long periods of storage or standstill (approx. 6 months).

	While the measurement is being taken and immediately afterwards, some of the terminals carry dangerous voltages and must not be touched.

Insulation resistance

- The minimum insulation resistance of new, cleaned or repaired windings with respect to ground is 10 MOhm.
- The critical insulation resistance R_{crit} is calculated first by multiplying the rated voltage U_N, e.g. 0,69 kV AC, with the constant factor (0,5 MOhm/kV): R_{crit} = 0,69 kV * 0,5 MOhm/kV = 0,345 MOhm.

Measurement

The minimum insulation resistance of the windings to ground is measured with 500 V DC. The winding temperature should then be 25°C ± 15°C. The critical insulation resistance should be measured with 500 V DC with the winding at operating temperature.

Checking

If the minimum insulation resistance of a new, cleaned or re- paired machine, which has been stored or at standstill for a pro- longed period of time, is less than 10 MOhm, this may be due to humidity. The windings must then be dried. After long periods of operation, the minimum insulation resistance may drop to the critical insulation resistance. As long as the measured value does not fall below the calculated value of the critical insulation resistance, the machine may continue in operation. If it does, the machine must be stopped immediately. The cause must be determined, and the windings or winding sections repaired, cleaned or dried as necessary.

3.6. Commissioning

NOTE:

Where the torque is very uneven (the drive of a piston-type compressor, for example), the inevitable result is a non-sinusoidal motor current, whose harmonics can lead to excessive system perturbation or excessive electromagnetic interference.

In the case of converter-fed motors, high-frequency current or voltage harmonics in the motor cables can give rise to electromagnetic interference. That is why the use of shielded cables is recommended.

Before commissioning, check that:

- The minimum insulation resistances are adhered to
- The rotor turns freely without rubbing
- The motor is properly assembled and aligned
- The transmission elements are correctly adjusted (e.g. belt tension) and the transmission element is suitable for the given operating conditions
- All electrical connections, mounting screws and connecting elements are properly tightened and fitted
- All protective conductors are properly installed
- Any auxiliaries that may be fitted (brakes, speedometer, separate fan) are in working order
- Touch protection guards are installed around moving and live parts
- The maximum speed n_{max} (if noted, see rating plate) is not exceeded.

  NOTE:

The maximum speed n_{max} is the highest operating speed permitted for short periods. It should be kept in mind that motor noise and vibration are worse at this speed, and bearing life is reduced!

	After motor installation, the brake, if fitted, should be checked for proper functioning!
	It is not possible to formulate a complete check list. Other checks may also be necessary!

4. Maintenance

Safety precautions

	Before starting any work on the motor or other equipment, particularly before opening covers over live or moving parts, the motor must be properly isolated from the power supply. Besides the main circuits, any additional or auxiliary circuits that may be present must also be isolated. The usual 5 safety rules (as set forth in EN 50110-1) are: ➢ Isolate the equipment ➢ Take effective measures to prevent reconnection ➢ Verify equipment is dead ➢ Earth and short-circuit ➢ Cover or fence off adjacent live parts The precautions listed above should remain in force until all maintenance work is finished and the motor has been fully assembled.

NOTE:
Where motors are fitted with closed condense water openings, these should be opened from time to time to allow any accumulated condense water to be drained away. Condense water openings should always be at the lowest point of the motor!

Fitting new bearings, grease lifetime, type of grease
Under normal operating conditions, with horizontally mounted motors and coolant temperatures up to 40°C, the grease lifetime should be:

- approx. 40.000 operating hours for speeds of 1500 rpm
- approx. 20,000 operating hours for speeds of 3000 rpm.

Irrespective of the number of operating hours, the grease should be renewed every 3 years because of ageing. In this case the bearings should be dismounted, washed and newly greased. The modifications with additional greasing are to be maintained according to instructions on the lubricating data plate.

In the case of motors operating under special conditions, such as vertical motor position, frequent operation at maximum speed n_{max}, heavy vibration, sudden load changes and frequent reversing operation, the bearing should be changed at considerably more frequent intervals than at the operating hours stated above. The motors are standardly equipped with radial ball bearings of 62 . . or 63 . . .

NOTE:
Notice the bearing arrangement when changing the bearings because standard modifications can differ from special motors!

Type of grease for standard machines equipped with regreasing device:
High temperature lithium grease; grease lifetime and lubrication intervals are valid for this type of grease only. Compensatory greases must conform to DIN 51825-KL3N at least. In this case the lubrication intervals at KT > 25 °C are to be reduced.

Avoid mixing different types of grease!

Dismantle the motor to the extent necessary. Pull off the bearing with a suitable. Clean the journal! Clean the bearing, or obtain a new one, and pack it with fresh grease. Pack the bearing cavities flush with grease! The cover plate or endshield is kept free of grease to prevent overgreasing. Heat bearings evenly to about 80-100°C and press on. Heavy blows (such as with a hammer, ...) should be avoided. Any worn sealing elements (such as shaft sealing ring, etc.) should also be renewed. If springless radial shaft sealing rings are used, the replacement sealing rings must also be of the springless type.

Regreasing device
In the case of motors with regreasing device, take note of the information given on the lubricating data plate!

Joint sealing
When reassembling machines with degree of protection IP55 or higher (see rating plate), the bright surfaces of the joint between the motor frame and the endshields should be coated with a suitable non-hardening sealing compound (such as Hylomar, Curil).

5. Appendix

5.1. Tightening torques

Table 1: Tightening torques for screwed electrical connections and terminal board connections (except for terminal strips)

	Thread						
	M4	**M5**	**M6**	**M8**	**M10**	**M12**	**M16**
Tightening torque [*Nm*]	1,2	2,5	4	8	13	20	40

Table 2: Tightening torques for screws at the electrical terminal box, endshields and protective conductor-screw connections

	Thread							
	M4	**M5**	**M6**	**M8**	**M10**	**M12**	**M16**	**M20**
Tightening torque [*Nm*]	3	5	9	24	42	70	165	340

Table 3: Tightening torque for screw unions in metal

	Thread						
	M12x1,5	**M16x1,5**	**M25x1,5**	**M32x1,5**	**M40x1,5**	**M50x1,5**	**M63x1,5**
Tightening torque [*Nm*]	6	7,5	9	12	12	14	14

Table 4: Tightening torque for screw unions in plastic

	Thread						
	M12x1,5	**M16x1,5**	**M25x1,5**	**M32x1,5**	**M40x1,5**	**M50x1,5**	**M63x1,5**
Tightening torque [*Nm*]	3	3	3	6	6	6	6

Subsidiaries

Deutschland

J. Helmke & Co.
Garvensstraße 5
D-30519 Hannover
P.O. Box 89 01 26
D-30514 Hannover
Tel.: +49 (0) 5 11 / 87 03-0
Fax: +49 (0) 5 11 / 86 39 30
E-Mail: helmke@helmke.de
www.helmke.de

J. Helmke & Co.
Working areas: direct current, low-voltage, transformers, frequency converters

Ludwig-Erhard-Ring 7 - 9
D - 31157 Sarstedt
P.O. Box 13 64
D - 31153 Sarstedt
Tel.: +49 (0) 50 66 903 33-0
Fax: +49 (0) 50 66 903 33-291
E-Mail: helmke2@helmke.de
www.helmke.de

Helmke Orbis GmbH
Garvensstraße 5
D-30519 Hannover
P.O. Box 89 01 40
D-30514 Hannover
Tel.: +49 (0) 5 11 / 87 03-0
Fax: +49 (0) 5 11 / 86 83 45
E-Mail: orbis@helmke.de
www.helmke.de

France

Helmke S.à.r.l.
Z.I. - 1 Allée Vert Bois
BP 17
F-68840 Pulversheim
Tel.: +33 (0) 3 89 83 25 25
Fax: +33 (0) 3 89 48 89 47
E-Mail: helmke@helmke.fr
www.helmke.fr

Helmke S.à.r.l.
Bureau de Lyon
107, Cours Albert Thomas
F-69003 Lyon
Tel.: +33 (0) 4 72 12 06 39
Fax: +33 (0) 4 78 53 89 89
E-Mail: helmke.lyon@helmke.fr

Helmke Orbis S.à.r.l.
Z.I. - 1 Allée Vert Bois
BP 17
F-68840 Pulversheim
Tel.: +33 (0) 3 89 83 25 25
Fax: +33 (0) 3 89 48 82 61
E-Mail: helmkeorbis@helmke.fr
www.helmke.fr

Russia

J. Helmke & Co.
J. Helmke & Co.
Representative Office in Moscow
Krasnoproletarskaya Street 16, Building 1
RUS - 127473 MOSCOW
Tel. & Fax +7 495 234 1630
E-Mail: helmke.russia@mail.ru

Nederland

Helmke B.V.
Elektrische machines en apparaten
Aalbosweg 24
NL-8171 MA Vaassen
Postbus 1 95
NL-8170 AD Vaassen
Tel.: +31 (0) 578 578 578
Fax: +31 (0) 578 578 585
E-Mail: info@helmke.nl
www.helmke.nl

Italia

Helmke Italia S.r.l.
Via P. Kolbe 7
I-20090 Cesano Boscone (Mi)
Tel.: +39 02 48 60 24 85
Fax: +39 02 48 60 24 94
E-Mail: helmke.italia@iol.it

Sverige

Helmke Norden AB
August Barks Gata 20
S - 42132 Västra Frölunda (Göteborg)
Tel.: +46 (0) 31 45 10 19
Fax: +46 (0) 31 47 74 72
E-Mail: info@helmke.se
www.helmke.se

España

Helmke Orbis España
Delegación España
Camino de Mundaiz no. 10 – 2°
Ofic. 24-A
E-20012 San Sebastián
Tel.: +34 943 32 08 44
Fax: +34 943 32 13 09
E-Mail: helmke@terra.es

Schweiz

Proproject AG
Wettsteinplatz 7
CH-4058 Basel
Tel.: +41 (0) 61 692 91 31
Fax: +41 (0) 61 692 91 32
E-Mail: info@proproject.ch
www.proproject.ch

HELMKE

Internet
http://www.helmke.de