Re-greasing intervals and grease types when re-lubricating low-voltage motors

low-voltage motors 1LA & 1LG

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Service & Support

Answers for industry.

SIEMENS

Question

Which re-greasing intervals and greasing types must be observed when re-lubricating low-voltage motors 1LA / 1LG?

Answer

Siemens motors up to and including shaft height 250 have, in the basic version, have permanently lubricated bearings. In this case the grease life is harmonized to the bearing lifetime. A prerequisite to achieving these figures is that the motor is operated according to its rated data.

From shaft height 280 and above, re-lubricated bearings are used as standard. These have a lubricating nipple M10 x 1 according to DIN 3404.

For shaft heights 100 to 250 there is the re-lubrication device that can be optionally ordered by specifying code K40.

Re-lubricated devices are required, if e.g. for large bearings or when high speed applications are involved where the relative velocities in the bearings are too high and therefore the re-lubrication interval in comparison to the theoretical bearing lifetime is too small.

Motors equipped with re-lubricated bearings always have a supplementary re-lubrication instruction plate with the re-lubricating data. This re-lubricating data includes the grease type, re-lubricating intervals, quantity of grease per lubricating point etc. (refer to the example).

The specified lubricating intervals apply for standard application conditions (e.g. KT 40), load levels within the framework of the catalog data, low-vibration operation, almost neutral ambient air and the use of high-quality roller bearing grease can be taken from the re-lubricating instruction plate (original lubrication).

Example of a re-lubrication instruction plate:

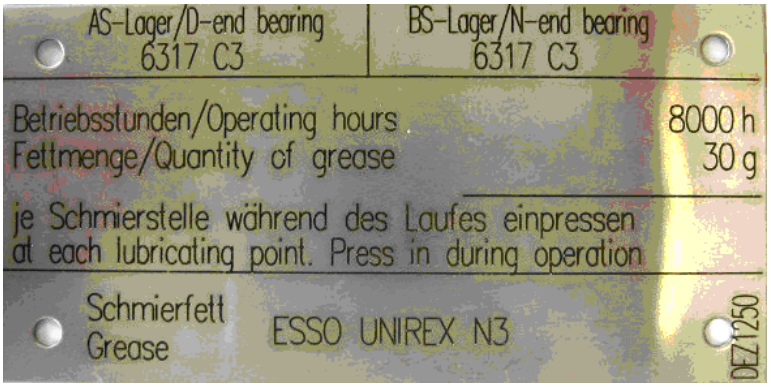

Table of content

1 Re-lubricating intervals for standard Catalog motors.

This table is for information purposes only. The exact re-lubricating intervals should be taken from the re-lubricating instruction plate attached to the motor itself.

Grease life and relubrication intervals Permanent lubrication			
Type Series	Frame Size	Number of poles	Grease life up to CT 40 °C [1]
All	56 bis 250	2 bis 8	20000 h or 40000 h [2]
Regreasing 1) Type Series	Frame Size	Number of poles	Regreasing interval CT 40 °C [1]
1LA6	100 to 160	2 to 8	8000 h
	180 to 250	2	4000 h
		4 to 8	8000 h
	280 to 315	2	2000 h
		4 to 8	4000 h
1LA5 1LA7 1LA9	100 to 225	2 to 8	8000 h
1LA8	315 to 400	2	4000 h
		4 to 8	6000 h
	450	2	3000 h
		4 to 8	6000 h
1MA6	100 to 200	2 to 8	8000 h
	225 to 280	2	4000 h
		4 to 8	8000 h
	315	2	3000 h
		4 to 8	6000 h
1MA7	100 to 160	2 to 8	8000 h
1MJ6	180 to 200	2 to 8	8000 h
1MJ7	225 to 280	2	4000 h
1MJ8		4 to 8	8000 h
1MJ1	315	2	3000 h
		4 to 8	6000 h
	355 to 450	2 and 4	2000 h
		6 and 8	4000 h
1LG4	180 to 280	2	4000 h
1LG6		4 to 8	8000 h
	315	2	3000 h
		4 to 8	6000 h

[1] If the coolant temperature is increased by 10K, the grease life and regreasing interval are halved.

[2] 40000 h applies to horizontally mounted motors for coupling abrasion (wear) without additional axial loads.

2 Re-lubricating intervals for standard Catalog motors.

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	450	2	3000 h
		4 to 8	6000 h
1MA6	100 to 200	2 to 8	8000 h
	225 to 280	2	4000 h
		4 to 8	8000 h
	315	2	3000 h
		4 to 8	6000 h
1MA7	100 to 160	2 to 8	8000 h
1MJ6 1MJ7 1MJ8	180 to 200 225 to 280	2 to 8	8000 h
		2	4000 h
		4 to 8	8000 h
1MJ1	315	2	3000 h
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	355 to 450	2 and 4	2000 h
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1LG4 1LG6	180 to 280	2	4000 h
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[1] If the coolant temperature is increased by 10K, the grease life and regreasing interval are halved.

[2] 40000 h applies to horizontally mounted motors for coupling abrasion (wear) without additional axial loads.

3 Grease designations according to DIN 51825 and 51502

Industrial lubricating greases come under the Standards according to DIN 51825 and 51502. The following designation structure is defined in the Standards:

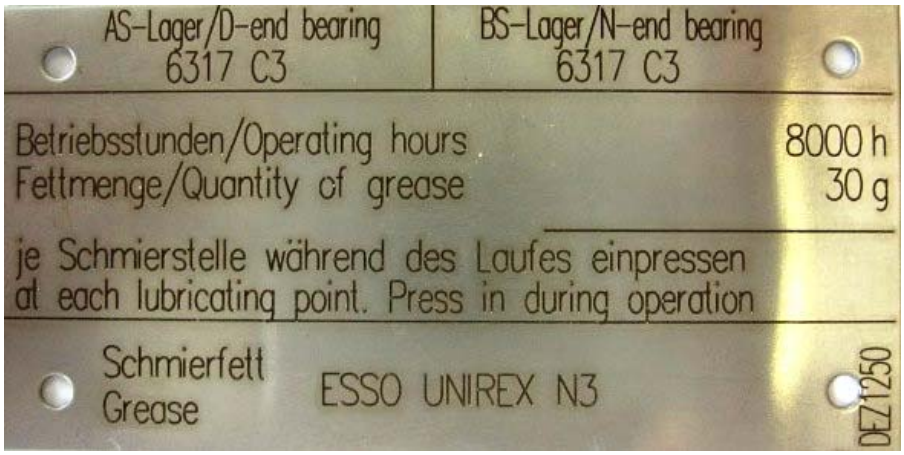
Grease DIN 51 825-	**K _ _ 3 N - Li**	**Example: DIN 51 825- K 3N – Li**
Acc.to DIN 51 502; Tl.1	**K**	Basic mineral-based oil (if other supplementary code letters are missing)
Acc.to DIN 51 502, Tl. 2	**KTC**	Lower operating temperature, –50°C
Acc. to DIN 51 502	**L**	Active substance to increase protection against corrosion and/or aging. Renowned, international manufacturers guarantee this quality also without using this code letter
	E	Basic synthetic oil, E = Ester oil, deviating from code letter K (basic mineral-based oil)
	2 (**3**)	Consistency code and worked penetration, classified acc. to the NLGI Class (a lower number corresponds to a softer) grease
		Operating temperature and resistance to water
Acc. to DIN 51 825; Tl.1	K	-20 + 120 °C
Acc. to DIN 51 825; Tl.1	N	-20 + 140 °C
Acc. to DIN 51 825; Tl.1	P	-20 + 160 °C
Acc. to DIN 51 825; Tl.2	G	-50 + 100 °C
Acc. to DIN 51 825; Tl.2	K	-50 + 120 °C
	Li	- lithium grease as thickening agent - **microgel or gel** - anorganic thickening agent

When the bearings are **lubricated for the first time** (i.e. when the motor is first supplied), for Siemens **standard motors**, lubricating greases, type series **K3N-Li** are used:

Motors 1LG4/6,1LA5/7/9, 1LE1 - K3N-Li grease ESSO UNIREX N3

Esso Unirex N3 is used as standard grease for these motors. Grease lifetimes and relubrication intervals are only valid in conjunction with rated grease type. When using other greases, they must as a minimum comply with appropriate standard and lubricating intervals have to be halved.

Only re-lubricate bearings when the motor has a speed of at least n > 300 RPM.



Special greases are specified on the lubrication instruction plate. For instance, **Klueberquiet BQH72-102** is used for high-speed motors that are fed from drive converters. This is grease with synthetic oil base that cannot be mixed with standard greases (mineral oil).

<u>Caution:</u> Greases may never be mixed with different thickening agents and basic oils!

Motors 1LA6, 1LA8 – K3N-Li grease SHELL Alvania RL3 (old G3)

Comment: The manufacturer has replaced Shell Alvania G3 by Shell Alvania RL3.

K3N GREASES
ARAL / Aralub 4340
ESSO UNIREX N3
ESSO / Mobilux EP3
Fuchs / Renolit FWA 220
SHELL / Alvania RL3 (old G3)
SHELL / Alvania R 3
WINTERSHALL / Wiolub LFK 3
DEA / Glissando 30

Only use suitable and tested, high-quality roller bearing greases to re-lubricate bearings. Only re-lubricate the bearings when the motor has a speed of at least n > 300 RPM.

These greases have lithium soap as thickening agent and mineral-based oil as basic oil. When using other K3N greases that may only comply with the minimum requirements according to DIN 51825 then the lubricating intervals have to be halved.

Caution: Greases may never be mixed with different thickening agents and basic oils!

For special application conditions (high ambient temperatures, high speeds and similar), special greases are used, e.g. grease Klueberquiet BQH72-102.

This involves a grease type with a synthetic oil that cannot be mixed with standard greases (mineral oil based).

While new grease is being pressed into the bearing when re-lubricating using the lubricating nipple, the used (spent) grease is caught in a chamber. The hollow area in the bearing cover is large enough so that there is practically enough space to accommodate old grease from re-lubrication operations (approx. 10) – i.e. for the lifetime of the bearings of approx. 40,000 operating hours

4 Appendix

4.1 Internet links

This list is by no means complete and only provides a selection of appropriate sources.

	Topic	Title
\1\	Documentation	Catalogs
\2\	FAQ	1LA / 1LG: Instructions and measures when storing the motors for longer periods of time - as well as commissioning and maintenance of low voltage motors

4.2 History

Table 4-1 History

Version	Date	Changes
V1.0	May 2008	First issue
V1.1	September 2009	Chapter 3. up dated
V1.2	November 2009	Tabel K3N Greases up datet