IMA Integrated Motor Rod-Style Actuator

LUBRICATION

NOTE!

Before starting any maintenance activities, make sure that the supply power is shut OFF.

⚠ CAUTION: DO NOT FILL WITH GREASE!

IMA actuators have been lubricated at the factory and are ready for installation. Please use the appropriate lubrication interval calculations listed below for schedule estimates.

Overfilling will cause a reduction in performance, excessive heat build up and potential premature failure.

All curves represent properly lubricated and maintained actuators.

BALL SCREW

Step 1: Calculate actuator Power Output

$\mathbf{P}_{IMA} = \mathbf{V}_{RMS} \times \mathbf{T}_{RMS} \times 0.113$ *(watts)*

Step 2: Select the appropriate actuator power level $\mathbf{P}_C$

Step 3: Calculate the Power Factor

$$\mathbf{K}_P = \frac{\mathbf{P}_C}{\mathbf{P}_{IMA}}$$

	33	44	55
P_C	105	185	240

Step 4: The lubrication interval ($\mathbf{t}_l$) for a given cycle is then calculated as:

$\mathbf{t}_l = 1000$ *(hours)* $= \mathbf{K}_P < 1$

$\mathbf{t}_l = 9000$ *(hours)* $= \mathbf{K}_P > 1$

• Re-lubricate with Mobilith SHC220 #2744-1016 (*QUANTITY:* IMA33: 3.0 g; IMA44: 5.0 g; IMA55: 7.0 g) into the grease zerk located on the rod end.

• IMA22 ballscrew does not require relubrication.

Where:

$\mathbf{P}_{IMA}$ = IMA Power Output

$\mathbf{V}_{RMS}$ = RMS Velocity *(in/sec)*

$\mathbf{T}_{RMS}$ = RMS Thrust *(lbf)*

$\mathbf{K}_P$ = Power Factor

$\mathbf{P}_C$ = Power Level

$\mathbf{t}_l$ = Lubrication Interval *(hours)*

BALL SCREW LUBRICATION (Example Calculation)

Cycle Details:

Product: IMA33 BN

$\mathbf{V}_{RMS}$: 1.66 in/sec

$\mathbf{T}_{RMS}$: 400 lbf

$\mathbf{T}_{MAX}$: 400 lbf

Step 1: Calculate your actuator's power output.

$\mathbf{P}_{IMA} = 1.66$ in/sec • 400 lbf • $0.113 = 75$ *(watts)*

Step 2: Select the appropriate actuator power level. $\mathbf{P}_C$

$\mathbf{P}_C = 105 =$ IMA33BN

Step 3: Calculate the Power Factor.

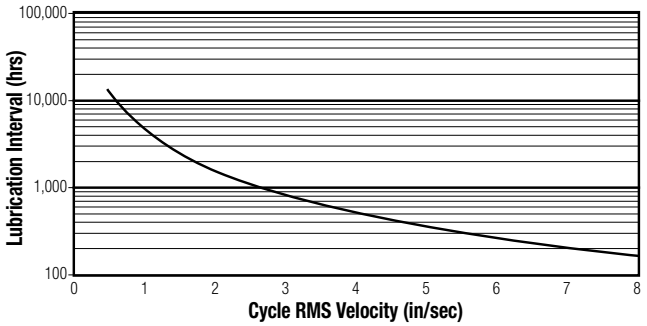
$$\mathbf{K}_P = \frac{105}{75} = 1.4$$

Step 4: The lubrication interval ($\mathbf{t}_l$) for a given cycle is then calculated as:

$\mathbf{t}_l = 9000$ *(hours)* $= \mathbf{K}_P > 1$

ROLLER SCREW

• For optimal performance and rated life, periodic re-lubrication is required.



Step 1: Select the Basic Lubrication Interval ($\mathbf{t}_{BL}$) based on the cycles RMS Velocity ($\mathbf{V}_{RMS}$).

$$\mathbf{t}_{BL} = 4500 \times (\mathbf{V}_{RMS})^{-1.57} \ \textit{(hours)}$$

Step 2: Determine the Thrust Correction Factor (K_T) based on the ratio of the

Actuator Peak Thrust Rating (T_{PEAK}) to the Maximum Cycle Thrust (T_{MAX}).

$$\mathbf{K}_T = \mathbf{K}_{Co} \left(\frac{T_{PEAK}}{P_e}\right) - 0.15$$

	33RN05	33RN10	44RN05	44RN10	55RN05	55RN10
K_{Co}	0.24	0.44	0.26	0.40	0.31	0.84

IMPORTANT NOTE:

K_T can not be greater than 1.

Step 3: The Lubrication Interval (t_L) for a given cycle is then calculated as:

$$\mathbf{t}_L = \mathbf{t}_{BL} \times \mathbf{K}_T \ \textit{(hours)}$$

Where:

$\mathbf{t}_{BL}$ = Basic Lubrication Interval *(hours)*

$\mathbf{V}_{RMS}$ = RMS Velocity *(in/sec)*

$\mathbf{K}_T$ = Thrust Correction Factor

$\mathbf{K}_{Co}$ = Screw Static Load Factor

$\mathbf{T}_{PEAK}$ = Actuator Peak Thrust Rating

$\mathbf{P}_e$ = Cycle Equivalent Load

$\mathbf{t}_L$ = Lubrication Interval *(hours)*

• Re-lubricate with Tolomatic Grease #2744-9099 (*QUANTITY:* IMA33: 3.0 g; IMA44: 5.0 g; IMA55: 7.0 g) into the grease zerk located on the rod end.

ROLLER SCREW LUBRICATION (Example Calculation)

Cycle Details:

Product: IMA33 RN05

$\mathbf{V}_{RMS}$: 1.66 in/sec

$\mathbf{T}_{PEAK}$: 1700 lbf

$\mathbf{P}_e$: 400 lbf

Step 1: Select the Basic Lubrication Interval ($\mathbf{t}_{BL}$) based on the cycles RMS Velocity ($\mathbf{V}_{RMS}$).

$$\mathbf{t}_{BL} = 4500 \times (1.66 \text{ in/sec})^{-1.57} = 2030 \ \textit{(hours)}$$

Step 2: Determine the Thrust Correction Factor (K_T) based on the ratio of the

Actuator Peak Thrust Rating (T_{PEAK}) to the Cycle Equivalent Load (P_e).

$$\mathbf{K}_T = 0.24 \left(\frac{1700 \text{ lbf}}{400 \text{ lbf}}\right) - 0.15 = 0.87$$

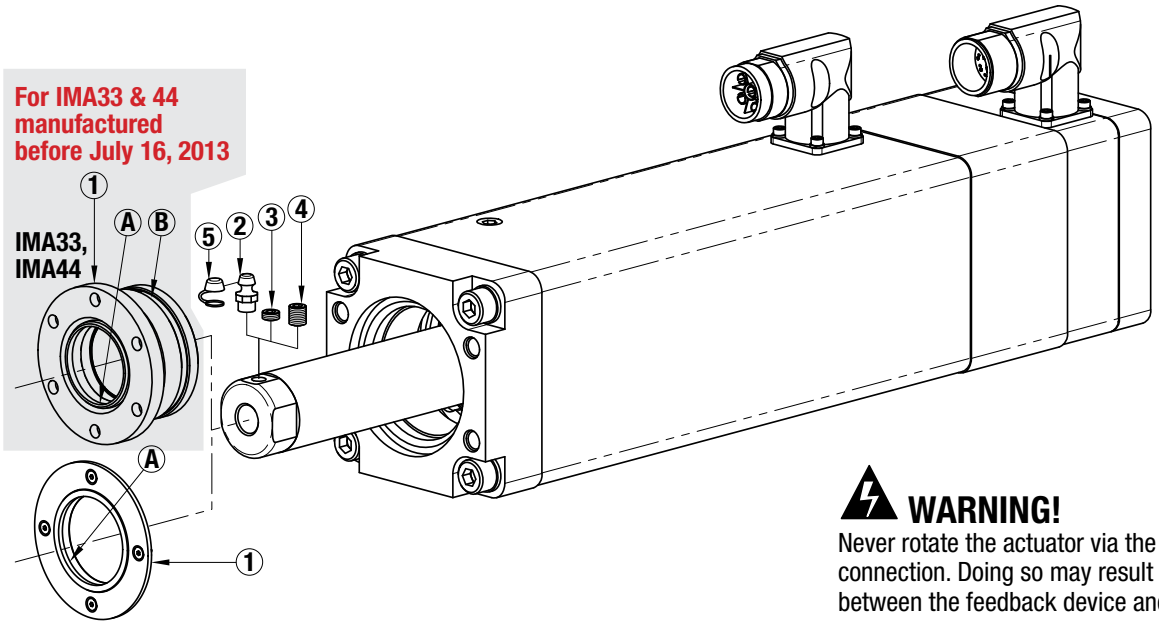
	33RN05	33RN10	44RN05	44RN10	55RN05	55RN10
K_{Co}	0.24	0.44	0.26	0.40	0.31	0.84

IMPORTANT NOTE:

K_T can not be greater than 1.

Step 3: The Lubrication Interval (t_L) for a given cycle is then calculated as:

$$\mathbf{t}_L = 2030 \ \textit{(hours)} \times 0.87 = 1766 \ \textit{(hours)}$$



Parts Listing

Item	Part No.	Description
1.	2733-9003	IMA33 Kit, Bearing / Wiper
	2744-9003	IMA44 Kit, Bearing / Wiper

	IMA33	IMA44	
A.	2115-1030	2744-1003	Wiper
B.	1014-1037	1019-1037	O-Ring

Item	Part No.	Description
1.	2722-9146	IMA22 Kit, Pilot Ring / Wiper
	2733-9146	IMA33 Kit, Pilot Ring / Wiper
	2744-9146	IMA44 Kit, Pilot Ring / Wiper
	2755-9146	IMA55 Kit, Pilot Ring / Wiper
2.	0100-1601	Zerk, Fitting, 1/4-28
3.	2309-1055	Set Screw, 1/4-28 (Flush zerk replacement)
4.	2744-1214	Grease Fitting Plug, 1/4-28 (leak-proof)
5.	2744-1213	Grease Zerk Cap (leak-resistant)

	IMA22	IMA33	IMA44	IMA55	
A.	2552-1132	2115-1030	2744-1003	2140-1030	Wiper

WARNING!
Never rotate the actuator via the feedback device connection. Doing so may result in the loss of phasing between the feedback device and motor windings.

WARNING!
There is a possibility that base oil may leak from the Grease Zerk (#2). In contamination sensitive applications replace Grease Zerk (#2) with a leak-proof Grease Fitting Plug (#4), or add a leak-resistant Grease Zerk Cap (#5) to cover Grease Zerk (#2).

IMA Maintenance and Repair

The only user serviceable components of the IMA actuator are the rod bearing/wiper assembly and grease zerk.
Further disassembly of the IMA is not recommended. IMA actuators should be returned to Tolomatic for evaluation and repair.
Contact Tolomatic for instructions on how to return the IMA actuator for evaluation.

Wiper Maintenance

In extreme environments it may be necessary to replace the rod bearing/wiper assembly.

IMA33 & 44 (manufactured before July 16, 2013)
The rod bearing/wiper assembly can be removed, after grease zerk removal, by threading it out of the front plate using a spanner wrench. A new rod bearing/wiper assembly can then be reinstalled. To have this service performed for you, contact Tolomatic.

IMA22, 33, 44 & 55
IMA22, 33, 44 and 55 have a replaceable wiper only. The wiper can be replaced by removing the zerk and the screws from the pilot ring.

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