NORTH AMERICA, INC.
a member of the mk Technology Group

Technical Documentation

LZR
TIMING BELT DRIVEN LINEAR MOTION MODULE

Each serial number is unique to that specific linear motion module and provides mk North America with complete order details.

Your serial number is also recorded above.

Ensure the serial number tag above matches the serial number on your linear motion module.

Technical Documentation
LZR

1 GENERAL INFORMATION

1.1 Foreword

Congratulations on purchasing a linear motion module from mk North America, Inc. Our more than 25 years experience in material handling allows us to offer robust solutions with long life and reliable operation. We strive to make the best products in the industry even better and we are committed to making sure our customers get top notch support before, during, and after each and every sale.

1.2 The importance of reading your manual

Inside this manual you will find the instructions on how to set up and maintain your mk linear motion module properly, as well as maximize its performance. Please take the time to read this manual and familiarize yourself with these instructions. These instructions will help assure a long product life that requires a minimum amount of service and keeps your linear motion module working at its maximum capacity.

1.3 If you need assistance

If you need assistance there are a variety of ways to get it. You can contact our customer service team Monday through Friday, 8am-5pm (Eastern Time) at 860-769-5500. You can also visit our website for additional information and technical documentation at www.mknorthamerica.com. In addition, your local representative can provide support in many instances.

1.4 When your shipment arrives

1) Check your shipment
   a) If you have not already done so, visually inspect the shipping crate/container for any damage caused during shipment.
      Retain shipping contain if damage is present.
   b) Carefully unpack the crate/container making sure to inspect the components for damage that may have occurred inside the packaging materials.
   c) If you find any damage, please contact the carrier and mk North America, Inc.
   d) Lastly, check the contents against the packing slip provided by mk for any discrepancies. If you should find any, please contact mk North America, Inc.

2) Locate your ordered items
   a) Review the packing slip against your purchase order.

2 DECODING YOUR SERIAL NUMBER

- See image below for label example.
- YOUR SERIAL NUMBER IS ON THE FRONT COVER OF THIS MANUAL.
- We have provided an area in the back of this manual for you to add any notes about this unit.

Serial #: This number is unique to this item. With this number we can access all of the original order details.

Date: This is the date that the unit was scheduled to ship.

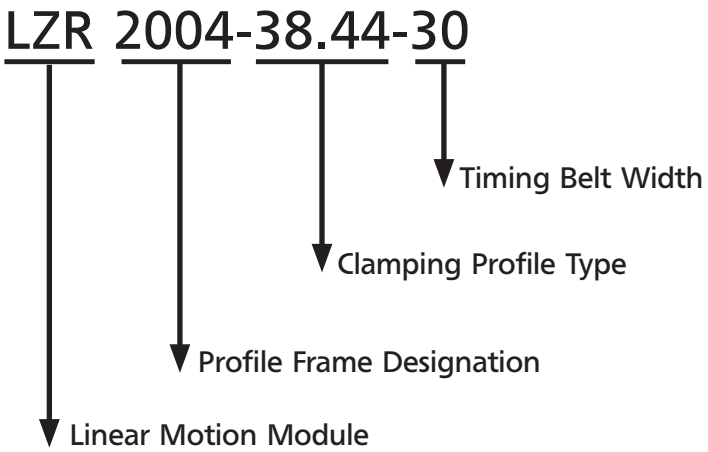
Type: This description refers to the type of unit that is associated with the particular serial number. The type should NOT be substituted for the serial number when inquiring.

DWG#: This number, if applicable, refers to the specific drawing that was created for this unit. Not all orders require a drawing and therefore in some cases no DWG# is assigned. If your DWG# field is blank it is not a cause for concern.

SO#: This is the shop order number in which this unit was built. This is an mk North America, Inc. internal number. This number is also referenced on any related invoices, etc.

3 LINEAR MOTION MODULE DESCRIPTION

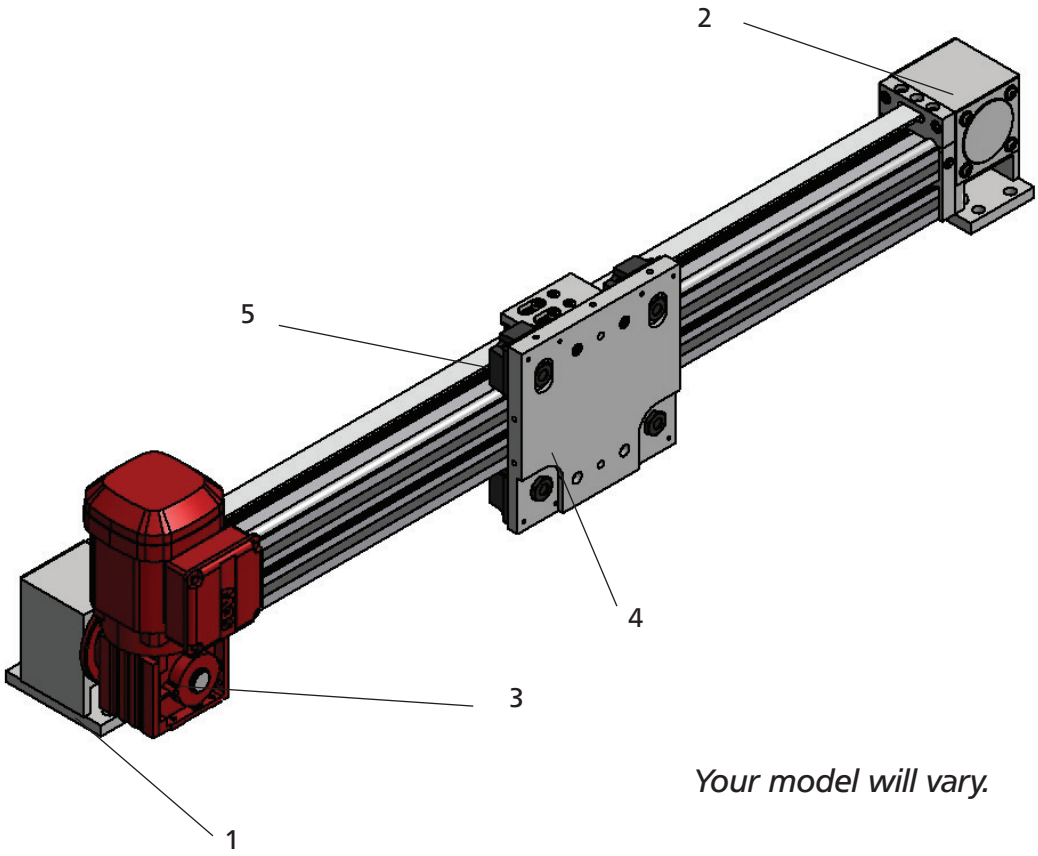
3.1 LZR Description



3 LINEAR MOTION MODULE DESCRIPTION (CONT.)

3.2 LZR Components

Linear motion modules have many common components regardless of their series. Below is a description of the basic parts and basic part options. The items you receive will vary based on your actual purchase order. Items may appear different on your model based on your particular order requirements. Consult your approval drawing for specific items included in your order.



Your model will vary.

Typical Components

1) Motor End - **serial number plate mounted here**
2) Idler End
3) Gearmotor (not included with all orders, see your approval drawing)
4) Carriage Plate
5) Timing Belt

4 WARRANTY INFORMATION

Warranty

mk North America, Inc. (MKNA) offers a COMPLETE ONE YEAR WARRANTY from the date of delivery, to the original purchaser of the MKNA equipment (CUSTOMER), to be free from defects in material and workmanship; under normal use and with proper installation, maintenance and cleaning.

> Additionally MKNA offers a LIMITED 10 YEAR WARRANTY on all equipment that MKNA is the original manufacturer of, to be free from defect and workmanship.[1.]

This warranty is extended by MKNA only to CUSTOMER, and is non-transferable. All warranty requests shall be made by CUSTOMER.

MKNA will replace or repair, at our factory or any other location we designate[2.], any defective part within the warranty period and without charge. It is at MKNA's sole discretion whether to repair or replace. CUSTOMER will provide MKNA with a prompt written notice of the defect, including the serial number of the unit (when applicable) and the date of delivery.

At MKNA's request CUSTOMER will return all defective parts for evaluation at MKNA. MKNA will provide CUSTOMER with a return goods authorization number (RGA#). No parts will be returned without a RGA#. The RGA# must clearly be marked on all labels, packages and packing slips.

CUSTOMER shall pay all costs for packaging, shipping, duties and/or any other related costs in the sending or receiving of parts. CUSTOMER is responsible for all labor associated with sending or receiving of parts.

MKNA PROVIDES NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE; UNLESS IT IS AGREED TO BY MKNA AND CUSTOMER IN WRITING PRIOR TO PLACEMENT OF ORDER. Such agreement requires approval of MKNA Management.

UNDER NO CIRCUMSTANCES SHALL MKNA BE HELD LIABLE FOR DAMAGES OR LIABILITY FOR LOSS OF PRODUCTION, PRODUCT, EQUIPMENT OR PROFITS OR LIABILITY FOR DIRECT, INCIDENTAL, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES TO PERSONS OR PROPERTY, WHATSOEVER. CUSTOMER agrees that it is their sole remedy for liability of any kind, including negligence with respect to the equipment and services furnished by MKNA shall be limited to the remedies provided herein. This warranty shall not apply to any failure of the unit or its components caused by lack of maintenance and/or improper maintenance, incorrect adjustments, misuse or unreasonable use or exposure to chemicals and/or environments which the unit is not designed for. Unauthorized modification of the unit or the use of non-MKNA replacement parts and building components voids this warranty.

[1.] The limited 10 year warranty does not apply to equipment and components manufactured by others. Such equipment and components are subject to any limitation contained in the original manufacturer's warranty and include, but are not limited to: bearings, belts, casters, controllers, motors and pneumatic devices.

[2.] No work will be performed by MKNA or an MKNA factory authorized service representative at the site of installation unless in MKNA's opinion it is impractical for Customer to remove and return the defective part to MKNA's factory.

EXCEPT AS EXPRESSLY STATED HEREIN, THERE ARE NO WARRANTIES, EXPRESSED OR IMPLIED, BY OPERATION OF LAW OR OTHERWISE, OF THE EQUIPMENT OR SERVICES FURNISHED BY MKNA OR FACTORY AUTHORIZED SERVICE REPRESENTATIVE. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF.

mk North America, Inc. reserves the right to change, modify or discontinue products and/or specifications with or without notice.

All of mk North America, Inc. products are covered by this warranty.

5 SAFETY REQUIREMENTS

5.1 Warnings - Safety Guidelines

READ AND UNDERSTAND ALL OF THESE WARNINGS PRIOR TO OPERATING EQUIPMENT.

6 WEAR ITEMS & MAINTENANCE

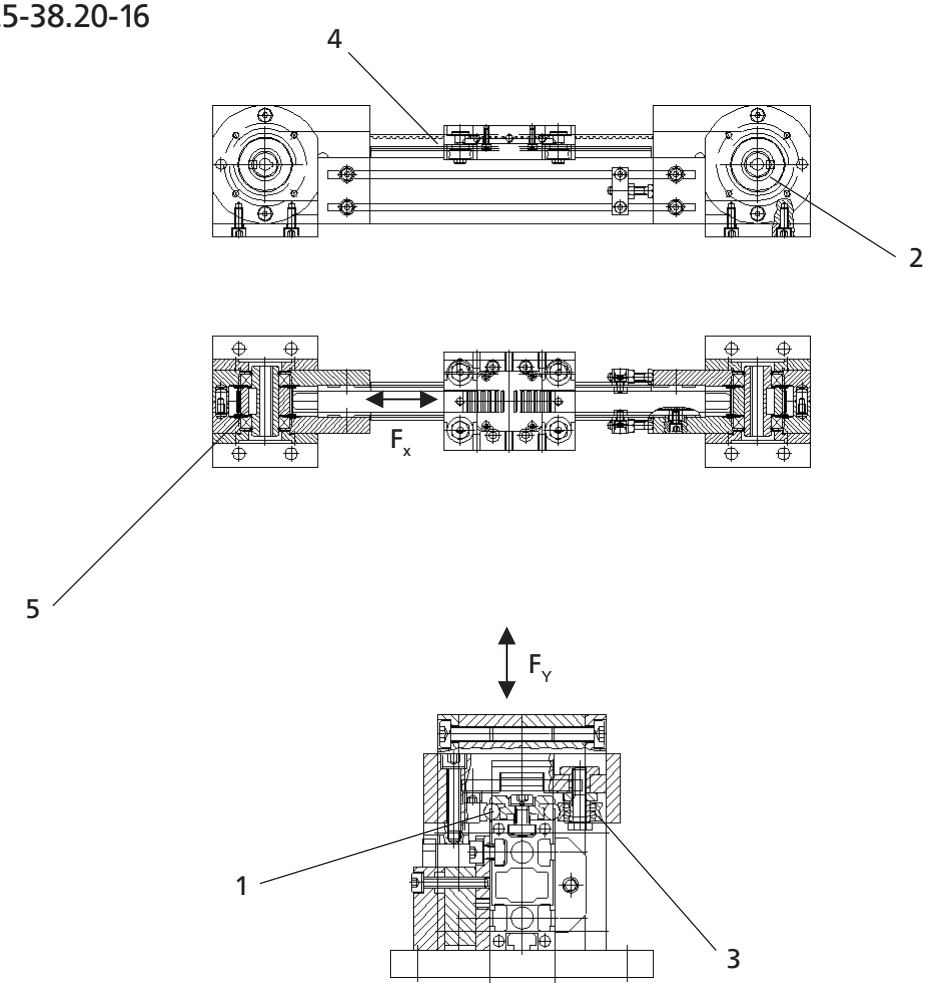
6.1 Important Notes About Wear Items & Maintenance

The following information regarding life of the wear items and service or adjustment intervals of the functional elements are only GUIDELINES. Linear motion modules are application-specific products whose life expectancy can vary depending on their relative loads and speeds, and which can be significantly influenced by environmental factors.

- All moving components and screw connections should be checked every 6 months.
- All safety-relevant components should be part of a regularly scheduled weekly inspection
- The proper function of these components must be confirmed at all times.
- Do NOT operate linear motion modules if safety-relevant components are damaged or missing.

6 WEAR ITEMS & MAINTENANCE

6.2 LZR 2025-38.20-16



Specifications (Do Not Exceed Values Shown)			
Carriage Length	100 / 150 / 200 [mm]	Roller Dynamic [C_W]	1,270 [N]
Static Load [F_{Y0}]	200 [N]	Roller Static [C_{0W}]	890 [N]
Side Load [F_{Z0}]	350 [N]	Toothed Belt Type	AT5-16
Torque [M_{X0}]	2.5 [Nm]	Toothed Belt [$F_{allow}=F_X$]	1,200 [N]
Torque [M_{Y0}]	13 / 21 / 30 [Nm]	Recommended Toothed Belt [$F_V=F_U$]	600 [N]
Torque [M_{Z0}]	8 / 13 / 18 [Nm]		

NOTE: Not all items shown in all views for clarity. Not all views are to scale. (Cont.)

6 WEAR ITEMS & MAINTENANCE

6.2 LZR 2025-38.20-16 (CONT.)

Maintenance Work

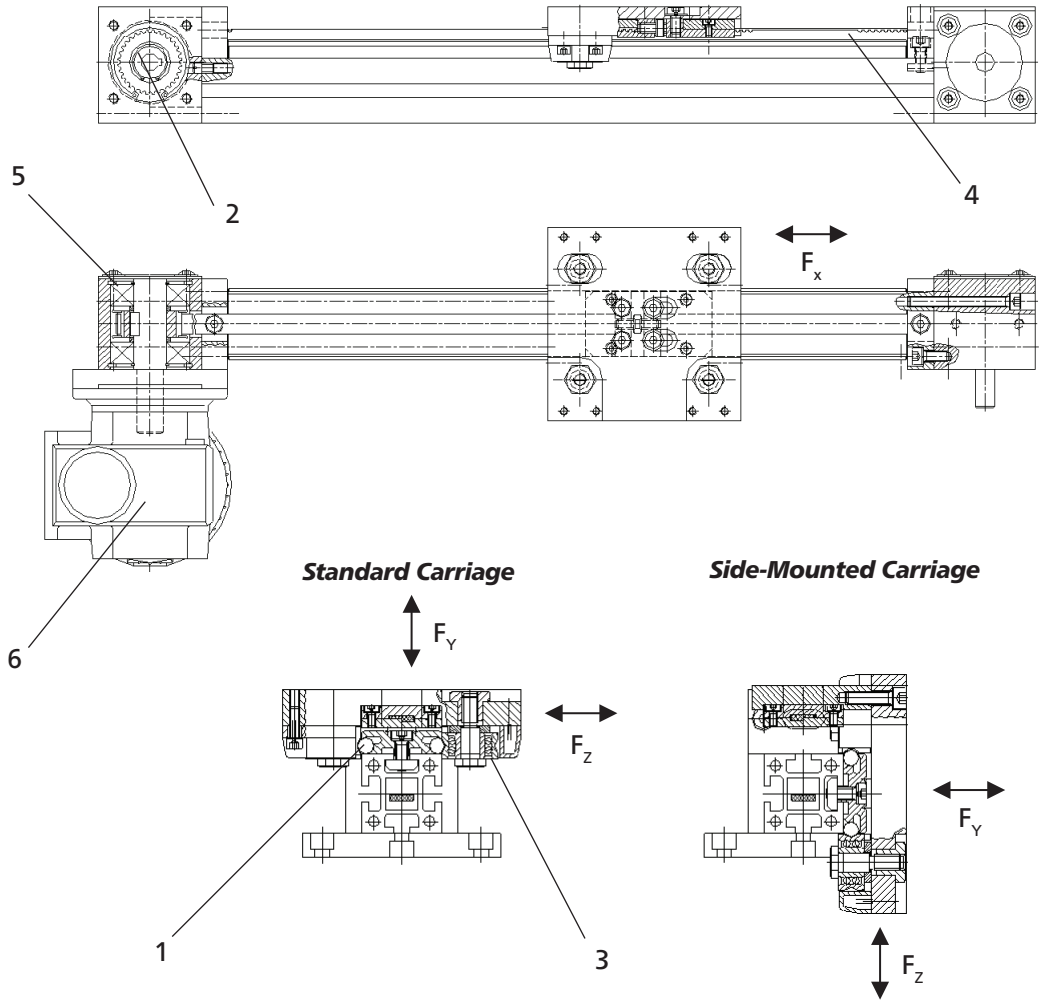
Position	Description	Action*	Interval in Hours (Months)	Lubricant
1	Guide rod	C, I, L	500 Hours (Max. 3 Months)	SAE20-SAE50
		R	Replace if wear visible	
2	Timing Belt Pulley	C, I	500 Hours (Max. 3 Months)	
		R	Replace if wear visible	
3	Roller	C, I	500 Hours (Max. 3 Months)	
		R	Replace if wear visible	
4	Timing Belt	C, I, A	500 Hours (Max. 3 Months)	
		R	Replace if wear visible	
5	Bearing	I	1,000 Hours (Max. 6 Months)	
		R	Replace if wear visible	
	Motor (not shown)	C, I	Maintenance work should be done according to manufacturer	

** LEGEND: **A = Adjust tension; C = Clean, L = Lubricate, I = Inspect***

Note: When cleaning the timing belt do not use any harsh cleaners or sharp edges

6 WEAR ITEMS & MAINTENANCE

6.3 LZR 2000-38.41-15



Specifications (Do Not Exceed Values Shown)			
Carriage Length	150 / 250 [mm]	Roller Dynamic [C_W]	8,500 [N]
Static Load [F_{Y0}]	1,000 [N]	Roller Static [C_{0W}]	5,100 [N]
Side Load [F_{Z0}]	2,000 [N]	Toothed Belt Type	5M-15
Torque [M_{X0}]	25 [Nm]	Toothed Belt [$F_{allow}=F_X$]	1,150 [N]
Torque [M_{Y0}]	100 / 200 [Nm]	Recommended Toothed Belt [$F_V=F_U$]	575 [N]
Torque [M_{Z0}]	50 / 100 [Nm]		

NOTE: Not all items shown in all views for clarity. Not all views are to scale. (Cont.)

6 WEAR ITEMS & MAINTENANCE

6.3 LZR 2000-38.41-15 (CONT.)

Maintenance Work

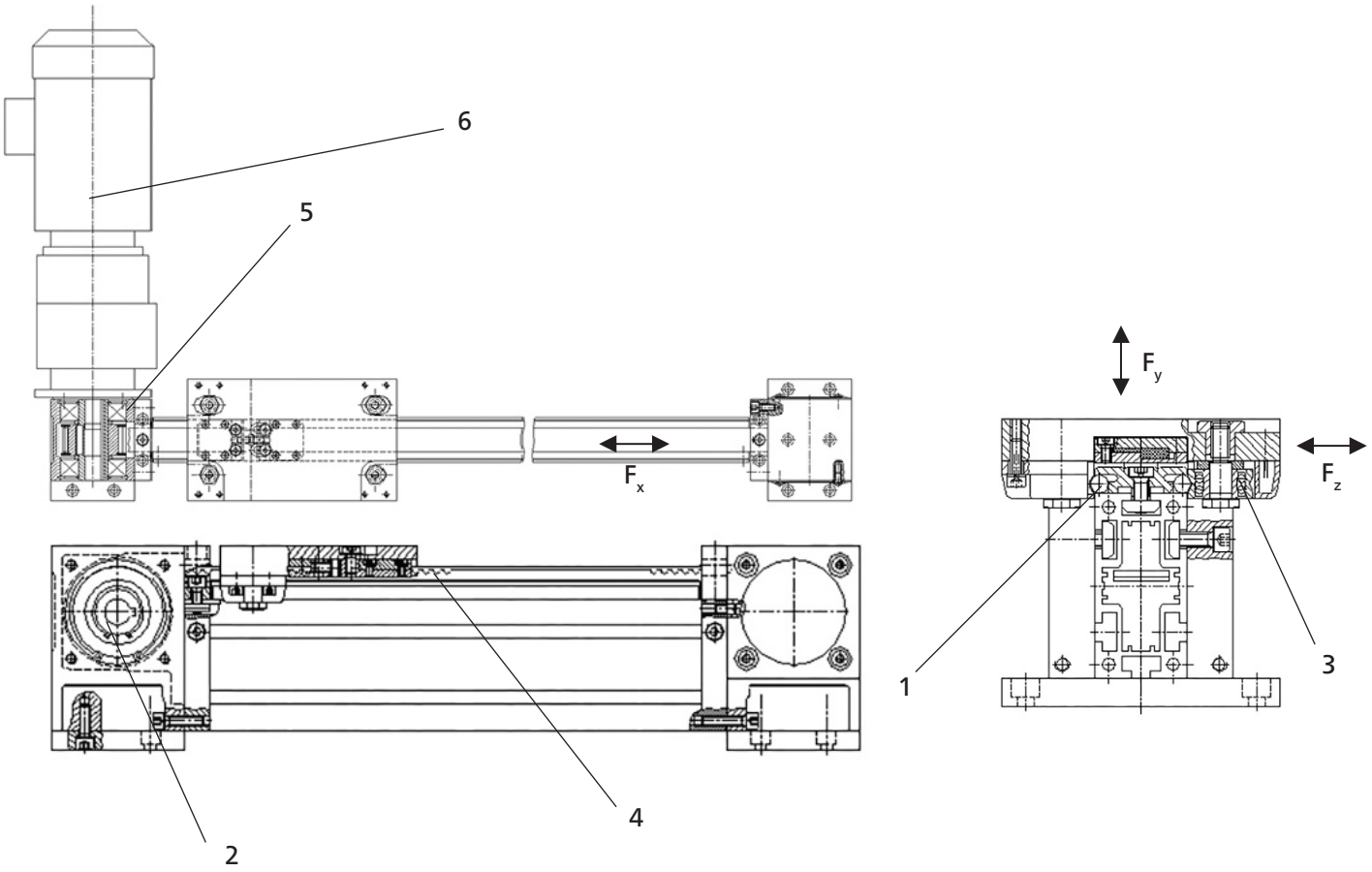
Position	Description	Action*	Interval in Hours (Months)	Lubricant
1	Guide rod	C, I, L	500 Hours (Max. 3 Months)	SAE20-SAE50
		R	Replace if wear visible	
2	Timing Belt Pulley	C, I	500 Hours (Max. 3 Months)	
		R	Replace if wear visible	
3	Roller	C, I	500 Hours (Max. 3 Months)	
		R	Replace if wear visible	
4	Timing Belt	C, I, A	500 Hours (Max. 3 Months)	
		R	Replace if wear visible	
5	Bearing	R	1,000 Hours (Max. 6 Months)	
		I	Replace if wear visible	
6	Motor	C, I	Maintenance work should be done according to manufacturer	

** LEGEND: **A = Adjust tension; C = Clean, L = Lubricate, I = Inspect***

Note: When cleaning the timing belt do not use any harsh cleaners or sharp edges

6 WEAR ITEMS & MAINTENANCE

6.4 LZR 2004-38.41-30



Specifications (Do Not Exceed Values Shown)			
Carriage Length	150 / 250 [mm]	Roller Dynamic [C_W]	8,500 [N]
Static Load [F_{Y0}]	1,000 [N]	Roller Static [C_{0W}]	5,100 [N]
Side Load [F_{Z0}]	2,000 [N]	Toothed Belt Type	8M-30
Torque [M_{X0}]	25 [Nm]	Toothed Belt [$F_{allow}=F_X$]	4,000 [N]
Torque [M_{Y0}]	100 / 200 [Nm]	Recommended Toothed Belt [$F_V=F_U$]	2,000[N]
Torque [M_{Z0}]	50 / 100 [Nm]		

NOTE: Not all items shown in all views for clarity. Not all views are to scale. (Cont.)

6 WEAR ITEMS & MAINTENANCE

6.4 LZR 2004-38.41-30 (CONT.)

Maintenance Work

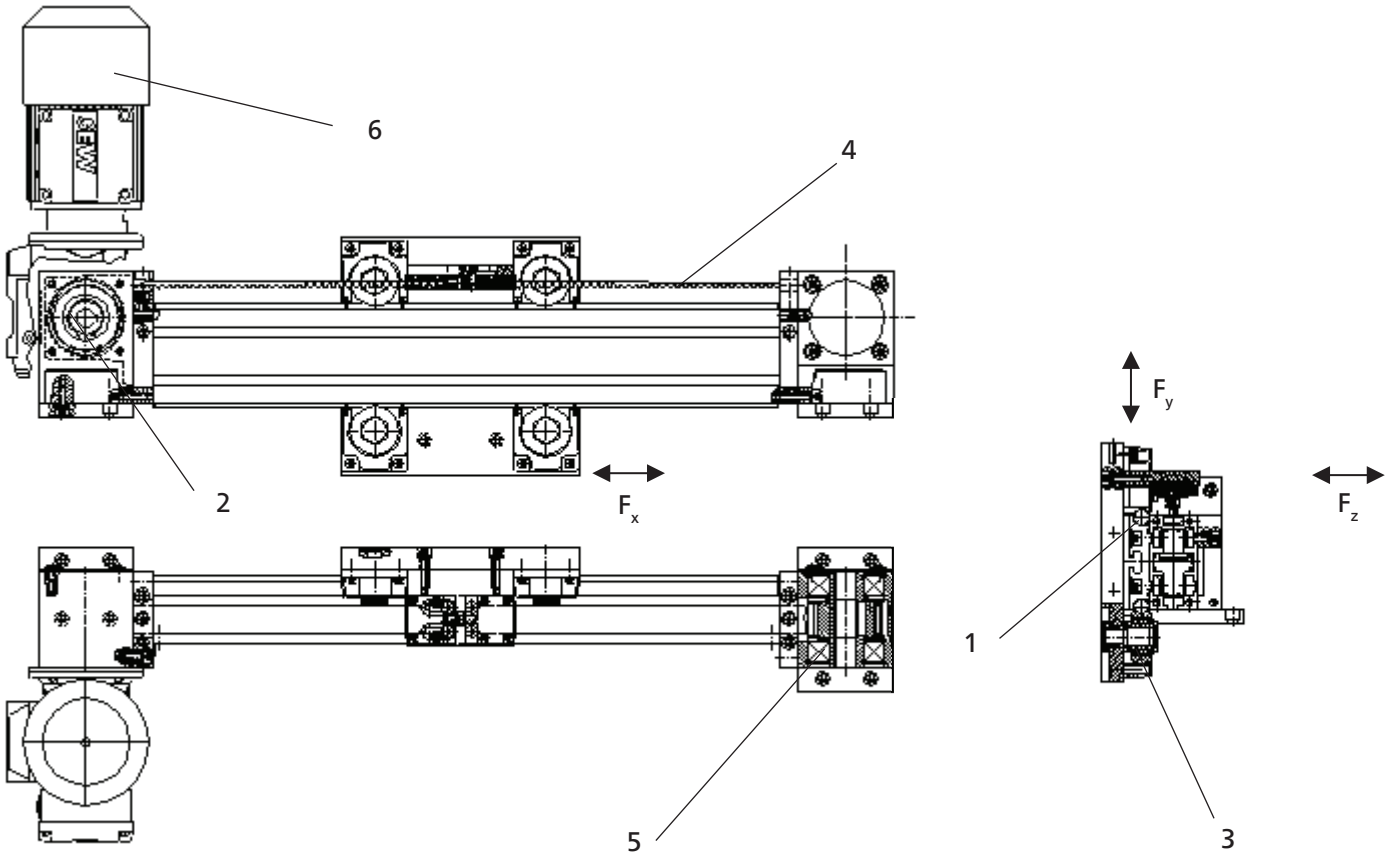
Position	Description	Action*	Interval in Hours (Months)	Lubricant
1	Guide rod	C, I, L	500 Hours (Max. 3 Months)	SAE20-SAE50
		R	Replace if wear visible	
2	Timing Belt Pulley	C, I	500 Hours (Max. 3 Months)	
		R	Replace if wear visible	
3	Roller	C, I	500 Hours (Max. 3 Months)	
		R	Replace if wear visible	
4	Timing Belt	C, I, A	500 Hours (Max. 3 Months)	
		R	Replace if wear visible	
5	Bearing	I	1,000 Hours (Max. 6 Months)	
		R	Replace if wear visible	
6	Motor	C, I	Maintenance work should be done according to manufacturer	

** LEGEND: **A = Adjust tension; C = Clean, L = Lubricate, I = Inspect***

Note: When cleaning the timing belt do not use any harsh cleaners or sharp edges

6 WEAR ITEMS & MAINTENANCE

6.4A LZR 2004-38.44-30



Specifications (Do Not Exceed Values Shown)			
Carriage Length	150 / 250 [mm]	Roller Dynamic [C_W]	16,800 [N]
Static Load [F_{Y0}]	1,600 [N]	Roller Static [C_{0W}]	9,500 [N]
Side Load [F_{Z0}]	4,000 [N]	Toothed Belt Type	8M-30
Torque [M_{X0}]	80 [Nm]	Toothed Belt [$F_{allow}=F_X$]	4,000 [N]
Torque [M_{Y0}]	350 / 760 [Nm]	Recommended Toothed Belt [$F_V=F_U$]	2,000[N]
Torque [M_{Z0}]	150 / 300 [Nm]		

NOTE: Not all items shown in all views for clarity. Not all views are to scale. (Cont.)

6 WEAR ITEMS & MAINTENANCE

6.4A LZR 2004-38.44-30 (CONT.)

Maintenance Work

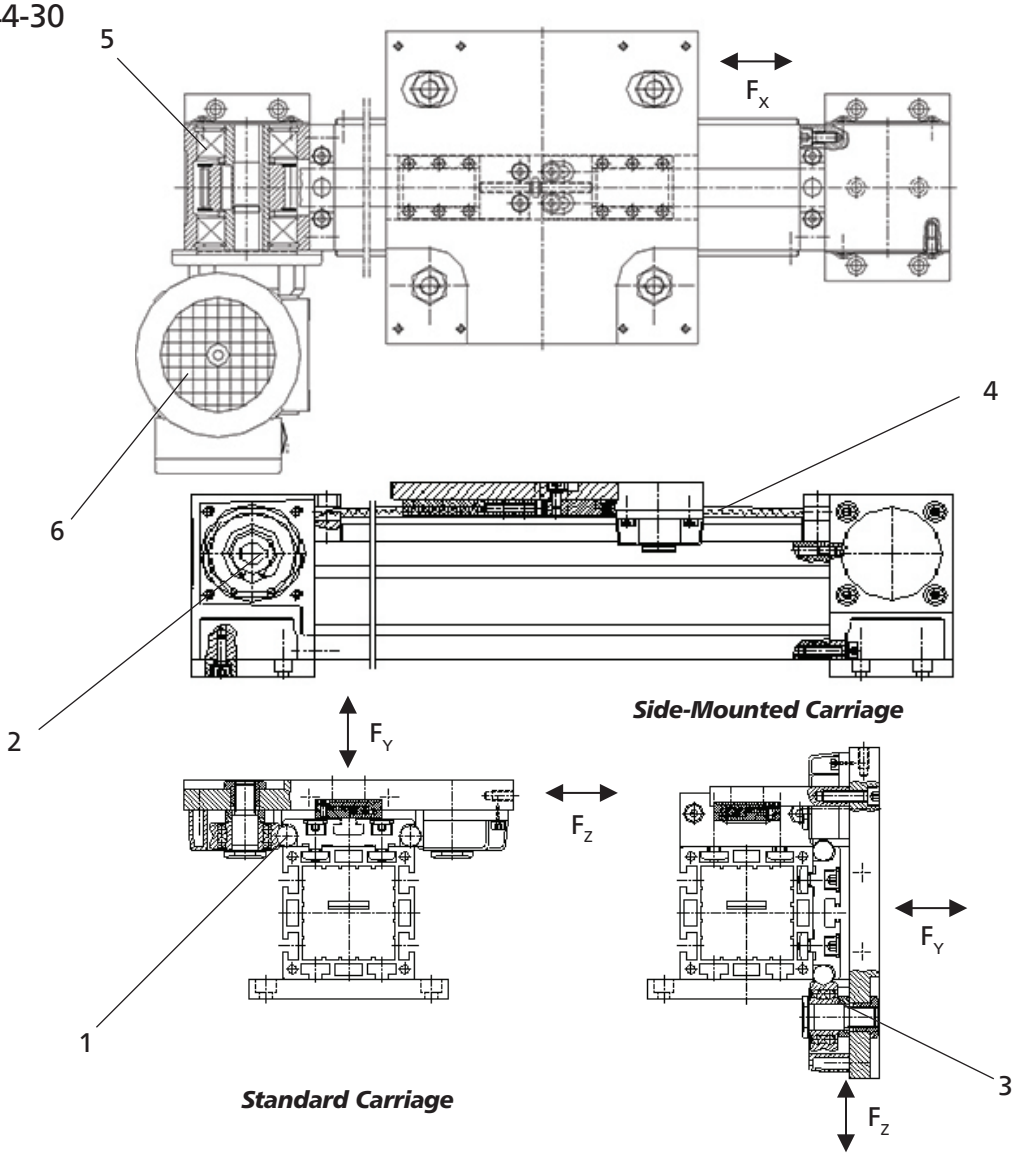
Position	Description	Action*	Interval in Hours (Months)	Lubricant
1	Guide rod	C, I, L	500 Hours (Max. 3 Months)	SAE20-SAE50
		R	Replace if wear visible	
2	Timing Belt Pulley	C, I	500 Hours (Max. 3 Months)	
		R	Replace if wear visible	
3	Roller	C, I	500 Hours (Max. 3 Months)	
		R	Replace if wear visible	
4	Timing Belt	C, I, A	500 Hours (Max. 3 Months)	
		R	Replace if wear visible	
5	Bearing	I	1,000 Hours (Max. 6 Months)	
		R	Replace if wear visible	
6	Motor	C, I	Maintenance work should be done according to manufacturer	

** LEGEND: **A = Adjust tension; C = Clean, L = Lubricate, I = Inspect***

Note: When cleaning the timing belt do not use any harsh cleaners or sharp edges

6 WEAR ITEMS & MAINTENANCE

6.5 LZR 2005-38.44-30



Specifications (Do Not Exceed Values Shown)			
Carriage Length	250 / 450 [mm]	Roller Dynamic [C_W]	16,800 [N]
Static Load [F_{Y0}]	1,600 [N]	Roller Static [C_{0W}]	9,500 [N]
Side Load [F_{Z0}]	4,000 [N]	Toothed Belt Type	8M-30
Torque [M_{X0}]	80 [Nm]	Toothed Belt [$F_{allow}=F_X$]	4,000 [N]
Torque [M_{Y0}]	350 / 760 [Nm]	Recommended Toothed Belt [$F_V=F_U$]	2,000 [N]
Torque [M_{Z0}]	150 / 300 [Nm]		

NOTE: Not all items shown in all views for clarity. Not all views are to scale. (Cont.)

6 WEAR ITEMS & MAINTENANCE

6.5 LZR 2005-38.44-30 (CONT.)

Maintenance Work

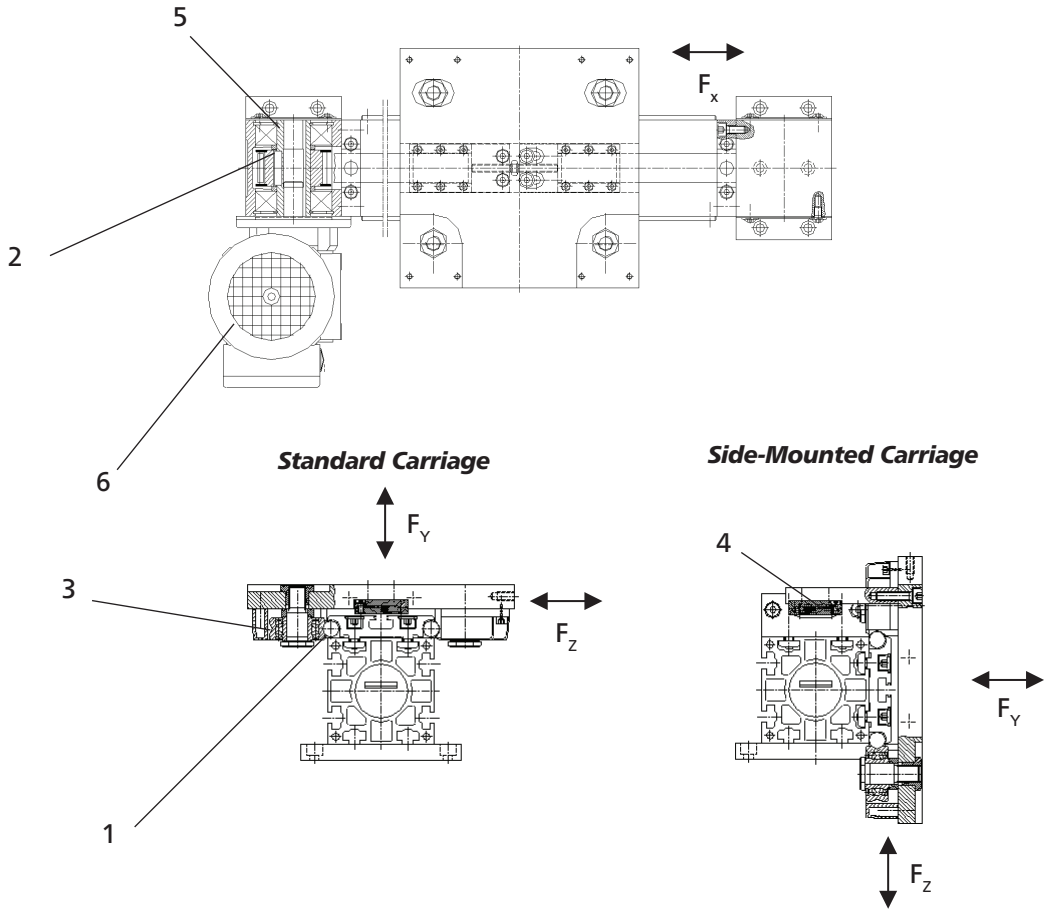
Position	Description	Action*	Interval in Hours (Months)	Lubricant
1	Guide rod	C, I, L	500 Hours (Max. 3 Months)	SAE20-SAE50
		R	Replace if wear visible	
2	Timing Belt Pulley	C, I	500 Hours (Max. 3 Months)	
		R	Replace if wear visible	
3	Roller	C, I	500 Hours (Max. 3 Months)	
		R	Replace if wear visible	
4	Timing Belt	C, I, A	500 Hours (Max. 3 Months)	
		R	Replace if wear visible	
5	Bearing	I	1,000 Hours (Max. 6 Months)	
		R	Replace if wear visible	
6	Motor	C, I	Maintenance work should be done according to manufacturer	

** LEGEND: **A = Adjust tension; C = Clean, L = Lubricate, I = Inspect***

Note: When cleaning the timing belt do not use any harsh cleaners or sharp edges

6 WEAR ITEMS & MAINTENANCE

6.6 LZR 2011-38.44-30



Specifications (Do Not Exceed Values Shown)			
Carriage Length	250 / 450 [mm]	Roller Dynamic [C_W]	16,800 [N]
Static Load [F_{Y0}]	1,600 [N]	Roller Static [C_{0W}]	9,500 [N]
Side Load [F_{Z0}]	4,000 [N]	Toothed Belt Type	8M-30
Torque [M_{X0}]	80 [Nm]	Toothed Belt [$F_{allow}=F_X$]	4,000 [N]
Torque [M_{Y0}]	350 / 760 [Nm]	Recommended Toothed Belt [$F_V=F_U$]	2,000 [N]
Torque [M_{Z0}]	150 / 300 [Nm]		

NOTE: Not all items shown in all views for clarity. Not all views are to scale. (Cont.)

6 WEAR ITEMS & MAINTENANCE

6.6 LZR 2011-38.44-30 (CONT.)

Maintenance Work

Position	Description	Action*	Interval in Hours (Months)	Lubricant
1	Guide rod	C, I, L	500 Hours (Max. 3 Months)	SAE20-SAE50
		R	Replace if wear visible	
2	Timing Belt Pulley	C, I	500 Hours (Max. 3 Months)	
		R	Replace if wear visible	
3	Roller	C, I	500 Hours (Max. 3 Months)	
		R	Replace if wear visible	
4	Timing Belt	C, I, A	500 Hours (Max. 3 Months)	
		R	Replace if wear visible	
5	Bearing	I	1,000 Hours (Max. 6 Months)	
		R	Replace if wear visible	
6	Motor	C, I	Maintenance work should be done according to manufacturer	

** LEGEND: **A = Adjust tension; C = Clean, L = Lubricate, I = Inspect***

Note: When cleaning the timing belt do not use any harsh cleaners or sharp edges

7 ASSEMBLY AND ADJUSTMENT INSTRUCTIONS

All work to be performed by qualified personnel only.

Power must be disconnected before performing maintenance.

This section contains information on how to change the rollers, guide rods and belts on an mk linear motion module. Also contained in this section is how to tension the belt.

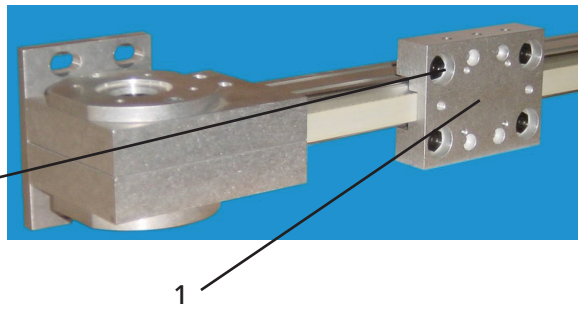
Reminders: The guide rods must be protected against corrosion by a film of oil.
Before delivery of the mk product, the timing belt was factory-tensioned.

7 ASSEMBLY AND ADJUSTMENT INSTRUCTIONS

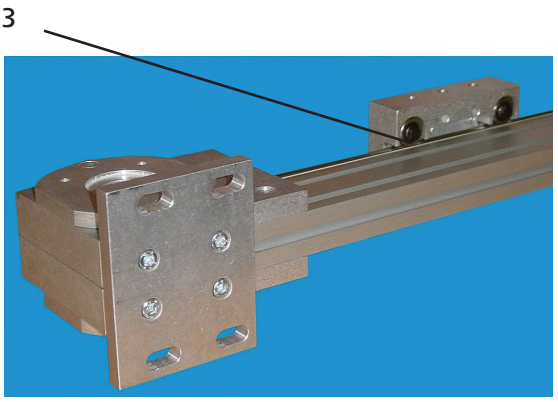
7.1 LZR 2025-38.20-16

7.1A Changing the Rollers

The rollers can be accessed from either side of the carriage plate (1). Remove bolt (2); the roller (4) can now be pulled out. Reassemble in reverse order. When the roller is changed, the contact surface of the guide rod must be re-oiled.



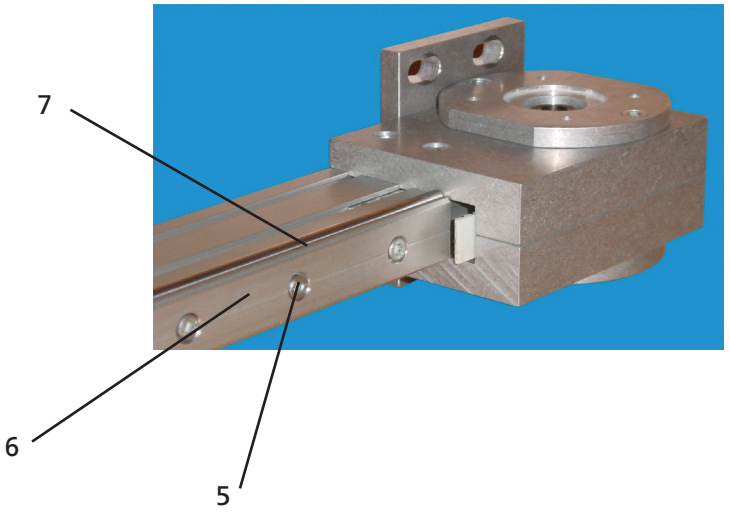
Important!
It is important to ensure proper clearance for the rollers. The clearance is adjusted using the eccentric bushing (3). When the roller is adjusted properly it is possible to move the carriage plate (1) without load; the roller (4) moves with it and it is possible to hold it in-place by hand. *If carriage is orientated vertically, ensure eccentric rollers / bushings are not supporting the carriage load.*



7.1B Changing the Guide Rods

The clamping section is located under the belt. Loosen the SHCS (5) in the clamping section (6). The guide rods (7) can now be removed. Reassemble in the reverse order, inserting the new rods. The SHCS (5) must be tightened to a torque of 19 Nm.

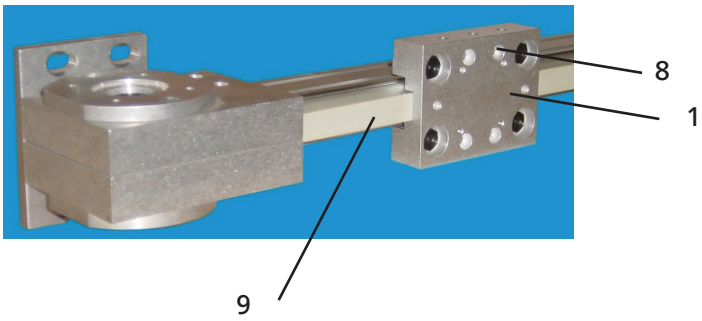
NOTE: If multiple guide rods are used, down the length; where they abut must be as seamless as possible.



7 ASSEMBLY AND ADJUSTMENT INSTRUCTIONS

7.1 LZR 2025-38.20-16 Continued

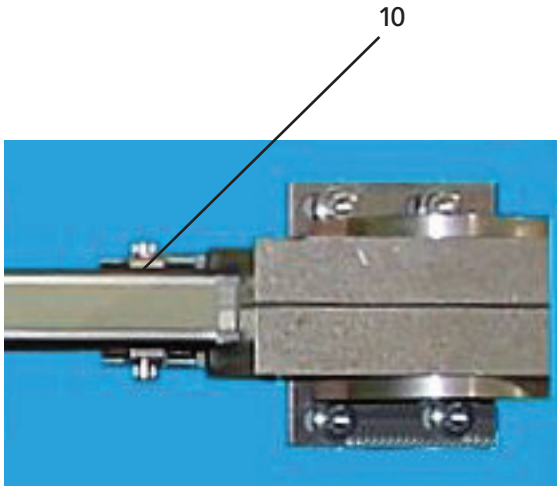
7.1C Changing the Belt



Release any belt tension (see Tensioning, below). The carriage plate (1) must be removed by removing the SHCS (8). This will expose the clamp plate that joins the timing belt ends. Remove the old belt (9).

Thread the new belt through the linear module. Ensuring that the new belt is properly seated on the timing belt pulley on both ends of the assembly.

Place the timing belt between the clamping plate and the carriage plate (1). Replace the SHCS (8) to complete the assembly.



Tensioning the Timing Belt:
The timing belt is tensioned via the alignment blocks (10) on either side of the module. Adjust the screw in the alignment block to apply tension. The belt should be tensioned to 0.1% and 0.2% of its length. See example below on how to measure this.

Tensioning Example
The belt is marked off at intervals of 1,000 mm before tensioning. After tensioning, there must be a distance of 1,001 and 1,002 mm between the marks.

7 ASSEMBLY AND ADJUSTMENT INSTRUCTIONS

7.2 LZR Models: All except LZR 2025-38.20-16

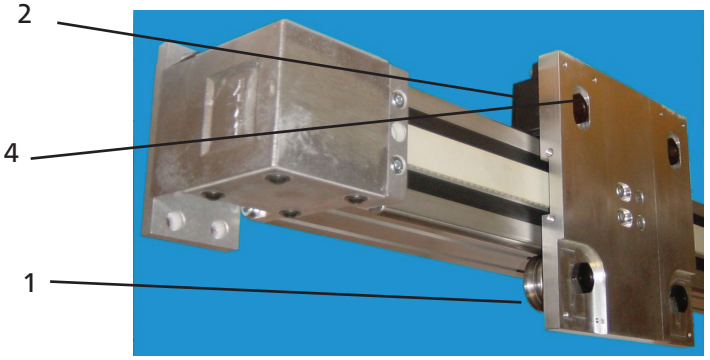
7.2A Changing the Rollers

Before the rollers (1) are changed, the wipers (2) must be removed.

Remove the rollers (1) by loosening the bolt (3)

Reassemble in reverse order. When the roller is changed, the contact surface of the guide rod must be re-oiled.

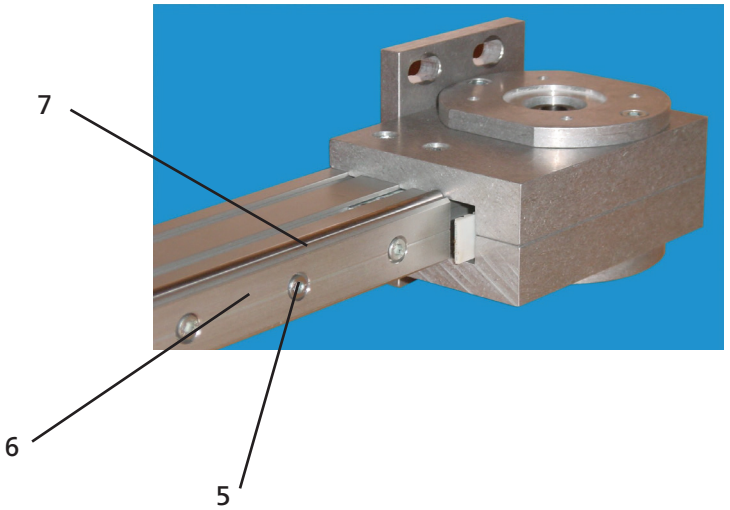
NOTE: If the carriage plate is vertical the slots of the carriage plate (with the eccentric bushings) must be down (see image).



7.1B Changing the Guide Rods

The clamping section is located under the belt. Loosen the SHCS (5) in the clamping section (6). The guide rods (7) can now be removed. Reassemble in the reverse order, inserting the new rods. The SHCS (5) must be tightened to a torque of 19 Nm.

NOTE: If multiple guide rods are used, down the length; where they intersect must be as seamless as possible.



7 ASSEMBLY AND ADJUSTMENT INSTRUCTIONS

7.2 LZR Models: All except LZR 2025-38.20-16 Continued

7.2C Changing the Belt

The carriage plate (1) must be uncoupled by removing the SHCS (8). This will expose the clamp plate (11) that joins the timing belt ends.

The clamp plate is composed of upper and lower portions. Remove the SHCS (12) in order to remove the upper portion.

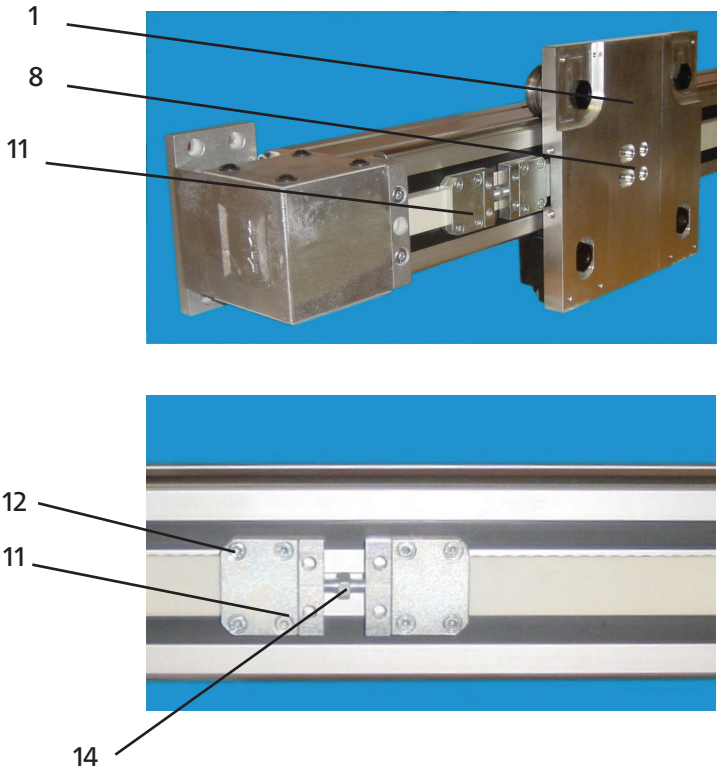
Remove the old belt.

Thread the new belt through the linear module. Ensuring that the new belt is properly seated on the timing belt pulley on both ends of the assembly.

Place the ends of the timing belt in the clamp and reassemble in reverse order. Before reattaching the clamping plate to the carriage plate, tension the belt (see below). One ideal tension is achieved secure carriage plate to clamping plate.

Tensioning the Timing Belt:
The timing belt is tensioned via the nut (14) in the clamping plate. The belt should be tensioned to 0.1% and 0.2% of its length. See example below on how to measure this.

Tensioning Example
The belt is marked off at intervals of 1,000 mm before tensioning. After tensioning, there must be a distance of 1,001 and 1,002 mm between the marks.



8 NOTES & CONTACT INFORMATION

8.1 Record Your Notes

8.2 Contacting mk North America, Inc.

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Technical Documentation
LZR LINEAR MOTION MODULE

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REV. 2019.02.19