

MOTOMAN-MPL100 II SUPPLEMENTAL INSTRUCTIONS

TYPE:

YR-MPL0100-JF0 (FOR FOOD GRADE GREASE (DX200))

Upon receipt of the product and prior to initial operation, read these instructions thoroughly, and retain for future reference.

MOTOMAN INSTRUCTIONS

MOTOMAN-MPL100 II INSTRUCTIONS (HW1482984)
MOTOMAN-MPL100 II SUPPLEMENTAL INSTRUCTIONS
DX200 INSTRUCTIONS
DX200 OPERATOR'S MANUAL (for each purpose)
DX200 MAINTENANCE MANUAL

The DX200 operator's manual above corresponds to specific usage. Be sure to use the appropriate manual.

Part Number: 177137-1CD

Revision: 0

MANUAL NO.

HW1483337

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MPL100 II

Introduction

This supplementary instruction manual describes how YR-MPL0100-JF0 (Food grade grease specification) is different from the YR-MPL0100-J00 (Standard).

In case of using YR-MPL0100-JF0, read this supplementary instruction manual thoroughly with: "MOTOMAN-MPL100 II INSTRUCTIONS" (Part No. 171751-1CD).

Point of Difference

YR-MPL0100-JF0 differ from the YR-MPL0100-J00 in the following point:

(1)Food grade grease specification

- 3.3 Location (Page 3-4)
- 5.1 Basic Specifications (Page 5-1)
- 9.1 Inspection Schedule (Page 9-2 to 9-3)
- 9.3 Grease Replenishment/Exchange (Page 9-8 to 9-17)
- 10 Recommended Spare Parts (Page 10-1)

The differences are described based on "MOTOMAN-MPL100 II INSTRUCTIONS" (Part No. 171751-1CD). Read this manual thoroughly replacing the subject matters for changes with this supplementary instruction manual.

3.3 Location (Page 3-4)

When installing a manipulator, it is necessary to satisfy the following environmental conditions:

- Ambient temperature: +15 to + 45°C
- Humidity: 20 to 80%RH (no-condensing)
- Free from dust, soot, oil, or water
- Free from corrosive gas or liquid, or explosive gas or liquid.
- Free from excessive vibration
(Vibration acceleration: 4.9 m/s^2 [0.5 G] or less)
- Free from large electrical noise (plasma)
- Flatness for installation: 0.5 mm or less



During winter or when the ambient temperature is around 15 degrees break-in the each axes in turn for about five minutes each at 40% of the maximum speed until it is warmed up before the actual operation.

5 Basic Specifications

5.1 Basic Specifications (Page 5-1)

Table 5-1: Basic Specifications¹⁾

Item		Model	MOTOMAN-MPL100 II	
Flange for Cable Processing ²⁾			Not Equipped	Equipped
Application			Palletizing	
Structure			Vertically Articulated	
Degree of Freedom			5	
Payload			115 kg	100 kg
Repeatability ³⁾			±0.2 mm	
Range of Motion	S-Axis (turning)		-180° - +180°	
	L-Axis (lower arm)		-60° - +76°	
	U-Axis (upper arm)		-147° - +40°	
	B-Axis (wrist pitch/yaw)		-15° - +15° ⁴⁾	
	T-Axis (wrist twist)		-360° - +360°	-210° - +210°
Maximum Speed	S-Axis		1.83 rad/s, 105°/s	
	L-Axis		1.53 rad/s, 88°/s	
	U-Axis		2.18 rad/s, 125°/s	
	B-Axis		3.05 rad/s, 175°/s	
	T-Axis		3.58 rad/s, 205°/s	
Allowable Moment ⁵⁾	B-Axis		196 N•m (20 kgf•m)	
	T-Axis		0	
Allowable Inertia (GD ² /4)	B-Axis		90 kg•m ²	88 kg•m ²
	T-Axis		55 kg•m ²	
Approx. Mass			950 kg	
Protective Structure			Basic axis: IP54 or equivalent Wrist axis only: IP67 or equivalent	
Ambient Conditions	Temperature		+15° C to +45° C	
	Humidity		20 to 80% RH (non-condensing)	
	Vibration Acceleration		4.9 m/s ² or less (0.5 G)	
	Others		Free from corrosive gases or liquids, or explosive gases Free from exposure to water, oil, or dust Free from excessive electrical noise (plasma)	
Power Requirements			8.0 kVA	
Noise ⁶⁾			77 dB	

1) SI units are used in this table. However, gravitational unit is used in ().

2) Specification changes when the manipulator is equipped with a flange for cable processing. (Refer to Fig. 5-3 "Dimensions and P-Point Maximum Envelope".)

3) Conformed to ISO9283

4) The range of motion of the B-axis indicates the angle to the ground. With certain postures, however, motion may be limited by the relative angle between the B-axis and the upper arm. Refer to section 5.5 "B-Axis Operating Range".

5) Refer to chapter 6 "Allowable Load for Wrist Axis and Wrist Flange" for details on the permissible moment of inertia.

6) Conformed to ISO6926

1, Measurement is carried out when the maximum load is mounted to the manipulator and operated in the maximum speed.

2, Measurement is carried out:

- between 1.2 m and 1.5 m above the ground.
- 400 mm away from the P-point maximum envelope.

9.1 Inspection Schedule (Page 9-2 to 9-3)

Table 9-1: Inspection Items (Sheet 1 of 2)

Items ¹⁾		Schedule					Method	Operation	Inspection Charge		
		Daily	1000HCycle	3000HCycle	9000HCycle	18000HCycle			Specified Personnel	Licensee	Service Company
1	Alignment mark	●					Visual	Check alignment mark accordance and damage at the home position. Check for damage.	●	●	●
2	External lead	●					Visual	Check for damage and deterioration of leads.	●	●	●
3	Working area and manipulator	●					Visual	Clean the work area if dust or spatter is present. Check for damage and outside cracks.	●	●	●
4	Motors for L- and U-axes	●					Visual	Check for grease leakage. ²⁾	●	●	●
5	Baseplate mounting bolts		●				Spanner Wrench	Tighten loose bolts. Replace if necessary.	●	●	●
6	Cover mounting screws				●		Screwdriver, Wrench	Tighten loose bolts. Replace if necessary.	●	●	●
7	S-,L-,U-axes motor connector		●				Manual	Check for loose connectors and tighten if necessary.	●	●	●
8	Connector base				●		Manual	Check for loose connectors.	●	●	●
9	Wire harness in manipulator (SLU-axis wires) (BT-axis wires)				●			Check for conduction between the main connector of base and intermediate connector with manually shaking the wires. Check for wear of protective spring. ³⁾		●	●
					●			Replace ⁴⁾			●
10	Battery pack in manipulator					●		Replace the battery pack when the battery alarm occurs or the manipulator drove for 18000H.		●	●
11	S-axis speed reducer, S-axis gear			●	●		Grease Gun	Check for malfunction. (Replace if necessary.) Replace grease ⁵⁾ (3000H cycle). See <i>section 9.3.2</i> .		●	●
12	L-axis speed reducer,			●	●		Grease Gun	Check for malfunction. (Replace if necessary.) Replace grease ⁵⁾ (3000H cycle). See <i>section 9.3.3</i> .		●	●

Table 9-1: Inspection Items (Sheet 2 of 2)

Items ¹⁾	Schedule	Method	Operation	Inspection Charge						
				Specified Personnel	Licensee	Service Company				
	Daily	1000HCycle	3000HCycle	9000HCycle	18000HCycle					
13	U-axis speed reducer,		●	●		Grease Gun	Check for malfunction. (Replace if necessary.) Replace grease ⁵⁾ (3000H cycle). See <i>section 9.3.4</i> .		●	●
14	B- and T-axes speed reducer, B- and T-axes gear		●	●		Grease Gun	Check for malfunction. (Replace if necessary.) Replace grease ⁵⁾ (3000H cycle). See <i>section 9.3.5</i> .		●	●
15	Overhaul				●					●

1 Inspection No. correspond to the numbers in *Fig. 9-1 "Inspection Items"*.

2 The occurrence of a grease leakage indicates the possibility that grease has seeped into the motor. This can cause a motor breakdown. Contact your YASKAWA representative.

3 When checking for conduction with multimeter, connect the battery to "BAT" and "OBT" of connectors on the motor side for each axis, and then remove connectors on detector side for each axis from the motor. Otherwise, the home position may be lost. (Refer to *section 9.3.5 "Grease Replenishment/Exchange for U-Arm"*)

4 Wire harness in manipulator to be replaced at 18000H inspection.

5 For the grease, refer to *Table 9-2 "Inspection Parts and Grease Used"*.

Table 9-2: Inspection Parts and Grease Used

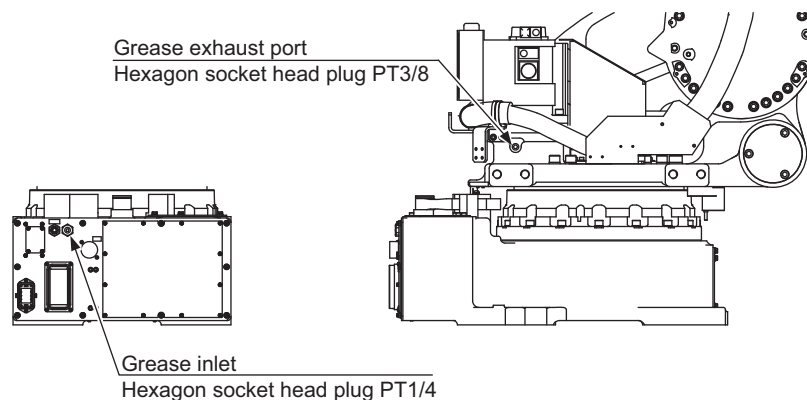
No.	Grease Used	Inspected Parts
11, 13, 14	Cassida Grease EPS 00	Speed Reducers for all Axes B-, and T-Axes gears

The numbers in the above table correspond to the numbers in *Table 9-1 "Inspection Items"*.

9.3 Grease Replenishment/Exchange (Page 9-8 to 9-17)

9.3.2 Grease Replenishment/Exchange for S-Axis Speed Reducer

Fig. 9-4: S-Axis Speed Reducer Diagram



9.3.2.2 Grease Exchange

(Refer to Fig. 9-4 "S-Axis Speed Reducer Diagram".)

1. Remove the plugs from the grease inlet and the grease exhaust port.



If grease is injected with the plug on, grease will leak inside the motor and may cause a damage. Make sure to remove the plug before grease injection.

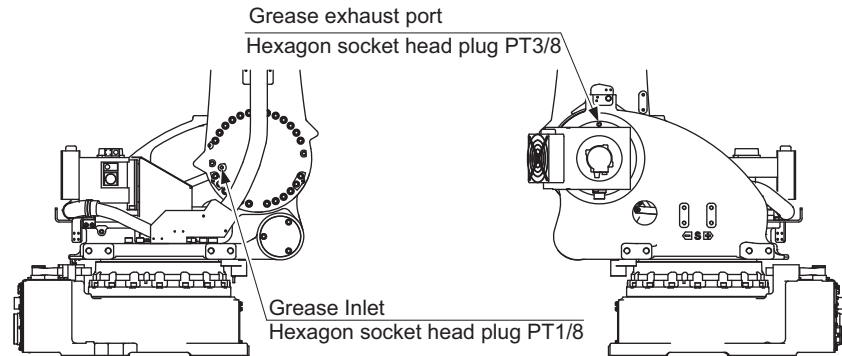
2. Install the grease zerk A-PT1/4 to the grease inlet. (The grease zerk is delivered with the manipulator.)
3. Inject grease through the grease inlet using a grease gun.
 - Grease type: Cassida Grease EPS 00
 - Amount of grease: approx. 5000 cc
 - Air supply pressure of grease pump: 0.3 MPa or less
 - Grease injection rate: 8 g/s or less
4. The grease exchange is completed when new grease appears from the exhaust port. (The new grease can be distinguished from the old grease by color.)
5. Move the S-axis for a few minutes to discharge excess grease.
6. Wipe the discharged grease with a cloth, and reinstall the plug PT3/8 to the grease exhaust port with a tightening torque of 23 N•m (2.34 kgf•m). (Apply ThreeBond 1206C to the thread part of the plug.)
7. Remove the grease zerk from the grease inlet and reinstall the plug PT3/8. Tighten the plug with a tightening torque of 4.9 N•m (0.5 kgf•m). (Apply ThreeBond 1206C to the thread part of the plug.)



If the plug is installed while grease is being exhausted, grease will leak inside the motor and may cause a damage. Ensure that grease has been completely exhausted before installing the plug.

9.3.3 Grease Replenishment/Exchange for L-Axis Speed Reducer

Fig. 9-5: L-Axis Speed Reducer Diagram



9.3.3.2 Grease Exchange

(Refer to Fig. 9-5 “L-Axis Speed Reducer Diagram”).

1. Make the L-arm vertical to the ground.
2. Remove the plugs from the grease inlet and the grease exhaust port.



If grease is injected with the plug on, grease will leak inside the motor and may cause a damage. Make sure to remove the plug before grease injection.

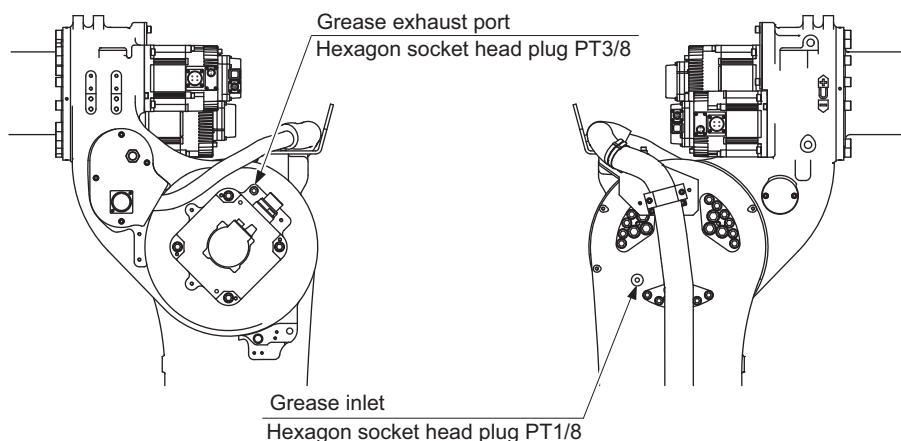
3. Install the grease zerk A-PT1/8 to the grease inlet.
(The grease zerk is delivered with the manipulator.)
4. Inject grease through the grease inlet using a grease gun.
 - Grease type: Cassida Grease EPS 00
 - Amount of grease: approx. 2500 cc
 - Air supply pressure of grease pump: 0.3 MPa or less
 - Grease injection rate: 8 g/s or less
5. The grease exchange is completed when new grease appears from the exhaust port. (The new grease can be distinguished from the old grease by color.)
6. Move the L-axis for a few minutes to discharge excess grease.
7. Wipe the discharged grease with a cloth, and reinstall the plug PT3/8 to the grease exhaust port with a tightening torque of 23 N•m (2.34 kgf•m).
(Apply ThreeBond 1206C to the thread part of the plug.)
8. Remove the grease zerk from the grease inlet and reinstall the plug PT3/8. Tighten the plug with a tightening torque of 4.9 N•m (0.5 kgf•m).
(Apply ThreeBond 1206C to the thread part of the plug.)



If the plug is installed while grease is being exhausted, grease will leak inside the motor and may cause a damage. Ensure that grease has been completely exhausted before installing the plug.

9.3.4 Grease Replenishment/Exchange for U-Axis Speed Reducer

Fig. 9-6: U-Axis Speed Reducer Diagram



9.3.4.2 Grease Exchange

(Refer to Fig. 9-6 “U-Axis Speed Reducer Diagram”).

1. Make the U-arm horizontal to the ground.
2. Remove the plugs from the grease inlet and the grease exhaust port.



If grease is injected with the plug on, grease will leak inside the motor and may cause a damage. Make sure to remove the plug before grease injection.

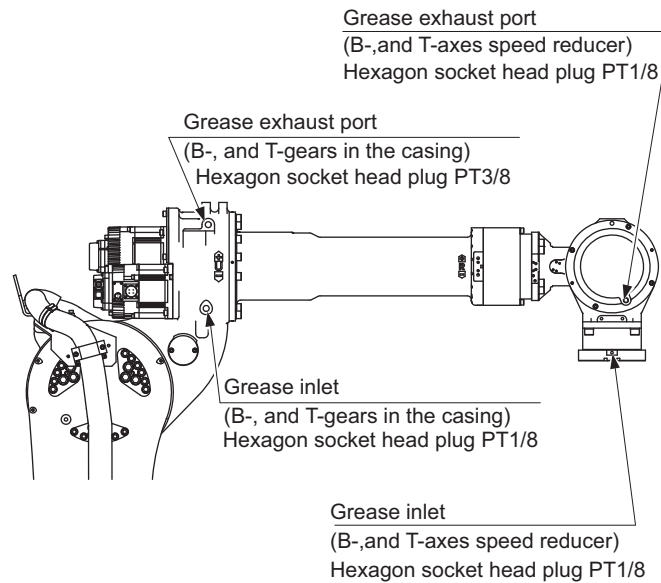
3. Install the grease zerk A-PT1/8 to the grease inlet.
(The grease zerk is delivered with the manipulator.)
4. Inject grease through the grease inlet using a grease gun.
 - Grease type: Cassida Grease EPS 00
 - Amount of grease: approx. 2500 cc
 - Air supply pressure of grease pump: 0.3 MPa or less
 - Grease injection rate: 8 g/s or less
5. The grease exchange is completed when new grease appears from the exhaust port. (The new grease can be distinguished from the old grease by color.)
6. Move the U-axis for a few minutes to discharge excess grease.
7. Wipe the discharged grease with a cloth, and reinstall the plug PT1/8 to the grease inlet and the plug PT3/8 to the grease exhaust port with a tightening torque of 23 N•m (2.34 kgf•m).
(Apply ThreeBond 1206C to the thread part of the plug.)
8. Remove the grease zerk from the grease inlet and reinstall the plug PT1/8. Tighten the plug with a tightening torque of 4.9 N•m (0.5 kgf•m).
(Apply ThreeBond 1206C to the thread part of the plug.)



If the plug is installed while grease is being exhausted, grease will leak inside the motor and may cause a damage. Ensure that grease has been completely exhausted before installing the plug.

9.3.5 Grease Replenishment/Exchange for U-Arm

Fig. 9-7: U-Arm Diagram



9.3.5.3 Grease Exchange for B-, T-Axes Gears in the Casing

(Refer to Fig. 9-7 "U-Arm Diagram".)

1. Remove the plugs from the grease inlet and the grease exhaust port.



If grease is injected with the plug on, grease will leak inside the motor and may cause a damage. Make sure to remove the plug before grease injection.

2. Install the grease zerk A-PT3/8 to the grease inlet.
(The grease zerk is delivered with the manipulator.)
3. Inject grease through the grease inlet using a grease gun.
 - Grease type: Cassida Grease EPS 00
 - Amount of grease: approx. 2600 cc
 - Air supply pressure of grease pump: 0.3 MPa or less
 - Grease injection rate: 8 g/s or less
4. The grease exchange is completed when new grease appears from the exhaust port. (The new grease can be distinguished from the old grease by color.)
5. Move the R-, B-, and T-axes for a few minutes to discharge excess grease.
6. Wipe the discharged grease with a cloth, and reinstall the plug on the grease exhaust port. Tighten the plug with a tightening torque of 23 N•m (2.34 kgf•m).
(Apply ThreeBond 1206C to the thread part of the plug).
7. Remove the grease zerk from the grease inlet and reinstall the plug. Tighten the plug with a tightening torque of 4.9 N•m (0.5 kgf•m).
(Apply ThreeBond 1206C to the thread part of the plug.)

9.3.5.4 Grease Exchange for B-, T-Axis Speed Reducer

(Refer to *Fig. 9-7 “U-Arm Diagram”*.)

1. Remove the plugs from the grease inlet and the grease exhaust port.



If grease is injected with the plug on, grease will leak inside the motor and may cause a damage. Make sure to remove the plug before grease injection.

2. Install the grease zerk A-PT1/8 to the grease inlet.
(The grease zerk is delivered with the manipulator.)
3. Inject grease through the grease inlet using a grease gun.
 - Grease type: Cassida Grease EPS 00
 - Amount of grease: approx. 800 cc
 - Air supply pressure of grease pump: 0.3 MPa or less
 - Grease injection rate: 8 g/s or less
4. The grease exchange is completed when new grease appears from the exhaust port. (The new grease can be distinguished from the old grease by color.)
5. Move the B-, T-axis for a few minutes to discharge excess grease.
6. Wipe the discharged grease with a cloth, and reinstall the plug on the grease exhaust port. Tighten the plug with a tightening torque of 4.9 N•m (0.5 kgf•m).
(Apply ThreeBond 1206C to the thread part of the plug).
7. Remove the grease zerk from the grease inlet and reinstall the plug. Tighten the plug with a tightening torque of 4.9 N•m (0.5 kgf•m).
(Apply ThreeBond 1206C to the thread part of the plug.)

10 Recommended Spare Parts (Page 10-1)

It is recommended to keep the parts and components in the following table in stock as spare parts for the MOTOMAN-MPL100 II. Product performance cannot be guaranteed when using spare parts from any company other than YASKAWA. The spare parts are ranked as follows:

- Rank A: Expendable and frequently replaced parts.
- Rank B: Parts for which replacement may be necessary as a result of frequent operation.
- Rank C: Drive unit.



For replacing parts in Rank B or Rank C, contact your YASKAWA representative.

Table 10-1: Spare Parts for the YR-MPL0100-JF0 (Sheet 1 of 2)

Rank	Part No.	Name	Type	Manufacturer	Qty	Qty per Unit	Remarks
A	1	Grease	Cassida Grease EPS 00	YASKAWA	16 kg	-	For all axes speed reducers and wrist units
A	2	Grease	Cassida Grease EPS 2	Showa Oil Co.,Ltd.	16 kg	-	for balancer joint part
A	3	Liquid Gasket	Three Bond 1206C	Three Bond Co., Ltd.	1	1	
A	4	Battery Pack	HW0470360-A	YASKAWA	1	1	
A	5	Battery Pack	HW9470932-A	YASKAWA	6	-	For wire harness in manipulator replacing
B	6	Replacement Kit for S-Axis Speed Reducer	Y005C-MPL0100JF0S	YASKAWA	1	1	
B	7	Replacement Kit for L-Axis Speed Reducer	Y005C-MPL0100JF0L	YASKAWA	1	1	
B	8	Replacement Kit for U-Axis Speed Reducer	Y005C-MPL0100JF0U	YASKAWA	1	1	
B	9	Replacement Kit for B-Axis Speed Reducer	Y005C-MPL0100JF0B	YASKAWA	1	1	
B	10	Replacement Kit for T-Axis Speed Reducer	Y005C-MPL0100JF0T	YASKAWA	1	1	
B	11	Wrist Unit	HW1171565-A	YASKAWA	1	1	
C	12	AC Servo Motor for S-, and U-Axes	SGMRV-37ANA-YR1* HW0388670-A	YASKAWA	1	2	
C	13	AC Servo Motor for L-Axis	SGMRV-44ANA-YR1* HW0388698-A	YASKAWA	1	1	
C	14	AC Servo Motor for B-and T-Axes	SGMRV-13ANA-YR1* HW0388933-A	YASKAWA	1	2	

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Table 10-1: Spare Parts for the YR-MPL0100-JF0 (Sheet 2 of 2)

Rank	Part No.	Name	Type	Manufacturer	Qty	Qty per Unit	Remarks
C	15	Internal Wire Harness	HW1171910-A	YASKAWA	1	1	
C	16	Connector Base Set	HW1371448-B	YASKAWA	1	1	
C	17	Limit switch for S-axis	HW1470807-A	YASKAWA	1	1	Lead terminal treatment completion
C	18	Limit switch for L-axis	HW1470430-B	YASKAWA	1	1	Lead terminal treatment completion
C	19	Limit switch for U-axis	HW1470430-C	YASKAWA	1	1	Lead terminal treatment completion
C	20	Circuit Board	SGDR-EFBA02A	YASKAWA	1	1	

MOTOMAN-MPL100 II

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Specifications are subject to change without notice
for ongoing product modifications and improvements.

YASKAWA

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