

MOTOMAN-HP20D-6 INSTRUCTIONS

SUPPLEMENTARY FOR YR-HP0020D-A10
(LONG U-ARM, 6kg PAYLOAD SPECIFICATION)

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

Part Number: 156227-1CD
Revision: 1

Introduction

This supplementary instruction manual describes how YR-HP0020D-A10 (hereinafter referred to as HP0020D-A10) is different from the YR-HP0020D-A00 (hereinafter referred to as HP0020D-A00).

Read this supplementary instruction manual thoroughly together with the following instruction manual:

“MOTOMAN-HP20D INSTRUCTIONS”

(Type: YR-HP0020D-A00 for standard specification, Part No. 156192-1CD)

Points of Differences

The HP0020D-A10 differs from the HP0020D-A00 in the following points:

- (1) Long U-arm
- (2) 6 kg payload

The differences are described based on "MOTOMAN-HP20D INSTRUCTIONS" (Part No. 156192-1CD). Read this manual thoroughly replacing the subject matters for changes with this supplementary instruction manual.

5 Basic Specifications

5.1 Basic Specifications (Page 5-1)

Table 5-1: Basic Specifications^{a)}

Item	Model	MOTOMAN-HP20D-6
Structure		Vertically Articulated
Degree of Freedom		6
Payload		6 kg
Repeatability ^{b)}		±0.06 mm
Range of Motion	S-Axis (turning)	±180°
	L-Axis (lower arm)	+155°, -110°
	U-Axis (upper arm)	+255°, -162°
	R-Axis (wrist roll)	±200°
	B-Axis (wrist pitch/yaw)	+230°, -50°
	T-Axis (wrist twist)	±360°
Maximum Speed	S-Axis	3.44 rad/s, 197°/s
	L-Axis	3.05 rad/s, 175°/s
	U-Axis	3.26 rad/s, 187°/s
	R-Axis	6.98 rad/s, 400°/s
	B-Axis	6.98 rad/s, 400°/s
	T-Axis	10.47 rad/s, 600°/s
Allowable Moment ^{c)}	R-Axis	11.8 N•m (1.2 kgf•m)
	B-Axis	9.8 N•m (1.0 kgf•m)
	T-Axis	5.9 N•m (0.6 kgf•m)
Allowable Inertia (GD ² /4)	R-Axis	0.24 kg•m ²
	B-Axis	0.17 kg•m ²
	T-Axis	0.06 kg•m ²
Approx. Mass		273 kg
Ambient Conditions ⁴⁾	Temperature	0°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 gasses or liquids, or explosive gasses Free from exposure to water, oil, or dust Free from excessive electrical noise (plasma)
Power Requirements		2.0 kVA

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

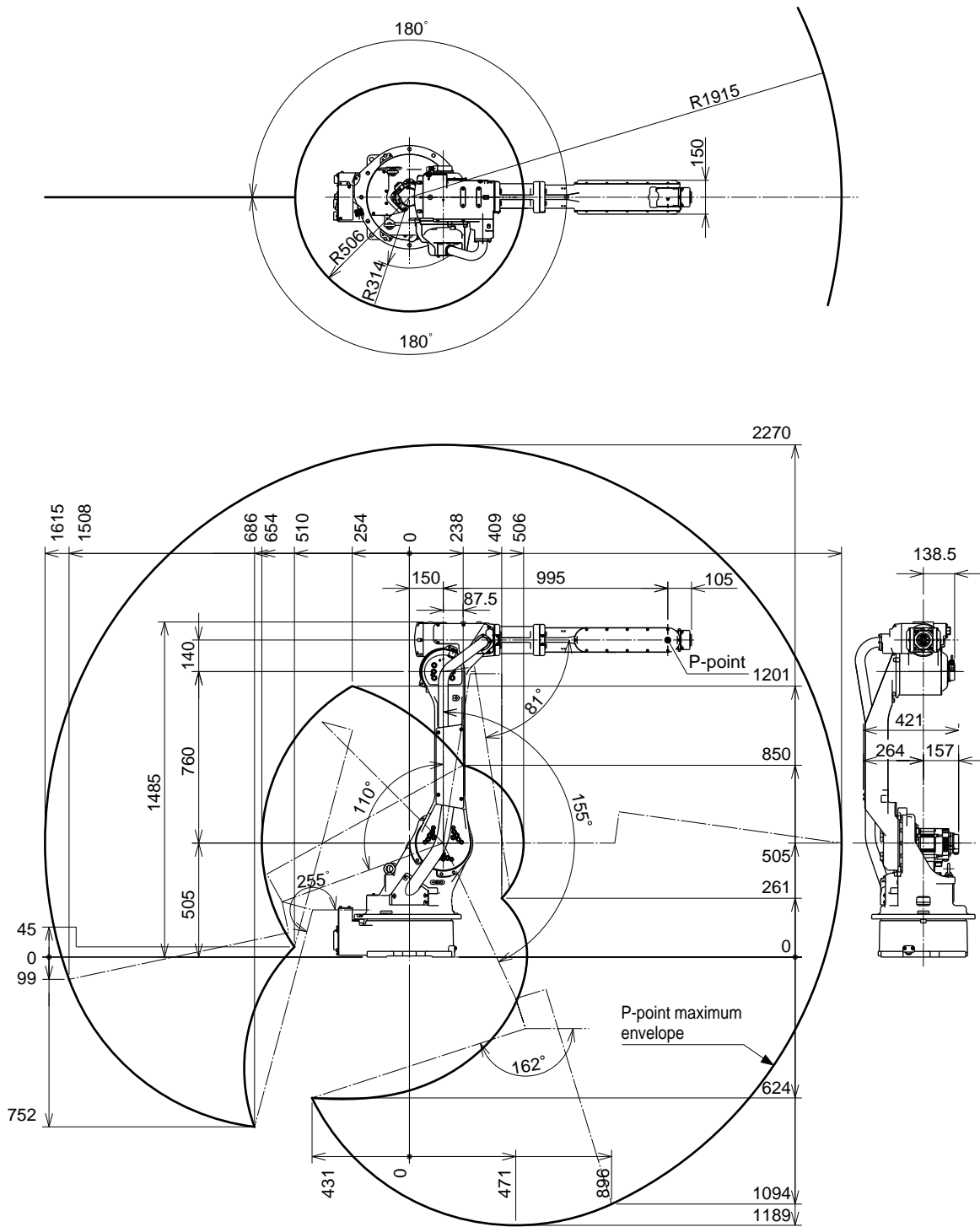
b Conformed to ISO9283

c Refer to Section 6.1 "Allowable Wrist Load" for details on the permissible moment of inertia.

4 Conformed to IP54 for the main part of the manipulator (only floor-mounted type). Conformed to IP67 for the wrist part (IP65 for the main part is optional.)

5.3 Dimensions and P-Point Maximum Envelope (Page 5-4)

Fig. 5-1: Dimensions and P-Point Maximum Envelope



6 Allowable Load for Wrist Axis and Wrist Flange

6.1 Allowable Wrist Load (Page 6-1)

The allowable wrist load is 6 kg maximum. If force is applied to the wrist instead of the load, force on R-, B-, and T-axes should be within the value shown in *Table 6-1 Allowable Wrist Load*. Contact your Yaskawa representative for further information or assistance.

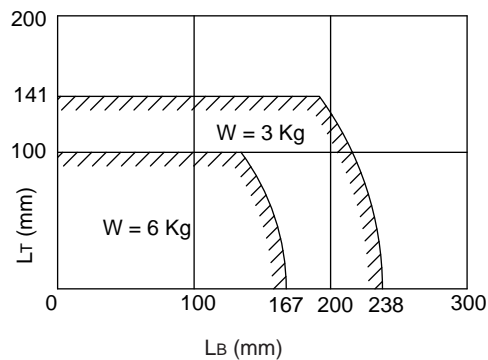
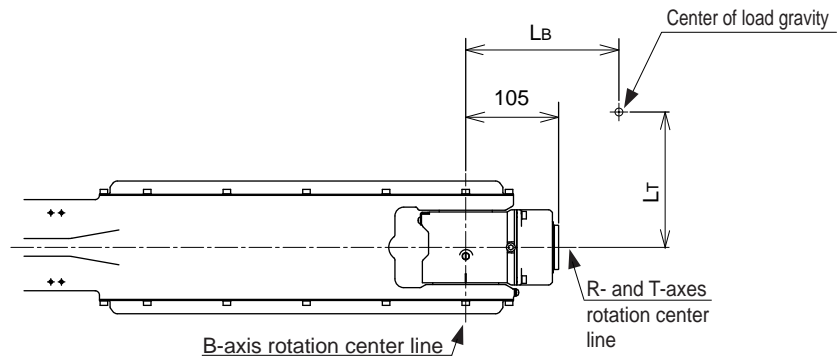
Table 6-1: Allowable Wrist Load

Axis	Moment N•m (kgf•m)	GD ² /4 Total Moment of Inertia kg•m ²
R-Axis	11.8	0.24
B-Axis	9.8	0.17
T-Axis	5.9	0.06

When the volume load is small, refer to the moment arm rating shown in *Fig.6-2 Moment Arm Rating*.

The allowable total moment of inertia is calculated when the moment is at the maximum. Contact your Yaskawa representative beforehand when only moment of inertia, or load moment is small and moment of inertia is large. Also, when the load mass is combined with an outside force, contact your Yaskawa representative beforehand.

Fig. 6-2: Moment Arm Rating



7 System Application

7.1 Peripheral Equipment Mounts (Page 7-1)

The peripheral equipment mounts are provided on the U-axis (upper arm) as shown in *Fig.7-1 Installing Peripheral Equipment* for easier installation of the users's system applications. The following conditions shall be observed to attach or install peripheral equipment.

7.1.1 Allowable Load

The maximum allowable load on the U-axis is 15 kg, including the wrist load. For instance, when the mass installed on the wrist point is 6 kg, the mass which can be installed on the upper arm is 9 kg.

7.1.2 Installation Position

There is a limitation on the installation position.

Fig.7-2 Allowable Load on U-axis shows the distance between the center of U-axis rotation and the load gravity.

Fig. 7-1: Installing Peripheral Equipment

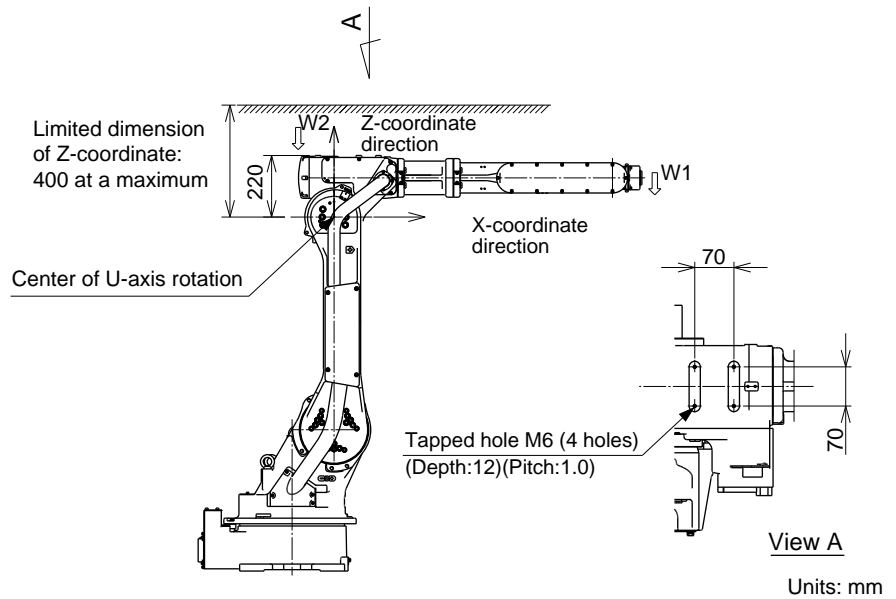
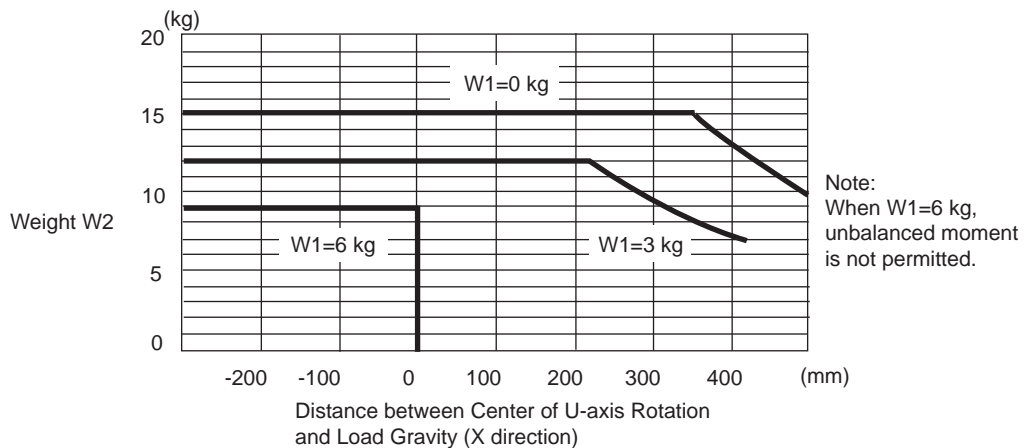
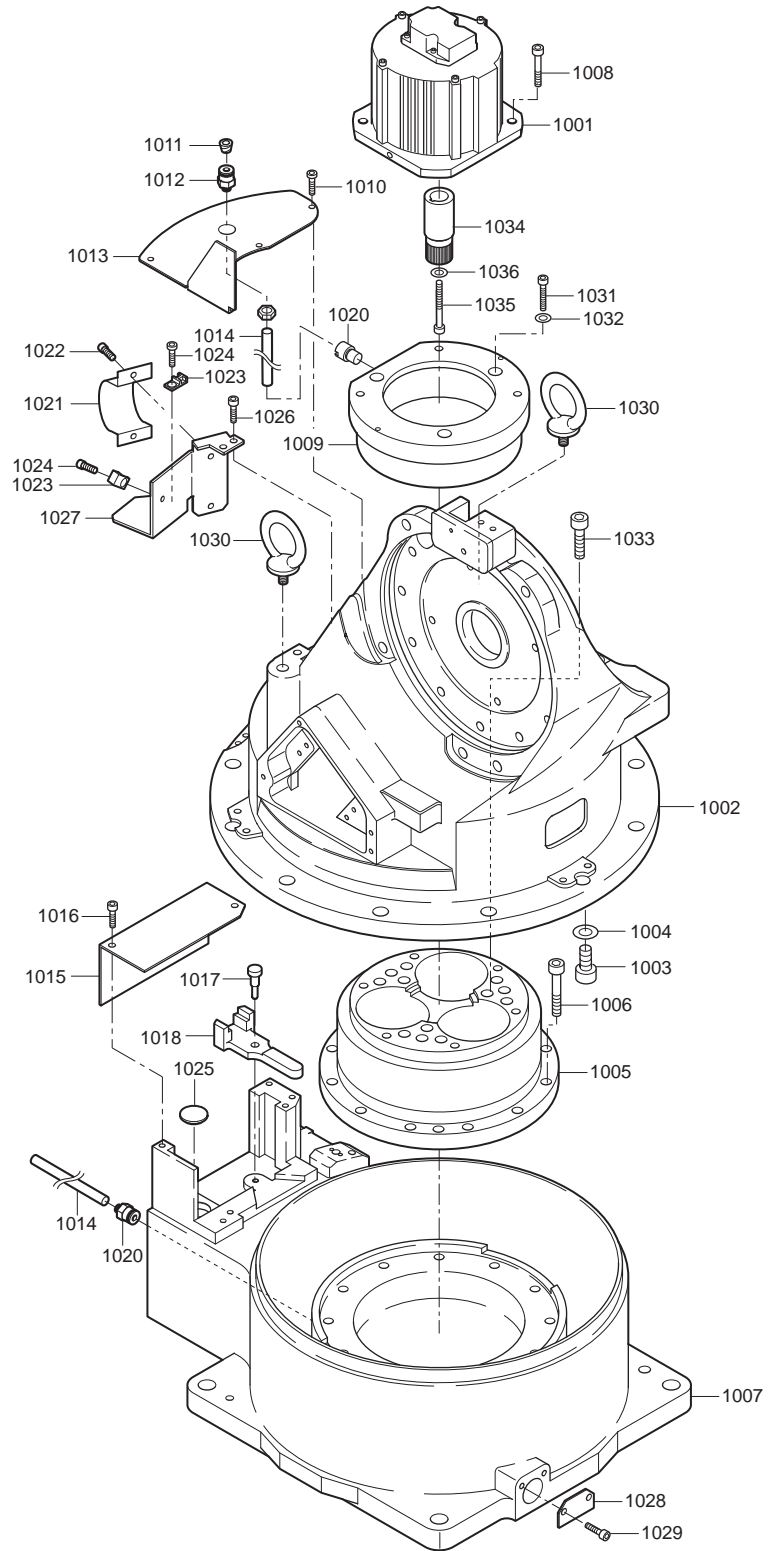


Fig. 7-2: Allowable Load on U-axis



10 Recommended Spare Parts (Page 10-2)*Table 10-1: Spare Parts for the YR-HP0020D-A00, -A01(Sheet 2 of 2)*

Rank	Parts No.	Name	Type	Manufacturer	Qty	Qty per Unit	Remarks
B	18	Internal Cable for B- and T-Axes	HW0273265-B	Yaskawa	1	1	in U-arm

11 Parts List**11.1 S-Axis Unit**

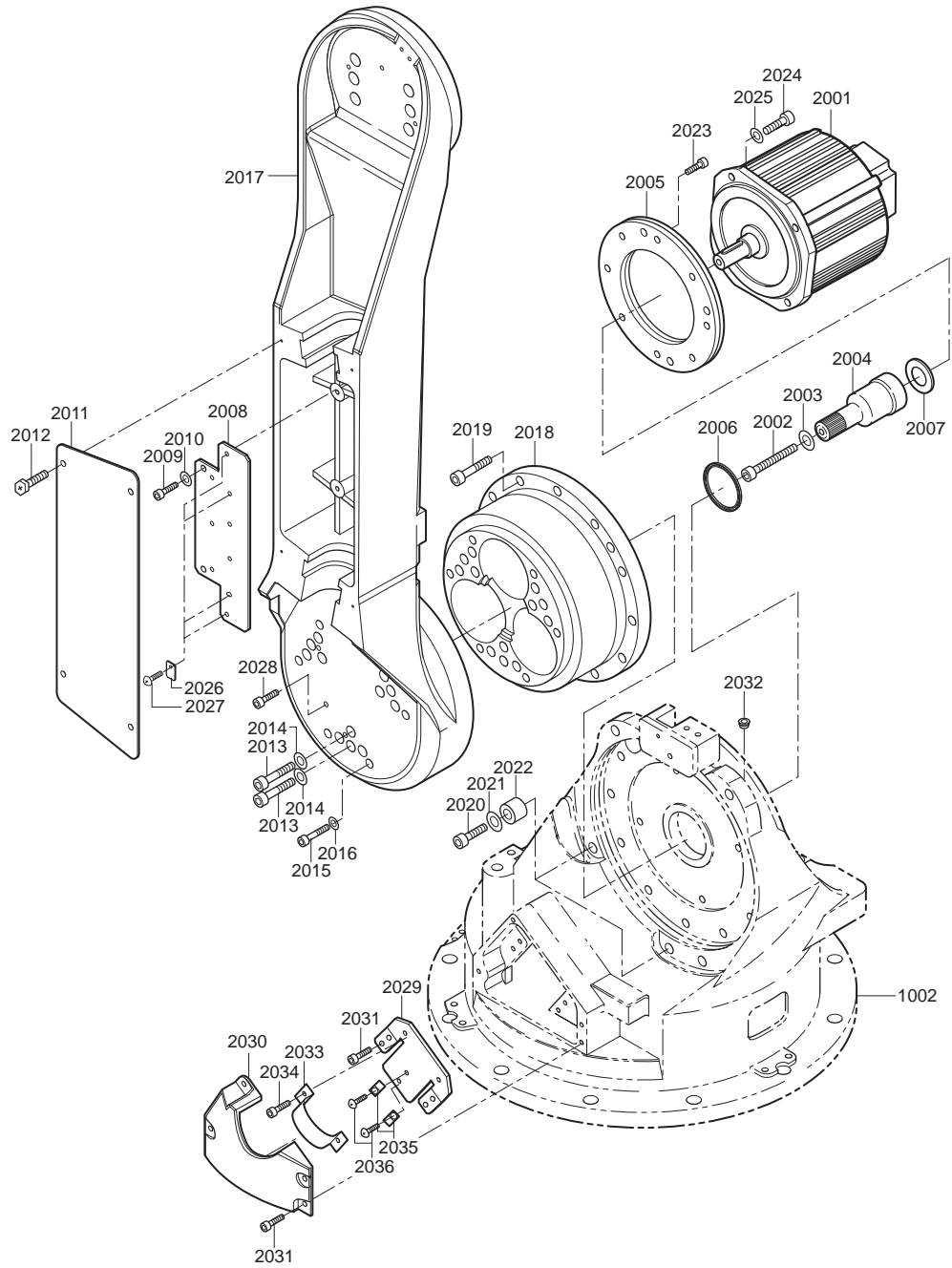
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11 Parts List
11.1 S-Axis Unit

Table 11-1: S-axis Unit

No.	DWG No.	Name	Pcs
1001	SGMRV-09ANA-YR1*	Motor	1
1002	HW0100545-2	S head	1
1003	M16X20	Socket screw	1
1004	2H-16	Spring washer	1
1005	HW0387753-B	Speed reducer	1
1006	M10X40	GT-SA bolt	16
1007	HW0100544-2	Base	1
1008	M8X30	GT-SA bolt	3
1009	HW0305306-2	M base	1
1010	M5X10	APS bolt	1
1011	PT1/8	Plug	1
1012	UKM6-01	Union	1
1013	HW0305809-1	Cover	1
1014	NB-0640-0.3	Tube	2
1015	HW0304221-1	Cover	1
1016	M6X15	GT-SA bolt	2
1017	MSB8-15	Shoulder	1
1018	HW0400645-1	Lever	1
1019	M5X10	APS bolt	6
1020	TSH6-01M	Union	2
1021	CD-31	Saddle	1
1022	M6X10	Socket screw	2
1023	TA1-S10	Clamp	2
1024	M5X10	Screw with spring washer	2
1025	EZ5036A0	Cap	1
1026	M6X15	GT-SA bolt	2
1027	HW0305812-1	Holder	1
1028	HW9406775-1	Cover	1
1029	M6X8	APS bolt	1
1030	M12	Eye bolt	2
1031	M8X60	Socket screw	3
1032	2H-8	Spring washer	3
1033	M12X35	GT-SA bolt	12
1034	HW0313491-1	Gear	1
1035	M6X60	Socket screw	1
1036	2H-6	Spring washer	1

11.2 L-Axis Unit



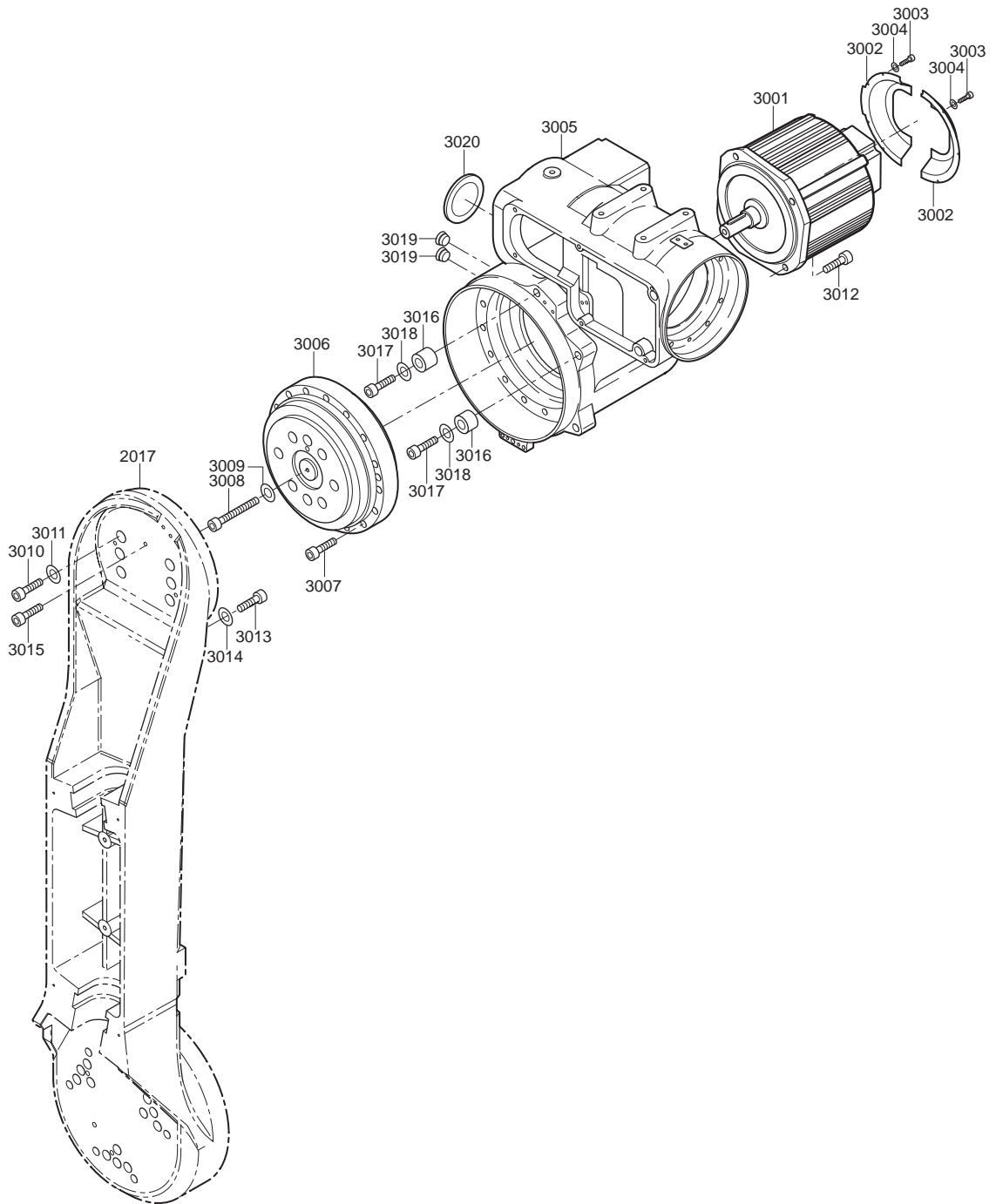
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11 Parts List
11.2 L-Axis Unit

Table 11-2: L-Axis Unit

No.	DWG No.	Name	Pcs
2001	SGMRV-13ANA-YR2*	Motor	1
2002	M6X90	Socket screw	1
2003	2H-6	Spring washer	1
2004	HW0313492-1	Gear	1
2005	HW0304229-1	M base	1
2006	Y426012.5	Oil seal	1
2007	HW0401506-1	Plate	1
2008	HW0304226-1	Support	1
2009	M6X10	Socket screw	2
2010	2H-6	Spring washer	2
2011	HW0304227-1	Cover	1
2012	M6X8	APS bolt	4
2013	M12X40	Socket screw	12
2014	2H-12	Spring washer	12
2015	M10X35	Socket screw	6
2016	2H-10	Spring washer	6
2017	HW0100546-2	L arm	1
2018	HW0387753-C	Speed reducer	1
2019	M10X40	Socket screw	16
2020	M12X40	Socket screw	2
2021	2H-12	Spring washer	2
2022	HW0404196-4	Washer	1
2023	M8X30	GT-SA bolt	4
2024	M8X25 *DACROTIZED coating*	Socket screw	4
2025	2H-8 *DACROTIZED coating*	Spring washer	4
2026	TA1-S10	Clamp	4
2027	M5X10	Screw with spring washer	4
2028	M6X10	Socket screw	1
2029	HW0305813-1	Holder	1
2030	HW0305698-1	Cover	1
2031	M5X12	GT-SA bolt	6
2032	PT1/8 *DACROTIZED coating*	Plug	1
2033	CD-31	Saddle	1
2034	M5X12	GT-SA bolt	2
2035	TA1-S10	Clamp	2
2036	M5X10	Screw with spring washer	2
1002	HW0100545-2	S head	1

11.3 U-Axis Unit



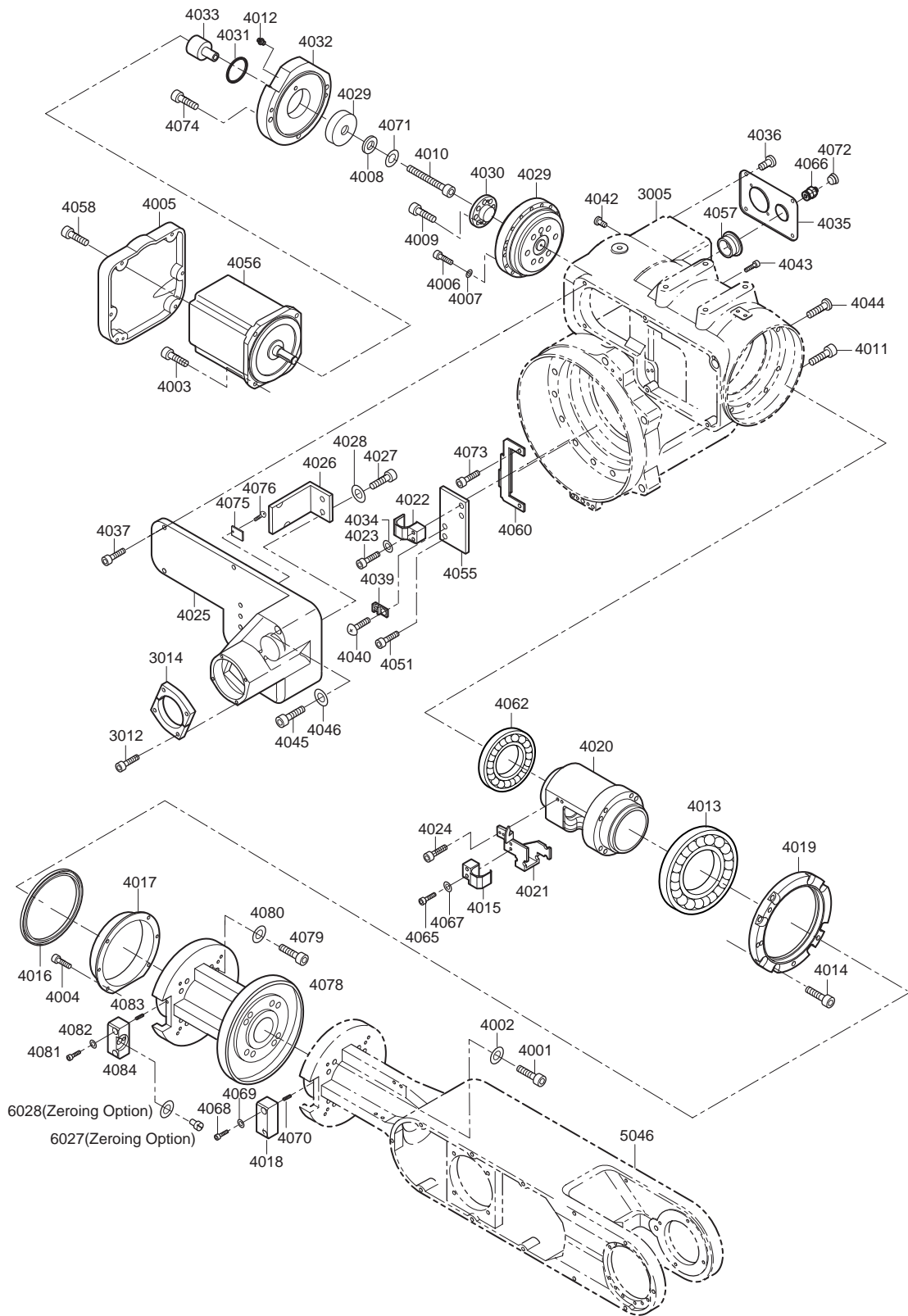
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11 Parts List
 11.3 U-Axis Unit

Table 11-3: U-Axis Unit

No.	DWG No.	Name	Pcs
3001	SGMRV-05ANA-YR1*	Motor	1
3002	HW0313489-1	Cover	1
3003	M4X10	APS bolt	7
3004	M4	Washer	7
3005	HW0102379-1	Casing	1
3006	HW9280880-G	Speed reducer	1
3007	M8X45	GT-SA bolt	16
3008	M5X65	Socket screw	1
3009	2H-5	Spring washer	1
3010	M14X35	Socket screw	6
3011	GT-SH-14	GT-SH washer	6
3012	M8X30	GT-SA bolt	4
3013	M10X20	Socket screw	1
3014	H-10	Spring washer	1
3015	M6X10	Socket screw	1
3016	HW0404196-2	Washer	2
3017	M10X35	Socket screw	2
3018	2H-10	Spring washer	2
3019	PT1/8	Plug	2
3020	EZ2940A0	Cap	1
2017	HW0100546-2	L arm	1

11.4 R-Axis Unit



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11 Parts List
11.4 R-Axis Unit

Table 11-4: R-Axis Unit (Sheet 1 of 2)

No.	DWG No.	Name	Pcs
4001	M6X50	Socket screw	8
4002	2H-6	Spring Washer	8
4003	M5X20	GT-SA bolt	4
4004	M4X12	GT-SA bolt	4
4005	HW0305305-1	M cover	1
4006	M4X20	Socket screw	12
4007	2H-4	Spring Washer	12
4008	HW0404196-5	Washer	1
4009	M6X20	GT-SA bolt	8
4010	M4X45	Socket screw	1
4011	M6X6	Socket screw	1
4012	A-MT6X1	G Nipple	1
4013	HW0381872-A	Cross roller bearing	1
4014	M6X35	GT-SA bolt	8
4015	HW0403879-1	Saddle	1
4016	TC941045*A727*	Oil seal	1
4017	HW0403857-1	Shaft	1
4018	HW0405201-3	Block	1
4019	HW0304318-1	Housing	1
4020	HW0304085-1	Shaft	1
4021	HW0304914-1	Support	1
4022	HW0403879-1	Saddle	1
4023	M4X20	Socket screw	2
4024	M4X12	GT-SA bolt	2
4025	HW0200530-1	S cover	1
4026	HW0404919-1	Support	1
4027	M5X16	Socket screw	2
4028	2H-5	Spring washer	2
4029	HW0381463-A	Speed reducer	1
4030	HW0404403-1	Shaft	1
4031	AE1314A0	Oil seal	1
4032	HW0304932-1	M base	1
4033	HW0404402-1	Shaft	1
4034	2H-4	Spring Washer	2
4035	HW0404900-1	N base	1
4036	M4X10	Screw with spring washer	4
4037	M5X16	GT-SA bolt	4
4039	TA1-S8	Clamp	4
4040	M4X8	Screw with spring washer	4
4042	M5X8	APS bolt	1
4043	M6X6	Socket screw	1
4044	LP-M5	Plug	1

 11 Parts List
 HP20D-6 11.4 R-Axis Unit

Table 11-4: R-Axis Unit (Sheet 2 of 2)

No.	DWG No.	Name	Pcs
4045	M5X35	Socket screw	2
4046	2H-5	Spring Washer	2
4051	M4X12	GT-SA bolt	2
4055	HW0404918-1	Support	1
4056	SGMPH-02ANA-YR1*	Motor	1
4057	EZ5036A0	Cap	1
4058	M6X20	GT-SA bolt	6
4060	HW0304930-1	Support	1
4062	6811LLU	Bearing	1
4065	M4X20	Socket screw	2
4066	KQE12-03	Union	1
4067	2H-4	Spring Washer	2
4068	M4X20	Socket screw	2
4069	2H-4	Spring Washer	2
4070	MS4-10	Pin	2
4071	2H-4	Spring Washer	1
4072	PT 3/8	Plug	1
4073	M4X12	GT-SA bolt	2
4074	M6X30	GT-SA bolt	3
4075	TA1-S8	Clamp	3
4076	M4X8	Screw with spring washer	3
4078	HW0305332-1	Flange	1
4079	M6X65	Socket screw	8
4080	2H-6	Spring Washer	8
4081	M4X20	Socket screw	2
4082	2H-4	Spring Washer	2
4083	MS4-10	Pin	2
4084	HW0405201-2	Block	1
	HW0405201-1 (For zeroing spec. only)	Block	1
3005	HW0102378-1	Casing	1
3012	M4X16	GT-SA bolt	4
3014	HW0404179-1	Support	2
5046	HW0100623-1	U arm	1
6027	HW0405202-1 (Zeroing Option)	Plug	1
6028	HW0405203-1 (Zeroing Option)	Gasket	1

Table 11-5: Wrist Unit (Sheet 1 of 2)

No.	DWG No.	Name	Pcs
5001	HW9406556-1	Support	1
5002	M4X12	GT-SA bolt	2
5003	M5X20	GT-SA bolt	4
5005	HW9200798-1	Cover	2
5006	SGMPH-02ANA-YR1*	Motor	2
5007	M4X16	Socket screw	2
5008	HW9482727-A	Pulley	2
5011	80S4.5M518	Belt	1
5012	HW9381658-A	Gear	1
5013	M4X12	GT-SA bolt	4
5014	HW9405452-1	B cover	1
5016	HW9482725-A	Pulley	1
5017	M5X16	GT-SA bolt	1
5018	M4X16	GT-SA bolt	4
5019	HW9482218-A	Bearing	1
5020	HW9405199-1	B nut	1
5021	SP-0120**	Shim	1
5022	HW9481180-A	Bearing	1
5023	M5X16	GT-SA bolt	1
5024	M5X12	GT-SA bolt	8
5025	HW0304232-1	Shaft	1
5026	TC60747	Oil seal	2
5027	HW9481187-A	Bearing	1
5028	HW0304233-1	Shaft	1
5029	S75	O ring	1
5030	HW0304087-1	Housing	1
5031	HW0382140-A	Speed reducer	1
5032	HW0304086-1	Housing	1
5033	HW9381659-A	Gear	1
5034	HW9482726-A	Pulley	1
5035	M5X16	Socket screw	1
5036	6002ZZ	Bearing	1
5037	6901ZZ	Bearing	1
5038	6814ZZ	Bearing	1
5039	HW9482668-A	Oil seal	1
5040	HW9381633-A	Speed reducer	1
5041	HW9405792-1	Housing	1
5042	HW0200451-1	Wrist base	1
5043	M5X16	GT-SA bolt	11
5044	80S4.5M653	Belt	1
5045	M5X12	GT-SA bolt	24
5046	HW0100623-1	U arm	1
5047	M6X6	Socket screw	1
5048	M4X16	GT-SA bolt	13

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11 Parts List
11.5 Wrist Unit*Table 11-5: Wrist Unit (Sheet 2 of 2)*

No.	DWG No.	Name	Pcs
5049	M4X12	GT-SA bolt	4
5050	M6X6	Socket screw	1
5052	M5X16	GT-SA bolt	5
5053	M6X6	Socket screw	1
5057	M6	L Washer	1
5062	LP-M5	Plug	1
5063	HW9405791-3	Housing	1
5064	6811LLU	Bearing	1
5065	HW0404606-1	Cover	1
5066	HW040605-1	Plug	1
4078	HW0305332-1	Flange	1

MOTOMAN-HP20D-6 INSTRUCTIONS

SUPPLEMENTARY FOR YR-HP0020D-A10
(LONG U-ARM, 6kg PAYLOAD SPECIFICATION)

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Specifications are subject to change without notice
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