



Product manual, spare parts IRB 4400

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Product manual, spare parts

IRB 4400/60

M2000, IRC5

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Original instructions.

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Overview of this manual

About this manual

This manual contains spare parts for:

- IRB 4400 and all its variants.

Usage

This manual shall be used as a complement to the product manual for IRB 4400 during:

- maintenance work
- repair work.

Who should read this manual?

This manual is intended for:

- maintenance personnel
- repair personnel.

Prerequisites

Maintenance/repair/installation personnel working with an ABB Robot must:

- be trained by ABB and have the required knowledge of mechanical and electrical installation/repair/maintenance work.

Organization of chapters

The manual is organized in the following chapters:

Chapter	Contents
1 Rebuilding robot	Information of rebuilding parts, required when rebuilding the robot to another version.
2 Spare parts and exploded view	Complete spare part list and complete list of robot components shown in exploded views.

References

Reference	Document ID
<i>Product manual - IRB 4400</i>	<i>3HAC022032-001</i>
<i>Circuit diagram - IRB 4400/4450S</i>	<i>3HAC9821-1</i>

Revisions

Revision	Description
-	First edition
A	This revision includes the following updates: <ul style="list-style-type: none"> • Spare part numbers for Graphite white added • Spare parts for variant IRB 4400/L are reinstated.
B	This revision includes the following updates: <ul style="list-style-type: none"> • Generally modified due to update of BOL • Corrections due to updates in SAP terminology.

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Revision	Description
C	Published in release R17.1. The following updates are made in this revision: <ul style="list-style-type: none">• New article numbers for wrist, upper arm (3HAB9398-1 --> 3HAC059445-001, 3HAC050646-001 --> 3HAC059445-002).

Product documentation, IRC5

Categories for user documentation from ABB Robotics

The user documentation from ABB Robotics is divided into a number of categories. This listing is based on the type of information in the documents, regardless of whether the products are standard or optional.

All documents listed can be ordered from ABB on a DVD. The documents listed are valid for IRC5 robot systems.

Product manuals

Manipulators, controllers, DressPack/SpotPack, and most other hardware is delivered with a **Product manual** that generally contains:

- Safety information.
- Installation and commissioning (descriptions of mechanical installation or electrical connections).
- Maintenance (descriptions of all required preventive maintenance procedures including intervals and expected life time of parts).
- Repair (descriptions of all recommended repair procedures including spare parts).
- Calibration.
- Decommissioning.
- Reference information (safety standards, unit conversions, screw joints, lists of tools).
- Spare parts list with exploded views (or references to separate spare parts lists).
- Circuit diagrams (or references to circuit diagrams).

Technical reference manuals

The technical reference manuals describe reference information for robotics products.

- *Technical reference manual - Lubrication in gearboxes*: Description of types and volumes of lubrication for the manipulator gearboxes.
- *Technical reference manual - RAPID overview*: An overview of the RAPID programming language.
- *Technical reference manual - RAPID Instructions, Functions and Data types*: Description and syntax for all RAPID instructions, functions, and data types.
- *Technical reference manual - RAPID kernel*: A formal description of the RAPID programming language.
- *Technical reference manual - System parameters*: Description of system parameters and configuration workflows.

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Application manuals

Specific applications (for example software or hardware options) are described in **Application manuals**. An application manual can describe one or several applications.

An application manual generally contains information about:

- The purpose of the application (what it does and when it is useful).
- What is included (for example cables, I/O boards, RAPID instructions, system parameters, DVD with PC software).
- How to install included or required hardware.
- How to use the application.
- Examples of how to use the application.

Operating manuals

The operating manuals describe hands-on handling of the products. The manuals are aimed at those having first-hand operational contact with the product, that is production cell operators, programmers, and trouble shooters.

The group of manuals includes (among others):

- *Operating manual - Emergency safety information*
- *Operating manual - General safety information*
- *Operating manual - Getting started, IRC5 and RobotStudio*
- *Operating manual - IRC5 Integrator's guide*
- *Operating manual - IRC5 with FlexPendant*
- *Operating manual - RobotStudio*
- *Operating manual - Trouble shooting IRC5*

1 Introduction

Definitions

This chapter contains detailed views of the components on the manipulator.

The numbered details are specified with item numbers in the part lists.

The exploded views are divided into:

- Exploded view 1-5: Manipulator (part list: [Manipulator on page 13](#))
- Exploded view 6.1- 6.3: Upper arm part, axes 4-6 (part list: [Upper arm part, axes 4-6 on page 19](#))
- Exploded view 7: Serial measurement unit (part list: [Serial measurement unit on page 21](#))
- Exploded view 8: Position switch, axis 1 (part list: [Position switch, axis 1 on page 23](#))

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2 Manipulator

Part list, manipulator

See the Foldout 1, 2, 3:1, 3:2, 4 and 5 for location of parts.

Item	Qty	Name	Art.no	Color	Note
1	1	Foot	3HAC5947-1	ABB Orange	
	1	Foot	3HAC050520-001	Graphite White	
2	1	Gearbox axes 1-3	3HAC5948-1		/45, /60, L/10, L/30, Standard
			3HAC027304-003		/45, /60, L/10, L/30, Foundry Prime
			3HAC034962-003		/45, /60, L/10, L/30, Foundry Prime 2
3	26	Screw	3HAB7700-88		M16x80 8.8, Gleitmo 610
4	14	Washer	3HAA1001-186		
5	1	Motor unit axis 1	3HAC 5952-1		/45, /60, L/10, L/30, (Elmo)
			3HAC9841-1	ABB Orange	
			3HAC021724-001	ABB Orange	L10/45/60, (Yaskawa)
			3HAC021724-003	Graphite White	L10/45/60, (Yaskawa)
			3HAC021725-001	ABB Orange	L/30, (Yaskawa)
			3HAC021725-003	Graphite White	L/30, (Yaskawa)
			3HAC021729-001	ABB Orange	
6	2	Motor unit axes 2 and 3	3HAC5954-1		(Elmo)
			3HAC021725-001	ABB Orange	L/30, (Yaskawa)
			3HAC021725-003	Graphite White	(Yaskawa)
7	3	O-ring	2152 0431-11		149x4
8	12	Spring washer	2154 2033-10		10.5x23x2.5
9	4	Screw	3HAB3409-59		M10x70 12.9, Gleitmo
10	8	Screw	3HAB3409-51		M10x30 12.9, Gleitmo 610
11	1	Lower arm	3HAC5955-1	ABB Orange	
			3HAC050254-001	Graphite White	
			3HAC5956-1	ABB Orange	Foundry
12	2	Spring washer	3HAB3640-1		
13	10	Screw	3HAB3409-85		M16x55 12.9, Gleitmo 610
14	4	Cushion axis 2	3HAB9237-1		
15	2	Damper	3HAB3648-1		Axis 3
16	20	Screw	9ADA629-56		M6x16
18	1	Parallel arm 45 kg	3HAB8467-1	ABB Orange	Foundry
		Parallel arm 45 kg	3HAB3642-1		
		Parallel arm 60 kg	3HAB8466-1	ABB Orange	
		Parallel arm 60 kg	3HAC050481-001	Graphite White	

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2 Manipulator

Continued

Item	Qty	Name	Art.no	Color	Note
19	1	V-ring	3HAB3732-11		
20	1	Groove ball bearing	3HAC10905-1		61830
21	1	Sealing ring	3HAB3749-1		
22	2	Washer	3HAC7409-1		
23	2	Sealing	3HAB3701-25		
24	2	Washer	3HAC4160-1		
25	1	Balancing unit	3HAC15083-1		
26	2	Shaft	3HAC3970-1		
27	1	Needle roller bearing	3HAB3757-17		
28	1	Securing bracket	3HAC4168-1		
29	1	Stop pin	3HAB3647-1		
30	1	Cushion	3HAB3741-1		
31	1	Screw	9ADA183-38		M8x30 8.8
32	1	Plain washer	9ADA312-7		8.4x16x1.6
33	1	Stop screw	9ADA205-73		M10x12
34	1	Sync. market axis 3	3HAB3755-1		
35	2	Washer	3HAB3704-1		
36	4	Screw	2121 2851-449		M8x16 8.8
37	-	Lubricating oil	-		Type of oil and amount is detailed in <i>Technical reference manual - Lubrication in gearboxes.</i>
38		Grease	3HAC042536-001		200 g
39		Locking liquid	1269 0014-429		1 ml, Loctite 243
40		Sealing ring	3HAB3701-26		
41	2	V-ring	3HAB3773-11		
42		Grease	3HAC14950-1		100 ml
43	4	Bearing sleeve	3HAC4156-1		6.3 x 2.4
44	1	Cylindrical roller bearing	3HAC4334-2		
46	1	Screw	9ADA183-48		M10x16 8.8
47	1	Plain washer	9ADA312-8		10.5x20x2
48	1	Bracket	3HAC4162-1		
49	2	Bushing	3HAC3977-1		
50	2	Sealing	3HAC3297-1		
51	1	Parallel bar	3HAC1621-1		
52	2	Spher. roller bearing	3HAA2167-11		
53	2	Sealing without dustlip	3HAC3990-11		

Continues on next page

Item	Qty	Name	Art.no	Color	Note
54	1	Upper arm without wrist and motors	3HAC17542-1		
		Upper arm without wrist and motors	3HAC 1670-1		L/30
		Upper arm without wrist and motors	3HAC 1629-3		L/10
55	2	Sealing with dustlip	3HAC7877-1		
56	2	Tapper roller bearing	3HAA2103-13		
57	2	VK-cover	3HAA2166-11		80x10
58	2	Lock nut	21262851-110		M50x1.5
59	2	Shaft stub	3HAC4744-1		
60	1	Sync. market axis 2	3HAB3754-1		
61	4	Washer	3HAA2356-13		6.4x22x1.5
63	1	Step protector	3HAC3943-1		
64	3	Air ventilation plug	3HAC0127-1		
65	2	V-ring	3HAB3732-15		
66	2	O-ring	3HAB3772-23		
67	1	Sealing	3HAC5479-1		
68	1	Sealing	3HAC5479-2		
100	1	Cable unit axis 1-3	3HAC5958-1	ABB Orange	
			3HAC050567-001	Graphite White	
			3HAC027281-002	Grey	
-	1	Cable box axis 1-3	3HAC7294-1	ABB Orange	
			3HAC050910-002	ABB Orange	
			3HAC050910-003	Graphite White	
101	1	Cable unit axis 4-6	3HAC8304-1	ABB Orange	
			3HAC050568-001	Graphite White	
			3HAC027282-002	Grey	
102	1	Bottom plate	3HAC3692-1		
103	1	Gasket	3HAC3688-1		
104	1	Cover	3HAC8306-1	ABB Orange	
			3HAC055292-001	Graphite White	
			3HAC050905-002	ABB Orange	
			3HAC050905-003	Graphite White	
105	1	Gasket	3HAC3547-1		
106	1	Cable bushing	3HAC3388-1		
107	1	Bracket	3HAC4116-1		
108	2	Cable guide bracket	3HAB3299-1		
109	1	Cable guide	3HAB3756-1		

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2 Manipulator

Continued

Item	Qty	Name	Art.no	Color	Note
110	1	Spring	3HAB3662-1		
111	1	Cable guide upper arm	3HAB3699-1		
112	3	Cover	3HAC2327-2	ABB Orange	
			3HAC050645-001	Graphite White	
			3HAC035022-001	Grey	
113	1	Cover punchb. 4400	3HAC3585-1		
114	1	Cover	3HAB3666-1		
116	23	Screw	21212416-329		M5x16 8.8
118	20	Nut with flange	9ADA290-1		M5 fzb
119	30	Straps, outdoor	21662055-3		4.8x208
120	22	Bolt with flange	21212172-228		M5x12 8.8
121	1	DSQC 563 Brake release board	3HAC16035-1		
122	4	Distance bolt	21252052-198		M5x15
123	1	Pushbutton guard	3HAC2744-1		
124	8	Screw	21212477-291		M4x12
125	1	Housing 64-p	5217687-22		
126	1	Designation sign	3HAB8431-1		
127	36	Screw	9ADA629-43		M5x10
128	1	Bracket (Only for protection type Standard.)	3HAC024590-001		IRB 4450S
130	2	Screw	3HAC4867-11		M20x90, UNBRAKO 12.9
132	2	Dust cap	3HAC7561-3		
133	1	Dust cap	3HAC7561-4		
135	6	Screw	9ADA183-34		M8x12 8.8
137	34	Screw	9ADA629-44		M5x12 8
139	1	Coupling	3HAB3333-20		
140		Locking liquid	12690014-412		1 ml, Loctite 542
141	3	Protective hood	25222101-8		D=11.4 - 13
144	2	Spring pin	9ABA142-62		
147	3	Gasket	3HAC4432-1		
148	3	Gasket	3HAB3676-1		
150		Flange sealing	3HAC042581-001		1 ml, Loctite 574
152	1	Gasket	3HAB7097-1		
153	9	Screw	9ADA618-46		M5x20 8.8
154	1	Gasket	3HAB9040-1		
155	1	Housing 40-p	3HAB6411-1		
A	1	SIM-ring	2522290-32		196.5x254x15/10 BAB 6 SL NLR

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Item	Qty	Name	Art.no	Color	Note
158	4	Cable starps, outdoor	21662055-6		Polyamide 6.6, black, 7.6x368
161	4	Hex socket head cap screw	3HAB3409-50		Steel 12.9 M10x40, Gleitmo 610
		Touch up paint Foundry Prime, orange	3HAC037052-001		Instructions included
		Touch up paint Foundry Prime 2, grey	3HAC035355-001		Instructions included

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3 Upper arm part, axes 4-6

Part list, upper arm part

See the Foldout 6:1, 6:2 and 6:3 for location of parts.

Item	Qty	Name	Art.no	Color	Note
-	1	Upper arm without wrist and motors.	3HAC17542-1		Protection type Foundry, but also used for protection type Standard.
-	1	Tubular shaft	3HAC9642-1	ABB Orange	
	1	Tubular shaft	3HAC050902-003	Graphite White	
1	12	Hex socket head cap screw	9ADA183-40		M8x40 8.8-A2F
2	10	Plain washer	9ADA312-7		8.4x16x1.6 A2F
4	3	Hex socket head cap screw	3HAB3409-57		M10x60 12.9. Gleitmo 610
5	3	Spring washer	21542033-10		10.5x23x2.5 fzm
13	1	Stop axis 4	3HAB3759-1		
14	1	Damper	3HAB3760-1		
15	4	Screw	9ADA183-35		M8x16 8.8
25	8	Screw	3HAB3409-51		M10x30 12.9. Gleitmo 610
26	8	Plain washer	9ADA312-8		10.5x20x2
		Plain washer	9ADA312-7		8.4x16x1.6, L/10, L/30
27	1	O-ring	21522012-541		199.3x5.7
28	1	Wrist	3HAC3941-1	ABB Orange	Protection type Standard
			3HAC050269-001	Graphite White	Protection type Standard
			3HAB 8271-1		Wrist 3HAB8271-1 is mechanically the same as 3HAC3941-1. 3HAC3941-1 has a different oil which makes it suitable only for robot installations in warm (+30 deg celsius) conditions.
			3HAC059445-001	ABB Orange	L/10, Protection type Foundry A pin is delivered with the wrist, only used when robot is Axis calibrated. A pin is delivered with the wrist, only used when a robot is calibrated with the Axis Calibration method.
			3HAC059445-002	Graphite White	L/10, Protection type Foundry A pin is delivered with the wrist, only used when the robot is calibrated with the Axis Calibration method.
29	1	Gear, axis 6	3HAB3613-1		
31	1	Flange sealing	3HAC042581-001		1 ml, Loctite 574

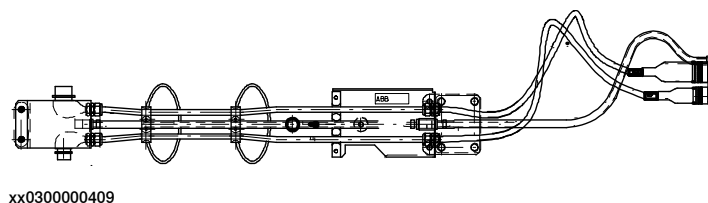
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3 Upper arm part, axes 4-6

Continued

Item	Qty	Name	Art.no	Color	Note
33	4	Magnetic plug	3HAC037925-001		R1/4"
34	4	Sealing washer	21522031-6		13.7x20.6
35	-	Lubricating oil	-		Type of oil and amount is detailed in <i>Technical reference manual - Lubrication in gear-boxes</i> .
48	3	O-ring	21522012-426		74.5x3
49	1	Motor unit axis 4/5 with pinion (Elmo)	3HAC10603-1	ABB Orange	
		Motor unit axis 4/5 with pinion (Elmo)	3HAC050662-001	Graphite White	
		Motor unit axis 4/5 with pinion (Yaskawa)	3HAC021726-001	ABB Orange	
		Motor unit axis 4/5 with pinion (Yaskawa)	3HAC021726-003	Graphite White	
		Motor unit axis 4/5 with pinion (Yaskawa)	3HAC021962-001	ABB Orange	IRB 4400/L10
		Motor unit axis 4/5 with pinion (Yaskawa)	3HAC021962-002	Graphite White	IRB 4400/L10
50	1	Motor unit axis 6 with pinion (Elmo)	3HAC10604-1		
50	1	Motor unit axis 6 with pinion (Yaskawa)	3HAC021728-001		
51	24	Screw	3HAB3409-26		M6x25 12.9, Gleitmo 610
52	12	Conical spring washer	21542033-7		6.4x14x1.5
52	1	Customer cable extension, axis 4	3HAC8820-1		Option 04y. See figure below!
56	1	Cover axis 4	3HAB8861-1	ABB Orange	
		Cover axis 4	3HAC050487-001	Graphite White	
57	6	Hex socket head cap screw	3HAB3409-38		M8x30 12.9 Gleitmo 610, L/10

Signal cabling, upper arm



4 Serial measurement unit

Part list, serial measurement unit

See the Foldout 7 for location of parts.

Item	Name	Art.no.	Note
3	Battery unit (3-pole battey contact)	3HAC044075-001	RMU Lithium Can only be used with SMB unit 3HAC046277-001 containing SMB board 3HAC044168-001.
3	Battery pack (2-pole battery contact)	3HAC16831-1	Lithium Does not fit SMB board 3HAC044168-001.
4	Straps, outdoor	21662055-6	L=368 mm
5	Serial measurement unit	3HAC046277-001	Contains serial measurement board 3HAC044168-001 and battery unit 3HAC044075-001.
5	Serial measurement board	3HAC044168-001	RMU 101
7	Cable SMB	3HAC7819-1	
8	Straps, outdoor	21662055-3	L=208 mm
9	Label	29401413-1	38x19

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5 Position switch, axis 1

Part list, position switch

See the Foldout 8 for location of parts.

Item	Qty	Name	Art.no.	Note
	1	Pos. switch ax 1, 1 sw	3HAC12042-1	Option 25-2 Standard, complete set
	1	Pos. switch ax 1, 1 sw	3HAC12042-2	Option 25-2 Foundry, complete set
	1	Pos. switch ax 1, 2 sw	3HAC12054-1	Option 25-4 Standard, complete set
	1	Pos. switch ax 1, 2 sw	3HAC12054-2	Option 25-4 Foundry, complete set
	1	Pos. switch ax 1, 3 sw	3HAC12071-2	Option 25-3 Foundry, complete set
	1	Pos. switch cable	3HAC7997-1	7 m
	1	Pos. switch cable	3HAC7997-2	15 m
	1	Pos. switch cable	3HAC7997-3	22 m
	1	Pos. switch cable	3HAC7997-4	30 m
1	1	Position switch 1	3HAC8039-1	ax1 pos.sw. (one) option
1	1	Position switch 1-2	3HAC8040-1	ax1 pos.sw. (two) option
1	1	Position switch 1-3	3HAC8041-1	ax1 pos.sw. (three) option
2	1	Segment Foundry	3HAC6474-1	ax1 pos.sw. (one, two, three)
3	3	Cam, blank	3HAC4476-1	ax1 pos.sw. (one)
3	5	Cam, blank	3HAC4476-1	ax1 pos.sw. (two)
3	7	Cam, blank	3HAC4476-1	ax1 pos.sw. (three)
4	1	Bracket Foundry	3HAC6558-1	ax1 pos.sw. (one, two, three)
5	4	Distance bolt	21252052-216	2 1914-04 M6x55 protection (foundry)
5	3	Torx pan head roll. screw	9ADA629-56	Steel 8-A2F, M4x20, protection (foundry)
6	2	Hex socket head cap screw	9ADA183-6	Steel 8.8-A2F. M4x20 ax1possw(one)
6	6	Hex socket head cap screw	9ADA183-6	Steel 8.8-A2F. M4x20 ax1possw(two)
6	4	Hex socket head cap screw	9ADA183-6	Steel 8.8-A2F. M4x20 ax1possw(three)
7	4	Shims-sheet	3HAB7478-1	ax1possw(one)
7	8	Shims-sheet	3HAB7478-1	ax1possw(two)
7	12	Shims-sheet	3HAB7478-1	ax1possw(three)
9	6	Torx pan head roll. screw	9ADA618-54	Steel 8.8-A2F, M6x10 ax1possw(one)

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5 Position switch, axis 1

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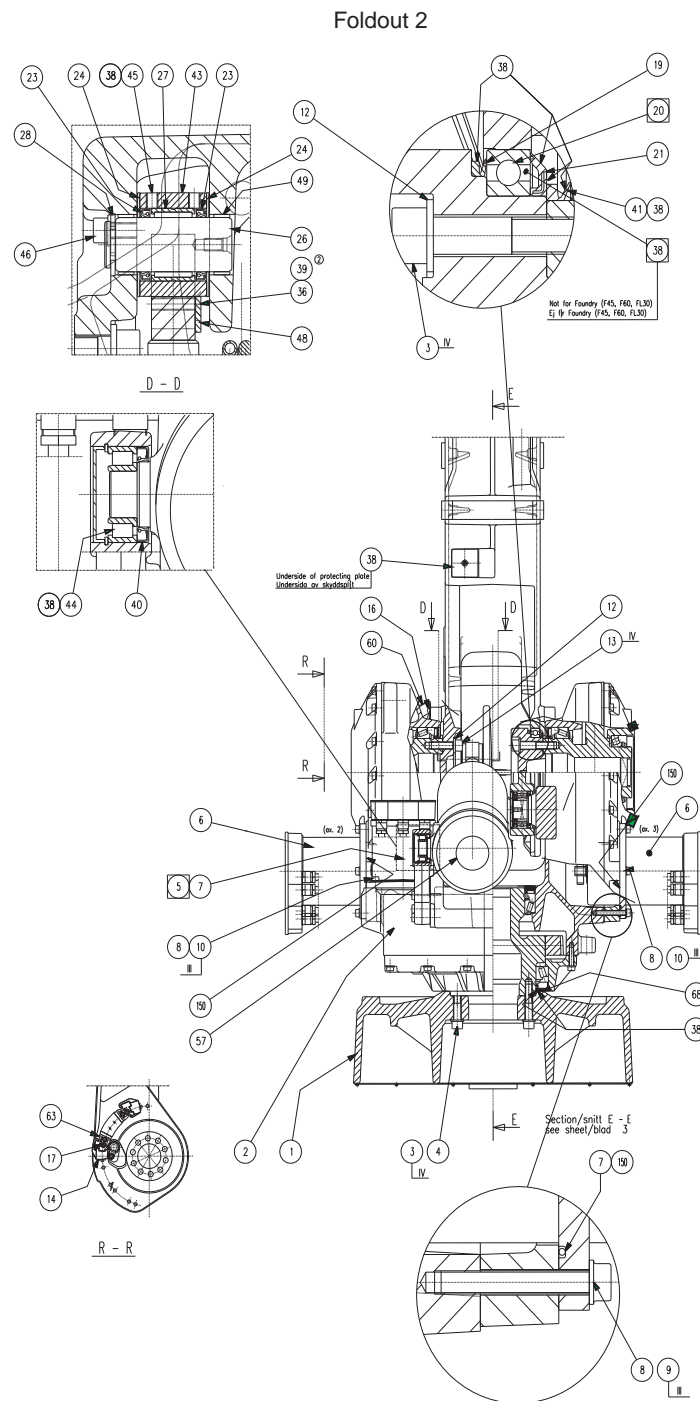
Item	Qty	Name	Art.no.	Note
9	12	Torx pan head roll. screw	9ADA618-54	Steel 8.8-A2F, M6x10ax1possw(two)
9	18	Torx pan head roll. screw	9ADA618-54	Steel 8.8-A2F, M6x10ax1possw(three)
10	1	Bracket position switch	3HAC8057-1	Limit position switch
11	1	Hexagon nut	9ADA267-5	Steel 8-A2F, M5 ax1pos-sw(one)
11	1	Hexagon nut	9ADA267-5	Steel 8-A2F, M5ax1pos-sw(two)
11	1	Hexagon nut	9ADA267-5	Steel 8-A2F, M5ax1pos-sw(three)
12	1	Cable straps, outdoors	21662055-3	Polyamide 6.6 black 4.8x208, ax1possw (one, two, three)
15	1	Label	29401413-1	B-619, 38x19 mm ax1pos-sw (one, two, three) Text: R1.LS1. Text height 3 mm
17	6	Hex socket counters, head	21212852-449	Steel 8.8 Fe/Zn 5c, M8x16, ax1possw (one, two, three)
19	1	Earth symbol	3HAB5617-1	ax1possw(one, two, three)
21	1	Plain washer	9ADA312-5	Steel-A2F 5.3x10x1 ax1possw(one)
21	2	Plain washer	9ADA312-5	Steel-A2F 5.3x10x1 ax1possw(two)
21	3	Plain washer	9ADA312-5	Steel-A2F 5.3x10x1 ax1possw(three)
22	6	Plain washer	3HAB8389-1	ax1possw(three)
23	2	Torx pan head roll. screw	9ADA618-59 *	Steel 8.8-A2F, M6x30, ax1possw (one, two, three)
24	1	Box foundry switch	3HAC6475-1	Protection Foundry
25	4	Torx pan head screw	9ADA618-55	Steel 8.8-A2F, M6x12 protection Foundry

* Existing screws must be exchanged to this longer screws

6 Exploded views

Continued

Exploded view 2

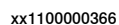


xx1100000362

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Foldout 4

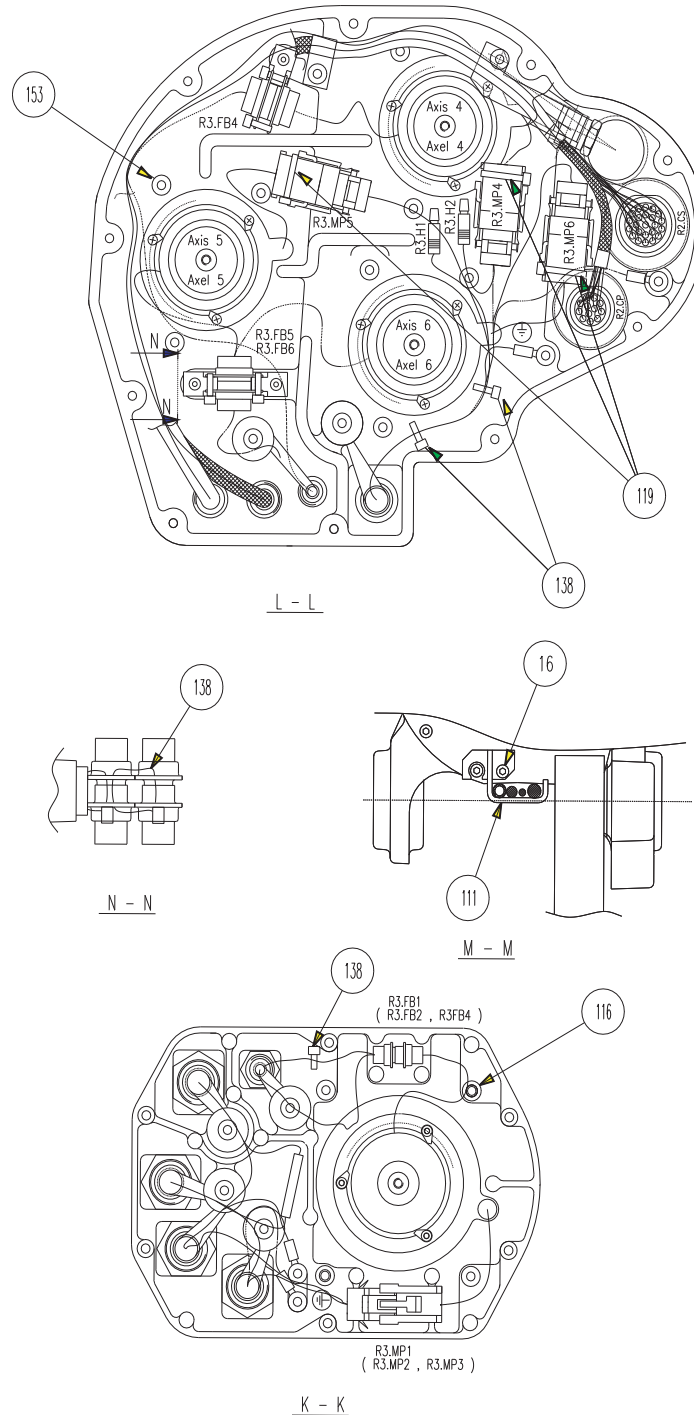


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Exploded view 5

Foldout 5



xx1100000367

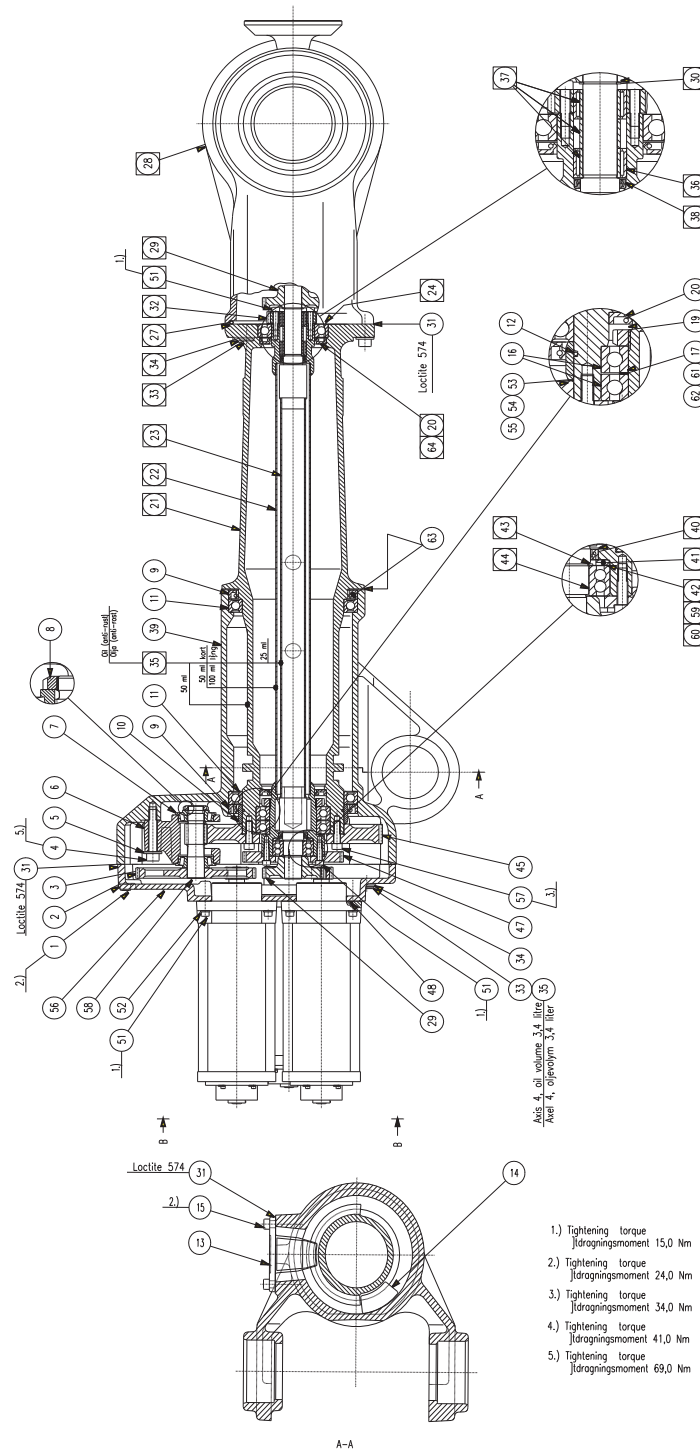
Continues on next page

6 Exploded views

Continued

Exploded view 6:1

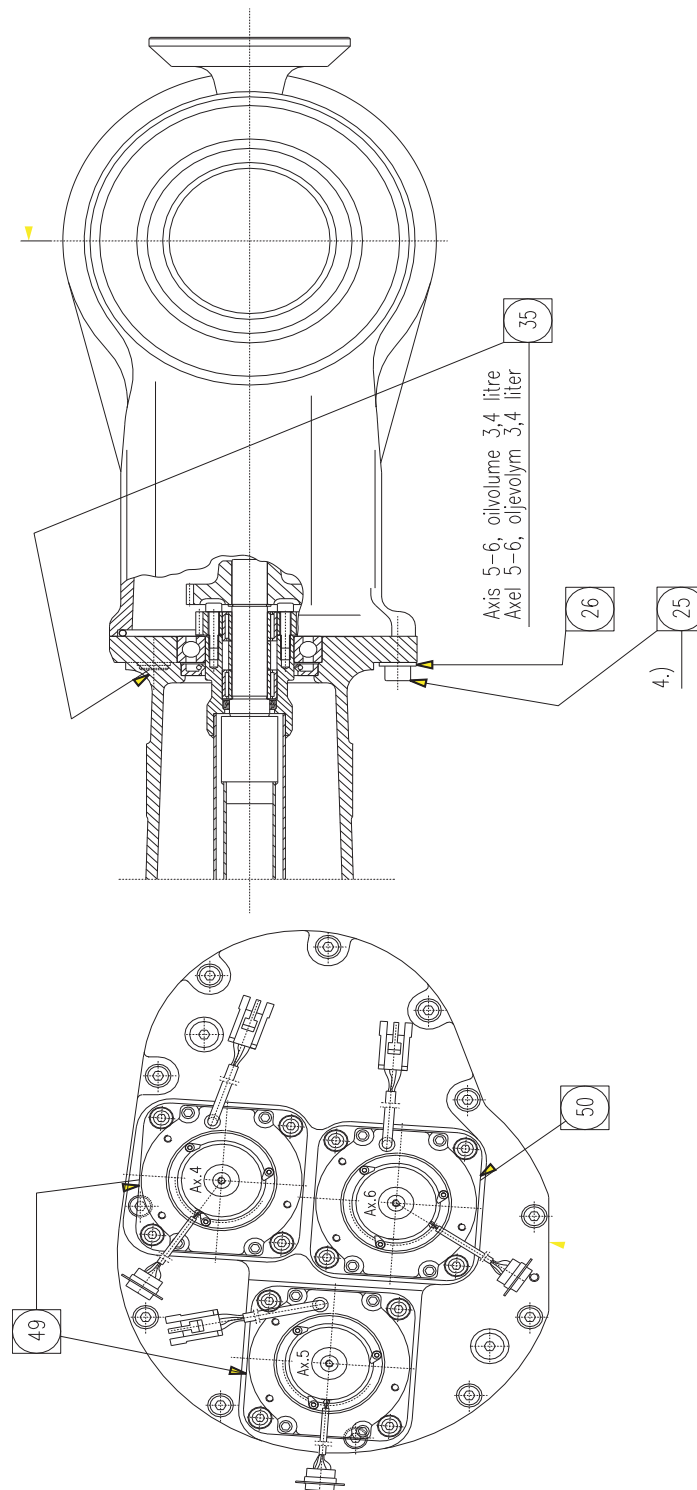
Foldout 6:1



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Exploded view 6:2

Foldout 6:2



xx1100000369

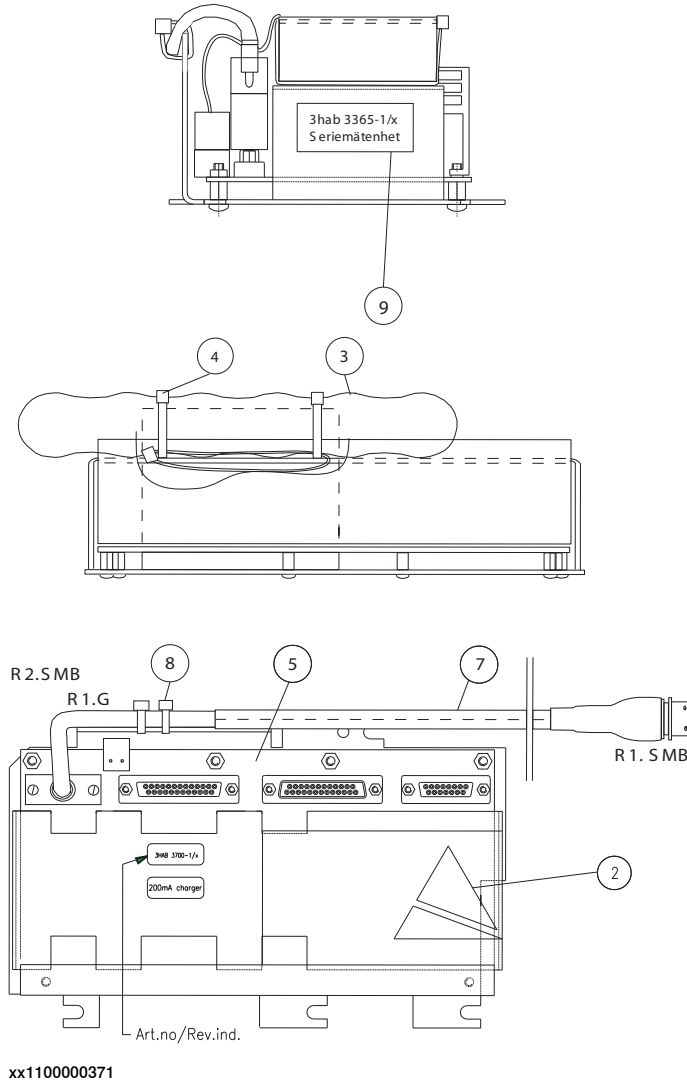
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6 Exploded views

Continued

Exploded view 7

Foldout 7



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