

Product manual

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2003-04

Safety equipment
M2001



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ABB Automation Technology Products AB

Arc Welding & Application Equipment

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Sverige

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1 General

In order to avoid personal danger when entering supervised areas demands continuous supervision of:

- the status of safety components
- operator communication
- moving machine parts.

This is provided by a circuit board for safety supervision, which includes functions to immediately cut the control system's operating stop loop when a course of events occur that can result in personal danger.

Examples of events are:

- hardware failure in the safety equipment
- incorrect operation
- carelessness
- machine fault

Safety equipment is designed according to category 4 described in EN 954-1, doubled and self-supervision.

The equipment can be adapted for optimal handling in each individual case by connecting different accessories to the circuit board.

General stop (G-stop)

A general stop occurs:

- If the light barriers are broken during station switching.
- If the light barriers are broken when the motor on the operator's work station (the positioner's loading side) is engaged. *Does not apply to the positioner type C and the Fixed table.*
- If the light barriers are broken for the station where the robot is located, *applies to positioner types A/L and the Fixed table.*

An auto stop occurs (A-stop)

- If the gate is opened during an ongoing working cycle

Station switching during an ongoing working cycle may only be performed with the key switch in the "Manual" position. Only applies to positioners with the station switching unit.

Safety equipment
General

The following safety components are available as standard options for

All station types:

- Operator panel
- Light barriers
- Roller door (FlexArc)
- Gate supervision
- Timer resetting

For station types S/L/A/T there are also the functions:

- Home position/transport position indication
- Station indication with the service position
- Activation from extended programming area

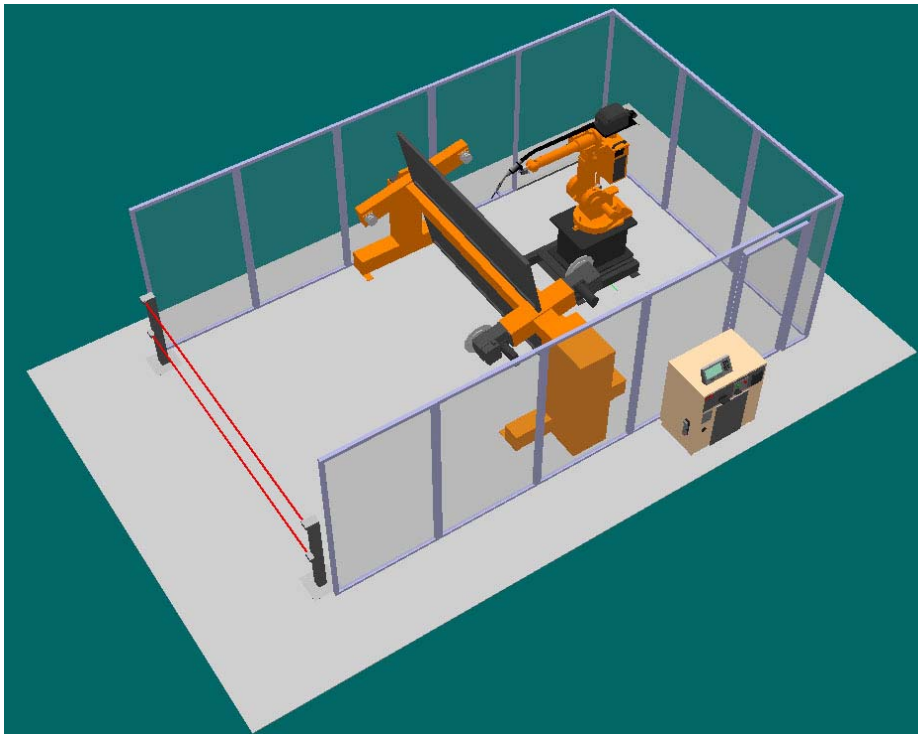


Figure 1 Welding robot station with the safety equipment

1.1 System solutions

1.1.1 Traditional welding robot station

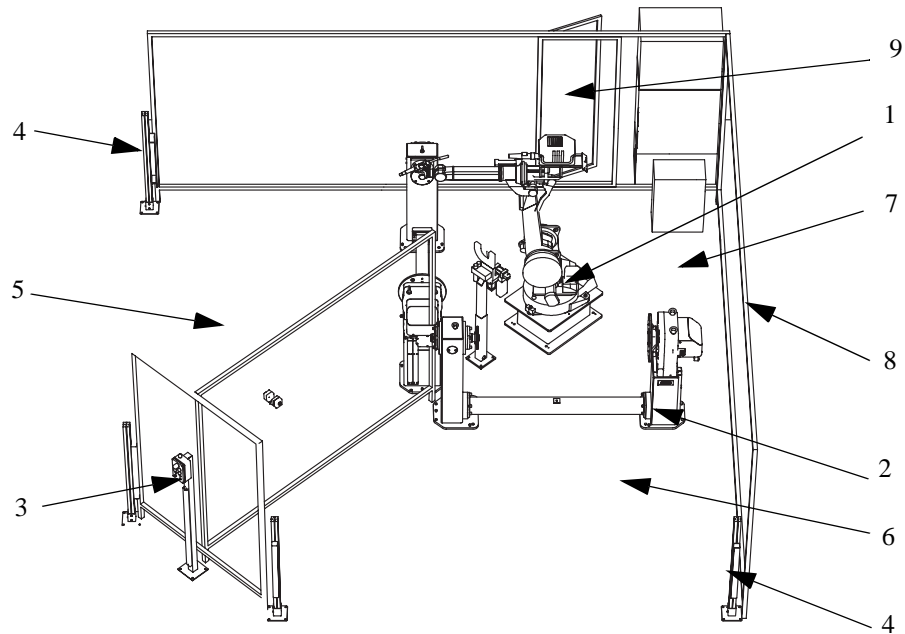


Figure 2 Traditional welding robot station

1 Robot	6 Supervised area station 2
2 Positioner	7 Supervised programming area
3 Operator panel	8 Barrier
4 Light barriers	9 Service door
5 Supervised area station 1	

1.1.2 FlexArc

FlexArc is a complete welding robot station built on a base plate including walls. The total solution gives easy connection and rapid start-up.

FlexArc always incorporates safety with a light barrier or roller door.

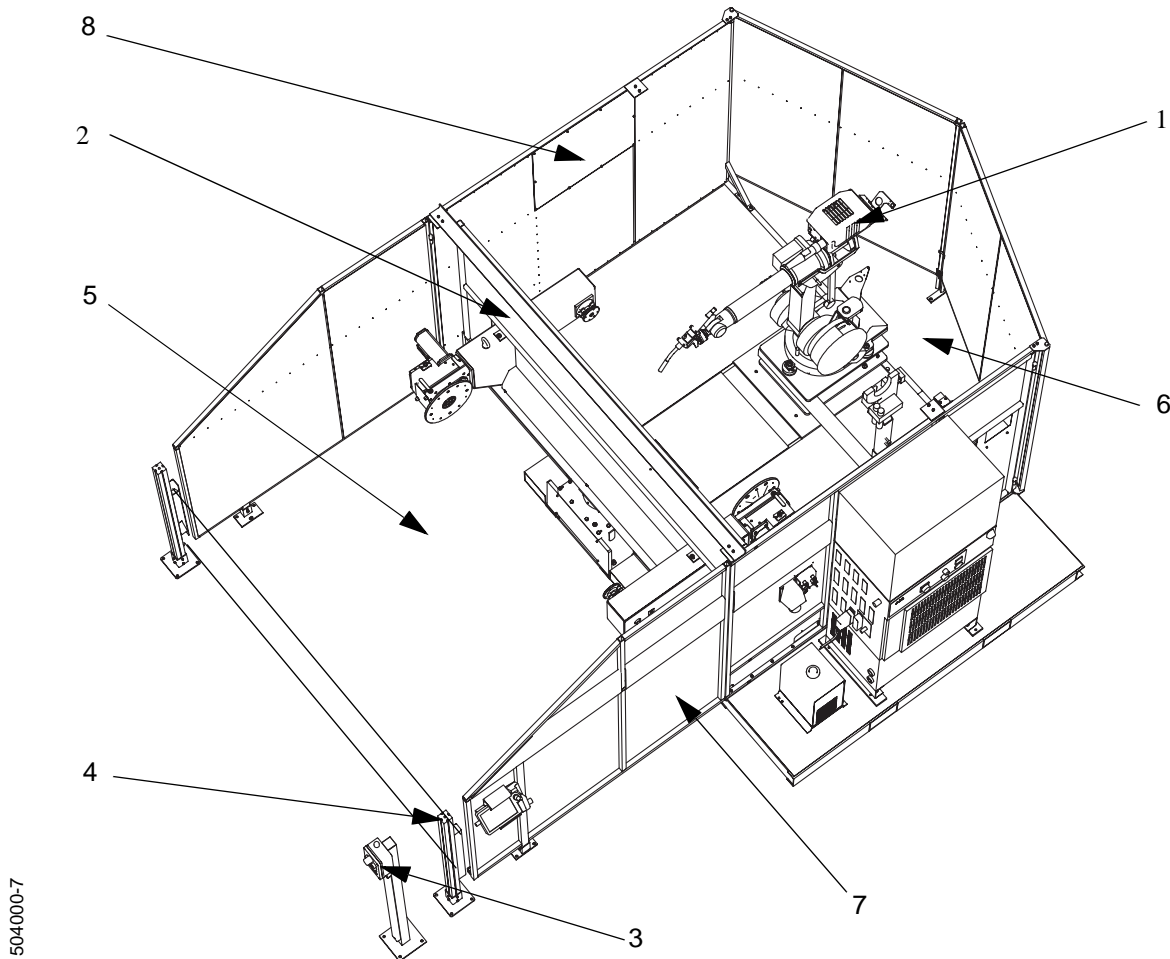


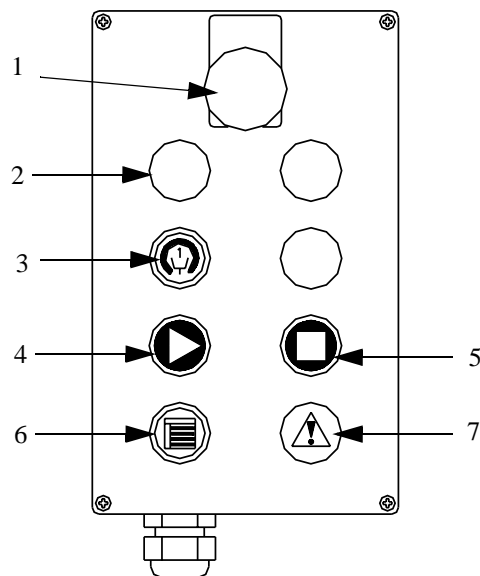
Figure 3 FlexArc 250R with light barriers

1 Robot	5 Supervised area
2 Positioner	6 Supervised programming area
3 Operator panel	7 Barrier
4 Light barriers	8 Service door

2 Operator panel

2.1 One working area

This variant applies to stations with one working area for operator.



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Figure 4 Operator's panel 1 station

1. Emergency stop

Pressing the emergency stop button immediately stops the entire welding robot system.

The emergency stop button is connected in series with the other emergency stop buttons in the system.

2. Entry permitted indication

Lamp, when green, indicates to the operator that the station is ready for loading the next workpiece.



3. Start Process, Resetting - (toggle function)

Pressing the push-button after loading the workpiece in station 1:

The status lamp in the push-button comes on:

- 1 Gives the ready signal to the robot system that loading of the workpiece in the station is complete.
- 2 Resets the personal safety protection around the station's working area.
- 3 Starts the process

Pressing the push-button once again:

The status lamp in the push-button goes out:

- 4 Cancel button for operator ready. Stops the process



4. Program start

Starts the execution of the robot program.



5. Program stop

Stops the execution of the robot program.



6. Menu

Push-button to access the main menu (Applies if the GPP function is included).



7. Error indication

Lamp that indicates an error.

2.2 Two working areas

This variant applies to stations with two working areas for the operator.

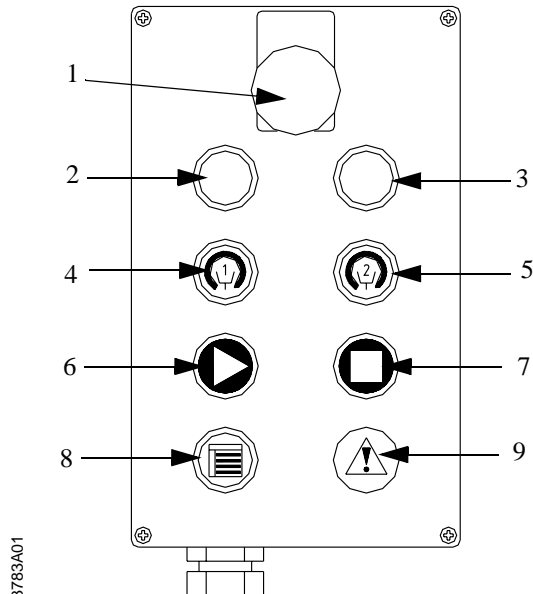


Figure 5 Operator's panel 2 stations

1. Emergency stop

Pressing the emergency stop button immediately stops the entire welding robot system.

The emergency stop button is connected in series with the other emergency stop buttons in the system.

2. Entry permitted indication - station 1

Lamp, when green, indicates to the operator that station 1 is ready for loading the next workpiece.

3. Entry permitted indication - station 2

Lamp, when green, indicates to the operator that station 2 is ready for loading the next workpiece.



4. Start Process, Resetting - (toggle function) - station 1

Pressing the push-button after loading the workpiece in station 1:

The status lamp in the push-button comes on:

- 1 Gives the ready signal to the robot system that loading of the workpiece in station 1 is complete.
- 2 Reset personal safety protection around the working area for station 1.
- 3 Starts the process

Pressing the push-button once again:

The status lamp in the push-button goes out:

- 4 Cancel button for operator ready. Stops the process



5. Start Process, Resetting - (toggle function) - station 2

Pressing the push-button after loading the workpiece in station 2:

- 1 Gives the ready signal to the robot system that loading of the workpiece in station 2 is complete.
- 2 Reset personal safety protection around the working area for station 2.
- 3 Starts the process

Pressing the push-button once again:

The status lamp in the push-button goes out:

- 4 Cancel button for operator ready. Stops the process



6. Program start

Starts the execution of the robot program.



7. Program stop

Stops the execution of the robot program.



8. Menu

Push-button to access the main menu (Applies if the GPP function is included).



9. Error indication

Lamp that indicates an error.

3 Working area supervision

3.1 Light barriers

Light barriers are an opto-electronic protective device intended to protect dangerous areas.

The light barriers in the robot system are used to stop the robot and positioner if anyone enters the risk zone where moving parts are activated.

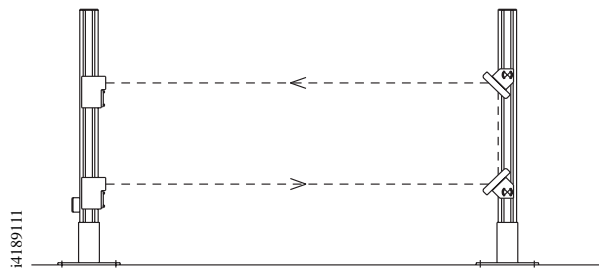


Figure 6 Light barrier

Light barriers can, where appropriate, be replaced by hatches, sliding doors or gates.

Example:

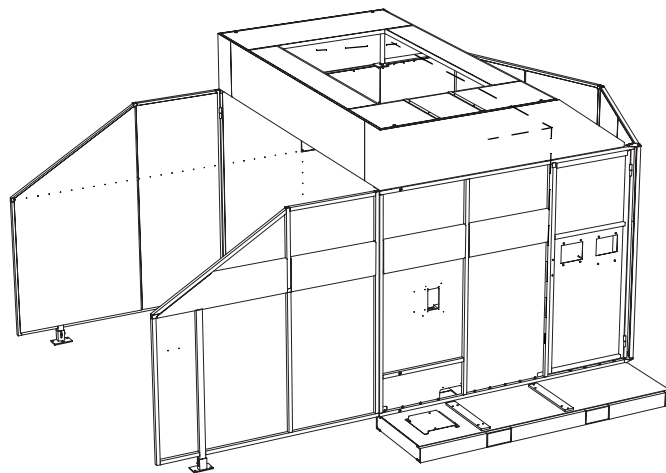


Figure 7 FlexArc 250R Standard, right, with light barrier

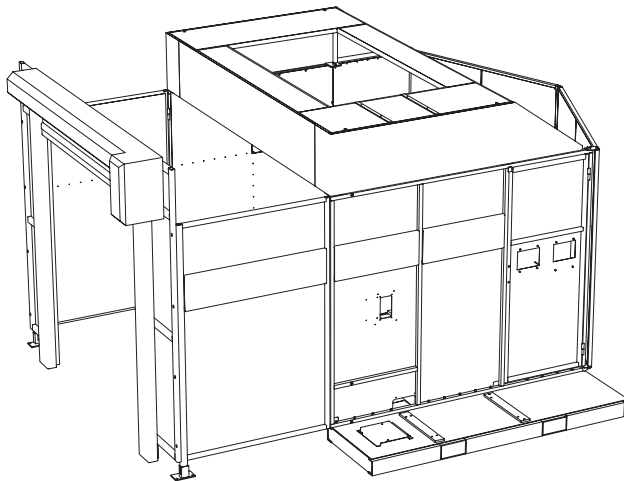
The light barrier equipment is connected directly to the circuit card for safety supervision without any further safety components.

3.2 Roller door

The roller door in the robot system is used to prevent access to the risk zone where moving parts are activated.

A light curtain is used with the roller door to assure that no personnel remain in the cell when the door closes and goes down.

Example:



FlexArcell 250R Standard, right, with the roller door

3.3 Gate interlock unit

The protective barrier that surrounds the robot system can be supplemented with one or more service gates to increase accessibility to the robot's working area, for example, during programming. Such a gate should be fitted with a positive opening gate switch (interlock contact).

If a service gate is opened during an ongoing working cycle:

- the system is automatically switched to standby mode and
- the motors are shutdown.

To restart the system:

- the gate be must closed and
- the gate interlock reset.

This can be done in two ways depending on where the control cabinet is located.

- 1** Resetting, option 1. See "Resetting, option 1" on page 16.
- 2** Resetting, option 2. See "Resetting, option 2" on page 17.

3.3.1 Resetting, option 1

When the control cabinet is located close to the service gate giving a good view of the risk zone resetting can be done using the controller on the control cabinet's control panel.

The gate switch (the interlock contact) is directly connected with the Auto-stop circuits.

Resetting for operation after closing the gate, takes place using the controller on the control cabinet's or from the teach pendant.

The gate switch consists of:

- positive opening interlock contact, which is secured to the door frame.
- coded key, which is fitted on the gate.

The gate switch (Figure 8) is connected to the control cabinet's safety interface and is supplied with a 7 m cable.

- 1 Gate switch
- 2 Control Cabinet
- 3 Service door

Example:

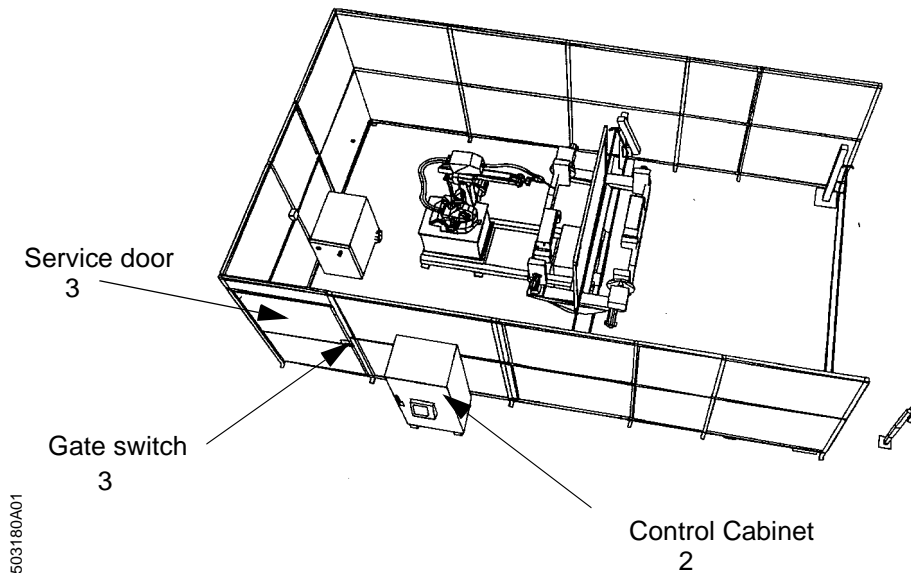


Figure 8 Gate switch used for resetting, option 1.

3.3.2 Resetting, option 2

When the control cabinet is located far from the service gate where you cannot see over the risk zone, an external push-button should be fitted in order to reset the gate interlock. The push-button should be located outside of the risk zone.

- Resetting can only be done when the gate is closed.

The push-button and gate switch are connected to an option card in the control cabinet's safety equipment.

The option card's safety relays are connected with the AUTO-stop circuits.

Components according to Figure 9:

- 1 Push-button outside of the gate
- 2 Option card for external gate interlock (control cabinet)
- 3 Gate switch (service door)

Example

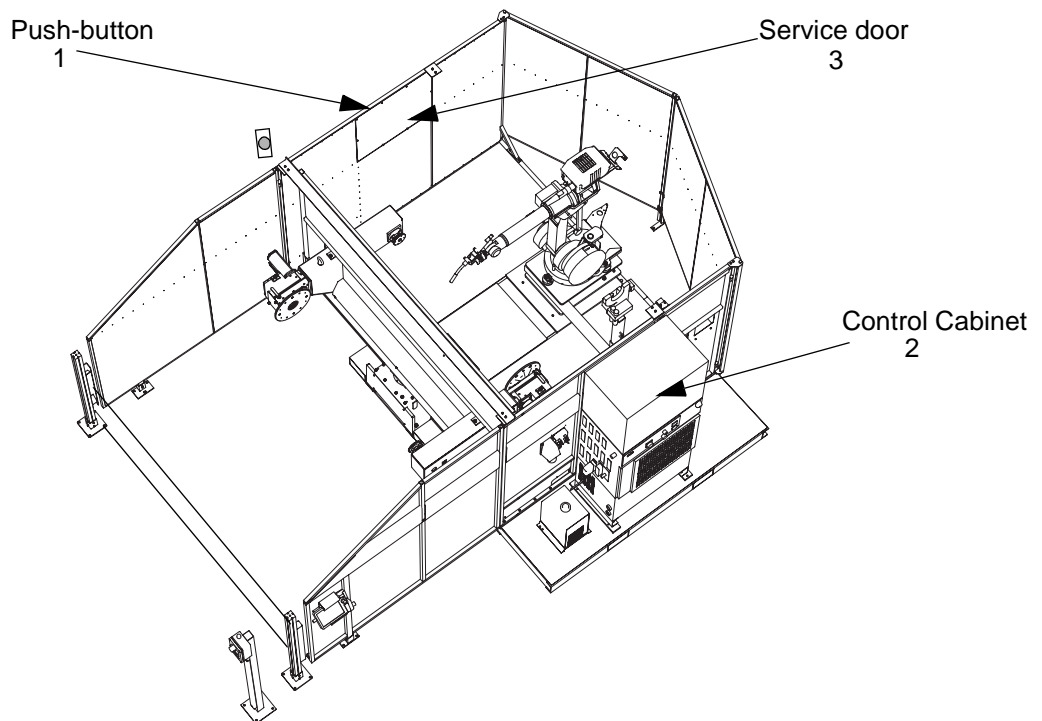


Figure 9 Gate switch with resetting, option 2.

3.4 Timer resetting unit

The timer resetting unit is a device used in connection with resetting light barriers. It is connected to the light barriers' sensing circuits.

The timer resetting unit prevents unintentional starting when the operator is inside the restricted service area.

The timer resetting unit consists of:

- A timer resetting button located inside the service area.
- Timer resetting unit placed on the safety card in the control cabinet.

The timer resetting button must first be pressed in to reset the light barriers, this gives the operator 10 seconds to reset the light barriers using **Process** button on the operator's panel.

- 1 Timer resetting unit (control cabinet)
- 2 Timer resetting button
- 3 Operator's panel - Process button

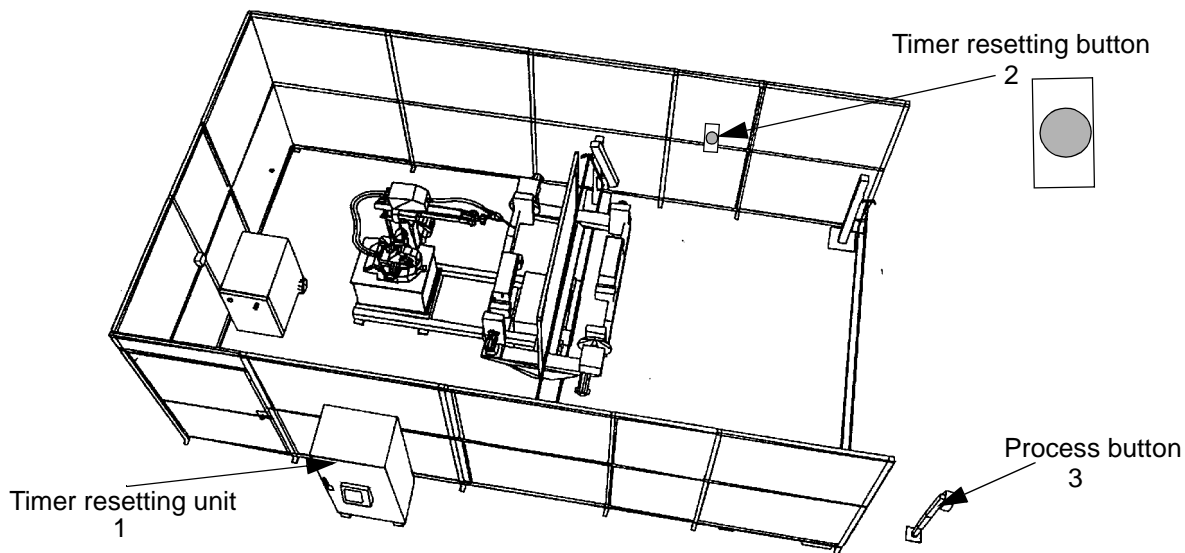


Figure 10 The timer resetting unit.

The timer resetting button should be placed inside the service area so that it is not accessible to anyone outside of the light barriers that monitor this area.

The timer resetting button is connected to the control cabinet's safety equipment and is supplied with a 17 m cable.



If the light barriers' sensing circuits have not been reset within 10 seconds after the timer resetting unit (push-button) has been activated, this function must be reactivated in order for resetting to take place.

3.5 Activation from the supervised area

It can sometimes be desirable to program equipment of the type A/L/Fixed table from the Unloading/Loading side.

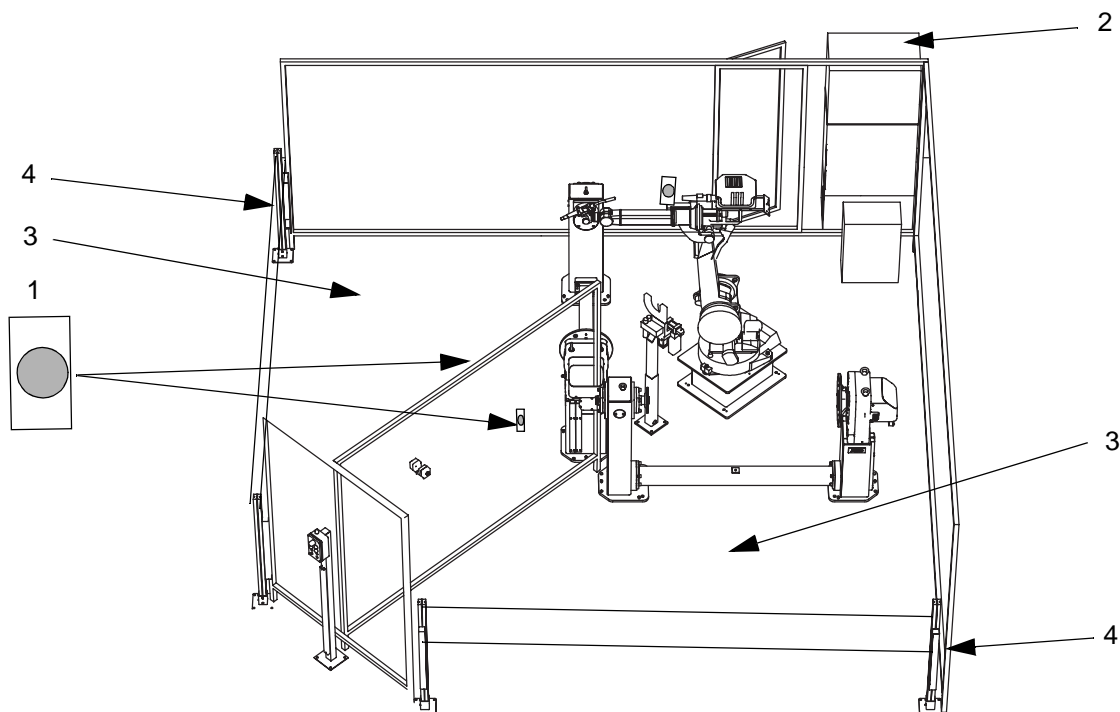
This can be done by allowing the operator to activate light barriers from the inside of the supervised area.

Activation is performed using a separate push-button inside the supervised area and can only be done in manual operating mode.

- MANUAL REDUCED SPEED (<math><250\text{ mm/s}</math>) 
- MANUAL FULL SPEED 100% 

Components according to Figur 11:

- 1 Push-buttons for activation of light barriers
- 2 Safety card in the control cabinet
- 3 Supervised area
- 4 Light barriers



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Figur 11 Activation unit.

4 Positionsindikering

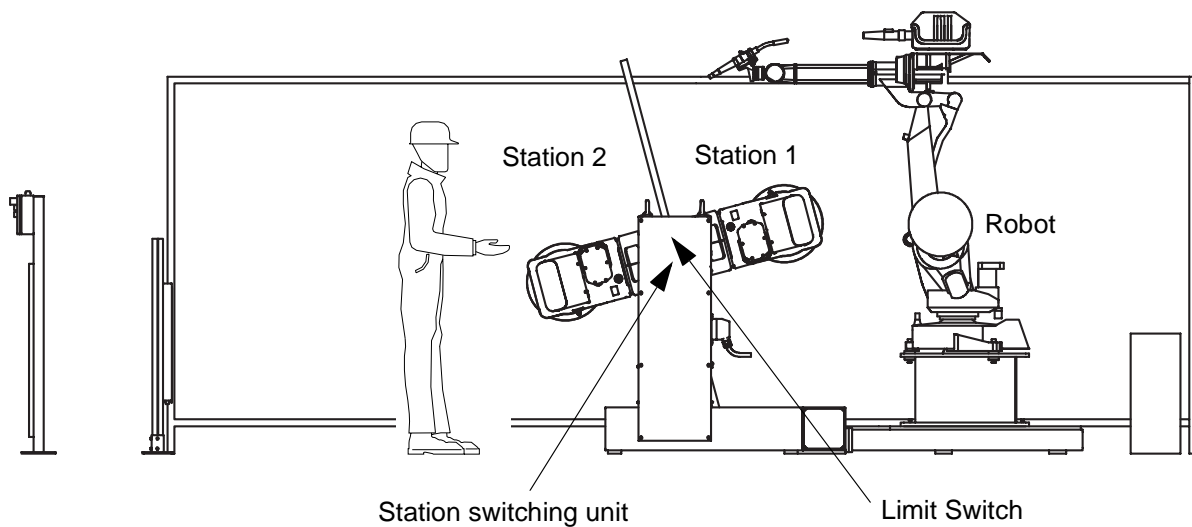
4.1 Station indication

The station indication function is used to monitor the system's work stations. The positive opening limit switches are used for this function.

The limit switches are located in different positions depending on the station layout.

Example 1:

Station indication on a manipulator with a station switching unit and two stations.



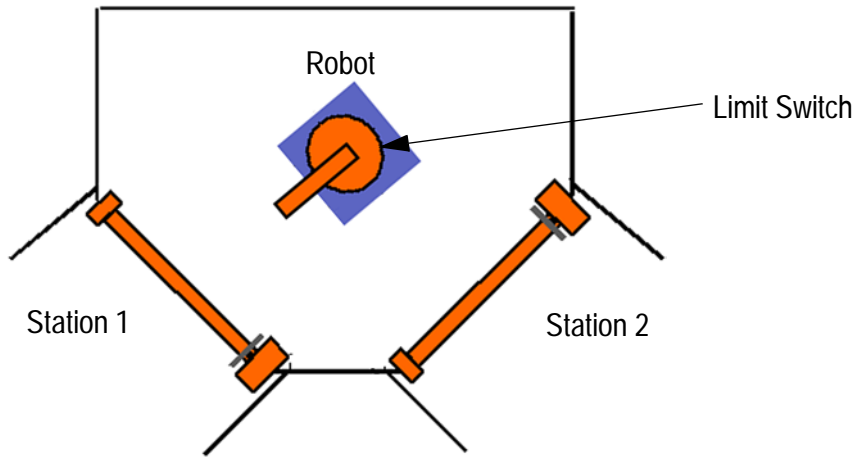
The limit switches are placed on the station switching unit.

The limit switches have the task of:

- Monitor unpermitted movement on the station switching unit.
- Indicate which station side is facing the robot.

Example 2:

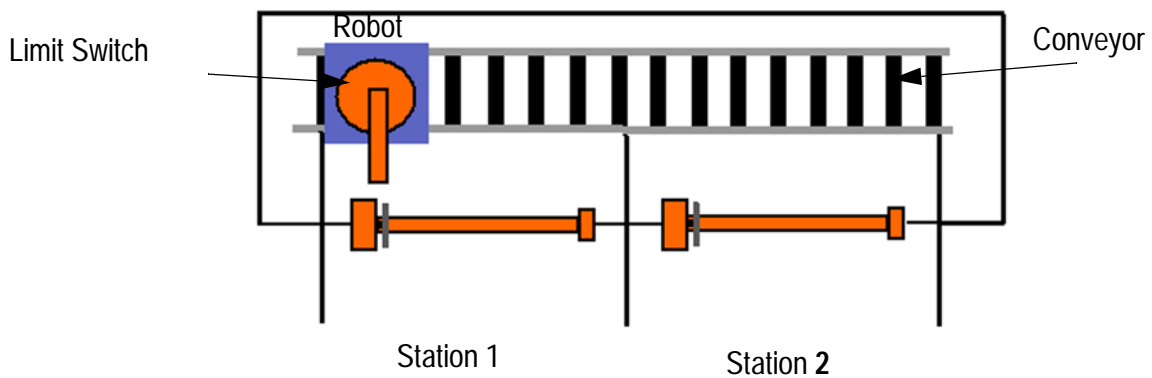
Station indication on the robot with two work stations.



The limit switches, which are located on the base of the robot, indicate which station side the robot faces.

Example 3:

Station indication on the conveyor for the robot with two work stations.



The limit switches, which are located on the carriage, indicate which station side the robot is next to.

4.2 Service position

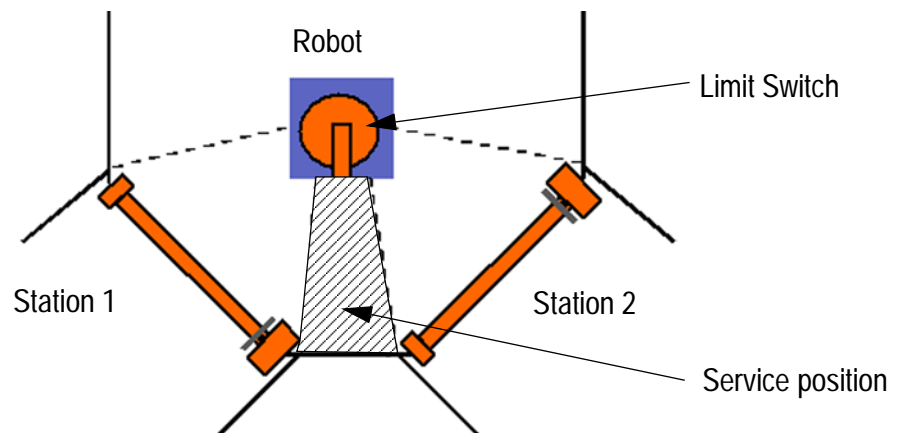
The service position is a limited area (position) between two work stations where the robot can perform tool cleaning (e.g. the weld gun). When the robot is in this area the operator can enter both work stations without the robot shutting down.

NOTE! If the work stations are made up of manipulators, the motors for these must be shutoff before the operator can enter the working area.

The limit switches are used in the service position function for station indication. See “Station indication” on page 21..

Example:

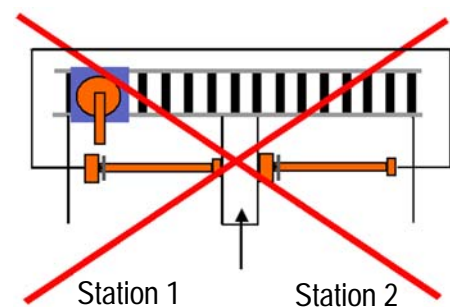
Service position for a robot with two work stations.



The limit switches, which are located on the base of the robot, indicate when the robot is in the service position.

NOTE! Systems that include a conveyor with a gun service unit as illustrated cannot provide a service position for the robot between the two work stations.

To clean the tool in this case use another function called Home position, see Home position on page 24.



4.3 Home position

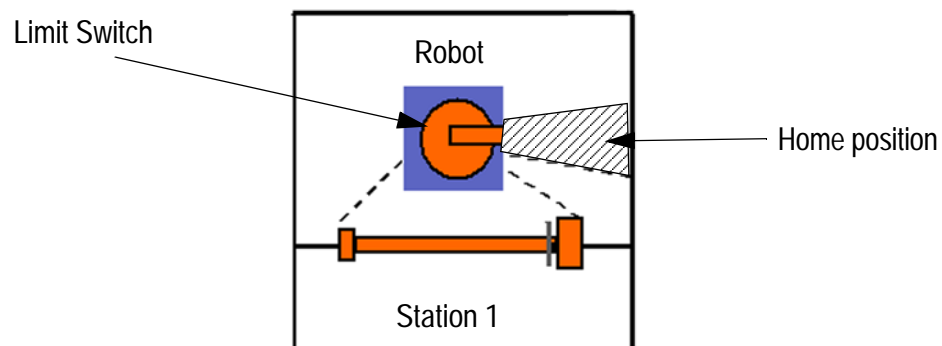
The home position is a position where the robot is run to a safe position out of reach for the operator. Positive opening limit switches are used for this function and are located on the base of the robot.

The home position function is used in station solutions that only include one work station, which is common to the robot and operator.

When the robot is in the home position the operator is permitted to enter the working area.

Example:

Home position for the robot with one work station.



The limit switches, which are located on the base of the robot, indicate when the robot is in the home position.

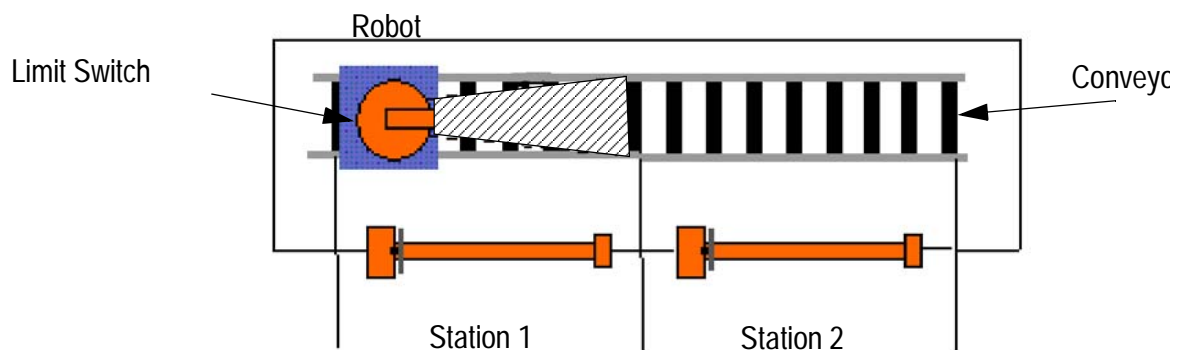
4.4 Transport position

The transport position is a safe position out of reach for the operator that the robot, fitted on a conveyor, is put into pass a work station where the operator is present.

Positive opening limit switches are used for this function and are located on the base of the robot, the same limit switches as in the home position function on page 24.

Example:

Transport position for the robot.



The limit switches, which are located on the base of the robot, indicate when the robot is in the transport position. When the robot is in the transport position:

1. The operator can enter both work stations.

The robot can pass the work station that the operator is in.

4.4.1 Fixtures

If the fixture is not fitted, or if the shape and size of the fixture does not prevent access to the danger zone, applies for the L-type manipulators that a fence or similar must be put up to prevent access.

Safety equipment
Positionsindikering

5 Installation and set-up



This work may only be carried out by persons trained in the use of the complete equipment and who are aware of the special risks involved with these different parts.

5.1 Transport and unpacking



The safety instructions and other instructions should be studied carefully before starting transport and unpacking of the safety equipment. These can be found under a separate tab in the System manual.

- Check that the equipment is not damaged in any way.
- Report any visible transport damage immediately.

5.2 Lifting instructions

Lifting of the safety equipment may only:

- be carried out using equipment that corresponds with applicable lifting standards.
- be carried out by authorised personnel.



Do not walk under a suspended load!

Weight:

- Roller door, standard kg

5.3 Installation of the light barrier



Applicable regulations for machine safety are to be observed during installation and usage. Consult with the relevant local authorities concerning technical safety issues, if necessary.

- Follow the instructions for the supplied light barrier.

Safety instructions

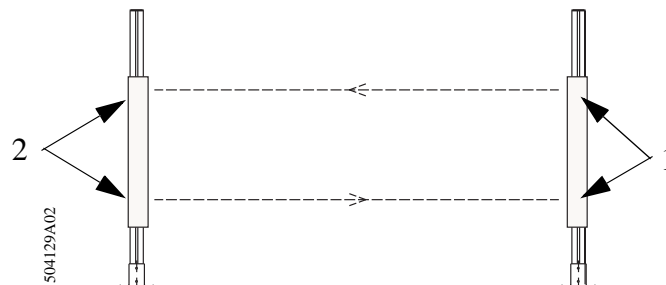
In general the following conditions are to be satisfied:

- The light barriers are to be installed so that the risk zone cannot be passed from behind. If this cannot be guaranteed, further safety devices must be installed.
- During all phases of the work it must be possible to check the control of the machine electrical, so that a dangerous machine movement can be averted immediately.
- The safety distance between the risk zone and the light field must be so high that a dangerous movement is interrupted, before a person can reach the risk zone.
- The mechanical and electrical installations are to be carried out by trained and qualified personnel.
- Installation and commissioning of the equipment may only be carried out by trained and qualified personnel.
- Repairs, in particular with regard to optics and circuit cards, may only be carried out by the manufacturer or by persons appointed by the manufacturer.
- Interference or modifications to equipment must not take place, except for that described in these instructions.

Connection, see page 30:

- Connection of the light barrier to the system is done through the two-piece cable glands to the jackable terminal X 41

.Set up



1 Transmitter/receiver unit	2 Deflection mirror
------------------------------------	----------------------------

Figure 12 Light barrier

5.4 Installation of the roller door

The roller door is supplied with all essential cables for connection to the safety system.

A light curtain is used with the roller door to assure that no personnel remain in the cell when the door closes and goes down.

General

Observe the general safety instructions.

In principle all units are to be installed so that you cannot reach the risk area without breaking the light field and so that sufficient distance is maintained between the risk area and light field.

Connection, see page 30:

- Connection of the roller door to the system is done via outputs XS 41.1 and XS 41.2.
- Connect the light curtain using the two-piece cable gland to the jackable terminal blocks XS 81 and XS 81.1.

Example:

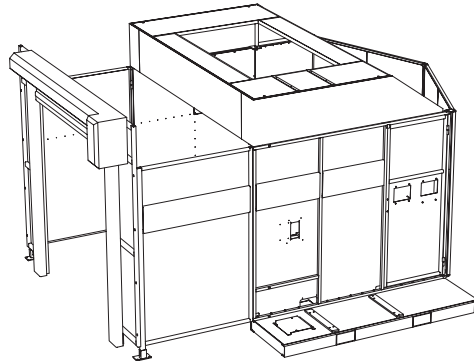


Figure 13 FlexArc with roller door.

5.5 Connections

5.5.1 External safety components

- Connected to the jackable terminal blocks fitted internally by the two-piece cable glands on the left-hand side of the top cabinet.



5.5.2 General

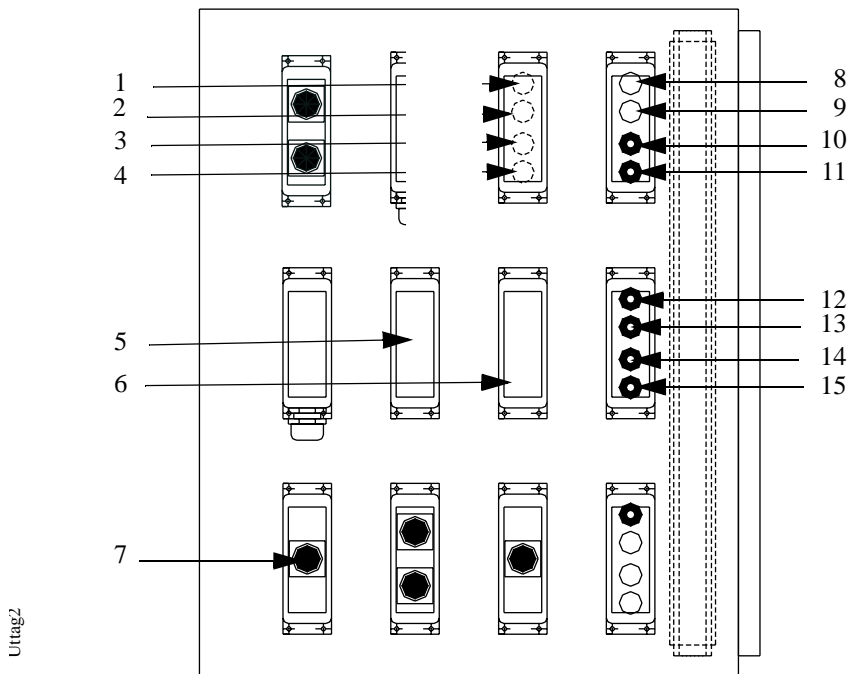




Figure 14 General connections

1 Gate switch	9 Timer resetting station 2/ Light curtain station 2
2 Gate reset	10 Light curtain (resetting protection) station 2
3 Home position/transport indication	11 Light barrier 2
4 Position indication for robot/ conveyor	12 Activation unit working area 1
5 Roller door station 1	13 Timer resetting station 1/ Light curtain station 1
6 Roller door station 2	14 Light curtain (resetting protection) station 1
7 Operator panel	15 Light barrier 1
8 Activation unit working area 2	

5.6 Inspection before start up

NOTE! Keep the doors to the control cabinet and top cabinet closed to prevent dust and dirt from entering.

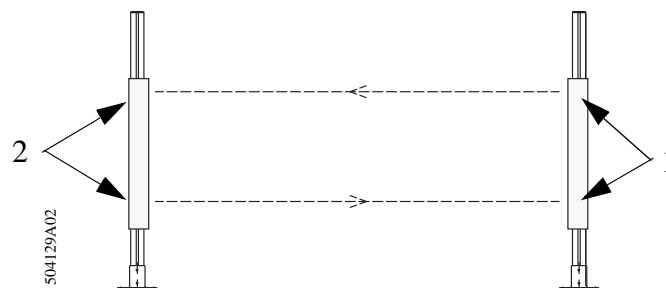
Before switching on the voltage check that the following has been done:

- Check that all component equipment is connected correctly.
- The main voltage is according to the identification plate on the control cabinet.
- The teach pendant is connected.
- **The operating mode selector**  on the control cabinet's control panel is in the
 - MANUAL position  .
- Check that the safety equipment is installed.



Light barriers

Satisfactory protection for the operator/operating personnel and machines can only be guaranteed if the protective equipment is used correctly.



1 Transmitter/receiver unit	2 Deflection mirror
------------------------------------	----------------------------

Figure 15 Light barrier

- The electrical connections should be inspected before the light barrier is connected. The transmitter's LEDs come on when the system is activated.
- Check that the receiver unit has been adjusted correctly.
- Adjust the position if necessary so that it is optimal.
- Loosen the assembly screws and then move the optical centre point horizontally and vertically.

5.7 Start up

All requisite system software is installed on delivery.

- Switch on the main power switch on the control cabinet and the main power switch on the welding power source if fitted. The main power switch on the control cabinet normally controls the power supply to all component modules in the cabinet.

Note! Some power sources supply the process control card with an external reference voltage, which is why some parts of the control cabinet can be voltage fed even when the main power switch is in the "OFF" position.

- The robot makes a self-test on the hardware and software. This test takes about 1 minute.
- Wait until the message “Welcome to...” is shown on the teach pendant's display.

The system is now ready for use.

6 Maintenance



The wrist strap, provided in the cabinet, must be worn when handling the circuit cards and other electronics in the control cabinet to prevent ESD damage.

- The control system is fully enclosed and the electronics are thereby protected in a normal workshop environment. However, in very dusty and powdery environments the inside of cabinet should be checked regularly. If necessary use a vacuum cleaner.
- Check that the cables/connectors are not damaged. Damaged components must be replaced immediately.

At the start of each shift:

- An operating test is to be made on the safety equipment.

Safety equipment
Maintenance

7 Reservdelsförteckning/Spare Parts List

Reservdelar beställs genom ABB Automation Technology Products AB. Vid beställning var vänlig uppge typ och tillverkningsnummer samt benämningar och beställningsnummer enligt reservdelsförteckningen.

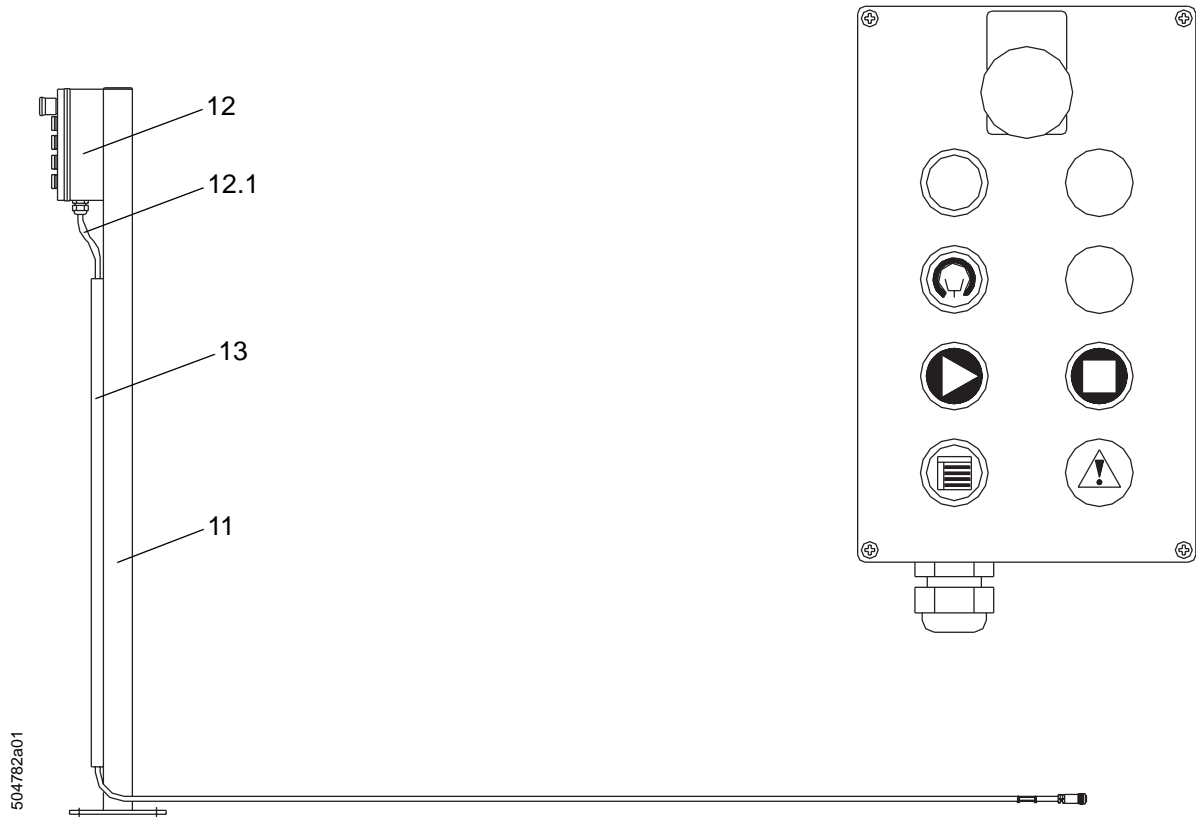
Rätt till ändring av specifikationer utan avisering förbehålles.

*Spare parts are to be ordered from ABB Automation Technology Products AB.
Kindly indicate type of unit, serial number, denominations and ordering number
according to the spare parts list.*

Rights to reserved to alter specifications without notice.

Reservdelsförteckning/Spare Parts List

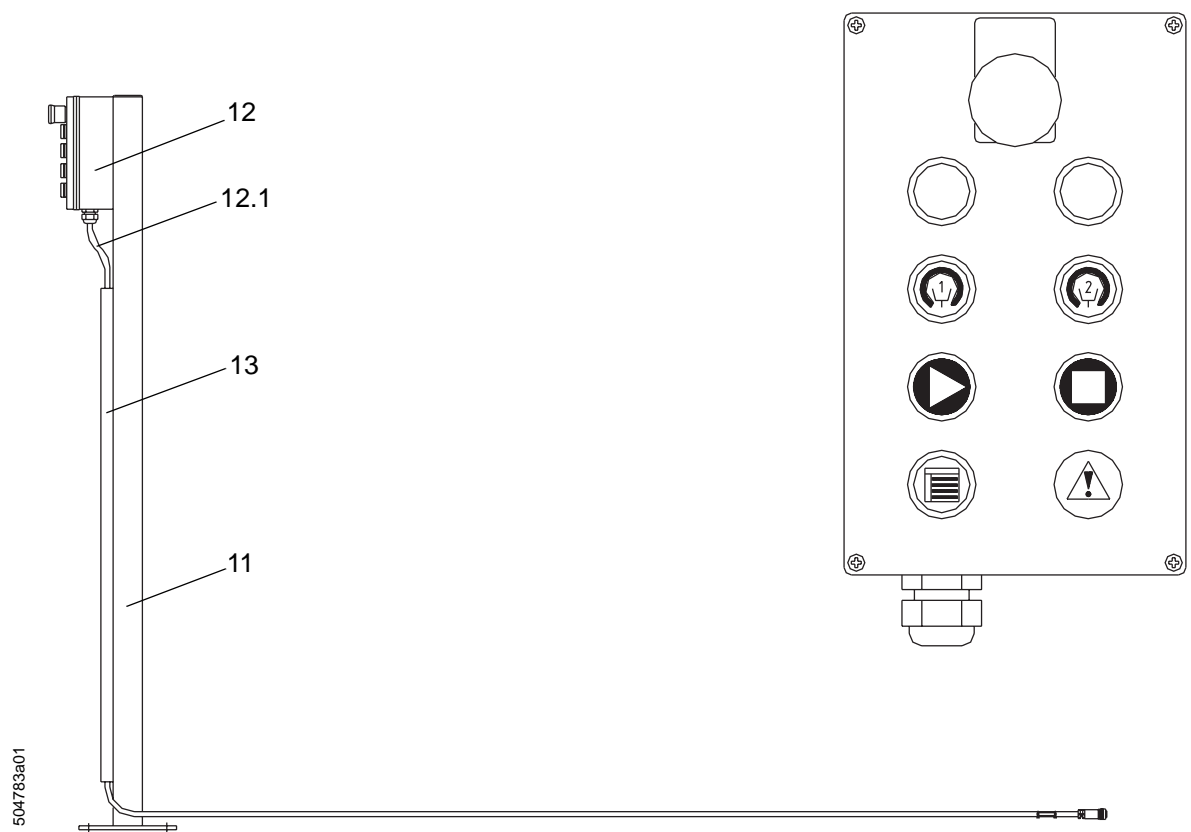
Positions- nummer Position number	Antal Quantity	Beställningsnummer Ordering number	Benämning	Denomination	Anmärkingar Remarks
		504 782-880	Op.panel 1 Op-klar kompl.	Op-panel 1 Op-ready compl.	
11		416 592-880	Stolpe	Pillar	
12		504 776-880	Op-panel 1 op-klar	Op-panel 1 op-ready	
12.1		504 988-882	Kabel W70	Cable W70	L=15m
13		416 593-001	Kabelkanal OP.Panel MHA	Cable trough OP.Panel MHA	



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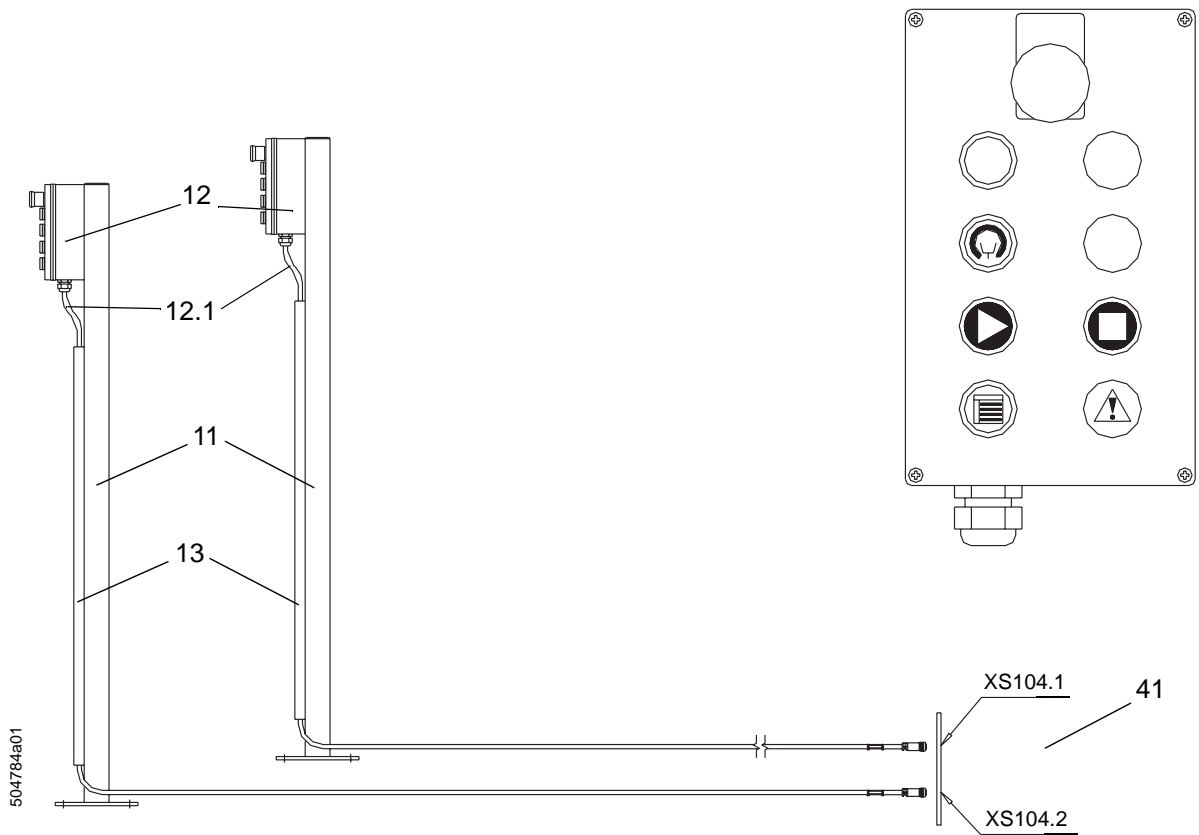
Reservdelsförteckning/Spare Parts List

Positions- nummer Position number	Antal Quantity	Beställningsnummer Ordering number	Benämning	Denomination	Anmärkingar Remarks
		504 783-880	Op.panel 2 Op-klar, kompl.	Op.panel 2 Op-ready, compl.	
11		416 592-880	Stolpe	Pillar	
12		504 778-880	Op-panel, 2 op-klar	Op-panel, 2 op-ready	
12.1		504 988-882	Kabel W70	Cable W70	L=15m
13		416 593-001	Kabelkanal OP.Panel MHA	Cable trough OP.Panel MHA	



Reservdelsförteckning/Spare Parts List

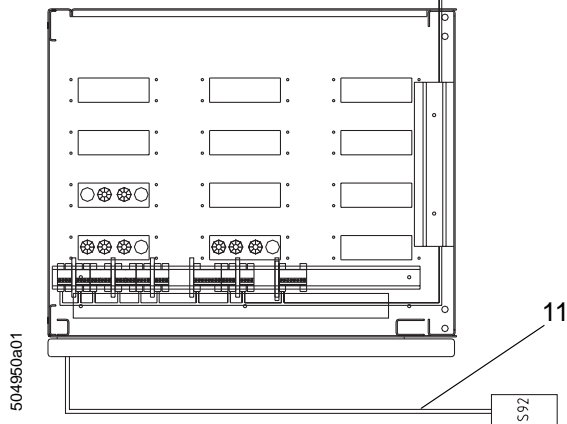
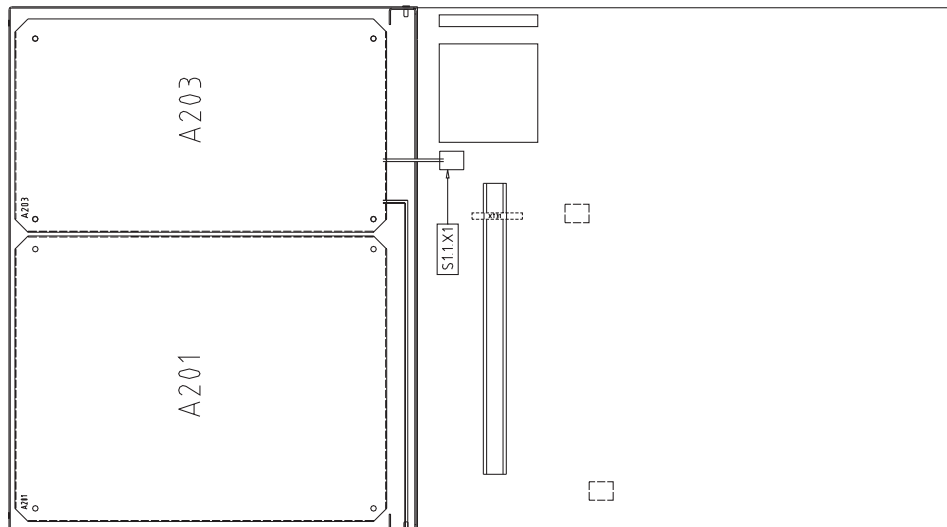
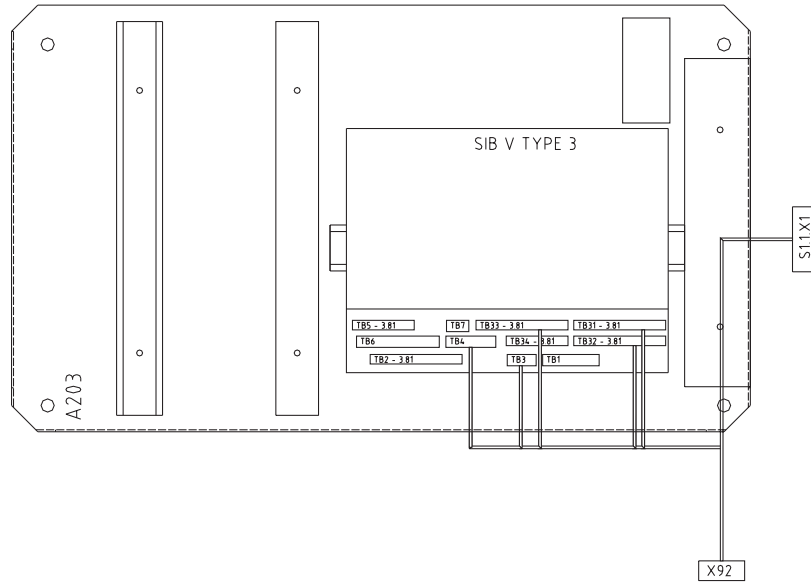
Positions- nummer Position number	Antal Quantity	Beställningsnummer Ordering number	Benämning	Denomination	Anmärkingar Remarks
		504 784-880	Op-panel 1+1 Op-klar, kompl.	Op-panel 1+1 Op-ready, compl.	
11		416 592-880	Stolpe till op-panel	Pillar to op-panel	
12		504 776-880	Op-panel 1 op-klar	Op-panel 1 op-ready	
12.1		504 988-882	Kabel W70	Cable W70	L=15m
13		416 593-001	Kabelkanal OP.Panel MHA	Cable trough OP.Panel MHA	
16		418 159-021	Täcklock fläns	Cover plate	23+23 pole
41		504 976-880	Kabelstam	Cable harness	



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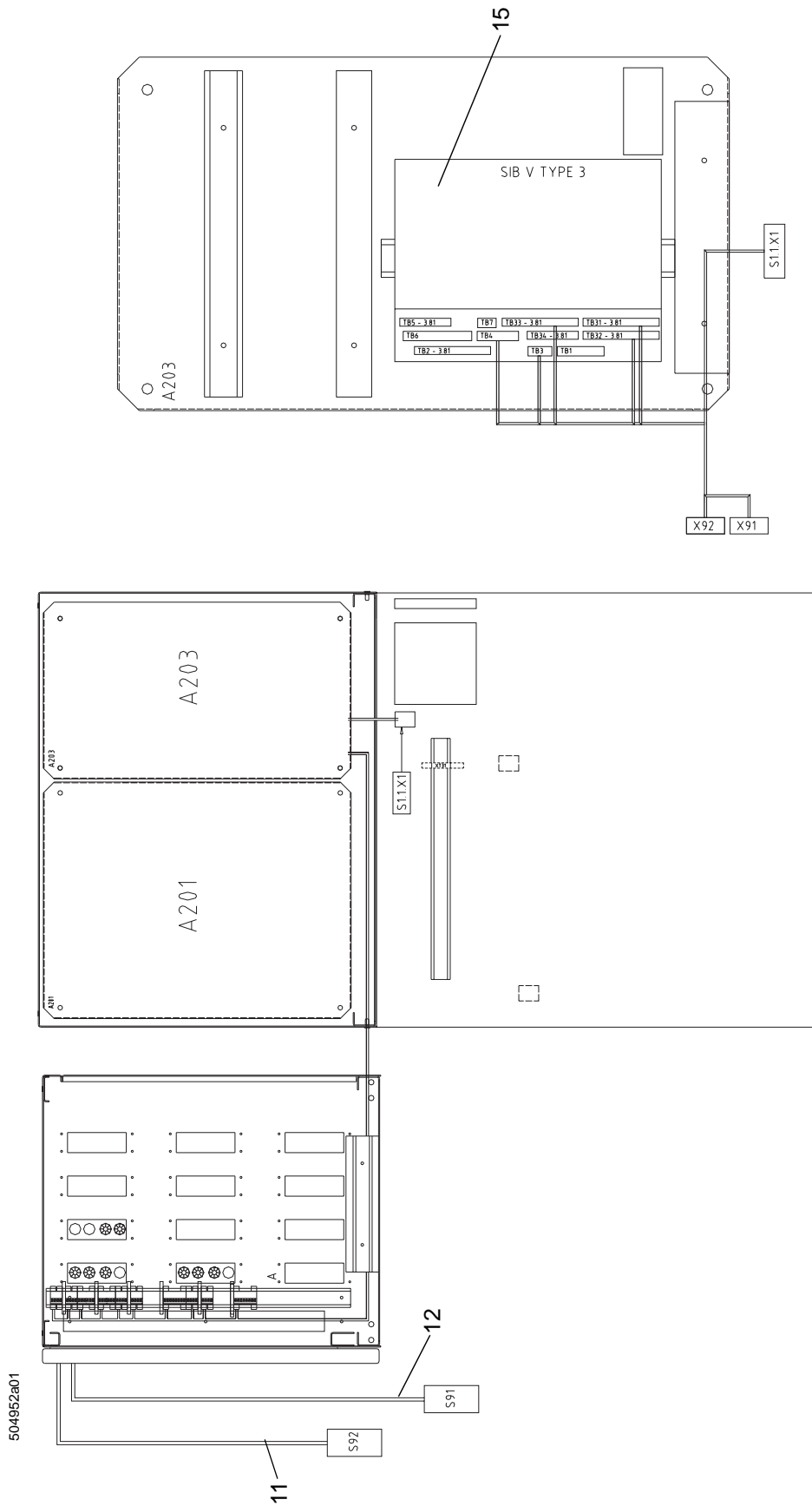
Reservdelsförteckning/Spare Parts List

Positions- nummer Position number	Antal Quantity	Beställningsnummer Ordering number	Benämning	Denomination	Anmärkingar Remarks
		504 950-880	OPTION Dörrbrytare	OPTION Gate switch	
11		504 985-880	Dörrbrytare, kompl.	Gate switch, compl.	W92, L=7 m



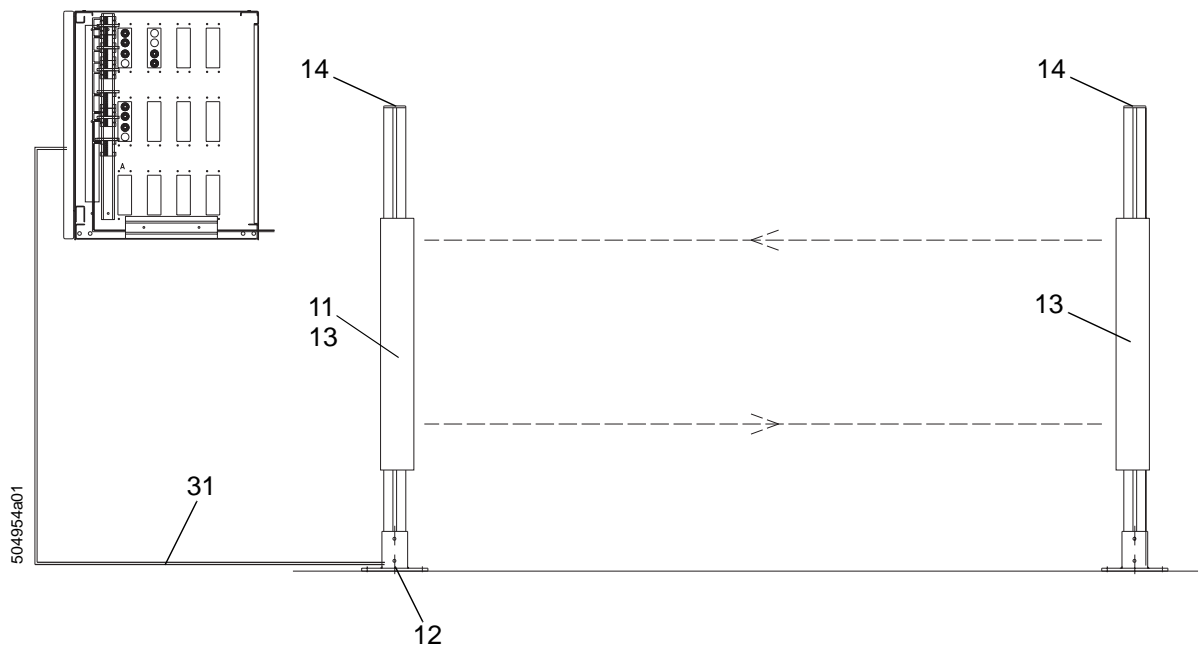
Reservdelsförteckning/Spare Parts List

Positions- nummer Position number	Antal Quantity	Beställningsnummer Ordering number	Benämning	Denomination	Anmärkingar Remarks
		504 952-880	OPTION Extern återställning	OPTION External reset gate	
11		504 985-882	Dörrbrytare, kompl.	Gate switch, compl.	W92, L=15 m
12		504 982-882	Tryckknapp, kompl.	Push button, compl.	W91, L=15 m
15		504 997-880	Säkerhetskort V, OPT.1	SafetyInterfaceBoard V, OPT.1	SIB



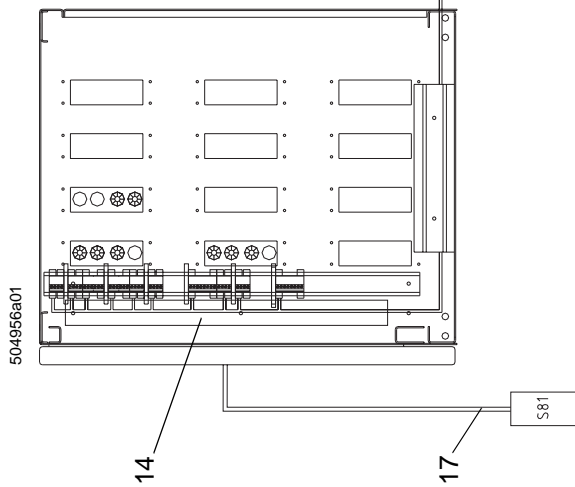
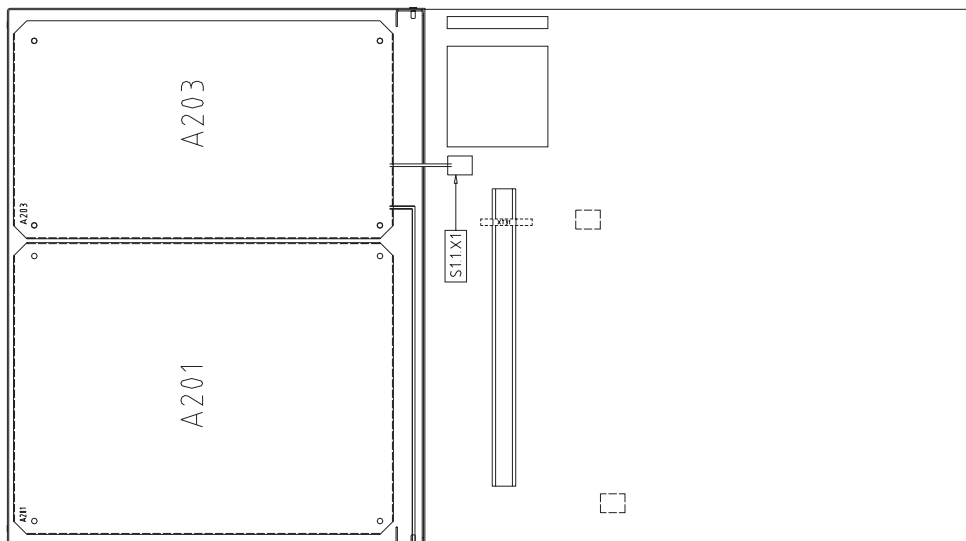
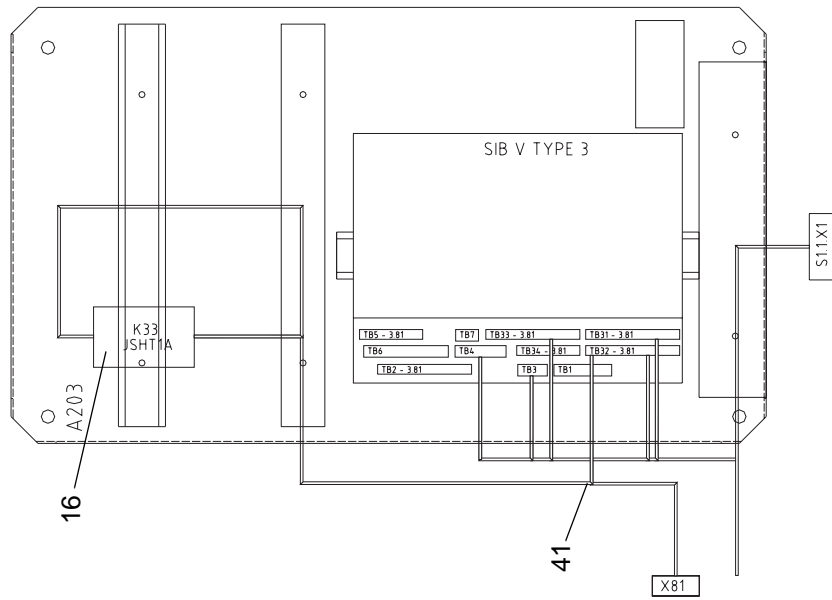
Reservdelsförteckning/Spare Parts List

Positions- nummer Position number	Antal Quantity	Beställningsnummer Ordering number	Benämning	Denomination	Anmärkingar Remarks
A		504 954-880	OPTION Ljusbom	OPTION Light beam	
B		504 954-881	Ljusbom	Light beam	FLEXARC
11		504 024-880	Ljusbom	Light beam	
12		501 521-880	Fotocellfot	Photo cell foot	15m
13		500 382-001	Stativbalk	Stand beam	
14		500 379-005	Täcklock	Cover plate	60x60mm
31		504 727-882	Kabel W41/42 ljusbom	Cable W41/42 light beam	A L=15 m
		504 727-911	Kabel W41/42 ljusbom	Cable W41/42 light beam	B L=6 m, FLEXARC



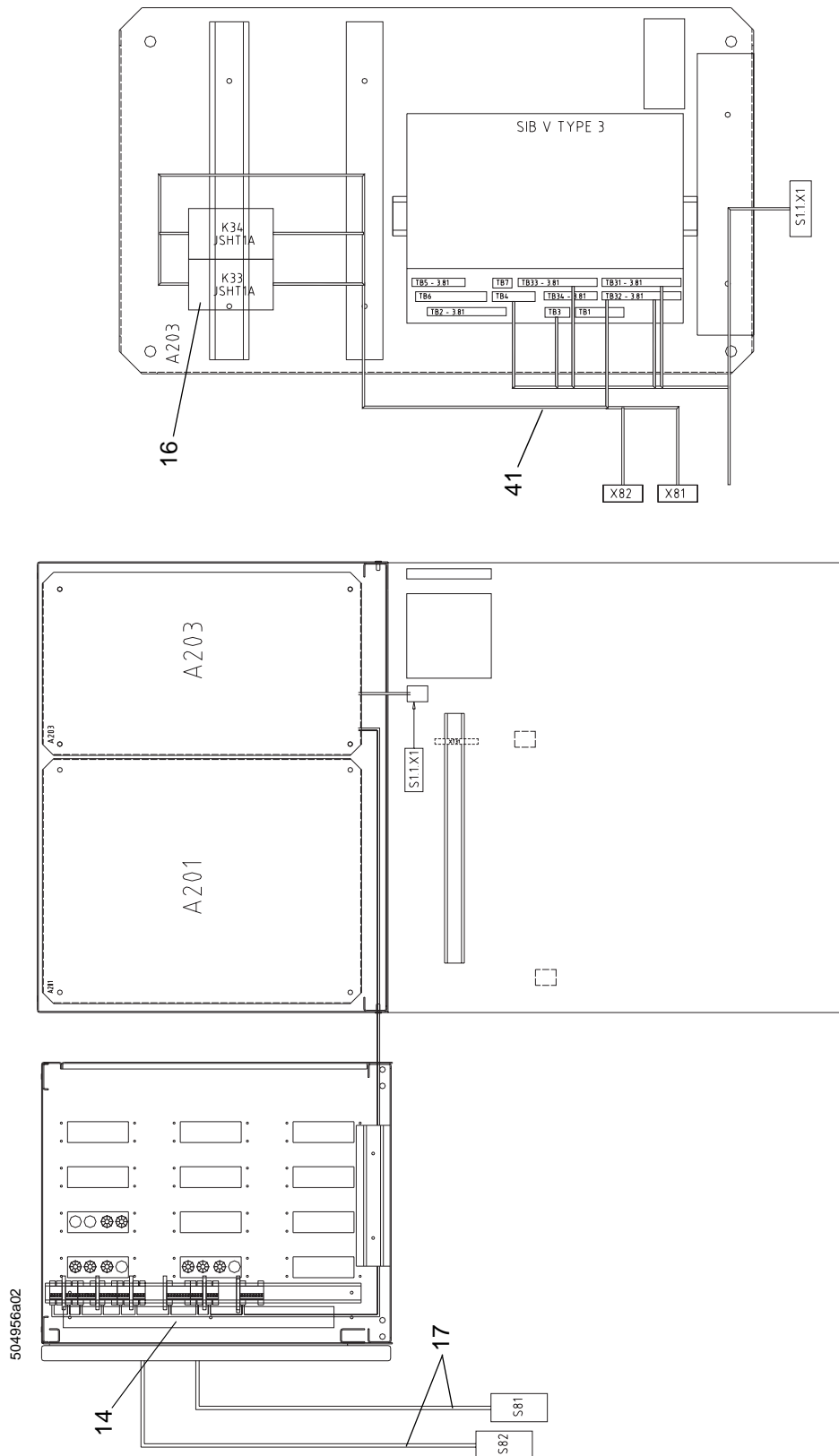
Reservdelsförteckning/Spare Parts List

Positions- nummer Position number	Antal Quantity	Beställningsnummer Ordering number	Benämning	Denomination	Anmärkingar Remarks
		504 956-880	OPTION Tidsåterställning	OPTION Pre reset	1 area
14		436 829-009	Jordklämma	Terminal	
16		193 757-002	Tidsåterställningsdon	Pre reset unit	
17		503 179-880	Tryckknapp, kompl.	Push button, compl.	Pre Reset W81, L=7m
41		502 914-880	Kabelstam	Cable harness	



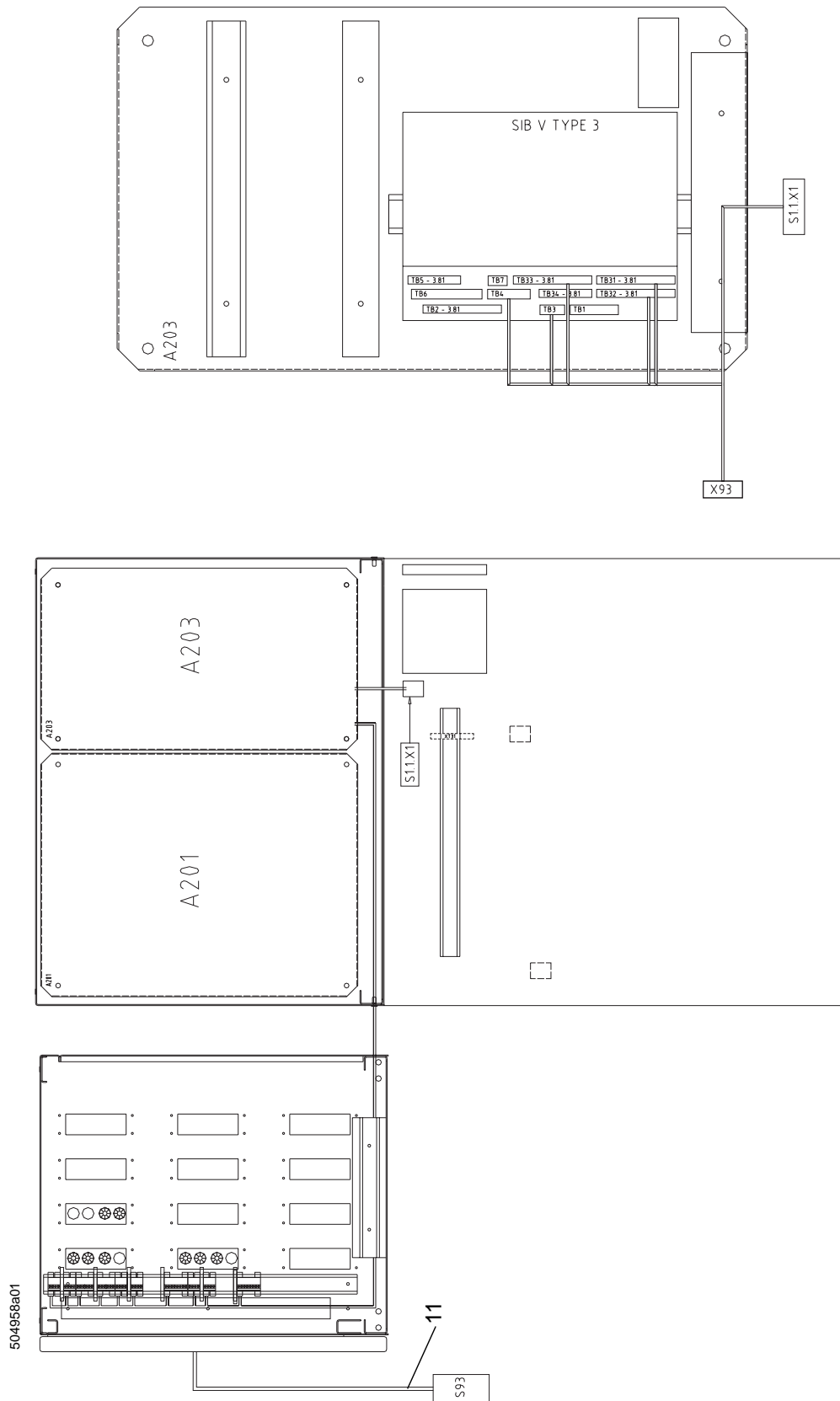
Reservdelsförteckning/Spare Parts List

Positions- nummer Position number	Antal Quantity	Beställningsnummer Ordering number	Benämning	Denomination	Anmärkningar Remarks
		504 956-881	OPTION Tidsåterställning	OPTION Pre reset	2 areas
14		436 829-009	Jordklämma	Terminal	
16		193 757-002	Tidsåterställningsdon	Pre reset unit	
17		503 179-880	Tryckknapp, kompl.	Push button, compl.	Pre Reset W81/W82, L=7m
41		502 914-881	Kabelstam	Cable harness	



Reservdelsförteckning/Spare Parts List

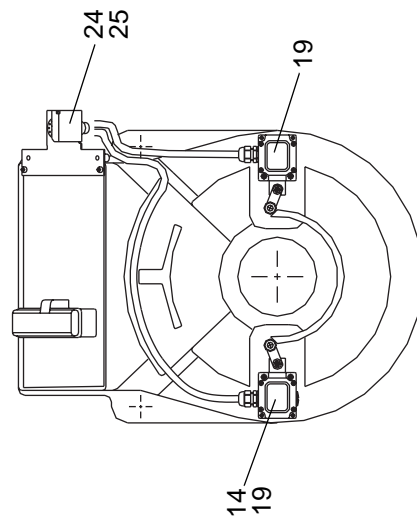
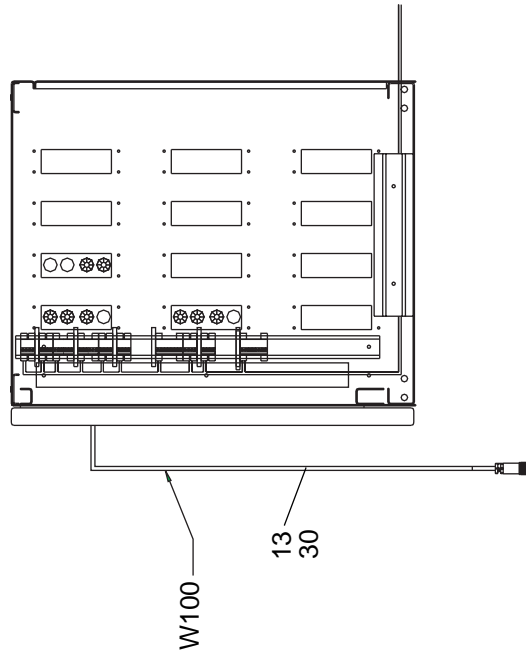
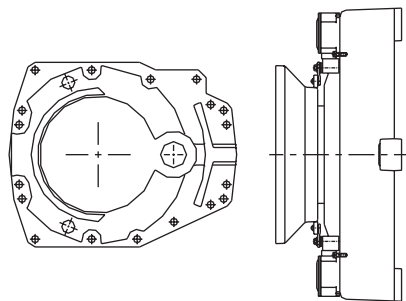
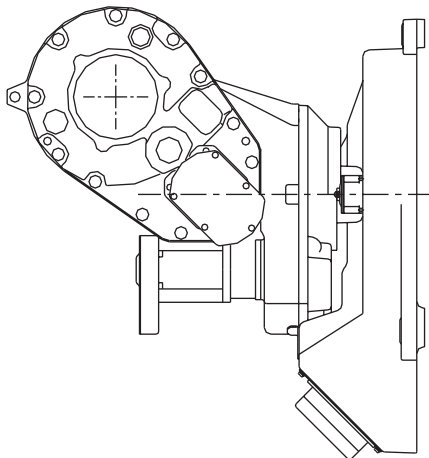
Positions- nummer Position number	Antal Quantity	Beställningsnummer Ordering number	Benämning	Denomination	Anmärkingar Remarks
11		504 958-880 504 982-881	OPTION Återställningdon Tryckknapp, kompl.	OPTION Reset unit Push button, compl.	W93/W94 L=10m



Reservdelsförteckning/Spare Parts List

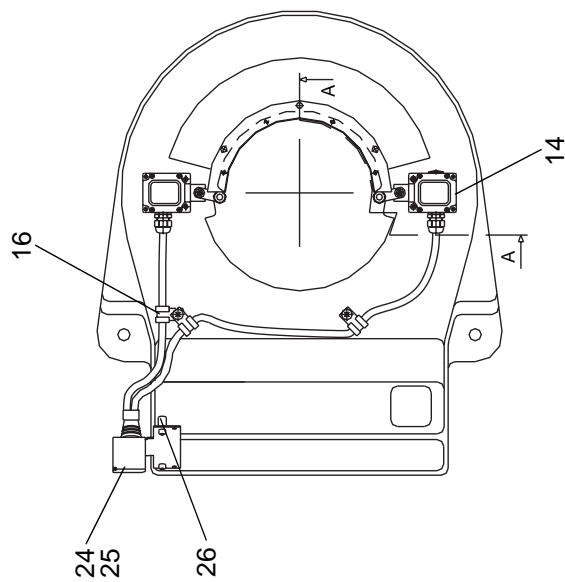
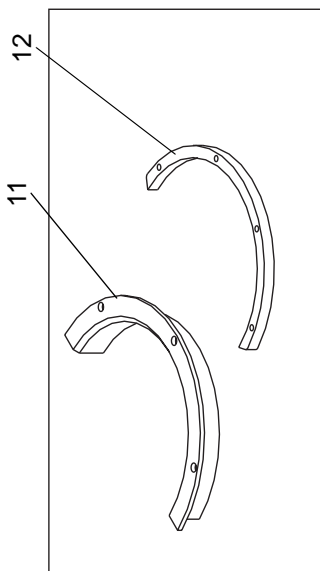
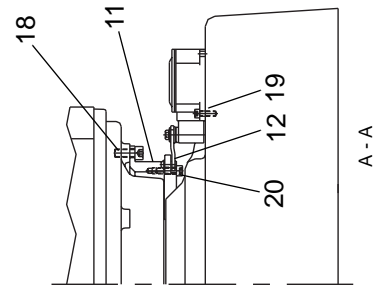
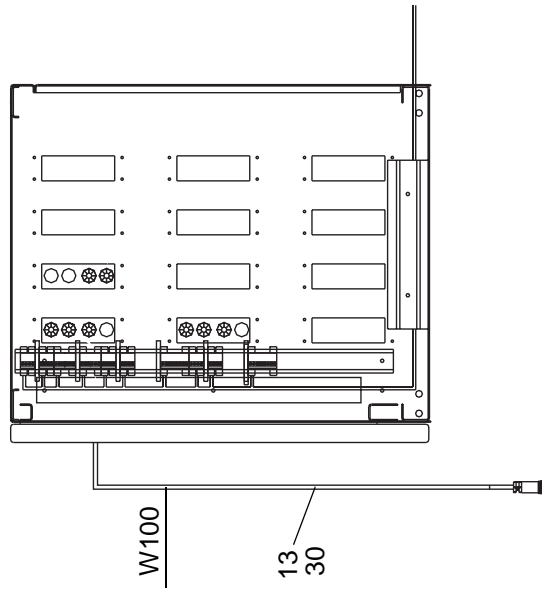
Positions- nummer Position number	Antal Quantity	Beställningsnummer Ordering number	Benämning	Denomination	Anmärkingar Remarks
		504 960-880	OPTION Stationsindikering	OPTION Station indication	IRB 1400
13		504 991-880	Kabel, W100/W111	Cable, W100/W111	7 m
14		504 067-880	Kabel, W100	Cable, W100	
16		500 077-009	Ståklamma	Clamp	
19		192 238-329	Skruv	Screw	M5x16
24		505 158-880	Anslutningsplåt	Plate	1400 / 2400
25		489 327-009	Skruv	Screw	M3x6
30		504 781-880	Märksats	Marking set	

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Reservdelsförteckning/Spare Parts List

Positions- nummer Position number	Antal Quantity	Beställningsnummer Ordering number	Benämning	Denomination	Anmärkingar Remarks
		504 962-880	OPTION Stationsindikering	OPTION Station indication	IRB 2400
11		505 155-001	Fastsättningsring	Fixing coil	IRB 2400
12		505 156-001	Påverkarring	Coil	
13		504 991-880	Kabel, W100/W111	Cable, W100/W111	7 m
14		504 067-880	Kabel, W100	Cable, W100	
16		500 077-009	Stålklamma	Clamp	
18		192 238-449	Skruv	Screw	M8x16
19		192 238-329	Skruv	Screw	M5x16
20		192 238-370	Skruv	Screw	M6x20
24		505 158-880	Anslutningsplåt	Plate	1400 / 2400
25		489 327-009	Skruv	Screw	M3x6
26		394 516-048	Distansskruv	Screw	M6x18
30		504 781-880	Märksats	Marking set	

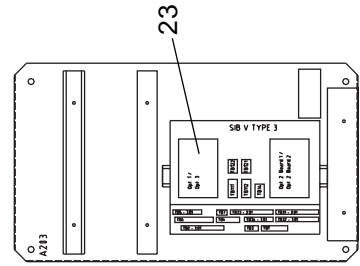
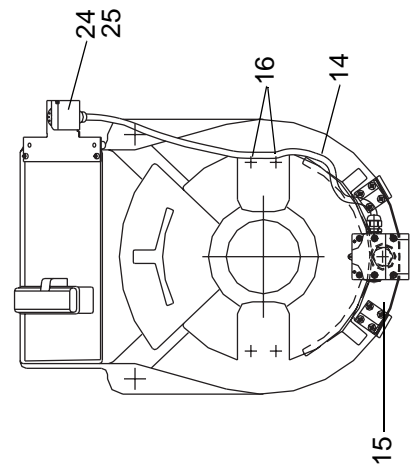
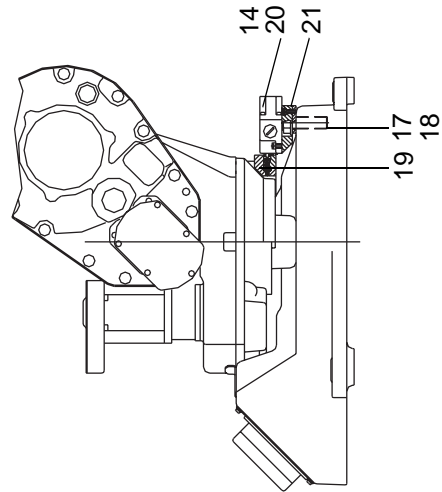
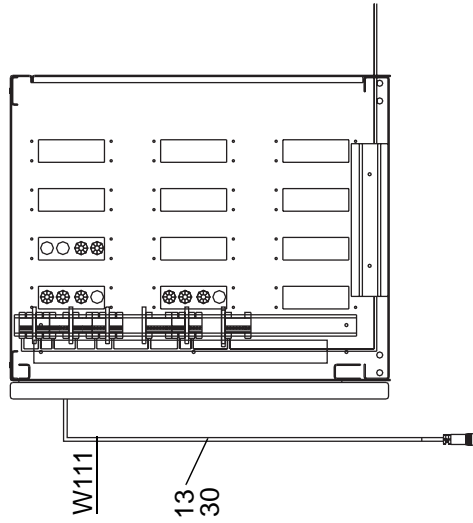
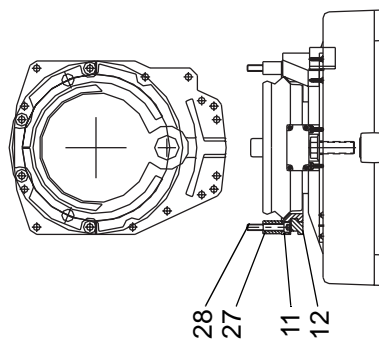
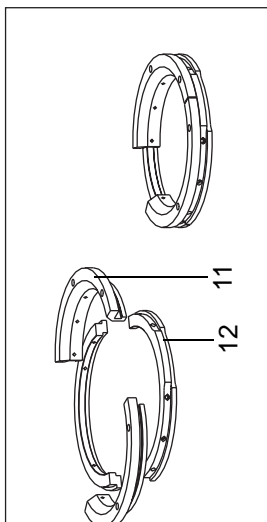


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Reservdelsförteckning/Spare Parts List

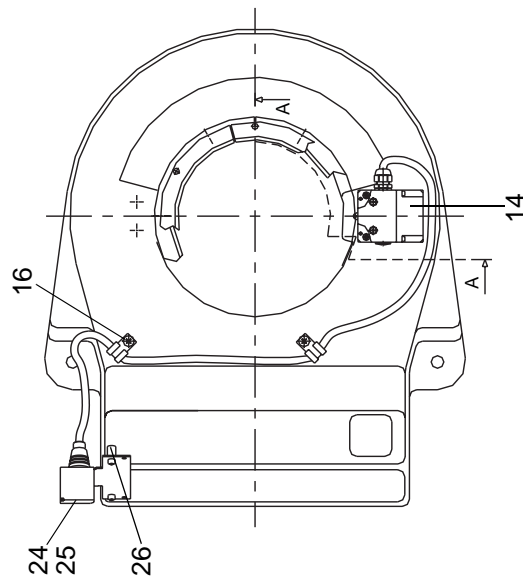
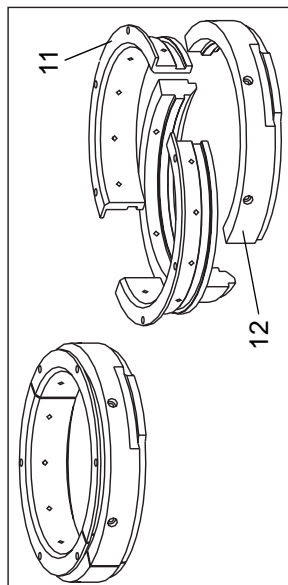
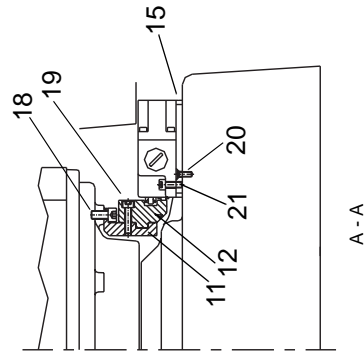
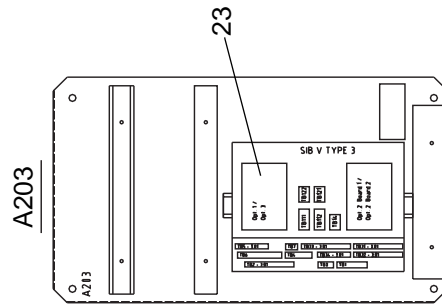
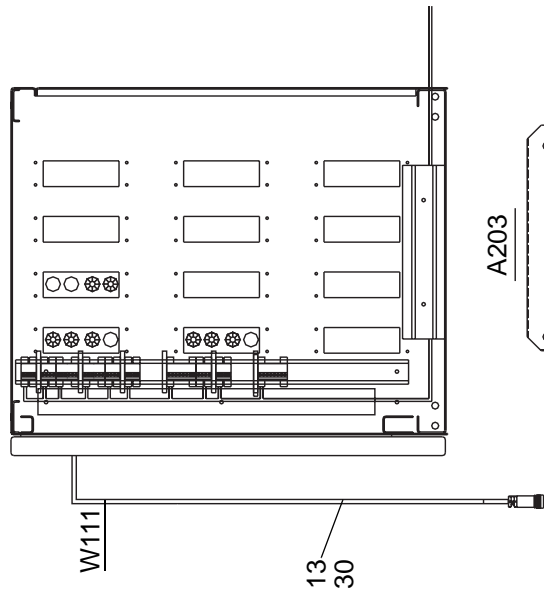
Positions- nummer Position number	Antal Quantity	Beställningsnummer Ordering number	Benämning	Denomination	Anmärkingar Remarks
		504 964-880	OPTION Hemmaläge	OPTION Home Position	IRB 1400
11		504 968-880	Fastsättningsring	Fixing coil	IRB 1400
12		505 157-880	Påverkarring	Coil	
13		504 991-880	Kabel, W100/W111	Cable, W100/W111	7 m
14		504 077-880	Kabel, W111.1	Cable, W111.1	Home Pos.
15		504 076-880	Plåt till brytare	Plate	1400
16		500 077-009	Stålklamma	Clamp	
17		2121 017-06	Skruv	Screw	M20x60
18		2151 000-37	Bricka	Washer	36/21x3
19		192 238-331	Skruv	Screw	M5x20
20		192 238-370	Skruv	Screw	M6x20
21		192 238-329	Skruv	Screw	M5x16
23		504 999-880	SäkerhetsInterface-kort	Safety Interface Board	SIB V
24		505 158-880	Anslutningsplåt	Plate	1400 / 2400
25		489 327-009	Skruv	Screw	M3x6
27		504 081-001	Distans	Screw	M6x18
28		192 238-503	Skruv	Screw	M10x60
30		504 781-880	Märksats	Marking set	

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Reservdelsförteckning/Spare Parts List

Positions- nummer Position number	Antal Quantity	Beställningsnummer Ordering number	Benämning	Denomination	Anmärkingar Remarks
		504 966-880	OPTION Hemmaläge	OPTION Home Position	IRB 2400
11		504 969-880	Fastsättningsring	Fixing coil	IRB 2400
12		505 118-880	Påverkarring	Coil	
13		504 991-880	Kabel, W100/W111	Cable, W100/W111	7 m
14		504 077-880	Kabel, W111.1	Cable, W111.1	Home Pos.
15		505 117-001	Fästplåt	Attachment plate	2400
16		500 077-009	Stålklamma	Clamp	
18		192 238-449	Skruv	Screw	M8x16
19		192 238-453	Skruv	Screw	M8x25
20		190 684-329	Skruv	Screw	M5x16
21		192 238-368	Skruv	Screw	M6x16
23		504 999-880	SäkerhetsInterface-kort	Safety Interface Board	SIB V
24		505 158-880	Anslutningsplåt	Plate	1400 / 2400
25		489 327-009	Skruv	Screw	M3x6
26		394 516-048	Distans	Screw	M6x18
30		504 781-880	Märksats	Marking set	



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Säkerhetsutrustning/ Safety equipment
Reservdelsförteckning/Spare Parts List

