ROBOTICS

Product manual

IRC5 Panel Mounted Controller



Product manual

IRC5 Panel Mounted Controller

Design 14

Document ID: 3HAC047137-001

Revision: AE

© Copyright 2007-2026 ABB. All rights reserved.
Specifications subject to change without notice.

Using lifting accessories and other external equipment

Ensure that all equipment used during installation, service and all handling of the robot are in correct condition for the intended use.

Electrical safety

Incoming mains must be installed to fulfil national regulations.

The power supply wiring to the robot must be sufficiently fused and if necessary, it must be possible to disconnect it manually from the mains power.

The power to the robot must be turned off with the main switch and the mains power disconnected when performing work inside the controller cabinet. Lock and tag shall be considered.

Hazards due to stored electrical energy in the controller must be considered.

Harnesses between controller and manipulator shall be fixed and protected to avoid tripping and wear.

Wherever possible, power on/off or rebooting the robot controller shall be performed with all persons outside the safeguarded space.

Note

Use a CARBON DIOXIDE (CO_2) extinguisher in the event of a fire in the robot.

ELECTRICAL SHOCK

The controller mains power switch shall be disabled before connecting or disconnecting the controller power cable from the mains supply.

Safety devices

The integrator is responsible for that the safety devices necessary to protect people working with the robot system are designed and installed correctly.

When integrating the robot with external devices to a robot system:

- The integrator of the robot system must ensure that emergency stop functions are interlocked in accordance with applicable standards.
- The integrator of the robot system must ensure that safety functions are interlocked in accordance with applicable standards.

Other hazards

A robot may perform unexpected limited movement.

WARNING

Manipulator movements can cause serious injuries on users and may damage equipment.

The risk assessment should also consider other hazards arising from the application, such as, but not limited to:

- Water

Continues on next page

© Copyright 2007-2026 ABB. All rights reserved.

2.3.2 The unit is sensitive to ESD

Description

ESD (electrostatic discharge) is the transfer of electrical static charge between two bodies at different potentials, either through direct contact or through an induced electrical field. When handling parts or their containers, personnel not grounded may potentially transfer high static charges. This discharge may destroy sensitive electronics.

Safe handling

Use one of the following alternatives:

- Use a wrist strap. The wrist strap button is located inside the controller.

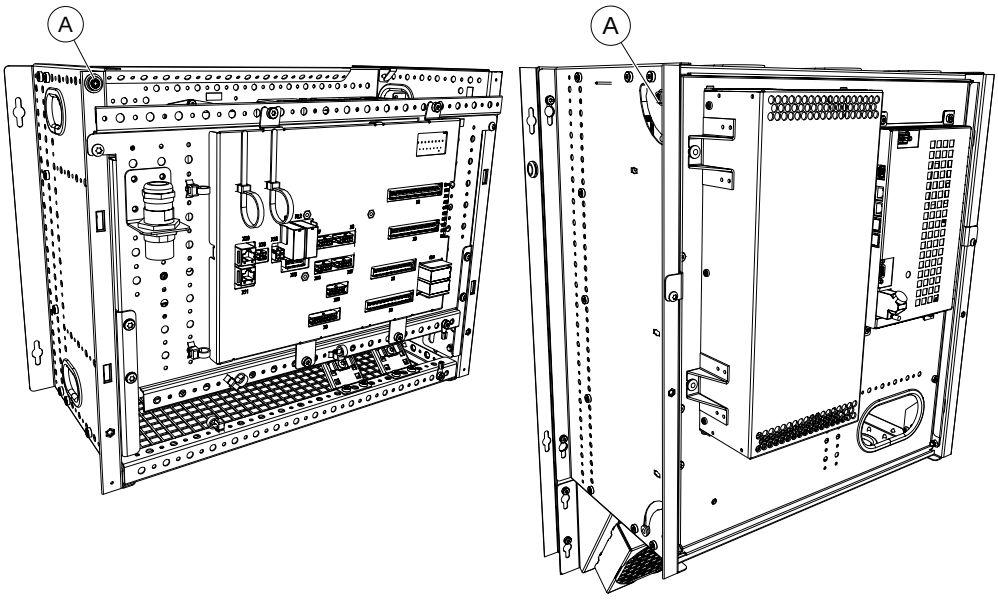
  Wrist straps must be tested frequently to ensure that they are not damaged and are operating correctly.
- Use an ESD protective floor mat.

  The mat must be grounded through a current-limiting resistor.
- Use a dissipative table mat.

  The mat should provide a controlled discharge of static voltages and must be grounded.

Wrist strap button

The location of the wrist strap button is shown in the following illustration.



A	Wrist strap button

There is an additional wrist strap button on the main computer.

© Copyright 2007-2026 ABB. All rights reserved.

2.9.3 Installation of external enabling device

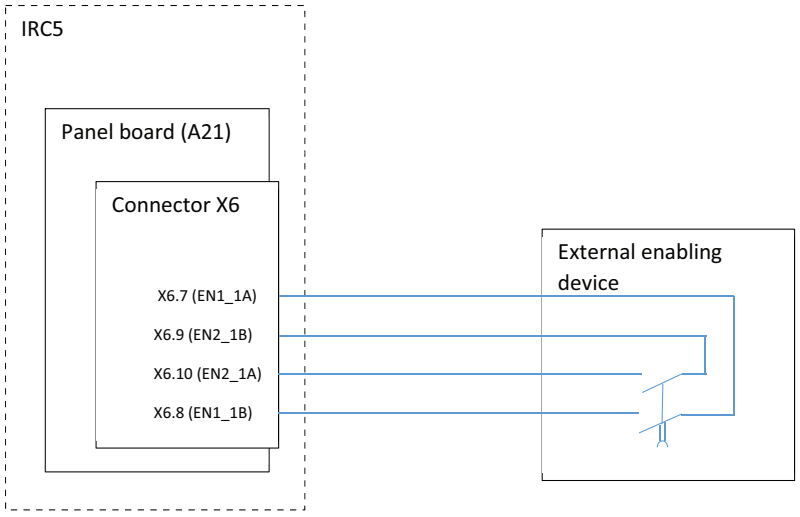
Overview

IRC5 is delivered with one enabling device but have the possibility to connect one additional external enabling device (cannot be ordered from ABB Robotics).

When an external enabling device is used together with the three-position enabling device on the teach pendant, both enabling devices must be enabled to be able to operate the manipulator in manual mode.

Connecting the external enabling device

The external enabling device must be connected to the panel board connector X6 pin 7-10 as shown in the figure below.



xx1500000534

The enabling device chain is enabled if X6 pin 7 is short circuited with X6 pin 8 at the same time as X6 pin 9 is short circuited with X6 pin 10.

Requirement on the external enabling device

The external enabling device connected to IRC5 must have the following characteristics:

- Redundant channels.
- Three-position enabling device. When the enabling device is pressed to the center position the enabling device chain must be enabled. When the enabling device is released or pressed to third position, the enabling device chain must be disabled.
- The enabling device must have a B10 value of at least 100000 cycles (less than 10% chance of failure before 100000 cycles).
- The mean time to dangerous failure ($MTTF_d$) of the external enabling device must be high enough to ensure that the external enabling device together

Continues on next page

© Copyright 2007-2026 ABB. All rights reserved.

3.4 Function tests

3.4.1 Function test of emergency stop

Overview

Perform this test on the emergency stop button both on the operating panel and on the FlexPendant.

Performing the function test

	Action	Note
1	Make a visual inspection of the emergency stop button to make sure it is not physically damaged.	If any damage is found on the emergency stop button, it must be replaced.
2	Start the robot system.	
3	Press the emergency stop button.	The test is passed if the event message **10013 Emergency stop state** appears in the event log. If either of the following happens, then the test is failed and the root cause must be found: • if the event message **10013 Emergency stop state** does not appear • if the event message **90223 Emergency stop conflict** appears
4	After the test, release the emergency stop button and press the motors on button to reset the emergency stop state.	

© Copyright 2007-2026 ABB. All rights reserved.

3.4.2 Function test of mode switch

2-position mode switch

	Action	Note
1	Start the robot system.	
2	Start with the mode switch in manual mode and then switch the mode switch to auto mode. Run the robot in auto mode.	This test is passed if it is possible to run the robot in auto mode. If it is not possible to run the robot in auto mode, this test is failed and the root cause of the failure must be found.
3	Switch the mode switch to manual mode.	This test is passed if the event message **10015 Manual mode selected** appears in the event log. If the event message **10015 Manual mode selected** is not shown, the test failed and the root cause of the failure must be found.

3-position mode switch

	Action	Note
1	Start the robot system.	
2	Start with the mode switch in manual mode and then switch the mode switch to auto mode. Run the robot in auto mode.	This test is passed if it is possible to run the robot in auto mode. If it is not possible to run the robot in auto mode, this test is failed and the root cause of the failure must be found.
3	Switch the mode switch to manual full speed mode. Run the program in manual full speed mode.	This test is passed if it is possible to run the program in manual full speed mode. If it is not possible to run the program in manual full speed mode, this test is failed and the root cause of the failure must be found.
4	Switch the mode switch to manual mode.	This test is passed if the event message **10015 Manual mode selected** appears in the event log. If the event message **10015 Manual mode selected** is not shown, the test failed and the root cause of the failure must be found.

© Copyright 2007-2026 ABB. All rights reserved.

3.4.3 Function test of three-position enabling device

Performing the function test

	Action	Note
1	Start the robot system and turn the mode switch to manual mode.	
2	Press the three-position enabling device to the middle position and then hold the enabling device in this position.	This test is passed if the event message **10011 Motors ON state** appears in the event log. If either of the following happens, then the test is failed and the root cause must be found: • if the event message **10011 Motors ON state** does not appear • if the event message **90224 Enabling Device conflict** appears
3	While still holding the three-position enabling device pressed, press the enabling device harder to the enable the device's third position.	This test is passed if the event message **10012 Safety guard stop state** appears in the event log. If either of the following happens, then the test is failed and the root cause must be found: • if the event message **10012 Safety guard stop state** does not appear • if the event message **90224 Enabling Device conflict** appears

© Copyright 2007-2026 ABB. All rights reserved.

3.4.4 Function test of motor contactors K42 and K43

Performing the function test

	Action	Note
1	Start the robot system and turn the mode switch to manual mode.	
2	Press the three-position enabling device to the middle position and then hold the enabling device in this position.	This test is passed if the event message **10011 Motors ON state** appears in the event log. If the event message **37001 Motor on activation error** appears, the test is failed and the root cause of the failure must be found.
3	Release the three-position enabling device.	This test is passed if the event message **10012 safety guard stop state** appears in the event log. If the event message **90227 Motor contactor conflict** appears, the test is failed and the root cause of the failure must be found.

© Copyright 2007-2026 ABB. All rights reserved.

3.4.5 Function test of brake contactor K44

Performing the function test

	Action	Note
1	Start the robot system and turn the mode switch to manual mode.	
2	Press the three-position enabling device to the middle position and then hold the enabling device in this position. While having eye contact with the manipulator, move the joystick slightly in any direction to disengage the brakes.	This test is passed if the brakes is disengaged and the manipulator can be moved. If the event message **50056 Joint collision** appears in the event log, the test is failed and the root cause of the failure must be found.
3	Release the three-position enabling device to engage the brakes.	This test is passed if the event message **10012 safety guard stop state** appears in the event log. If the event message **37101 Brake failure** appears, the test is failed and the root cause of the failure must be found.

© Copyright 2007-2026 ABB. All rights reserved.

3.4.6 Function test of Automatic Stop

Performing the function test

	Action	Note
1	Start the robot system and change the operating mode to auto mode.	
2	Activate the Automatic Stop, for example by opening the connected robot cell door, which has interlock connection with Automatic Stop.	The test is passed if the event message **90205 Auto Stop open** appears in the event log. If the event message **90205 Auto Stop open** does not appear or if the event message **90225 Auto Stop conflict** appears in the event log, then the test has failed and the root cause of the failure must be found.

© Copyright 2007-2026 ABB. All rights reserved.

3.4.7 Function test of General Stop

Performing the function test

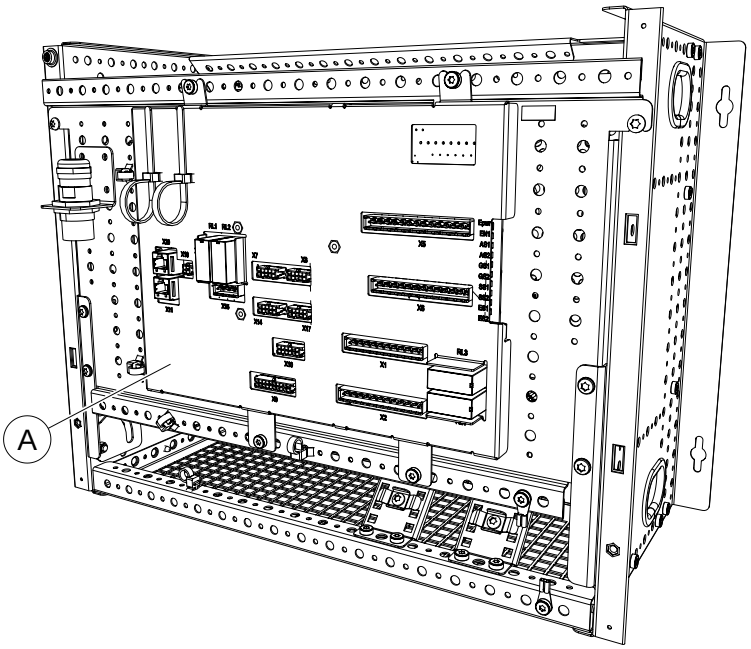
	Action	Note
1	Start the robot system.	
2	Activate the General Stop.	The test is passed if the event message **90206 General Stop open** appears in the event log. If either of the following happens, then the test is failed and the root cause must be found: • if the event message **90206 General Stop open** does not appear • if the event message **90226 General Stop conflict** appears

© Copyright 2007-2026 ABB. All rights reserved.

4.2 Replacement of panel board

Location

The panel board unit, DSQC 643, is located as shown in the illustration below.



xx1300001948

A	Panel board unit

Required equipment

Equipment	Note
Panel board unit	DSQC 643 See *Spare parts on page 255*.
Standard toolkit	The contents are defined in section Standard toolkit!
Other tools and procedures may be required. See references to these procedures in the step-by-step instructions below.	These procedures include references to the tools required.
Circuit diagram	See *Circuit diagrams on page 275*.

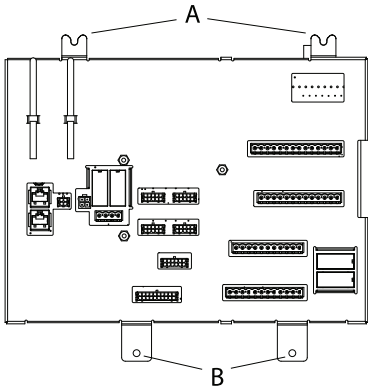
Removal

The procedure below details how to remove the panel board unit.

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 36*.	

Continues on next page

© Copyright 2007-2026 ABB. All rights reserved.

	Action	Note/Illustration
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 50*.	
3	Disconnect all connectors.	**Note** Make a note of any connections.
4	Remove the lower attachment screws, and remove the Panel Unit.	 xx0600003227 • A: fixed attachments • B: hole for attachment screw

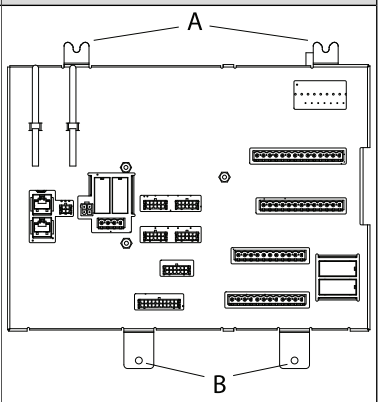
Refitting

The procedure below details how to refit the panel board unit.

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 36*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 50*.	
3	Refit the panel board unit.	

Continues on next page

© Copyright 2007-2026 ABB. All rights reserved.

	Action	Note/Illustration
4	Refit the lower attachment screws.	 xx0600003227 • A: fixed attachments • B: hole for attachment screw
5	Reconnect all connectors.	
6	Perform the function tests in section *Function tests on page 150* to verify that the safety features work properly.	

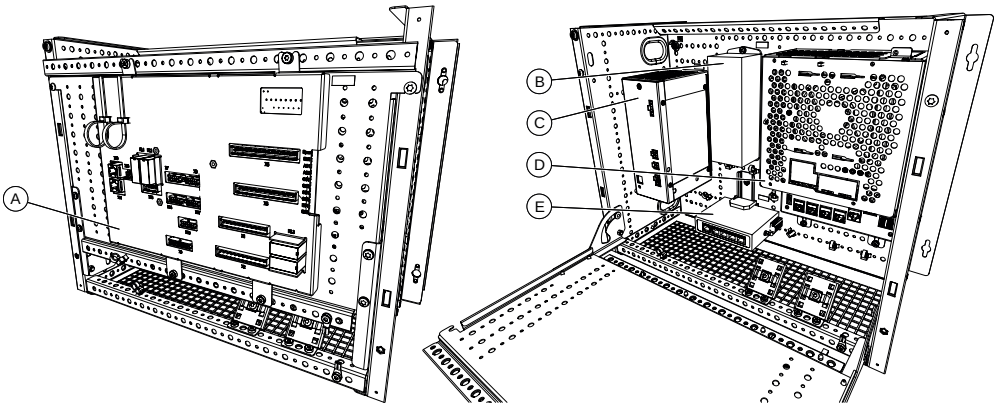
© Copyright 2007-2026 ABB. All rights reserved.

7 Spare parts

7.1 Controller parts

Control module parts

The illustration below shows the placement of the control module parts in the recommended spare part list.



xx1300001959

	Spare part no.	Description	Note
A	3HAC024488-001	Panel board unit	DSQC 643
B	3HAC025562-001	Backup energy bank	DSQC 655
C	3HAC12928-1	Control power supply	DSQC 604
D	See *Computer unit parts on page 259*.		
E	3HAC045976-001	DSQC1007 Eth. switch (MultiMove)	DSQC1007
	3HAC024244-001	Ethernet cable cross conn	
	3HAC021377-001	Bridge connector for panel board	
	3HAC024000-001	Bridge connector for panel board X1	
	3HAC024000-002	Bridge connector for panel board X2	
	3HAC024000-003	Bridge connector for panel board X6	
	3HAC024000-004	Bridge connector for panel board X5	
	3HAC082466-001	Ethernet switch (for IRC5 and PMC)	

Continues on next page

© Copyright 2007-2026 ABB. All rights reserved.