ABB Robotics

Operating manual
Trouble shooting, IRC5

Power and productivity
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1.3. Safety during trouble shooting

General

All normal service work; installation, maintenance and repair work, is usually performed with all electrical, pneumatic and hydraulic power switched off. All manipulator movements are usually prevented by mechanical stops etc.

Trouble shooting work differs from this. While trouble shooting, all or any power may be switched on, the manipulator movement may be controlled manually from the FlexPendant, by a locally running robot program or by a PLC to which the system may be connected.

Dangers during trouble shooting

This implies that special considerations **unconditionally** must be taken when trouble shooting:

- All electrical parts must be considered as *live*.
- The manipulator must at all times be expected to perform any movement.
- Since safety circuits may be disconnected or strapped to enable normally prohibited functions, the system must be expected to perform accordingly.

1.4. Applicable safety standards

Standards, EN ISO

The manipulator system is designed in accordance with the requirements of:

Standard	Description
EN ISO 12100 -1	Safety of machinery - Basic concepts, general principles for design - Part 1: Basic terminology, methodology
EN ISO 12100 -2	Safety of machinery - Basic concepts, general principles for design - Part 2: Technical principles
EN ISO 13849-1	Safety of machinery, safety related parts of control systems - Part 1: General principles for design
EN ISO 13850	Safety of machinery - Emergency stop - Principles for design
EN ISO 10218-1[1]	Robots for industrial environments - Safety requirements -Part 1 Robot
EN ISO 9787	Manipulating industrial robots, Coordinate systems and motion nomenclatures
EN ISO 9283	Manipulating industrial robots, Performance criteria and related test methods
EN ISO 14644-1[2]	Classification of air cleanliness
EN ISO 13732-1	Ergonomics of the thermal environment - Part 1
EN 61000-6-4 (option 129-1)	EMC, Generic emission
EN 61000-6-2	EMC, Generic immunity
EN IEC 60974-1[3]	Arc welding equipment - Part 1: Welding power sources
EN IEC 60974-10[3]	Arc welding equipment - Part 10: EMC requirements
EN 60204-1	Safety of machinery - Electrical equipment of machines - Part 1 General requirements
IEC 60529	Degrees of protection provided by enclosures (IP code)

1. There is a deviation from paragraph 6.2 in that only worst case stop distances and stop times are documented.

2. Only robots with Protection Clean Room.

3. Only valid for arc welding robots. Replaces EN 61000-6-4 for arc welding robots.

European standards

Standard	Description
EN 614-1	Safety of machinery - Ergonomic design principles - Part 1: Terminology and general principles
EN 574	Safety of machinery - Two-hand control devices - Functional aspects - Principles for design
EN 953	Safety of machinery - General requirements for the design and construction of fixed and movable guards

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Other standards

Standard	Description
ANSI/RIA R15.06	Safety Requirements for Industrial Robots and Robot Systems
ANSI/UL 1740 (option 429-1)	Safety Standard for Robots and Robotic Equipment
CAN/CSA Z 434-03 (option 429-1)	Industrial Robots and Robot Systems - General Safety Requirements

1.5.1. DANGER - Robot without axes' holding brakes are potentially lethal!

1.5 Safe Trouble Shooting

1.5.1. DANGER - Robot without axes' holding brakes are potentially lethal!

Description

Since the robot arm system is quite heavy, especially on larger robot models, it is dangerous if the holding brakes are disconnected, faulty, worn or in any way rendered non-operational.

For instance, a collapsing IRB 7600 arm system may kill or seriously injure a person standing beneath it.

Elimination

	Action	Info/illustration
1.	If you suspect that the holding brakes are non-operational, secure the robot arm system by some other means before working on it.	Weight specifications etc. may be found in the *Product manual* of each robot model.
2.	If you intentionally render the holding brakes non-operational by connecting an external voltage supply, the utmost care must be taken!  **DANGER!** **NEVER** stand inside the robot working area when disabling the holding brakes unless the arm system is supported by some other means!  **DANGER!** Under no circumstance stand beneath any of the robot's axes!	How to correctly connect an external voltage supply is detailed in the *Product manual* of each robot model.

1.5.3. WARNING - 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.

Elimination

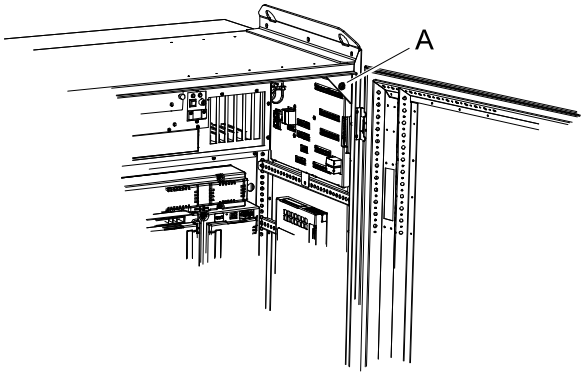
	Action	Note
1.	Use a wrist strap	Wrist straps must be tested frequently to ensure that they are not damaged and are operating correctly.
2.	Use an ESD protective floor mat.	The mat must be grounded through a current-limiting resistor.
3.	Use a dissipative table mat.	The mat should provide a controlled discharge of static voltages and must be grounded.

Location of wrist strap button

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

IRC5

The wrist strap button is located in the top right corner.



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A	Wrist strap button

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1.5.3. WARNING - The unit is sensitive to ESD!

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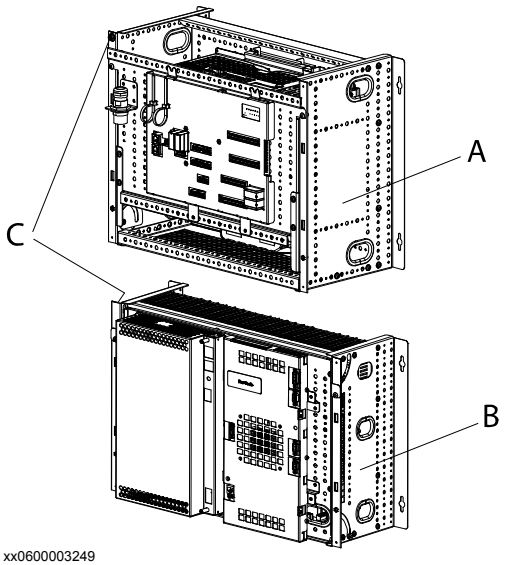
Panel Mounted Controller



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A	Panel Mounted Control Module
B	Panel Mounted Drive Module
C	Wrist strap button NOTE! When not used, the wrist strap must always be attached to the wrist strap button.

3 Troubleshooting by fault symptoms

3.1. Start-up failures

Introduction

This section describes possible faults during start-up and the recommended action for each failure.

Consequences

Problem starting the sytem.

Symptoms and causes

The following are the possible symptoms of a start-up failure:

- LEDs not lit on any unit.
- Earth fault protection trips.
- Unable to load the system software.
- FlexPendant not responding.
- FlexPendant starts, but does not respond to any input.
- Disk containing the system software does not start correctly.

Recommended actions

The following are the recommended actions to be taken during a start-up failure:

NOTE!

This may be due to a loss of power supply in many stages.

	Action	Info/illustration
1.	Make sure the main power supply to the system is present and is within the specified limits.	Your plant or cell documentation can provide this information.
2.	Make sure that the main transformer in the Drive module is correctly connected to the mains voltage levels at hand.	How to strap the mains transformer is detailed in the product manual for the controller.
3.	Make sure that the main switches are switched on.	
4.	Make sure that the power supply to the Control module and Drive module are within the specified limits.	If required, trouble shoot the power supply units as explained in section *Trouble shooting power supply on page 56*.
5.	If no LEDs lit, proceed to section *All LEDs are OFF at Controller on page 36*.	
6.	If the system is not responding, proceed to section *Controller not responding on page 33*.	
7.	If the FlexPendant is not responding, proceed to section *Problem starting the FlexPendant on page 40*.	

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3.1. Start-up failures

Continued

	Action	Info/illustration
8.	If the FlexPendant starts, but does not communicate with the controller, proceed to section *Problem connecting FlexPendant to the controller on page 41*.	

3.2. Controller not responding

Description

This section describes the possible faults and the recommended actions for each failure:

- Robot controller not responding
- LED indicators not lit

Consequences

System cannot be operated using the FlexPendant.

Possible causes

	Symptoms	Recommended action
1	Controller not connected to the mains power supply.	Ensure that the mains power supply is working and the voltage level matches that of the controller requirement.
2	Main transformer is malfunctioning or not connected correctly.	Ensure that the main transformer is connected correctly to the mains voltage level.
3	Main fuse (Q1) might have tripped.	Ensure that the mains fuse (Q1) inside the Drive Module is not tripped
4	Connection missing between the Control and Drive modules.	If the Drive Module does not start although the Control Module is working and the Drive Module main switch has been switched on, ensure that all the connections between the Drive module and the Control module are connected correctly.

3.3. Low Controller performance

Description

The controller performance is low, and seems to work irrationally.

The controller is *not* completely“ dead”. If it is, proceed as detailed in section *Controller not responding on page 33*.

Consequences

These symptoms can be observed:

- Program execution is sluggish, seemingly irrational and sometimes stalls.

Possible causes

The computer system is experiencing too high load, which may be due to one, or a combination, of the following:

- Programs containing too high a degree of logical instructions only, causing too fast program loops and in turn, overloads the processor.
- The I/O update interval is set to a low value, causing frequent updates and a high I/O load.
- Internal system cross connections and logical functions are used too frequently.
- An external PLC, or other supervisory computer, is addressing the system too frequently, overloading the system.

Recommended actions

	Action	Info/illustration
1.	Check whether the program contains logical instructions (or other instructions that take “no time” to execute), since such programs may cause the execution to loop if no conditions are fulfilled. To avoid such loops, you can test by adding one or more WAIT instructions. Use only short WAIT times, to avoid slowing the program down unnecessarily.	Suitable places to add WAIT instructions can be: • In the main routine, preferably close to the end. • In a WHILE/FOR/GOTO loop, preferably at the end, close to the ENDWHILE/ENDFOR etc. part of the instruction.
2.	Make sure the I/O update interval value for each I/O board is not too low. These values are changed using RobotStudio. I/O units that are not read regularly may be switched to “change of state” operation as detailed in the RobotStudio manual.	ABB recommends these poll rates: • DSQC 327A: 1000 • DSQC 328A: 1000 • DSQC 332A: 1000 • DSQC 377A: 20-40 • All others: >100
3.	Check whether there is a large amount of cross connections or I/O communication between PLC and robot system.	Heavy communication with PLCs or other external computers can cause heavy load in the robot system main computer.

	Action	Info/illustration
4.	Try to program the PLC in such a way that it uses event driven instructions, instead of looped instructions.	The robot system have a number of fixed system inputs and outputs that may be used for this purpose. Heavy communication with PLCs or other external computers can cause heavy load in the robot system main computer.

3.4. All LEDs are OFF at Controller

Description

No LEDs at all are lit on the Control Module or the Drive Module respectively.

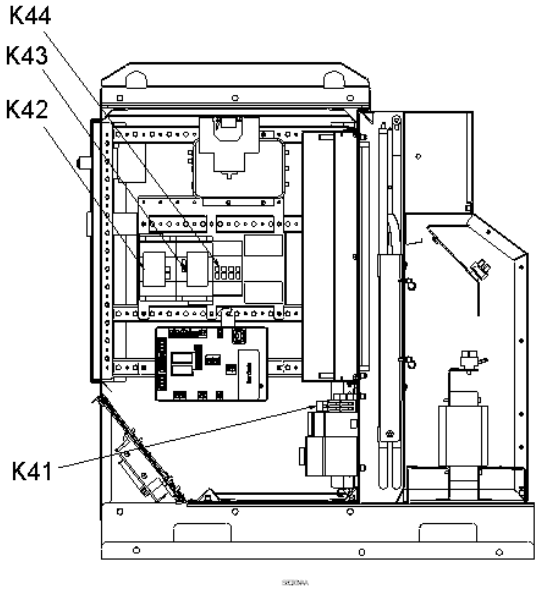
Consequences

The system cannot be operated or started at all.

Possible causes

The symptom can be caused by (the causes are listed in order of probability):

- The system is not supplied with power.
- The main transformer is not connected for the correct mains voltage.
- Circuit breaker F6 (if used) is malfunctioning or open for any other reason.
- Contactor K41 is malfunctioning or open for any other reason.



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Recommended actions

	Action	Info
1.	Make sure the main switch has been switched on.	
2.	Make sure the system is supplied with power.	Use a voltmeter to measure incoming mains voltage.
3.	Check the main transformer connection.	The voltages are marked on the terminals. Make sure they match the shop supply voltage.
4.	Make sure circuit breaker F6 (if used) is closed in position 3.	The circuit breaker F6 is shown in the circuit diagram in the product manual for the controller.
5.	Make sure contactor K41 opens and closes when ordered.	
6.	 - Disconnect connector X1 from the Drive Module power supply and measure the incoming voltage.	Measure between pins X1.1 and X1.5.
7.	If the power supply incoming voltage is correct (230 VAC) but the LEDs still do not work, replace the Drive Module power supply.	Replace the power supply as detailed in the product manual for the controller.

3.5. No voltage in service outlet

Description

Some Control Modules are equipped with service voltage outlet sockets, and this information applies to these modules only.

No voltage is available in the Control Module service outlet for powering external service equipment.

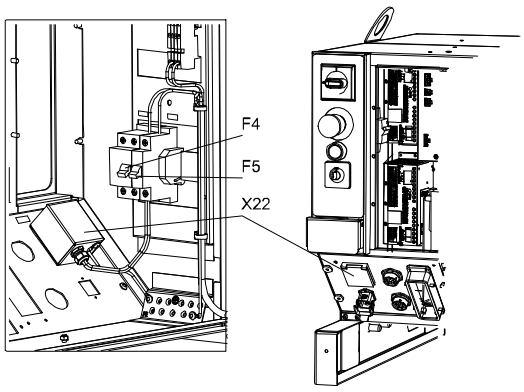
Consequences

Equipment connected to the Control Module service outlet does not work.

Probable causes

The symptom can be caused by (the causes are listed in order of probability):

- Tripped circuit breaker (F5)
- Tripped earth fault protection (F4)
- Mains power supply loss
- Transformers incorrectly connected



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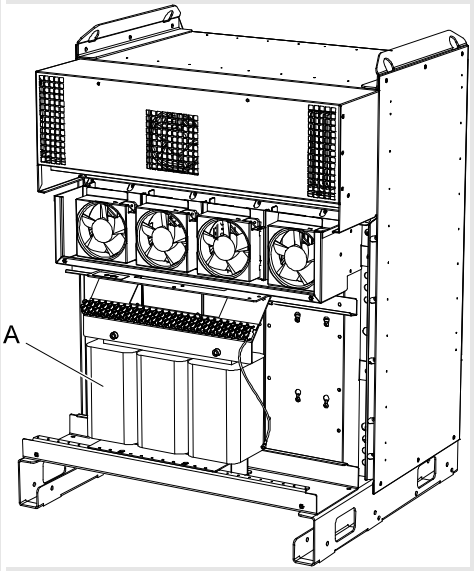
Recommended actions

	Action	Info
1.	Make sure the circuit breaker in the Control Module has not been tripped.	Make sure any equipment connected to the service outlet does not consume too much power, causing the circuit breaker to trip.
2.	Make sure the earth fault protection has not been tripped.	Make sure any equipment connected to the service outlet does not conduct current to ground, causing the earth fault protection to trip.
3.	Make sure the power supply to the robot system is within specifications.	Refer to the plant documentation for voltage values.
4.	Make sure the transformer (A) supplying the outlet is correctly connected, i.e. input and output voltages in accordance with specifications.	 xx0500002028 Refer to the plant documentation for voltage values.

3.6. Problem starting the FlexPendant

Description

The FlexPendant is completely or intermittently "dead".

No entries are possible, and no functions are available.

If the FlexPendant starts but does not display a screen image, proceed as detailed in section *Problem connecting FlexPendant to the controller on page 41*.

Consequences

The system cannot be operated using the FlexPendant.

Possible causes

The symptom can be caused by (the causes are listed in order of probability):

- The system has not been switched on.
- The FlexPendant is not connected to the controller.
- The cable from the controller is damaged.
- The cable connector is damaged.
- FlexPendant power supply from controller is faulty.

Recommended actions

The following actions are recommended (listed in order of probability):

	Action	Info
1.	Make sure the system is switched on and that the FlexPendant is connected to the controller.	How to connect the FlexPendant to the controller is detailed in *Operating manual - Getting started, IRC5 and RobotStudio*.
2.	Inspect the FlexPendant cable for any visible damage.	If faulty, replace the FlexPendant.
3.	If possible, test by connecting a different FlexPendant to eliminate the FlexPendant and cable as error sources.	
4.	If possible, test the FlexPendant with a different controller to eliminate the controller as error source.	

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3.7. Problem connecting FlexPendant to the controller

Description

The FlexPendant starts but does not display a screen image.

No entries are possible, and no functions are available.

The FlexPendant is not completely dead. If it is dead, proceed as detailed in section *Problem starting the FlexPendant on page 40*.

Consequences

The system cannot be operated using the FlexPendant.

Possible causes

The symptom can be caused by (the causes are listed in order of probability):

- The Ethernet network has problems.
- The main computer has problems.

Recommended actions

The following actions are recommended (listed in order of probability):

	Action	Info
1.	Check all cables from power supply unit to main computer, making sure these are correctly connected.	
2.	Make sure the FlexPendant has been correctly connected to the controller.	
3.	Check all indication LEDs on all units in the controller.	All indication LEDs and their significance are specified in section *Indications on page 65*.
4.	Check all status signals on the main computer.	

3.8. Erratic event messages on FlexPendant

Description

The event messages displayed on the FlexPendant are erratic and do not seem to correspond to any actual malfunctions on the robot. Several types of messages can be displayed, seemingly erroneously.

This type of fault may occur after major manipulator disassembly or overhaul, if not performed correctly.

Consequences

Major operational disturbances due to the constantly appearing messages.

Possible causes

The symptom can be caused by (the causes are listed in order of probability):

- Internal manipulator cabling not correctly performed. Causes may be: faulty connection of connectors, cable loops too tight causing the cabling to get strained during manipulator movements, cable insulation chafed or damaged by rubbing short-circuiting signals to earth.

Recommended actions

The following actions are recommended (listed in order of probability):

	Action	Info
1.	Inspect all internal manipulator cabling, especially all cabling disconnected, connected re-routed or bundled during recent repair work.	Refit any cabling as detailed in the product manual for the robot.
2.	Inspect all cable connectors to make sure these are correctly connected and tightened.	
3.	Inspect all cable insulation for damage.	Replace any faulty cabling as detailed in the product manual for the robot.

3.9. Problem jogging the robot

Description

The system can be started but the joystick on the FlexPendant does not work.

Consequences

The robot can not be jogged manually.

Possible causes

The symptom can be caused by (the causes are listed in order of probability):

- The joystick is malfunctioning.
- The joystick may be deflected.

Recommended actions

The following actions are recommended (listed in order of probability):

	Action	Info
1.	Make sure the controller is in manual mode.	How to change operating mode is described in *Operating manual - IRC5 with FlexPendant*.
2.	Make sure the FlexPendant is connected correctly to the Control Module.	
3.	Reset the FlexPendant.	Press Reset button located on the back of the FlexPendant.  **NOTE!** The Reset button resets the FlexPendant not the system on the Controller.

3.10. Reflashing firmware failure

Description

When reflashing firmware, the automatic process can fail.

Consequences

The automatic reflashing process is interrupted and the system stops.

Possible causes

This fault usually occurs due to a lack of compatibility between hardware and software.

Consequences

The following actions are recommended (listed in order of probability):

	Action	Info
1.	Check the event log for a message specifying which unit failed.	The logs may also be accessed from RobotStudio.
2.	Was the relevant unit recently replaced? If YES; make sure the versions of the old and new unit is identical. If NO; check the software versions.	
3.	Was the RobotWare recently replaced? If YES; make sure the versions of the old and new unit is identical. If NO; proceed below!	
4.	Check with your local ABB representative for a firmware version compatible with your hardware/software combination.	

3.11. Inconsistent path accuracy

Description

The path of the robot TCP is not consistent. It varies from time to time, and is sometimes accompanied by noise emerging from bearings, gearboxes, or other locations.

Consequences

Production is not possible.

Possible causes

The symptom can be caused by (the causes are listed in order of probability):

- Robot not calibrated correctly.
- Robot TCP not correctly defined.
- Parallel bar damaged (applies to robots fitted with parallel bars only).
- Mechanical joint between motor and gearbox damaged. This often causes noise to be emitted from the faulty motor.
- Bearings damaged or worn (especially if the path inconsistency is coupled with clicking or grinding noises from one or more bearings).
- The wrong robot type may be connected to the controller.
- The brakes may not be releasing correctly.

Recommended actions

In order to remedy the symptom, the following actions are recommended (the actions are listed in order of probability):

	Action	Info/Illustration
1.	Make sure the robot tool and work object are correctly defined.	How to define these are detailed in *Operating manual - IRC5 with FlexPendant*.
2.	Check the revolution counters' positions.	Update if required.
3.	If required, recalibrate the robot axes.	How to calibrate the robot is detailed in *Operating manual - IRC5 with FlexPendant*.
4.	Locate the faulty bearing by tracking the noise.	Replace faulty bearing as specified in the product manual for the robot.
5.	Locate the faulty motor by tracking the noise. Study the path of the robot TCP to establish which axis, and thus which motor, may be faulty.	Replace the faulty motor/gearbox as specified in the product manual for the robot.
6.	Check the trueness of the parallel bar (applies to robots fitted with parallel bars only).	Replace the faulty parallel bar as specified in the product manual for the robot.
7.	Make sure the correct robot type is connected as specified in the configuration files.	
8.	Make sure the robot brakes work properly.	Proceed as detailed in section *Problem releasing Robot brakes on page 50*.

3.12. Oil and grease stains on motors and gearboxes

Description

The area surrounding the motor or gearbox shows signs of oil leaks. This can be at the base, closest to the mating surface, or at the furthest end of the motor at the resolver.

Consequences

Besides the dirty appearance, in some cases there are no serious consequences if the leaked amount of oil is very small. **However**, in some cases the leaking oil lubricates the motor brake, causing the manipulator to collapse at power down.

Possible causes

The symptom can be caused by (the causes are listed in order of probability):

- Leaking seal between gearbox and motor.
- Gearbox overfilled with oil.
- Gearbox oil too hot.

Recommended actions

In order to remedy the symptom, the following actions are recommended (the actions are listed in order of probability):

	Action	Info
1.	**CAUTION!** Before approaching the potentially hot robot component, observe the safety information in section *CAUTION - Hot parts may cause burns! on page 21*.	
2.	Inspect all seals and gaskets between motor and gearbox. The different manipulator models use different types of seals.	Replace seals and gaskets as specified in the product manual for the robot.
3.	Check the gearbox oil level.	Correct oil level is specified in the product manual for the robot.
4.	Too hot gearbox oil may be caused by: • Oil quality or level used is incorrect. • The robot work cycle runs a specific axis too hard. Investigate whether it is possible to program small "cooling periods" into the application. • Overpressure created inside gearbox.	Check the recommended oil level and type as specified in the product manual for the robot. Manipulators performing certain, extremely heavy duty work cycles may be fitted with vented oil plugs. These are not fitted to normal duty manipulators, but may be purchased from your local ABB representative.

3.13. Mechanical noise

Description

During operation, no mechanical noise should be emitted from motors, gearboxes, bearings, or similar. A faulty bearing often emits scraping, grinding, or clicking noises shortly before failing.

Consequences

Failing bearings cause the path accuracy to become inconsistent, and in severe cases, the joint can seize completely.

Possible causes

The symptom can be caused by (the causes are listed in order of probability):

- Worn bearings.
- Contaminations have entered the bearing races.
- Loss of lubrication in bearings.

If the noise is emitted from a gearbox, the following can also apply:

- Overheating.

Recommended actions

The following actions are recommended (listed in order of probability):

	Action	Info
1.	**CAUTION!** Before approaching the potentially hot robot component, observe the safety information in section *CAUTION - Hot parts may cause burns! on page 21*.	
2.	Determine which bearing is emitting the noise.	
3.	Make sure the bearing has sufficient lubrication.	As specified in the product manual for the robot.
4.	If possible, disassemble the joint and measure the clearance.	As specified in the product manual for the robot.
5.	Bearings inside motors are not to be replaced individually, but the complete motor is replaced.	Replace faulty motors as specified in the product manual for the robot.
6.	Make sure the bearings are fitted correctly.	Also see the product manual for the robot for general instruction on how to handle bearings.

3.13. Mechanical noise

	Action	Info
7.	Too hot gearbox oil may be caused by: • Oil quality or level used is incorrect. • The robot work cycle runs a specific axis too hard. Investigate whether it is possible to program small "cooling periods" into the application. • Overpressure created inside gearbox.	Check the recommended oil level and type as specified in the product manual for the robot. Manipulators performing certain, extremely heavy duty work cycles may be fitted with vented oil plugs. These are not fitted to normal duty manipulators, but may be purchased from your local ABB representative.

6 Trouble shooting by Event log

10002, Program pointer has been reset

Description

The program pointer of task *arg* has been reset.

Consequences

When started, program execution will start on the first instruction of the task's entry routine. NOTE that the manipulator may move to unexpected position when restarted!

Probable causes

The operator has probably requested this action manually.

10009, Work memory full

Description

The task *arg* has no memory left for new RAPID instructions or data.

Recommended actions

Save the program and then restart the system.

10010, Motors OFF state

Description

The system is in the Motors OFF state. It enters this state either after switching from Manual mode to Automatic, or after the Motors ON circuit has been opened during program execution.

Consequences

No operation will be possible until after closing the Motors ON circuit. The manipulator's axes are meanwhile held in position by mechanical holding brakes.

10011, Motors ON state

Description

The system is in the Motors ON state.

Consequences

The Motors ON circuit has been closed., enabling power supply to the manipulator's motors. Normal operation may be resumed.

10012, Safety guard stop state

Description

The system is in the Guard stop state. It enters this state either after switching from Automatic mode to Manual, or after the Motors ON circuit has been opened by an Emergency Stop, General Stop, Automatic Stop or Superior Stop.

Consequences

No operation will be possible until after closing the Motors ON circuit. The manipulator's axes are meanwhile held in position by mechanical holding brakes.

Probable causes

Any safety device connected to the system's stop inputs have been opened. These are shown in the Circuit Diagram.

Recommended actions

1. Check which safety device caused the stop.
2. Close the device.
3. To resume operation, switch the system back to state Motors ON.

10013, Emergency stop state

Description

The system is in the Emergency stop state, since the Motors ON circuit has been opened by an Emergency Stop device.

Consequences

All program execution and thus robot actions are immediately halted. The robot axes are meanwhile held in position by mechanical holding brakes.

Probable causes

Any emergency stop device connected to the emergency stop input have been opened. These may be internal (on the controller or on the teach pendant) or external (devices connected by the system builder). The internal devices are shown in the Circuit Diagram.

Recommended actions

1) Check which emergency stop device caused the stop.

2) Close/reset the device.

3) To resume operation, switch the system back to state Motors ON by pressing this button on the Control Module.

10014, System failure state

Description

Execution of all NORMAL tasks has been stopped due to malfunction.

Consequences

No start of program execution or manual manipulator jogging will be possible until after the system has been restarted.

Probable causes

A large number of malfunctions may cause this condition. Please use the teach pendant or RobotStudio to check other event log messages for events occurring at this time!

Recommended actions

1. Determine what caused the stop by studying the event log.
2. Remedy the fault.
3. Restart the system as detailed in the Operator's Manual.

10015, Manual mode selected

Description

The system is in the Manual mode.

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Continued

Consequences

Programmed operation is possible, but only with a max. speed of 250 mm/s. The manipulator may also be jogged manually after pressing the enabling device on the teach pendant.

10016, Automatic mode requested

Description

The system has been ordered to go to the Automatic mode.

Consequences

The system will go to the Automatic mode after confirmed from teach pendant.

10017, Automatic mode confirmed

Description

The system is in the Automatic mode.

Consequences

The enabling device is disconnected. The robot can move without human intervention.

10018, Manual mode full speed requested

Description

The system has been ordered to go to the Manual mode without any speed restraints.

Consequences

The system will go to the Manual mode full speed.

10019, Manual mode full speed confirmed

Description

The system is in the Manual mode without any speed restraints.

Consequences

Programmed operation is possible while pressing the hold-to-run button on the teach pendant. The manipulator may also be jogged manually after pressing the enabling device on the teach pendant.

10020, Execution error state

Description

The program execution in task *arg* has been stopped due to a spontaneous error.

Consequences

No program execution will be possible until the error has been removed.

Probable causes

A large number of malfunctions may cause this condition. Please use the teach pendant or RobotStudio to check other event log messages for events occurring at this time!

Recommended actions

1. Determine what caused the stop by studying the event log.
2. Remedy the fault.
3. If neccesary, move Program Pointer to main before pressing start button.

10021, Execution error reset

Description

The program execution in task *arg* has left a spontaneous error state.

10024, Collision triggered

Description

Some mechanical part of the manipulator has collided with a piece of fixed equipment in the cell.

Consequences

Manipulator movement is interrupted and program execution is stopped.

10025, Collision confirmed

Description

The collision detection has been confirmed.

Recommended actions

10026, Collision retraction

Description

The manipulator has attempted to back away from the obstacle, into which it collided, and succeeded.

Consequences

The system is ready to go back to normal operation.

10027, Collision retraction fail

Description

The manipulator has attempted to back away from the obstacle, into which it collided, and failed.

Consequences

The system is NOT ready to go back to normal operation.

Probable causes

This may be caused by the robot being stuck to the object into which it collided.

Recommended actions

1) Go to Manual Mode.
2) Manually run the robot away from the object.
3) Resume operation by restarting the program.

Continues on next page

Continued

10030, All axes commutated

Description

After checking, the system has found all manipulator axes to be commutated.

Consequences

Normal operation is possible.

10031, All axes calibrated

Description

After checking, the system has found all manipulator axes to be calibrated.

Consequences

Normal operation is possible.

10032, All revolution counters updated

Description

After checking, the system has found all revolution counters for all manipulator axes to be updated.

Consequences

Normal operation is possible.

10033, All axes synchronized

Description

After checking, the system has found all manipulator axes to be synchronized.

Consequences

Normal operation is possible.

10034, Axis not commutated

Description

After checking, the system has found that one or more manipulator axes are not commutated.

Consequences

To enable operation, all manipulator axes must be commutated.

Probable causes

The manipulator drive motor and related units may have been altered, e.g. after replacing a faulty unit.

Recommended actions

Commutate the manipulator axes as detailed in the manipulator Product Manual.

10035, Axis not calibrated

Description

After checking, the system has found that one or more manipulator axes are not calibrated.

Consequences

To enable operation, all manipulator axes must be calibrated.

Probable causes

The manipulator drive motor and related units may have been altered, e.g. after replacing a faulty unit.

Recommended actions

Calibrate the manipulator axes as detailed in the manipulator Product Manual.

10036, Revolution counter not updated

Description

After checking, the system has found that the revolution counters of one or more manipulator axes are not updated.

Consequences

To enable operation, the revolution counters of all manipulator axes must be updated.

Probable causes

The manipulator drive motor and related units may have been altered, e.g. after replacing a faulty unit.

Recommended actions

Update the revolution counters of all manipulator axes as detailed in the manipulator Product Manual.

10037, Axis not synchronized

Description

After checking, the system has found that one or more manipulator axes are not synchronized.

Consequences

To enable operation, all manipulator axes must be synchronized.

Probable causes

The manipulator drive motor and related units may have been altered, e.g. after replacing a faulty unit.

Recommended actions

Synchronize the manipulator axes as detailed in the manipulator Product Manual.

10038, SMB memory is OK

Description

During startup, the system has found that all data on the Serial Measurement Board (SMB) is OK.

Continues on next page

Continued

Consequences

Operation is possible.

10039, SMB memory is not OK

Description

During startup, the system has found that data in the Serial Measurement Board (SMB) memory is not OK.

Consequences

All data must be OK before automatic operation is possible. Manually jogging the robot is possible.

Probable causes

There are differences between the data stored on the SMB and the data stored in the controller. This may be due to replacement of SMB, controller or both.

Recommended actions

1) Update the Serial Measurement Board data as detailed in Operator's Manual, IRC5.

10040, Program loaded

Description

A program or program module has been loaded into task *arg*. After loading, *arg* bytes memory remain. The size of the loaded program is *arg*.

10041, Program deleted

Description

A program or program module was deleted from task *arg*.

Consequences

If the deleted program contained the task entry routine, the program will no longer be executable.

Probable causes

The program may have been removed manually.

Recommended actions

1) Define an entry routine in one of the task's remaining programs, or:

2) Load a program containing an entry routine.

10042, Axis recalibrated

Description

Fine calibration or rev counter update was made for an axis in an already synchronized mechanical unit.

10043, Restart failed

Description

The task *arg* can't restart.

10044, Program Pointer updated

Description

The task *arg* could have changed the Program Pointer position.

Recommended actions

10045, System restarted

Description

An already installed system was restarted.

Recommended actions

10046, System restarted in cold mode

Description

First start after installation.

Recommended actions

10048, Background task did stop

Description

The task *arg* stopped without reason.

Recommended actions

10051, Event routine error

Description

The task *arg* could not start the specified system event routine *arg*. The routine is either unknown to the system or the program is unlinkable.

Recommended actions

Insert the routine in a system module or correct the program.

10052, Regain start

Description

A regain movement has started.

Recommended actions

10053, Regain ready

Description

The regain movement is ready.

Recommended actions

10054, Regain rejected

Description

Regain on path not possible, as one client has already ordered it.

Recommended actions

A new regain movement is ordered during an already started regain movement. Reduce the number of start orders from e.g system I/O

10055, Path process restarted

Description

The path process has been restarted.

Recommended actions

10060, Test of enable chain

Description

The enable chain is always tested at startup. If the test failed an error message concerning enable will follow.

Recommended actions

If enable chain test at startup failed the related error message will be "Enable chain timeout"

10061, A target has been modified

Description

A target in module *arg* in task *arg* has been modified or tuned.

Start line *arg*, column *arg*, end line *arg*.

10062, A module has been edited.

Description

Module *arg* in task *arg* has been edited between lines: *arg*, *arg*.

10063, Module has been edited

Description

Module *arg* in task *arg* has been edited.

10064, A module has been erased.

Description

Module *arg* in task *arg* has been erased.

10065, New user has started to modify RAPID.

Description

User *arg* has started with RAPID program modifications in task *arg*.

10066, Not possible to load system module

Description

System module *arg* in task *arg* cannot be loaded since the file is not found.

10067, Program Pointer Reset

Description

Unable to reset the program pointer for task *arg*.

Consequences

The program will not start.

Probable causes

- No program is loaded.
- The main routine is missing.
- There are errors in the program.

Recommended actions

1. Load program if no program is loaded.
2. Check that the program has a main routine. If there is no main routine, add one.
3. Check for errors in the program and correct them.
4. See previous error messages in the Event log.

10068, Start Program

Description

Unable to start program for task *arg*.

Consequences

The program will not execute.

10074, NFS server up

Description

The control system communicates correctly with the NFS server *arg*.

10075, NFS server down

Description

The control system is not able to communicate correctly with the NFS server *arg*.

Consequences

If the server *arg* is defined as TRUSTED, robot program execution will be stopped. If the server is defined as NON-TRUSTED, execution will proceed. These definitions are specified in the Application manual - Robot communication and I/O control.

Probable causes

If this message is displayed at first start-up, the server configuration may be incorrect. If displayed during operation, the previously working communication has been lost due to a broken connection. Also see the I/O event log!

Recommended actions

1. Check the NFS server configuration.
2. Check all communication hardware, cables and such.
3. Check NFS client configuration on the controller.

10076, FTP server up

Description

The control system communicates correctly with the FTP server *arg*.

10077, FTP server down

Description

The control system is not able to communicate correctly with the FTP server *arg*.

Consequences

If the server *arg* is defined as TRUSTED, robot program execution will be stopped. If the server is defined as NON-TRUSTED, execution will proceed. These definitions are specified in the Application manual - Robot communication and I/O control.

Probable causes

If this message is displayed at first start-up, the server configuration may be incorrect. If displayed during operation, the previously working communication has been lost due to a broken connection. Also see the I/O event log!

Recommended actions

1. Check the FTP server configuration.
2. Check all communication hardware, cables and such.
3. Check the FTP client configuration on the controller.

10080, An updated RAPID file is found

Description

The SEMISTATIC task *arg* has an older version of a module installed than the source *arg*

Recommended actions

Restart the system with a P-START to install the newer version.

10081, Background task *arg*

Description

failed to load a newer version of a module. The source of the module is *arg*.

Recommended actions

See previous messages for the cause or restart the system with a P-START to load the newer version.

10082, RAPID Task supervision

Description

Task *arg* is not running. The system will be set in SysFail state. It's now impossible to change to motors on *arg*.

Recommended actions

See previous messages for the cause. Restart the system to reset the error state.

10083, RAPID Task supervision

Description

Task *arg* is not running. The system will be set in motors off state. *arg*

Recommended actions

See previous messages for the cause.

10084, RAPID Task supervision

Description

Task *arg* is not running. All NORMAL tasks will also be stopped.

Recommended actions

See previous messages for the cause.

10085, RAPID Task supervision

Description

Task *arg* can't be stopped. The trustLevel is set to a safety level.

Recommended actions

If the task should be possible to stop change the trustLevel or task type in the system parameters menu.

10086, Robot is purged OK

Description

Purging pressure regained after a purge fault.

Recommended actions

10087, Purge state: *arg*.

Description

State changed.

Recommended actions

10090, P-Start done

Description

A P-Start is done.

Consequences

After restart the system's state will be resumed except for manually loaded programs and modules. Static and semistatic tasks are restarted from the beginning, not from the state they had when the system was stopped.

Modules will be installed and loaded in accordance with the set configuration. System parameters will not be affected.

Probable causes

1. The P-start was ordered by the user.
2. The system forced the P-start due to inconsistent data, malfunction or unrecoverable task state.

10091, Restart not possible

Description

A restart after collision detection is not possible before acknowledge the error dialogue.

Recommended actions

10092, (Re)start not possible

Description

(Re)start is not possible due to lost contact with IO module *arg* configured with trustlevel 3.

Recommended actions

10093, (Re)start not possible

Description

(Re)start of task *arg* is not possible before a warm start is done.

Recommended actions

The background task is configured with Trustlevel set to SysHalt

10095, At least one task is unchecked in the task selection panel

Description

One or more of the NORMAL tasks are unchecked in the task selection panel when performing a (re)start.

Recommended actions

10096, *arg* not active!

Description

The workobject *arg* contains a coordinated mechanical unit which is not activated.

Recommended actions

Activate the mechanical unit and perform the operation again.

10097, Restart not possible

Description

The task *arg* is set in blocked state and the program is for that reason not possible to restart from the current program position.

Recommended actions

The Program Pointer must be moved before restart.

10098, Restart not possible

Description

The task *arg* has been in system failure state and the program is for that reason not possible to restart from the current program position.

Recommended actions

The Program Pointer must be moved before restart.

10099, Program start rejected

Description

The system has performed a soft stop, and the program may not be restarted.

Consequences

The system goes to the Motors OFF state and can not be started. The full meaning of this status is described in the Trouble shooting manual, IRC5.

Probable causes

The soft stop may be caused by opening the safety circuit.

Recommended actions

1) Check the safety circuits for an open switch.

2) Go to Motors ON and restart the program.

10106, Service Message

Description

It's time for service for robot *arg* because it is *arg* days since the last service.

Recommended actions

10107, Service Message

Description

It remains *arg* days for robot *arg* until it's time for service.

Recommended actions

10108, Service Message

Description

It's time for service for robot *arg* cause it's *arg* hours of production since last service.

Recommended actions

10109, Service Message

Description

It remains *arg* hours of production for robot *arg* to next service.

Recommended actions

10110, Service Message

Description

The gearbox at *arg* of robot *arg* needs service.

Recommended actions

10111, Service Message

Description

The gearbox at *arg* of robot *arg* has reached *arg* of its service interval.

Recommended actions

10112, Service Message

Description

The system date and time has changed.

This could cause problems with the SIS calender notification.

Recommended actions

The SIS parameters Calender Limit and Calender Warning might need to be changed

10120, Program stopped

Description

The task *arg* has stopped. The reason is that an external or internal stop after current instruction has occurred.

Recommended actions

10121, Program stopped

Description

The task *arg* has stopped. The reason is that the task has reached an exit instruction.

Recommended actions

10122, Program stopped

Description

The task *arg* has stopped. The reason is that the task is ready.

Recommended actions

10123, Program stopped

Description

The task *arg* has stopped. The reason is that the task is ready with this step.

Recommended actions

10124, Program stopped

Description

The task *arg* has stopped. The reason is that the task has reached a break instruction.

Recommended actions

10125, Program stopped

Description

The task *arg* has stopped. The reason is that an external or internal stop has occurred.

Recommended actions

10126, Program stopped

Description

The task *arg* has stopped. The reason is that an error has occurred.

Recommended actions

10127, Backward execution not possible

Description

The task *arg* has stopped. The reason is that it is not possible to execute backward past beginning of instruction list.

Recommended actions

10128, Backward execution not possible

Description

The task *arg* has stopped. The reason is that it is not possible to execute backward past the instruction.

Recommended actions

10129, Program stopped

Description

The task *arg* has stopped. The reason is that the event routine for RESET or POWER_ON is ready.

Recommended actions

10130, Program stopped

Description

The task *arg* has stopped. The reason is that the task is ready with this move step.

Recommended actions

10131, Program stopped

Description

The task *arg* has stopped. The reason is that the routine called from system IO interrupt is ready.

Recommended actions

10132, Program stopped

Description

The task *arg* has stopped. The reason could not be determined.

Recommended actions

10133, Program stopped

Description

The task *arg* has stopped. The reason is that the task is ready with the execution of the UNDO handlers.

10150, Program started

Description

Execution of task *arg* has been started from the first instruction of the task's entry routine. The originator could not be determined.

Recommended actions

10151, Program started

Description

Execution of task *arg* has been started from the first instruction of the task's entry routine. The originator is an external client.

Recommended actions

10152, Program started

Description

Execution of task *arg* has been started from the first instruction of the task's entry routine. The start order was initiated by an action causing the UNDO handler to execute.

10155, Program restarted

Description

Execution of task *arg* has been restarted from where it was previously stopped. The originator could not be determined.

Recommended actions

10156, Program restarted

Description

Execution of task *arg* has been restarted from where it was previously stopped. The originator is an external client.

Recommended actions

10157, Program restarted

Description

Execution of task *arg* has been restarted from where it was previously stopped. The restart order was initiated by an action causing the UNDO handler to execute.

10170, Background task *arg*

Description

refuse to start. Task is empty.

Recommended actions

10171, Background task *arg*

Description

refuse to start. Wrong state.

Recommended actions

10172, Background task *arg*

Description

refuse to start. Can't set PP to the main routine.

Probable causes

The module that contains the main routine was not loaded since the module file is missing in the target directory.

The module that contains the main routine was not loaded since the configuration file has no entry for automatic loading of the module.

The main routine is missing.

The main entry is corrupted.

Recommended actions

Load the module by hand or perform an I-start when the cause of the problem is removed.

10173, Background task *arg*

Description

refuse to start. Can't set the execution mode.

Recommended actions

10174, Background task *arg*

Description

refuse to start. The start order failed.

Recommended actions

10175, Background task *arg*

Description

refuse to start due to a syntax error.

Recommended actions

10176, Background task *arg*

Description

refuse to start. Can't load module.

Probable causes

The module file is missing in the target directory.

Recommended actions

1. Copy the module file to the target directory.
2. Perform an I-start.

10177, Task refuses to start

Description

Task *arg*:

There is not sufficient program memory or the program memory is fragmented. Modules could be missing or data may not have been installed.

Recommended actions

1. Unload/reload modules and warmstart.
2. Split large data structures.
3. P-start the system.
4. Increase stack size for task.

10178, A static/semistatic task can't be stepped

Description

Task *arg* can't be started.

A static/semistatic task can only run in continuous mode.

Consequences

No tasks will be started.

Probable causes

Trying to step (forward or backward) a static/semistatic task.

Recommended actions

Start *arg* in continuous mode.

10185, Task could not be prepared for start

Description

Task *arg*:

There is not sufficient program memory or the program memory is fragmented. Modules could be missing or data may not have been installed.

Recommended actions

1. Unload/reload modules and warm start.
2. Split large data structures.
3. P-start the system.

10190, Protected area not done

Description

A power fail did occur in the middle of a protected area for the task *arg*. The system is trying to selfheal.

Recommended actions

10191, Protected area not done

Description

A power fail did occur in the middle of a protected area for the task *arg*. A pending error is removed from the queue.

Recommended actions

10192, Protected area not done

Description

A power fail did occur in the middle of a protected area for the task *arg*. A pending exit is removed from the queue.

Recommended actions

10193, Protected area not done

Description

A power fail did occur in the middle of a protected area for the task *arg*. This may result in an extra program cycle.

Recommended actions

10194, Protected area not done

Description

A power fail did occur in the middle of a protected area for the task *arg*. The task will be restarted from the main routine.

Recommended actions

10195, Protected area not done

Description

A power fail did occur in the middle of a protected area for the task *arg*. All tasks are reset and all user programs are lost.

Recommended actions

Try to save the user program and do a warm start of the system

10196, Protected area not done

Description

A power fail did occur in the middle of a protected area for the task *arg*.

Recommended actions

10210, Execution cancelled

Description

The restart will clear the execution in task *arg* of a POWER ON system event routine.

Recommended actions

10211, Execution cancelled

Description

The restart will clear the execution in task *arg* of a STOP system event routine.

Recommended actions

10212, Execution cancelled

Description

The restart will clear the execution in task *arg* of an EMERGENCY STOP system event routine.

Recommended actions

10213, Execution cancelled

Description

The restart will clear the execution in task *arg* of a START system event routine.

Recommended actions

10214, Execution cancelled

Description

The restart will clear the execution in task *arg* of a RESTART system event routine.

Recommended actions

10215, Execution cancelled

Description

The restart will clear the execution in task *arg* of a RESET system event routine.

Recommended actions

10216, Execution cancelled

Description

The restart will clear the execution in task *arg* of an INTERNAL system event routine.

Recommended actions

10217, Execution cancelled

Description

The restart will clear the execution in task *arg* of a USER routine.

Recommended actions

10218, Execution cancelled

Description

The restart will clear the execution in task *arg*.

Recommended actions

10219, Execution cancelled

Description

The restart will clear the execution in task *arg*of a STEP system event routine.

Recommended actions

10230, Backup step ready

Description

The backup step Prepare is ready.

Recommended actions

10231, Backup step ready

Description

The backup step Configuration is ready.

Recommended actions

10232, Backup step ready

Description

The backup of Task is ready.

Recommended actions

10250, Restore step ready

Description

The restore step Prepare is ready.

Recommended actions

10251, Restore step ready

Description

The restore step Configuration is ready.

Recommended actions

10252, Restore step ready

Description

The restore of Task is ready.

Recommended actions

10253, Restore step ready

Description

The restore of User Task is ready.

Recommended actions

10260, System diagnostics info generated

Description

System diagnostics information was successfully generated to file *arg*

10261, System diagnostics info unavailable

Description

User requested to save diagnostics system information to file *arg*. System was unable to fulfill this request.

Consequences

Diagnostics system information is normally used when reporting a problem with the system to ABB support.

Probable causes

The system is in such state that it is not possible to generate the requested information.

Please check that the device has enough space left.

Recommended actions

If you are experiencing a problem with the system contact ABB support.

10270, Cyclic Brake Check Done

Description

The Cyclic Brake Check has been done for all brakes supervised by Safety Controllers.

10300, A P-Start is ordered

Description

The P-Start has been ordered from the system.

Recommended actions

10301, A P-Start is ordered

Description

The P-Start has been ordered manually or automatically during a configuration.

Recommended actions

10304, An update has been ordered

Description

An update of program configuration is done.

Recommended actions

10350, Update of task failed

Description

The system could not update task *arg* to the new configuration.

Recommended actions

10351, A task is removed

Description

The task *arg* was removed because of configuration changes.

Recommended actions

10352, A task is added

Description

The task *arg* was installed because of configuration changes.

Recommended actions

10353, A task is reinstalled

Description

The task *arg* was reinstalled because of configuration changes.