ABB Robotics

# Operating manual
# Trouble shooting, IRC5

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# Operating manual - Trouble shooting, IRC5

## Robot Controller

## IRC5

M2004

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ABB AB
Robotics Products
SE-721 68 Västerås
Sweden

# Overview of this manual

## About this manual

This manual contains information, procedures and descriptions, for trouble shooting IRC5 based robot systems.

## Usage

This manual should be used whenever robot operation is interrupted by malfunction, regardless of whether an error event log message is created or not.

## Who should read this manual?

This manual is intended for the following personnel:

- Machine and robot operators qualified to perform very basic trouble shooting and reporting to service personnel.
- Programmers qualified to write and change RAPID programs.
- Specialized trouble shooting personnel, usually very experienced service personnel, qualified for methodically isolating, analyzing and correcting malfunctions within the robot system.

## Prerequisites

The reader should:

- Have extensive experience in trouble shooting industrial electro-mechanical machinery.
- Have in depth knowledge of the robot system function.
- Be familiar with the actual robot installation at hand, its surrounding equipment and peripherals.

## References

| Reference: | Document ID: |
|---|---|
| Product manual - IRC5 | 3HAC021313-001 |
| Emergency safety information | 3HAC027098-001 |
| General safety information | 3HAC031045-001 |
| Operating manual - IRC5 with FlexPendant | 3HAC16590-1 |
| Operating manual - RobotStudio | 3HAC032104-001 |
| Operating manual - Getting started, IRC5 and RobotStudio | 3HAC027097-001 |
| Technical reference manual - System parameters | 3HAC17076-1 |
| Application manual - MultiMove | 3HAC021272-001 |



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## Revisions

| Revision | Description |
|---|---|
| - | First edition. |
| A | Information has been added.<br>The document has been partly restructured. |
| B | Information on how to submit error report has been changed.<br>Information on RAPID change logs have been added.<br>Event log messages have been added. |
| C | Updated Event log messages. |
| D | Updated Event log messages. |
| E | Updated Event log messages. |
| F | Minor corrections. Updated Event log messages. |
| G | Minor corrections. Updated Event log messages. |
| H | New information in section Serial Measurement Unit regarding the battery pack.<br>More detailed information about trouble shooting power supplies DSQC 604, 661 and 662.<br>Removed safety I/O signals: DRV1PANCH1, DRV1PANCH2, DRV1SPEED.<br>New drive system introduced. Drive System 04 and Drive System 09 are both described. |
| J | Released with RobotWare 5.13<br>The chapter *Safety* updated with:<br>• Updated safety signal graphics for the levels Danger and Warning, see *Safety signals in the manual on page 7*.<br>• New safety labels on the manipulators, see *Safety symbols on the manipulator labels on page 9*.<br>• Updated the graphic in the section *DANGER - Live voltage inside Drive Module! on page 17*.<br>The contents in the following sections were updated:<br>• Corrections regarding drive system information in chapter *Descriptions and background information on page 65*<br>• Restructured the chapters as per the new document startergy.<br>• Updated the graphic in the *Recommended actions* of the section *No voltage in service outlet on page 38*.<br>• Updated the *Possible causes* in the section *Problem starting the FlexPendant on page 40*.<br>• Updated the graphics in the section *LEDs in the Control Module on page 65*.<br>• Updated the graphic in *Possible causes* of the section *Problem releasing Robot brakes on page 50*. |
| K | Updated Event log messages. |

# 1 Safety

## 1.1. Safety signals in the manual

### Introduction to safety signals

This section specifies all dangers that can arise when doing the work described in this manual. Each danger consists of:

- A caption specifying the danger level (DANGER, WARNING, or CAUTION) and the type of danger.
- A brief description of what will happen if the operator/service personnel **do not** eliminate the danger.
- An instruction on how to eliminate the danger to simplify doing the work.

### Danger levels

The table below defines the captions specifying the danger levels used throughout this manual.

| Symbol | Designation | Significance |
|---|---|---|
|  danger | DANGER | Warns that an accident *will* occur if the instructions are not followed, resulting in a serious or fatal injury and/or severe damage to the product. It applies to warnings that apply to danger with, for example, contact with high voltage electrical units, explosion or fire risk, risk of poisonous gases, risk of crushing, impact, fall from height, etc. |
|  warning | WARNING | Warns that an accident *may* occur if the instructions are not followed that can lead to serious injury, possibly fatal, and/or great damage to the product. It applies to warnings that apply to danger with, for example, contact with high voltage electrical units, explosion or fire risk, risk of poisonous gases, risk of crushing, impact, fall from height, etc. |
|  Electrical shock | ELECTRICAL SHOCK | Warns for electrical hazards which could result in severe personal injury or death. |
|  caution | CAUTION | Warns that an accident may occur if the instructions are not followed that can result in injury and/or damage to the product. It also applies to warnings of risks that include burns, eye injury, skin injury, hearing damage, crushing or slipping, tripping, impact, fall from height, etc. Furthermore, it applies to warnings that include function requirements when fitting and removing equipment where there is a risk of damaging the product or causing a breakdown. |



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1.1. Safety signals in the manual

*Continued*

| Symbol | Designation | Significance |
|---|---|---|
|  Electrostatic discharge (ESD) | ELECTROSTATIC DISCHARGE (ESD) | Warns for electrostatic hazards which could result in severe damage to the product. |
|  Note | NOTE | Describes important facts and conditions. |
|  Tip | TIP | Describes where to find additional information or how to do an operation in an easier way. |

## 1.2. Safety symbols on the manipulator labels

### Introduction to labels

This section describes safety symbols used on labels (stickers) on the manipulator.

Symbol are used in combinations on the labels, describing each specific warning. The descriptions in this section are generic, the labels can contain additional information such as values.

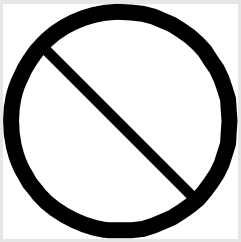
### Types of labels

Both the manipulator and the controller are marked with several safety and information labels, containing important information about the product. The information is useful for all personnel handling the manipulator system, for example during installation, service, or operation.

The safety labels are language independent, they only use graphics. See *Symbols on safety labels on page 9*.

The information labels can contain information in text (English, German, and French).

### Symbols on safety labels

| Symbol | Description |
|---|---|
|  xx0900000812 | **Warning!** Warns that an accident *may* occur if the instructions are not followed that can lead to serious injury, possibly fatal, and/or great damage to the product. It applies to warnings that apply to danger with, for example, contact with high voltage electrical units, explosion or fire risk, risk of poisonous gases, risk of crushing, impact, fall from height, etc. |
|  xx0900000811 | **Caution!** Warns that an accident may occur if the instructions are not followed that can result in injury and/or damage to the product. It also applies to warnings of risks that include burns, eye injury, skin injury, hearing damage, crushing or slipping, tripping, impact, fall from height, etc. Furthermore, it applies to warnings that include function requirements when fitting and removing equipment where there is a risk of damaging the product or causing a breakdown. |
|  xx0900000839 | **Prohibition** Used in combinations with other symbols. |



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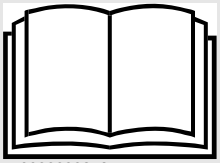
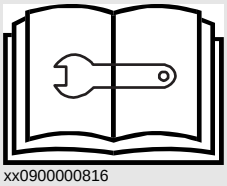
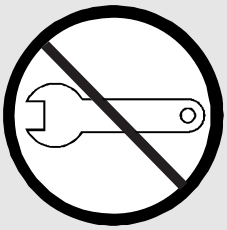
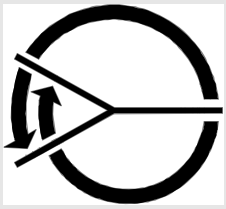
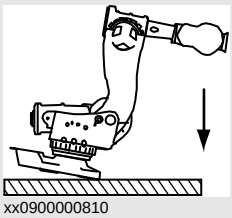
1.2. Safety symbols on the manipulator labels

*Continued*

| Symbol | Description |
|---|---|
|  xx0900000813 | **Product manual** Read the product manual for details. |
|  xx0900000816 | **Before dismantling see product manual** |
|  xx0900000815 | **Do not dismantle** Dismantling this part can cause injury. |
|  xx0900000814 | **Extended rotation** This axis has extended rotation (working area) compared to standard. |
|  xx0900000808 | **Brake release** Pressing this button will release the brakes. This means that the manipulator arm can fall down. |
|  xx0900000810 | **Tip risk when loosening bolts** The manipulator can tip over if the bolts are not securely fastened. |
|  xx0900000817 | **Crush** Risk for crush injuries. |

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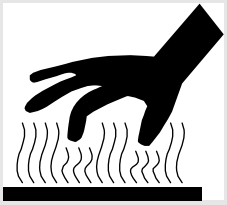
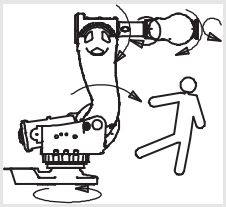
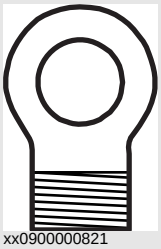
| Symbol | Description |
|---|---|
|  xx0900000818 | **Heat** Risk of heat that can cause burns. |
|  xx0900000819 | **Moving robot** The robot can move unexpectedly. |
|  xx0900000820 | **Brake release buttons** |
|  xx0900000821 | **Lifting bolt** |
|  xx0900000822 | **Lifting of robot** |
|  xx0900000823 | **Oil** Can be used in combination with prohibition if oil is not allowed. |

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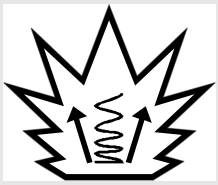
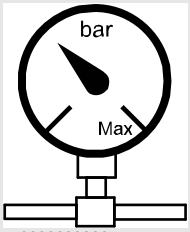
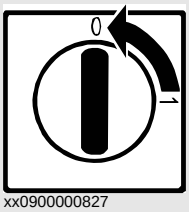
1.2. Safety symbols on the manipulator labels

*Continued*

| Symbol | Description |
|---|---|
|  xx0900000824 | **Mechanical stop** |
|  xx0900000825 | **Stored energy**<br>Warns that this part contains stored energy.<br>Used in combination with *Do not dismantle* symbol. |
|   xx0900000826 | **Pressure**<br>Warns that this part is pressurized. Usually contains additional text with the pressure level. |
|   xx0900000827 | **Shut off with handle**<br>Use the power switch on the controller. |

## 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 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.

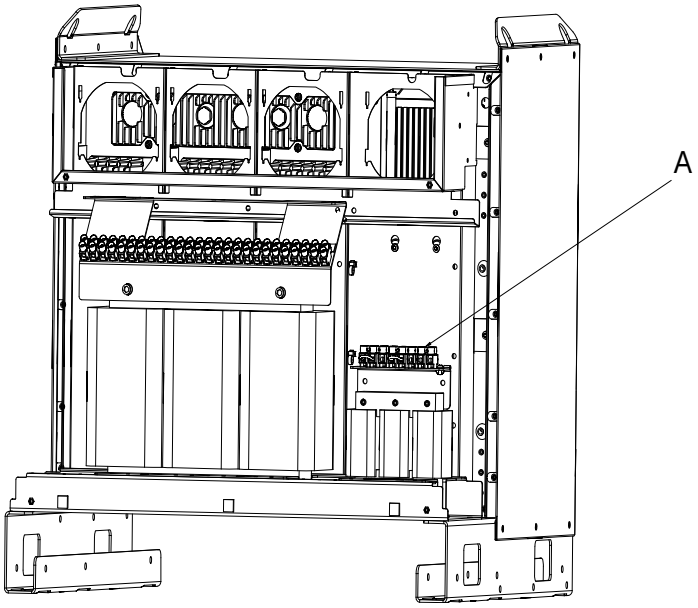
**Elimination**

| | 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!<br>  <br>**DANGER!**<br>**NEVER** stand inside the robot working area when disabling the holding brakes unless the arm system is supported by some other means!<br>  <br>**DANGER!**<br>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. |

## 1.5.2. DANGER - Live voltage inside Drive Module!

### Description

The Drive Module has live voltage potentially accessible directly behind the rear covers and inside the front cover, even when the main switches have been switched off.

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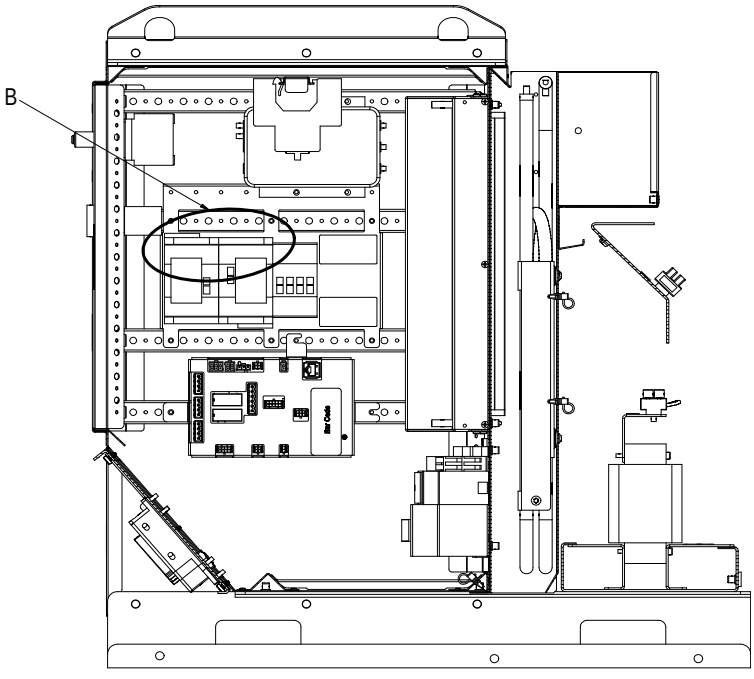


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| | |
|---|---|
| A | Live voltage at transformer terminals **even if the main power switches have been switched off**. |
| B | Live voltage at Motors ON terminals **even if the main power switches have been switched off**. |

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1.5.2. DANGER - Live voltage inside Drive Module!

*Continued*

**Elimination**

Read this information before opening the rear cover of either module.

| Step | Action |
|---|---|
| 1. | Make sure the incoming mains power supply has been switched off. |
| 2. | Use a voltmeter to verify that there is not voltage between any of the terminals. |
| 3. | Proceed with the service work. |

## 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

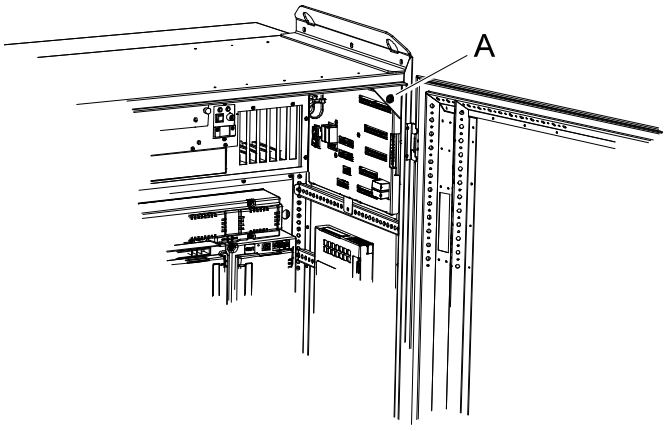
| | Action | Note |
|---|---|---|
| 1. | Use a wrist strap | Wrist straps must be tested frequently to ensure that they are not damaged and are operating correctly. |
| 2. | Use an ESD protective floor mat. | The mat must be grounded through a current-limiting resistor. |
| 3. | Use a dissipative table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




xx0500002171

| | |
|---|---|
| A | Wrist strap button |



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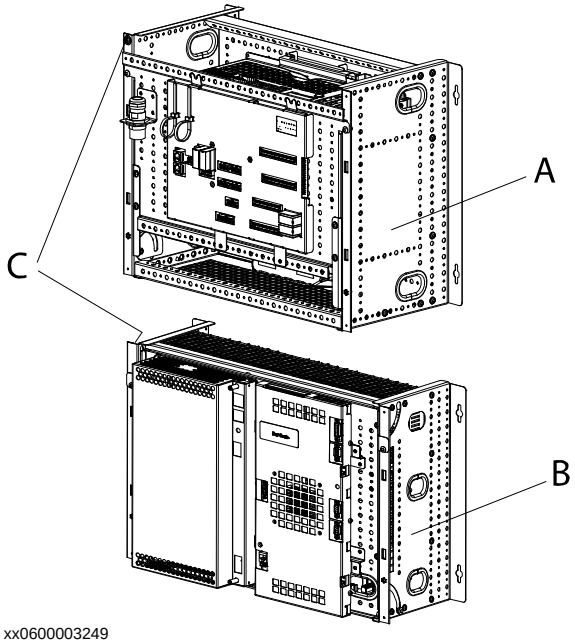
1.5.3. WARNING - The unit is sensitive to ESD!

*Continued*

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. |

## 1.5.4. CAUTION - Hot parts may cause burns!

### Description

During normal operation, many manipulator parts become hot, especially the drive motors and gears. Sometimes areas around these parts also become hot. Touching these may cause burns of various severity.

Because of a higher environment temperature, more surfaces on the manipulator get hot and may result in burns.

**NOTE!**

The drive parts in the cabinet can be hot.

### Elimination

The instructions below detail how to avoid the dangers specified above:

| | Action | Info |
|---|---|---|
| 1. | Always use your hand, at some distance, to feel if heat is radiating from the potentially hot component before actually touching it. | |
| 2. | Wait until the potentially hot component has cooled if it is to be removed or handled in any other way. | |
| 3. | The Bleeder can be hot upto 80 degrees. | |

1.5.4. CAUTION - Hot parts may cause burns!

# 2 Trouble shooting Overview

## 2.1. Documentation and references

### General

A great deal of effort was put into writing the event log messages as well as the technical documentation. Though imperfect, they may give vital clues. They are also constantly being upgraded.

The product documentation is available in several languages.

### Read the documentation!

Do not wait until nothing else works to read the manual!

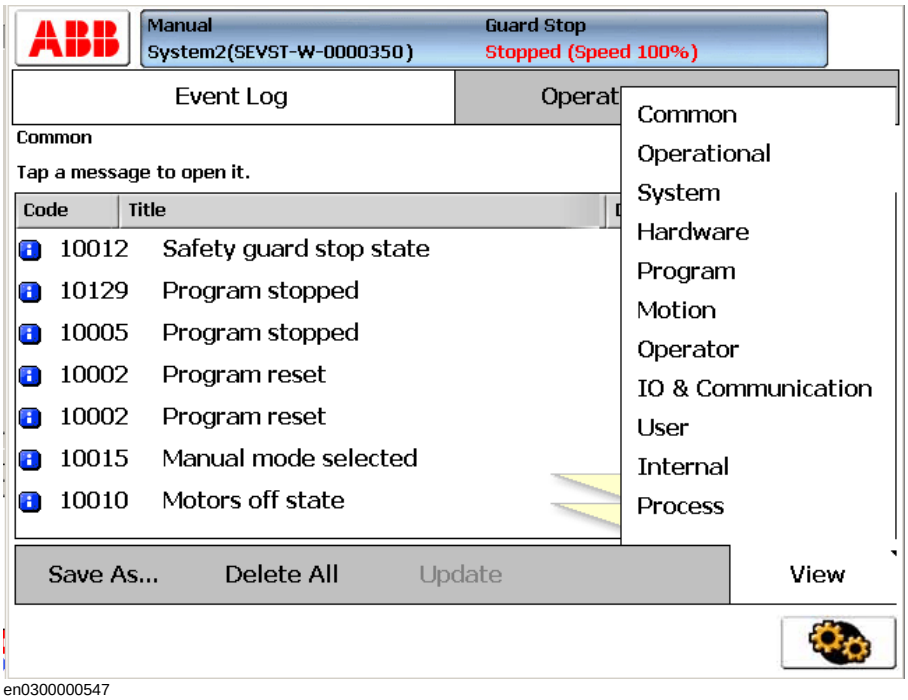
References to document numbers are specified in the chapter *Reference information* in *Product manual - IRC5*.

### Read the circuit diagram!

The complete electrical circuitry of the controller is documented in *Product manual - IRC5*. It contains a lot of information useful, or even essential, to a trained trouble shooter.

### Read the logs!

The error event logs which may be viewed on either the FlexPendant or RobotStudio, contain lots of information about any malfunction detected by the system.



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### Check the electronical unit's LEDs!

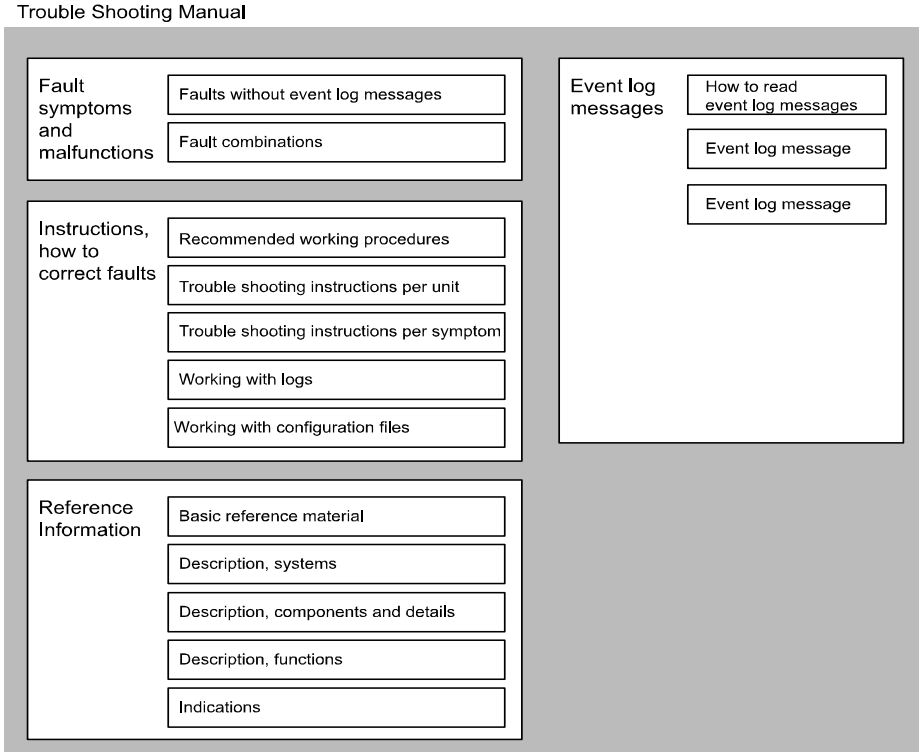
If a fault is thought to be caused by an electronic unit (circuit board in the controller or other), the LEDs on the unit front may give leads.

These are described in section *Indications on page 65*.

## 2.2. Overview

### How to use this manual when trouble shooting

The illustration and description detail how to put the information in this manual to best use during trouble shooting the robot system.

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Trouble shooting manual

Fault symptoms and malfunctions:

- Each fault or error is first detected as a symptom, for which an error event log message may or may not be created. It could be an error event log message on the FlexPendant, an observation that the gearbox on axis 6 is getting hot or that the controller can not be started. The faults displaying an event log message are listed in the end of this manual.

Instructions, how to correct faults:

- The instructions are divided into two main categories: descriptions of how to correctly handle the different parts of the system and instructions of how to remedy faults causing the symptoms specified above. The latter category is divided into two sub-

categories, depending on whether to trouble shoot a specific symptom or a suspected unit causing the problem. The first category contains information on how to use the event log to facilitate trouble shooting, etc.

Recommended working procedures:

- Here, you will find a procedure for how to correctly perform certain specific tasks. These may be used to make sure the seemingly irrational behavior of the system is not due to incorrect handling.

Basic reference info:

- This section contains information about what tools to use, references to documents that may be useful when trouble shooting, etc.

Description, systems:

- The different systems and sub-systems are described to give a better understanding of its function when it works “as it’s supposed to”. This enables the trouble shooter to better see and understand the differences between a system that’s functional and one that’s not.

Description, components and details:

- Specific details of the system are described with regards to their function, etc.

Description, functions:

- Contains descriptions on how specific functions within the system work, e.g the RUN chain, and what signals and other systems affect that particular function. This provides for a better understanding of the relations and mechanisms of the robot system.

Indications

- All indication LEDs and other indications (as found on the Control and Drive Modules as well as separate circuit boards, etc) are described in this section along with information about their indication modes and significances respectively. Recommended actions are often specified or references containing such instructions.

Event log messages:

- This section is basically a printout of all available event log messages. These may be displayed either on the FlexPendant or using RobotStudio. Having access to all messages at the same time may be useful during trouble shooting.

### Additional information

In addition to the information given in this document, other documents may provide vital information, e.g. the Circuit Diagram.

Such useful documents are listed in *Overview of this manual on page 5*.



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## 2.3. Standard toolkit

### General

Listed are tools required to perform the actual trouble shooting work. All tools required to perform any corrective measure, such as replacing parts, are listed in their Product Manual section respectively.

### Contents, standard toolkit, IRC5

| Tool | Remark |
|---|---|
| Screw driver, Torx | Tx10 |
| Screw driver, Torx | Tx25 |
| Ball tipped screw driver, Torx | Tx25 |
| Screw driver, flat blade | 4 mm |
| Screw driver, flat blade | 8 mm |
| Screw driver, flat blade | 12 mm |
| Screw driver | Phillips-1 |
| Box spanner | 8 mm |

### Contents, standard toolkit, trouble shooting

| Qty | Art. no. | Tool | Rem. |
|---|---|---|---|
| - | - | Normal shop tools | Contents as specified above. |
| 1 | - | Multimeter | - |
| 1 | - | Oscilloscope | - |
| 1 | - | Recorder | - |

## 2.4 Tips and Tricks while trouble shooting

### 2.4.1. Trouble shooting strategies

**Isolate the fault!**

Any fault may give rise to a number of symptoms, for which error event log messages may or may not be created. In order to effectively eliminate the fault, it is vital to distinguish the original symptom from the consequential ones.

A help in isolating the fault may be creating a historical fault log as specified in section *Make a historical fault log! on page 29*.

**Split the fault chain in two!**

When trouble shooting any system, a good practice is to split the fault chain in two. This means:

- identify the complete chain.
- decide and measure the expected value at the middle of the chain.
- use this to determine in which half the fault is caused.
- split this half into two new halves, etc.
- finally, a single component may be isolated. The faulty one.

Example

A specific IRB 7600 installation has a 12 VDC power supply to a tool at the manipulator wrist. This tool does not work, and when checked, there is no 12 VDC supply to it.

- Check at the manipulator base to see if there is 12 VDC supply. Measurement show there are *no* 12 VDC supply. (Reference: Circuit Diagram in the *Product manual, IRC5*)
- Check any connector between the manipulator and the power supply in the controller. Measurement show there are *no* 12 VDC supply. (Reference: Circuit Diagram in the *Product manual, IRC5*)
- Check the power supply unit LED. (Reference: *Indications on page 65*)

**Check communication parameters and cables!**

The most common causes of errors in serial communication are:

- Faulty cables (e.g. send and receive signals are mixed up)
- Transfer rates (baud rates)
- Data widths that are incorrectly set.

**Check the software versions!**

Make sure the RobotWare and other software run by the system are the correct version. Certain versions are not compatible with certain hardware combinations.

Also, make a note of all software versions run, since this will be useful information to the ABB support people.

How to file a complete error report to your local ABB service personnel is detailed in section *Filing an error report on page 30*.

## 2.4.2. Work systematically

**Do not replace units randomly!**

Before replacing *any part at all*, it is important to establish a probable cause for the fault, thus determining which unit to replace.

Randomly replacing units may sometimes solve the acute problem, but also leaves the trouble shooter with a number of units that may/may not be perfectly functional.

**Replace one thing at a time!**

When replacing a presumably faulty unit that has been isolated, it is important that **only one** unit be replaced at a time.

Always replace components as detailed in the Repairs section of the Product manual of the robot or controller at hand.

Test the system after replacing to see if the problem has been solved.

If replacing several units at once:

- it is impossible to determine which of the units was causing the fault.
- it greatly complicates ordering a new spare part.
- it may introduce new faults to the system.

**Take a look around!**

Often, the cause may be evident once you see it. In the area of the unit acting erroneously, be sure to check:

- Are the attachment screws secured?
- Are all connectors secured?
- Are all cabling free from damage?
- Are the units clean (especially for electronic units)?
- Is the correct unit fitted?

**Check for tools left behind!**

Some repair and maintenance work require using special tools to be fitted to the robot equipment. If these are left behind (e.g. balancing cylinder locking device or signal cable to a computer unit used for measuring purposes), they may cause erratic robot behavior.

Make sure all such tools are removed when maintenance work is complete!

## 2.4.3. Keeping track of history

**Make a historical fault log!**

In some cases, a particular installation may give rise to faults not encountered in others. Therefore, charting each installation may give tremendous assistance to the trouble shooter.

To facilitate trouble shooting, a log of the circumstances surrounding the fault gives the following advantages:

- it enables the trouble shooter to see patterns in causes and consequences not apparent at each individual fault occurrance.
- it may point out a specific event always taking place just before the fault, for example a certain part of the work cycle being run.

**Check up the history!**

Make sure you always consult the historical log if it is used. Also remember to consult the operator, or similar, who was working when the problem first occurred.

**At what stage did the fault occur?**

What to look for during trouble shooting depends greatly of when the fault occurred: was the robot just freshly installed? Was it recently repaired?

The table gives specific hints to what to look for in specific situations:

| If the system has just: | then: |
|---|---|
| been installed | Check:<br>• the configuration files<br>• connections<br>• options and their configuration |
| been repaired | Check:<br>• all connections to the replaced part<br>• power supplies<br>• that the correct part has been fitted |
| had a software upgrade | Check:<br>• software versions<br>• compatibilities between hardware and software<br>• options and their configuration |
| been moved from one site to another (an already working robot) | Check:<br>• connections<br>• software versions |

## 2.5. Filing an error report

### Introduction

If you require the assistance of ABB support personnel in trouble shooting your system, you may file a formal error report as detailed below.

In order for the ABB support personnel to better solve your problem, you may attach a special diagnostics file that the system generates on demand.

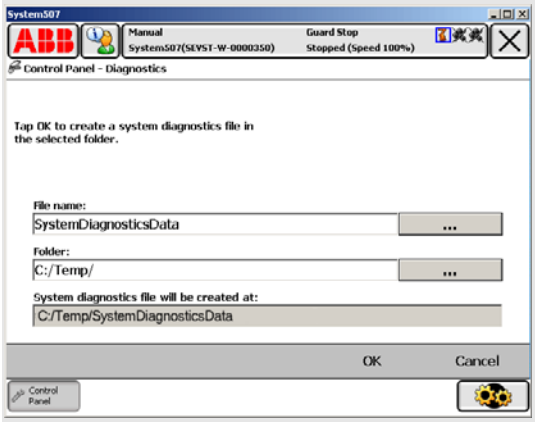
The diagnostics file includes:

- **Event log** A list of all system events.
- **Backup** A backup of the system taken for diagnostics purposes.
- **System information** Internal system information useful to ABB support personnel.

NOTE that it is not required to create or attach any additional files to the error report if not explicitely requested by the support personnel!

### Creating the diagnostics file

The diagnostics file is created manually as detailed below.

| | Action |
|---|---|
| 1. | Tap **ABB**, then **Control Panel** and then **Diagnostics**.<br>A display is shown:<br>  <br><br>en0500002175 |
| 2. | Specify the name you want for the diagnostics file, the save folder of it and tap **OK**. The default save folder is C:/Temp, but any folder may be selected, for instance an externally connected USB memory.<br>This may take a couple of minutes, while “Creating file. Please wait!” is displayed. |
| 3. | To shorten file transfer time, you may compress the data into a zip-file. |
| 4. | Write a regular e-mail addressed to your local ABB support personnel, and make sure to include the following information:<br>• Robot serial number<br>• RobotWare version<br>• External options<br>• A written fault description. The more detailed, the easier for the ABB support personnel to assist you.<br>• if available, enclose the license key.<br>• attach the diagnostics file! |
| 5. | Mail it! |

# 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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| | 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.<br>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:<br>• In the main routine, preferably close to the end.<br>• 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.<br>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:<br>• DSQC 327A: 1000<br>• DSQC 328A: 1000<br>• DSQC 332A: 1000<br>• DSQC 377A: 20-40<br>• 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.<br>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.

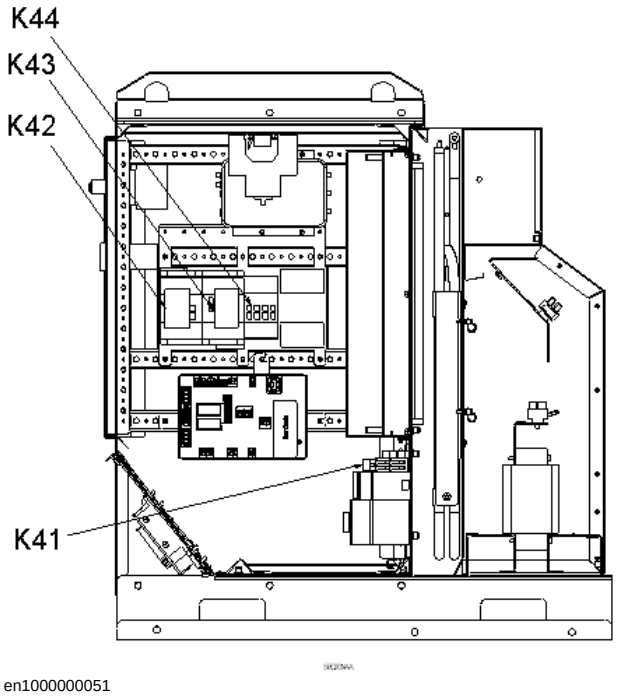
### Consequences

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. |  <br>-<br>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.

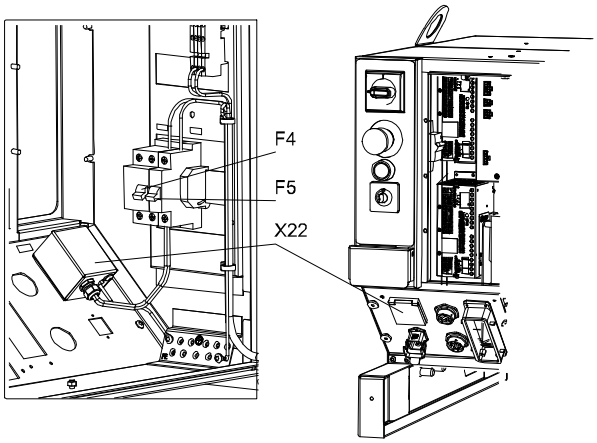
### Consequences

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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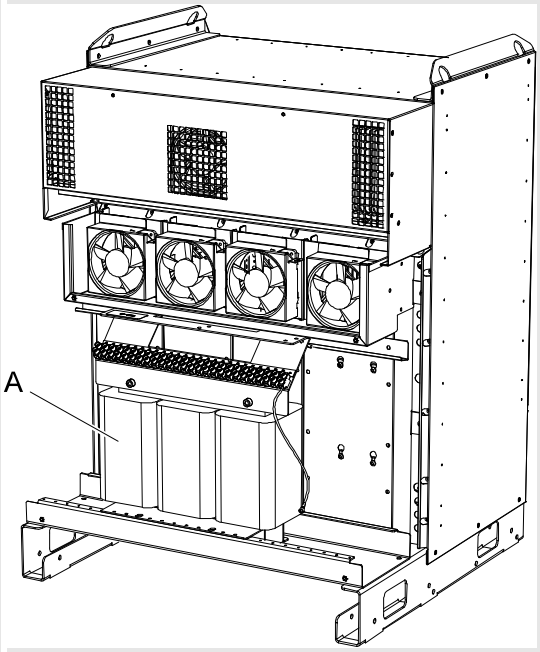
**Recommended actions**

| | 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.<br>  <br>**NOTE!**<br>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?<br>If YES; make sure the versions of the old and new unit is identical.<br>If NO; check the software versions. | |
| 3. | Was the RobotWare recently replaced?<br>If YES; make sure the versions of the old and new unit is identical.<br>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.<br>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!**<br>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:<br>• Oil quality or level used is incorrect.<br>• The robot work cycle runs a specific axis too hard. Investigate whether it is possible to program small "cooling periods" into the application.<br>• Overpressure created inside gearbox. | Check the recommended oil level and type as specified in the product manual for the robot.<br>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!**<br>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:<br>• Oil quality or level used is incorrect.<br>• The robot work cycle runs a specific axis too hard. Investigate whether it is possible to program small "cooling periods" into the application.<br>• Overpressure created inside gearbox. | Check the recommended oil level and type as specified in the product manual for the robot.<br>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. |

## 3.14. Manipulator crashes on power down

### Description

The manipulator is able to work correctly while Motors ON is active, but when Motors OFF is active, it collapses under its own weight.

The holding brake, integral to each motor, is not able to hold the weight of the manipulator arm.

### Consequences

The fault can cause severe injuries or death to personnel working in the area or severe damage to the manipulator and/or surrounding equipment.

### Possible causes

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

- Faulty brake.
- Faulty power supply to the brake.

### Recommended actions

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

| | Action | Info |
|---|---|---|
| 1. | Determine which motor(s) causes the robot to collapse. | |
| 2. | Check the brake power supply to the collapsing motor during the Motors OFF state. | Also see the circuit diagrams in the product manuals for the robot and the controller . |
| 3. | Remove the resolver of the motor to see if there are any signs of oil leaks. | If found faulty, the motor must be replaced as a complete unit as detailed in the product manual for the robot. |
| 4. | Remove the motor from the gearbox to inspect it from the drive side. | If found faulty, the motor must be replaced as a complete unit as detailed in the product manual for the robot. |



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## 3.15. Problem releasing Robot brakes

### Description

When starting robot operation or jogging the robot, the internal robot brakes must release in order to allow movements.

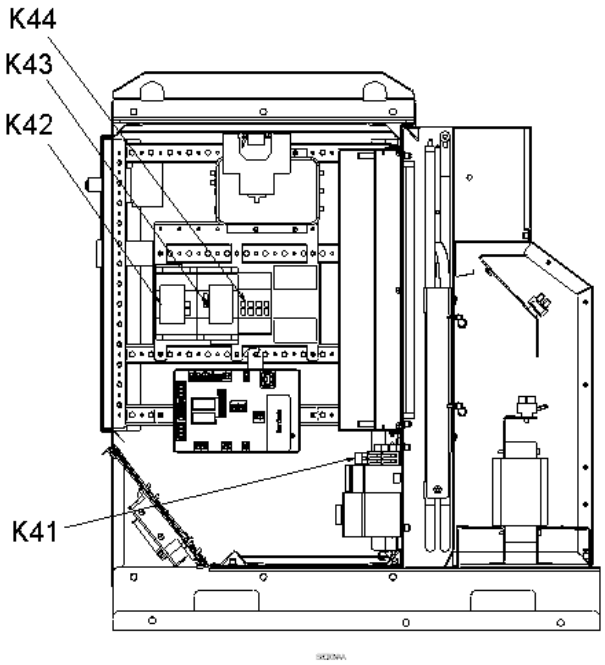
### Consequences

If the brakes do not release, no robot movement is possible, and a number of error log messages can occur.

### Possible causes

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

- Brake contactor (K44) does not work correctly.
- The system does not go to status Motors ON correctly.
- Faulty brake on the robot axis.
- Supply voltage 24V BRAKE missing.

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### Recommended actions

This section details how to proceed when the robot brakes do not release.

| | Action | Info |
|---|---|---|
| 1. | Make sure the brake contactor is activated. | A ‘tick’ should be audible, or you may measure the resistance across the auxiliary contacts on top of the contactor. |
| 2. | Make sure the RUN contactors (K42 and K43) are activated. NOTE that **both** contactors must be activated, not just one! | A ‘tick’ should be audible, or you may measure the resistance across the auxiliary contacts on top of the contactor. |
| 3. | Use the push buttons on the robot to test the brakes.<br>If just one of the brakes malfunctions, the brake at hand is probably faulty and must be replaced.<br>If none of the brakes work, there is probably no 24V BRAKE power available. | The location of the push buttons differ, depending on robot model. Please refer to the product manual for the robot! |
| 4. | Check the Drive Module power supply to make sure 24V BRAKE voltage is OK. | |
| 5. | A number of other faults within the system can cause the brakes to remain activated. In such cases, event log messages will provide additional information. | The event log messages can also be accessed using RobotStudio. |

## 3.16. Intermittent errors

### Description

During operation, errors and malfunctions may occur, in a seemingly random way.

### Consequences

Operation is interrupted, and occasionally, event log messages are displayed, that sometimes do not seem to be related to any actual system malfunction. This sort of problem sometimes affects the Emergency stop or Enable chains respectively, and may at times be very hard to pinpoint.

### Probable causes

Such errors may occur anywhere in the robot system and may be due to:

- external interference
- internal interference
- loose connections or dry joints, e.g. incorrectly connected cable screen connections.
- thermal phenomena , e.g. major temperature changes within the workshop area.

### 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. | Check all the cabling, especially the cables in the Emergency stop and Enable chains. Make sure all connectors are connected securely. | |
| 2. | Check if any indication LEDs signal any malfunction that may give some clue to the problem. | The significance of all indication LEDs are specified in section *Indications on page 65*. |
| 3. | Check the messages in the event log. Sometimes specific error combinations are intermittent. | The event log messages may be viewed either on the FlexPendant or using RobotStudio. |
| 4. | Check the robot's behaviour, etc, each time that type of error occurs. | If possible, keep track of the malfunctions in a log or similar. |
| 5. | Check whether any condition in the robot working environment also changes periodically, e.g, interference from any electric equipment only operating periodically. | |
| 6. | Investigate whether the environmental conditions (such as ambient temperature, humidity, etc) has any bearing on the malfunction. | If possible, keep track of the malfunctions in a log or similar. |



*Continues on next page*

# 4 Trouble shooting by Unit

## 4.1. Trouble shooting the FlexPendant

### General

The FlexPendant communicates, through the Panel Board, with the Control Module main computer. The FlexPendant is physically connected to the Panel Board through a cable in which the +24 V supply and two Enabling Device chains run and emergency stop.

### Procedure

The procedure below details what to do if the FlexPendant does not work correctly.

| | Action | Info/illustration |
|---|---|---|
| 1. | If the FlexPendant is completely “dead”, proceed as detailed in section *Problem starting the FlexPendant on page 40*. | |
| 2. | If the FlexPendant starts, but does not operate correctly, proceed as detailed in section *Problem connecting FlexPendant to the controller on page 41*. | |
| 3. | If the FlexPendant starts, seems to operate, but displays erratic event messages, proceed as detailed in section *Erratic event messages on FlexPendant on page 42*. | |
| 4. | Check the cable for connections and integrity. | |
| 5. | Check the 24 V power supply. | |
| 6. | Read the error event log message and follow any instructions of references. | |

## 4.2. Trouble shooting communications

### Overview

This section details how to trouble shoot data communication in the Control and Drive Modules.

### Trouble shooting procedure

When trouble shooting communication faults, follow the outline detailed below:

| | Action | Info/illustrations |
|---|---|---|
| 1. | Faulty cables (e.g. send and receive signals are mixed up). | |
| 2. | Transfer rates (baud rates). | |
| 3. | Data widths that are incorrectly set. | |

## 4.3. Trouble shooting fieldbuses and I/O units

**Where to find information**

Information about how to trouble shoot the fieldbuses and I/O units can be found in the manual for the respective fieldbus or I/O unit.

## 4.4 Trouble shooting power supply

## 4.4.1. Trouble shooting DSQC 604

### Required test equipment

Equipment needed for trouble shooting:

- Ohmmeter
- Resistive load (e.g. Main Computer DSQC 639 on +24V_PC)
- Voltmeter

### Preparations

| | Action | Note |
|---|---|---|
| 1. | Check the FlexPendant for errors and warnings. | |

### Trouble shooting procedure, DSQC 604

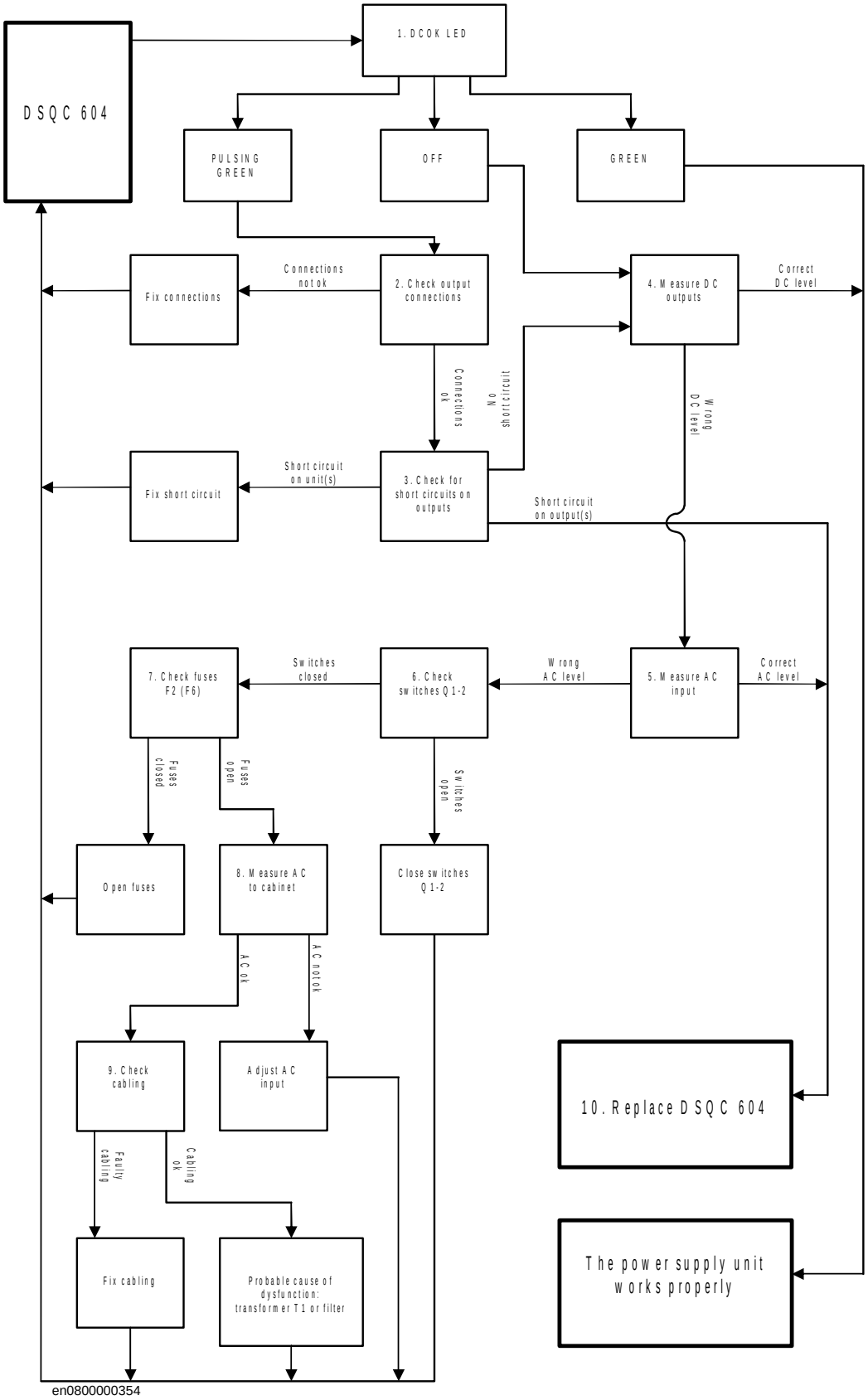
The trouble shooting table is supposed to be used as a detailed instruction together with the trouble shooting flowchart, see *Trouble shooting flowchart, DSQC 604 on page 58*.

| | Test | Note | Action |
|---|---|---|---|
| 1. | Check the indicator LED on DSQC 604. | The indicator LED is labelled DCOK. | If the LED is GREEN, the power supply should be working properly.<br>If the LED is PULSING GREEN, the DC outputs are probably not connected to any units or there may be a short circuit on an output. Proceed with step 2.<br>If the LED is OFF, either the power supply is faulty or it does not have sufficient input voltage. Proceed with step 4. |
| 2. | Check connections between DC outputs and connected units. | Make sure that the power supply is connected to its proper units.<br>A minimum load of 0.5-1A is required on at least one DC output for the 604 to work properly. | If the connections are OK, proceed with step 3.<br>If the connections are faulty or the power supply is not connected to any units at all, repair connections/ connect units. Verify that the fault has been fixed and restart this guide if necessary. |
| 3. | Check for short circuits on DC outputs. | Check both the DC outputs on DSQC 604 and the inputs on surrounding units.<br>Measure the resistance between voltage pins and ground. The resistance should NOT be zero.<br>The DC outputs are shown in the Circuit Diagram in *Product manual - IRC5*. | If no short circuit is found, proceed with step 4.<br>If a short circuit is found on DSQC 604, proceed with step 10.<br>If a short circuit is found on any surrounding unit, get that unit working. Verify that the fault has been fixed and restart this guide if necessary. |

| | Test | Note | Action |
|---|---|---|---|
| 4. | Disconnect one DC output at a time and measure its voltage. | Make sure that at least one unit is connected at all times. A minimum load of 0.5- 1A is required on at least one output for the 604 to work properly.<br>Measure the voltage using a voltmeter. The voltage should be: +24V < U < +27V.<br>The DC outputs are shown in the Circuit Diagram in *Product manual - IRC5*. | If the correct voltage is detected on all outputs and the DCOK LED is green, the power supply is working properly.<br>If the correct voltage is detected on all outputs and the DCOK LED is off, the power supply is regarded as faulty but does not have to be replaced instantly.<br>If no or the wrong voltage is detected, proceed with step 5. |
| 5. | Measure the input voltage to the 604. | Measure the voltage using a voltmeter. Voltage should be: 172 < U < 276V.<br>The AC input is shown in the Circuit Diagram in *Product manual - IRC5*. | If the input voltage is correct, proceed with step 10.<br>If no or the wrong input voltage is detected, proceed with step 6. |
| 6. | Check switches Q1-2. | Make sure that they are closed.<br>Their physical location is shown in the Circuit Diagram in *Product manual - IRC5*. | If the switches are closed, proceed with step 7.<br>If the switches are open, close them. Verify that the fault has been fixed and restart this guide if necessary. |
| 7. | Check main fuse F2 and optional fuse F6 if used. | Make sure that they are open.<br>Their physical location is shown in the Circuit Diagram in *Product manual - IRC5*. | If the fuses are open, proceed with step 8.<br>If the fuses are closed, open them. Verify that the fault has been fixed and restart this guide if necessary. |
| 8. | Make sure that the input voltage to the cabinet is the correct one for that particular cabinet. | | If the input voltage is correct, proceed with step 9.<br>If the input voltage is incorrect, adjust it. Verify that the fault has been fixed and restart this guide if necessary. |
| 9. | Check the cabling. | Make sure that the cabling is correctly connected and not faulty. | If the cabling is OK, the problem is likely to be the transformer T1 or the input filter. Try to get this part of the supply working. Verify that the fault has been fixed and restart this guide if necessary.<br>If the cabling is found unconnected or faulty, connect/replace it. Verify that the fault has been fixed and restart this guide if necessary. |

4.4.1. Trouble shooting DSQC 604

**Trouble shooting flowchart, DSQC 604**



## 4.4.2. Trouble shooting DSQC 661

### Required test equipment

Equipment needed for trouble shooting:

- Ohmmeter
- Resistive load (e.g. Main Computer DSQC 639 on +24V_PC)
- Voltmeter

### Preparations

| | Action |
|---|---|
| 1. | Check the FlexPendant for errors and warnings. |
| 2. | Make sure that the control system power supply is in run-time mode.<br>Do this by waiting 30 seconds after power-on. |

### Trouble shooting procedure, DSQC 661

The trouble shooting table is supposed to be used as a detailed instruction together with the trouble shooting flowchart, see *Trouble shooting flowchart, DSQC 661 on page 61*.

| | Test | Note | Action |
|---|---|---|---|
| 1. | Check the indicator LED on DSQC 661. | The indicator LED is labelled DCOK. | If the LED is GREEN, the 661 should be working properly.<br>If the LED is PULSING GREEN, the DC output is probably not connected to any unit (load) or there may be a short circuit on the output. Proceed with step 2.<br>If the LED is OFF, either the 661 is faulty or it does not have sufficient input voltage. Proceed with step 4. |
| 2. | Check connection between DC output and connected unit. | Make sure that the power supply is connected to DSQC 662.<br>A minimum load of 0.5-1A is required on the DC output for the 661 to work properly. | If the connection is OK, proceed with step 3.<br>If the connection is faulty or the power supply is not connected to DSQC 662, repair connection/ connect it. Verify that the fault has been fixed and restart this guide if necessary. |
| 3. | Check for short circuit on DC output. | Check both the DC output on DSQC 661 and the input on DSQC 662.<br>Measure the resistance between voltage pins and ground. The resistance should NOT be zero.<br>The DC output is shown in the Circuit Diagram in *Product manual - IRC5*. | If no short circuit is found, proceed with step 4.<br>If a short circuit is found on DSQC 661, proceed with step 10.<br>If a short circuit is found on DSQC 662, get that unit working. Verify that the fault has been fixed and restart this guide if necessary. |

*Continues on next page*

4.4.2. Trouble shooting DSQC 661

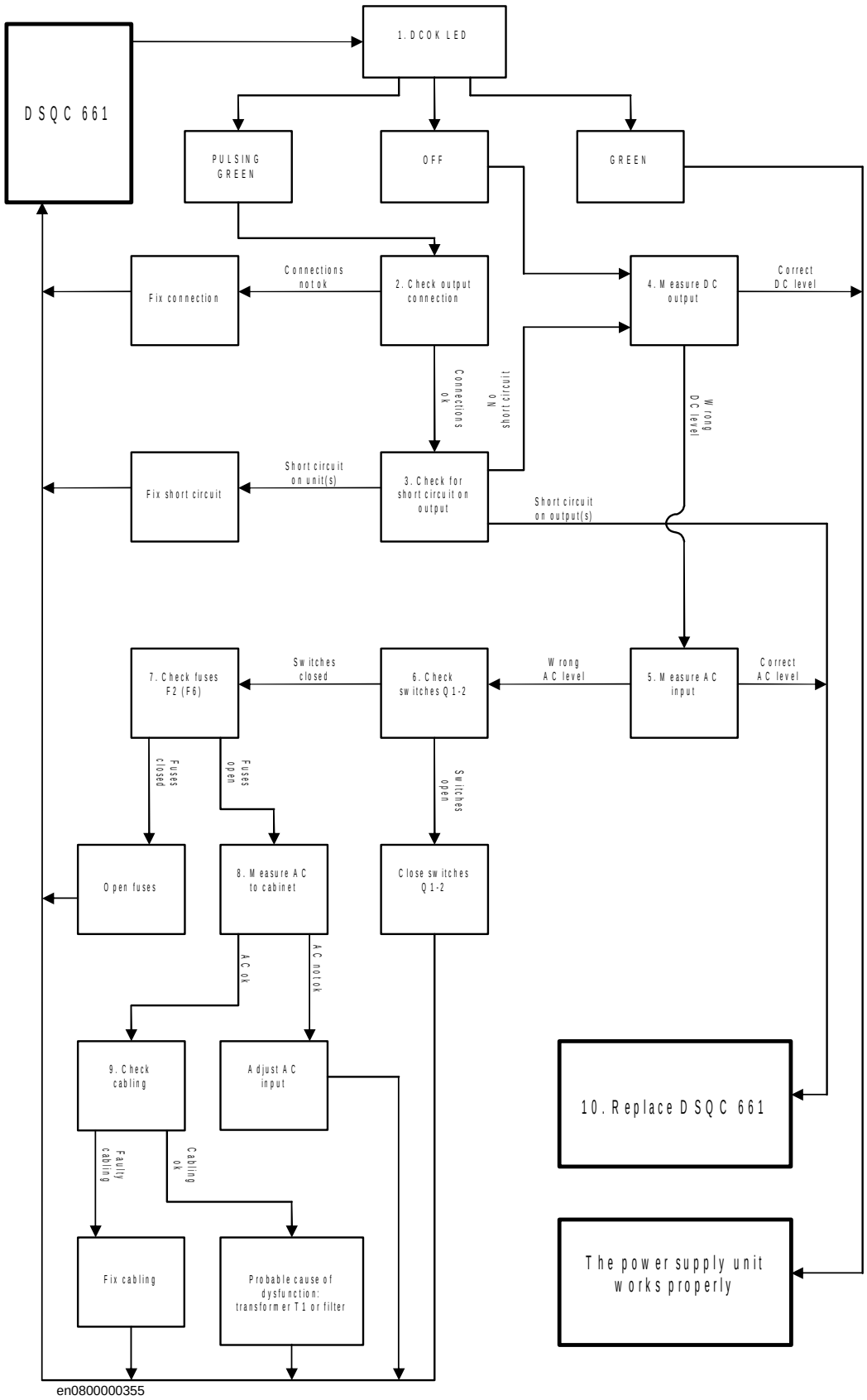
*Continued*

| | Test | Note | Action |
|---|---|---|---|
| 4. | Measure the DC voltage while the output is connected to DSQC 662 or some other load. | DSQC 661 requires a minimum load of 0.5- 1A in order for it to deliver +24V.<br>Measure the voltage using a voltmeter. The voltage should be: +24V < U < +27V.<br>The DC output is shown in the Circuit Diagram in *Product manual - IRC5*. | If the correct voltage is detected and the DCOK LED is green, the power supply is working properly.<br>If the correct voltage is detected and the DCOK LED is off, the power supply is regarded as faulty but does not have to be replaced instantly.<br>If no or the wrong voltage is detected, proceed with step 5. |
| 5. | Measure the input voltage to the 661. | Measure the voltage using a voltmeter. Voltage should be: 172 < U < 276V.<br>The AC input is shown in the Circuit Diagram in *Product manual - IRC5*. | If the input voltage is correct, proceed with step 10.<br>If no or the wrong input voltage is detected, proceed with step 6. |
| 6. | Check switches Q1-2. | Make sure that they are closed.<br>Their physical location is shown in the Circuit Diagram in *Product manual - IRC5*. | If the switches are closed, proceed with step 7.<br>If the switches are open, close them. Verify that the fault has been fixed and restart this guide if necessary. |
| 7. | Check main fuse F2 and optional fuse F6 if used. | Make sure that they are open.<br>Their physical location is shown in the Circuit Diagram in *Product manual - IRC5*. | If the fuses are open, proceed with step 8.<br>If the fuses are closed, open them. Verify that the fault has been fixed and restart this guide if necessary. |
| 8. | Make sure that the input voltage to the cabinet is the correct one for that particular cabinet. | | If the input voltage is correct, proceed with step 9.<br>If the input voltage is incorrect, adjust it. Verify that the fault has been fixed and restart this guide if necessary. |
| 9. | Check the cabling. | Make sure that the cabling is correctly connected and not faulty. | If the cabling is OK, the problem is likely to be the transformer T1 or the input filter. Try to get this part of the supply working. Verify that the fault has been fixed and restart this guide if necessary.<br>If the cabling is found unconnected or faulty, connect/ replace it. Verify that the fault has been fixed and restart this guide if necessary. |
| 10. | The 661 may be faulty, replace it and verify that the fault has been fixed. | How to replace the unit is detailed in *Product manual - IRC5*. | |



*Continues on next page*

**Trouble shooting flowchart, DSQC 661**



en0800000355

## 4.4.3. Trouble shooting DSQC 662

### Required test equipment

Equipment needed for trouble shooting:

- Ohmmeter
- Resistive load (e.g. Main Computer DSQC 639 on +24V_PC)
- Voltmeter

### Preparations

| | Action | Note |
|---|---|---|
| 1. | Check the FlexPendant for errors and warnings. | |
| 2. | Make sure that the power distribution board is in run-time mode.<br>Do this by waiting 1 minute after power-on. | When the AC power has been cut off, the indicator LED (Status LED) on DSQC 662 will turn red and stay red until UltraCAP is empty. This may take a long time and is completely normal. It does not mean that there is something wrong with the 662. |

### Trouble shooting procedure, DSQC 662

The trouble shooting table is supposed to be used as a detailed instruction together with the trouble shooting flowchart, see *Trouble shooting flowchart, DSQC 662 on page 64*.

| | Test | Note | Action |
|---|---|---|---|
| 1. | Check the indicator LED on DSQC 662. | The indicator LED is labelled Status LED. | If the LED is GREEN, the 662 should be working properly.<br>If the LED is PULSING GREEN, a USB communication error has occurred. Proceed with step 2.<br>If the LED is RED, the input/output voltage is low, and/or the logic signal ACOK_N is high. Proceed with step 4.<br>If the LED is PULSING RED, one or more DC outputs are under specified voltage level. Make sure cables are properly connected to its respective units. Proceed with step 4.<br>If the LED is PULSING REDGREEN, a firmware upgrade error has occurred. This is not supposed to happen during runtime mode, proceed with step 6.<br>If the LED is OFF, either the 662 is faulty or it does not have sufficient input voltage. Proceed with step 4. |

*Continues on next page*

*Continued*

| | Test | Note | Action |
|---|---|---|---|
| 2. | Check USB connection on both ends. | | If the connection seems OK, proceed with step 6.<br>If there is a problem with the connection, proceed with step 3. |
| 3. | Try to fix the communication between the power supply and the computer by reconnecting the cable. | Make sure that the USB cable is properly connected on both ends. | If the communication comes back up, verify that the fault has been fixed and restart this guide if necessary.<br>If unable to fix the communication, proceed with step 6. |
| 4. | Disconnect one DC output at a time and measure its voltage. | Make sure that at least one unit is connected at all times. A minimum load of 0.5- 1A is required on at least one output for the 662 to work properly.<br>Measure the voltage using a voltmeter. The voltage should be: +24V < U < +27V.<br>The DC outputs are shown in the Circuit Diagram in *Product manual - IRC5*. | If the correct voltage is detected on all outputs and the Status LED is green, the power supply is working properly.<br>If the correct voltage is detected on all outputs and the Status LED is NOT green, the power supply is regarded as faulty but does not have to be replaced instantly.<br>If no or the wrong voltage is detected, proceed with step 5. |
| 5. | Measure the input voltage to the 662 and the ACOK_N signal. | Measure the voltage using a voltmeter. Input voltage should be: 24 < U < 27V and ACOK_N should be 0V.<br>Make sure that connectors X1 and X2 are connected properly on both ends.<br>The DC input X1 and ACOK_N connector X2 are shown in the Circuit Diagram in *Product manual - IRC5*. | If the input voltage is correct, proceed with step 6.<br>If no or the wrong input voltage is detected, troubleshoot DSQC 661. |
| 6. | The 662 may be faulty, replace it and verify that the fault has been fixed. | How to replace the unit is detailed in *Product manual - IRC5*. | |



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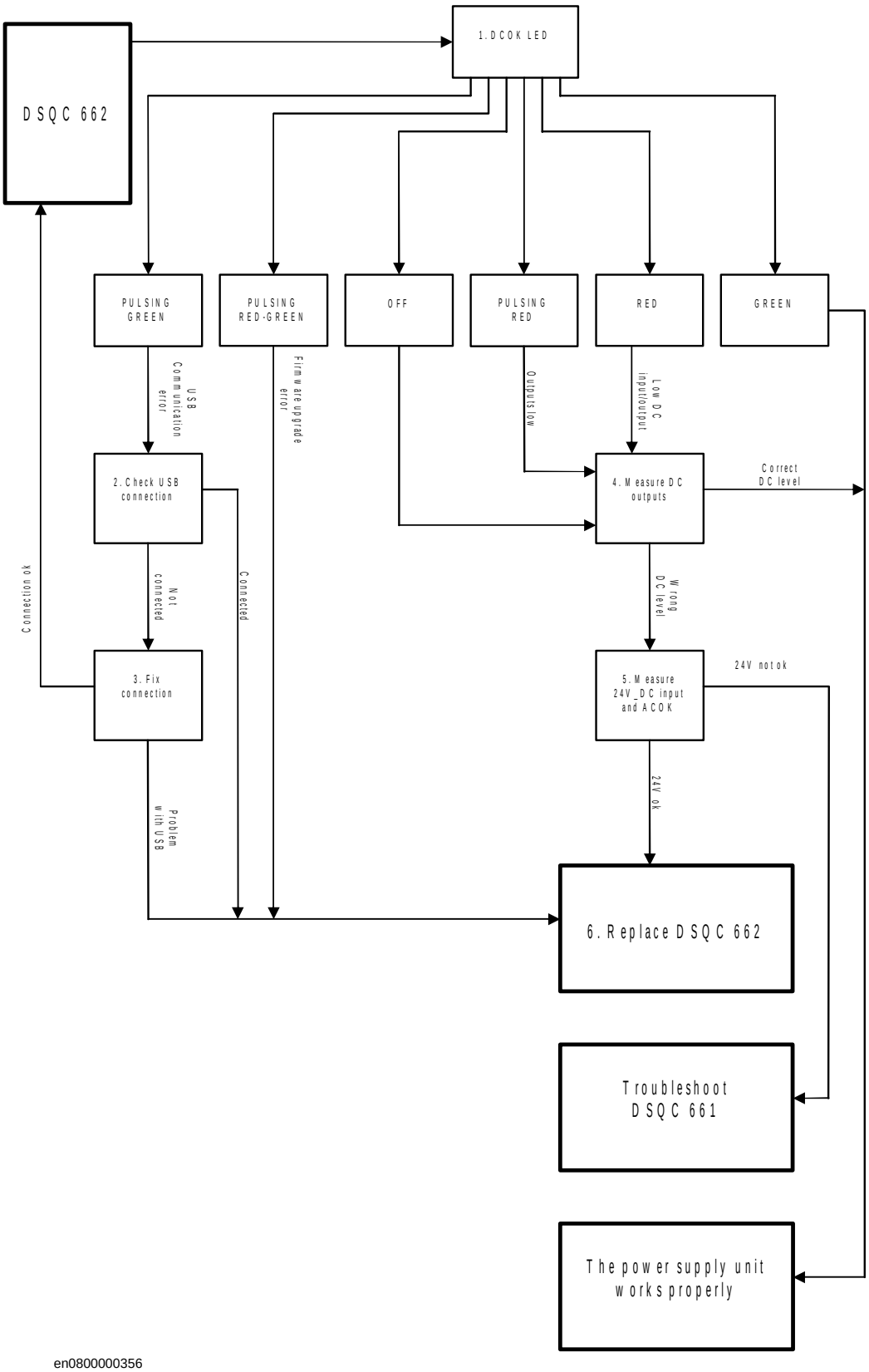
4.4.3. Trouble shooting DSQC 662

*Continued*

**Trouble shooting flowchart, DSQC 662**

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# 5 Descriptions and background information

## 5.1 Indications

### 5.1.1. LEDs in the Control Module

**General**

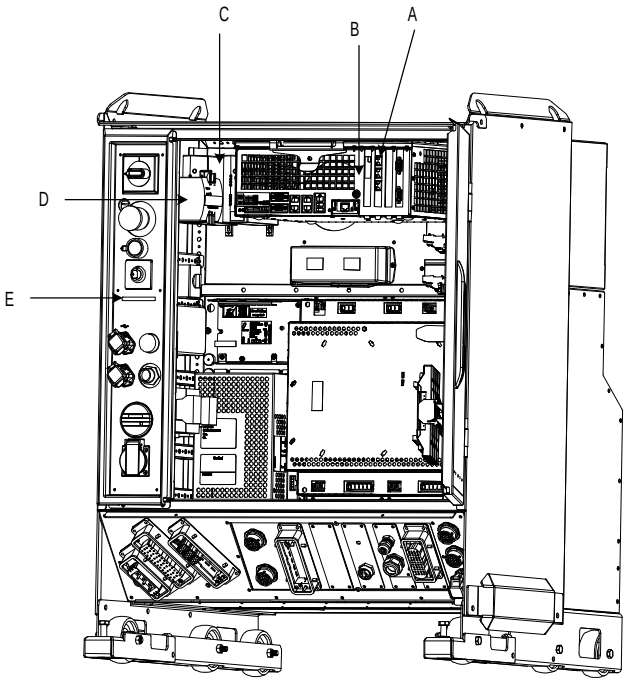
The Control Module features a number of indication LEDs, which provide important information for trouble shooting purposes. If no LEDs light up at all when switching the system on, trouble shoot as detailed in section *All LEDs are OFF at Controller on page 36*

All LEDs on the respective units, and their significance, are described in the following sections.

All units with LEDs are shown in the illustration below:

**LEDs**

Single cabinet controller




en1000000039

| | |
|---|---|
| A | Ethernet board (any of the four board slots) |
| B | Computer unit (DSQC 639) |
| C | Customer I/O power supply (up to three units) |
| D | Control module power supply |
| E | LED board |

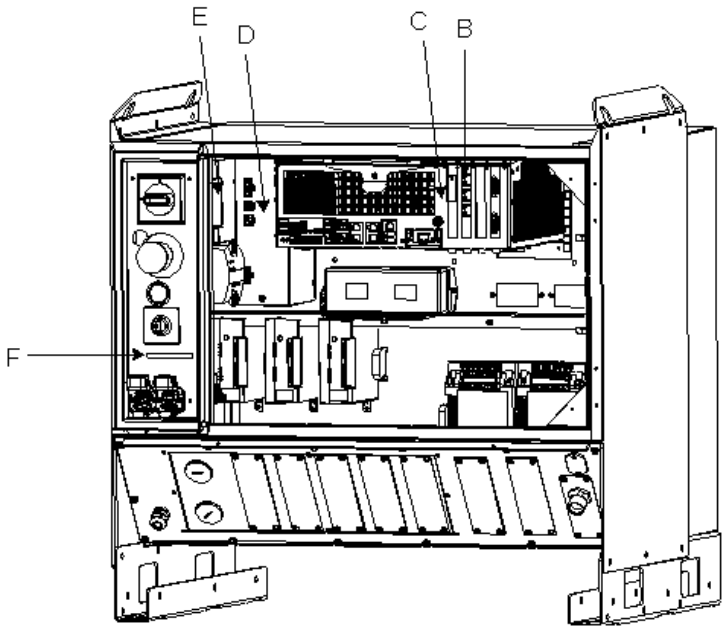


*Continues on next page*

5.1.1. LEDs in the Control Module

*Continued*

Control module for Dual cabinet controller

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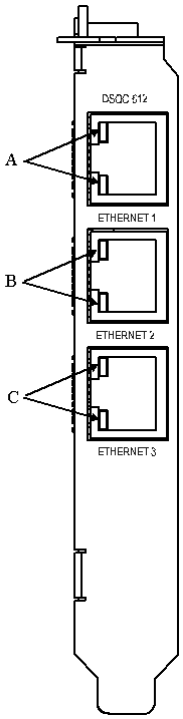
| | |
|---|---|
| B | Ethernet board (any of the four board slots) |
| C | Computer unit (DSQC 639) |
| D | Customer I/O power supply (up to three units) |
| E | Control module power supply |
| F | LED board |



*Continues on next page*

### Ethernet board

The illustration below shows the LEDs on the Ethernet board:




en0400000919

| | |
|---|---|
| A | AXC2 connector LED |
| B | AXC3 connector LED |
| C | AXC4 connector LED |

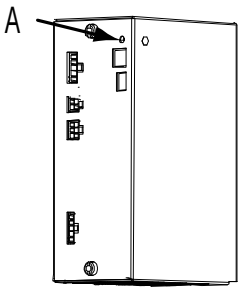
| Description | Significance |
|---|---|
| AXC2 connector LED | Shows the status of Ethernet communication between Axis Computer 2 and the Ethernet board.<br>GREEN OFF:10 Mbps data rate has been selected.<br>GREEN ON:100 Mbps data rate has been selected.<br>YELLOW flashing: The two units are communicating on the Ethernet channel.<br>YELLOW steady: A LAN link is established.<br>YELLOW OFF: A LAN link is *not* established. |
| AXC3 connector LED | Shows the status of Ethernet communication between Axis Computer 3 and the Ethernet board<br>See the description above! |
| AXC4 connector LED | Shows the status of Ethernet communication between Axis Computer 4 and the Ethernet board<br>See the description above! |

5.1.1. LEDs in the Control Module

### Control module Power supply

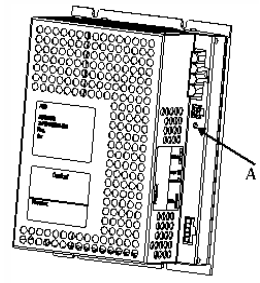
The illustration below shows the LEDs on the Control module power supply:

DSQC



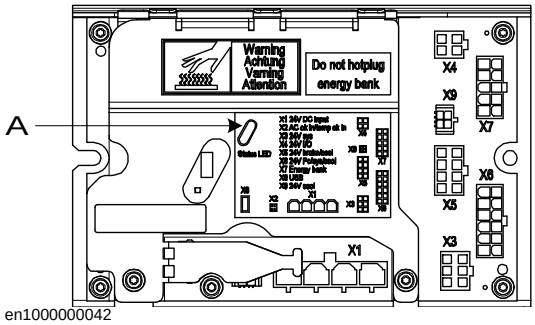

xx0400001073

DSQC 661




en1000000041

DSQC 662




en1000000042

| | |
|---|---|
| A | DCOK indicator |

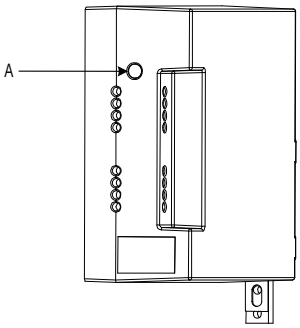
| Description | Significance |
|---|---|
| DCOK indicator | GREEN: When all DC outputs are above the specified minimum levels.<br>OFF: When one or more DC output/s below the specified minimum level. |

### Control module Power distribution board

| Description | Significance |
|---|---|
| DCOK indicator | GREEN: When DC output is above the specified minimum level.<br>OFF: When the DC output below the specified minimum level. |

### Customer Power Supply

The illustration below shows the LEDs on the Customer Power Supply Module:



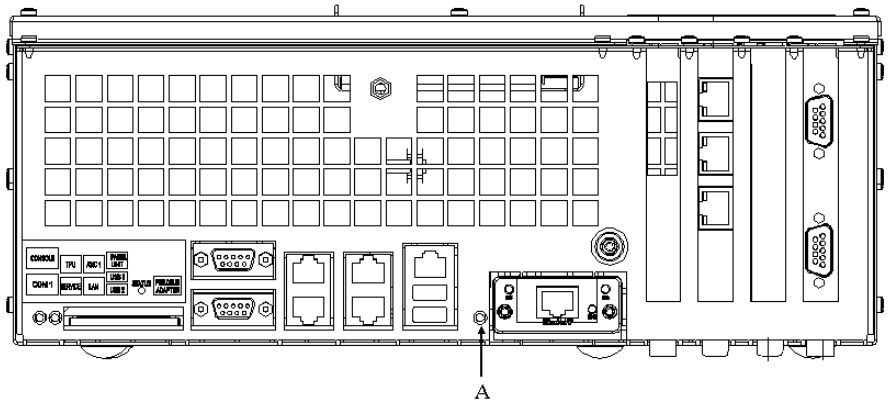

en1000000037

| | |
|---|---|
| A | DCOK indicator |

| Description | Significance |
|---|---|
| DCOK indicator | GREEN: When all DC outputs are above the specified minimum levels.<br>OFF: When one or more DC output/s below the specified minimum level. |

### Computer unit

The illustration below shows the LEDs on the Computer unit:




en1000000040

| Description | Significance |
|---|---|
| Status LED | Shows the status of the communication on the computer unit |



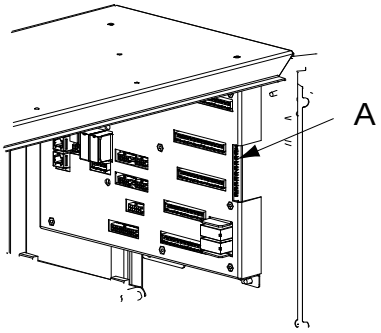
*Continues on next page*

5.1.1. LEDs in the Control Module

*Continued*

### Panel board

The illustration below shows the LEDs on the Panel board:




dummy

| | |
|---|---|
| A | Panel board LEDs |

The panel board LEDs are described from top to bottom below:

| Description | Significance |
|---|---|
| Status LED | GREEN flashing: serial communication error.<br>GREEN steady: no errors found and system is running.<br>RED flashing: system is in power up/selftest mode.<br>RED steady: other error than serial communication error. |
| Indication LED, ES1 | YELLOW when Emergency stop chain 1 closed |
| Indication LED, ES2 | YELLOW when Emergency stop chain 2 closed |
| Indication LED, GS1 | YELLOW when General stop switch chain 1 closed |
| Indication LED, GS2 | YELLOW when General stop switch chain 2 closed |
| Indication LED, AS1 | YELLOW when Auto stop switch chain 1 closed |
| Indication LED, AS2 | YELLOW when Auto stop switch chain 2 closed |
| Indication LED, SS1 | YELLOW when Superior stop switch chain 1 closed |
| Indication LED, SS2 | YELLOW when Superior stop switch chain 2 closed |
| Indication LED, EN1 | YELLOW when ENABLE1=1 and RS-communication is OK |

### LED board

The function of the LEDs on the LED board are identical to those on the Panel board as described above.

Should the LED board not be working, but the Panel board is, the problem is the communication between these boards or the LED board itself. Check the cabling between them.



*Continues on next page*

*Continued*

## 5.1.2. LEDs in the Drive Module for Drive System 04

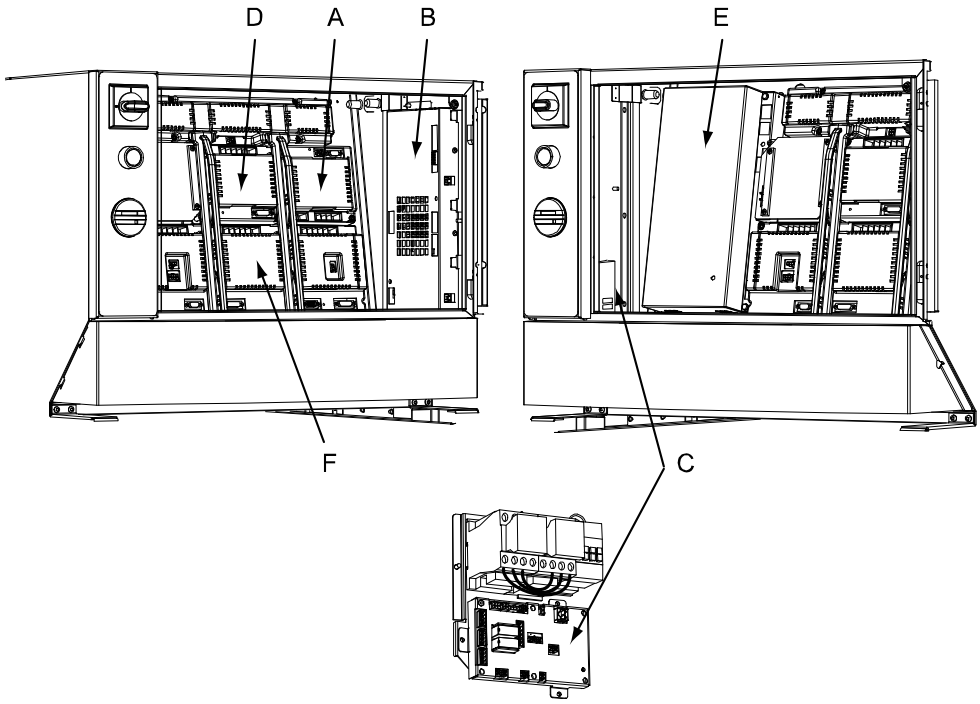
### General

The Drive Module features a number of indication LEDs, which provide important information for trouble shooting purposes. If no LEDs light up at all when switching the system on, trouble shoot as detailed in section *All LEDs are OFF at Controller on page 36*.

All LEDs on the respective units, and their significance, are described in the following sections.

All units with LEDs are shown in the illustration below:

### LEDs




xx0400001084

| | |
|---|---|
| A | Rectifier |
| B | Axis Computer |
| C | Contactor interface board |
| D | Single servo drive |
| E | Drive Module Power Supply |
| F | Main drive unit |



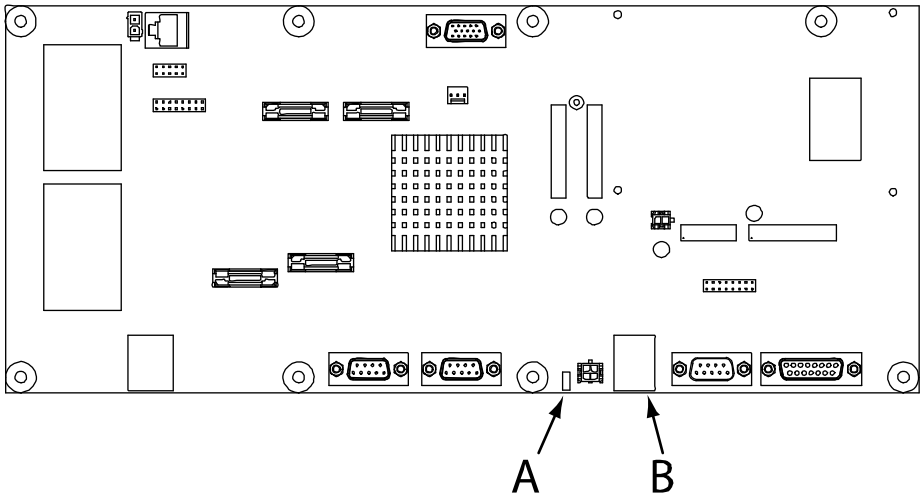
*Continues on next page*

5.1.2. LEDs in the Drive Module for Drive System 04

*Continued*

### Axis computer

The illustration below shows the LEDs on the Axis computer:




xx0300000023

| | |
|---|---|
| A | Status LED |
| B | Ethernet LEDs |

| Description | Significance |
|---|---|
| Status LED | Normal sequence during startup:<br>1. RED steady: Default at power-up.<br>2. GREEN flashing: Establish connection to main computer, retrieve IP address and download the application file.<br>3. GREEN steady. Start-up sequence ready. Application is running.<br>The following indicates errors:<br>• RED steady (forever): The axis computer has failed to initialize basic hardware.<br>• RED (long) -> GREEN flashing (short) -> RED (long) -> GREEN flashing (short) -> ... : Missing connection to main computer. Possible cable problem.<br>• RED (short) -> GREEN flashing (long) -> RED (short) -> GREEN flashing (long) -> ... : Connection established with main computer. Possible RobotWare problem in main computer.<br>• GREEN flashing (forever): Possible cable or RobotWare problem in main computer. |
| Ethernet LED | Shows the status of Ethernet communication between an additional axis computer (2, 3 or 4) and the Ethernet board.<br>• GREEN OFF:10 Mbps data rate has been selected. This is an error state.<br>• GREEN ON:100 Mbps data rate has been selected.<br>• YELLOW flashing: The two units are communicating on the Ethernet channel.<br>• YELLOW steady: A LAN link is established.<br>• YELLOW OFF: A LAN link is *not* established. |



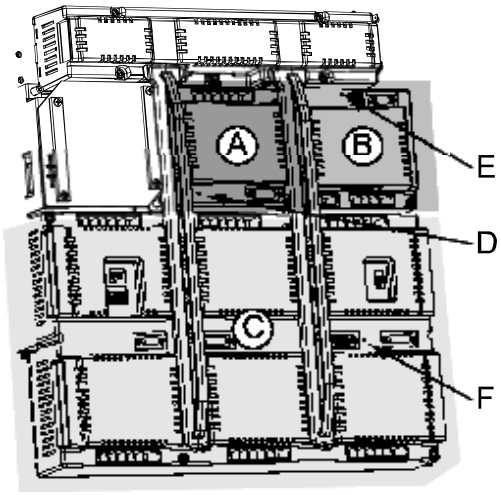
*Continues on next page*

*Continued*

### Main drive unit, single drive unit and rectifier unit

The illustration below shows the indication LEDs on the main drive unit, single drive unit and rectifier unit.

NOTE that there are two types of main drive units: a six unit drive and a three unit drive which are both used to power a six axes robot. Shown in the illustration is a six unit drive. The three unit drive is half the size of the six unit drive, but the indication LED is positioned in the same place.




xx0400001089

| | |
|---|---|
| A | Single drive unit |
| B | Rectifier unit |
| C | Main drive unit |
| D | Indication LED, single servo drive |
| E | Indication LED, rectifier unit |
| F | Indication LED, main drive unit |

| Description | Significance |
|---|---|
| Indication LEDs D, E and F | GREEN flashing: Internal function is OK and there is a malfunction in the interface to the unit. The unit does not need to be replaced.<br>GREEN steady: Program loaded successfully, unit function OK and all interfaces to the units is fully functional.<br>RED steady: Permanent internal fault detected. The LED is to have this mode in case of failure at internal self test at start-up, or in case of detected internal failure state in running system. The unit probably needs to be replaced. |



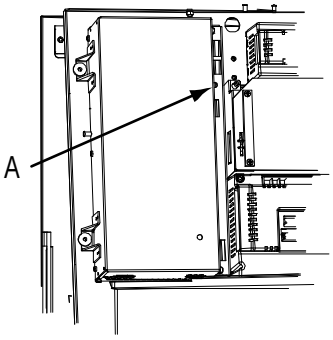
*Continues on next page*

5.1.2. LEDs in the Drive Module for Drive System 04

*Continued*

### Drive Module Power Supply

The illustration below shows the LEDs on the Drive Module power supply:



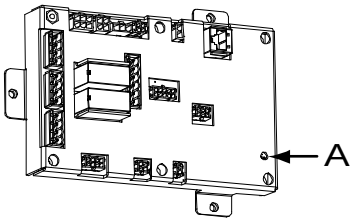

xx0400001090

| | |
|---|---|
| A | DCOK indicator |

| Description | Significance |
|---|---|
| DCOK indicator | GREEN: When all DC outputs are above the specified minimum levels.<br>OFF: When one or more DC output/s below the specified minimum level. |

### Contactor interface board

The illustration below shows the LEDs on the Contractor interface board:




xx0400001091

| | |
|---|---|
| A | Status LED |

| Description | |
|---|---|
| Status LED | GREEN flashing: serial communication error.<br>GREEN steady: no errors found and system is running.<br>RED flashing: system is in power up/selftest mode.<br>RED steady: other error than serial communication error. |

## 5.1.3. LEDs in the Drive Module for Drive System 09

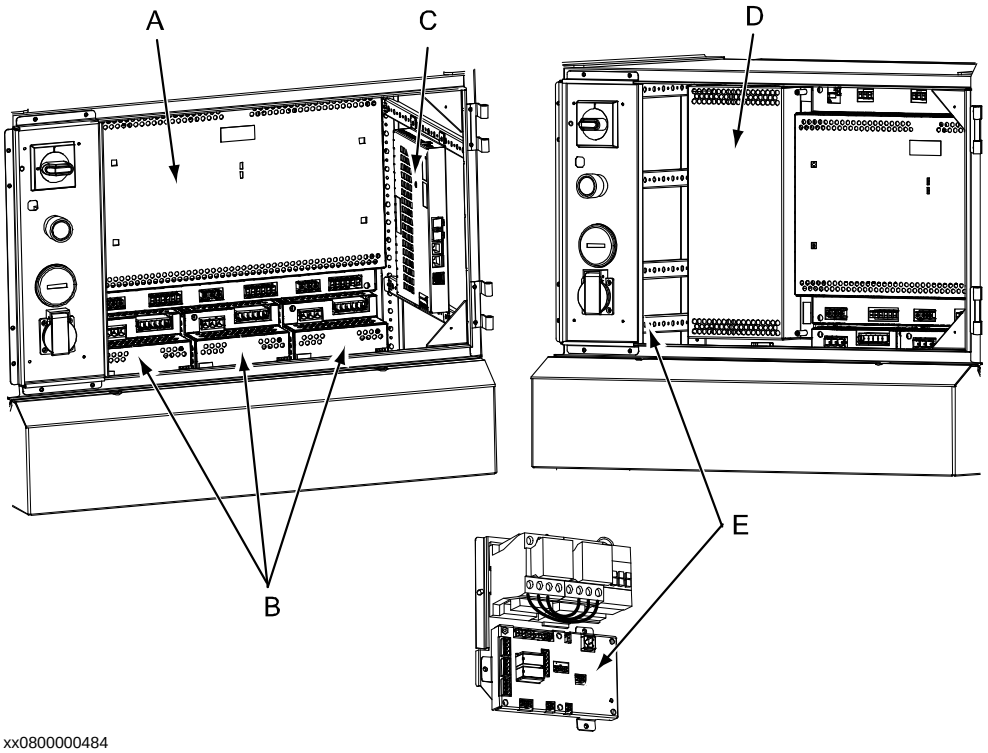
### General

The Drive Module features a number of indication LEDs, which provide important information for trouble shooting purposes. If no LEDs light up at all when switching the system on, trouble shoot as detailed in section *All LEDs are OFF at Controller on page 36*.

All LEDs on the respective units, and their significance, are described in the following sections.

All units with LEDs are shown in the illustration below:

### Units




xx0800000484

| | |
|---|---|
| A | Main Drive Unit |
| B | Additional Drive Units |
| C | Axis computer |
| D | Drive Module power supply |
| E | Contactor interface board |



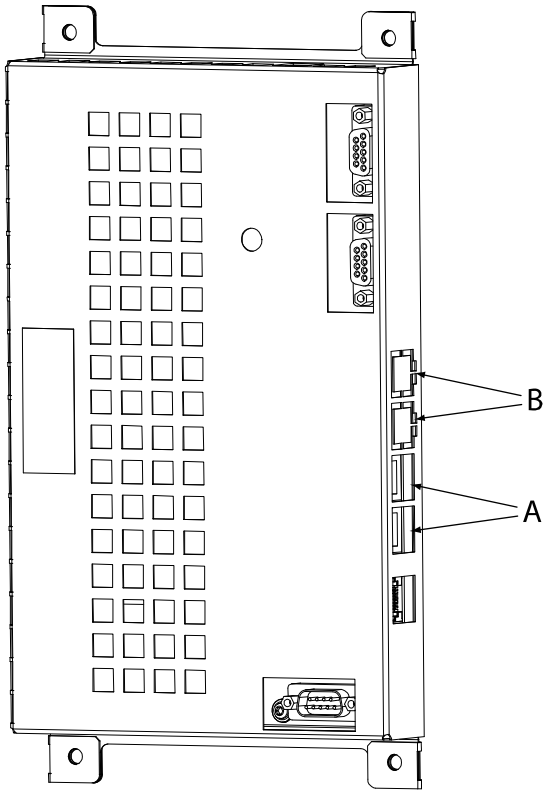
*Continues on next page*

5.1.3. LEDs in the Drive Module for Drive System 09

*Continued*

### Axis computer

The illustration below shows the LEDs on the Axis computer:




xx0800000485

| | |
|---|---|
| A | Status LED |
| B | Ethernet LED |

| Description | Significance |
|---|---|
| Status LED | Normal sequence during startup:<br>1. RED steady: Default at power-up.<br>2. RED flashing: Establish connection to main computer and load program to axis computer.<br>3. GREEN flashing: Start-up of axis computer program and connect peripheral units.<br>4. GREEN steady. Start-up sequence ready. Application is running.<br>The following indicates errors:<br>• DARK: No power to axis computer or internal error (hardware/ firmware).<br>• RED steady (forever): The axis computer has failed to initialize basic hardware.<br>• RED flashing (forever): Missing connection to main computer, main computer start-up problem or RobotWare installation problem.<br>• GREEN flashing (forever): Missing connections to peripheral units or RobotWare start-up problem. |



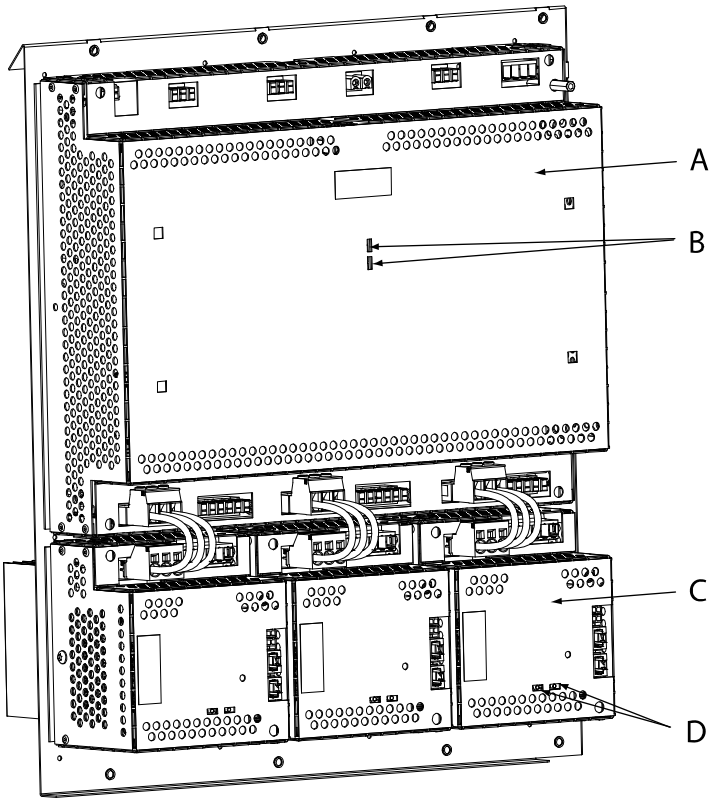
*Continues on next page*

*Continued*

| Description | Significance |
|---|---|
| Ethernet LED | Shows the status of Ethernet communication between an additional axis computer (2, 3 or 4) and the Ethernet board.<br>• GREEN OFF:10 Mbps data rate has been selected.<br>• GREEN ON:100 Mbps data rate has been selected.<br>• YELLOW flashing: The two units are communicating on the Ethernet channel.<br>• YELLOW steady: A LAN link is established.<br>• YELLOW OFF: A LAN link is *not* established. |

### Main Drive Unit and Additional Drive Unit

The illustration below shows the indication LEDs on the Main Drive Unit and Additional Drive Units.




xx0800000486

| | |
|---|---|
| A | Main Drive Unit |
| B | Main Drive Unit Ethernet LEDs |
| C | Additional Drive Unit |
| D | Additional Drive Unit Ethernet LEDs |



*Continues on next page*

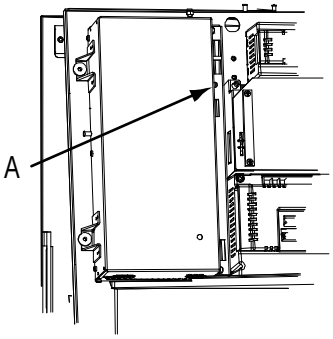
5.1.3. LEDs in the Drive Module for Drive System 09

*Continued*

| Description | Significance |
|---|---|
| Ethernet LEDs (B and D) | Shows the status of Ethernet communication between an additional axis computer (2, 3 or 4) and the Ethernet board.<br>• GREEN OFF:10 Mbps data rate has been selected.<br>• GREEN ON:100 Mbps data rate has been selected.<br>• YELLOW flashing: The two units are communicating on the Ethernet channel.<br>• YELLOW steady: A LAN link is established.<br>• YELLOW OFF: A LAN link is *not* established. |

### Drive Module Power Supply

The illustration below shows the LEDs on the Drive Module power supply:



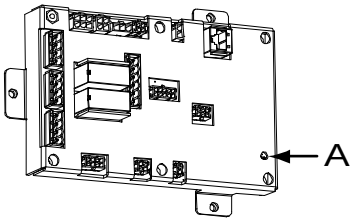

xx0400001090

| | |
|---|---|
| A | DCOK indicator |

| Description | Significance |
|---|---|
| DCOK indicator | GREEN: When all DC outputs are above the specified minimum levels.<br>OFF: When one or more DC output/s below the specified minimum level. |

### Contactor interface board

The illustration below shows the LEDs on the Contractor interface board:




xx0400001091

| | |
|---|---|
| A | Status LED |

| Description | |
|---|---|
| Status LED | GREEN flashing: serial communication error.<br>GREEN steady: no errors found and system is running.<br>RED flashing: system is in power-up/self-test mode.<br>RED steady: other error than serial communication error. |

# 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.

*Continues on next page*

*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.

#### Recommended actions

## 10354, Restore aborted due to lost system data.

#### Description

The system is using a backup of the system data, since the system data was not properly saved at last shutdown. Due to this, a previously ordered Restore from directory *arg* was attempted again, but was aborted.

#### Consequences

No RAPID programs or modules will be loaded.

#### Probable causes

The system data was not properly saved at last shutdown.

#### Recommended actions

After recovering from the system data loss by a (B)ackup-Restart or system re-installation, please verify that the backup directory *arg* is OK, and perform the Restore again.

## 10355, Restore error

#### Description

Error during the restore of Task. Trying to load to unknown task, *arg*.

#### Consequences

Loading has been aborted for *arg*.

#### Probable causes

The current system doesn't have the same options as the one used to create the backup.

## 10400, User *arg* logged on

#### Description

User *arg* logged on using *arg*.

## 10401, User *arg* logged off

#### Description

User *arg* using *arg* logged off.

## 10420, New unsafe robot path

#### Description

The robot path has been cleared after a target has been modified in task *arg*. The robot will for that reason move towards the position pointed out by the move instruction at the program pointer. Move instructions between the modified target and the program pointer will be skipped.

#### Consequences

The programmed speed is used for this movement.

The new untested path may contain obstacles that might cause a collision.

#### Recommended actions

Check your program pointer and move it if necessary.

Reduce the speed.

## 10421, Planned path not aborted

#### Description

A target that may be part of the planned robot path has been modified. The new target position will be used the next time the instruction with the target is executed.

#### Consequences

The current planned path is using the old target position.

#### Recommended actions

If the current planned path is unsafe, move the program pointer to abort it.

## 11020, Backup error

#### Description

Error during the backup step Prepare. Unknown error.

#### Recommended actions

*arg*

## 11021, Backup error

#### Description

Error during the backup step Prepare. General error.

#### Recommended actions

*arg*

## 11022, Backup error

#### Description

Error during the backup step Prepare. The directory contains items that are to be created.

#### Recommended actions

*arg*

## 11023, Backup error

#### Description

Error during the backup step Prepare. The directory lacks at least one neccessary item.

#### Recommended actions

*arg*

## 11024, Backup error

#### Description

Error during the backup step Prepare. The directory does not exist.

**Recommended actions**

*arg*

## 11025, Backup error

**Description**

Error during the backup step Prepare. Directory cannot be created.

**Recommended actions**

*arg*

## 11026, Backup error

**Description**

Error during the backup step Prepare. Error whilst writing the backup.

**Recommended actions**

*arg*

## 11027, Backup error

**Description**

Error during the backup step Prepare. Error reading configuration parameters.

**Recommended actions**

*arg*

## 11028, Backup error

**Description**

Error during the backup step Prepare. Error writing configuration parameters.

**Recommended actions**

*arg*

## 11029, Backup error

**Description**

Error during the backup step Prepare. The structure is too deep.

**Recommended actions**

*arg*

## 11030, Backup error

**Description**

Error during the backup step Prepare. No more objects.

**Recommended actions**

*arg*

## 11031, Backup error

**Description**

Error during the backup step Prepare. The directory lacks at least one neccessary item.

**Recommended actions**

*arg*

## 11032, Backup error

**Description**

Error during the backup step Prepare. The system version doesn't match the backup.

**Recommended actions**

*arg*

## 11033, Backup error

**Description**

Error during the backup step Prepare. Error restoring configuration parameters.

**Recommended actions**

*arg*

## 11034, Backup error

**Description**

Error during the backup step Prepare. Error restoring configuration parameters.

**Recommended actions**

*arg*

## 11035, Backup error

**Description**

Error during the backup step Prepare. Mismatch between current system and the backup.

**Recommended actions**

*arg*

## 11036, Backup error

**Description**

Error during the backup step Prepare. Write error.

**Consequences**

The backup will be incomplete.

**Probable causes**

You may not have write access to the backup drive.

The drive might be full.

If it is a network drive you might have lost connection.

**Recommended actions**

*arg*

## 11037, Backup error

**Description**

Error during the backup step Prepare. At least one modname is too long.

**Recommended actions**

*arg*

## 11038, Backup error

**Description**

Error during the backup step Prepare. Unknown task.

**Recommended actions**

*arg*

## 11039, Backup error

**Description**

Error during the backup step Prepare. Storage media full.

**Recommended actions**

*arg*

## 11040, Backup error

**Description**

Error during the backup step Prepare. Item not possible to delete.

**Recommended actions**

*arg*

## 11120, Backup error

**Description**

Error during the backup step Configuration. Unknown error.

**Recommended actions**

## 11121, Backup error

**Description**

Error during the backup step Configuration. General error.

**Recommended actions**

## 11122, Backup error

**Description**

Error during the backup step Configuration. The directory contains items that are to be created.

**Recommended actions**

## 11123, Backup error

**Description**

Error during the backup step Configuration. The directory lacks at least one neccessary item.

**Recommended actions**

## 11124, Backup error

**Description**

Error during the backup step Configuration. The directory does not exist.

**Recommended actions**

## 11125, Backup error

**Description**

Error during the backup step Configuration. Directory cannot be created.

**Recommended actions**

## 11126, Backup error

**Description**

Error during the backup step Configuration. Error whilst writing the backup.

**Recommended actions**

## 11127, Backup error

**Description**

Error during the backup step Configuration. Error reading configuration parameters.

**Recommended actions**

## 11128, Backup error

**Description**

Error during the backup step Configuration. Error writing configuration parameters.

**Recommended actions**

## 11129, Backup error

**Description**

Error during the backup step Configuration. The structure is too deep.

**Recommended actions**

## 11130, Backup error

**Description**

Error during the backup step Configuration. No more objects.

**Recommended actions**

## 11131, Backup error

**Description**

Error during the backup step Configuration. The directory lacks at least one neccessary item.

**Recommended actions**

## 11132, Backup error

**Description**

Error during the backup step Configuration. The system version doesn't match the backup.

**Recommended actions**

## 11133, Backup error

**Description**

Error during the backup step Configuration. Error restoring configuration parameters.

**Recommended actions**

## 11134, Backup error

**Description**

Error during the backup step Configuration. Error restoring configuration parameters.

**Recommended actions**

## 11135, Backup error

**Description**

Error during the backup step Configuration. Mismatch between current system and the backup.

**Recommended actions**

## 11136, Backup error

**Description**

Error during the backup step Configuration. Write error.

**Recommended actions**

## 11137, Backup error

**Description**

Error during the backup step Configuration. At least one modname is too long.

**Recommended actions**

## 11138, Backup error

**Description**

Error during the backup step Configuration. Unknown task.

**Recommended actions**

## 11139, Backup error

**Description**

Error during the backup step Configuration. Storage media full.

**Recommended actions**

## 11140, Backup error

**Description**

Error during the backup step Configuration. Item not possible to delete.

**Recommended actions**

## 11220, Backup error

**Description**

Error during the backup of Task. Unknown error.

**Recommended actions**

## 11221, Backup error

**Description**

Error during the backup of Task. General error.

**Recommended actions**

## 11222, Backup error

**Description**

Error during the backup of Task. The directory contains items that are to be created.

**Recommended actions**

## 11223, Backup error

**Description**

Error during the backup of Task. The directory lacks at least one neccessary item.

**Recommended actions**

## 11224, Backup error

**Description**

Error during the backup of Task. The directory does not exist.

**Recommended actions**

## 11225, Backup error

**Description**

Error during the backup of Task. Directory cannot be created.

**Recommended actions**

## 11226, Backup error

**Description**

Error during the backup of Task. Error whilst writing the backup.

**Recommended actions**

## 11227, Backup error

**Description**

Error during the backup of Task. Error reading configuration parameters.

**Recommended actions**

## 11228, Backup error

**Description**

Error during the backup of Task. Error writing configuration parameters.

**Recommended actions**

## 11229, Backup error

**Description**

Error during the backup of Task. The structure is too deep.

**Recommended actions**

## 11230, Backup error

**Description**

Error during the backup of Task. No more objects.

**Recommended actions**

## 11231, Backup error

**Description**

Error during the backup of Task. The directory lacks at least one neccessary item.

**Recommended actions**

## 11232, Backup error

**Description**

Error during the backup of Task. The system version doesn't match the backup.

**Recommended actions**

## 11233, Backup error

**Description**

Error during the backup of Task. Error restoring configuration parameters.

**Recommended actions**

## 11234, Backup error

**Description**

Error during the backup of Task. Error restoring configuration parameters.

**Recommended actions**

## 11235, Backup error

**Description**

Error during the backup of Task. Mismatch between current system and the backup.

**Recommended actions**

## 11236, Backup error

**Description**

Error during the backup of Task. Write error.

**Recommended actions**

Check: No space left on device. Corrupt device.

## 11237, Backup error

**Description**

Error during the backup of Task. At least one modname is too long.

**Recommended actions**

## 11238, Backup error

**Description**

Error during the backup of Task. Unknown task.

**Recommended actions**

## 11239, Backup error

**Description**

Error during the backup of Task. Storage media full.

**Recommended actions**

## 11240, Backup error

**Description**

Error during the backup of Task. Item not possible to delete.

**Recommended actions**

## 12020, Restore error

**Description**

Error during the restore step Prepare. Unknown error.

**Recommended actions**

*arg*

## 12021, Restore error

**Description**

Error during the restore step Prepare. General error.

**Recommended actions**

*arg*

## 12022, Restore error

**Description**

Error during the restore step Prepare. The directory contains items that are to be created.

**Recommended actions**

*arg*

## 12023, Restore error

**Description**

Error during the restore step Prepare. The directory lacks at least one neccessary item.

**Recommended actions**

*arg*

## 12024, Restore error

**Description**

Error during the restore step Prepare. The directory does not exist.

**Recommended actions**

*arg*

## 12025, Restore error

**Description**

Error during the restore step Prepare. Directory cannot be created.

**Recommended actions**

*arg*

## 12026, Restore error

**Description**

Error during the restore step Prepare. Error whilst writing the backup.

**Recommended actions**

*arg*

## 12027, Restore error

**Description**

Error during the restore step Prepare. Error reading configuration parameters.

**Recommended actions**

*arg*

## 12028, Restore error

**Description**

Error during the restore step Prepare. Error writing configuration parameters.

**Recommended actions**

*arg*

## 12029, Restore error

**Description**

Error during the restore step Prepare. The structure is too deep.

**Recommended actions**

*arg*

## 12030, Restore error

**Description**

Error during the restore step Prepare. No more objects.

**Recommended actions**

*arg*

## 12031, Restore error

**Description**

Error during the restore step Prepare. The directory lacks at least one neccessary item.

**Recommended actions**

*arg*

## 12032, Restore error

**Description**

Error during the restore step Prepare. The system version doesn't match the backup.

**Recommended actions**

*arg*

## 12033, Restore error

**Description**

Error during the restore step Prepare. Error restoring configuration parameters.

**Recommended actions**

*arg*

## 12034, Restore error

**Description**

Error during the restore step Prepare. Error restoring configuration parameters.

**Recommended actions**

*arg*

## 12035, Restore error

**Description**

Error during the restore step Prepare. Mismatch between current system and the backup.

**Recommended actions**

*arg*

## 12036, Restore error

**Description**

Error during the restore step Prepare. Write error.

**Recommended actions**

*arg*

## 12037, Restore error

**Description**

Error during the restore step Prepare. At least one modname is too long.

**Recommended actions**

*arg*

## 12038, Restore error

**Description**

Error during the restore step Prepare. Unknown task.

**Recommended actions**

*arg*

## 12039, Restore error

**Description**

Error during the restore step Prepare. Storage media full.

**Recommended actions**

*arg*

## 12040, Restore error

**Description**

Error during the restore step Prepare. Item not possible to delete.

**Recommended actions**

*arg*

## 12120, Restore error

**Description**

Error during the restore step Configuration. Unknown error.

**Recommended actions**

## 12121, Restore error

**Description**

Error during the restore step Configuration. General error.

**Recommended actions**

## 12122, Restore error

**Description**

Error during the restore step Configuration. The directory contains items that are to be created.

**Recommended actions**

## 12123, Restore error

**Description**

Error during the restore step Configuration. The directory lacks at least one neccessary item.

**Recommended actions**

## 12124, Restore error

**Description**

Error during the restore step Configuration. The directory does not exist.

**Recommended actions**

## 12125, Restore error

**Description**

Error during the restore step Configuration. Directory cannot be created.

**Recommended actions**

## 12126, Restore error

**Description**

Error during the restore step Configuration. Error whilst writing the backup.

**Recommended actions**

## 12127, Restore error

**Description**

Error during the restore step Configuration. Error reading configuration parameters.

**Recommended actions**

## 12128, Restore error

**Description**

Error during the restore step Configuration. Error writing configuration parameters.

**Recommended actions**

## 12129, Restore error

**Description**

Error during the restore step Configuration. The structure is too deep.

**Recommended actions**

## 12130, Restore error

**Description**

Error during the restore step Configuration. No more objects.

**Recommended actions**

## 12131, Restore error

**Description**

Error during the restore step Configuration. The directory lacks at least one neccessary item.

**Recommended actions**

## 12132, Restore error

**Description**

Error during the restore step Configuration. The system version doesn't match the backup.

**Recommended actions**

## 12133, Restore error

**Description**

Error during the restore step Configuration. Error restoring configuration parameters.

**Recommended actions**

## 12134, Restore error

**Description**

Error during the restore step Configuration. Error restoring configuration parameters.

**Recommended actions**

## 12135, Restore error

**Description**

Error during the restore step Configuration. Mismatch between current system and the backup.