

Version 10/03



# Robot System Robby RP5 Robot (CCRP5)

Brief guide

Item no.: 19 03 33

These Operating Instructions are part of the product. They contain important information on commissioning and installation. Please follow them, including when passing this product on to third parties.

Please keep the Operating Instructions for future reference!



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Dear customer,

Before initial operation, please carefully and completely read these instructions and the entire operating instructions for the Robby RP5 robot and its suggested accessories. They contain numerous instructions regarding proper usage of this product and safety information. These operating instructions belong to this product. Please observe this information and point them out to others as well if you pass on the device to a third party. Therefore you should keep these operating instructions for future reference.

This product fulfils the requirements of the valid European and national guidelines. The conformity was proven and the corresponding explanations and data are available from the manufacturer.

**This is only a brief guide.**

**Detailed instructions for operating the RP5 robot system can be found in the complete operating instructions of the RP5 robot (Conrad item no. 19 03 33) and the operating instructions of the Robby RP5 extension board (Conrad Electronic Best. Nr. 19 03 10).**

**Both operating instructions and further information can be found on the CD included with the Robby RP5 robot or at our website: [www.c-robotics.de](http://www.c-robotics.de).**

## Proper use

This mobile robot has a programmable microcomputer that must be loaded via PC with the enclosed driver programs, example programs and custom programs. It experimentally demonstrates data collection and behaviours, for those interested in robotics, under the execution and effect of general software parameters. The robot is not certified for commercial usage.

Mobile operation is not permitted with a plugged-in power supply.

Any use other than described here is not permitted.

**Operation is only possible after installing the driver program from the CD.** Please get all necessary information regarding operation, control, and programming from the complete, detailed operating instructions of both the Robby RP5 and Robby RP5 extension board (Item no.: 19 03 10).

## Scope of delivery

- 1 connection-ready, constructed Robby RP5 robot
- 1 programming cable
- 1 CD with all necessary programs and detailed operating instructions
- 1 brief guide

## Safety instructions

**Read this section carefully! Non-compliance with the safety instructions poses a lethal hazard from electric shock or fire.**

The robot may not be used a toy by children under 14 years. Supervise children when operating the robot. Depending on programming, unexpected drive and control movements can occur.

For traction drive, there are **drive positions between the wheel and traction band**. These are mainly occupied and secured there between the wheel and gearbox. When using, make sure **not to put your fingers between the wheel and traction band**. Supervise any children in the room. Do not use the robot if there are small animals running free nearby.

**Caution!**



**Depending on the robot's programming, the motor can start unexpectedly!**

### 3 RUN\_ACS\_INTERRUPT.BAS

The ACS can also be used in Interrupt mode. This explains how it works.

### 4 RUN\_DRIVE.BAS

The robot is ready for its first trip. A demo for driving with ACS shows the basics of controlling the drive motors and how to avoid collision messages with a dodge manoeuvre.

**If you start a program that activates the drive system, you should first disconnect the interface cable from the robot.**

### 4 RUN\_MOTIONSENSOR\_ACS.BAS

See here how the ACS works as a motion sensor.

### 4 RUN\_DISTANCESENSOR\_ACS.BAS

In this demo, the ACS is used to maintain a constant distance from and, so to speak, monitor an object.

### 5 RUN\_LIGHT\_SENSOR\_1 to 3

These are three examples for using the light sensor as e.g. a motion monitor or light intensity gauge.

### 6 RUN\_TRIP\_COUNTER.BAS

Measuring travel paths is an essential point for orienting a robot in a room.

### 7 RUN\_VOLTAGE\_SENSOR.BAS

CCRP5 has a sensor for monitoring rechargeable battery voltage. Information for operation and meaning can be found in the example program.

### 8 RUN\_CURRENT\_SENSOR.BAS

### 9 RUN\_IR\_COMM.BAS

This is mainly used for the IR communication system.

### 9 RUN\_IR\_COMM\_INT.BAS

This is mainly used for the IR communication system with interrupt.

### 9 RUN\_REMOTE\_CONTROL.BAS

This shows how to use the communication system for remote transport control.

Covered components and conductor paths exist on the surface of the mainboard. Do not create any short-circuits from carelessly placed metal objects or other objects touching the metal underside.

Before operating the robot, all containers holding liquid, such as coffee cups, bottles or flower vases, must be stabilised or removed.

Do not operate the robot on tabletops or areas that present an accident hazard. Keep in mind the climbing ability of robot.

Do not operate the robot in an environment with flammable or explosive liquids, gases or dust.

## Quick introduction for start-up with an example program

### Set-up

- Only set up the robot in a dry and clean interior area. Dirt, dust, foreign particles and moisture will destroy the mechanical integrity of the device.
- Before working with the robot, you should touch a large, grounded object (e.g. PC housing, water pipe or heating pipe) in order to diminish static charge. Discharging the robot itself against grounded objects is not dangerous, but can crash programs and activate uncontrolled robotic functions.

### Power supply

All electrical connections for power supply to and from the device have been provided. Plugging/unplugging connection cables or creating/removing connections can lead to destruction of the control computer or connected devices. The robot is certified for a power supply of 7.2VDC produced by 6 NiCd rechargeable batteries. Only use a certified charger device for the rechargeable batteries. An available accessory, the plug-in power supply, can help for managing the rechargeable batteries. Optimal charging and protection against overloading can be ensured as a result.

The robot can also be operated with 6 high-quality, alkali-magnesium batteries. Because of high inner resistance, peaks in current (e.g. abrupt change in travel direction) must be avoided in the programming.

#### CAUTION:



- **Never try to connect the robot with an external power supply if no rechargeable batteries are installed.**
- **Never try to connect the robot with an external power supply if the ON/OFF switch is on OFF or if batteries are installed.**
- **Never connect a power supply unit apart from the one recommended as an accessory.**

In any of these cases, it is certain that components of the robot can be destroyed by overloading.

## Battery installation

Make **absolutely** sure:

- that the robot has no connection to the PC
- that the ON/OFF switch is on OFF (switched forward)

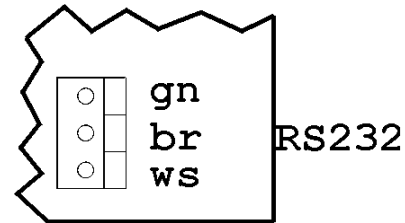
Remove the four fastening screws on the mainboard and **carefully** withdraw them. Insert 6 (at least minimally charged) Mignon NiCd batteries into the battery compartment with **proper polarity**. When you are certain the battery position is correct, remount the mainboard to the frame.

Recommended Power Supply Conrad Order-No. 51 00 10.

## Connecting the robot with the PC

Now connect the 1.5m null-modem cable to a free serial interface on your computer. Many computers have a 9-pole and 25-pole serial interface. If your computer only has a free 25-pole interface, use a supplemental adapter.

Connect the 3-pole plug at the end of the interface cable to the terminal strip of the robot, observing correct polarity (the plug has polarity protection).



## Software installation

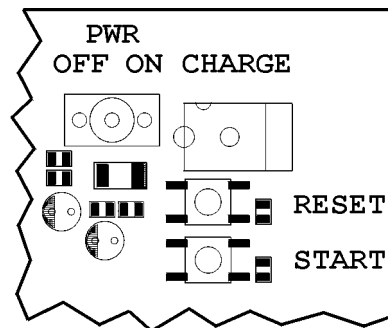
With the robot, you received an installation CD containing all necessary programs and examples.

- Insert the CCRP5 Utility CD. The installation screen appears automatically.
- Start the CCRP5 installation program.  
This program installs all necessary data on your computer.
- Start the CCRP5 program from the Windows menu Start/Programs/CCRP5.
- Select the "Environment" submenu under the "Options" menu.
- Select "Simulator and charger" and then make a connection to the interface on the rear side of your computer using the null modem cable.
- Close the window with OK.

The examples in CCBASIC, installed with the IDE in the Introduction\_CCBASIC directory, are not for operating the robot and are only intended as programming examples.

## Loading the systems driver and first function control

Now switch the robot's ON/OFF switch to ON and press the RESET button on the board. Robby RP5 is now ready to download the first program.



### CAUTION:



Do not skip this example since it loads an important system driver.

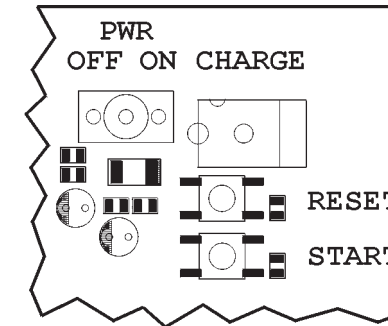
Start the program 1\_RUN\_LEDS.BAS in the IDE.

Select the "BASIC compiler" command from the "Development" menu. The program now converts (compiles) code. Observe the "Message" window. Messages regarding runtime and performance of the conversion appear in the message window. If errors are contained in the BASIC source code, this is displayed in the message window.

No errors should occur with this example.

After a correct transfer, select the "Transfer to C-Control unit" command in the "Development" menu. The codes generated by the compiler are then available to the robot's core, C-Control (computer control). Performance or error messages during the transfer appear in the message window.

If the transfer occurs with errors, press the START button on the robot mainboard to start the program. Four red LED's give a running status signal.



4\_RUN\_DRIVE.BAS.

Before you send the robot on its first trip, run at least the first 4 example programs and familiarise yourself with robot management and using sensors.

## Example programs on the CD

The examples contain all programming components for controlling system resources, because they must be partly accessed during the installation. The relevant example code is provided and clearly explained. With all examples, the last program line is "commented out" since it loads the system driver. Loading the driver is only necessary once and is performed with the first example.

There are 14 examples on the CD, from 001.BAS to 014.BAS, which help explain the CC-BASIC language step-by-step.

### 1 RUN\_LEDS.BAS

This example shows how LED's 1 to 4 are controlled. The LED's, along with the beeper, provide the single output option.

### 1 RUN\_TOUCHSENSOR\_1.BAS

The robot has a touch sensor as an input option. It is connected to an A/D converter and can differentiate between several degrees of contact. Get an impression of the kind of touch to apply and observe A/D converter values shown in the bar display.

### 1 RUN\_TOUCHSENSOR\_2.BAS

This example shows how recognition is used as well as, for example, how to select one program from four.

### 2 RUN\_SOUNDSENSOR.BAS

The sound level is valuated and displayed with LED's.

### 3 RUN\_ACS.BAS

Here the subsystem for the anti-collision system (ACS) component is explained. This example shows the functionality of the ACS. Use this program to get an idea of what the ACS does and doesn't see.

### 3 RUN\_ACS\_SENSITIVITY.BAS

This example demonstrates how to adjust the sensitivity of the ACS and how far the detection area extends.