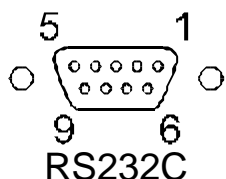


## 11. Remote control

### 11.1. Setup for remote control



- Check the interface parameters for both interfaces (on circulator and PC) and make sure they match. (Serial interface - see page 35)
- Set the menu item >Remote< from >no< to >YES<. (see page 34).
- Connect both units with an interface cable.



Like all parameters which can be entered through the keypad, interface parameters are stored in memory even after the circulator is turned off.

### 11.2. Communication with a PC or a superordinated data system



If the circulator is put into remote control mode via the menu item >Remote<, the MULTI-DISPLAY (LED) will read „R -OFF-„, = REMOTE STOP. The circulator is now operated via the computer. In general, the computer (master) sends commands to the circulator (slave). The circulator sends data (including error messages) only when the computer sends a query.



In remote control mode: After a power interruption the order to start and all values which have to be adjusted must be resent from the personal computer via the interface. AUTOSTART is not possible.

A transfer sequence consists of:

- command
- space (↔; Hex: 20)
- parameter (the character separating decimals in a group is the period)
- end of file (↵; Hex: 0D)

The commands are divided into **in** or **out** commands.

**in** commands: asking for parameters to be displayed

**out** commands: setting parameters



The **out** commands are valid only in remote control mode.

Examples:

Command to set the working temperature >t 1< to 55,5 °C:

**out\_sp\_00** ⇔ **55.5**¿

Command to ask for the working temperature >t 1<:

**in\_sp\_00**¿

Response from the circulator:

**55.5**¿

### 11.3. List of commands

**out commands:** Setting parameters or temperature values.

| Command     | Parameter | Response of circulator                           |
|-------------|-----------|--|
| version     | None      | Number of software version (V X.xx)              |
| status      | none      | Status message, error message (see page 46 )     |
|             |           |  |
| out_mode_01 | 0         | Use working temperature >t 1<                    |
| out_mode_01 | 1         | Use working temperature >t 2<                    |
| out_mode_01 | 2         | Use working temperature >t 3<                    |
| out_mode_05 | 0         | Stop the unit = R –OFF-.                         |
| out_mode_05 | 1         | Start the unit.                                  |
|             |           |  |
| out_sp_00   | xxx.xx    | Set working temperature. „t 1“                   |
| out_sp_01   | xxx.xx    | Set working temperature. „t 2“                   |
| out_sp_02   | xxx.xx    | Set working temperature. „t 3“                   |
| out_sp_03   | xxx.xx    | Set high temperature warning limit „t High“      |
| out_sp_04   | xxx.xx    | Set low temperature warning limit „t Low“        |
| out_sp_07   | x         | Set the pump pressure stage. (1 ... 4)           |
|             |           |  |
| out_par_06  | xxx       | Xp control parameter of the internal controller. |
| out_par_07  | xxx       | Tn control parameter of the internal controller. |
| out_par_08  | xxx       | Tv control parameter of the internal controller. |

**in commands:** Asking for parameters or temperature values to be displayed.



| <b>Command</b> | <b>Parameter</b> | <b>Response of circulator</b>  |
|----------------|------------------|--|
| in_pv_00       | none             | Actual bath temperature.   |
| in_pv_01       | none             | Heating power being used (%).  |
| in_pv_03       | none             | Temperature value registered by the safety sensor.                                   |
| in_pv_04       | none             | Setpoint temperature („SafeTemp“) of the excess temperature protection               |
| in_sp_00       | none             | Working temperature „t 1“  |
| in_sp_01       | none             | Working temperature „t 2“  |
| in_sp_02       | none             | Working temperature „t 3“  |
| in_sp_03       | none             | High temperature warning limit „t High“  |
| in_sp_04       | none             | Low temperature warning limit „t Low“  |
| in_sp_07       | none             | Pump pressure stage  |
| in_par_01      | none             | Te - Time constant of the external bath.   |
| in_par_02      | none             | Si - Internal slope  |
| in_par_03      | none             | Ti - Time constant of the internal bath.   |
| in_par_06      | none             | Xp control parameter of the internal controller.                                     |
| in_par_07      | none             | Tn control parameter of the internal controller.                                     |
| in_par_08      | none             | Tv control parameter of the internal controller.                                     |
| in_mode_01     | none             | Selected setpoint:<br>0 = Setpoint „t 1“<br>1 = Setpoint „t 2“<br>2 = Setpoint „t 3“ |
| in_mode_05     | none             | Circulator in Stop/Start condition:<br>0 = Stop<br>1 = Start                         |

#### 11.4. Status messages

| Status messages        | Description                        |
|------------------------|------------------------------------|
| <b>00 MANUAL STOP</b>  | Circulator in „OFF“ state.         |
| <b>01 MANUAL START</b> | Circulator in keypad control mode. |
| <b>02 REMOTE STOP</b>  | Circulator in „r OFF“ state.       |
| <b>03 REMOTE START</b> | Circulator in remote control mode. |

#### 11.5. Error messages

| Error messages                                    | Description  |
|---|--|
| -01 LOW LEVEL ALARM                               | Low liquid level alarm.  |
| -02 REFRIGERATOR ALARM                            | Control cable of the refrigerated circulator or MVS solenoid valve controller short-circuited or interrupted.          |
| -03 EXCESS TEMPERATURE WARNING                    | High temperature warning.  |
| -04 LOW TEMPERATURE WARNING                       | Low temperature warning.   |
| -05 WORKING SENSOR ALARM                          | Working temperature sensor short-circuited or interrupted.   |
| -06 SENSOR DIFFERENCE ALARM                       | Sensor difference alarm.<br>Working temperature and safety sensors report a temperature difference of more than 25 °C. |
| -07 I <sup>2</sup> C-BUS ERROR                    | Internal error when reading or writing the I <sup>2</sup> C bus.   |
| -08 INVALID COMMAND                               | Invalid command.   |
| -09 COMMAND NOT ALLOWED IN CURRENT OPERATING MODE | Invalid command in current operating mode.   |
| -10 VALUE TOO SMALL                               | Entered value too small.   |
| -11 VALUE TOO LARGE                               | Entered value too large.   |
| -12 TEMPERATURE MEASUREMENT ALARM                 | Error in A/D converter.  |

| Error messages  | Description  |
|---|--|
| -13 WARNING : VALUE EXCEEDS TEMPERATURE LIMITS                              | Value lies outside the adjusted range for the high and low temperature warning limits. But value is stored.  |
| -14 EXCESS TEMPERATURE PROTECTOR ALARM                                      | Excess temperature protection alarm   |
| -20 WARNING: CLEAN CONDENSOR OR CHECK COOLING WATER CIRCUIT OF REFRIGERATOR | Cooling of the condenser is affected.<br>Clean air-cooled condenser.<br>Check the flow rate and cooling water temperature on water-cooled condenser.   |
| -21 WARNING: COMPRESSOR STAGE 1 DOES NOT WORK                               | Compressor stage 1 does not work.  |
| -22 WARNING: COMPRESSOR STAGE 2 DOES NOT WORK                               | Compressor stage 2 does not work.  |
| -23 WARNING: HIGH TEMPERATURE ON COMPRESSOR STAGE 1                         | Excess temperature on compressor stage 1.  |
| -24 WARNING: HIGH TEMPERATURE ON COMPRESSOR STAGE 2                         | Excess temperature on compressor stage 2.  |
| -25 REFRIGERATOR WARNING  | Error in the refrigerating machine.  |
| -30 CONFIGURATION ERROR: CONFIRM BY PRESSING <ENTER> ON CIRCULATOR          | The configuration of the circulator does not conform to its present use.<br>Press enter  to automatically perform a single modification of the configuration. |
| -33 SAFETY SENSOR ALARM   | Excess temperature sensor short-circuited or interrupted.  |
| -40 NIVEAU LEVEL WARNUNG  | Low liquid level warning in the internal reservoir.  |

## 12. JULABO Service – Online remote diagnosis

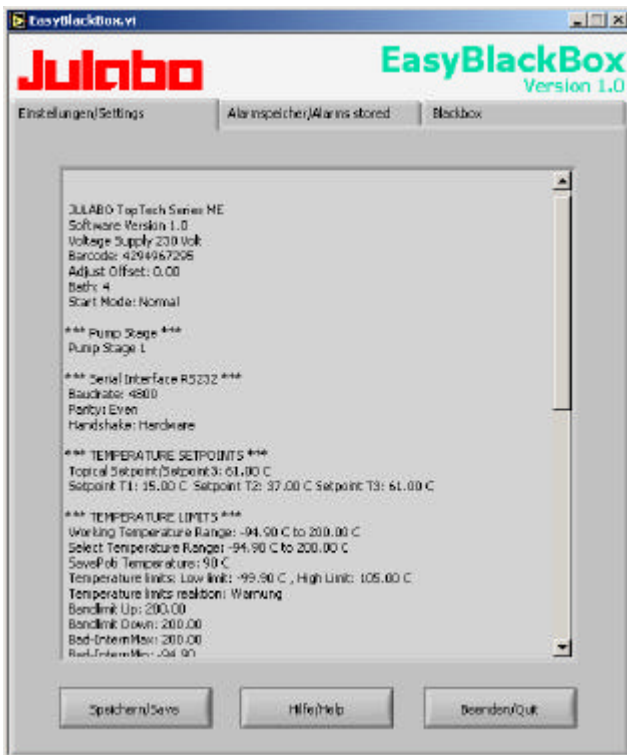
JULABO circulators of the HighTech series are equipped with a so-called black box. This box is implemented in the controller and records all significant data for the last 30 minutes.

In case of a failure, this data can be read out from the unit by using special software. The respective program is available for **free** download from [www.julabo.de](http://www.julabo.de) \ EasyBlackBox.

- Installation is easy and carried out step by step. Please observe the instructions.



- Data read-out is possible in the conditions „OFF“, „R OFF“ or „ALARM“.
- Connect the circulator to the computer using an interface cable.
- Start the EasyBlackBox program. The program asks for the used port (COM1, .....) and the baud rate of the unit. You do not have this information on hand? Simply try it out! The program keeps on sending this request until the actually used port and correct baud rate are entered.



- Data is read out and shown on the monitor divided in the sections >Einstellungen/Settings<, >Alarmspeicher/Alarms stored<, >Blackbox<
- ← see example
- After pressing >Speichern/Save< a text file is compiled. The program proposes a filename - >C:\model description and barcode no.<. Modifications are possible.
- E-mail this file to [service@julabo.de](mailto:service@julabo.de), JULABO's service department. JULABO is thus able to provide rapid support.