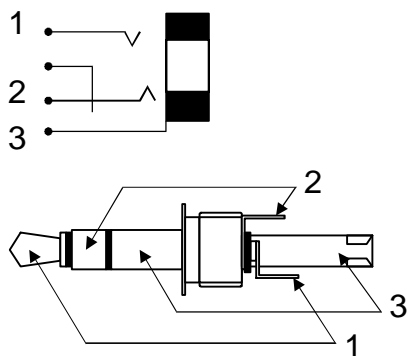


1. ELECTRICAL CONNECTION

RS232C serial interface

This port can be used to connect a computer with an RS232C cable for remote control of the waterbath.

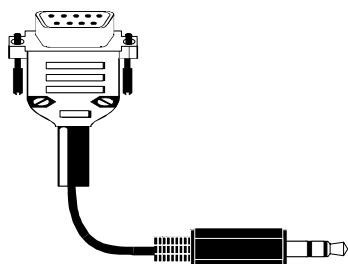


Pin assignment:

| | | |
|-------|------|---------------|
| Pin 1 | RxD | Receive Data |
| Pin 2 | TxD | Transmit Data |
| Pin 3 | 0 VD | Signal GND |



Use shielded cables only.



Accessories:

RS-232 interface connecting cable, terminated with 3-pin Cinch plug and 9 hole subD socket. Length: 3.0 m.

Order No. 8 980 075

If the waterbath is put into remote control mode via the menu level, the display will read "OFF" = REMOTE STOP.

The waterbath is now operated via the computer.

In general, the computer (master) sends commands to the waterbath(slave). The waterbath sends data (including error messages) only when the computer asks for it.

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 to 55.5 °C:
out_sp_00 ⇔ 55.5↵
- Command to ask for the working temperature T:
in_sp_00↵
- Response from the waterbath:
55.5↵

1.1. List of commands

| Command | Parameter | Response of the shaking water bath |
|-------------|-----------|--|
| version | none | Number of software version(V X.xx) |
| status | none | Status message, error message (see below) |
| out_mode_05 | 0 | STOP - returns the water bath to the „OFF“ state |
| out_mode_05 | 1 | START - water bath is switched to the operating state |
| out_mode_08 | 0 | Circulator pump „OFF“ |
| out_mode_08 | 1 | Circulator pump „ON“ |
| out_mode_09 | 0 | Shaking operation drive motor „OFF“ |
| out_mode_09 | 1 | Shaking operation drive motor „ON“ |
| out_sp_00 | xxx.x | Set working temperature „T“ |
| out_sp_02 | xxx.x | Set high temperature warning limit \mathcal{J}_w |
| out_sp_03 | xxx.x | Set low temperature warning limit \mathcal{J}_w |
| out_sp_16 | xxx.x | Set shaking frequency |
| in_sp_00 | none | Ask for working temperature „T“ |
| in_sp_02 | none | Ask for high temperature warning limit \mathcal{J}_w |
| in_sp_03 | none | Ask for low temperature warning limit \mathcal{J}_w |
| in_sp_16 | kein | Ask for shaking frequency |
| in_pv_00 | none | Ask for actual bath temperature |
| in_pv_01 | none | Ask for the heater wattage being used |

1.2. Status messages

| Message | Description |
|-----------------|-----------------------------------|
| 01 MANUAL START | Waterbath in keypad control mode. |
| 02 REMOTE STOP | Waterbath in „OFF“ state |
| 03 REMOTE START | Waterbath in remote control mode |

1.3. Error messages

| Message | Description |
|--|---|
| -01 TEMP / LEVEL ALARM | Safety temperature or low liquid level alarm |
| -03 EXCESS TEMPERATURE WARNING | High temperature warning „ T_w „ |
| -04 LOW TEMPERATURE WARNING | Low temperature warning „ $-T_w$ „ |
| -05 TEMPERATURE MEASUREMENT ALARM | Error in measuring system |
| -07 I ² C-BUS WRITE ERROR -07 I ² C-BUS READ ERROR -07 I ² C-BUS READ/WRITE ERROR | Internal error |
| -08 INVALID COMMAND | Invalid command |
| -10 VALUE TOO SMALL | Entered value too small |
| -11 VALUE TOO LARGE | Entered value too large |
| -12 WARNING : VALUE EXCEEDS TEMPERATURE LIMITS | Value lies outside the adjusted range for the high and low temperature warning limits. But value is stored. |
| -13 COMMAND NOT ALLOWED IN CURRENT OPERATING MODE | Invalid command in current operating mode |