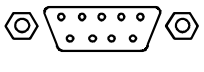
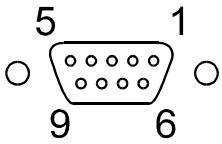


RS232C serial interface

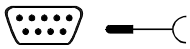
This port can be used to connect a computer with an RS232C cable for remote control of the controller.



Pin assignments:

Pin 2	RxD	Receive Data
Pin 3	TxD	Transmit Data
Pin 5	0 VD	Signal GND
Pin 6	DTR	Data terminal ready
Pin 7	RTS	Request to send
Pin 8	CTS	Clear to send

Interface correspondence:

Controller		Computer	Controller		Computer
					
9-pole		25-pole	9-pole		9-pole
Pin 2 RxD	⇔	Pin 2 TxD	Pin 2 RxD	⇔	Pin 3 TxD
Pin 3 TxD	⇔	Pin 3 RxD	Pin 3 TxD	⇔	Pin 2 RxD
Pin 5 GND	⇔	Pin 7 GND	Pin 5 GND	⇔	Pin 5 GND
Pin 6 DTR	⇔	Pin 6 DSR	Pin 6 DTR	⇔	Pin 6 DSR
Pin 7 RTS	⇔	Pin 5 CTS	Pin 7 RTS	⇔	Pin 8 CTS
Pin 8 CTS	⇔	Pin 4 RTS	Pin 8 CTS	⇔	Pin 7 RTS

If the controller is put into remote control mode via the configuration level, the display will read "r OFF" = REMOTE STOP. The controller is now operated via the computer.

In general, the computer (master) sends commands to the controller (slave). The controller 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 T1 to 55.5 °C

out_sp_00 ⇔ 55.5↵

Command to ask for the working temperature T1:

in_sp_00↵

Response from the circulator:

55.5↵

0.1. List of commands

Befehl	Parameter	Description
version	none	Number of software version (V X.xx)
status	none	Status message, error message (see page 5)
out_mode_05	0	Stop the controller = r OFF
out_mode_05	1	Start the controller
out_mode_02	1	Parameter set 1 effective for control
out_mode_02	2	Parameter set 2 effective for control
out_mode_02	3	Parameter set 3 effective for control
out_mode_02	4	Parameter set 4 effective for control
out_mode_02	5	Parameter set 5 effective for control
in_mode_02	none	Ask for effective parameter set
out_sp_00	xxx.x	Set working temperature
in_sp_00	none	Ask for working temperature
in_pv_00	none	Ask for effective value registered by working sensor
in_pv_01	none	Ask for effective heater capacity
out_par_00	xxx.x	Set Xp of parameter set 1
in_par_00	none	Ask for Xp of parameter set 1
out_par_01	xxx.x	Set Tn of parameter set 1
in_par_01	none	Ask for Tn of parameter set 1
out_par_02	xxxx.x	Set Tv of parameter set 1
in_par_02	none	Ask for Tv of parameter set 1
out_par_03	xxx.x	Set Xp of parameter set 2
in_par_03	none	Ask for Xp of parameter set 2

Command	Parameter	Description
out_par_04	xxx.x	Set Tn of parameter set 2
in_par_04	none	Ask for Tn of parameter set 2
out_par_05	xxxx.x	Set Tv of parameter set 2
in_par_05	none	Ask for Tv of parameter set 2
out_par_06	xxx.x	Set Xp of parameter set 3
in_par_06	none	Ask for Xp of parameter set 3
out_par_07	xxx.x	Set Tn of parameter set 3
in_par_07	none	Ask for Tn of parameter set 3
out_par_08	xxxx.x	Set Tv of parameter set 3
in_par_08	none	Ask for Tv of parameter set 3
out_par_09	xxx.x	Set Xp of parameter set 4
in_par_09	none	Ask for Xp of parameter set 4
out_par_10	xxx.x	Set Tn of parameter set 4
in_par_10	none	Ask for Tn of parameter set 4
out_par_11	xxxx.x	Set Tv of parameter set 4
in_par_11	none	Ask for Tv of parameter set 4
out_par_12	xxx.x	Set Xp of parameter set 5
in_par_12	none	Ask for Xp of parameter set 5
out_par_13	xxxx.x	Set Tn of parameter set 5
in_par_13	none	Ask for Tn of parameter set 5
out_par_14	xxxx.x	Set Tv of parameter set 5
in_par_14	none	Ask for Tv of parameter set 5

0.2. Status messages

Message	Description
00 MANUAL STOP	Controller in "OFF" state
01 MANUAL START	Controller in keypad control mode
02 REMOTE STOP	Controller in "r OFF" state
03 REMOTE START	Controller in remote control mode

0.3. Error messages

Message	Description
-01 SAFETY-TEMP ALARM	Safety temperature alarm
-05 TEMPERATURE MEASUREMENT ALARM	Error in measuring system.
-07 I^2C-BUS WRITE ERROR -07 I^2C-BUS READ ERROR -07 I^2C-BUS READ/WRITE ERROR	Internal errors
-08 INVALID COMMAND	Invalid command
-10 VALUE TOO SMALL	Entered value too small
-11 VALUE TOO LARGE	Entered value too large
-12 VALUE NOT VALID	Value not valid
-13 COMMAND NOT ALLOWED IN CURRENT OPERATING MODE	Invalid command in current operating mode