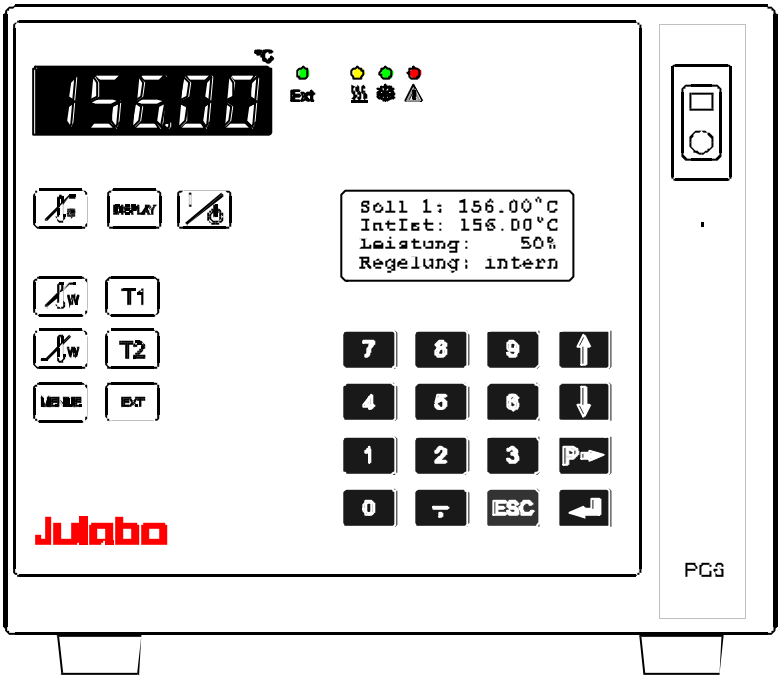
Operating Manual

Programmer

PG6



JULABO PG 6
Version 5.00

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Congratulations!

You have made an excellent choice.
JULABO thanks you for the trust you have placed in us.
This operating manual has been designed to help you gain an understanding of the principles of operating and possibilities of our circulators. For optimum utilization of all functions, we recommend that you thoroughly study this manual prior to beginning operation.

Safety Warnings

Take care your unit is operated only by qualified persons.
Make sure you read and understand all instructions and safety precautions listed in this manual before installing or operating your unit. If you have any questions concerning the operation of your unit or the information in this manual, contact JULABO.

Performance of installation, operation, or maintenance procedures other than those described in this manual may result in a hazardous situation and may void the manufacturer's warranty.

Transport the unit with care. Sudden jolts or drops may cause damages in the interior of the unit.

Observe all warning labels.

Never remove warning labels.

Never operate damaged or leaking equipment.

Always turn off the unit and disconnect the mains cable from the power source before performing any service or maintenance procedures, or before moving the unit.

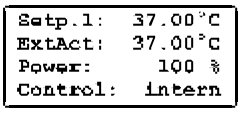
Never operate equipment with damaged mains power cables.

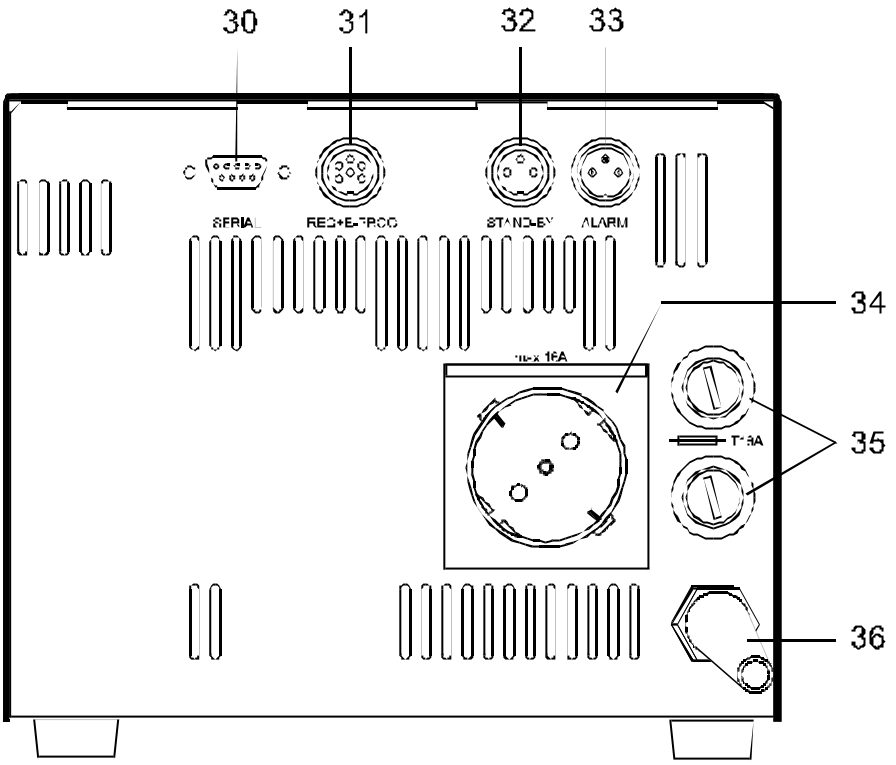
Refer service and repairs to a qualified technician.

	In addition to the safety warnings listed above, warnings are posted throughout the manual. These warnings are designated by an exclamation mark inside an equilateral triangle. „Warning of a dangerous situation (Attention ! Please follow the documentation).“ The danger is described according to an alarm keyword. Read and follow these important instructions.
	**Warning:** Describes a possibly highly dangerous situation. If this is not avoided, serious injury and danger to life could result.
	**Caution:** Describes a possibly dangerous situation. If this is not avoided, slight or minor injuries could result. A warning of possible damage can also be contained in the text.
	**Notice:** Describes a possibly harmful situation. If this is not avoided, the product or anything in its surroundings can be damaged.

TABLE OF CONTENTS

1. Operating controls and functional elements

1		Mains power switch, illuminated
2		Start / stop key
3		Working temperature T1
4		Working temperature T2 *
5		High temperature warning limit
6		Low temperature warning limit
7		Key not assigned
9		Control type: internal/external control *
10		MULTI-DISPLAY (LED) temperature indication
11		Display of internal/external actual value
		Indicator lights: Temperature indication - external actual value * Alarm / Cooling / Heating
12		DIALOG-DISPLAY (LCD) for indication of: Line 1: Setpoint  or  or  or  Line 2: Internal or external actual value  Line 3: Heating power in % Line 4: Control type: internal /  external control *
13		MENUE key - for selecting the menu functions
14		Cursor keys - Select menu items
15		P-key Selecting parameters
16		Numeral keypad: numerals 0 to 9; minus / decimal point
17		Enter key 1) Store value / parameter 2) Next lower menu level
18		Escape key 1) Cancel entries 2) Return to a higher menu level



Rear view

30	SERIAL	Interface RS232
31	REG+E-PROG	Programmer output (analog signal)
32	STAND-BY	Stand-by input (for external emergency switch-off)
33	ALARM	Socket: output for alarm messages
36		Integrated mains outlet: for powering the connected equipment for remote control; max. current rating: 16 A
28		Mains fuses T16A
29		Mains power cable with plug

* The functions of the keys and indicators depend on the technical features of the equipment connected. If the features of the equipment connected match with the functions of the Programmer, they can also be remotely controlled by the Programmer via the serial interface connection.

2. Unpacking and checking

Unpack the programmer and accessories and check for damages incurred during transit. These should be reported to the responsible carrier, railway, or postal authority, and a request for a damage report should be made. These instructions must be followed fully for us to guarantee our full support of your claim for protecting against loss from concealed damage. The form required for filing such a claim will be provided by the carrier.

3. Description

The Julabo Programmer PG6 provides the nominal values for time- and temperature controlled processes for the connection of circulators, laboratory temperature controllers and recirculating coolers. Such a temperature response is referred to as „profile“. A profile consists of individual segments. The segments are defined by time and the decided end temperature. The end temperature is identical with the nominal temperature reached at the end of a segment. The time and temperature difference within a segment is used by the Programmer to compute and establish a temperature ramp.
The Programmer PG6 features a number of novelties:

- selections of functions via waterprotected foil keypad.
- user guidance DIALOG display optionally in German or English.
- automatic identification of the connected JULABO equipment by means of the serial interface connection. The PG6 can then be used for remote control of the connected equipment.
  Error messages issued by the connected equipment are also optically and acoustically displayed and indicated on the Programmer.
- program signal output via RS 232 serial interface connector.
  Only JULABO equipment with correspondingly configured RS 232 interface may be connected to this digital output connector.
- 6-pin output socket for analog signal output.
  This output enables connection of JULABO equipment as well as other equipment with a corresponding programmer input connection.
- memory for presetting up to 6 temperature profiles.
- each profile can feature as many as 60 program segments and may be repeated up to 99 times. The individual segments can be programmed with a maximum time of 99 hours and 59 minutes.
- temperature control range from -100 °C...+400 °C.

Programming units of this model-line comply with the low voltage guide lines of EN 61010 and the NAMUR recommendations.

4. Quality Management System

Quality Management System

The JULABO **Q**uality **M**anagement **S**ystem:
Development, production and distribution of temperature application instruments for research and industries conform to the requirements according to DIN EN ISO 9001:2000.
Certificate Registration No. QA 051004008.

5. Safety recommendations

Warning:

To prevent injuries to personnel and/or damage to the equipment, it is important to comply with the safety recommendations for the equipment connected (see chapter „Safety recommendations“ in the operating instructions of the relevant equipment)..

Important!

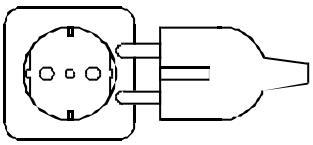
The safety temperature adjustment (overtemperature protection according to IEC 61010-2-010) is performed by an independent control circuit and must be adjusted directly on the equipment connected..

6. Operating procedures

6.1. Power connection

Caution:

Connect the unit only to a grounded mains power socket!
We disclaim all liability for damage caused by incorrect line voltages!

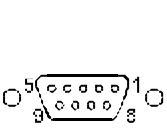


Check to make sure that the line voltage matches the supply voltage specified on the identification plate.

Deviations of ±10 % are permissible.

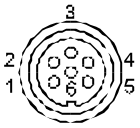
6.2. Preparations for remote control

- The Programmer PG6 offers two different methods of signal output:



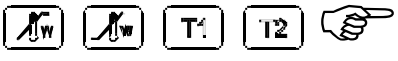
SERIAL

Digital signal output via RS 232 serial interface SERIAL.



REG+E-PROG

Analog signal output (current or voltage) via the 6-pin connecting socket REG +E-PROG.



On the PG6 programmer please check and change (if necessary) the values for warning functions (see page 14) and working temperatures T1, T2 (see page 13).

Important:

All temperature values entered by means of the keypad must lie within the valid adjustment range of the unit connected for remote control operation to avoid error messages appearing during the self-test ③ (see page 10)

- Equipment to be remotely controlled must first be set up for signal reception.

Equipment with RS 232 interface connection:
Switch the equipment to REMOTE operation (message: rOFF).

Equipment with analog input only:
This type of equipment can be switched to the E-PROG input by means of a switch.

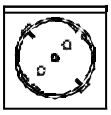
For a detailed description on the set-up, always refer to the operating instructions of the equipment connected.

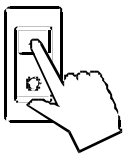
Please note:
If the equipment to be remotely controlled features both types of inputs, the RS 232 serial interface connection should be used for presetting the nominal value.

Connect and fasten the 9-pole connecting cable to both units.

JULABO No. 8980090

Connect and fasten the 6-pole connecting cable to both units..





SLAVE

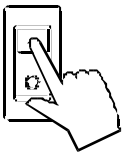
Important!

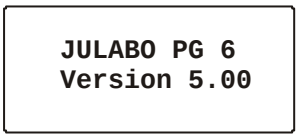
Connect the equipment to be remotely controlled (Slave unit) to the integrated mains power socket on the rear of the Programmer and switch the equipment with the mains power switch to position „ON“.

Connect the equipment to be remotely controlled (Slave unit) to the integrated mains power socket on the rear of the Programmer or to some other mains outlet, and switch on the equipment with the mains power switch.

Please note:
At digital data transmission, the Slave unit will be switched off and on with the mains power switch of the Programmer only.
This ensures that the values in the RAM of the Slave unit are always supplied and controlled by the Programmer. The switch-on tests ①, ② and ③ (see below) must have been performed successfully (without any error messages appearing) at least one time.

6.3. Switching on / Selecting the language



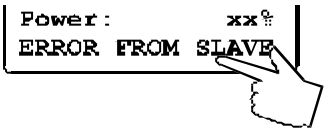


Programmer switch-on:

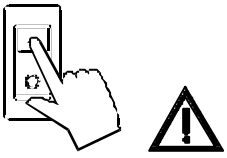
The Programmer and the Slave unit connected to it are switched on with the mains power switch on the front of the Programmer.

① On switch-on, a self-test-routine takes place, during which time all segments of the 5-digit LED MULTI-DISPLAY, all control indicators and the DIALOG-DISPLAY will illuminate.
The installed software version (e.g. 5.00) will be displayed briefly in addition, after which the message „**OFF**“ appears to indicate standby for operation.

Select language:	**see page 10**
Select input:	**see page 10**



Should the error message „E09/ERROR FROM SLAVE appear, it indicates that the Slave unit has not been set up for (switched to) remote control operation.

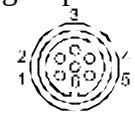


- Switch the Slave unit to remote control operation (message: rOff)
- Switch off the Programmer briefly with the mains power switch and then switch it on again
  → ① see above

<u>continue with ② and ③</u>

Digital output:

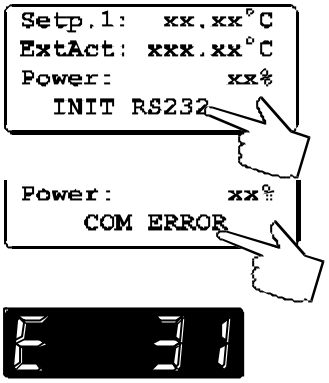
Analog output:



- Match the analog output of the Programmer to the program input of the Slave unit (see pages 16 and 24).
- Select and start the desired preset temperature profile on the Programmer

Starting the Programmer
(see page 19)

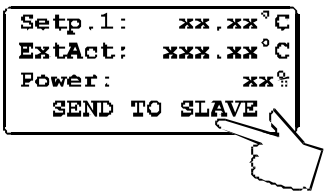
Programmer
(see page 21)



② A second test procedure serves testing of the serial interface. The adjustments of both interfaces must match. Activation of the test procedure is indicated by the message „INIT RS232“ appearing in the DIALOG-DISPLAY.
If the interface adjustments do not match or the connecting cable is defective, the message „COM ERROR“ is displayed and error message „E 31“ appears.

- Match the interface connection on the slave unit to the factory-set values of the Programmer (see page 27).
- **Important!**
  Switch off the Programmer briefly with the mains power switch and then switch it on again. → see ① above.

All JULABO equipment leaves the factory with identical adjustments, so that normally, no error message should appear during the test procedure.



③ On successful completion of the interface test, the Programmer identifies the connected unit and then transfers all data and parameters to the RAM of the connected Slave unit via the interface connection. During data transmission the message „SEND TO SLAVE“ will appear in the DIALOG-DISPLAY.

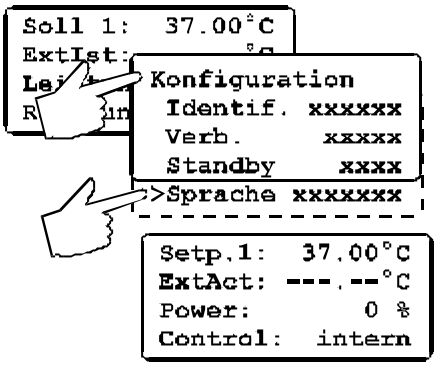
All temperature values entered by means of the keypad must lie within the valid adjustment range of the unit connected for remote control operation to avoid error messages appearing during the self-test ③ !

- The menue functions now available depend on the technical features (options) of the connected Slave unit (see page 16)

NAMUR recommendation:
The defined safe operating state „off“ is also assumed after a power failure, for example. The preset profiles are hereby retained in the memory circuit of the Programmer. The connected Slave unit is again identified, after which the relevant data and parameters are once more transferred to the RAM of the Slave unit.

Selecting the language:

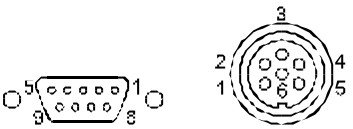
There are two options for the language of the DIALOG-DISPLAY (LCD): German or English. Select the desired language in the MENUE level under the configuration submenu.



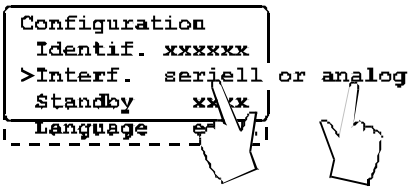
Press the respective keys in the following order:

1. MENUE key 1x
2. Enter key 1x
3. Cursor key 3x
4. P key 1x
5. Enter key 1x
6. Escape key 2x

The DIALOG-DISPLAY (LCD) helps to follow up the individual settings. (example: swap the language from German to English.)



SERIAL REG+E-PROG



Selecting the output:

The selection is performed at menue level by choosing (selecting) the option „>Configuration“.

The number of switch-on test procedures and the program output mode depend on the adjustments of the interface connection („Interf.“).

The interface connection on JULABO equipment is factorywise set for „analog“ output.

On the PG6 programmer check the values for warning functions (see page 14) and the working temperatures T1, T2 (see page 13) prior to switching to the serial interface on the PG6 programmer. **All temperature values entered by means of the keypad must lie within the valid adjustment range of the unit connected for remote control operation to avoid error messages appearing during the self-test ③ (see page 10)!**

To change to serial data output press the following keys in the order and number of times indicated:

1. MENUE key 1x
2. ENTER key 1x
3. Cursor key 1x
4. P- key 1x
5. ENTER key 1x
6. ESC key 2x

The individual actions can be monitored on the LCD DIALOG-DISPLAY .

All parameters which can be entered through the keypad are stored in memory even after the programmer is turned off.

7. Remote control

7.1. Remote control via operator foil keypad

The number of available functions depend on the technical features of the unit connected.

7.1.1. Start - Stop

JULABO Model:	HD/SD/TD; HP/SP/TP; MD/MV/MW; FC600/S; FC1200/S/T; FC1600/S/T HE/SE/HL/SL, Semichill Recirculating coolers SCXXXXx

Start:

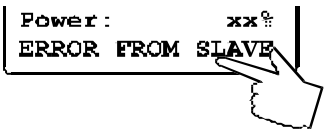
- Press the start/stop key  .
  The MULTI-DISPLAY (LED) indicates the actual bath temperature. (example: 21.03 °C)

Stop:

- Press the start/stop key  .
  The MULTI-DISPLAY (LED) indicates the message "OFF".

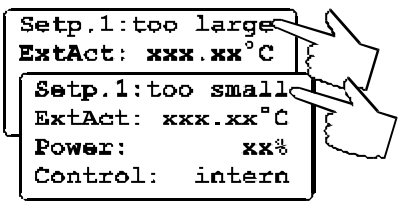
7.1.2. Setting the temperatures

All temperature values entered by means of the keypad must lie within the valid adjustment range of the unit connected for remote control operation.



1. If a value outside the valid adjustment range of the connected equipment is entered, an error message is displayed in the LED MULITI-DISPLAY (E 13, for example) and an acoustical alarm signal is output.
   Even though the value entered has been accepted by the Programmer, it could not be transferred to the connected equipment because it is outside the acceptable parameter limits of that equipment.

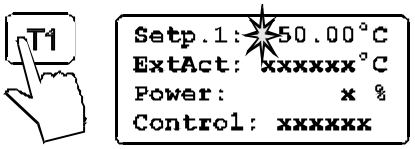
See page 29 („Error messages of remotely controlled unit“)



2. If a value outside the valid adjustment range of the Programmer is entered, the entry will be disregarded (not saved) and a corresponding message appears in the DIALOG-DISPLAY.

- Correction of an invalid entry**:**
  To correct an invalid entry simply enter a new value within the valid adjustment range of the Programmer

JULABO Model:	HD/SD/TD; HP/SP/TP; MD/MV/MW; FC600/S; FC1200/S/T; FC1600/S/T HE/SE/HL/SL, Semichill Recirculating coolers SCXXXXx

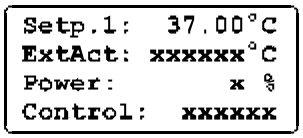


This setting may be carried out with the programmer being in operating state Start or Stop!

Setting the working temperature "T1":

① Press the setpoint key T1.
The value previously set appears on the DIALOG-DISPLAY (LCD) (example: 50.00°C).
A flashing segment indicates that a value needs to be entered.

② Use the keypad to enter the new value (example: 37.00 °C).



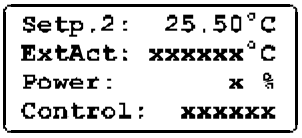
③ Press enter ↵ to store the selected value.

Setting the working temperature "T2":

① Press the setpoint key T2.

② Follow the instructions

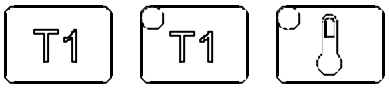
③ for "T1" (example: 25.50 °C).



Selecting the working temperature:

- Press the setpoint key T1 or. T2 and then enter ↵.

Example:

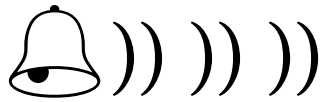


HD MV FC

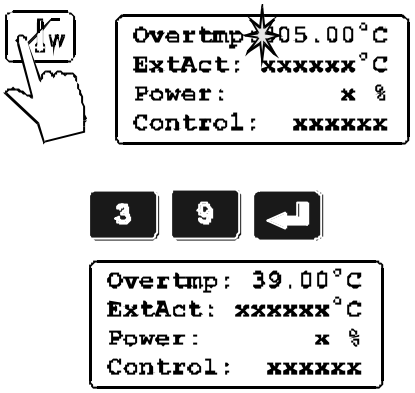
- Depending on the configuration of the remote controlled equipment, this value is indicated either as T1 or as nominal value .

7.1.3. Warning functions

JULABO Model:	HD/SD/TD; HP/SP/TP; MD/MV/MW; HE/SE/HL/SL, Semichill Recirculating coolers SCXXXXx



An audible signal sounds in intervals when the actual temperature value exceeds one of the set limits (patented).
The threshold values of the connected equipment can be redefined by the Programmer

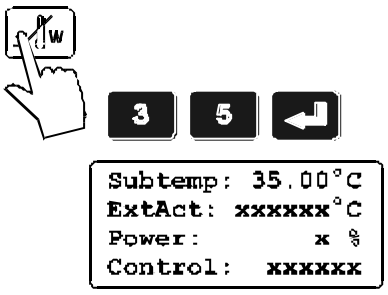


Setting the high temperature limit:

① Press the key .
The value previously set appeears on the DIALOG-DISPLAY (LCD) (example: 305.00°C). A flashing segment indicates that a value needs to be entered.

② Use the keypad to enter the new value (example: 39.00 °C).

③ Press enter to store the value.



Setting the low temperature limit:

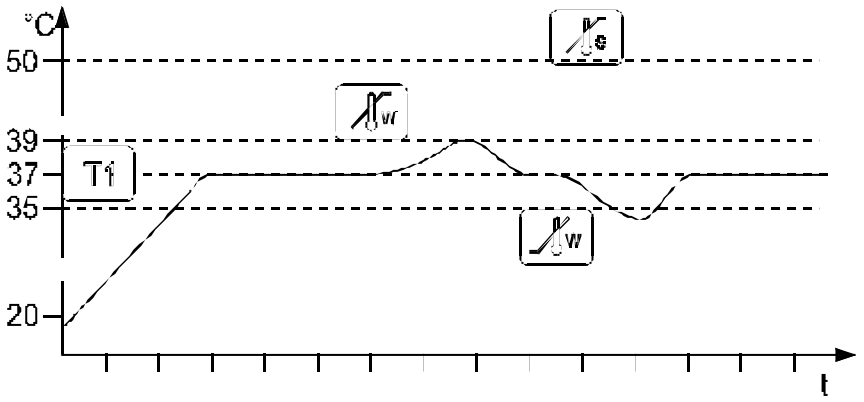
① Press the key .

② Follow the instructions

③ for (example: 35.00 °C).

Note:

The warning functions will only be triggered when the actual bath temperature, after start from the „OFF“ mode, lies within the set limits for 3 seconds.



7.1.4. Internal / external control

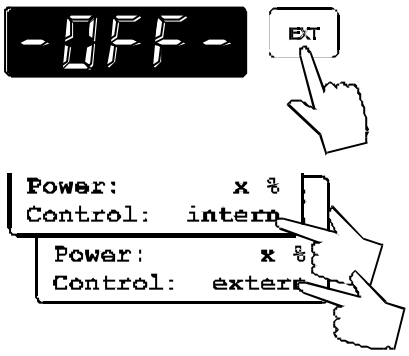
JULABO Model:	HD/SD/TD; HP/SP/TP; FC1200T; FC1600T HE/SE/HL/SL, Semichill Recirculating coolers SCXXXXx

The connected equipment must have been set up for external control

- Connect and calibrate the PT100 external temperature sensor (see operating instructions of the equipment connected).

Attention:

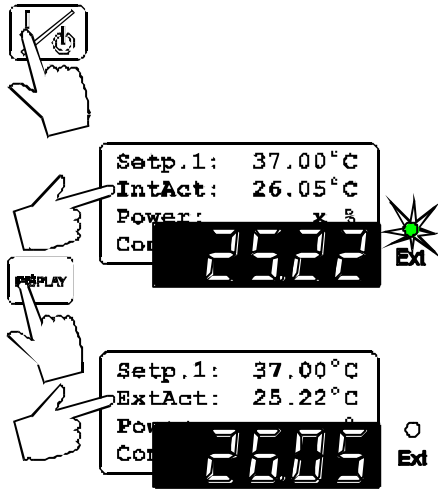
Assign the external temperature sensor to the medium to be heated (thermic contact to medium) and fasten it with suitable material..



Switching from internal to external control:

- Press the key EXT in operating state "OFF" to select the control type.

- The DIALOG-DISPLAY (LCD) indicates the effective control type.



- Press the start/stop key .

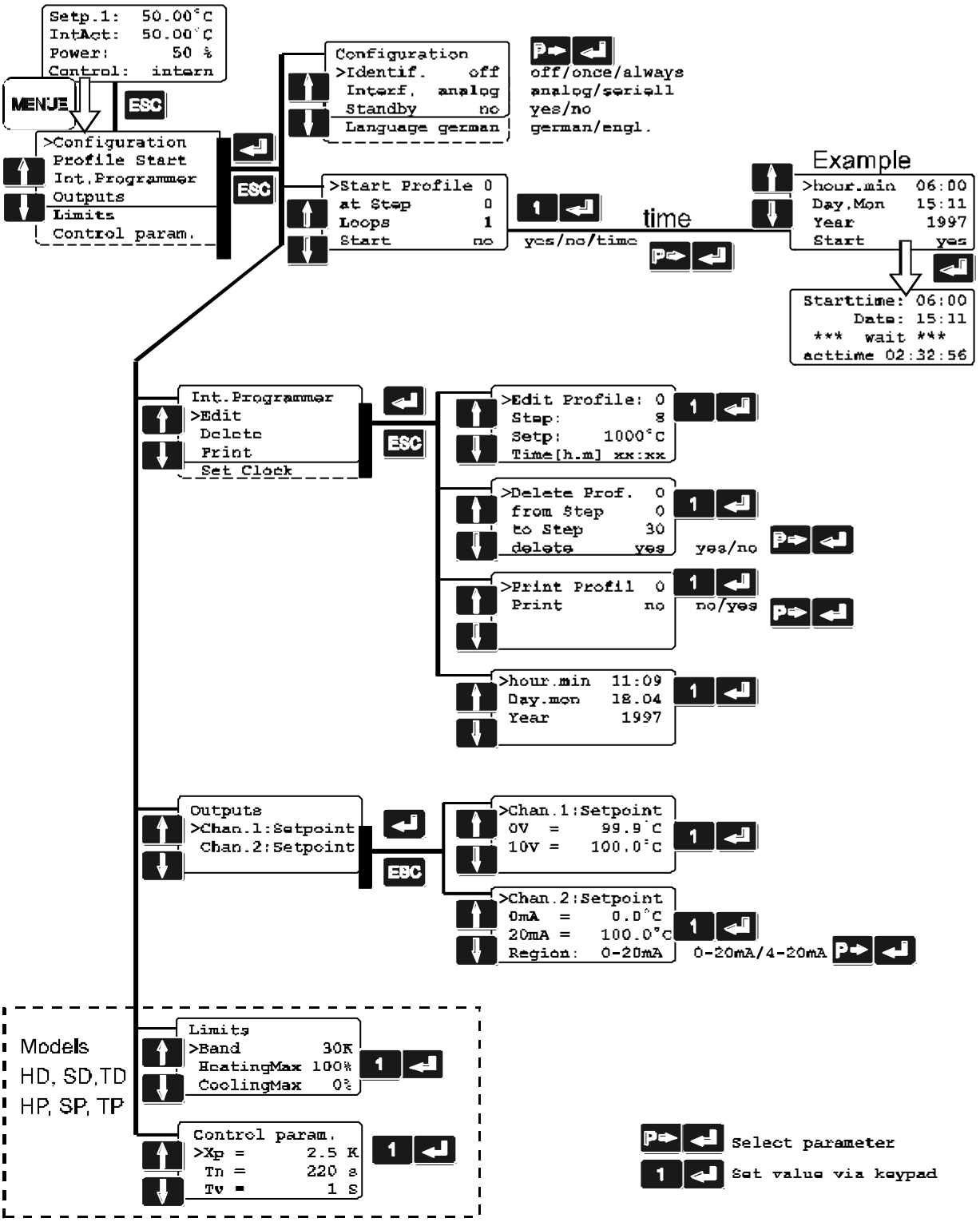
Temperature indication:

- Both actual temperatures are indicated at the same time:
  1) on the MULTI-DISPLAY (LED)
  2) on the DIALOG-DISPLAY (LCD).

- Press the key DISPLAY to swap the values on the displays.
  The indicator light „Ext" refers to the indication on the MULTI-DISPLAY (LED).

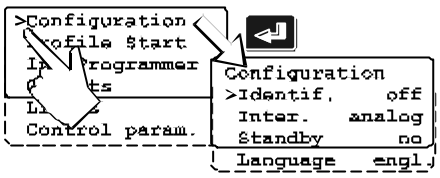
7.2. Menu functions

- Press the MENUE key to enter the menu level.
- Use the up/down cursor keys to select the desired submenu and press enter.
- Press escape ESC to return to the previous menu level.



7.2.1. Configuration

By means of the configuration functions, operation of the programmer can be optimized for the current application.



- Press enter ↵ to select the configuration submenu.
- Use the up/down cursor keys ↑ ↓ to select the desired option. A flashing line indicates that a value needs to be entered.
- Press the P-key P➔ to select the parameter and press enter ↵.
- Press escape ESC to return the previous menu level.

Only JULABO Model: HD/SD/TD; HP/SP/TP; HE/SE/HL/SL, Semichill Recirculating coolers SCXXXXx

Identification

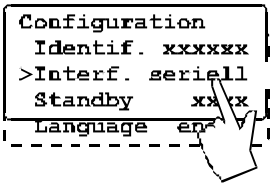
When performing an identification for the controlled system (temperature application system), the control parameters Xp, Tn and Tv will be automatically determined and stored.

Possible parameters:

off - no identification.
The control parameters ascertained during the last identification are used for control purposes.

once - single identification
The circulator performs a single identification of the controlled system after start.
After the identification process the parameter is automatically set to “off“.

always - continual identification
The circulator performs an identification of the controlled system whenever a new setpoint is to be reached.
NOTE:
Use this setting only when the temperature application system changes permanently.



REG+E-PROG

SERIAL

Interf.

The Programmer provides two different methods for presetting and data transfer of the nominal value. The selected method is indicated in the LCD DIALOG-DISPLAY:

Possible parameters:

analog - nominal value transfer via analog socket REG+EPROG

seriell - nominal value transfer via RS232 serial interface connection SERIAL.

Stand-by input

STAND-BY

External stand-by for emergency switch-off
(connector - see page 28)

Possible parameters:

no - stand-by input is ignored

yes - stand-by input is active

Language

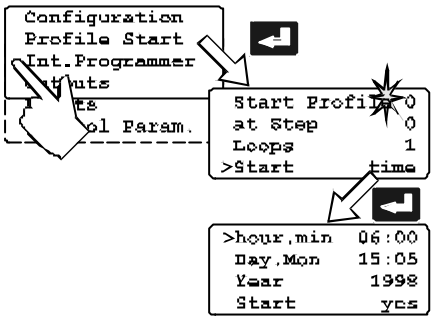
There are two options for the language of the DIALOG-DISPLAY (LCD): German or English.

Possible parameters:

German (deutsch)

English (engl).

7.2.2. Start of a profile



The start menu of the integrated programmer allows calling up and defined starting of one of six previously stored temperature profiles.

- Press enter to select the submenu „Profile Start“.
- Use the up/down cursor keys to select the desired option.

A flashing segment indicates that a number needs to be entered.

Start Profile	0 to 5
at Step	0 to 60
Loops	1 to 99

Enter the desired number and set each entry with enter.

Start **no / yes** ⇨ (manual start)
or
time ⇨ (via integrated timer)

A flashing line indicates that a parameter needs to be entered.
Press the P-key to select the respective parameter and press enter.

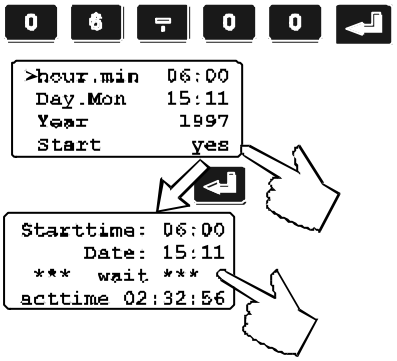
- When selecting the parameter **time**, a new menu level is called up for entry of the start time.
  A flashing segment indicates that a start time needs to be entered.

hour.min	Start time
Day.Mon	day and month
Year	year

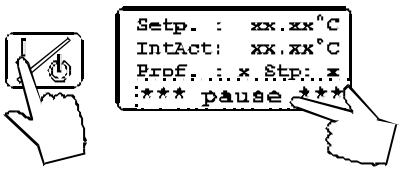
Set each entry with enter.

Start **no / yes**
A flashing line indicates that the parameter „yes“ needs to be entered.
Press the P-key to select the parameter and press enter.

Example: hour.min 6:00 h

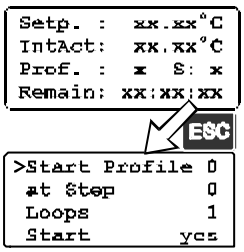


The Programmer switches to waiting mode and a flashing line „wait“ appears on the DIALOG-DISPLAY (LCD). The start time and actual time are permanently indicated on the display.



Interrupting a profile:

Press the start/stop key to interrupt or continue a profile.
The setpoint and time period set for the corresponding section are thus stopped at the values presently achieved.
The circulator is put on hold and the message „pause“ flashes on the DIALOG DISPLAY (LCD).



Exiting a program:

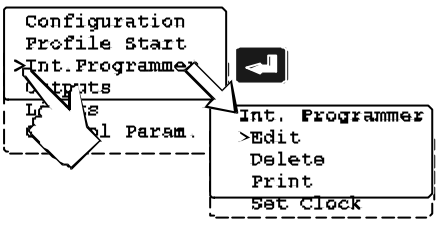
An active program can be exited by pressing the ESC key.
On pressing this key, the Programmer returns to the START menue.

continue

press the ESC key once again to leave the menue
or
select the desired option in the menue with the cursor keys .

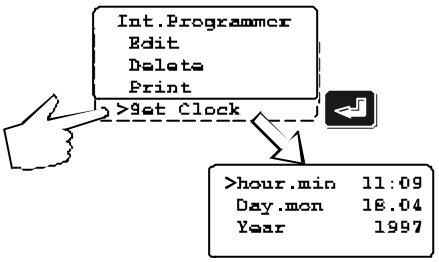
7.2.3. Programmer

The Programmer allows any desired temperature program sequences to be realized. Such a temperature sequence is called profile. A profile consists of individual sections defined by duration (t:) and target temperature. Target temperature is the setpoint (T:), that is achieved at the end of a section. The programmer uses time and temperature difference values within a section to calculate a temperature ramp.



- Press enter ↵ to select the submenu „Int. Programmer“.
- Use de up/down cursor keys ↑ ↓ to select the desired option. Then press enter ↵ to open.
  A flashing segment indicates that a number or value needs to be entered.

Edit	Compile profiles Display sections
Delete	Delete sections
Print	Print a programmed profile
Set clock	Set the real time on the circulator

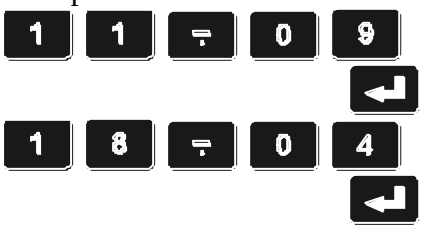


<u>Set clock</u>

The integrated clock allows starting a profile at any date and time. The clock is preset in the factory.

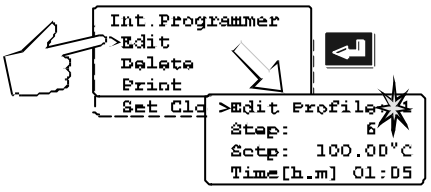
- However, the clock must be set to the corresponding local time that might differ from the preset time. In leap years, the dates for February must also be adjusted.

Examples:



- Use the numerals to set time, date and year and set each entry with enter ↵.

- Press escape ESC to return to the previous menu level.



Edit

Compile profiles:

- A flashing segment indicates that a number needs to be entered. Under submenu „Edit Profile“ enter a profile number. Six profiles may be stored (nos. 0 to 5).

Examples:

Profile No. 1 [1] [↵]

Step [6] [↵]

Setpoint [1] [0] [0] [↵]

Time [0] [1] [.] [0] [5] [↵]

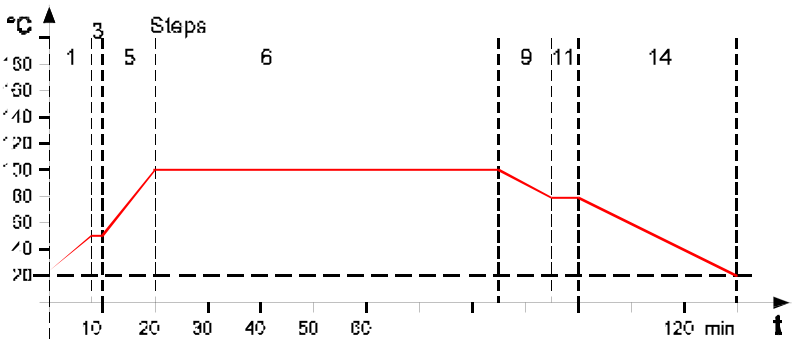
- Then programme the desired values for each section. Use the keypad to set section number, target temperature and time period. Set each entry with enter [↵].

  When the program is running, only sections having complete information for target temperature and time period are considered.
  It makes sense, to leave out section numbers in the profile, in order to use them later for corrections in the profile.
  Important:
  If a time of 00:00 is set for a profile, the profile is continued with the next section only after the setpoint temperature (±0.2 °C) is reached.

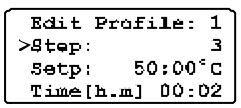
When the programmer is operating in the analog program mode, a time must be entered for each segment, as the Programmer does not receive a flashback.

- Press escape [ESC] to return to the previous menu level.

Example: Step	(No.)	1	3	5	6	9	11	14
Setpoint	(°C)	50	50	100	100	80	80	20
Time	(h.m)	00:08	00.02	00:10	01:05	00:10	00:05	00:30

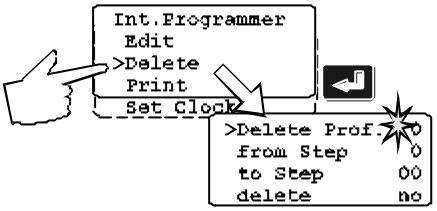


Step [3] [↵]



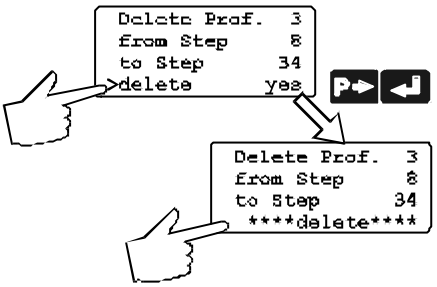
Display sections:

- Use the cursor keys [↑] [↓] to select the submenu „Step“, enter the desired number and press enter [↵].
- The values previously set are displayed.



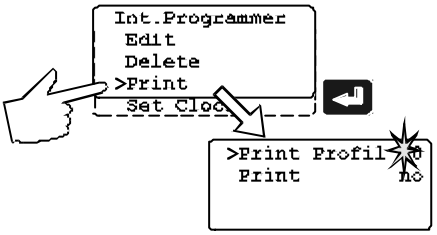
Delete

- A flashing segment indicates that the respective profile number needs to be entered in which one or more consecutive sections are to be deleted.
- In lines 2 and 3 of the DIALOG DISPLAY (LCD) enter the numbers of the sections to be deleted. Press enter ↵.



- **delete no / yes**
  Press the P-key P↵ to select the parameter „yes“ and press enter ↵.
  Line 4 indicates the deletion.

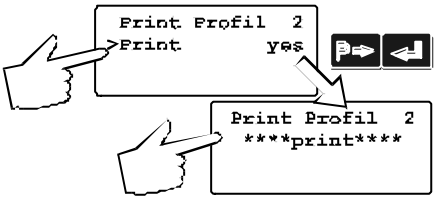
  Example:
  Delete section 8 to section 34 in profile 3.
- Press escape ESC to return to the previous menu level.



Print

Each profile may be printed via the serial interface for control or documentation.

- A flashing segment indicates that the number of the profile to be printed needs to be entered.



- **Print no / yes**
  Press the P-key P↵ to select the parameter „yes“ and press enter ↵.

  Printing is indicated in line 2.

Profile 1

Step 0	not defined!	
Step 1	50	00:08
Step 2	not defined!	
Step 3	50	00:02
Step 4	not defined!	
Step 5	100	00:10
Step 6	100	01:05
Step 7	not defined!	
Step 8	not defined!	
Step 9	80	00:10
Step 10	not defined!	
Step 11	80	00:05
Step 12	not defined!	
Step 13	not defined!	
Step 14	20	00:30
Step 15	not defined!	

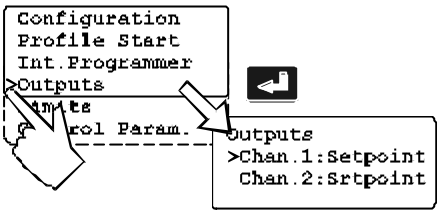
.....usw.

This printing example shows the profile given as example on page 22.

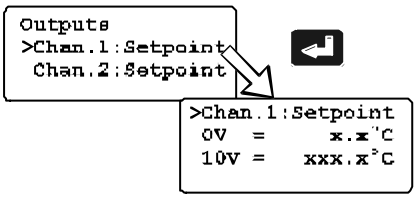
7.2.4. Outputs

This submenu serves adjustment i.e. setting of the desired output parameters for the analog output socket „REG+E-PROG“ of the Programmer.
The adjustment is necessary to match the nominal value to equipment with external programmer input.

- select the submenue „Outputs“ by pressing the ENTER key
- select the desired submenue with the  cursor keys and open the menue by pressing the ENTER key  .

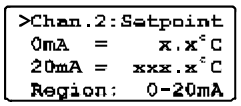


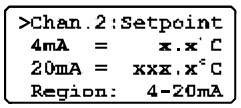
Channel 1: nominal value voltage output
Channel 2: nominal value current output



Voltage outputs channel 1:
Assign
0 V to the lowest temperature value and
10 V to the highest temperature value to be set

Current output channel 2:
Assign
0 mA i.e. 4 mA to the lowest temperature value and
20 mA to the highest temperature value to be set.



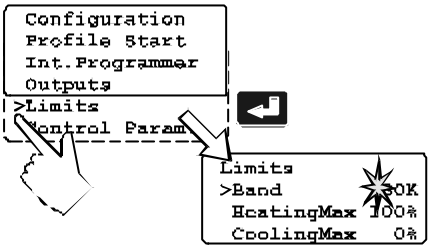


The current output offers two ranges for selection:
0...20 mA or 4...20 mA.
Select the desired range by pressing the  key, and then confirm the selection by pressing the ENTER key  .

The LCD DIALOG-DISPLAY will be automatically switched to the selected range.

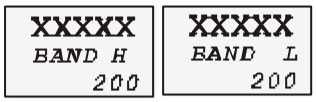
7.2.5. Limits

Only JULABO Model:	HD/SD/TD; HP/SP/TP HE/SE/HL/SL, Semichill Recirculating Coolers SCXXXXx

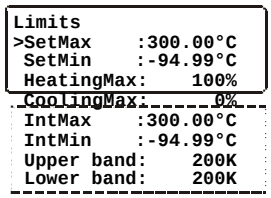


Band limiting is active at external control of the remotely controlled thermostat. The adjusted value determines the maximum temperature difference between internal bath and external load. This adjustment provision protects equipment and sensitive temperature goods from lasting damage.

HE, SE, SC



HL, SL



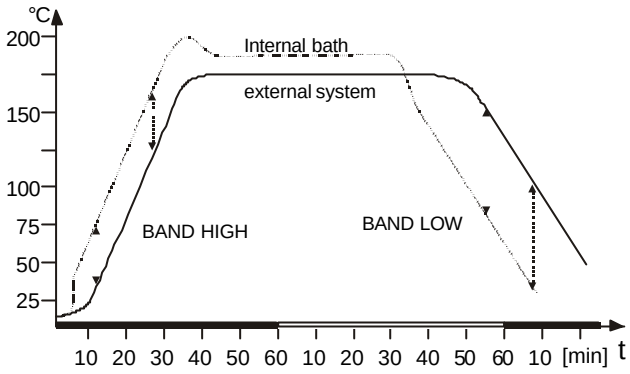
ⓘ **Band** limiting
HE/SE/HL/SL, Semichill Recirculating Coolers SCXXXXx
These units provide their own band limiting function.
If they are operated via the PG6 programmer, the values adjusted on the units are set to the band limiting value of the PG6.

Description see page 26

- Heating power of the circulators is adjustable.
  100 % corresponds to the values in the technical specifications of the equipment.
- Only HP/SP/TP, HE/SE/HL/SL, SCXXXXx
  Cooling power of the circulators is adjustable.
  100 % corresponds to the values in the technical specifications of the equipment.

- Select the submenu „Limits“ with enter .
- Select the desired option with the up/down cursor keys .
  A flashing digit indicates that a value needs to be entered.
  Band 0 to 200 °C
  HeatingMax 0 to 100 % in steps of 1 %
  CoolingMax 0 to 100 % in steps of 1 %
- To set the newly entered value press enter .
- To return to the previous menu level press escape ESC.

Description: **Upper band:** and **Lower band:** or **BAND HIGH / LOW**



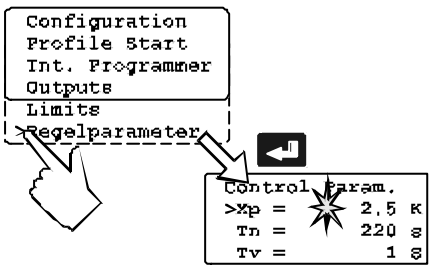
Using **Upper band** and **Lower band**, the difference between the temperatures in the internal bath and the external system can be limited to any maximum value for the heat-up or the cool-down phase.
During the heat-up phase the difference value always adds to the actual external temperature. During the cool-down phase, the difference value is subtracted.

ⓘ If set on the PG6, the values for >**Upper band** and **Lower band** < are always equal.

7.2.6. Control parameters

Only JULABO Model: HD/SD/TD; HP/SP/TP;

When performing an identification for the controlled system (temperature applications system) (see page 17), the control parameters Xp, Tn, and Tv will be automatically determined and stored.



Each parameter may be manually set via the keypad if necessary, to allow optimum control performance.

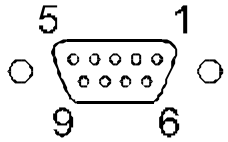
- Press enter ↵ to select the submenu „control parameters“.
- Use the up/down cursor keys ↑ ↓ to select the desired option. A flashing segment indicates that a new value needs to be entered.
- Use the numeral keypad to set the value and then set with enter ↵ (example: Xp = 2.5 °C).
- Press escape ESC to return to the previous menu level.

Xp = 2 . 5 ↵

For hints and notes on optimizing the PID control parameters refer to the operating instructions of the equipment connected for remote control.

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

8. Electrical connections



SERIAL

Serial interface

This socket, for example, enables connection of thermostats for remote control.

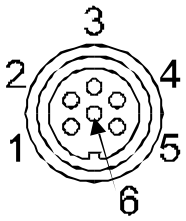
Factory settings of the serial interface:

BAUDRATE	4800 bauds
PARITY	even parity
HANDSHAKE	Protocoll RTS/CTS (hardware handshake)
	Data bits 7
	Stop bit 1

Interface correspondence:

9-pole plug		9-pole plug
Pin 2 RxD	⇔	Pin 3 TxD
Pin 3 TxD	⇔	Pin 2 RxD
Pin 5 GND	⇔	Pin 5 GND

JULABO Order No.8980090

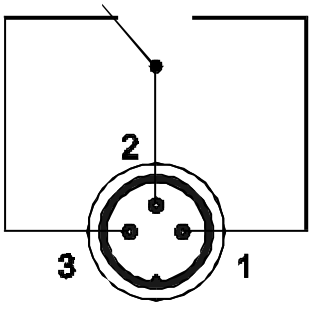


REG+E-PROG

Programmer-Outputs

Outputs see page 24

Pin			Signal
1	Voltage output	Channel 1	0 ... 10 V
5	Current output	Channel 2 0 ... 20 mA /	4 ... 20 mA
3	Gnd for outputs		0 V



ALARM

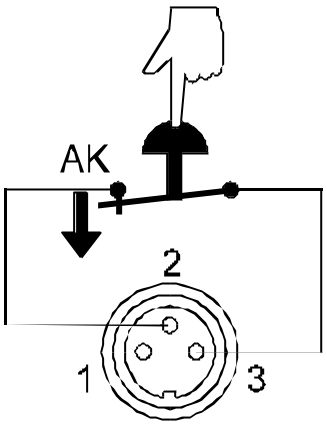
Alarm output (24)

(for external alarm signal)

This potential-free change-over contact is activated in case of an alarm when pins 2 and 3 are connected.

Switching capacity	max.	30 W / 40 VA
Switching voltage	max.	125 V~/–
Switching current	max.	1 A

Notice: Use shielded cables only.
The shield of the connecting cable is electrically connected to the plug housing.



STAND-BY

STAND-BY input (for external emergency switch-off)

When the Programmer is operating in the analog signal mode (equipment connected to socket REG+E-PROG), use of the stand-by input is not logical.

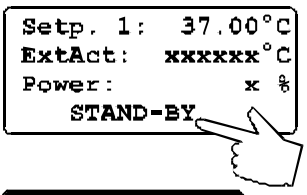
Pin assignment:

Pin	Signal
1	not connected
2	5 V / DC
3	0 V

Activate the stand-by input:

Under menu item Stand-by, set the parameter to „yes“ (see page 18).

Connect an external contact 'AK' (e.g. for emergency switch-off) or an alarm contact of the superordinated system.



In case the connection between Pin 2 and Pin 3 is interrupted by opening the contact 'AK', the Programmer and the remote controlled unit enter the condition "OFF".
As long as the contact remains open, line 4 of the DIALOG-DISPLAY (LCD) flashes and displays the message „STAND-BY“.

Both units remain in the „Off“ state when contact „AK“ is closed again.

Notice: Use shielded cables only.
The shield of the connecting cable is electrically connected to the plug housing.

9. Error messages

Programmer error messages

Error at serial interface connection „COM ERROR“, „E 31“

COM ERROR after switch-on:

- interface adjustments do not match
- connecting cable not properly connected (no firm contact with socket pins) or defective

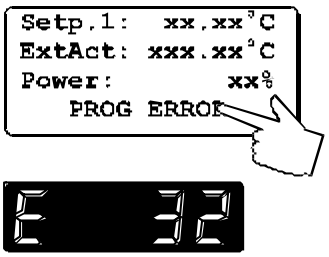
COM ERROR during operation:

- connecting cable loose or defective

Fault remedy:

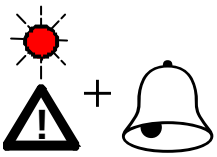
Establish interface connection between the two units and set the mains power switch on the Programmer briefly to position „Off“ and then return it to position „On“ again.

Switch off the Programmer with the mains power switch (1), repair or remedy the fault condition and then return the mains power switch to position „On“.



Error occurs upon issue of nominal value by Programmer
„PROG ERROR“, „E 32“

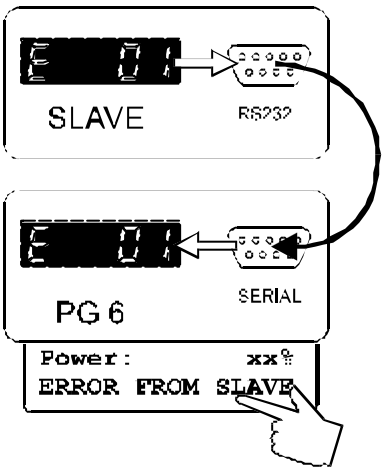
- Nominal value output signal of Programmer outside the valid parameter range of Slave unit
  The error message PROG ERROR returns both Programmer and Slave unit to the „Off“ state.
- Press the ESC key to terminate the alarm. Check the nominal values of the relevant profile and adjust them as required (Editing see page 22)



Error messages of Slave unit

The error messages of the Slave unit are transferred to the Programmer, where they are indicated as optical and acoustical error (alarm) signals.

- The controller indicator "⚠" illuminates and an acoustical alarm signal is output in addition

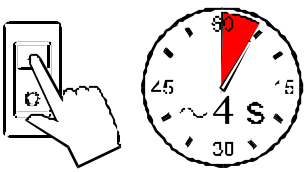


Alarm messages (e.g. 01) are displayed in the MULTI-DISPLAY of the remote controlled Slave unit and transferred to the Programmer as error messages via the RS 232 serial interface connection.

For explanation of the error message code refer to the operating instructions of the Slave unit (see subchapter „error messages“ of chapter „remote control“).

xx.x Status messages / error messages

Error messages	Description
-01 LOW LEVEL ALARM	Low liquid level alarm



After eliminating the malfunction, press the mains power switch of the **programmer** off and on again to cancel the alarm state.

If the unit cannot be returned to operation, contact an authorized JULABO service station.

10. Cleaning the unit

Caution:

Before cleaning the unit, disconnect the power plug from the mains socket!

Prevent humidity from entering into the circulator.

Clean the outside of the programmer using a wet cloth and low surface tension water.

11. Maintenance

Caution:

Configuration, installation, maintenance and repairs on the circulator may only be carried out by qualified personnel.

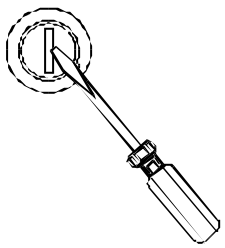
The programmer is designed for continuous operation under normal conditions. Periodic maintenance is not required.

Repairs

Before asking for a service technician or returning a JULABO circulator for repair, please contact an authorized JULABO service station.

When returning a unit, take care of careful and adequate packing. JULABO is not responsible for damages that might occur from insufficient packing.

JULABO reserves the right to carry out technical modifications with repairs for providing improved performance of a unit.



Fuses

The mains fuses on the rear of the unit may easily be exchanged as shown on the left.

Fine fuses	230 V, T16, dia. 5 x 20 mm
	115 V, T16 A, dia. 5 x 20 mm

Warnung:

Before exchanging the fuses, turn off the mains power switch and disconnect the power plug from the mains socket!
Only use fine fuses with a nominal value as specified.

12. Technical specifications

			PG6
Temperature range		°C	-100 ... +400
Temperature selection			digital
via keypad			indication on DIALOG-DISPLAY (LCD)
remote control via personal computer			indication on monitor
Temperature indication			MULTI-DISPLAY (LED) DIALOG-DISPLAY (LCD)
Resolution		°C	0.01
Electrical connections:			
Serial interface:			Output for remote control
Analog programmer outputs			
Chanel 1 / 2	1 voltage output	V	0 - 10 V
Chanel 3	2 current output	mA	0 - 20 or 4 - 20
Stand-by input			
External alarm device 24-0 V DC / max. 25mA			
Mains power connection ±10 %		V / Hz	230 / 50 or 115 / 60
Total power consumption		W	100
Overall dimensions (WxDxH)		cm	21x18x18
Weight		kg	3.3

All measurements have been carried out at:
mains voltage: 230 V / 50 Hz ambient temperature: 20 °C
Technical changes without prior notification reserved.

Standards:

EMC regulations	EN 61326
Guideline for first voltage range	EN 61010-1, EN 61010-2-010

Environment:

Use only indoor.
Altitude up to 2000 m - normal zero.
Ambient temperature: +5 ... +40 °C (for storage and transportation)

Air humidity acc. DIN EN 61 010, part 1:

Max. rel. humidity 80 % for temperatures up to +31 °C,
linear decrease down to 50 % rel. humidity at a temperature of +40 °C

Protection class: IP 31 acc. EN 60 529

Power supply: acc. to class 1, VDE 0106 T1

not for use in explosive atmosphere

Max. mains fluctuation of ±10 % are permissible.

Overvoltage category II

Pollution degree 2

13. EC Declaration of Conformity

CE

The following unit complies with the essential safety requirements outlined by the EC Directives concerning the guidelines for electromagnetic compatibility (89/336/EEC) and for the low voltage regulations (73/23/EEC).

Programmer PG6

This unit is manufactured in compliance with the following guidelines

electrical equipment for control technology and laboratory application –
EMC requirements outlined by
EN 61326

safety regulation for electrical devices for measuring, control and
laboratory application specified by
EN 61010

Julabo

Julabo Labortechnik GmbH
Eisenbahnstr. 45
D-77960 Seelbach / Germany

G. Juchheim, Managing Director

14. Warranty conditions

JULABO Labortechnik GmbH warrants its products against defects in material or in workmanship, when used under appropriate conditions and in accordance with appropriate operating instructions

for a period of ONE YEAR.

Extension of the warranty period – free of charge

With the '1PLUS warranty' the user receives a free of charge extension to the warranty of up to 24 months, limited to a maximum of 10 000 working hours.

To apply for this extended warranty the user must register the unit on the JULABO web site www.julabo.de, indicating the serial no. The extended warranty will apply from the date of JULABO Labortechnik GmbH's original invoice.

JULABO Labortechnik GmbH reserves the right to decide the validity of any warranty claim. In case of faults arising either due to faulty materials or workmanship, parts will be repaired or replaced free of charge, or a new replacement unit will be supplied.

Any other compensation claims are excluded from this guarantee.