GoldLeaf Scientific

Instruction manual

Stirring motors

R 100C, R 100CL and R 100CT

Content

1 User Instructions

1.1 Important Instructions for your safety

- Every user must read and understand this manual completely before use. Only instructed users may operate the instrument. Failure to do so can result in serious injury or death.
- Follow general instructions for hazard prevention and general safety instructions, e.g. wear protection clothing, eye protection and gloves.
- This operating manual is part of the product. Thus, it must always be easily accessible.
- Enclose this operating manual when transferring the device to another place.
- If this manual is lost, please request another one. Please contact your dealer or

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1.2 Danger symbols in this operating manual

The safety instructions in this manual appear with the following danger symbols and danger levels:

1.2.1 Danger symbols:

	**Hazard point**		**Electrical shock**
	**Risk of fire**		**Explosion**
	**Crushing**		**Bio hazard**

1.2.2 Danger levels

⚠DANGER	Will lead to severe injuries or death
⚠WARNING	May lead to severe injuries or death
⚠CAUTION	May lead to light to moderate injuries
NOTICE	May lead to material damage

2 General safety warnings and instructions

	**⚠DANGER Risk of explosion.** ● Do not operate the device in the vicinity of highly flammable or explosive substances. The instrument is not explosion-proof. ● Do not use this device for processing any substances which could generate an explosive atmosphere. ● Do not use this device to process any explosive or highly reactive substances.
	**⚠DANGER Electric shock as a result of penetration of liquid.** ● Do not allow any liquids to penetrate the inside of the housing ● Switch off the device and disconnect the power plug before starting cleaning or disinfection work. The On/Off Switch on the device does not disconnect the device from the power source. ● Only plug the device back in if it is completely dry, both inside and outside.
	**⚠WARNING Risk from incorrect supply voltage** ● Only connect the device to an AC power source with a protective earth (PE). ● Only connect the device to voltage sources which correspondent to the electrical requirements on the type label.
	**⚠WARNING Electric shock due to damage to device or mains cable** ● Only connect the device to the mains supply if the device and the mains cable are undamaged ● Only use devices that have been properly installed or repaired. ● In case of danger, disconnect the device from the mains supply by pulling the power plug from the mains socket or by using the isolating device intended for this purpose (e.g. emergency stop switch)
	**⚠WARNING Lethal voltage inside the device** ● Do not open the device. ● Ensure that the housing is always closed and undamaged so that no parts inside the housing can be contacted by accident. ● Do not allow any liquids to penetrate the inside of the housing. ● Repairs are only to be carried out by trained service technicians.
	**⚠WARNING Damages to health due to infectious liquids and pathogenic germs.** ● When handling infectious liquids and pathogenic germs, observe the national regulations, the biological security level of your laboratory, the material safety data sheets and the manufacturer`s application notes. ● Wear personal protective equipment ● For comprehensive regulations about handling germs or biological material of the risk group II or higher, please refer to the “Laboratory Biosafety Manual” in its respectively current valid version from the World Health Organization
	**⚠WARNING Risk of fire** ● Do not use this device to process any highly flammable liquids
	**⚠WARNING Damage to health due to contaminated device and accessories** In the following cases, sample material can be released: - improperly fixed agitator vessels - unstable vessels - damaged sealings - smashed glass vessels ● Only mix in suitable vessels ● Observe the nationally prescribed safety environment when working with hazardous, toxic and pathogenic samples. Pay particular attention to personal protective equipment (gloves, clothing, goggles, etc.), extraction, and the safety class of the lab. ● Decontaminate the device and the accessories before storage and shipping.

	**⚠CAUTION Poor safety due to inadequate fixing of the unit** ● Ensure that the unit is firmly attached to a solid stand.
	**⚠CAUTION Poor safety due to incorrect accessories and spare parts.** The use of accessories and spare parts other than recommended by Goldleaf Scientific may impair the safety, function and precision of the device. Goldleaf Scientific cannot be held liable or accept any liability for damage resulting from the use of incorrect or non-recommended accessories and spare parts, or from the improper use of such equipment. ● Only use accessories and spare parts recommended by Goldleaf Scientific
	**⚠CAUTION Crush hazard due to moving parts** ● Always use a stirring shaft protector ● Do not replace any consumables as long as the device is running. ● Do not detach the stirring shaft protector as long as the device is running ● Only switch-on the device with properly mounted tools and completely closed stirring shaft protector.

2.1 Warning signs on the device

⚠WARNING This symbol indicates to read the instruction manual carefully prior to operation of the instrument. Please mark points which require special attention in your field of application so they are not overlooked. Disregarding of warnings may result in impairment of serviceability as well as impairment of the user.

2.2 Warning signs on the device

WARNING!
This symbol indicates to read the instruction manual carefully prior to operation of the instrument. Please mark points which require special attention in your field of application so they are not overlooked. Disregarding of warnings may result in impairment of serviceability as well as impairment of the user.

3 General Information

The overhead stirrers R 100C / R 100CL / R 100CT are designed in accordance with Safety Class 1, and built and tested in accordance with DIN EN 61010.
According to these regulations, the unit is designed to meet the requirements for safe and correct operations. To maintain the proper safety and operational functions of the instrument, the user should follow the instructions and safety guidelines in this manual.

3.1 Scope of Delivery

Please check that the package contains the following:

1 Overhead Stirrer R 100C	Part No. 60218-0000 (230V) with EU plug or
1 Overhead Stirrer R 100C	Part No. 60218-0003 (230V) with UK plug or
1 Overhead Stirrer R 100C	Part No. 60218-0001 (115V) with US plug or
1 Overhead Stirrer R 100CT	Part No. 60314-0000 (230V) with EU plug or
1 Overhead Stirrer R 100CT	Part No. 60314-0003 (230V) with UK plug or
1 Overhead Stirrer R 100CT	Part No. 60314-0001 (115V) with US plug or
1 Overhead Stirrer R 100CL	Part No. 60315-0000 (230V) with EU plug or
1 Overhead Stirrer R 100CL	Part No. 60315-0003 (230V) with UK plug or
1 Overhead Stirrer R 100CL	Part No. 60315-0001 (115V) with US plug
2 Support Rods	Part No. 10402-0064
1 Chuck key	
1 Instruction Manual	

Accessories and stirring tools (optional):

U-Stand	Part No. 60494-0000
Special Clamp to fix the unit to a stand	Part No. 60495-0000
Stirring shaft protector to be fixed to the stand	Part No. 20618-0060
„Jumbo“-Clamp to fix Stirring shaft protector to the stand	Part No. 8B00565000
Y-Cabel for connection of further units via RS232	Part No. 60729-0000
RS 232 Interface cable D-Sub 9pin 1,8m	Part No. 30275-0051
USB to RS23 Adapter	Part No. 30244-0001
Software Stirrer Control	Part No. (upon request)

Please see price list for further accessories such as suitable stirring paddles

4 Unpacking

Unpack the instrument carefully and check to see that it is not damaged. It is important that any damage incurred in transport be recognized at the time of unpacking. Notify your carrier or forwarding agent immediately in case of such damage.

⚠WARNING

- Read this instruction manual carefully before operating the instrument. Should there be any additional questions, after reading these instructions, concerning the set-up, operation or warranty, please contact either your distributor, or the manufacturer.
- After reading and understanding the instruction manual you may now start operating the unit.
- Store the instruction manual in a place easily accessible to every user.

5 Set-up

⚠DANGER 

- The units are not to be used in rooms with danger of explosion.
- Do not use this device to process any highly flammable liquids
- The unit is not to be used without supervision.

Please put the unit on to a fire-proof respectively non-combustible even surface.

5.1 Electrical Connection

⚠WARNING 

A earthing-pin plug (DIN 49441 CEE 7/VII10/ 16 A 250 V, a standard plug in Germany, Austria, the Netherlands, Belgium, France, Norway, Sweden, Finland, Denmark, Portugal and Spain) is standard on all instruments. For North America instruments feature standard US plugs (NEMA Pub.No.WDI1961 ASA C 73.1. 1961 page 8 15A 125V),), for the UK with a standard UK plug BS 1363.

- When operating the instruments in countries with different AC plug systems use an approved adapter or have a qualified electrician replace the AC plug with an approved model suitable fort the country of operation.
- The instrument is earthed as supplied. When replacing the original AC plug, ensure that the earth conductor is connected to the new plug!
- When connecting the instrument to an AC power outlet, ensure that your local supply voltage matches that indicated on the instrument’s rating plate.

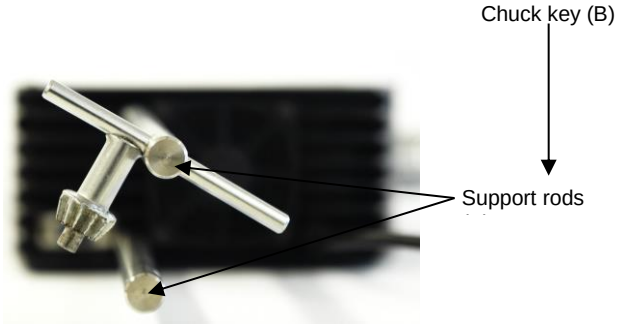
Before connection the instrument to the mains ensure that the rocker switch (1) is set to the „OFF“-position.

5.2 Mounting of Support Rods

⚠WARNING

The device operates with a high torque and vibrated when running. Insufficient mounted mechanical parts may detach themselves and endanger the health of the user.

- Ensure that all mechanical connections are firmly tightened.
- Ensure that the unit is firmly attached to a stand.



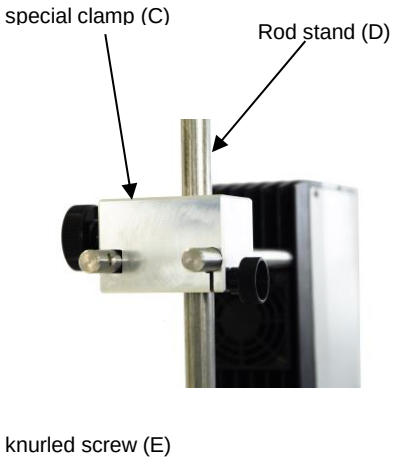
Screw the two support rods (A) (Part No. 10402-0064) into the threaded holes at the back of the overhead stirrer.
(see also Chapter 6.4)

Use the chuck (B) to firmly tighten them.

5.3 Attach the Overhead Stirrer to a Stand

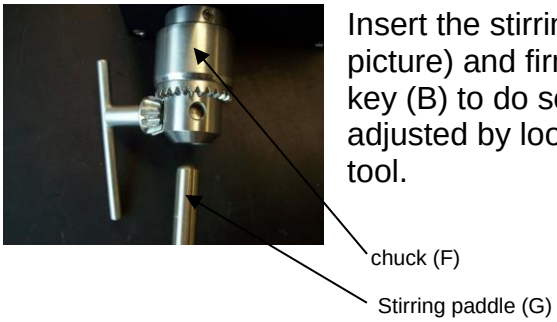
⚠WARNING

- Ensure that all mechanical connections are firmly tightened.



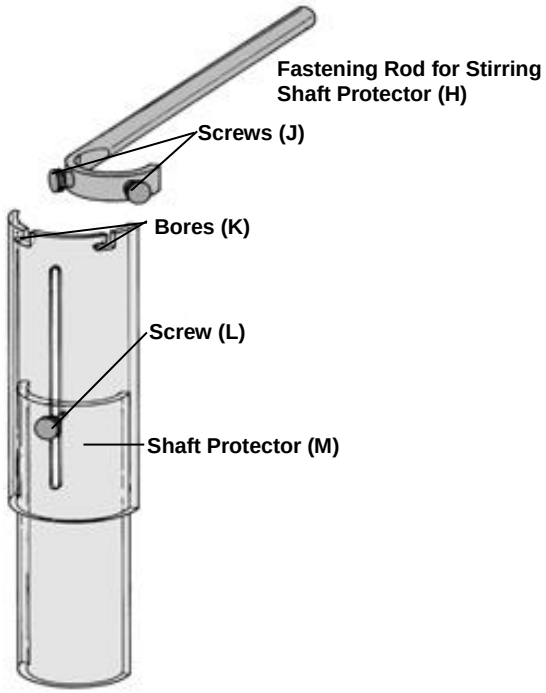
Mount the special clamp (Part No. 60495-0000) to the rod (C) of the stand (D).
Insert the support rods (A) of the overhead stirrer into the openings of the special clamp (C) and turn the knurled screws (E) until the drive unit is firmly attached to the stand.

5.4 Attachment of Stirring Paddle



Insert the stirring paddle (G) into the chuck (F) (as shown in the picture) and firmly tighten it in the desired position. Use the chuck key (B) to do so. The immersion depths of the stirring tool may be adjusted by loosening the chuck (F) and axially moving the stirring tool.

5.5 Assembling the Shaft Protector



⚠WARNING Use a stirring shaft protector (Part No. 20618-0060) to provide protection against injury when working with the unit.

Attach the fastening rod (H) of the shaft protector (M) in front of the chuck to the stand; e.g. use cross over clamp part no. 60492-0000) to fix the stirring shaft protector. Now bring the pockets (K) to the screws (J) and turn the stirring shaft protector to the left to the limit stop.
The screw (L) is used to adjust the length of the stirring shaft protector.

Check that the stirring shaft protector is held in position securely prior to each use and also at regular intervals. The position of the stirring shaft protector must only be adjusted when the unit is stationary and the power supply is disconnected.

6 Set-up and Operation

6.1 Intended Use

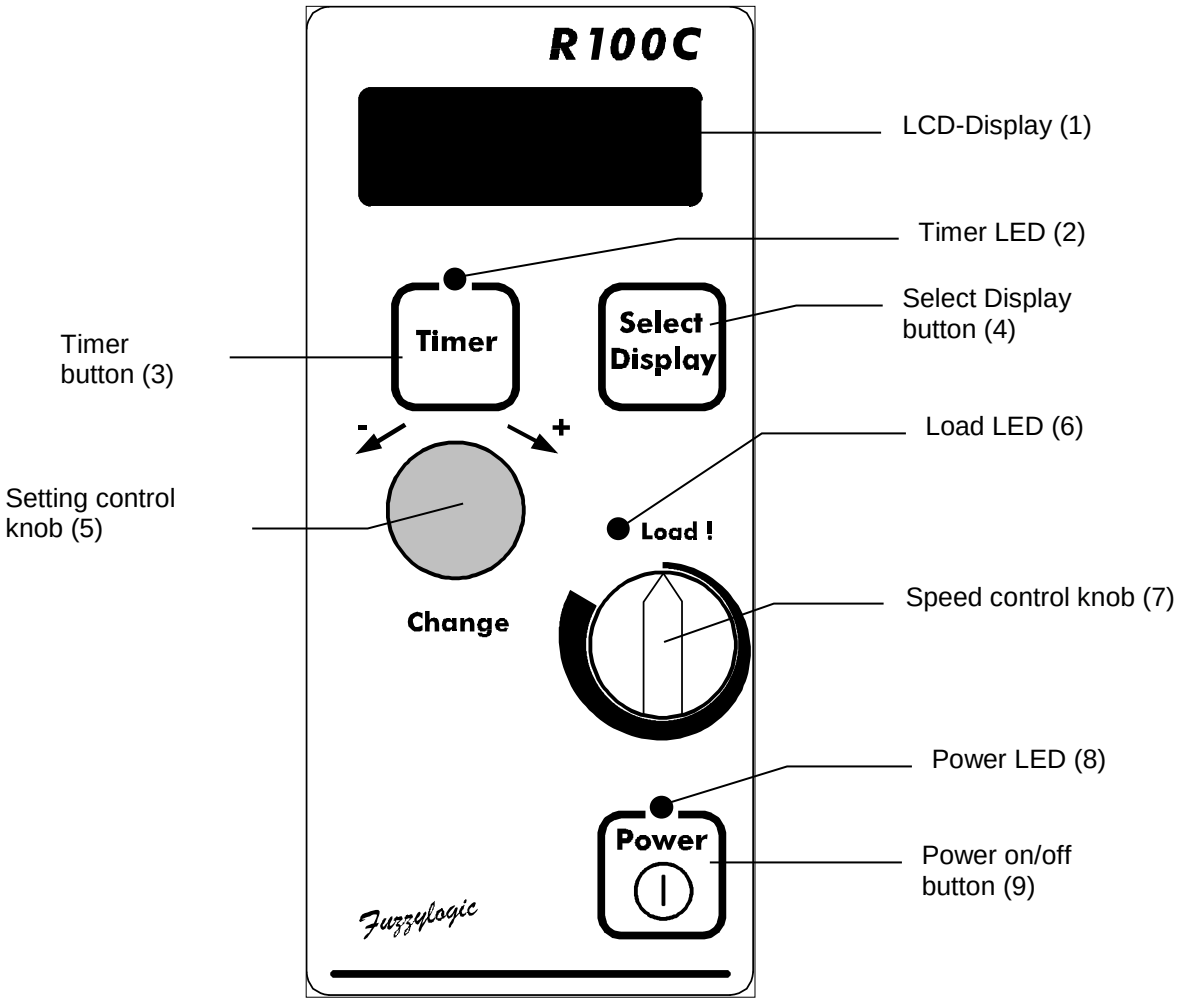
The R 100C / R 100CL / R 100CT is designed for use in chemical and biological laboratories of industrial enterprises, universities and pharmacies. It is suitable for stirring and mixing of liquids from medium to high viscosity. For correct use the device must be fixed to an appropriate stand.

To ensure maximum service life, observe the specified ambient conditions (temperature and humidity) and ensure that the instrument is not exposed to a corrosive atmosphere.

NOTICE The device is not suitable for permanent use

6.2 The Front Panel Controls

The innovative key-pad makes data entry easy and incorporates a 2-line alpha-numeric LCD-display (1) which shows all relevant data. The entry and changing of timer or setup settings is made via the setting control knob (5), the motor speed is set with the right speed control knob (7).

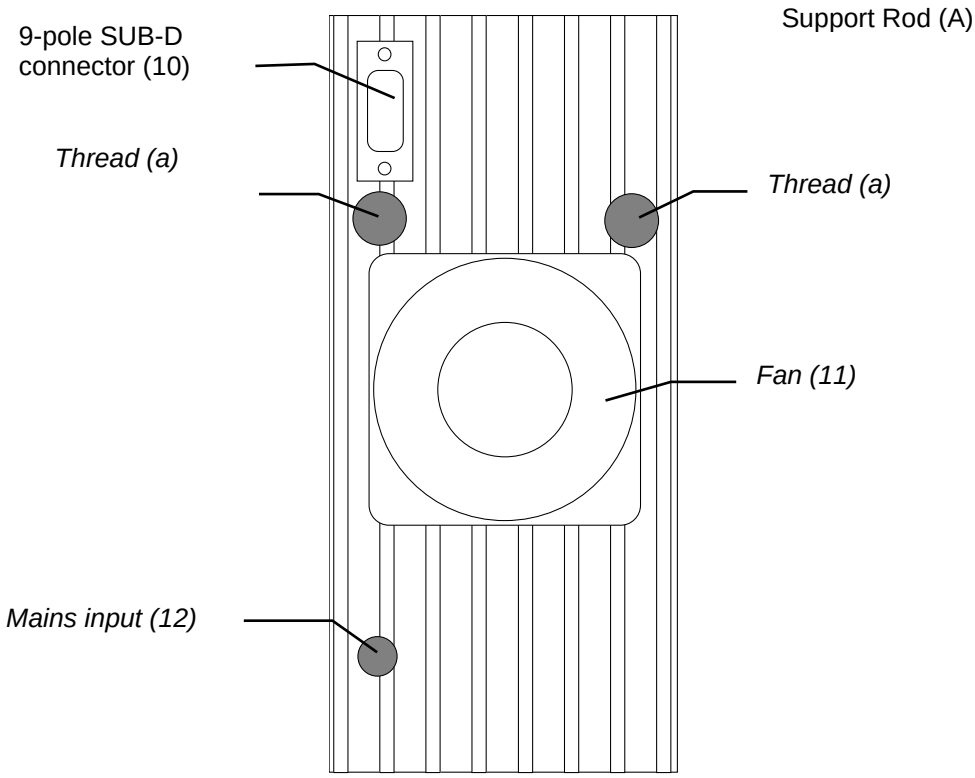


(view on the R 100C / R 100CL / R 100CT front panel)

6.3 Description of the front panel functions

LCD display (1)	The LCD display shows all relevant system data
Timer LED (2)	indicates that timer is active and unit will be automatically switched off when timer is expired
Timer button (3)	If required, pressing this key initiates the timer function which will shut down the R 100C / R 100CL / R 100CT. To change the timer setting use the setting control knob. The timer is calibrated to show - days : hours : minutes.
Select Display button (4)	Press this key once shortly to step from one display option to the next. Press and hold this key for 3 seconds to zero the relative torque measurement (Mr). Press and hold this key for at least 5 seconds to switch back from relative torque measurement (Mr) to absolute torque measurement (Ma). (The same applies also to the Power output measurement function)
Setting control knob (5)	entry and change of timer or setup settings
Load LED(6)	Indicates when the unit is not able to hold set motor speed due to too high torque taken from motor shaft. Under this condition the unit will reduce the real motor speed so that the maximum allowed motor torque is not exceeded.
Speed control knob (7)	setting the speed manually
Power LED(8)	indicates that unit is powered up
Power on/off button (9)	Press this key to turn the unit on or off.

6.4 Description of the rear panel on the R 100C / R 100CL / R 100CT

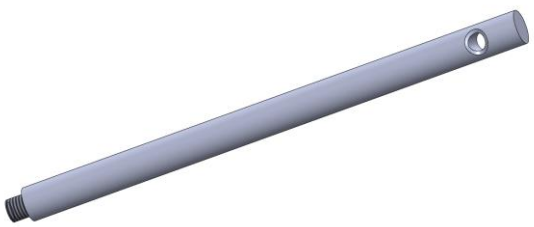


(rear view of the R 100C / R 100CL / R 100CT)

9-pole SUB-D connector	*In/Output for:* ▪ *RS232 interface (full duplex)* ▪ *analogue input for speed setting via voltage signal* ▪ *input range: 0-10V, operation range programmable* ▪ *analogue output for speed, torque or power monitoring.* *output range: 0-4V, operation range programmable*
mains power supply	*make sure that the voltage printed on the R 100C corresponds to the voltage from your mains !*

On the rear panel of the R 100C / R 100CL / R 100CT you will find 2 threads (a) to attach the support rods (A), a 9-pin SUB-D connector (10), a fan and the mains power supply cable (12).

support rod (A)



6.5 Stirring operation

⚠DANGER

- The units are not to be used in rooms with danger of explosion.
- The unit is not to be used without supervision.

⚠WARNING

- When connecting the instrument to an AC power outlet, ensure that your local supply voltage matches that indicated on the instrument's rating plate.
- Avoid splashing of liquids by using a suitable vessel, lower liquid level. Make sure that suitable protective clothing and eye-wear is used.
- This instruction sheet does not purport to address all of the safety problems which might result from the use of this instrument, chemicals, reagents, apparatus or equipment employed in any specific test or protocols. It is the responsibility of the user to consult their authorised safety advisors and establish appropriate health and safety practices and then determine the application of regulatory limitations prior to use.

Please put the unit on to a fire-proof respectively non-combustible even surface.

- Set the speed setting knob (7) to minimum.
- Press the power on/off button (9)
- Set the desired motor speed using the speed setting knob (7).
  The digital value of the set motor speed can be read out in the top line of the display (1)

☞ **The maximum allowed motor speed can be adjusted / limited in the setup menu**

The R 100C / R 100CL / R 100CT has a soft start feature which helps to prevent the liquid from splashing.

6.6 Timer controlled operation

The Timer function can be activated by pressing the **Timer** key (3). The Edit arrow appears in the display (1) and the time can be changed in increments of one minute by turning the setting control knob (5). If the time is set to zero, the timer function is disabled. If, for example, a time of ten minutes is selected (00:10:00), the unit will shut down after ten minutes. The readout of the timer is in: days : hours : minutes

- **press Timer (3)** and then **turn the setting control knob** (**5)** to set the desired shut down time.
- The Timer LED signals if the timer is running

7 Safety Functions

7.1 Rotor stuck detection

If the torque increase versus time exceeds a certain limit the unit will assume that the rotor was suddenly blocked and will switch off immediately.
Cut-off limit sensitivity can be adjusted in the Set-up menu (→ Cut off limit)

7.2 Overload protection

If the torque or power drawn from the stirring motor exceeds the allowed range, the unit will automatically reduce the motor speed until the torque is reduced to the allowed range. If this happens the LED Load (6) is switched on.

As long as the Load LED (6) is on, the motor is not able to hold the set motor speed.

7.3 Overtemperature protection R 100C

If the temperature inside the unit exceeds the maximum operating temperature, the unit will automatically reduce power output (speed and torque) in order to get back to a safe operating point (= fold back characteristic). This prevents the unit to be destroyed by constant overload operation. This overload condition is also signalled by the red ´Load´ LED (6).
Furthermore a cooling fan (11) on the rear side of the instrument is automatically switched on if required.

If the temperature inside the R 100C exceeds 70°C by any means, the unit will shut down immediately. This safety feature is fully "redundant". The unit either shuts down if the microprocessor measures a temperature higher than 70°C, or if the thermo-switch (inside the R 100C) detects a temperature higher than 70°C.

Important Note:
Before re-starting the unit after cooling down, switch it off and then on again by using the on/off button.

7.4 Overtemperature protection R 100CL

If the temperature inside the unit exceeds the maximum operating temperature, the unit will automatically reduce power output (speed and torque) in order to get back to a safe operating point (= fold back characteristic). This prevents the unit to be destroyed by constant overload operation. This overload condition is also signalled by the red ´Load´ LED (6).
Furthermore a cooling fan (11) on the rear side of the instrument is automatically switched on if required.

7.5 Over-temperature protection R 100CT

If the temperature inside the unit exceeds the maximum operating temperature, the unit will automatically reduce power output (speed and torque) in order to get back to a safe operating point (= fold back characteristic). This prevents the unit to be destroyed by constant overload operation. This overload condition is also signaled by the red ´Load´ LED (6).
Furthermore a cooling fan (11) on the rear side of the instrument is automatically switched on if required.

If the temperature inside the R 100CT exceeds 70°C by any means, the unit will shut down immediately. This safety feature is fully "redundant".

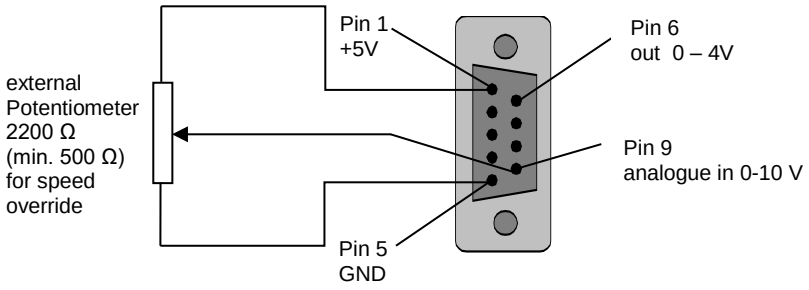
7.6 I/O Connector (9-pin SUB-D)

Pinout of the I/O connector

The following signals are led out on the 9-pin SUB-D connector on the rear side of the instrument:

- RS232 control signals
- Analogue input (0-10V) for speed override.
- Analogue output (0-4V) for recording of process parameters (speed, torque, power)

Pin Number	Description
1	+ 5V (max. 10mA)
2	TxD (RS232 transmit data)
3	RxD (RS232 receive data)
4	n.c.
5	GND (signal ground)
6	analogue output (0-4V)
7	n.c.
8	n.c.
9	analogue input (0-10V)



Socket of the I/O connector (view on socket - 9 pin Sub-D socket)

8 The RS232 interface of the R 100C / R 100CL / R 100CT

The RS232 interface enables remote control of all stirrer functions. In this configuration a computer can access each connected unit via a sub address (daisy chaining). This address is programmable for every unit (→Setup menu, slave-address).
For daisy-chaining, the transmit line (TxD) of the PC is connected to the receive line (RxD) of the first unit. The transmit line of this unit is then connected to the receive line of the next unit in the chain. The transmit line of the last unit in the chain is returned to the receive line of the PC, which closes the link (ring). You achieve this by using one or more Y cables (PN 60729-00). For each additional device, you will need a Y-cable, e.g. for 3 devices to be connected, 2 Y-cables are required (see also Chapter 8.6)
For addressing a specific unit in a daisy-chain, each controller carries a so called ´Slave-address´ which can be any number from 1 to 255. The default slave address is 1.
The slave-address 0 is defined as the general call address on which all controllers will respond.
The slave-address can be set/changed in the Setup-menu.

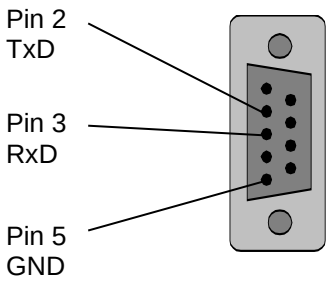
A ***Windows® Software*** to control a connected unit is optional available.

Parameters of the serial interface (1200-4800,8,N,1):

Baudrate:	1200-4800 Baud (1200 default, see also: Set-up menu)
Databits:	8 Bit
Parity:	none
Stopbits:	1

Pinout of the RS232 connector:

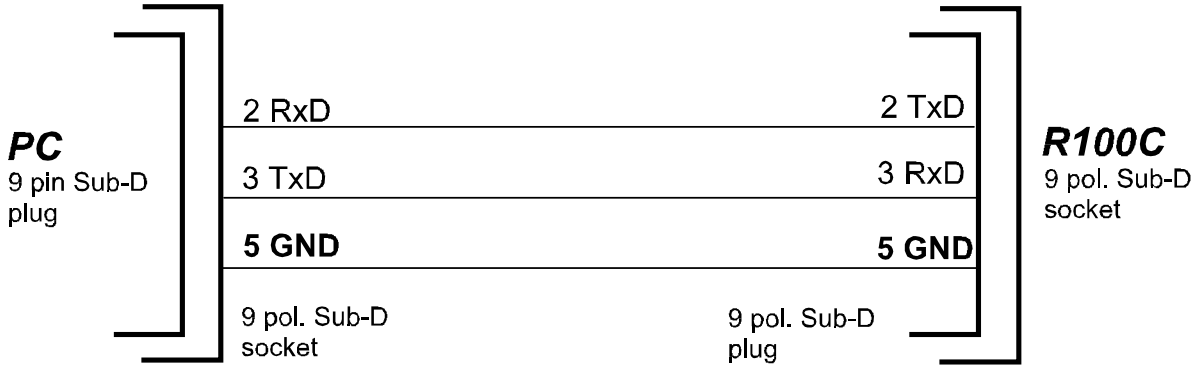
Description	pin number
TxD (transmit data)	2
RxD (receive data)	3
GND (GROUND)	5



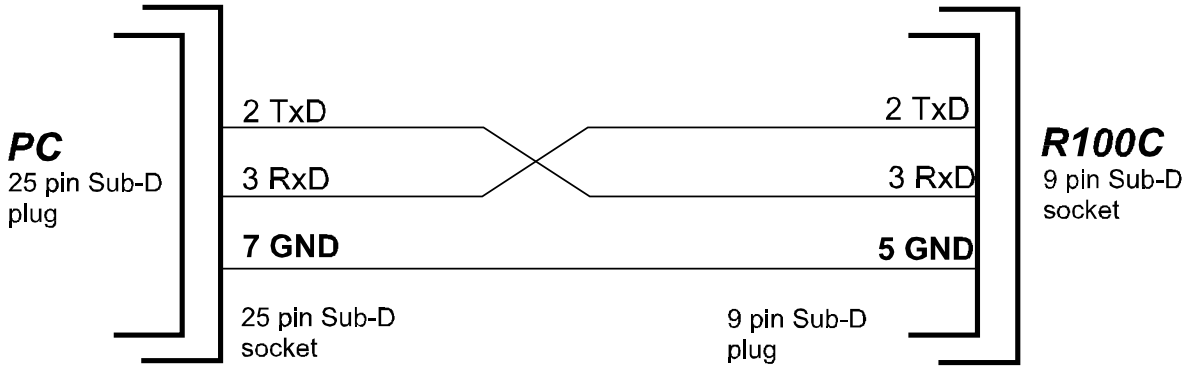
socket of the serial interface (view on socket – female 9 pin Sub-D socket)

8.1 RS232 Connection configuration between PC and the R 100C / R 100CL / R 100CT

a) PC with 9-pin RS232-plug



b) PC with a 25-pin RS232-plug



8.2 Format of an RS232-Command

Each command which is sent to the device must have the format:

ADR , CMDCODE , PARAMETERLIST <CR>

Description:

ADR: Slave Address of the unit to execute the command

CMDCODE: Command-code

PARAMETERLIST: 1 to 6 parameters separated by commas

CR: The command string must be terminated by Carriage/Return (ASCII 13)

8.3 Format of the Controller Handshake

After receiving a RS232-command the unit will:

1. Send the received command to the next unit (or back to the PC - daisy chaining)
2. Answer with a handshake string, which is defined as follows:

ADR , "HS", RETCODE , PARAMETERLIST CR

Explanation:

ADR: Slave Address of the unit sending the handshake

RETCODE: Errorcode (see table 1 below)

PARAMETERLIST: 1 to 6 parameters, each parameter is separated by a comma "," (see also table 2, Command codes)

CR the handshake as any command, is terminated by ASCII-code 13 (CR)

Table of return codes:

(Table1)

Return Code	Explanation	Parameter List
OK	command executed, no error	see table 1
UC	unknown command	none
PA	wrong parameter number (too few or too many parameters specified)	none
NA	command is not allowed in actual operation mode	actual operation mode
PR	at least one parameter is out of range	none
PL	at least one parameter is too long	none
DF	unknown data format	none

8.4 RS232 commands of the R 100C / R 100CL / R 100CT

Table 2:

CMD. CODE	Explanation	Parameter list	Range
RAC	Read actual settings from the unit	1. Dummy parameter to initiate transfer -> Controller sends in handshake A) actual motor speed (rpm) B) actual torque (relative) C) actual torque (absolute) D) actual power (relative) E) actual power (absolute)	1
WTR	Write Timer	A) Timer value in [sec]	0..2592000
RTR	Read Timer	1. Dummy parameter to initiate transfer -> Controller sends in handshake: A) Timer value (seconds) → 0 = Timer disabled	1 0..2592000
WSE	Write Motor (SET) define motor speed setpoint in rmp´s	A) Motor speed in rpm´s 0 → Motor is switched stopped (speed=0) if selected speed is above allowed limit, value will be reduced to allowed limit (→ Set-up menu, Max MotorRpm)	0..2000
RSE	Read motor setpoint (SET)	1. Dummy parameter to initiate transfer -> Controller sends in handshake: A) Motor setpoint in rpm	1 0..2000
RSS	Read system status	1. Dummy parameter to initiate transfer -> Controller sends in handshake: 1. actual systemstatus code 1 → normal operation 2. Overload condition 0 → no overload condition 1 → Motor is under overload operation	1 1 0/1
RTY	Read Type Information of unit	1. Dummy parameter to initiate transfer -> Controller sends in handshake: A) name of connected device B) firmware version number C) ON/OFF counts D) total operation time in minutes	1 string string number number
WSM	Keyboard or RS232 speed control (Write serial mode) Select if setting for motor speed is accepted from frontpanel (speed control knob) or via RS232 command (WSE)	A) Control parameter 0→ frontpanel control of motor speed 1→ RS232 control of motor speed (via WSE command)	0/1

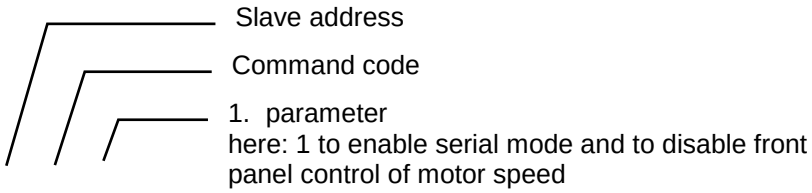
CMD. CODE	Explanation	Parameter list	Range
KEN	Lock/Unlock frontpanel keyboard	1. lock / unlock parameter 0 → frontpanel keyboard is disabled (except On/Off button) 1 → frontpanel keyboard is enabled	0/1
WSA	Set RS232 slave-address, + renumber slaves	1. New slave-address of unit	0...255
OFF	Switch unit off	1. Security parameter	1234
WEE	Save set-up settings to EEPROM	1. Security parameter	4321

8.5 Programming examples

The following application examples show how RS232 commands can be sent to the stirrer and how actual parameters can be read out from the stirrer.

8.5.1 Writing parameters to the stirrer

If, for example the motor speed should be set to 500 rpm´s, the following two command strings have to be sent to the unit with slave-address 1:



1,WSM,1 ; 1. command: disable front panel control and enable RS232 control
1,WMS,500 ; 2. command: set motor speed to 500 rpm

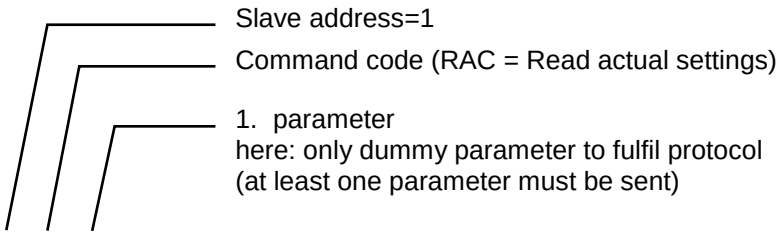
The R 100 Controller then sends the following strings to the next unit (or back to the PC if only one device is connected):

1,WSM,1 ; Echo of the 1. Command
1,HS,OK ; Handshake (response) to the 1. Command (=accepted, no error)

1,WMS,500 ; Echo of the 2. command
1,HS,OK ; Handshake (response) to the 2. Command (=accepted, no error)

8.5.2 Reading parameters from the stirrer

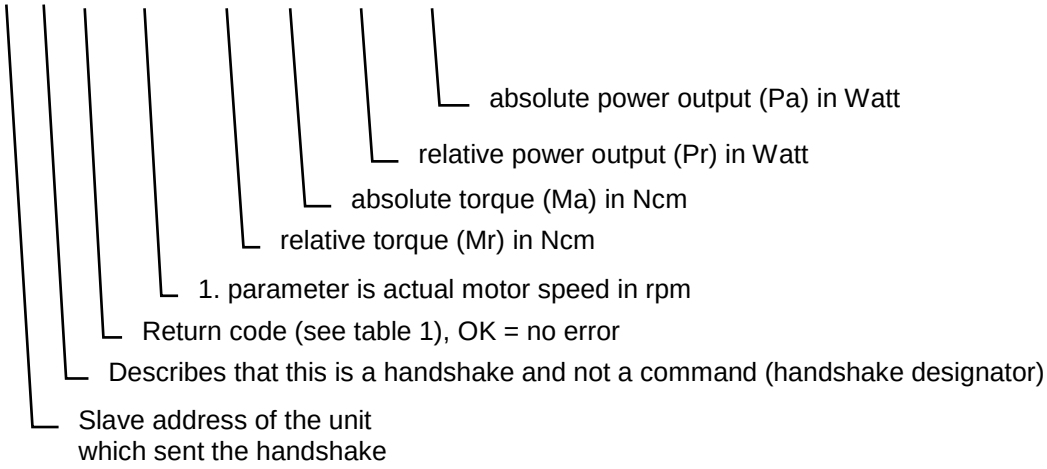
To read the actual values of motor speed, torque and power output send the following command to the unit with SlaveAdress 1.



1,RAC,1 ;see also table 2: RAC-command

The Controller then sends the following two strings to the next unit (or back to the PC):

1,RAC,1 ;Echo of the received command
1,HS,OK, 300.0, 50.0, 56.0, 15.7, 17.59 ;Handshake (response) with return parameters



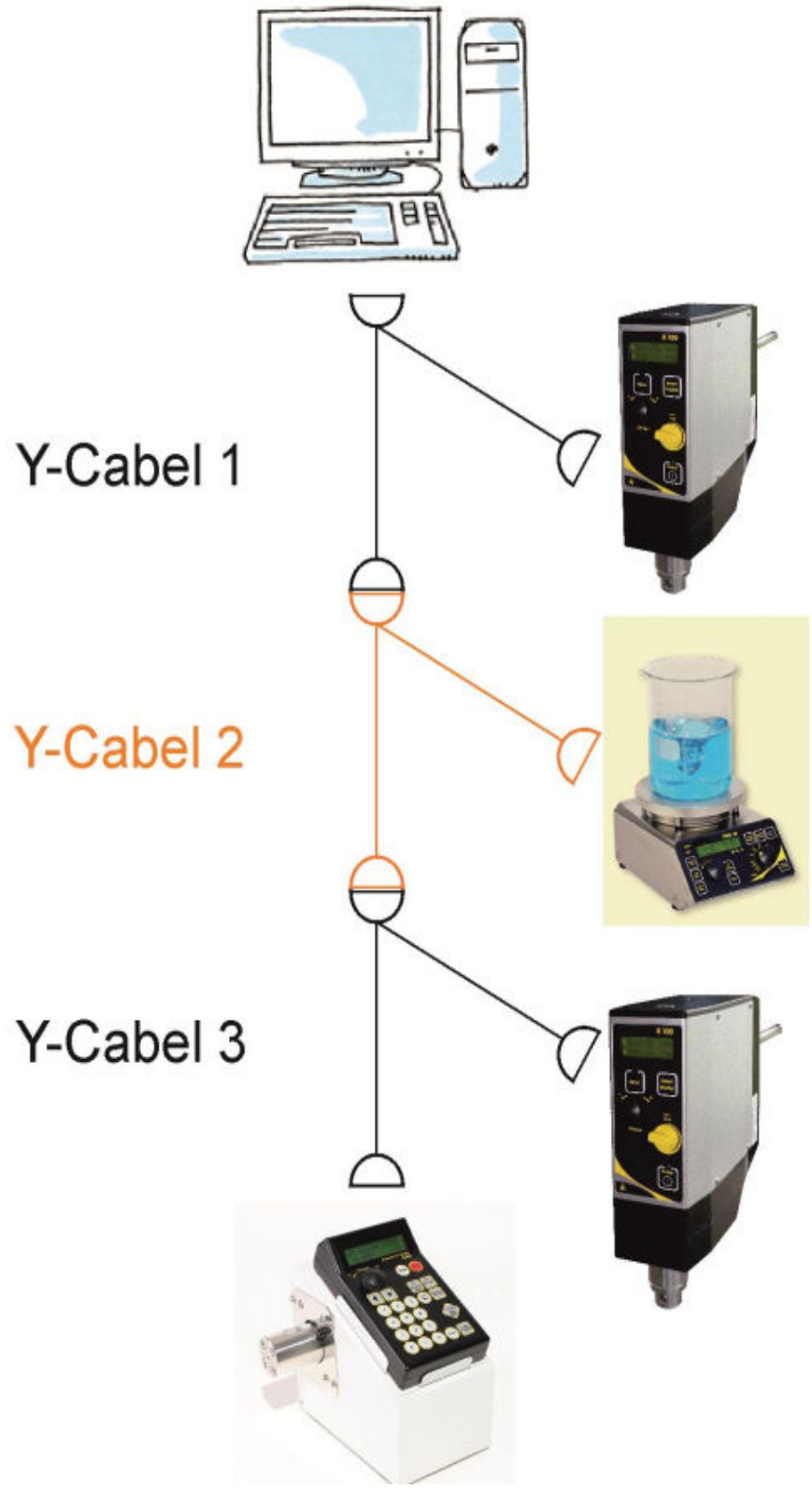
☞ Every command or handshake sequence is terminated by ASCII-Code 13 (CR)

8.6 Connection of more than one unit to a computer

The powerful protocol of the RS232 interface allows also for connection of other Laboratory instruments like hotplate stirrers (M 26, MCS 66), micrometering pumps (HPLH series), dispensers to only one RS232 interface on the computer side. By assigning different slave-addresses to each connected unit the computer can access each unit individually.
For connection of more than one unit to a computer a special Y-cable is used for every additional unit (RS232 Y-cable part no.: 60729-0000).
For application adaptation a Windows® program is optionally available.

Application example:

(schematic representation)



9 The Setup menu

Global settings are stored in a non-volatile memory (EEPROM). To modify these global settings press and hold the ´**Select Display**´ key, while switching the unit on with the **Power On/Off** key.

The following settings could be adjusted in the setup menu of the R 100C / R 100CL/ R 100CT:

RS232 Address	Defines the address under which the stirrer can be accessed using RS232 commands. factory setting: 1 range: 1-255
Baudrate	Baudrate of the RS232 interface factory setting: 1200 Baud options: 1200, 2400, 4800 Baud
Max MotorRpm	User selectable maximum motor speed in rpm. factory setting **R 100C**: 2000 rpm range: 40-2000 rpm factory setting **R 100CL**: 1100 rpm range: 30-1100 rpm factory setting **R 100CT**: 500 rpm range: 10-500 rpm
Min MotorRpm	User selectable minimum motor speed in rpm. factory setting **R 100C**: 40 rpm range: 40-2000 rpm factory setting **R 100CL**: 30 rpm range: 30-1100 rpm factory setting **R 100CT**: 10 rpm range: 10-500 rpm
Max torque	Maximum allowed torque on shaft in Ncm factory setting **R 100C**: 150 Ncm Range: 10-150 Ncm Maximum allowed torque on shaft in Ncm factory setting **R 100CL**: 250 Ncm Range: 10-250 Ncm Maximum allowed torque on shaft in Ncm factory setting **R 100CT**: 600 Ncm factory setting: 600 Ncm Range: 10-600 Ncm
CutOff limit	Cut-off limit sensitivity in percent (→ rotor stuck detection) If the torque increase versus time exceeds a certain limit the unit will assume that the rotor was suddenly blocked. If this happens the unit will shut down immediately. factory setting: 60% range: 10-100% (100% disables this safety check) ☞ The lower the entered value, the more sensitive the unit will react on sudden torque increases.
Analogue input	Allow or block speed setting via external analogue voltage control.

An Inp. F=0	Defines the control voltage (→ analogue input) when the motor has to be stopped (speed = 0). The voltage at the analogue input functions as multiplication factor onto the frontally set speed (→ speed control knob). This value reflects the input voltage at which the multiplication factor is zero. This setting is only relevant if the analogue input is enabled (see above). Factory setting: 0.0 V Range: -20.0 to +30.0 V (only to define the load line, max. applied voltage: 0 - 10 V)
An Inp. F=1	This value reflects the input voltage at which the multiplication factor of the speed is 1.0. Factory setting: 24.0 V
An Output	Selects which function/value has to be monitored on the analogue output pin. Factory setting: DISABLED Available options: Torque-R (relative torque) Torque-A (absolute torque) Power -R (relative power) Power-A (absolute power) DISABLED (output de-activated, 0V output)
An. Out U=0V	This value defines the operation value (speed, torque or power) which is related to a voltage outlet of **0.0V** at the analogue pin output (pin no. 6)
An. Out U=4V	This value indicates which operation value (speed, torque or power) is related to the output voltage of **4.0V** at the analogue pin output (pin no. 6).

9.1 Example: How to change setup settings

Example of the necessary steps to set/define the maximum allowed motor speed in the setup menu:

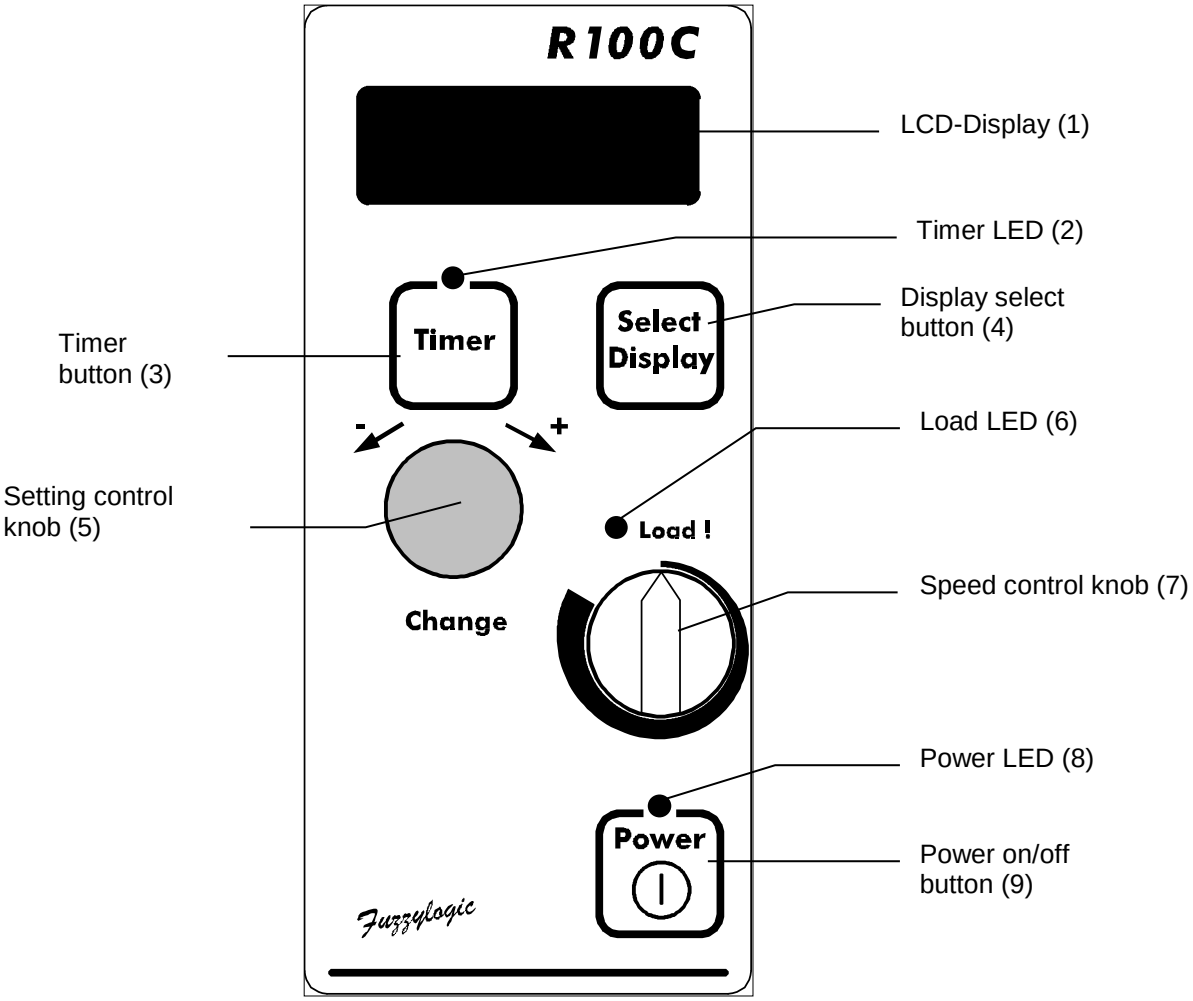
- **press** and hold the ´**Select Display**´ key (4), whilst switching on the R 100C / R 100CT. The unit initialises and then switches into the Setup menu.

The ´**Select Display**´ key (4) must be pressed down until the Setup menu appears on the display.

- **turn** the handwheel (5) until ´Max MotorRpm´ occurs on the display
- **press** the **Timer** key (3) to edit the max. motor speed (→ Edit arrow appears).
- **turn** the handwheel (5) to adjust the value.
- **press** the ´**Select Display**´ key (4) to leave the setup menu.
- **press** the ´**Select Display**´ key (4) once again when the units asks to save the setup parameters.

Important Note

The different options/parameters in the setup menu can be displayed/selected by simply turning the handwheel (5). To change a displayed value press the Timer key (3) and an edit arrow (→) will appear in front of the parameter to be changed. As long as the edit arrow is on the display, turning the handwheel (5) will change the displayed value. If the handwheel (5) is not touched for approx. 3 seconds the edit arrow will disappear and an other menu option can be selected by turning the handwheel (5).
When editing the setup parameters, the ´**Select Display**´ button (4) is used to leave the setup menu, or to confirm a selection. The ´**Timer**´ button (3) is used to edit/change a displayed value.
The Setup-menu can only be left by pressing the Power On/Off key (9) or the ´Select Display´ key (4)!
Pressing the Power On/Off key (9) from within the setup menu will prevent the unit to store eventually changed settings to non-volatile memory. After pressing the ´**Select Display**´ key (4) the unit will ask if the settings should be stored to non-volatile memory. To confirm this question press ´Select Display´ (4) again. If the parameters should not be stored turn the handwheel (5) until “NO” is displayed and then press the ´**Select Display**´ button (4).



(view on the R 100C / R 100CL / R 100CT front panel)

10 Error messages

The R 100C / R 100CL / R 100CT overhead stirrer has an on-board self diagnostic program that detects possible failures and, should one occur, the R 100C / R 100CL / R 100CT shuts itself down. To enable the user to prevent the problem re-occurring, the R 100C / R 100CL / R 100CT will display any of the following error messages as it is switched on again. Please read carefully the following table of error messages.

Error message:	**Reason for shut down:**
Time-out	the programmable timer has expired (timer key)
rotor stuck	A too fast increase of rotor torque was detected (see also: Setup menu)
Overtemp.	the motor temperature was too high
RS232 Off	The unit was switched off by an RS232 command
Sensor Err.	The temperature measurement sensor or circuit is damaged

11 Cleaning and Maintenance

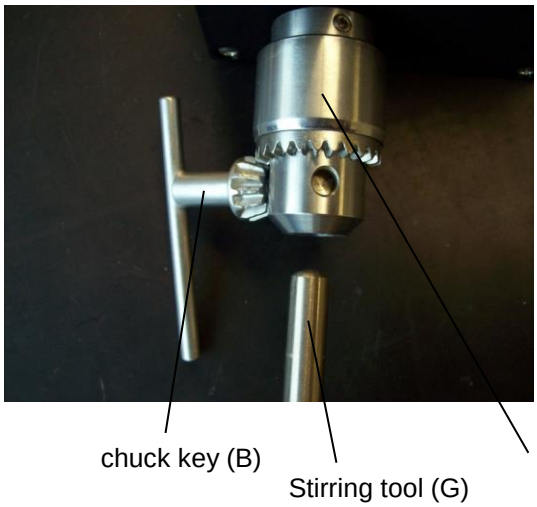
The outer casing consists of painted or anodised aluminium and a chemically resistant splash-proof membrane key-pad and therefore easily cleaned with warm water and any suitable liquid laboratory detergent. Do not use steel wool or any similar plastic wool sponge to clean the unit.

⚠WARNING **In case of malfunction do not attempt to repair the unit. There are no user-serviceable parts in this instrument.**

The stirrer R 100C / R 100CL / R 100CT should only be opened and repaired by authorised service personnel. Any work on the electronics inside the unit should only be carried out by knowledgeable, trained personnel. Any attempt by the user to repair the unit will immediately render the guarantee null and void. Please contact your local distributor in the event of a problem.

12 Dismantling, Transport and Storage

12.1 Dismantling



Switch the unit off.
Disconnect the unit from the mains.
Remove any glass beakers and any other equipment around the overhead stirrer.
Remove the stirring tool (G) by loosening the chuck (F) with the chuck key (B).
Loosen the special clamp (C) and remove the clamp from the support rods.
Unscrew the support rods (A).
Now you may remove the instrument from the working area.

12.2 Transport and Storage

Prior to transport:

Switch the instrument off and unplug the power supply.

Place the instrument and its parts in its original packaging or another suitable container to protect it during transport. Close the packaging with adhesive tape.

Store the instrument in a dry environment. Please observe the specified conditions of the ambient (temperature and humidity).

Do not subject the instrument to mechanical shocks or vibration during transporting it.

In case you do not use the original packaging please mark the box with the following notes:

- Glass symbol (handle with care, fragile)
- Umbrella (keep dry)
- Content (list of content)

Storage ambient:

Max. ambient temperature:	RT to +40°C
Max. humidity:	80%

13 Disposal

Please dispose of used instruments and defective components at your local recycling collection point. Prior to disposal, sort according to materials: metal, glass, plastic, etc. Also be sure to dispose of the packing material in an environmental-friendly manner.

14 Warranty and Liability

The manufacturer agrees to either repair, or replace, at the manufacturer's discretion, any defects in materials or workmanship which develop within 24 months of the delivery of this product to the original user. In the event of replacement, the replacement unit will be guaranteed for the remainder of the original twenty-four (24) month period or ninety (90) days, whichever is longer.

If this product should require service, contact your local distributor or manufacturer for necessary instructions.

This guarantee will not apply if the defect or malfunction was caused by accident, neglect, unreasonable use or fitness for a particular purpose, which extend beyond the description and period set forth herein.

The manufacturer's sole obligation under this guarantee is limited to the repair or replacement of a defective product and the manufacturer shall not, in any event, be liable for any incidental or consequential damages of any kind, resulting from use or possession of the product.

	**⚠WARNING** The user has to determine, if the instrument is suitable for his specific application. If there are any further queries, contact your local dealer or the manufacturer direct.

15 Technical Data

15.1 Technical Data R 100C

Type: R 100C	Specifications
Electrical power requirements	115/230V, 300W, 50/60 Hz (see R 100C rear panel)
LCD-Display	bright back-lit LCD display, showing all relevant system data. Simultaneous display of set and real values of motor speed, torque, or power output.
Incremental encoder wheel	allows fast and intuitive adjustment of timer and system settings
Timer function	programmable switch-off timer, programmable from 1 minute to 99 days. Resolution: 1 minute
Torque output display	displays true torque at shaft in Ncm (relative or absolute readout possible) Accuracy: 5%
Power output display	displays true power output at shaft in watts. (relative or absolute readout possible) Accuracy: 5%
Motor specification	▪ torque microprocessor controlled for easy operation and accuracy ▪ soft-start and soft-stop logic prevents splashing of liquid ▪ precise adjustable motor speed from 50 to 2000 rpm in steps of 10 rpm ▪ max. 220 watts shaft power output ▪ extra long life, high performance, brush motor ▪ silent belt drive power transmission ▪ max. torque: 150 Ncm (20 min) ▪ continuous torque output (at 1100 rpm): 100 Ncm ▪ maximum limitation of torque (programmable) ▪ The device is not suitable for permanent use
Multistep safety system	detects and protects against the following dangerous situations: ▪ rotor stuck/block detection ▪ motor overtemperature monitoring ▪ self test of all safety functions after switching on
Auxiliary functions	User programmable limits for: maximum motor speed (40-2000 rpm) maximum allowed torque at shaft (10-150 Ncm)

Type: R 100C	Specifications
RS232 interface	programmable baudrate: 1200,2400,4800; 8,N,1 Full remote access of all stirrer functions (read and write) daisy chain feature by sub addressing allows to connect up to 255 units to only one serial interface on the computer side. Windows® software optional available
Permissible ambient temperature	5 - 40 °C within operating area, e.g. fume cupboard
Permissible humidity	80 % RH
Safety class acc. to DIN EN 60529	IP42
Case dimensions	78 x 200 x 230 mm (W x D x H)
weight	4.7 Kg

15.2 Technical Data R 100CL

Type: R 100CL	Specifications
Electrical power requirements	115/230V, 300W, 50/60 Hz (see R 100CL rear panel)
LCD-Display	bright back-lit LCD display, showing all relevant system data. Simultaneous display of set and real values of motor speed, torque, or power output.
Incremental encoder wheel	allows fast and intuitive adjustment of timer and system settings
Timer function	programmable switch-off timer, programmable from 1 minute to 99 days. Resolution: 1 minute
Torque output display	displays true torque at shaft in Ncm (relative or absolute readout possible) Accuracy: 5%
Power output display	displays true power output at shaft in watts. (relative or absolute readout possible) Accuracy: 5%

Type: R 100CL	Specifications
Motor specification	▪ torque microprocessor controlled for easy operation and accuracy ▪ soft-start and soft-stop logic prevents splashing of liquid ▪ precise adjustable motor speed from 30 to 1100 rpm in steps of 10 rpm ▪ max. 230 watts shaft power output ▪ extra long life, high performance, brush motor ▪ silent belt drive power transmission ▪ max. torque: 250 Ncm (20 min) ▪ continuous torque output (at 700 rpm): 200 Ncm ▪ maximum limitation of torque (programmable) ▪ The device is not suitable for permanent use
Multistep safety system	detects and protects against the following dangerous situations: ▪ rotor stuck/block detection ▪ motor overtemperature monitoring ▪ self test of all safety functions after switching on
Auxiliary functions	User programmable limits for: maximum motor speed (30-1100 rpm) maximum allowed torque at shaft (10-250 Ncm)
RS232 interface	programmable baudrate: 1200,2400,4800; 8,N,1 Full remote access of all stirrer functions (read and write) daisy chain feature by sub addressing allows to connect up to 255 units to only one serial interface on the computer side. Windows® software optional available
Permissible ambient temperature	5 - 40 °C within operating area, e.g. fume cupboard
Permissible humidity	80 % RH
Safety class acc. to DIN EN 60529	IP42
Case dimensions	78 x 200 x 230 mm (W x D x H)
weight	5 Kg

Technical Data R 100CT

Type: R 100CT	**Specifications**
Electrical power requirements	115/230V, 300W, 50/60 Hz (see R 100CT rear panel)
LCD-Display	bright back-lit LCD display, showing all relevant system data. Simultaneous display of set and real values of motor speed, torque, or power output.
Incremental encoder wheel	allows fast and intuitive adjustment of timer and system settings
Timer function	programmable switch-off timer, programmable from 1 minute to 99 days. Resolution: 1 minute
Torque output display	displays true torque at shaft in Ncm (relative or absolute readout possible) Accuracy: 10%
Power output display	displays true power output at shaft in watts. (relative or absolute readout possible) Accuracy: 10%
Motor specification	▪ torque microprocessor controlled for easy operation and accuracy ▪ soft-start and soft-stop logic prevents splashing of liquid ▪ precise adjustable motor speed from 10 to 500 rpm in steps of 2 rpm ▪ max. 220 watts shaft power output ▪ extra long life, high performance, brush motor ▪ silent belt drive power transmission ▪ max. torque: 600 Ncm (20 min) ▪ continuous torque output at 250 rpm: 400 Ncm ▪ maximum limitation of torque (programmable) ▪ The device is not suitable for permanent use
Multistep safety system	detects and protects against the following dangerous situations: ▪ rotor stuck/block detection ▪ motor over-temperature monitoring ▪ self test of all safety functions after switching on
Auxiliary functions	User programmable limits for: maximum motor speed (10-500 rpm) maximum allowed torque at shaft (10-600 Ncm)
RS232 interface	programmable baudrate: 1200,2400,4800; 8,N,1 Full remote access of all stirrer functions (read and write) daisy chain feature by sub addressing allows to connect up to 255 units to only one serial interface on the computer side. Windows® software optional available

Type: R 100CT	Specifications
Permissible ambient temperature	5 - 40 °C within operating area, e.g. fume cupboard
Permissible humidity	80 % RH
Safety class acc. to DIN EN 60529	IP42
Case dimensions	78 x 200 x 250 mm (W x D x H)
weight	5.5 Kg

16 Repairs

When returning instruments for repair that have come into contact with hazardous substances, please:
Fill in attached "Repair Return Form"
Provide precise information on the relevant medium
Take protective measures to ensure the safety of our receiving and maintenance personnel
Mark the package as appropriate for hazardous materials.

17 Appendix A

17.1 Displaying the system info:

For additional user information the R 100C / R 100CL / R 100CT tracks the total operation time and the number of power-up's.

- **press** and hold the **Timer** key, whilst switching on the R 100C. The unit initialises and then displays the System Info screen. **Press** any key to display the next info.

The system Info is shown on the LCD-display and contains the following information:

1. total operation time of the unit (days:hours:minutes)
2. number of times the R 100C / R 100CL / R 100CT has been turned on

17.2 Repair Return Form

CONTACT/USER INFORMATION	
Contact:	Phone No.
Fax No.	Email:
Billing:	Shipping:
Company	Company
Address	Address

INSTRUMENT INFORMATION	
Model	Serial No.
Please describe all problems/malfunctions	

Operating Conditions (please fill in if applicable)		
Ambient Temp.	Humidity	Speed
Load	Volume	Viscosity
Temperature in °C	Sample Temperature	Operating Time
Sample Description*		

*NOTE: If the instrument was exposed to hazardous material, it must be decontaminated BEFORE returning it to Goldleaf Scientific and an MSDS for hazardous material must be included with the instrument.

RETURN SHIPPING			
UPS ❑	Air Parcel Post ❑	Collect** ❑	Other** ❑

**Your account number is required for UPS collect respectively the address and contact of your preferred forwarder if you choose any other transport means.

PACKAGING INSTRUCTIONS TO RETURN AN INSTRUMENT FOR REPAIR

- ✓ Remove all accessories (e.g. homogenizer tools, stirring paddles) from the instrument
- ✓ Clean excess testing material off the instrument/accessory
- ✓ Include MSDS sheets for all hazardous materials used with this instrument
- ✓ Pack the instrument in its original box. If the box is not available, take care to wrap the instrument and accessories with enough material to support them.
- ✓ DO NOT send pedestal stand unless there is a problem with the upright rod, clamp or base. If there is a problem with the stand remove the upright rod from the base and individually wrap each item to avoid contact with the instrument. (Applicable for overhead stirrers and homogenizers.)
- ✓ Pack the instrument and related items in a strong box for shipping. Mark the outside of the box with handling instructions.

Example: “Handle with care” or “Fragile- Delicate Instrument” and send to:

Goldleaf Scientific,
Service Department
3300 Harrison st suite 2
Riverside, CA 92503