Ingenieurbüro
M. Zipperer GmbH
Etzenbach 16
D-79219 Staufen

Instruction Manual

Stirring motor R20

Table of Contents

1. General information

The stirring motor R20 is manufactured and tested according to DIN EN 61010. The device has left the factory in a safety-related faultless state. To obtain this state and operate safe the user has to pay attention to the notes and warnings inside this instruction manual.

1.1 Unpacking the device

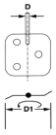
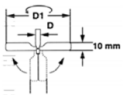
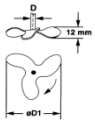
Check the outside box around the instrument. If there is any damage, such as pushed-in sides, chemical damage to the box, water marks or other physical effects that may have damaged the contents then inform the forwarding agent and ask about the necessary measures to be taken. If there is no visible damage on the outside of the box then open it carefully.

1.2 Scope of delivery and accessories

Please check the contents for damage or deviation from the packing list:

1 Stirring Motor R20	Art. Nr. 60214-50
1 Support Rod	
1 Allan Key	
1 clamp lever	
1 power supply with clamp	
1 operating manual	

Accessories and stirring tools (optional):

Blade Stirrer	Length Including blade	Diameter of rod	Diameter of blade	**Art.Nr.**
	300mm	8mm	70mm	8B009403
	400mm	8mm	70mm	8B009404
	300mm	8mm	70mm	8B009503
	400mm	8mm	70mm	8B009504
Centrifugal stirrer				
	300mm	8mm	90/15mm	8B009209
	400mm	8mm	90/15mm	8B009210
Propeller Stirrer				
	300mm	6mm	50mm	8B009100
	300mm	8mm	50mm	8B009103
	400mm	8mm	50mm	8B009104
	300mm	6mm	70mm	8B009106
	300mm	8mm	70mm	8B009109
	400mm	8mm	70mm	8B009110

D-Sub to USB adapter	30244-01
9-pole D-Sub cable 1,8m	30275-51
Plate Stand	60491-00

Note:
If the stirring motor, support rod, clamp and the power supply are not damaged and all parts are complete then you can start operate the device after reading the instructions.

Note:
Please read the operating instructions thoroughly and make sure that you have understood everything before starting the device.
Should you have any questions about installation, operation or maintenance after reading the instructions then please contact the supplier or manufacturer of the device at the following address:

CAT

Ingenieurbüro
M. Zipperer GmbH
Etzenbach 16
D-79219 Staufen

Tel: +49-(0)7636-7803-0
Fax: +49-(0)7636-7803-45
E-Mail: info@cat-ing.de
Web: www.cat-ing.de

Important Note:
These instructions should always be at hand particularly for those who want to use the device. Hence the instructions should be kept close to the device.

The power supply is equipped with a EURO AC plug (DIN 49441 CEE 7/VII10/ 16A 250V). For North America the power supply features a standard US plugs (NEMA Pub.No.WDI1961 ASA C 73.1. 1961 page 8 15A 125V).

When operating the device 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 for 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.

2. Safety instructions

2.1 Explanation of the safety instructions in the operating manual

This symbol highlights the following instructions, which the user hast to follow strictly! Failure to follow these instructions can impair the safe function and safety of the user.

This symbol highlights bans, which the user has to follow strictly! Failure to follow these bans can seriously impair the functionality and safety of the user.

This symbol highlights instructions that should be strictly followed by the user to ensure safe operation of device.

Caution
Hazard of fire or explosion!

Advise for repair / maintenance

Advise for connection to the mains

2.2 Explanation of the safety instructions on the device

Warning against general dangers: This symbol indicates that it is imperative to read and understand the operating instructions of the device before starting it. Incorrect handling can endanger the safe operation of the device and health of the user.

2.3 General safety information

Attention:
Please comply with all safety and accident-prevention regulations applicable to laboratory work.

Danger!
Do not operate in unsafe areas, especially not in explosive areas!

Attention:
Only instructed users may operate the instrument.

Attention:
When connecting the instrument to an AC power outlet, ensure that your local supply voltage matches that indicated on the instrument's rating plate.

CAUTION:
Use great Caution when working with highly flammable substances. Pay attention to the MSDS. The device is not explosion-proof!

Turn the power switch off when not using the instrument and before disconnecting it from the AC power outlet.

Important Note:
Make sure that all safety information of the instrument respectively on the device itself is clearly visible during operation.

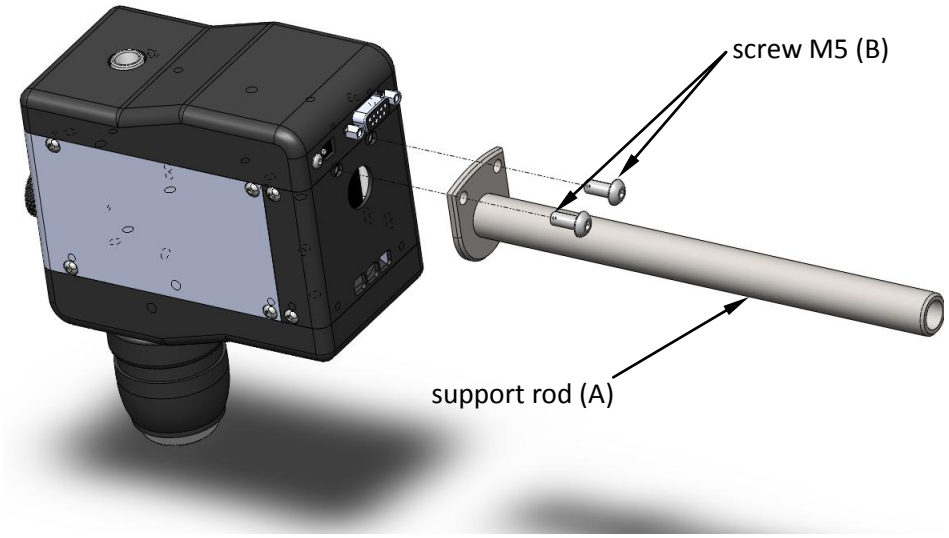
Attention:
Do not open the instrument. Repairs are only to be carried out by trained service technicians.

Always connect the instrument to an earthed AC power outlet.

Ensure that the unit is securely fixed to a stand.

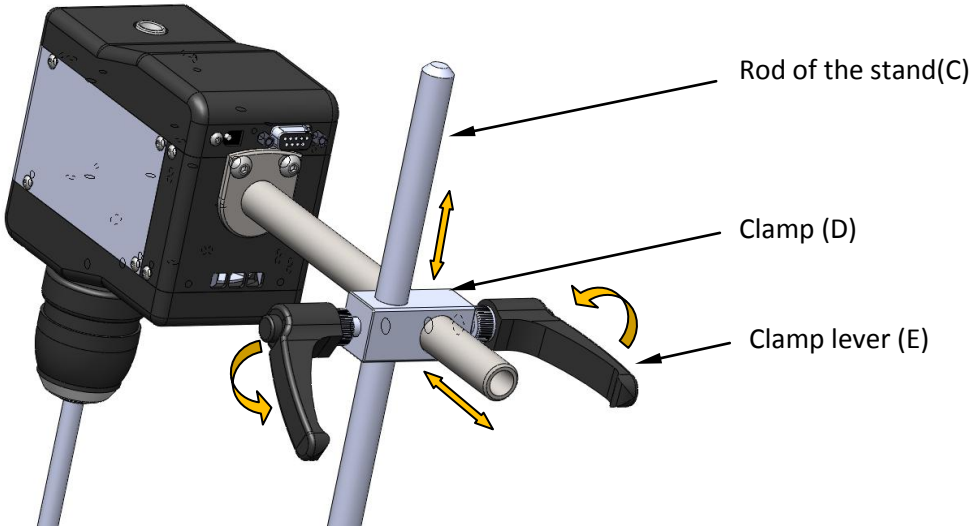
3. Installation

3.1 Mounting the support rod



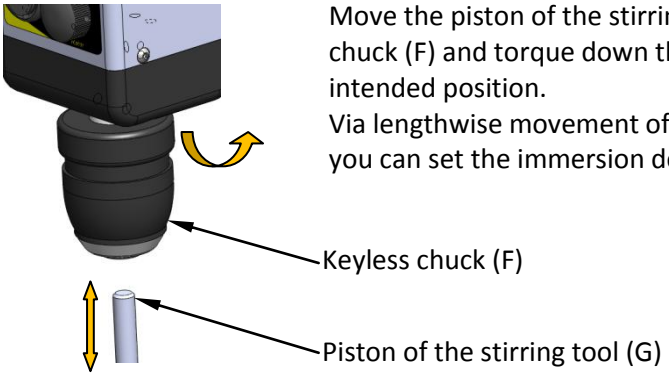
Screw the support rod (A) to the rear panel of the stirrer with the two M5 screws (B)
Therefore use the hexagon socket screw key with AF (across flats) 3.
Screw the screws strongly tight.

3.2 Fastening the stirring motor to the stand



Arm the clamp (D) to the rod of the stand (C).
Insert the support rod (A) of the stirrer through the intended hole in the clamp (D).
When the stirrer is in the favoured position you can fix the support rod (A) and the clamp (D) with the 2 clamp levers (E)

3.3 Mounting the stirring tool



Move the piston of the stirring tool (G) as pictured into the keyless chuck (F) and torque down the chuck when the piston is in the intended position.
Via lengthwise movement of the piston (G) with unfastened chuck (F) you can set the immersion depths of the stirring tool.

⚠ You should insert the piston (G) at least 150mm into the chuck (respectively the hollow-shaft)

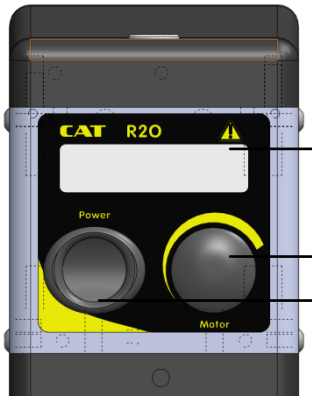
4. Operation

4.1 Intended use

The stirring motor R20 is designed for the professional use in Laboratories. The R20 is for stirring and mixing fluids with low to medium viscosity. For the intended use the device has to be mounted to a stand.

For continuous operation ensure that the ambient conditions are in compliance with the max. ambient temperatures (temperature and humidity, see technical data) as well as a corrosion free atmosphere.

4.2 The front panel



Display (1)	- shows speed - If the display is on power. the device is turned on
Speed control knob (2)	- set speed
Rocker switch (3)	- On/Off switch

5. Switching on the device

Caution:
Before connecting the device to the mains supply, make sure that the voltage printed on the rear panel of the stirrer, corresponds to the voltage from your mains power supply.

Caution:
Make sure, that the speed control knob (2) is at left hand stop before switching on the device respectively connecting it to the mains!

Caution
Always turn off the device with the on/off switch. The device is only disconnected completely from the mains, if the power supply plug is unplugged.

1. Press the rocker switch (3)
2. Set speed with the speed control knob (2).
   The digital value of the actual speed can be read out at the display.

The R20 stirrer has a soft start/stop feature which helps to prevent liquid from splashing.

Attention:
Avoid splashing of liquids by using 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 device, chemicals, reagents, apparatus or equipment employed in any specific test or protocols. It is the responsibility of the user to consult their authorized safety advisors and establish appropriate health and safety practices and then determine the application of regulatory limitations prior to use.

6. Description of the rear panel

On the rear panel of the R20 stirrer, you will find two threaded holes for mounting the support rod (A) with fixing screws (B), the power supply (5) and the serial interface (4) for control via PC.

Make sure that the voltage printed in the R20 corresponds to the voltage from your mains!

7. Activation and serial interface

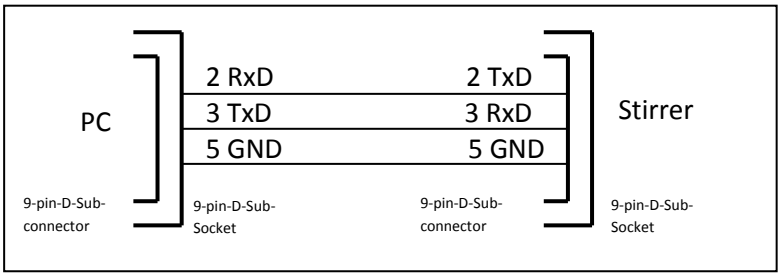
7.1 Activation of the R20 unit via the PC (RS232-interface)

The standard RS232 interface enables remote monitoring of the stirrer as well the programming of speed and stop functions.

Pin configuration of the RS232 socket on the back of the stirrer:

Description	Socket Pin Number
TxD (transmit Data)	2
RxD (receive Data)	3
GND (Ground)	5

This results in the following connection diagram for a PC with 9 pin RS232 socket:



The following RS232 commands can be sent with any normal terminal program (terminal.exe or hyperterminal in Windows XP) via the serial interface (4) of the R20 stirrer.

Serial interface parameters:

Baud rate: 9600 Baud
Data bits: 8 Bit
Parity: none
Stop bits: 1

7.2 RS232-Commands for serial activation

7.2.1 Format of a RS232 command

Each command that is sent to a R20 stirrer is made up as follows:

ADR, CMDCODE, PARAMETER <CR>

Beschreibung:

ADR	Slave address of the R20 stirrer that should execute the command (Value range: 0-255)
CMDCODE	Command Code (see chapter 7.2.2)
PARAMETER	Value range for each respective command code (see Chapter 7.2.2)
<CR>	The command must be completed with carriage return (ASCII Code 13)

7.2.2 Command list

Read Type information:	**0,RTY,1**	
Activate serial mode:	**0,WSM,x**	(x=1 PC, x=0 manual)
Write actual set speed:	**0,WSE,x**	(x=speed, Value range 50-2000)
Read actual set speed:	**0,RSE,1**	
Read actual speed:	**0,RAC,1**	
Write slave address	**0,WSA,x**	(x=slave address, value range 0-255)
Save new slave address	**0,WEE,2**	(if new slave address is not saved, it will not be stored after a restart of the device)

Important Note:
Slave address “0“is global, every device can be addressed with it.
The default slave address of every device is: “1”

7.2.3 Programming examples

Example 1: Read type information

1,RTY,1	Read type information of a device with the slave address 1

The device responds with the following handshake string:

1,HS,OK,R20,V1.0,CAT,1005

- **serial number / firmware version**
- **manufacturer**
- **device designation, device version**
- **command OK, no error**
- **HandShake**
- **Slave address**

Example 2: Set Speed

1,WSM,1	activate serial mode (Slave address 1)
1,WSE,100	set speed of a device with slave address 1 to 100rpm

The device responds with the following handshake string:

1,HS,OK	Handshake response, command accepted, no error

Example 3: Read actual speed

1,WSM,1	activate serial mode (Slave address 1)
1,RAC,1	read actual speed of a device with slave address 1

The device responds with the following handshake string:

1,HS,OK,100	Handshake response, command accepted, no error Actual speed is 100 rpm

Important Note:
Before switching between serial mode and manual mode it is strongly recommended to turn the speed control knob against the left hand stop (start position)

Note:
After switching back from serial mode to manual mode, the device has to be switched off and on again.
After switching off the device in serial mode, the device is automatically set to manual mode.

Note:
If there is an error with a command the device responds with no handshake string.
Exception: If the max. RPM is exceeded: **1,HS, PR** (e.g. 1,WSE,2500)

8. Safety Functions

8.1 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 stop immediately.

8.2 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.

Note:
As long as this is the case, the motor is not able to hold the set motor speed.

8.3 Overtemperature protection

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 from being damaged by constant overload operation.

If the temperature inside the R20 exceeds a critical temperature, the unit will shut down immediately.

Note
To restart the stirrer after over-temp shut down it has to be switched off and on again.

9. Maintenance and service

9.1 Service and Repair

Should you have any questions about installation operation or maintenance then please contact the supplier or manufacturer of the device at the following address:

Ingenieurbüro
M. Zipperer GmbH
Etzenbach 16
D-79219 Staufen

Tel.: ***+49 (0)7636-78030***
Fax: ***+49 (0)7636 780345***
E-Mail: ***info@cat-ing.de***
Web: ***www.cat-ing.de***

Don't carry out any electronic or mechanical repairs on the device. There are no parts inside the device that can be maintained or repaired by the user. Repairs by the user may damage the electronics. The warranty may also be void as a result.

Caution:
Don't open the device! Repairs are only to be carried out by trained service technicians.

Caution:
In case of repair: If you are obliged to send the device back to the manufacturer, please make sure that the device has been adequately cleaned / decontaminated beforehand. The user is responsible for direct or indirect damage both corporal and material that may result from the media used.

9.2 Cleaning

The anodized aluminium housing and the polyamide plastic covers allow an easy cleaning of the device. Also the front panel is chemically stable and splash-proof. We advise to use a lint-free cloth and a mild soap solution (water and household detergent) for cleaning.

Please do not use steel-wool or aggressive detergent, otherwise damage to the lettering and surface cannot be avoided.

10 Disassembly, packing and storage

10.1 Disassembly

Switch off the device and disconnect the power supply from the mains. For a trouble-free disassembling take away all flasks, vessels and other instruments around the stirring motor.

First take the stirring tool (G) out of the device by loosening the keyless chuck (F).
Loose the clamp (D) and pull the device out of it.
Now you can unscrew both of the M5 screws (B) and take away the support rod (A).

10.2 Packing and storage of the device

When possible use the original material for packing the device. Protect each module against shocks from outside with bubble wrap. If you pack individual modules in a box ensure adequate spacing between them and fill the spaces with insulation material. If you don't use the original packing then mark the pack on the outside as follows:

Also pack content (details about the content)

Observe the following notes for correct storage of the stirrer

1. Separate the individual modules from each other for storing.
2. Pack each module in a separate airtight plastic bag.
3. Ensure the following ambient conditions:

Max. ambient temperature:	5-40°C
Max. air humidity:	80%

11 Disposal of the device

Damaged or diposed electric or electronic devices have to be handed in at recycling centres. The packing material too should be disposed of properly (material separation).

Alternatively we can carry out proper disposal of the device for you. Please contact us for this

12 Warranty and exclusion of liability

The manufacturer commits to repair or replace this product, at his direction, in case of defects arising from material or workmanship that appear within 24 months of delivery of said product. In case of replacement the warranty continues until the 24 months have elapsed from the date of purchase.

The dealer or manufacturer is to be involved for all customer service matters.

This warranty is not valid in case of the defects or malfunctions caused by accidents, negligence, incorrect use, wrong servicing and other grounds that cannot be traced back to faulty materials or workmanship.

All warranty and guarantee rights are limited to correct and proper use of the device while following the general safety regulations and these operating instructions. The manufacturer is not obliged to provide other performances apart from those contained in this warranty declaration. In particular corporal or material damages resulting from defective parts or other functional errors are excluded from liability.

The manufacturer's obligation is limited in scope to the repair or replacement of faulty parts. Under no circumstances is the manufacturer obliged to pay for all types of damages resulting from the use and ownership of this product.

CAUTION:
It is the user's task to find out whether the device is suitable for the application. In case of doubt clarify this with your dealer or directly with the manufacturer.

13 Technical Data

Type R20	Specifications
Power Supply	24V DC, 60W
Motor specification	• maintenance-free, brushless motor • microprocessor controlled for easy operation and accuracy • soft-start and soft-stop prevents splashing of liquid • precise adjustable motor speed from 50 to 2000 rpm • max. torque 20Ncm • silent belt drive transmission
Multistep Safety System	Detects and protects against the following dangerous situations: • rotor stuck/block detection • motor overtemperature
Ambient temperature range	5- 40°C
Max. humidity	80% RH
Safety class acc. to DIN 40050	IP42
Dimensions	68 x 121,5 (315mm with rod) x 102mm lengths incl. keyless chuck 165mm
Weight	1,3kg

14 Repairs

When returning devices for repair that have come into contact with hazardous substances, please provide:

- precise information on the relevant medium
- protective measures to ensure the safety of our receiving and maintenance personnel
- the package marked as appropriate for hazardous materials

Repair Return Form

Important:

1. Calibration of the device is done automatically.
2. You will receive an estimate for the expected repair costs.
3. Repairs will be done after release.

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

DEVICE 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	Samlpe Temperature	Operating Time
Sample Description*		

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

RETURN SHIPPING

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

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

PACKAGING INSTRUCTIONS TO RETURN A CAT DEVICE FOR REPAIR

- ✓ Remove all accessories (e.g. homogenizer tools, stirring paddles) from the device
- ✓ Clean excess testing material off the device/accessory
- ✓ Include MSDS for all hazardous materials used with this device.
- ✓ Pack the device in its original box. If the box is not available, take care to wrap the device and accessoiries 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 device. (Applicable for overhead stirrers and homogenisers)
- ✓ Pack the device 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:
  Ingenieurbüro CAT, M. Zipperer GmbH, Service Department, Etzenbach 16, D-79219 Staufen


CAT
MCS 66

Ingenieurbüro
M. Zipperer GmbH

Etzenbach 16,D-79219 Staufen
Tel.: +49 (0) 7636 78030
Fax: +49 (0) 7636 780345
E-Mail: info@cat-ing.de
Internet: http://www.cat-ing.de

CE

Konformitätserklärung
Declaration of conformity
Déclaration de conformité

We declare under our sole responsibility that this product (see table) corresponds to the regulations

2006/95/EC

DIN EN 61010-1; VDE 0411-1:2002-08; Amendment 1; VDE 0411-1 Amendment 1:2002-11; Amendment 2; VDE 0411-1 Amendment 2:2004-01
DIN EN 61010-2-051; VDE 0411-2-051:2004-07

2004/108/EC

DIN EN 61326-1; VDE 0843-20-1:2006-10
DIN EN 61000-6-2; VDE 0839-6-2:2006-03
DIN EN 61000-6-4; VDE 0839-6-4:2007-09
DIN EN 61000-4-2; VDE 0847-4-2:2009-12
DIN EN 61000-4-3; VDE 0847-4-3:2008-06
DIN EN 61000-4-4; VDE 0847-4-4:2005-07
DIN EN 61000-4-5; VDE 0847-4-5:2007-06
DIN EN 61000-4-6; VDE 0847-4-6:2009-12
DIN EN 55011; VDE 0875-11:2010-5
DIN EN 55014-1; VDE 0875-14-1:2010-02
DIN EN 55014-2; VDE 0875-14-2:2009-06

2006/42/EC

DIN EN ISO 12100-1:2004-04
DIN EN ISO 12100-2:2004-04

In the case of a modification of the unit which has not been agreed on with us, this declaration becomes null and void and the warranty expires.

Ingenieurbüro CAT
M.Zipperer GmbH

Manfred Zipperer
CEO
79219 Staufen, den 15. Juni 2010

Type	TYPE
R20, 24V, 60W	