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**Operating Instructions Vibratory Feeder  
Model DR 100**

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**Retsch**<sup>®</sup>

## Information on these operating instructions

The present operating instructions for the model DR 100 vibratory feeder unit provide all the necessary information on the topics mentioned in the table of contents.

These instructions will guide the readers to the topics designated for each target group, essential to safe use of the DR 100 in accordance with the purpose for which the unit is intended. Each target group should be fully familiar with the relevant chapters, as this is essential to safe and proper use of the equipment.

The present technical documentation has been designed for use as both a reference source and learning guide. Each chapter represents a self-contained unit.

These operating instructions do not contain any information on repairs. If repairs should ever become necessary, kindly contact your supplier or the Retsch company.

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# Safety

**Target group:** Everyone who deals with the machine in any manner whatsoever.

The DR 100 is a modern, high-performance product manufactured by the Retsch GmbH. It incorporates the latest technology. It is entirely safe in operation when used for the intended purpose and in accordance with the present technical documentation.

## Safety notes

You, as the owner/operator, must ensure that persons entrusted with the operation of the DR 100:

- \* have read and understood all the regulations included in the chapter on safety,
- \* have made themselves familiar, prior to starting work, with all the operating instructions and regulations for the target groups relevant to them,
- \* have complete, immediate and unhindered access to the technical literature for this machine,
- \* before commencing work, new personnel shall have been made familiar with safe and appropriate use of the DR 100 before starting work with the machine, through instruction by a qualified person and/or with the help of the present technical documentation.
- \* Incorrect operation can result in injuries to persons and damage to property. You bear responsibility for your own safety and for that of your coworkers.
- \* Ensure that no unauthorized persons have access to the DR 100.

For your own protection, have your co-workers certify in writing the fact that they have received instruction in the operation of the DR 100. A suggestion for a printed form which can be used for this purpose will be found at the end of the chapter on safety.



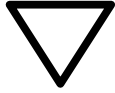
We reject herewith any and all claims in conjunction with personal injury or property damage resulting from failure to observe the following safety instructions.

### Warnings

The following symbols are used to identify specific hazard potentials:



**Personal injury**



**Property damage**

### Repairs

These operating instructions do not include any repair instructions. In the interest of your own safety, have repairs made only by the Retsch GmbH or an authorized representative (service technician).

In this case, please notify the following:

Local Retsch representative

Your supplier

The Retsch GmbH

### Your address for service:

_____
_____
_____
_____

### Confirmation

I have familiarized myself with the foreword to the operating instructions and the chapter on safety.

\_\_\_\_\_  
Owner/operator signature

\_\_\_\_\_  
Service technician's signature

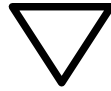
# Technical specifications

**Machine designation:** DR 100

## Utilization in accordance with the intended purpose

The DR 100 is suitable for feeding free-flowing solids, flowing unhindered from the associated feed hoppers, with the following feed grain sizes:

DR 100/15 ≤ 2 mm  
DR 100/40 ≤ 6 mm  
DR 100/75 ≤ 12 mm



Do not make any modifications to the machine and use only RETSCH approved spares and accessories.  
**Failure to comply will invalidate the CE declaration and guarantee.**

## Oscillation frequencies

3000 oscillations at 50 Hz  
3600 oscillations at 60 Hz

## Rated power

12 watts for the DR 100/15-40  
24 watts for the DR 100/75

## Capacity

Model	Hopper volumes
DR 100/15	2.65 dm <sup>3</sup>
DR 100/40	2.65 dm <sup>3</sup>
DR 100/75	3.5 dm <sup>3</sup>

## Feed volume

Medium being fed: Quartz sand at max. oscillation intensity		
Model	Set layer height	Quantity fed
DR 100/15	8 mm	approx. 0.5 dm <sup>3</sup> /min.
DR 100/40	30 mm	approx. 5.0 dm <sup>3</sup> /min.
DR 100/75	35 mm	approx. 5.0 dm <sup>3</sup> /min.

Guideline values; not guaranteed.

## Noise generation

Noise level registered at a distance of 1 m:  
from 36 to 42 dB(A)  
depending on the oscillation intensity selected

## Safety concept / Safety equipment

IP 40  
IP 20 at the housing openings for the vibratory feed chute studs

## Unit dimensions

Height	420 mm	Width	260 mm
Depth	280 mm	Net weight, approx.	10 kg

## Footprint

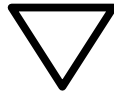
280 mm × 280 mm; no safety clearances required

# Shipping and installation

**Target group:** Owner, freight forwarder, operator

## Packing

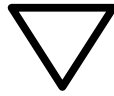
The type of packaging used has been selected in accordance with the shipping mode. It complies with generally accepted packaging guidelines.



Please retain the packaging for the duration of the guarantee period since, in case a claim arises, your guarantee entitlements will be jeopardized if the unit is returned in unsuitable packaging.

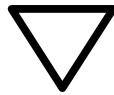
## Shipping

The DR 100 may not be subjected to impact or vibration during transportation; it must not be thrown. The electronic and mechanical components could otherwise be damaged.



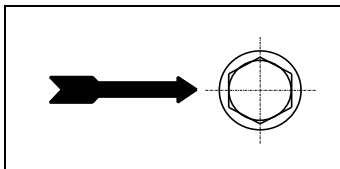
## Temperature fluctuations

In case of wide temperature fluctuations (during shipment by air, for instance) the DR 100 will have to be protected against condensation; the electronic components could otherwise be damaged.



## Shipping protection

To protect the mechanical and electronic components in the DR 100 from damage during shipping, a shipping screw has been installed at the bottom of the DR 100. **Fig. 1**



**Fig. 1**



After removing the shipping screw, using a 13 mm open-end wrench, be sure to retain this screw. Mechanical and electronic components could be damaged if the unit were to be moved at a later date without reinstalling the shipping screw.

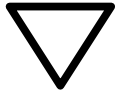
## Intermediate storage

Ensure that the DR 100 is stored in a dry place even when stored for short periods.

## Requirements for the installation site

### Ambient temperature

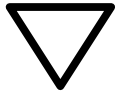
The ambient temperature should be between 5°C and 40°C.



When the ambient temperature exceeds or falls below that specified, the electronic and mechanical components may be damaged, and performance data changed to an unknown extent.

### Humidity

Maximum relative humidity 80% at temperatures up to 31°C; linear decline down to 50% relative humidity at 40°C.



At higher humidity, the electronic and mechanical components may be damaged, and performance data changed to an unknown extent.

### Installation site – Altitude

max. 2000 m above mean sea level



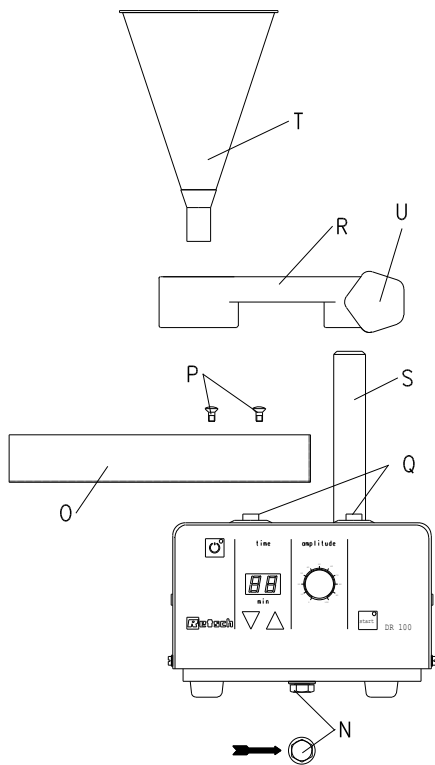


Fig. 2

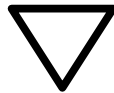
### Setting up the unit

- \* Unscrew the shipping screw **N**, indicated by the arrow, at the bottom of the unit.
- \* Use the provided bolts **P** to secure the vibratory feed chute **O** on the raised inserts **Q**.
- \* Attach the holder **R** to the mounting bar **S**.
- \* Insert the feed hopper **T** in the holder **R**.

Fig. 2

### Electrical connection

- \* The voltage and frequency specifications for the DR 100 will be found on the data plate.
- \* Ensure that the values shown there correspond to those for the local power supply.
- \* Use the supplied power cord to connect the DR 100 to the power source.
- \* When connecting the power cord to the line supply, external fusing shall be provided in accordance with local codes.



Failure to observe the values on the data plate can cause damage to either the electrical or the mechanical components or both.

# Operation

Target group: Operators

## Control elements and their use

Schematic view of the operating controls:

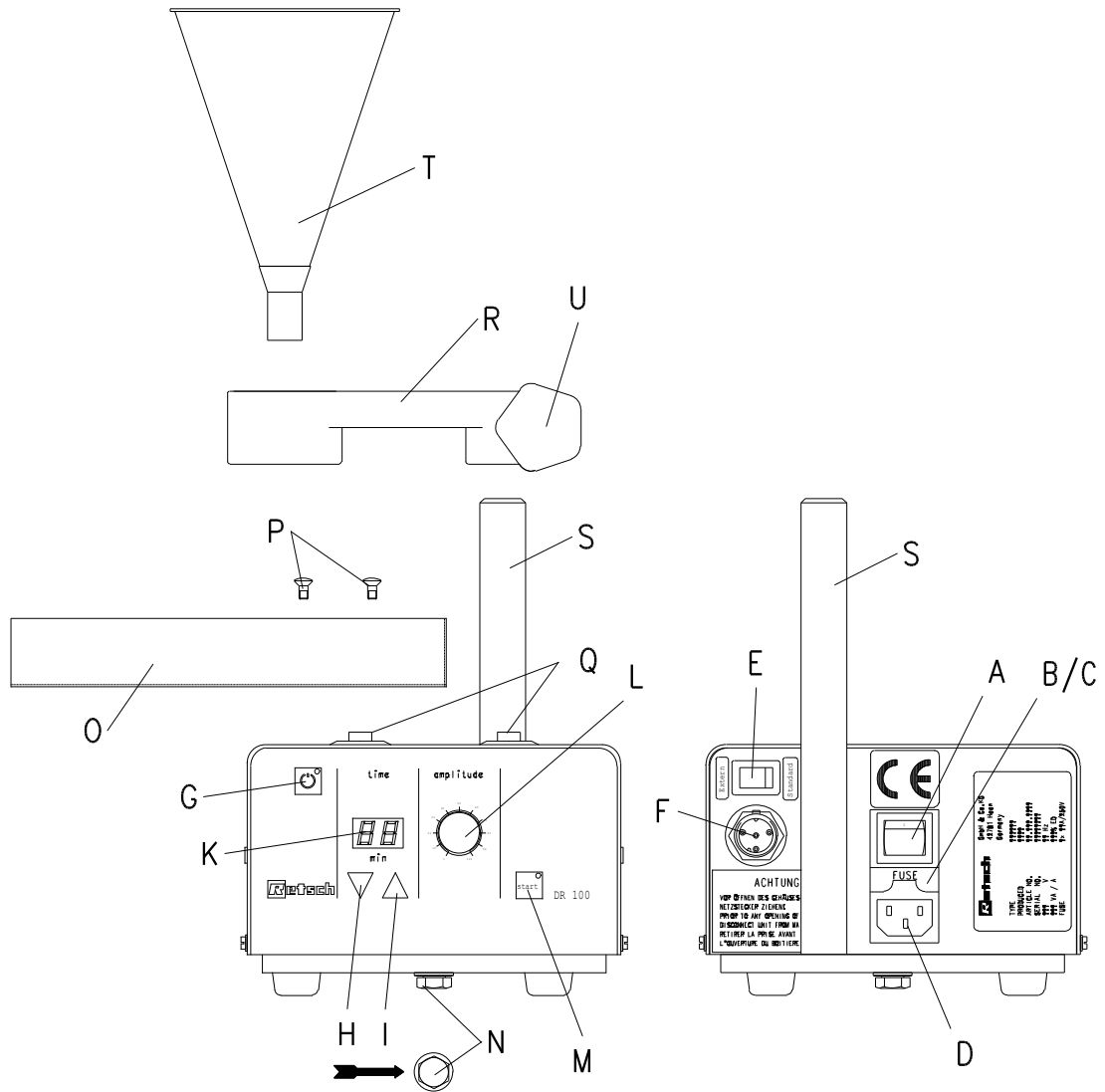




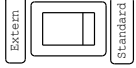





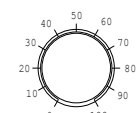

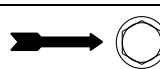



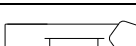





Fig. 3

**The operating controls and their functions**  
Summary table corresponding to Fig. 3

Item	Element	Illustration	Function
A	Main switch		Connects and isolates the DR 100 from the line supply, ON = LED in button <b>G</b> lights.
B	Fuse slide		Accepts two glass tube microfuses <b>C</b> .
C	Fuses		Protect the DR 100 against overloads and short circuits.
D	Line cord connection		Accepts the line cable connector.
E	Operating mode selector switch <b>standard</b> or <b>remote</b>		<b>standard</b> = All the functions at the keyboard are enabled. Exception: If the DR 100 is connected via interface <b>F</b> with a ZM200 unit, only the oscillation intensity can be adjusted at item <b>L</b> . <b>remote</b> = only the oscillation intensity can be adjusted at item <b>L</b> . This position can be selected whenever the DR 100 is being controlled by the following Retch units: ZM 1000, PT 1000, PK 1000.
F	Interface to the Retsch ZM200		Makes the connection to the ZM200 for data exchange purposes. Control function = feed yes/no. Prevents overloading the ZM200.
G	ON/OFF button Standby		Button pressed = LED goes out Display <b>K</b> shows "--", the run time can be set Display <b>K</b> shows "--", Item <b>M</b> can be used to start continuous operation Button pressed = LED lights; DR 100
H	Button Reduce run time		In conjunction with item <b>I</b> allows for programming desired feed time; reduced the feed period from 99 to 01 minutes. Two dashes "--" will be shown if value goes out of range.
I	Button Lengthen run time		In conjunction with item <b>H</b> allows for programming the desired feed time; increases the feed period from 01 to 99 minutes. Two dashes "--" will appear if value goes out of range.
K	Machine run time display		Shows the feed time which you have programmed. Default setting is for continuous operation; two dashes "--" appear in the display. Programming from 1 to 99 minutes is possible.
L	Adjustment knob for oscillation intensity or feed speed		Allows for setting feed speeds. Turning to the right increases the speed. Turning to the left decreases the speed. The values on the scale are not absolute and are provided only to assist in setting the speed.
M	START button		Button pressed = LED lights; feed process is started
N	Shipping screw		Used to protect mechanical and electronic components inside the DR 100 from being damaged when the unit is shipped.
O	Vibratory feeder		Feeds the product at a speed set at item <b>L</b> .
P	Recessed screws		Connect the vibratory feeder channel <b>O</b> with the studs <b>Q</b> .
Q	Raised inserts		Accept the screws <b>P</b> used to fasten the vibratory feeder channel <b>O</b> .
R	Hopper holder		Is positioned on the mounting bar <b>S</b> , holds the feed hopper <b>T</b> and makes possible height adjustment.
S	Mounting bar		Accepts the hopper holder <b>R</b> and make possible adjustment of the hopper holder <b>R</b> .
T	Feed hopper		Serves as supply container, accepts the product to the transported with the vibratory feeder channel <b>O</b> .
U	Knob		Secures the hopper holder <b>R</b> on the mounting bar <b>S</b> . Turning to the right = tightens Turning to the left = loosens

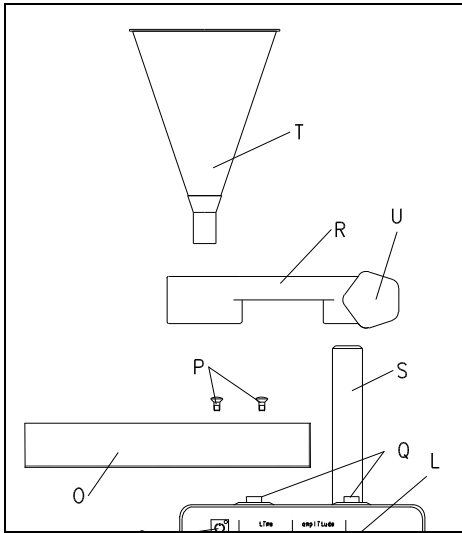


Fig. 4



### Mounting the vibratory feeder channel

The DR 100 is suitable for use with vibratory feeder channels with a front discharge width of 15 mm, 40 mm and 75 mm.

Prerequisites:

DR 100/15-40 for 15 mm and 40 mm feeder channels

DR 100/75 for 75 mm feeder channels

- \* Tools = Phillips screwdriver
- \* Insert the countersunk screws **P** in the holes in the feeder channel **O**, see **Fig. 4**.
- \* The feeder channel must hang over at the left.
- \* Insert the right-hand, rear screw in the raised insert **Q** and tighten down.
- \* Tighten down the second screw.
- \* Check the screws once again to insure that they are seated securely and tightened down completely.

If the connection between the vibratory channel and the studs is not tight, then transfer of the oscillation motion will be inadequate. **Feeder performance will not be controllable.**

### Mount hopper holder

- \* Set the hopper holder **R** on the mounting rod **S**, see **Fig. 4**.
- \* Turn the knob **U** to the right to tighten.

The hopper holder can be rotated around the rod and adjusted in height to put the feed hopper in the correct position.

### Insert feed hopper

Two different feed hoppers are available for the DR 100. For the

DR 100/15-40 a feed hopper with volume of 2.65 dm<sup>3</sup>

DR 100/75 a feed hopper with volume of 3.5 dm<sup>3</sup>

- \* Insert the feed hopper **T** in the hopper holder **R**, see **Fig. 4**.
- \* Set the desired gap between the bottom of the feed hopper and the bottom of the vibratory feeder channel by shifting the hopper holder; see **Fig. 5**.
- \* Re-tighten the knob **U**, see **Fig. 4**.

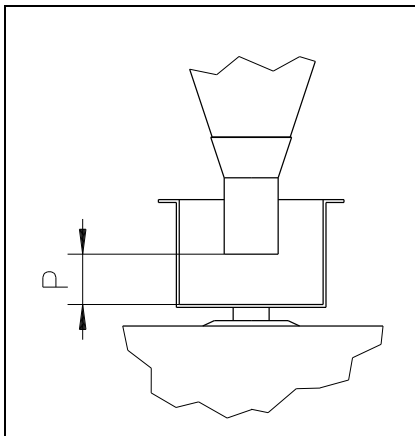


Fig. 5

The gap between the bottom of the feed hopper and the bottom of the vibratory channel will depend on the grain size of the product being handled and should be at least three times the size of the largest grain in the product.

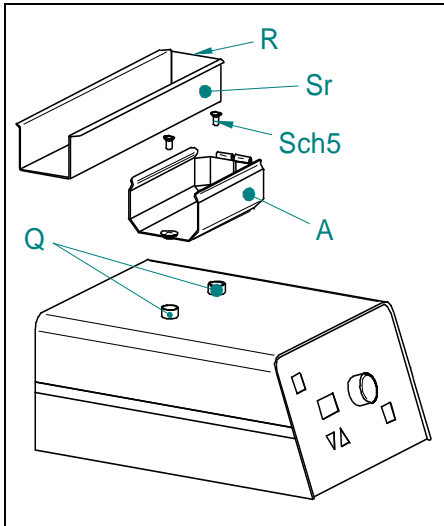


Fig.6

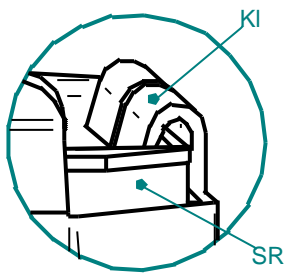


Fig.7

### Mounting the vibratory channel (plug-in)

The DR 100 is suitable for vibratory channels with an outlet width at the front of 15mm, 40mm and 75mm.

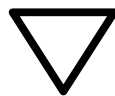
Requirements:

DR 100/15-40 for 15mm and 40mm vibratory channels.  
 DR 100/75 for 75mm vibratory channels.

Tool = flat blade screwdriver

- Fasten mounting **A** to the projecting pins **Q** using the slotted raised countersunk screws **Sch5**.
- Clamp the vibratory channel **Sr** with edge **R** below the lugs on the mounting **Kl**. **Fig.7**
- Press the vibratory channel into the mounting until it locks in place.

With the DR 100 vibratory channel on the left, the lugs **KL** on mounting **A** must be on the right hand side, and with the DR 100 vibratory channel on the right, they must be on the left hand side.



If there is no firm connection between the vibratory channel and the pins, the vibration is not transmitted sufficiently. **The material feed is not controllable.**

## Mounting the holder with level height adjustment

**Target group:** Trained installation staff

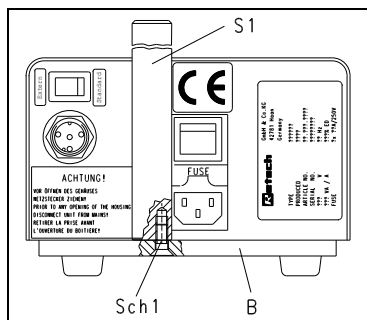
The level height adjustment system can only be installed in those DR 100s which have a modification index with the letter “G” or higher after the serial number.

Two different height adjustment systems are available for the DR 100. For :

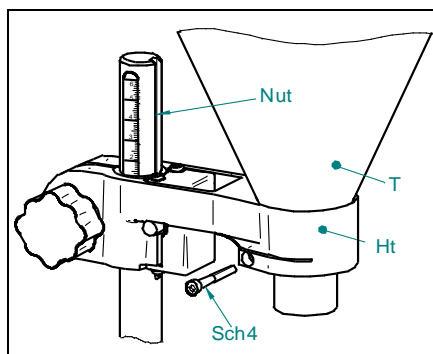
DR 100/15-40 for feed hoppers with  $V = 2.65\text{dm}^3$   
DR 100/75 for feed hoppers with  $V = 3.5\text{dm}^3$

Turning handwheel **H2** on the holder with level height adjustment facilitates easy and precise adjustment of the height of the feed hopper and thus of the discharge material level **P** (see **Fig.12**)

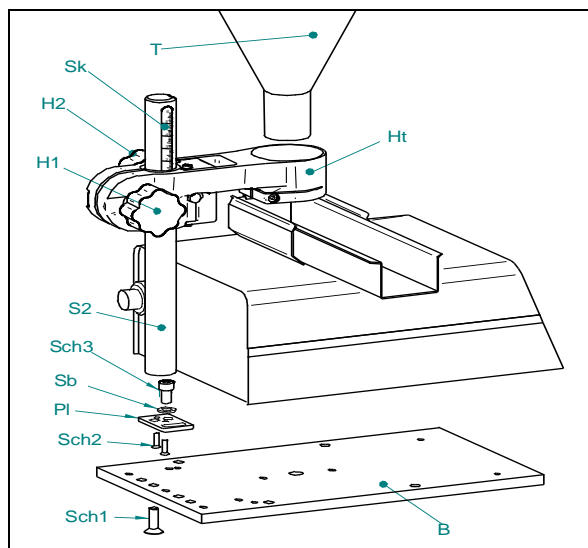
The scale **SK** on the stand rod merely serves as a guideline to the set height. The material height actually set cannot be read off direct.



**Fig.8**



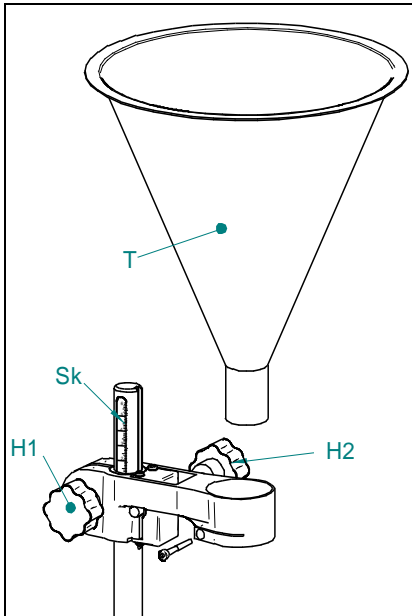
**Fig.9**



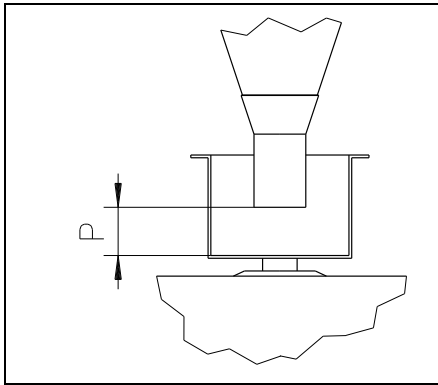
**Fig.10**

### Assembly procedure: Figs. 8, 9 and 10

- Remove countersunk screw **Sch1**. **Fig.8**
- Remove stand rod **S1**.
- Connect locking plate **PI** and the new stand rod **S2** with two countersunk screws **Sch2**. **Fig.10**
- Loosely screw locking plate **PI** and stand rod **S2** to base plate **B** with countersunk screw **Sch1**. **Fig.10**. Ensure that the groove in the stand rod faces the DR 100. **Fig.9**
- Loosely connect locking plate **PI** and base plate **B** through the slot with cheese head screw **Sch3** and washer **Sb**.
- Fit holder **Ht** and move it downwards with handwheel **H2**.
- Insert feed hopper **T** in hopper holder **Ht**. **Fig.9**
- Secure hopper **T** with cheese head screw **Sch4**.
- Align holder **Ht** with hopper **T** to the centre of the vibratory channel.
- Then tighten screws **Sch1** and **Sch3**.



**Fig.11**



**Fig.12**

### Description of function

- Lower the hopper holder with handwheel **H2** until the feed hopper touches the base of the vibratory channel.
- Feed in sample material.
- Read off the dimension from the scale **SK**. **Fig.11**
- Set the desired gap between the bottom of the feed hopper and the base of the vibratory channel with handwheel **H2**. **Fig.12**
- The gap can only be set as a differential value on the scale.
- Gently tighten handwheel **H1** to lock the height adjuster. **Fig.11**
- Start the DR 100.

The gap between the bottom of the feed hopper and the base of the vibratory channel depends on the grain size of the input material, and should be at least 3x greater than the max. grain size of the input material.

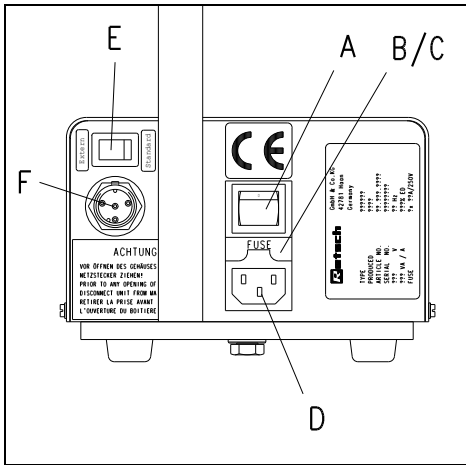


Fig. 6

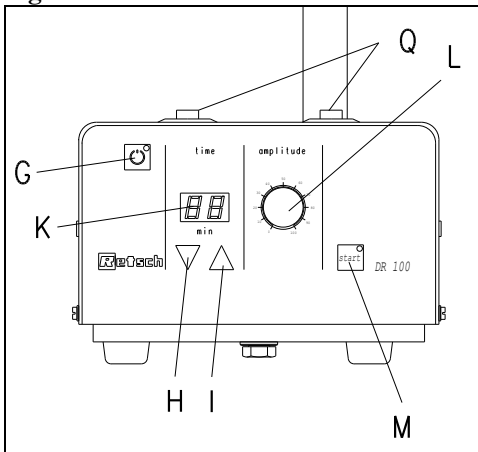


Fig. 7

## Mains connection

Use the supplied power cord to connect the power point and the appliance socket **D**, see **Fig. 6**.

## Operating the DR 100 in the “standard” mode

In this operating mode all the functions of the items on the DR 100 front panel are available for use.

## Switching on and off

The main switch **A** and operating mode selector switch **E** are located at the rear of the DR 100; see **Fig. 6**.

- \* Set the operating mode selector switch **E** to **standard**.
- \* Switch on the main switch **A**.

The LED in button **G** lights; see **Fig. 7**.

The DR 100 is now in the standby mode.

- \* Press button **G**; the LED in the button goes out. Display **K** shows two dashes “- -”.

The DR 100 is now ready to run in continuous operation.

- \* Set the knob **L** to the minimum setting.
- \* Press button **M**, the vibratory feeder channel will vibrate gently.
- \* Turn the knob **L** clockwise until the desired feed speed is achieved.

The DR 100 will now feed the product into the receiver or device which you have provided.

## Setting the time

In addition to continuous operation, a feed period from 1 to 99 minutes can be specified.

If the setting goes out of the 1 to 99 minute range, two dashes “- -” will appear in the display **K**, signaling that the unit is set for continuous operation; see **Fig. 7**.

- \* Press button **G**, the LED in the button goes out and two dashes “- -” will appear at the display **K**.
- \* Press button **I** to lengthen the feed period.
- \* Press button **H** to shorten the feed period.
- \* Display **K** will show the feed time in minutes.
- \* Turn knob **L** to its minimum setting.
- \* Press button **M**; the feeder channel will vibrate gently.
- \* Turn knob **L** clockwise until the desired feed speed is attained.

The DR 100 will now feed the product into the receiver or device which you have provided until the preset time elapses.



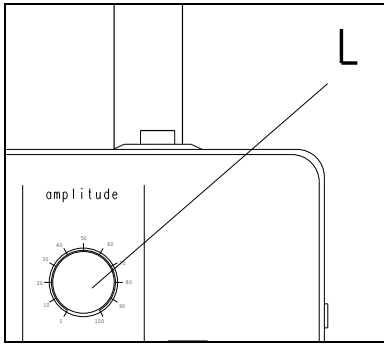


Fig. 8

## Setting the feed speed

The feed speed is set by changing the power feed (generalized phase control) to the directional-throw vibrator built into the DR 100.

The adjustment is made at knob **L**. **Fig. 8**.

- \* Turning to the right increases the speed
- \* Turning to the left reduces the speed

The scale is provided only as an aid in adjustment and is not absolute, since the line voltage will normally not be entirely stable and the performance of the vibrator will change depending on the period in service (heating or cooling).

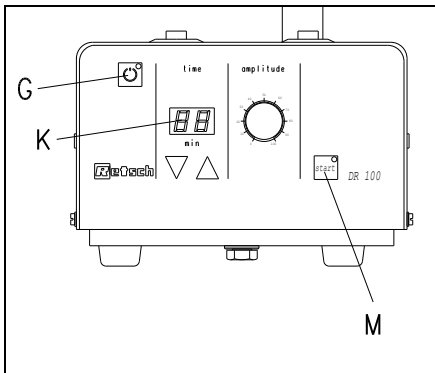


Fig. 9

## Interrupt – resume – terminate feed

### Interrupt:

The display **K** shows the run time to be set at **88 min.**, for example; the LED in button **M** lights. **Fig. 9**.

- \* Press button **G** once (after 10 minutes' operation, for example).

The LED in button **M** and the display **K** go out.  
The LED in button **G** lights.

### Resume:

- \* Press button **G**.

Display **K** once again shows the remaining time, in our case **88 minutes**.

- \* Press button **M**.

Product feed is resumed and will continue until the remaining time of 88 minutes has elapsed or until operation is again interrupted as described above.

### Termination:

- \* Switch off the main switch **A** at the rear; see **Fig. 10**.

Feed is now terminated and the run time previously set will be canceled.

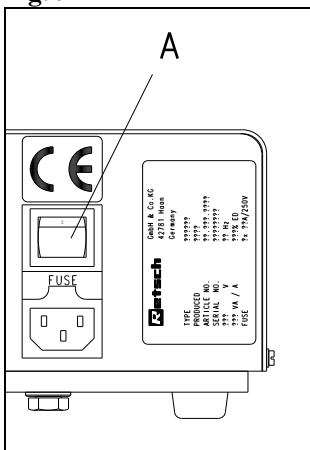


Fig. 10

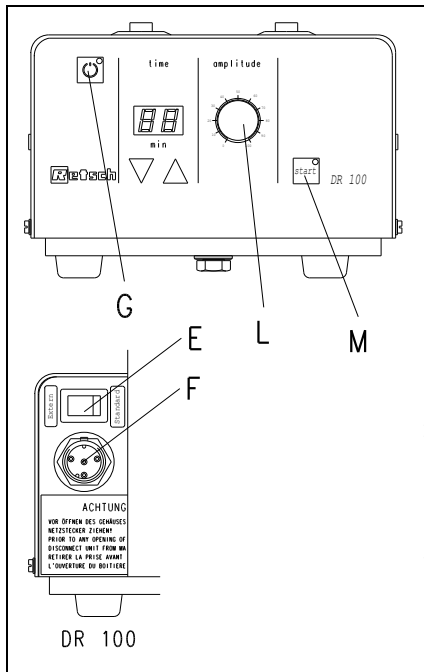
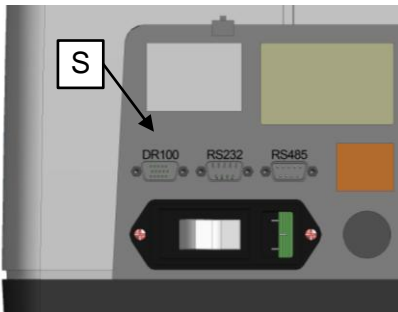


Fig. 11



### Interface to the ZM200 ultra-centrifugal mill

Interface **F** at the DR 100 can be joined with interface **S** at the ZM200; see **Fig. 11**.

An interface cable, available as an accessory, is required for this purpose.

#### Functional notes:

- \* Connect both units to the mains.
- \* Connect interface **F** to interface **S**.

#### Important

- \* Set the operating mode selector switch **E** to **standard**.
- \* The LEDs in button **G** light.
- \* Set knob **L** to **40**.
- \* Pour product into the feed hopper.
- \* Swing the vibratory feeder channel over the hopper at the ZM200.
- \* Start the ZM200.

A communications test taking a few seconds is made between the ZM200 and the DR 100; then:

- \* The LED in button **M** lights.

The DR 100 moves product into the ZM200.

- \* Slowly turn knob **L** to the right until the desired feed speed is achieved.

The ZM200 will automatically reduce the feed speed at the DR 100 as soon as an overload condition is registered at the ZM200.

Never set the knob **L** to **maximum** before starting the ZM200 as the unit would be overloaded immediately and the feed speed could no longer be reduced.  
Mechanical components could be damaged.

### Operating the DR 100 in the “remote” mode

In this mode you will be able only to adjust the feed speed using the controls at the front panel of the DR 100.

This mode is to be selected whenever the DR 100 is to be used to feed the Retsch PK 1000, PT 1000, ZM 1 or ZM 1000 units.

**This function is not available with the ZM200.**

### Make the remote connection

Connect the line power cord of the DR 100 with the appliance socket at the remote Retsch unit.

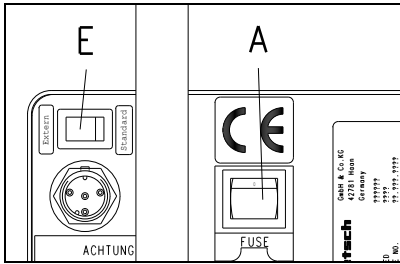


Fig. 12

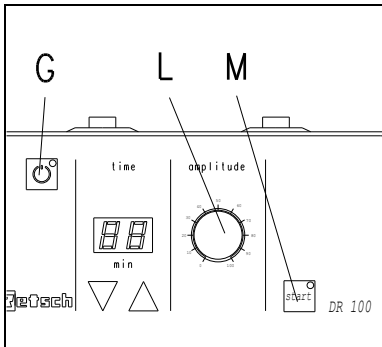
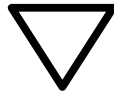


Fig. 13



The scale is provided only as an aid in adjustment and is not absolute, since the line voltage will normally not be entirely stable and the performance of the vibrator will change depending on the period in service (heating or cooling).

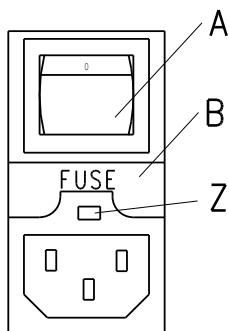


Fig. 14



Never replace the fuses while the mains power cord is connected.  
**Hazard of fatal electrical shock.**

### Switching on and off

The main switch **A** and operating mode selector switch **E** are located at the rear of the DR 100; see **Fig. 12**

- \* Set the operating mode selector switch **E** to **remote**.
- \* Switch on the main switch **A**.  
The LED in button **G** lights; see **Fig. 13**.  
The LED in button **M** lights; see **Fig. 13**.

The DR 100 will now feed the product into the device being served.

The remote unit will control the feed period.

### Setting the feed speed

The feed speed is set by changing the power feed (generalized phase control) to the directional-throw vibrator built into the DR 100.

The adjustment is made at knob **L**. **Fig. 13**

- \* Turning to the right increases the speed
- \* Turning to the left reduces the speed

### Replacing the fuses

The DR 100 is protected with two glass-tube microfuses, T2A/250 V (slow-blow). If the LED in button **G** **does not light** when the main switch **A** is turned on, then the fuses are defective. **Fig. 14**

- \* Fuses, Item No. 05.699.0004 are required.
- \* Disconnect the mains power cord from the socket.
- \* Disconnect the mains power cord at the DR 100.
- \* Raise lever **Z** and pull out the slide **B**.
- \* Replace the fuses.
- \* Restore the mains connection.
- \* Switch on the main switch **A**.  
The LED in button **G** must light.

# Working instructions

**Target group:** Laboratory technicians

## General

The DR 100 is a highly modern, high-performance product manufactured by the Retsch GmbH.

Many laboratory units work particularly efficiently when provisions are made for constant material feed. Many processes can be simplified and improved in this way. You can use the Retsch model DR 100 feeder units for uniform conveyance and feed of free-flowing bulk goods and powders. Whether in direct conjunction with Retsch size-reduction units such as the ZM 1, ZM200, ZM 1000 or sample dividers such as the PT 1000 and PK 1000 or for simple loading of scales and for mixing and agitating processes or measurement instruments: the DR 100 units are flexible and effective in use.

The specimen passes through the fill hopper and onto the vibratory feeder channel. The latter is set in motion by an electromagnetic directional-throw vibrator at 50 or 60 Hz, giving uniform material conveyance. The oscillation intensity and with it the feed speed are infinitely adjustable.

The feed period can be pre-selected and is shown digitally. When operating under remote control, the DR 100 is controlled directly, in dependency on the momentary load, by downline units.

All the parts which come into contact with the products are made of stainless steel.

## Performance features:

- \* Uniform conveyance and feed of fine powders or free-flowing bulk goods with grain sizes up to a maximum of 12 mm
- \* Digital pre-selection of timed operation from 1 to 99 minutes or continuous operation
- \* Oscillation intensity steplessly adjustable
- \* Adjustable hopper height
- \* Components in contact with product are made of stainless steel
- \* Can be set for either standard (local) or remote operation when used in conjunction with Retsch equipment, e.g.:  
models ZM 1/100/1000 ultra-centrifugal mills  
models PT / PT 1000 laboratory sample dividers  
models PK / PK 1000 rotating-tube dividers

# General

## Cleaning

Use only a damp cloth to clean the 100.



Never use running water to clean the DR 100.  
**Hazard of fatal electrical shock.**

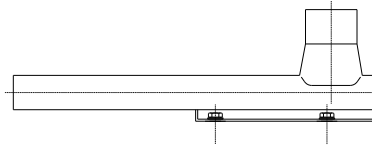
## Maintenance

The DR 100 requires no maintenance.

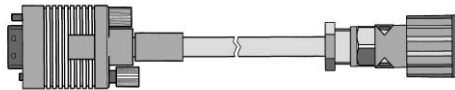
No service or adjustment work of any kind will be required if the unit is employed for the purpose for which it was intended.

## Accessories

- \* Vibratory tube, 18 mm I.D.



- \* Interface cable to the ZM200



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Non-compliance will subject violators to claims for damages.

## Modifications

Subject to modification without prior notice.