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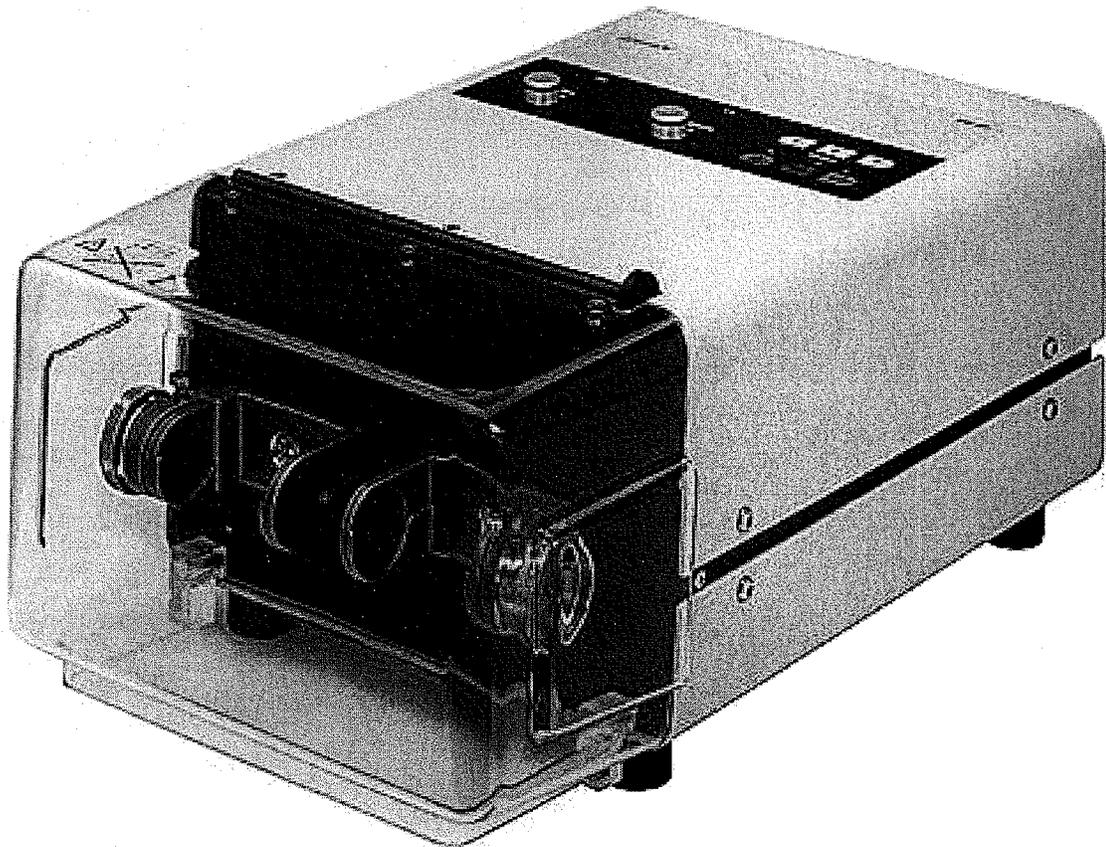
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Retsch Retsch GmbH
Rheinische Straße 36
42781 Haan, Germany
www.retsch.com

Type **MM301**
Produced **2007**
Part No. **20.741.0004**
Serial No. **127240816D**



Power **120V 50/60Hz**
184VA/0,5A; 30%ED; 2x Fuse T2A



Operating Instructions Mixer Mill Type MM 301

Retsch[®]

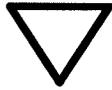
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Warning notes

We use the following signs to warn you against:



Personal injury



Damage to property

Repairs

These operating instructions do not contain any instructions on repairs. For your own safety, only have repairs performed by Retsch GmbH or by an authorised representative (service technicians).

In such cases, please notify:

The Retsch agency in your country
Your supplier
Retsch GmbH direct

Your service address:

--

Confirmation

I have read and noted the chapters entitled Foreword and Safety

Operator's signature

Service technician's signature

Description of function

The milling process in the MM 301 laboratory mill is performed by the beating effect of the grinding balls on the process material and the friction between the grinding balls and the walls of the grinding jars.

The grinding jars, positioned horizontally, are subjected to radial oscillations which ensure that the grinding balls impact against the material one after the other.

The speed can be set from 3 - 30 Hz (120 - 1800 oscillations/minute) and is kept constant by a speed controller during operation.

The milling and mixing duration can be preset digitally from 10 sec. to 99 min.; the setting is preserved in standby mode for further operations.

Drive

Single phase AC motor

Vibration frequency of the grinding jar fastening

3 - 30 1/s = 180 - 1800 1/min

The maximum frequency cannot be reached with every loading status: e.g. for a 50 ml steel grinding jar with one grinding ball of 30 mm diameter, only approx. 25 1/s or 1500 1/min can be reached.

This overload is indicated by the display alternating between the set and the actually frequency reached.

The MM 301 always operates with the lowest displayed value.

Rated power

Approx. 184 VA

Emissions

Noise measurement to DIN 45635-031-01-KL3

The noise levels are also influenced by the properties of the material to be milled.

Example 1:

Sound power level $L_{WA} = 71.4$ dB(A)

Workplace related emission level $L_{pAeq} = 61$ dB(A)

Operating conditions :

Vessels = 2 steel grinding jars, 25 ml

Milling unit = 1 steel ball, 20 mm each

Milled material = crushed quartz approx. 4.0 - 6.0 mm

Milled quantity = 8 ml

Example 2:

Sound power level $L_{WA} = 76$ dB(A)

Workplace related emission level $L_{pAeq} = 65$ dB(A)

Operating conditions:

Vessels = 2 steel grinding jars 5 ml

Milling unit = 2 tungstan carbide balls, 8 mm each

Milled material = crushed quartz approx. 1.0 - 2.0 mm

Milled quantity = 1.5 ml

IP rating

IP40 or IP20 casing aperture for grinding jar fastening

Dimensions

Height: up to approx. 225 mm, width: 300 mm, depth: 470 mm with cover open

Height: up to approx. 410 mm, width: 300 mm, depth: 470 mm

Weight: approx. 20 kg, without grinding jars

Installation area required

300 mm x 470 mm; no safety clearances are necessary.

Humidity:

Maximum relative humidity 80% at temperatures up to 31 °C, declining in a straight line to 50% relative humidity at 40 °C

Higher humidity can cause damage to the electrical and mechanical components, and performance data can change to an unknown extent.

Site altitude:

Max. 2000 m above sea level

Installation

Always set the MM 301 on a firm base.

Remove the braces fitted for transport:

Two such braces **P** are located on the bottom of the MM 301. **Fig.1** They are marked by arrows.

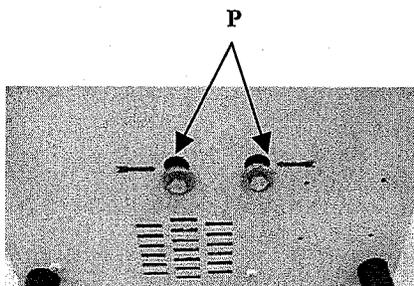


Fig.1

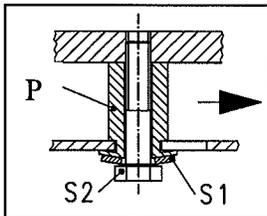
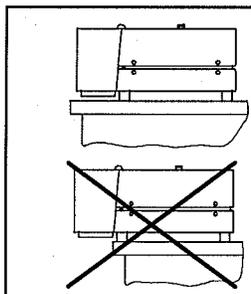


Fig.2

- Loosen bolts **S2**, see **Fig.2**
- Loosen the bolts **S2** of the transport brace **P** with washer **S1** by shifting the slot and removing it
- Keep the braces for use if the machine will have to be transported again.

If the machine is operated **with** the transport braces still in place or transported with the braces **not** in place, **mechanical components may be damaged.**



The machine must be positioned fully on the laboratory bench. Its cover must not project over the front of the bench.

Otherwise, it may be possible to reach into the machine.

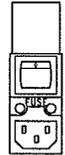
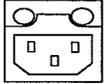
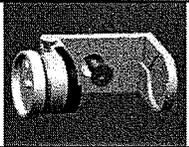
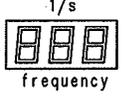
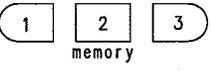
Danger of injury to the hands!

Electrical connection

- See the type plate for the voltage and frequency of the MM 301.
- Ensure that the values agree with those of the available power supply.
- Connect the MM 301 to the power supply using the power cable supplied.

Failure to observe the values on the type plate can lead to damage to electrical and mechanical components.

Table of controls

Item	Element	Illustration	Function
A A1	main switch fuse tray		Connects the MM 301 to, and isolates it from, the mains
B	Power socket		Accommodates the mains cable
C	Ratchet fastening		Accommodates the corresponding grinding jar
D	Hand wheel with compression disk		Clamps the grinding jar
E	Locking bolt		Secures against unintended loosening of the hand wheel
F	START button		Starts the grinding process LED lights up Access to adjustment mode
G	STOP button		Stops the grinding process before the set time has expired. LED lights up Press the STOP button a second time = standby Access to pause function
H	Display of machine running time		Indicates the pre-selected running time from 10 sec. to 99 min
J	Rotary knob for time setting		Facilitates programming of the desired running time.
L	Frequency display		Displays the pre-selected frequency and the operating frequency.
K	Rotary knob for frequency display		Regulates motor speed and accordingly the vibration intensity of the grinding jars.
M	Memory function		Facilitates storage and call-up of up to three times and frequency combinations.
N	Adjustment lockout		Prevents adjustment of time and frequency. Press button N to activate the adjustment lockout: the LED will then light up. To deactivate the lockout, press button N in standby mode
O	Plexiglas cover	Not shown	Prevents inadvertent reaching into a running machine
P	Transport brace	Not shown	Protects the internal components of the machine during transport

Switching on / off

The main switch **A** is located at the rear of the MM 301 **Fig.2**

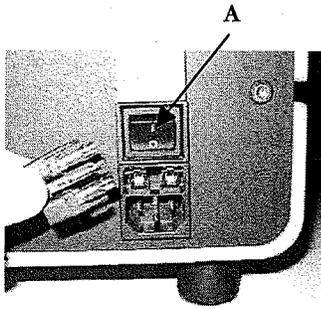


Fig.2

- Turn on the main switch **A**.
- The LED above **STOP F** flashes briefly after the machine has been turned on. **Fig.3**
- The time display shows the time last set.
- The frequency display shows the speed last set.

The MM 301 is now in programming mode.

Setting the time

When the MM 301 is switched on it automatically goes into programming mode. The running time last used is shown on display **H**.

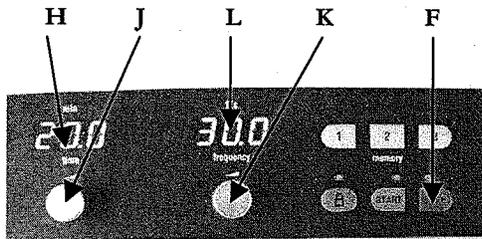


Fig.3

Set time to 10 sec - 99 minutes: **Fig.3**

- By turning knob **J** counterclockwise you can reduce the time set down to 10 seconds.
- By turning knob **J** clockwise you can increase the time set up to 99 minutes.

Running time can be set freely between 10 sec. and 99 min. From 10 min. onwards, the time can only be set in full minutes.

Turn knob slowly to move in steps of 1 sec. / 1 min.

Turn knob rapidly to move in steps of 30 sec. / 5 min.

Setting the frequency

When the MM 301 is switched on it automatically goes into programming mode. The frequency last used is shown on display **L**.

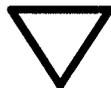
Set frequency to 3 - 30 Hz: **Fig.3**

- By turning knob **K** counterclockwise you can reduce the frequency set down to 3 Hz.
- By turning knob **K** clockwise you can increase the frequency set up to 30 Hz.

The frequency can be set freely between 3 and 30 Hz [1/s].

Turn knob slowly to move in steps of 0.1 Hz [1/s].

Turn knob rapidly to move in steps of 5 Hz [1/s].



The MM 301 is equipped with an electronic overload indicator. If there is an overload, the frequency display changes back and forth between the frequency that you have set and the maximum frequency reached.

Lower the frequency to the maximum frequency reached!

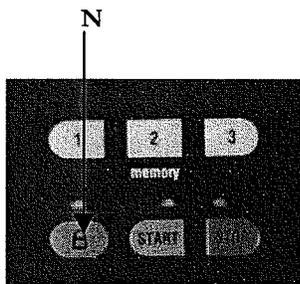


Fig.6

Adjustment lockout

The MM 301 has an adjustment lockout N.

Button **N** can be pressed when programming or during operation of the machine. **Fig.6**

- Press the adjustment lockout **N**.
- The LED lights up.

It is now impossible to change the time or frequency settings and no values saved to memory can be called up.

The lockout can only be deactivated by pressing button **N** in standby mode.

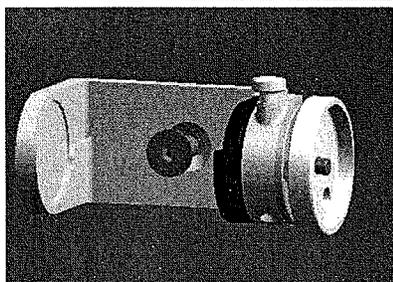
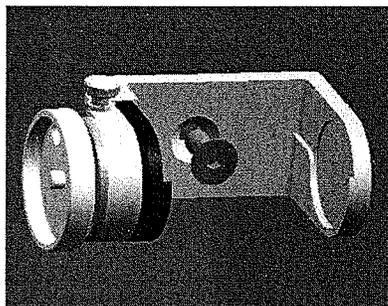


Fig.7

The grinding process

Clamp your grinding jars filled with the process material and the grinding ball/s into the grinding jar fastening. **Fig.7**

- Close the Plexiglas cover.
- Set the grinding parameters.

Start the MM 301.

Do not open the Plexiglas cover during the grinding process.

Although the grinding jars are brought to a standstill immediately by the built-in brake, the grinding process cannot be continued for the remaining time.

The MM 301 has to be restarted. The initial parameters are then once again available.

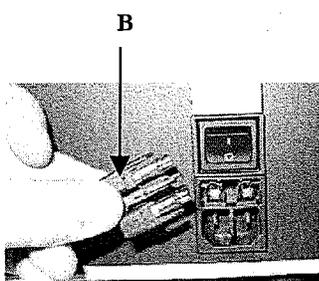


Fig.8

Changing fuses

Two glass fuses (5x20 mm) are required.

2 fuses mT 0.63 A 220-240V/50-60Hz

2 fuses F 1.6 A 100 / 110 and 120V 50-60Hz

Changing fuses: Fig.8

- Disconnect the mains plug
- Pull out fuse tray **B**
- Replace the fuses
- Slide the fuse tray back in



Cleaning

Do not clean the MM 301 under running water.

Danger of fatality from electric shock.

Use a moist cloth only.

Use no organic solvents.

The ingress protection rating of the MM 301 is IP40 / IP20 (casing aperture for grinding jar fastening).

Maintenance

The MM 301 is to the greatest possible extent maintenance-free. When used in accordance with the manufacturer's instructions the machine requires no maintenance or adjustment.

Necessary safety tests

The limit switch and the brake must be checked for correct functioning every six months.

1. Limit switch

- Remove the analysis sets or grinding jars from their fastenings.
- Switch the MM 301 vibration mill on.
- Set the frequency to 30Hz.
- Start the MM 301.
- Open the Plexiglas cover.
- When the Plexiglas cover has been opened by max. 8 mm, measured from the bottom edge of the housing, the motor brake must be activated.
- The motor must not restart when the Plexiglas cover is closed.

2. Brake

- Switch on the MM 301 vibration mill.
- Set the frequency to 30Hz.
- Switch the MM 301 vibration mill on.
- Open the Plexiglas cover.
- The brake must act within 1 second.

If the machine fails to behave as described in points 1 and 2 above, contact our service technicians.

Copyright

Dissemination or duplication of this documentation, utilisation and dissemination of its contents will only be permitted with the express approval of Retsch GmbH. Contravention will give rise to liability for damages.

Modifications

The right is reserved to modify any specification without notice.

Subject	Action	Hazard
Safety	Failure to observe the notes on safety can lead to damage to property and personal injury.	We accept no liability whatsoever for any damage or injury in this case.
Use for the intended purpose	The sample quantity should not fall below 25 % of the grinding jar volume	Otherwise the grinding balls could damage the grinding jar.
	The materials used for the grinding jar and grinding balls must always be identical.	Otherwise the grinding balls could damage the grinding jar.
	Do not modify the machine in any way, and use only spare parts and accessories approved by Retsch.	Otherwise the conformity with European Directives declared by Retsch will be invalidated. Furthermore, this will lead to all warranty claims being rendered null and void.
	Do not clamp ceramic grinding jars for the MM 2/200 or jars without complete steel jacket.	If clamped in the grinding jar holder of the MM 301, the metallic parts can cause damage to the ceramic parts.
Packaging	Please keep the packaging for the duration of the guarantee period.	Your guarantee claim may be invalidated if there is a complaint and the unit is returned in inadequate packaging.
Transport	The MM 301 must not be jarred, shaken or thrown during transport.	This could damage the electronic and mechanical components..
Temperature fluctuations	When subjected to major temperature fluctuations, the MM 301 is to be protected from condensation.	Damage to the electronic components may otherwise result.
Scope of supply	In cases of incomplete delivery and/or transport damage, you must notify the forwarding agent and Retsch GmbH without delay (within 24 hours).	It may not be possible to accept later complaints.
Ambient temperature	Not below 5 °C. Not above 40 °C.	Higher humidity can cause damage to the electrical and mechanical components, and performance data can change to an unknown extent..
Humidity	Do not exceed a maximum relative humidity of 80% at temperatures up to 31 °C, declining in a straight line to 50% relative humidity at 40 °C.	Higher humidity can cause damage to the electrical and mechanical components, and performance data can change to an unknown extent.
Transport braces	Remove the transport braces before commissioning. Secure the machine with transport braces when it is to be transported.	If the machine is operated with the transport braces still in place or transported with the braces not in place, mechanical components may be damaged.
Setting up the MM 301	The machine must be positioned fully on the laboratory bench. Its cover must not project over the front of the bench.	Otherwise, it may be possible to reach into the machine. Danger of injury to the hands!
Electrical connection	Ensure that the values on the type plate agree with those of the available power supply.	Electronic components could otherwise be damaged
Clamping the grinding jar	Do not load the MM 301 unequally.	In order to ensure smooth running of the MM 301, both milling points must be loaded with the same mass.
	Do not clamp grinding jars from the MM 2/200 or without complete steel jacket.	If clamped in the grinding jar holder of the MM 301, the metallic parts can cause damage to the ceramic parts.
Setting the frequency (vibration intensity)	If overloaded by a too high frequency setting, the display will alternate between the max. reached and the frequency set by you. Reduce the frequency setting to the max. value reached.	The MM 301 does not run at the set frequency.
Grinding process	Do not open the Plexiglas cover during the grinding process.	The analysis sets or grinding jars are brought to a standstill immediately by the built-in brake, but the grinding process cannot be continued for the remaining time. The MM 301 has to be restarted. The initial parameters are then once again available
	Do not load the MM 301 unequally.	In order to ensure smooth running of the MM 301, both milling points must be loaded with the same mass.
Cleaning	Disconnect the mains plug before every cleaning operation.	Danger of fatality from electric shock!
	Do not clean the under running water	Danger of fatality from electric shock!

Algeria**Retsch GmbH**

Rheinische Straße 36
42781 Haan
Germany
Phone: +49 (0)2129 5561-0
Fax: +49 (0)2129 8702
Email: info@retsch.com

Argentina**La Quimica Quirurgica S.A.C.I.**

Saavedra 247
C 1083 ACE Buenos Aires
Argentina
Phone: +54 115128 9100
Fax: +54 11 5128 9107
Email: abarie@laqq.com.ar

Australia**MEP Instruments PTY. Ltd.**

P. O. Box 1880
Unit 5, 112-118 Talavera Road
NSW 2113 North Ryde
Australia
Phone: +61 2 9878 6900
Fax: +61 2 9878 6999
Email: info@mep-instruments.com.au
Web: www.mep.net.au

Austria**Verder Ges.m.b.H.**

Eitnergasse 21
1230 Wien
Austria
Phone: +43 1 8651074-0
Fax: +43 1 8651076
Email: office@verder.at
Web: www.retsch.at

Bangladesh**ENTECH LOGISTICS LTD.**

Plot#39, Block KA
Pisciculture Society
Shyamoli Dhaka - 1207
Bangladesh
Phone: +880 2 8114789
Fax: +880 2 9122667
Email: entech@bdmail.net

Belarus**ODO "Belaquilon"**

Laboratory Equipment
Sharangovicha Str.19-217
220018 Minsk
Belarus
Phone: +375 172 590497
Fax: +375 172 590485
Email: info@belaquilon.by

Belgium**Govatec NV**

Kontichsesteenweg 17
2630 Aartselaar
Belgium
Phone: +32 3 8709640
Fax: +32 3 8709641
Email: info@retsch.be
Web: www.retsch.be

Bolivia**Abendroth Intl SA**

POB: 3275
La Paz
Bolivia
Phone: + 591 2 418141
Fax: +591 2 2422855
Email: aisalab@entelnet.bo

Brasil**Altmann S. A.**

Blocko I - 70 andar 04794-000
Av. das Nacoes Unidas, 13.771
04794-000 Sao Paulo-SP
Brasil
Phone: +55 11 55073302
Fax: +55 11 55074196
Email: altmann@altmann.com.br

Brasil**IPAS Comercio e Representacoes**

C.G.C. 28.257.418/0001-06
Rua Conde de Lages No. 44 Sala 216
20241 Rio De Janeiro-Rj
Brasil
Phone: +55 21 2221 5893
Fax: +55 21 2259 4484
Email: ipasbr@attglobal.net

Brasil**Polimate Ltda.**

Rua Basilio da Cunha, 206
Acclimacao
01544-000 Sao Paulo
Brasil
Phone: +55-11 5575 4041
Email: jose.neto@polimate.com.br

Bulgaria**MARVEL Ltd.**

12, Kuklensko chaussee
4004 Plovdiv
Bulgaria
Phone: +359 32 678026
Fax: +359 32 678021
Email: sales@marvel.dir.bg

Canada**Retsch Inc.**

74 Walker Lane
Newtown, PA 18940
United States
Phone: +1 267 7570351
Fax: +1 267 7570358
Email: info@retsch-us.com
Web: www.retsch-us.com

Chile**Equilab LTDA.**

El Quillay 627, sitio 96 Lampa
Ciudad empr. Valle grande
CASILLA 66 Santiago de Chile Santiago de Chile
Chile
Phone: +56 2 556 9974
Fax: +56 2 556 4006
Email: mvalenzuela@equilab.cl

China**VERDER RETSCH (Shanghai) Trading Co.Ltd.**

Mira Garden Business Center Rm C 308
West Yanan Road 2633
200336 Shanghai
China
Phone: +86-21-61506046
Fax: +86-21-61023711
Email: info@retsch.cn
Web: www.retsch.cn

Colombia**PC Quimica & Cia. Ltda**

Oficina 504, Edificio Agora Plaza
Avenida 15 Nr. 124-31
Bogota, D.C.
Colombia
Phone: +571 612 5793
Fax: +571 612 5805
Email: cpadilla@multiphone.net.co

Colombia**Symtek S.A.**

(exclusivo para la industria de cementos y fundiciones)
Cra 21 No 82-64/70 Of 702
Bogota
Colombia
Phone: +57 16167766
Fax: +57 16166889
Email: andres.diaz@symtek.com

Costa Rica**Tecnologia Aplicada Internacional**

POB: 1581-2150
San Juan
Costa Rica
Phone: +506 297 1011
Fax: +506 297 2231
Email: aulloa@tecnologia-aplicada.com

Croatia**Verder Ges.m.b.H.**

Eitnergasse 21
1230 Wien
Austria
Phone: +43 1 8651074-0
Fax: +43 1 8651076
Email: office@verder.at
Web: www.retsch.at

Czech Republic**BIA VERDER s.r.o.**

Hlavní sklad
Chlumecka 15
19800 Praha 9 - Kyje
Czech Republic
Phone: +420 286 853870
Fax: +420 286 856337
Email: jaroslav.seiml@retsch.cz
Web: www.retsch.cz

Denmark**SKANLAB ApS**

Kvinderupvej 30
3550 Slangerup
Denmark
Phone: +45 4738 1014
Fax: +45 4738 1064
Email: retsch@skanlab.com
Web: www.skanlab.com

Ecuador**Quifatex SA**

Apartado 17-04-10455
10 de Agosto 10640 y Man. Zambrano
Quito
Ecuador
Phone: +593 22477400
Fax: +593 4289734
Email: daniel.valladares@quifatex.com

Egypt**Salzburg Co. for Scientific Equipment**

292 Emtedad Ramsis 2
Nasr City - Cairo
Egypt
Phone: +202 22608082
Fax: +202 24041940
Email: salzburg_coeg@link.net

Estonia**G. W. Berg Oö**

Laki 25
12915 Tallinn
Estonia
Phone: +372-6505658
Fax: +372-6-505653
Email: laumets@gwb.ee
Web: www.gwb.fi

Finland**OY G.W.Berg & Co. Ab**

MÑ kituvantie 7
01510 Vantaa
Finland
Phone: +358 201 255255
Fax: +358 201 255256
Email: gwb@gwb.fi
Web: www.gwb.fi

France**VERDER S.A.R.L.**

Parc des Bellevues
Rue du gros chene
95610 Eragny sur Oise
France
Phone: +33 1 34643111
Fax: +33 1 34644450
Email: info@retsch-fr.com
Web: www.retsch-fr.com

Germany**Retsch GmbH**

Rheinische Straße 36
42781 Haan
Germany
Phone: +49 (0)2129 5561-0
Fax: +49 (0)2129 8702
Email: info@retsch.com

Pakistan

H. A. Shah & Sons

Office # 11, 3rd Fl., 109-W Sardar Begum Plaza
Jinnah Avenue, Blue Area
Islamabad
Pakistan
Phone: +92 51 2273557
Fax: +92 51 2272743
Email: hashah@apollo.net.pk

Peru

Quimica Suiza S.A.

Apdo. 3919
2577 Av. Republica de Panama
Lima
Peru
Phone: +51 1 2114055
Fax: +51 1 2114050
Email: atapia@quimicasuiza.com

Philippines

ITS Science & Medical Pte., Ltd.

219, Henderson Road, #011-02
Henderson Industrial Park
Singapore 159556
Singapore
Phone: +65 6273 0898
Fax: +65 6273 0810
Email: retsch@its-asia.com
Web: www.its-science.com

Poland

Verder Polska Sp. z o.o.

ul. Ligonja 8/1
40-036 Katowice
Poland
Phone: +48 32 7815032
Fax: +48 32 7815034
Email: verder@verder.pl
Web: www.verder.com

Portugal

Gravimeta Lda.

Rua da Vilarinha, 1235
4100-517 Porto
Portugal
Phone: +351 226184232
Fax: +351 226184619
Email: geral@gravimeta.pt
Web: www.gravimeta.pt

Republic of Korea (South)

Shinhan Science & Technology

Sambou Bldg., 3rd Floor
537-6, Yatap-dong, Bundang-ku
463-840 Sungnam-si Kyunggi-do
Republic of Korea (South)
Phone: +82 31 706-3642
Fax: +82 31 706-3645
Email: scientech@kornet.net
Web: www.shinhan.com

Romania

Verder Romania S.R.L.

Sector 5
Soseaua Villor no. 79
050152 Bucuresti
Romania
Phone: +40 21 3354592
Fax: +40 21 3373392
Email: eugen.ciotaru@verder.ro
Web: www.verder.ro

Russia

RVS Co. Ltd.

Khimanalit Cri.
ul. Bumazhnaya, 17
190020 St. Petersburg
Russia
Phone: +7 812 7869516
Fax: +7 812 2520136
Email: retsch@rvs-ltd.ru
Web: www.rvs-ltd.ru

Saudi-Arabia

National Scientific Company Ltd

Al Salam Building, Thrid Floor Tahlia Street
Jeddah 21431
Saudi-Arabia
Phone: +966 26644466
Fax: +966 26696192
Email: info@nsc-ksa.com
Web: nsc-ksa.com

Singapore

ITS Science & Medical Pte., Ltd.

219, Henderson Road, #011-02
Henderson Industrial Park
Singapore 159556
Singapore
Phone: +65 6273 0898
Fax: +65 6273 0810
Email: retsch@its-asia.com
Web: www.its-science.com

Slovak Republic

BIA VERDER s.r.o.

Hlavní sklad
Chlumecka 15
19800 Praha 9 - Kyje
Czech Republic
Phone: +420 286 853870
Fax: +420 286 856337
Email: jaroslav.seiml@retsch.cz
Web: www.retsch.cz

Slovenia

Verder Ges.m.b.H.

Eitnergasse 21
1230 Wien
Austria
Phone: +43 1 8651074-0
Fax: +43 1 8651076
Email: office@verder.at
Web: www.retsch.at

South Africa

Monitoring & Control

Laboratories (Pty) Ltd. Ground Floor Lumley House
177 Jan Smuts Avenue
Parktown North
South Africa
Phone: +27 11 327 6524
Fax: +27 11 327 6530
Email: gdavey@moncon.co.za
Web: www.moncon.co.za

Spain

Biometa Tecnologia y Sistemas, S.A.

Parque Tecnológico de Asturias
Parcela 38
33428 Llanera (Asturias)
Spain
Phone: +34 902 244343
Fax: +34 985 269169
Email: info@biometa.es
Web: www.biometa.es

Sweden

AB Ninolab

Instrumentvaegen 4
Postfach/P.O. Box 137
19422 Upplands Vaesby
Sweden
Phone: +46 8 59096200
Fax: +46 8 59096210
Email: info@ninolab.se
Web: www.ninolab.se

Switzerland

Schieritz & Hauenstein AG

Finkelerweg 32
4144 Arlesheim
Switzerland
Phone: +41 61 7011060
Fax: +41 61 7011641
Email: schieritz@magnet.ch

Syria

VART

P.O.Box 4859
Damascus
Syria
Phone: +963 11 334 5858
Fax: +963 11 334 5857
Email: vart@mail.sy

Taiwan

Sunway Scientific Corporation

6F, No. 23, Lung Chiang Road
104 Taipei
Taiwan
Phone: +886 2 2771-8337
Fax: +886 2 2741-4646
Email: retsch@mail.sun-way.com.tw
Web: www.sun-way.com.tw

Thailand

Scientific Promotion Co., Ltd.

1759 Soi Wachirathamsathit 57
Sukhumvit 101/1 Bangchak
Prakhanong, Bangkok 10260
Thailand
Phone: +66 2332 7960-4
Fax: +66 2331 8809
Email: marketing@spcgroup.co.th
Web: www.spcpromotion.com

Tunisia

Retsch GmbH

Rheinische Straße 36
42781 Haan
Germany
Phone: +49 (0)2129 5561-0
Fax: +49 (0)2129 8702
Email: info@retsch.com

Turkey

KUTAY LABORATUAR CIHAZLARI TIC. A.S.

Levent Cad. Krizantem Sok. No:62
34330 1. Levent/Istanbul
Turkey
Phone: +90 212 2829700
Fax: +90 212 2827975
Email: aysun@kutaygroup.com
Web: www.kutaygroup.com

Ukraine

MACROLAB Ltd.

Prospectus of 40-years of October
122/1 F. 91
03127 Kiev
Ukraine
Phone: +380 44 2583402
Fax: +380 44 2583402
Email: zhuravlov@volicable.com
Web: www.retsch.ru

United Arab Emirates

Al Muhairi Scientific

and Technical Supplies Est. 804,8th Floor, Green
Tower, Deira
P.O. Box 55219
Dubai
United Arab Emirates
Phone: +971 4 2623577
Fax: +971 4 2974560
Email: amsats07@eim.ae

United Kingdom

Retsch U.K. Ltd.

Whitehouse Street, Hunslet
Leeds LS10 1AD
United Kingdom
Phone: +44 113 2220266
Fax: +44 113 2465649
Email: info@retsch.co.uk

United States

Retsch Inc.

74 Walker Lane
Newtown, PA 18940
United States
Phone: +1 267 7570351
Fax: +1 267 7570358
Email: info@retsch-us.com
Web: www.retsch-us.com

Uruguay

Alton S.A.

Gral. Urquiza 3253
11600 Montevideo
Uruguay
Phone: +598 2 4872126
Fax: +598 2 487 6865
Email: altonventas@adinet.com.uy



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