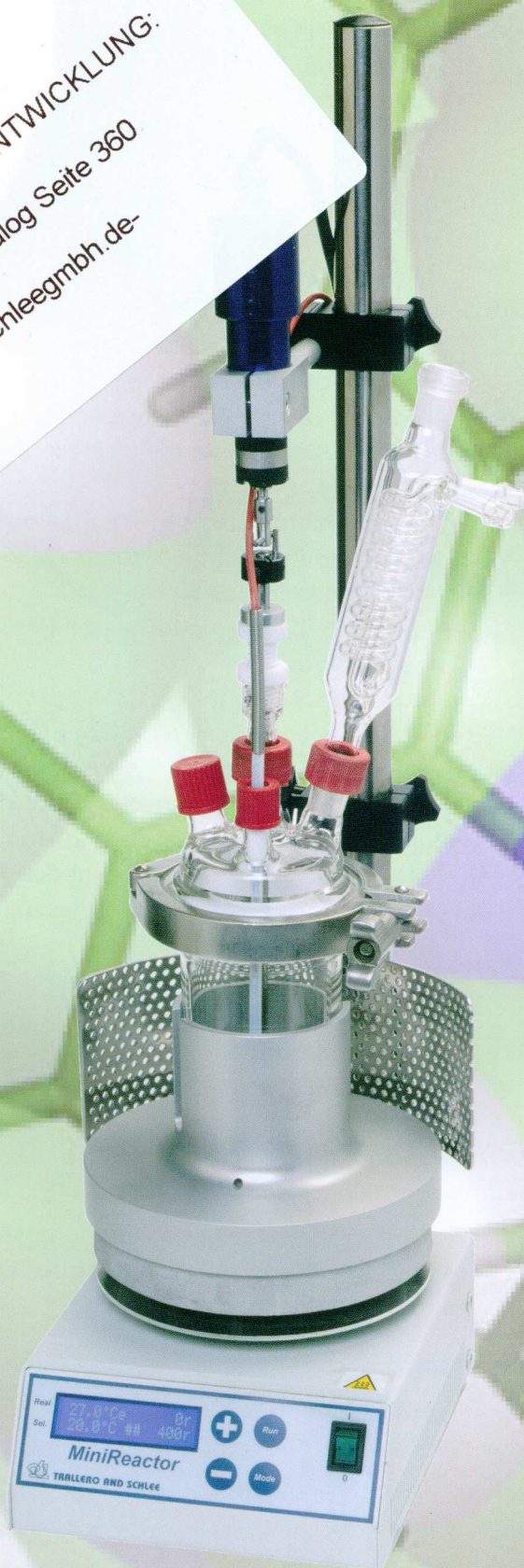


# Minireactors

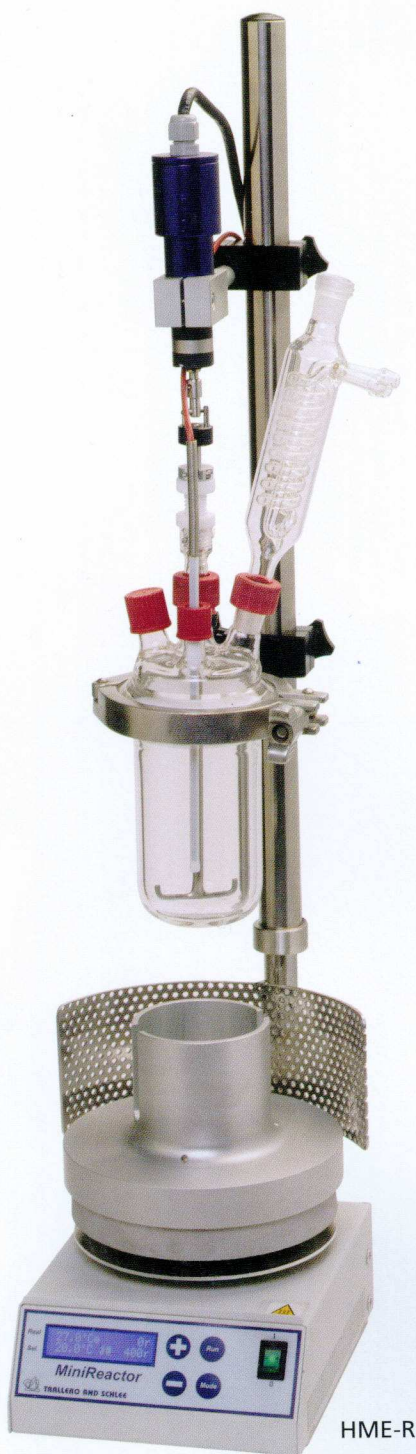
*complete but simple*

Unsere **neue** PRODUKTENTWICKLUNG:  
VGKL-Laborkatalog Seite 360  
[www.schleegmbh.de](http://www.schleegmbh.de)



# TRALLERO AND SCHLEE

# Compact Minireactor for synthesis in liquid phase with mechanical stirring and a capacity from 50 to 2000 ml. with electrical heating



HME-R

## General Advantages

- Easily accessible interior (20 seconds).  
Inert materials in contact with the reaction products Glass, PTFE, Hastelloy.
- Reactions can be made under vacuum or overpressure conditions (working range from 5 mbar up to 1 bar).
- Temperature adjustable from 20 to 300 °C controlled by microprocessor by means of an integrated PT100 sensor. Selection intervals of 0,5 °C.
- "ARA V2" fuzzy logic algorithm for temperature control of high precision to be used with external sensor (+/- 1 °C) without surpassing reference temperature (even 30 °C).
- Adjustable stirring speed from 100 rpm to 700 rpm controlled by microprocessor that could be selected at intervals of 25 rpm. Encoder feedback controlled.
- Automatic restart after unexpected shut down keeping the same parameters as before the incident. An incident sign appears on the display.
- The equipment detects the change on the conditions (addition of liquids, sudden change of temperature, changes on viscosity, etc). and reacts in consequence.
- Indicator of high temperature on the plate provides protection against burns.
- Membrane push-button control.
- LCD display equipped with backlighting indicating the selected and actual speed and temperature. Audible alarm.
- Safety automatic disconnection in case of overheating.
- Removable stainless steel cover of 154 mm. Ø is included.
- Custom-made glass lids with 5 necks with ground sockets.
- Integrated quick release flange closure and supporting device made of stainless steel.
- O-ring made of silicone / PTFE coated for sealing without joint grease.
- Aluminium block for fast heat transmission and a homogenous distribution of the temperature with grooves for an internal vision of the reaction.
- Reactor and stirrer mounted on a telescopic stand for more convenience during operation.

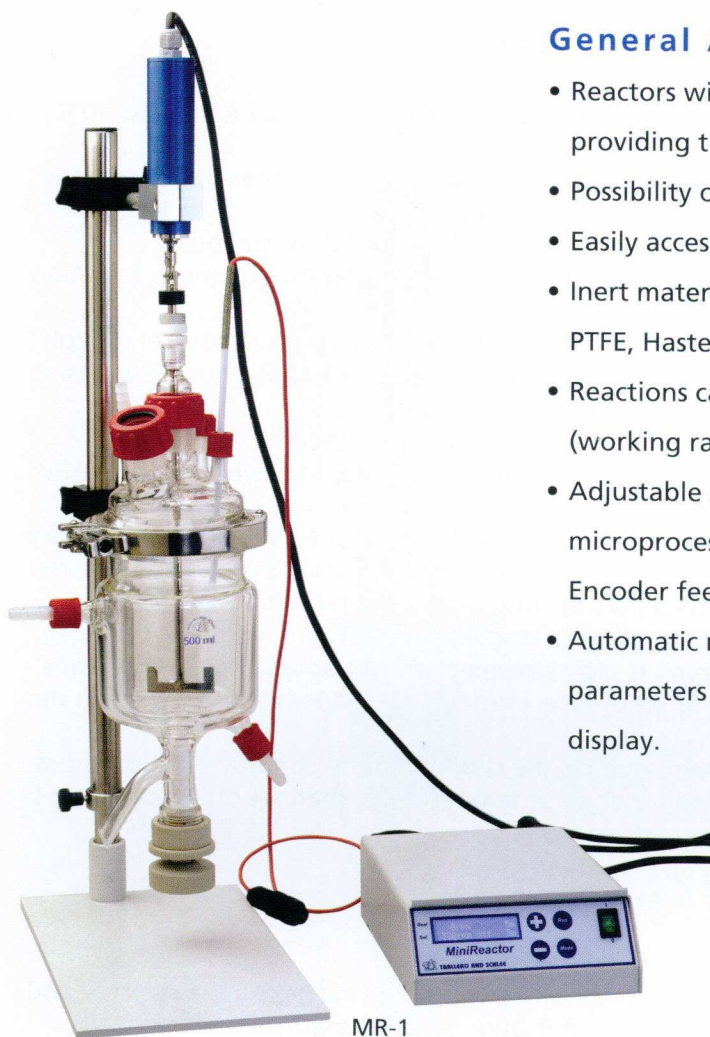
**Possibility of operating at a low temperature using external baths or reaction vessels with temperature stabilizing jackets connected to cooling thermostats.**

| EQUIPMENT                                                         | REFERENCE     |
|-------------------------------------------------------------------|---------------|
| Minireactor with mechanical stirring and heating of 50 ml.        | HME-R/50      |
| Minireactor with mechanical stirring and heating of 100 ml.       | HME-R/100     |
| Minireactor with mechanical stirring and heating of 250 ml.       | HME-R/250     |
| Minireactor with mechanical stirring and heating of 500 ml. (3'') | HME-R/500-3'' |
| Minireactor with mechanical stirring and heating of 500 ml. (4'') | HME-R/500-4'' |
| Minireactor with mechanical stirring and heating of 1000 ml.      | HME-R/1000    |
| Minireactor with mechanical stirring and heating of 2000 ml.      | HME-R/2000    |

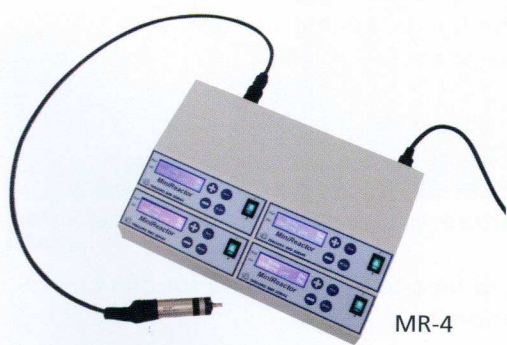
# Compact Minireactor for synthesis in liquid phase with mechanical stirring and a capacity from 50 to 2000 ml.

## General Advantages

- Reactors with temperature control through external equipment providing the heating.
- Possibility of controlling time and speed of stirring independently
- Easily accessible interior (20 seconds).
- Inert materials in contact with the products of the reaction (Glass, PTFE, Hastelloy).
- Reactions can be made under vacuum or overpressure conditions (working range from 5 mbar up to 1 bar).
- Adjustable stirring speed from 100 rpm to 700 rpm controlled by microprocessor that can process at selected intervals of 25 rpm. Encoder feedback controlled.
- Automatic restart after unexpected shut down keeping the same parameters as before the incident. An incident sign appears on the display.
- The equipment detects the change on the conditions (addition of liquids, sudden change of temperature, changes on viscosity, etc) and reacts in consequence.
- Membrane push-button control.
- LCD display equipped with backlighting indicating the selected and actual speed.
- Custom-made glass lids with 5 necks with ground sockets.
- Integrated quick release flange closure and supporting device made of stainless steel.
- O-ring made of silicone / PTFE coated for sealing without joint grease.
- Reactor and stirrer mounted on a telescopic stand for more convenience during operation.



MR-1



MR-4

Regulating panel for 4 motors with digital regulation of rpm and timer

**The user can chose from the different reactor shapes available depending on his own method of operation.**

| EQUIPMENT                                                        | REFERENCE |
|------------------------------------------------------------------|-----------|
| Control pannel for 1 motor, with digital rpm regulator and timer | MR1       |
| Control pannel for 4 motor, with digital rpm regulator and timer | MR4       |
| Mechanical stirrer with aluminium case and 2 mts cable           | MR-MOT-5  |
| Telescopic stand 25 mm D.                                        | MR-001    |
| Protective grid                                                  | MR-002    |
| Nut double (25 mm and 12 mm)                                     | MR-003    |
| Motor support device                                             | MR-004    |

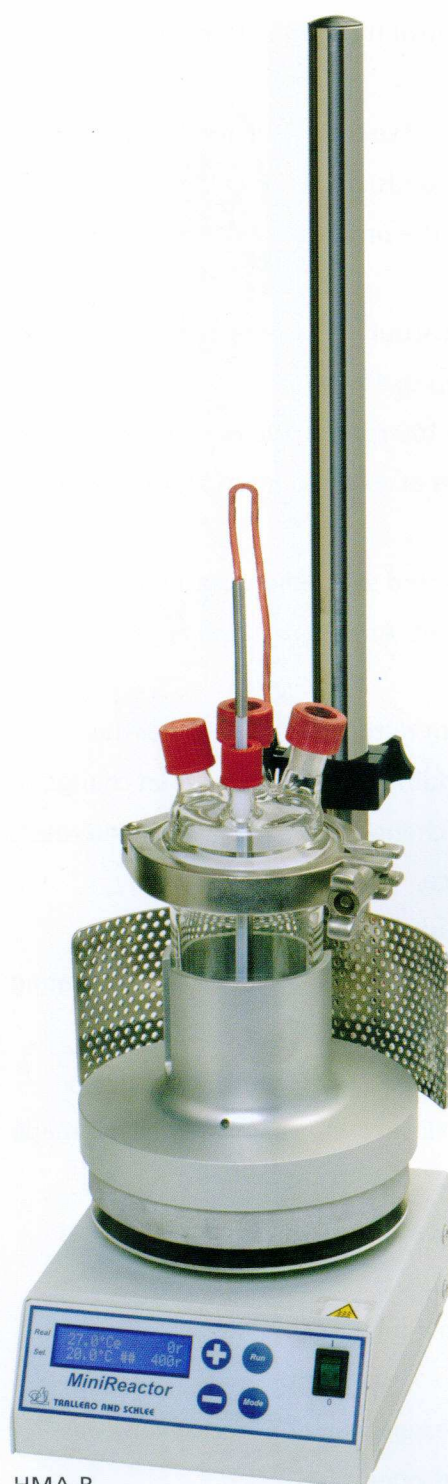
**See page 6 to configure your minireactor**

# Compact Minireactor for synthesis in liquid phase with magnetic stirring, electrical heating and a capacity from 50 to 1000 ml.

## General Advantages

- Easily accessible interior (20 seconds).
- Inert materials in contact with the reaction products (Glass, PTFE, Hastelloy).
- Reactions can be made under vacuum or overpressure conditions (working range from 5 mbar up to 1 bar).
- Temperature adjustable from 20 to 300 °C controlled by microprocessor by means of an integrated PT100 sensor. Selection intervals of 0,5 °C.
- "ARA V2" fuzzy logic algorithm for temperature control of high precision to be used with external sensor (+/- 1 °C) without surpassing reference temperature (even 30 °C).
- The unit will cut out if the temperature exceeds +2.5 °C.
- When external PT100 sensor is not in use, the temperature on the heating surface is controlled.
- Adjustable stirring speed from 100 rpm to 1.500 rpm controlled by microprocessor that can be selected at intervals of 25 rpm. Encoder feedback controlled. Stirring power equivalent to 15 L.
- Smooth and progressive start to maintain the magnetic coupling.
- Automatic restart after unexpected shut down keeping the same parameters as before the incident. An incident sign appears on the display.
- The equipment detects the change on the conditions (addition of liquids, sudden change of temperature, changes on viscosity, etc.) and reacts in consequence.
- 500 W heating resistance of.
- Indicator of high temperature on the plate provides protection against burns.
- Membrane push-button control.
- LCD display equipped with backlighting indicating the selected and actual speed and temperature. Audible alarm.
- Safety automatic disconnection in case of overheating.
- Removable stainless steel cover of 154 mm. Ø is included.
- Custom-made glass lids with 5 necks with ground sockets.
- Integrated quick release flange closure and supporting device made of stainless steel.
- O-ring made of silicone / PTFE coated for sealing without joint grease.
- Aluminium block for fast heat transmission and a homogenous distribution of the temperature with grooves for an internal vision of the reaction.
- Reactor and stirrer mounted on a telescopic stand for more convenience during operation.

**Possibility of operating at a low temperature using external baths or reaction vessels with temperature stabilizing jackets connected to cooling thermostats.**



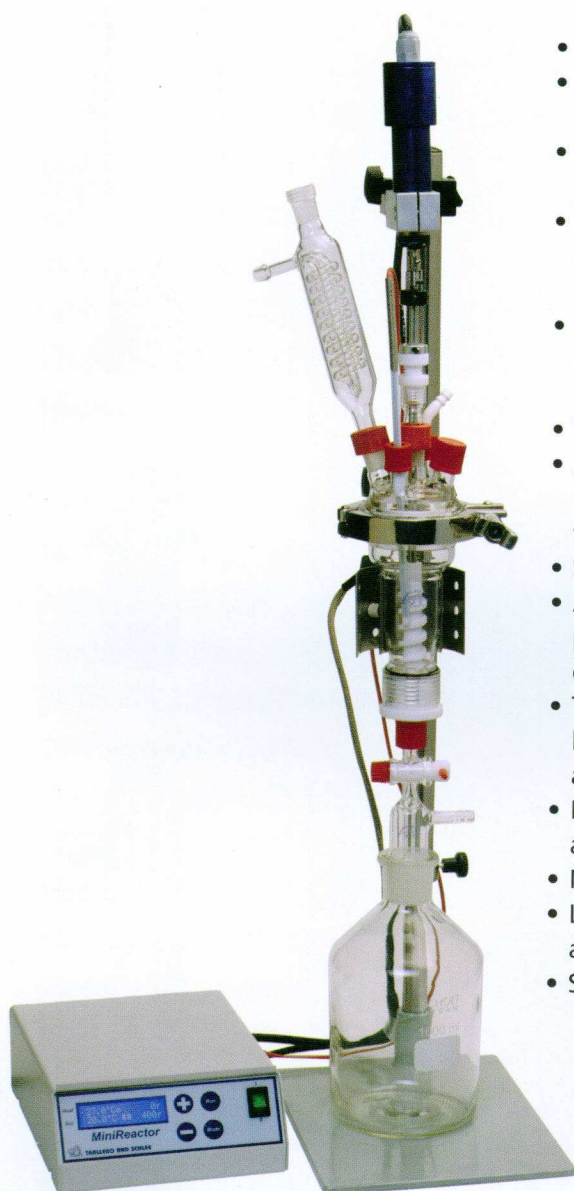
HMA-R

| EQUIPMENT                                                      | REFERENCE    |
|----------------------------------------------------------------|--------------|
| Minireactor with magnetic stirring and heating of 50 ml.       | HMA-R/50     |
| Minireactor with magnetic stirring and heating of 100 ml.      | HMA-R/100    |
| Minireactor with magnetic stirring and heating of 250 ml.      | HMA-R/250    |
| Minireactor with magnetic stirring and heating of 500 ml. (3") | HMA-R/500-3" |
| Minireactor with magnetic stirring and heating of 500 ml. (4") | HMA-R/500-4" |
| Minireactor with magnetic stirring and heating of 1000 ml.     | HMA-R/1000   |
| Minireactor with magnetic stirring and heating of 2000 ml.     | HMA-R/2000   |

# Compact Minireactor for synthesis in solid phase with mechanical stirring, electrical heating and a capacity from 50 to 500 ml.

## General Advantages

- Reactors with temperature control through external equipment providing the heating.
- Easily accessible interior (20 seconds).
- Inert materials in contact with the reaction products (Glass, PTFE, Hastelloy).
- Reactions can be made under vacuum or overpressure conditions (working range from 5 mbar up to 1 bar).
- Temperature adjustable from 20 to 300 °C controlled by microprocessor by means of an integrated PT100 sensor. Selection intervals of 0,5 °C.
- "ARA V2" fuzzy logic algorithm for temperature control of high precision to be used with external sensor (+/- 1 °C) without surpassing reference temperature (even 30 °C).
- The unit will cut out if the temperature exceeds +2.5 °C.
- Adjustable stirring speed from 1 rpm to 100 rpm controlled by microprocessor that can be selected at intervals of 1 rpm. Encoder feedback controlled.
- Smooth and progressive start.
- Automatic restart after unexpected shut down keeping the same parameters as before the incident. An incident sign appears on the display.
- The equipment detects the change on the conditions (addition of liquids, sudden change of temperature, changes on viscosity, etc). and reacts in consequence.
- Indicator of high temperature on the plate provides protection against burns.
- Membrane push-button control.
- LCD display equipped with backlighting indicating the selected and actual speed and temperature. Audible alarm.
- Safety automatic disconnection in case of overheating.
  - Custom-made glass lids with 5 necks with ground sockets.
  - Integrated quick release flange closure and supporting device made of stainless steel.
  - Stirring shaft made of PTFE and Hastelloy with Archimedes screw.
  - External heating is provided by an additional part that is manufactured in the shape of a half moon.
- O-ring made of silicone / PTFE coated for sealing without joint grease.
- Closing valve in glass / PTFE with vacuum hose connection
- Collecting flask.
- Reactor and stirrer mounted on a telescopic stand for more convenience during operation.



HEME-R

**Possibility of operating at a low temperature using external baths or reaction vessels with temperature stabilizing jackets connected to cooling thermostats**

| EQUIPMENT                                                   | REFERENCE     |
|-------------------------------------------------------------|---------------|
| Minireactor with mechanical stirring and heating of 50 ml.  | HEME-R/50     |
| Minireactor with mechanical stirring and heating of 100 ml. | HEME-R/100    |
| Minireactor with mechanical stirring and heating of 250 ml. | HEME-R/250    |
| Minireactor with mechanical stirring and heating of 500 ml. | HEME-R/500-4" |

# LIST OF COMPONENTS

## COMMON COMPONENTS

|          |                                                                                |
|----------|--------------------------------------------------------------------------------|
| HME-R    | Mechanical stirrer with heating function and Pt 100 sensor                     |
| MR1      | Control pannel for 1 motor, with digital rpm regulator and timer               |
| MR4      | Control pannel for 4 motor, with digital rpm regulator and timer               |
| HEME-R   | Control pannel for 1 motor, with digital rpm regulator and temperature control |
| MR-MOT-5 | Mechanical stirrer with aluminium case and 2 mts cable                         |
| MR-MOT-1 | Low rpm mechanical stirrer with aluminium case and 2 mts cable                 |
| MR-001   | Telescopic stand 25 mm D.                                                      |
| MR-002   | Protective grid                                                                |
| MR-003   | Nut double (25 mm and 12 mm)                                                   |
| MR-004   | Motor support device                                                           |

## SPECIFIC COMPONENTS FOR EACH REACTOR

### Aluminium heating blocks

|             |                                              |
|-------------|----------------------------------------------|
| MR-CAL-50   | Aluminium heating block for 50 ml. reactor   |
| MR-CAL-100  | Aluminium heating block for 100 ml. reactor  |
| MR-CAL-250  | Aluminium heating block for 250 ml. reactor  |
| MR-CAL-500  | Aluminium heating block for 500 ml. reactor  |
| MR-CAL-1000 | Aluminium heating block for 1000 ml. reactor |
| MR-CAL-2000 | Aluminium heating block for 2000 ml. reactor |

### Glass reaction vessels

|             |                                               |
|-------------|-----------------------------------------------|
| MR-R-50     | Glass reaction vessel 50 ml with joint 2"1/2  |
| MR-R-100    | Glass reaction vessel 100 ml with joint 2"1/2 |
| MR-R-250    | Glass reaction vessel 250 ml with joint 3"    |
| MR-R-500-3  | Glass reaction vessel 500 ml with joint 3"    |
| MR-R-500-4  | Glass reaction vessel 500 ml with joint 4"    |
| MR-R-1000-4 | Glass reaction vessel 1000 ml with joint 4"   |
| MR-R-2000-4 | Glass reaction vessel 2000 ml with joint 4"   |

### Glass reaction vessels jacketed without drain valve

|               |                                                       |
|---------------|-------------------------------------------------------|
| MR-R-T-50     | Glass reaction vessel jacketed 50 ml.                 |
| MR-R-T-100    | Glass reaction vessel jacketed 100 ml.                |
| MR-R-T-250    | Glass reaction vessel jacketed 250 ml.                |
| MR-R-T-500-3  | Glass reaction vessel jacketed 500 ml. with joint 3"  |
| MR-R-T-500-4  | Glass reaction vessel jacketed 500 ml. with joint 4"  |
| MR-R-T-1000-4 | Glass reaction vessel jacketed 1000 ml. with joint 4" |
| MR-R-T-2000-4 | Glass reaction vessel jacketed 2000 ml. with joint 4" |

### Glass reaction vessels jacketed with drain valve

|                |                                                                        |
|----------------|------------------------------------------------------------------------|
| MR-R-T-D-50    | Glass reaction vessel jacketed with drain valve 50 ml.                 |
| MR-R-T-D-100   | Glass reaction vessel jacketed with drain valve 100 ml.                |
| MR-R-T-D-250   | Glass reaction vessel jacketed with drain valve 250 ml.                |
| MR-R-T-D-500-3 | Glass reaction vessel jacketed with drain valve 500 ml. with joint 3"  |
| MR-R-T-D-500-4 | Glass reaction vessel jacketed with drain valve 500 ml. with joint 4"  |
| MR-R-T-D-1000  | Glass reaction vessel jacketed with drain valve 1000 ml. with joint 4" |
| MR-R-T-D-2000  | Glass reaction vessel jacketed with drain valve 2000 ml. with joint 4" |

### Glass lids with 5 necks

|          |                                                |
|----------|------------------------------------------------|
| MR-T-2,5 | Flange lid 2"1/2 with 5 necks                  |
| MR-T-3   | Flange lid 3" with 5 necks                     |
| MR-T-4   | Flange lid 4" with 5 necks C-SAV-29 (Rodaviss) |

### O-ring made of silicone and PTFE

|          |                                         |
|----------|-----------------------------------------|
| MR-J-2,5 | O-ring 2" 1/2 made of silicone and PTFE |
| MR-J-3   | O-ring 3" made of silicone and PTFE     |
| MR-J-4   | O-ring 4" made of silicone and PTFE     |

### Stirrer bearing

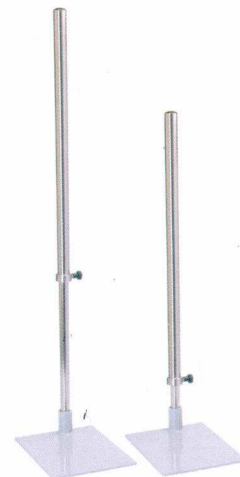
|         |                                                       |
|---------|-------------------------------------------------------|
| MR-C-14 | Stirrer bearing for stirrer shaft 6 mm D. and NS 14,5 |
| MR-C-29 | Stirrer bearing for stirrer shaft 6 mm D. and NS 29   |

### Stirring shaft anchor shaped made of Hastelloy

|               |                                                                         |
|---------------|-------------------------------------------------------------------------|
| MR-A-50/100   | Hastelloy stirring shaft for reaction vessel 50/100 ml. with coupling   |
| MR-A-250/500  | Hastelloy stirring shaft for reaction vessel 250/500 ml. with coupling  |
| MR-A-500/1000 | Hastelloy stirring shaft for reaction vessel 500/1000 ml. with coupling |
| MR-A-500/2000 | Hastelloy stirring shaft for reaction vessel 2000 ml. with coupling     |

### Flange closure and supporting device made of stainless steel

|          |                                                |
|----------|------------------------------------------------|
| MR-S-2,5 | Flange closure and supporting device for 2"1/2 |
| MR-S-3   | Flange closure and supporting device for 3"    |
| MR-S-4   | Flange closure and supporting device for 4"    |



## TECHNICAL DATA

| General performances                        |  | HME-R              | MR-1 / MR-4        | HMA-R              | HEME-R             |
|---------------------------------------------|--|--------------------|--------------------|--------------------|--------------------|
| Dimensions (WxDxH)                          |  | 160x260x650        | 160x260x650        | 160x260x650        | 16x260x650         |
| Weight                                      |  | 8.7                | 8.5                | 8.7                | 8.7                |
| Permissible ambient temperature             |  | 5-40               | 5-40               | 5-40               | 5-40               |
| Permissible humidity                        |  | 80                 | 80                 | 80                 | 80                 |
| Protection class                            |  | Class I            | Class I            | Class I            | Class I            |
| Over temperature protection                 |  | Relay & Electronic | Relay & Electronic | Relay & Electronic | Relay & Electronic |
| Power                                       |  | 520                | 20                 | 500                | Max. 500           |
| Voltage/Frequency                           |  | 230 - 50/60        | 230 - 50/60        | 230 - 50/60        | 230 - 50/60        |
| Heating function                            |  |                    |                    |                    |                    |
| Heating power                               |  | 500                |                    | 500                | Max. 500           |
| Temperature range                           |  | RT-300             |                    | RT-300             | RT-300             |
| Temperature accuracy                        |  | +/- 0.5            |                    | +/- 0.5            | +/- 1              |
| Temperature display                         |  | LCD Backlighted    |                    | LCD Backlighted    | LCD Backlighted    |
| Sensor for temperature in medium            |  | Pt-100 ClassA      |                    | Pt-100 ClassA      | Pt-100 ClassA      |
| Over temperature protection                 |  | Relay              |                    | Relay              | Relay              |
| Stirring Function                           |  |                    |                    |                    |                    |
| Stirring quantity (H2O)                     |  | 2                  | 2                  |                    | 5                  |
| Output at stirring shaft                    |  | 20                 | 20                 |                    | 15                 |
| Speed range                                 |  | 100 - 700          | 100 - 700          |                    | 1 - 100            |
| Speed display                               |  | LCD Backlighted    | LCD Backlighted    |                    | LCD Backlighted    |
| Speed variation under changing load[r.p.m.] |  | 25                 | 20                 |                    | 1                  |
| Magnetic stirring                           |  |                    |                    |                    |                    |
| Stirring quantity (H2O)                     |  |                    |                    | 15                 |                    |
| Output at stirring                          |  |                    |                    | 10                 |                    |
| Speed range                                 |  |                    |                    | 100 - 1500         |                    |
| Speed display                               |  |                    |                    | LCD Backlighted    |                    |
| Timer function                              |  |                    |                    |                    |                    |
| Timer                                       |  |                    | 120                |                    |                    |
| Timer display                               |  |                    | LCD Backlighted    |                    |                    |