# Programmable AC/DC load

M-192, M-192A

Basic technical data

Programmable AC/DC load M- 192

- **Resistance range from 15 Ohm to 4700 Ohm**
- **Resolution 0,1 Ohm to 1 Ohm**
- **Basic accuracy 0.1 %**
- **Temperature coefficient < 10 ppm/°C**
- **Maximal dissipation power 3000 W**
- **Maximal voltage 250 V rms**
- **Frequency range DC to 10 kHz**
- **Connection 2, 4 wires**
- **RS-232 (IEEE 488 optionally)**

Programmable AC/DC load M- 192A

- **Resistance range from 15 Ohm to 300 kOhm**
- **Resolution 0,001 Ohm to 1 kOhm**
- **Internal voltmeter 300 V AC/DC**
- **Basic accuracy 0.1 %**
- **Temperature coefficient < 10 ppm/°C**
- **Maximal dissipation power 3000 W**
- **Maximal voltage 250 V rms**
- **Frequency range DC to 10 kHz (1 MHz)**
- **Connection 2, 4 wires**
- **RS-232 (IEEE 488 optionally)**

Programmable AC/DC loads M-192 and M-192A offers 3 kW load with electric resistance range from 15 Ohm to 300 kOhm.

Basic application fields are manufacturers of voltage sources, tranformers, accumulators, AC/DC and DC/DC convertors and calibration laboratories. Load is especially suitable for automated testing systems.

Multifunction display shows:

* status of the load
* preset and measured values
* SETUP and Calibration menu
* calibration data
* local or remote control

Output terminals
2W, 4W resistance

Numerical keypad with cursor keys

GND terminal protection earth

LED indicated ON/OFF function

Output ON/OFF button

Power on/off button
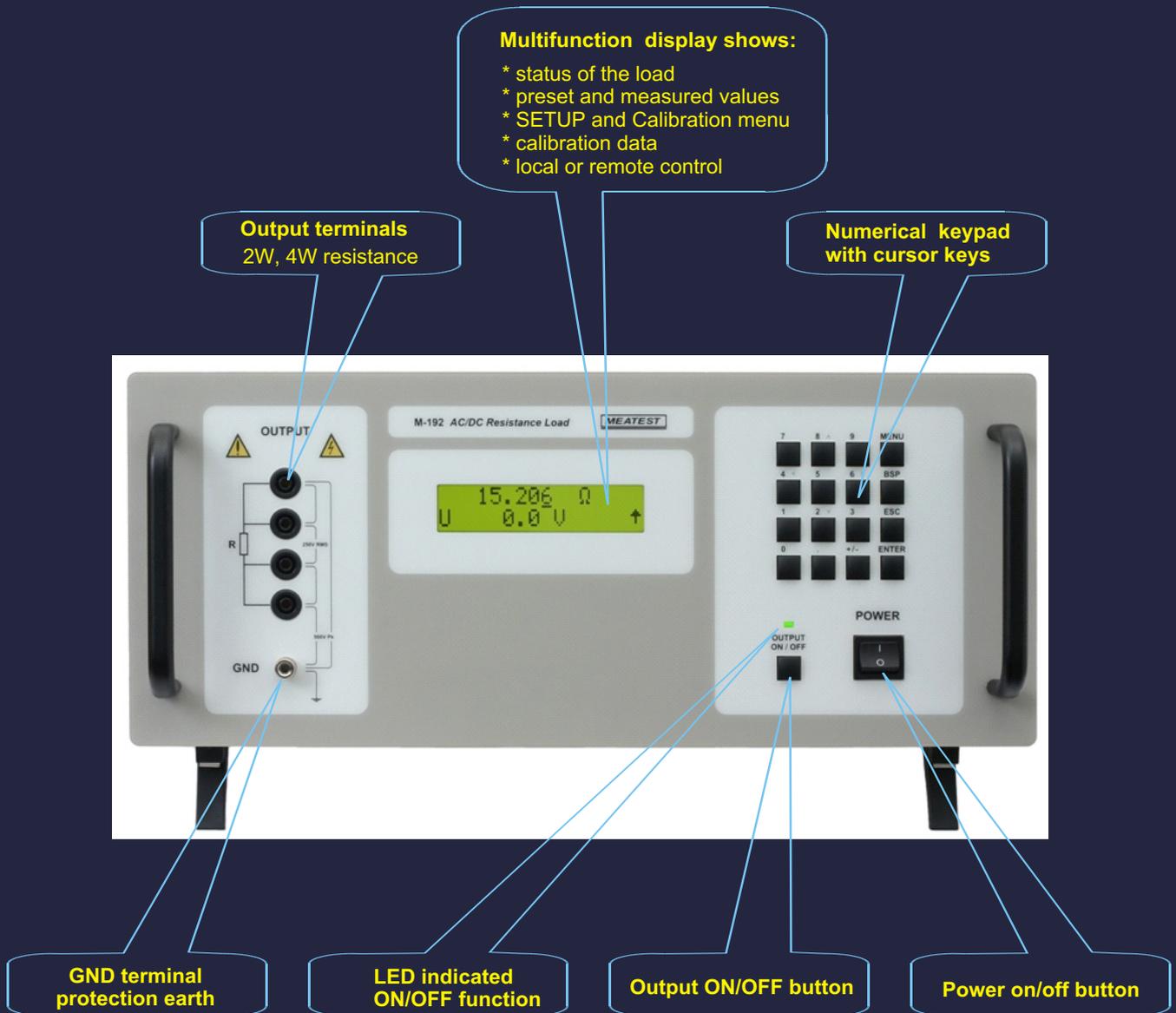
Front panel is divided into logical areas :

* output terminals field
* numerical keypad with cursor keys
* display with contact and visibility from all directions

RS-232 interface
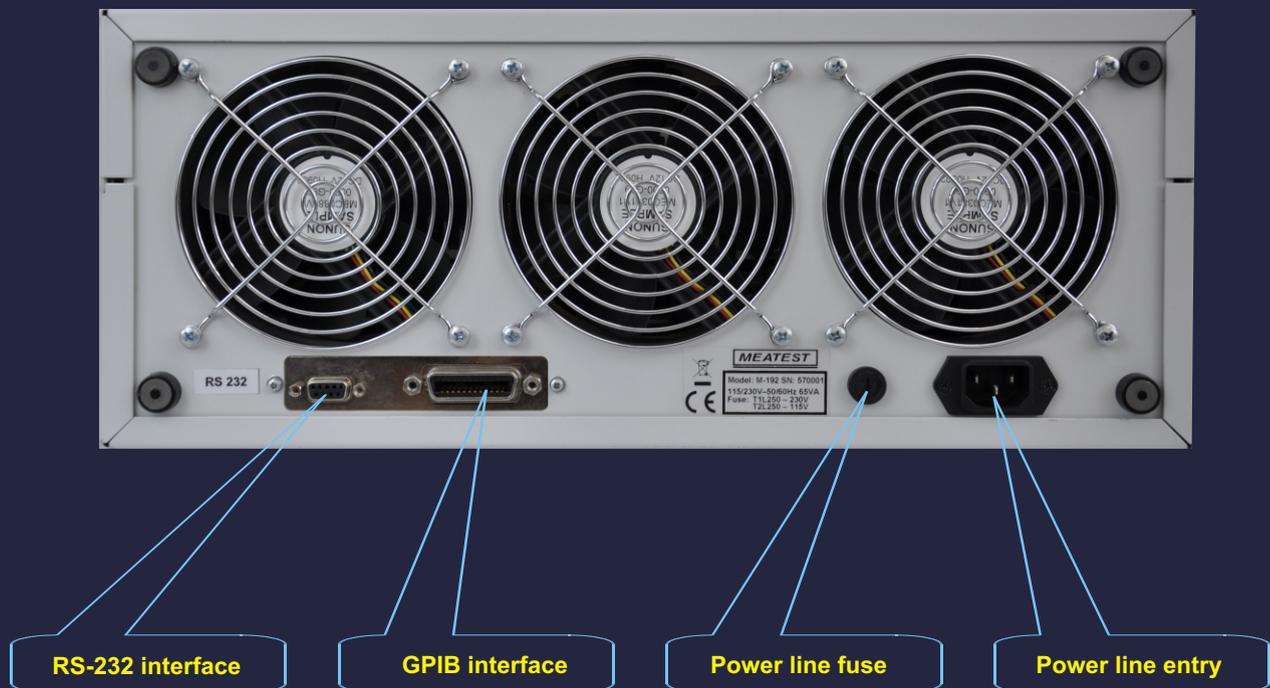
GPIB interface

Power line fuse

Power line entry

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M -192
2W / 4W   Resistance function

Load display R mode.

99.982 Ω

**Output terminals
2W / 4W**

M-192 AC/DC Resistance Load   MEATEST

99.982 Ω

Load display

99.864 Ω

1. Set requested value using
   numerical keypad or
   kursor keys
2. Press ENTER
3. Press ON/OFF

**64 discrete values of resistance in range 15.000 to 4700 Ohm can be set**

**Simple connection and one touch buttons simplify
two/four - terminal calibration or testing of UUTs:**
 * Connect UUT input/output to the load 2W / 4W output terminals
 * Set requested value
 * Press ENTER
 * Press ON/OFF

M -192 A
2W / 4W   Resistance function

Load display R mode.

100.000 Ω
U   0.0 V

Output terminals
2W / 4W

M-192 AC/DC Resistance Load   MEATEST

100.000 Ω
U   0.0 V

Load display

100.000 Ω
U   0.0 V
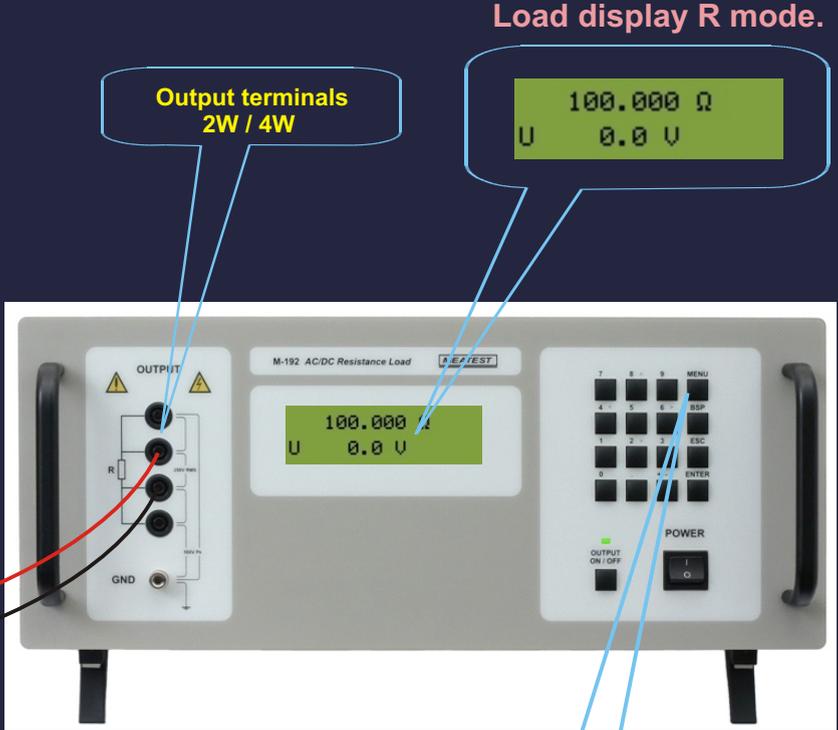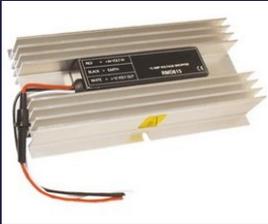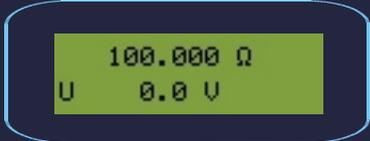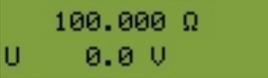
Constant resistance mode

10.250 A
U   0.0 V
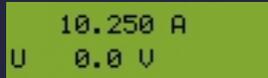
Constant current simulated mode

1.000 kW
U   0.0 V
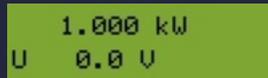
Constant power simulated mode

1. Set simulated function

SETUP MENU
↓Instrument   ↑

2. Set requested value using
   numerical keypad or
   kursor keys
3. Press ENTER
4. Press ON/OFF

Any value of resistance in range 15.000 to 300 kOhm can be set

Simple connection and one touch buttons simplify
two/four - terminal calibration or testing of UUTs:
 * Connect UUT input/output to the load 2W / 4W output terminals
 * Set function and requested value
 * Press ENTER
 * Press ON/OFF

Load recalibration

Simple procedure of recalibration is accesible using load CALIBRATION mode:

- correct password must be entered befor calibration

```
Enter Password
     _____
```

Load display
password mode.

- recalibration procedure consist of measuring basic resistance values and entering
   their actually measured data

```
R1 (48 Ω)
    47.97955 Ω    ↑
```

Load display
calibration mode.

- in following table nominal values of calibration points and requested recalibration
   accuracy are described

Standard (terminals)	Nominal value	Requested accuracy
R1	48 Ohm	10 mOhm
R2	50 Ohm	10 mOhm
R3	75 Ohm	15 mOhm
.	.	.
.	.	.
.	.	.
R24	120 MOhm	2 MOhm

Remote control & Automatic calibration

**Programmable AC/DC load full automatic operation using remote control mode.**

Following interfaces are available for connection the load to PC:

- **GPIB (IEEE-488) interface. Connector is located on the rear panel
  National instruments GPIB card is requested to be installed in the computer.**

- **RS-232 serial line. connector is located on the rear panel.**

- **USB interface using RS-232-USB converter**

Load can be applied in systems for automatic and semiautomatic testing and calibration of UUTs:

- **by user created application SW, using control commands SCPI**

- **using Meatest CALIBER application SW**

CALIBER application software for automatic and semiautomatic calibration of meters of electric quantities.

CALIBER	→	Procedure

Standard unit

Unit under test

Calibration certificate
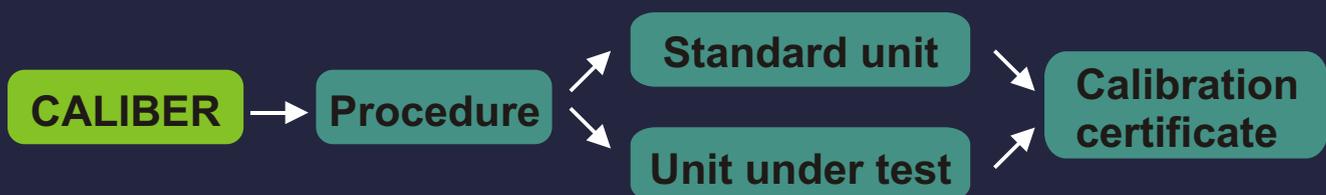
CALIBER application software is based on instrument cards. Basic instrument card are delivered with decades,however new card be created by calibration laboratory.

- **output from the CALIBER is list of calibration points with measured and evaluated
  results including uncertainty of calibration**

- **calibration procedures can be easily created by calibration laboratory**

Programmable AC/DC load M-192 / M-192A

M192-Vxxxx   - basic version (15 ohm - 4700 Ohm)
M192A-Vxxxx   - extended version (15 Ohm - 300 kOhm)

Remote control

M192-V0xxx   - RS-232
M192-V2xxx   - IEEE488

Housing

M192-Vxxx0   - table version
M192-Vxx1x   - module 19" , 4HE

Example of the order

M192A-V2000   - resistance load 15Ohm - 300 kOhm, IEEE488 bus, table version