M-612 *Precision RTD simulator*

User's manual

CONTENT:

1. Use of the instrument

Simulator is designed for parameter checking of various regulators and process meters, which use resistance temperature sensors for temperature measuring. Both Pt sensors and Ni sensor can be simulated with model M-612. Low thermal voltage relays and stable foil resistors with low temperature coefficient are used as main parts of the simulator. Actual set values are displayed on the front panel display. Simulator is supplied from internal battery. External power adapter is used as external power source and as battery charger.

Instrument is especially suitable for automatic testing procedures. RS232 line (optionally GPIB bus) is used for connecting simulator to the computer.

2. Contents of delivery

RS232 version	*GPIB version*
RTD simulator M612-V1xxx	RTD simulator M612-V2xxx
Power line adapter	Power line adapter
Cable RS-232	Demo program
Demo program	User's manual
User's manual	

3. Technical data

Only values, functions, ranges with signed accuracy in relative or absolute expression or where limits are specified, are guaranteed.

Range of Pt sensor temperature simulation	-200.000 °C – 850.000 °C
Range of Ni sensor temperature simulation	-60.000 °C – 300.000 °C
Resistance range	16.0000 Ω - 10000 Ω
	SHORT, OPEN terminals
	(version M612-Vx1xx only)
Resolution	0.001 °C for Pt100, Pt200, Ni100
	0.01 °C for Pt500, Pt1000, Ni1000
	0.0001 Ω for (16.0000 – 30.0000 Ω)
	0.001 Ω for (30.001 – 100.000 Ω)
	0.01 Ω for (100.01 – 500.00 Ω)
	0.1 Ω for (500.1 – 2000.0 Ω)
	1 Ω for (2000 – 10000 Ω)
Simulated temperature sensors	Pt100, Pt200, Pt500, Pt1000, Ni100, Ni1000
Temperature scale	IPTS68, ITS90
Pt sensor standard	DIN (IEC751)
	(1,3850 for IPTS68 / 1,3851 for ITS90)
	US (US/JIS) (1,3916)
Ni sensor standards	DIN 43760 (6180)
Resistance temperature coefficient	< 1ppm/ °C (16 Ω - 2000 Ω)

	< 5ppm/ °C (2 kΩ - 10 kΩ)
Maximal power dissipation	0,3 W
Maximal current	100 mA (16 – 30 Ω)
	50 mA (30 – 100 Ω)
	20 mA (100 – 500 Ω)
	10 mA (500 – 3000 Ω)
	5 mA (3000 – 10000 Ω)
Maximal voltage	50 V ef
Connection	2, 3 or 4 wire
Terminals	gold plated terminals 4mm
Remote control	interface RS-232, galvanically isolated
Reaction time *	3 ms
Power supply	internal battery 12 V – 2.6 Ah (WP2.6-12)
	external power line adapter 15VDC/2A 100–240V
Operating period	typically 6 hours
Range of reference temperatures	+18 °C … +28 °C
Range of working temperatures	+5 °C … +40 °C
Range of storage temperatures	-10 °C … +50 °C
Dimensions (table version)	W 364 mm, H 111 mm, D 316 mm (without holder)
Dimensions (19" module)	W 483 mm, H 133 mm, D 316 mm
Weight	4 kg

∗   *Reaction time means time interval between setting up value from front panel or receiving command from remote control bus and settling set-up value on output terminals.*

Note :
During over-switching resistance value, output terminals can be in status OPEN for approx. 1 ms.

Accuracy

Specified accuracy is valid after 10 minutes warm up in temperature range 23 ± 5 ºC. Uncertainties include long-term stability, temperature coefficient, linearity, load and line regulation and traceability of factory to National calibration standards. Accuracy assigned in % related to the set value. Specified accuracy is one-year accuracy.

Resistance accuracy

Range	Accuracy
16.0000 Ω ... 399.99 Ω	0.003 % + 3 mΩ
400.00 Ω ... 2000.0 Ω	0.005 %
2001 Ω ... 10000 Ω	0.015 %

Thermoelectric voltage in resistance range up to 2 kΩ is < 1 µV and in range over 2 kΩ is < 5 µV.

Pt sensors simulation accuracy

Temperature range	Accuracy Pt100	Accuracy Pt200	Accuracy Pt500	Accuracy Pt1000
-200.000 ... 200.000 °C	0.02 °C	0.02 °C	0.02 °C	0.03 °C
200.001 ... 500.000 °C	0.03 °C	0.04 °C	0.06 °C	0.15 °C
500.001 ... 850.000 °C	0.04 °C	0.06 °C	0.15 °C	0.20 °C

Ni sensors simulation accuracy

Temperature range	Accuracy Ni100	Accuracy Ni1000
-60.000 ... 300.000 °C	0.02 °C	0.1 °C

Temperature coefficient outside of the reference temperature range is 10 % of the stated specification per °C.

Leads simulation

Parts of the simulator are two resistors of nominal value 10Ω, which can be used as resistance leads compensation. Lead resistance accuracy is 0.1%, maximal allowed current is 100 mA.

Short and Open simulation (version M612-Vx1xx only)

When function Short is selected, output resistance is lower than 100 mΩ (typically 50 mΩ). Maximal allowed current is 500 mA.
When function Open is selected, output resistance is higher than 1 GΩ. Maximal allowed voltage is 50 V ef.

Note :
Resistance values in range 16 Ω - 10000 Ω are calibrated absolutely. Resistance value is not defined against SHORT position. Functions Short and Open positions are intended only for functional checking of tested instrument.

4. Preparing for use

M-612 Simulator is supplied from internal battery or from external power line adapter. Range of power line voltage is from 100 V to 240 V 50/60 Hz. M-612 is laboratory device. Its accuracy is guaranteed in temperature range 23 ± 5 °C. Instrument is aimed for use in horizontal or slope position. The angle of slope is determined by downcast holder.

After unpacking put the instrument on flat desk. If the instrument was stored out of range of reference temperatures, let it stabilise for one hour.

4.1.   Switching on

If the instrument is supplied from internal battery only, push the button POWER. If power line adapter is connected, simulator will switch on automatically. After switching on internal tests are performed for approx. 3s. On the display type name of the instrument and manufacturer are displayed during internal test. After finishing, setting to the start-up position (temperature 100°C or resistance 100Ω) is performed.

4.2.   Warm-up time

Simulator can operate immediately after switching on. After 10 min. warm-up period it meets specified accuracy. During warm-up period it is not recommended to perform recalibration.

5. Description

5.1.   *Front panel*
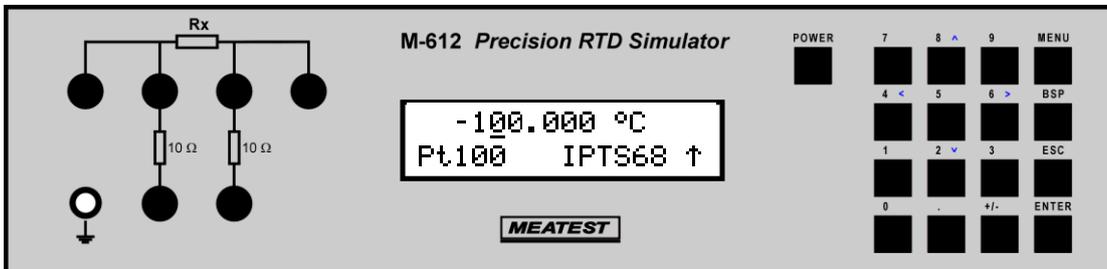
On the front panel there are located all main control keys, display and output terminals.

Keyboard

Numerical values can be entered from the numerical part of keyboard. Keys with number 2, 4, 6, 8 have also next meaning as display cursor keys. Except numerical there are following keys in the keyboard:

Key	Meaning
MENU	enter to the SETUP/CALIBRATION MENU.
BSP	deletes last entered number.
ESC	cancels last entered value or leaves last set mode
ENTER	confirms set value or confirms selected item in MENU or switches between numerical function (black label) and display cursor function (blue label) of the keys 2, 4, 6, 8. Switching over is indicated with symbol (↑) in right low corner of the display.
POWER	switches on and off the simulator. When switching off is requested, two-times the key must be pushed to confirm switching off.

Display

Two-row alphanumerical display is used for displaying all information. Main value, i.e. simulated temperature or output resistance is displayed in upper row. Auxiliary information are displayed in lower row. Depending on status following symbols can be displayed in right low corner:

   ↑   keys 2, 4, 6 and 8 are switched to the cursor function (blue labels are valid)

   ▯   simulator is in remote control via RS232 (GPIB optionally)

   ▯   internal battery is out of power

   ▮   power line adapter is connected

Output terminals

Simulated value of resistance is connected to the output terminals according to the symbol on the front panel. Two-, three- or four- wire connection can be used. Two terminals in lower row are

connected to the output terminals through 10Ω resistors, which can simulate lead resistance. Left terminal with symbol "GROUND" is connected with the housing.

5.2.   Rear panel
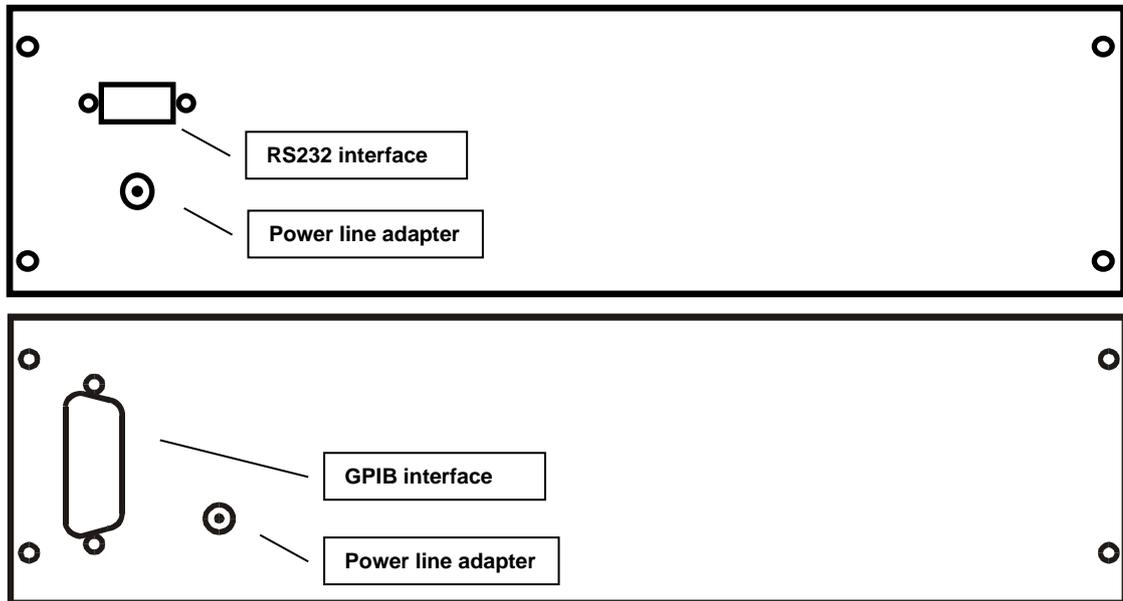
On the rear panel there are located power supply connector, interface RS-232 connector (optionally GPIB connector) and serial number plate.

6. Operation

6.1.   Switch on and off

When supplied from power line adapter, simulator is automatically switched on all this time the adapter is connected to the power source.

When supplied from internal battery (power line adapter is not connected to the power line connector, or adapter is not connected to the power source), simulator must be switched on by pushing the key POWER. To switch off the simulator, push the same key two times. When supplied from internal battery, simulator is automatically switch off, if for last 20 minutes no one key was pushed or if internal battery is discharged . One minute ⬚ before automatic switching off, simulator displays symbol and beeps to warn the user.

6.2.   Standard mode

After switching on simulator comes to standard mode. Following information is shown on the display:

```
┌─────────────────────────────┐
│     -100.000 °C             │
│  Pt100    IPTS68 ↑          │
└─────────────────────────────┘
```

In the upper row actually simulated temperature [°C] or resistance [Ω] is displayed. In the lower row type of simulated temperature sensor (Pt100, Pt200, Pt500, Pt1000, Ni100, Ni1000), set-up temperature scale IPTS68, ITS90 according to the IEC751 standard or US according to the US/JIS standards are displayed. Arrow symbol in right corner informs, that cursor function of keys 2, 4, 6, 8 is initialised. After pushing the key MENU, SETUP function is activated.

Use of cursor keys

Cursor keys ↑ ↓ enables to increase or decrease the number on active position. Active position is signed by symbol _ under the number place. With cursor keys ← → active position of the cursor can be changed.
Pushing the key ENTER switches keys 2, 4, 6, 8 function between cursor and numerical.

Numerical keyboard

With numerical keys value of temperature (or resistance) can be directly entered. Newly entered value is displayed in brackets under the actually set value. To confirm new value push the key ENTER.
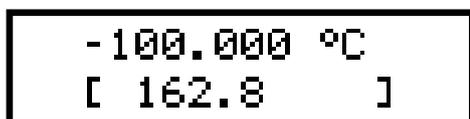
```
┌─────────────────────────────┐
│     -100.000 °C             │
│  [ 162.8      ]             │
└─────────────────────────────┘
```

Pushing the key ENTER switches keys 2, 4, 6, 8 function between cursor and numerical. Press ESC key to exit setting value from numerical keyboard mode. BSP key deletes last entered number.

6.3. Setup mode

This mode enables to set or display some auxiliary parameters. To enter this mode push the

```
┌──────────────────────────────┐
│ Function  Pt100              │
│      Pt100          ↑        │
└──────────────────────────────┘
```

key MENU in standard mode. To leave setup mode push the key ESC. With cursor keys ↑↓ following items in setup menu can be displayed:

Function

Basic function can be chosen here. With keys ← → one of function R, Pt100, Pt200, Pt500, Pt1000, Ni100, Ni1000, Short and Open can be set. Functions Short and Open are extra ordered option. Function Short simulates short on the output terminals, function Open simulates disconnected output terminals. Selected function is displayed in lower row. To confirm changing the function press ENTER. The newly set function is written into the upper row.
Note: the last set function is valid even if the instrument is switched off (except of Short and Open functions).

Temperature scale

Required temperature scale can be set here. With keys ← → one of type IPTS68 or ITS90 can be chosen. Selected scale is displayed in lower row. To change the scale press ENTER key. The newly set scale is written into the upper row.
Setting of the temperature scale can be performed for simulation of Pt temperature sensors according to the IEC 751 standard only. For Ni sensors or Pt sensors with selected type "US", this function is inactive.
Note: the last set temperature scale is valid even if the instrument is switched off.

Pt resistance temperature sensor type

Type of simulated Pt sensor standard can be chosen here. With keys ← → either US (coefficient 1,3916 according to the US/JIS standard) or IEC (coefficient 1.3850 for IPTS68 and coefficient 1,3851 for ITS90) can be selected. Set standard is displayed in lower row. To change the standard press ENTER key. The newly set standard is written into the upper row.
Note: the last set standard is valid even if the instrument is switched off.

Volume

Enables or disables acoustic indication when any front panel key is pressed.
With keys ← → values OFF (beeping switched off), LOW (low level volume), HIGH (high level volume) can be selected. Set volume level is displayed in lower row. To change it press the key ENTER. The newly set standard is written into the upper row.
Note: the last set volume level is valid even if the instrument is switched off.

Baud rate RS-232 (optionally GPIB address)

In standard version, the function involves to set parameter baud rate of RS-232 interface. With keys ← → any value from the row 300, 600, 1200, 2400, 4800, 9600 or 19200 Bd can be set. Set baud rate is displayed in lower row. To change currently valid value to the new value press the key ENTER. The newly set baud rate is written into the upper row.
If the simulator is optionally equipped with GPIB, instead of "Baud rate" you can set GPIB address of instruments.
In simulator with GPIB interface, GPIB address can be set-up here. The address range is 0 to 30.

Note: the last set baud rate is valid even if the instrument is switched off.

Lighting

Enables or disables lighting of the display. With keys ← → values OFF (lighting is switched off), 30 s (lighting is switched on for 30 s after last key pressing), 5m (lighting is switched on for 5 minutes after last key pressing) or ON (lighting is switched on) can be set. Selected parameter is displayed in lower row. To change currently selected parameter press ENTER key. The newly set standard is written into the upper row.

If the instrument is supplied from the external power adapter, lighting is switched on permanently.

Note: Display lighting influences significantly operating period from the internal battery. If not used when instrument is supplied from internal battery, the working period can be lengthen about 50 %.

Calibration mode password setting

Calibration code is a five-digit number, which must be entered to access the calibration mode. If the calibration code is set to "00000", this information is displayed in the Setup menu. Calibration code can be changed. New calibration code can be directly entered using numeric keyboard and confirmed by pressing ENTER. If non-zero calibration code is set, correct calibration code must be entered to access the calibration mode. Non-zero calibration code is not displayed further on the display.

The purpose of the calibration code is to prevent unauthorized users from changing the calibration of the changing the calibration of the instrument.

Note: it is advisable to write down actual calibration code if changed. If you forget the calibration code, you have to send the calibrator to the manufacturer.

Note: the last set calibration code is valid even if the instrument is switched off.

Serial number

Displays the serial number of the simulator. The parameter cannot be changed.

6.4. Calibration mode

In this mode resistance elements of the simulator can be recalibrated. Access to the calibration mode is enabled after double pushing MENU key from the standard mode or after single pushing the same key from the setup mode.

Correct password must be entered before calibration. Without correct password the access to the calibration mode is refused. Return to standard mode is possible after pushing ESC key.

Recalibration procedure consists of measuring 22 basic resistance values and entering their
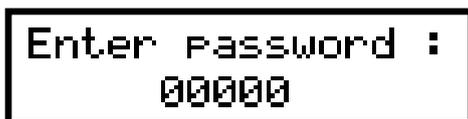
```
┌─────────────────────────┐
│  Enter  password  :     │
│          00000          │
│                         │
└─────────────────────────┘
```

measured data. Among calibration values can be moved with keys ↑ ↓.

In following table nominal values of calibration points and requested recalibration accuracy are described:

Calibration point	Nominal value	Accuracy
R00	31,6 Ω	1 mΩ
R01	61,9 Ω	1 mΩ
R02	121 Ω	2 mΩ
R03	237 Ω	3 mΩ
R04	464 Ω	6 mΩ
R05	909 Ω	15 mΩ
R06	1780 Ω	30 mΩ
R07	3480 Ω	100 mΩ
R08	6870 Ω	250 mΩ
R09	13,5 kΩ	500 mΩ
R10	26,6 kΩ	1 Ω
R11	52,2 kΩ	5 Ω
R12	103 kΩ	10 Ω
R13	202 kΩ	20 Ω
R14	398 kΩ	40 Ω
R15	780 kΩ	80 Ω
R16	1540 kΩ	200 Ω
R17	3020 kΩ	400 Ω
R18	5920 kΩ	1 kΩ
R19	12 MΩ	5 kΩ
R20	23 MΩ	50 kΩ
R21	48 MΩ	200 kΩ
R22	100 MΩ	500 kΩ

Process of calibration is following:
- Set the first calibration point (resistance element). Use keys ↑ ↓ to set the element.
- Measure resistance of the selected element. Use ohm-meter in 4-wire connection and with appropriate accuracy.
- Change function of the keyboard to the numerical one by pushing ENTER key.
- Write measured resistance value (there is original value in the first row and newly entered value in the second row).

```
R00   62.00000 Ω
      62.0200
```

- Confirm new calibration data by pushing ENTER key.
- Repeat above described procedure for all resistance elements.

7. Performance verification test

Parameter verification procedure is described in the chapter. Verification procedure is based on measuring resistance on the simulator output terminals with standard multimeter in recommended points.

Required equippment
- Ohm-meter nominal accuracy 0.001% in range 10 Ω to 10 kΩ (type HP3458A or Wavetek 1281 or similar)

Simulator setting
Switch simulator to the resistance function. Connect standard multimeter to the simulator output terminals. Use four-wire connection technique.

Range of the test
- output resistance checking
- lead resistance simulation checking

Procedure
Use following procedure to perform parameter verification test.
1. Connect simulator to the with standard ohm-meter (multimeter), switch both instruments on and let them for 1 hour stabilise in the laboratory with ambient temperature 23±2 ºC.
2. Perform output resistance verification test in all points according to the bellow described table. Maximal deviation should not exceed limits in the table.
3. Connect standard ohm-meter (multimeter) to the 10 Ω lead resistor in terminal Hi and measure its resistance. Allowed deviation is +/- 0.1%. In the same way check the resistance of lead resistor in Lo terminal.

Maximal deviations

Nominal value [Ω]	Max.deviation[mΩ]
20.0000	3.6
50.000	4.5
100.000	6.0
200.00	9.0
500.00	25
1000.0	50
2000.0	100
5000	750
10000	1500

8. Remote control

Standard version is equipped with RS232 bus. GPIB version is described in chapter 8.4. Commands for both versions are the same.

8.1. Commands

Communication between simulator and computer consists of flow of periodically alternating commands type command-response or query-response. Command is always a letter followed by parameter and ended by control sign <cr> or <lf>. Response is always ended with control signs <cr> <lf>.

Syntax description

<DNPD> =   Decimal Numeric Program Data, this format is used to express decimal number with or without the exponent.

<CPD> =   Character Program Data. Usually, it represents a group of alternative character parameters. E.g. {0 | 1 | 2 | 3}.

? =   A flag indicating a request for the value of the parameter specified by the command. No other parameter than the question mark can be used.

(?) =   A flag indicating a request for the parameter specified by the command. This command permits a value to be set as well as requested.

<cr> =   carriage return. ASCII code 13. This code executes the program line.

<lf> =   line feed. ASCII code 10. This code executes the program line.

8.2. Command list

Value setting / reading

A (?) <DNPD>

The command sets resistance value (resistance function) or temperature value (temperature sensor simulating function).

<DNPD>

It represents resistance value in Ohm or simulated temperature in ºC. When temperature parameter is used, both negative and positive values are acceptable. For resistance parameter positive value only is acceptable. Limit values are shown in chapter "Technical data".

In case of control, the simulator confirms correct setting with string „Ok <cr><lf>".

In case of query, M-612 returns set resistance/temperature value in the same format as it is on the display (number of decimal places). For example value -120 °C is returned as
-120.000<cr><lf>. Positive numbers are sent without polarity sign.

Example :

Command „A123.564 <cr>" sets temperature 123.564 °C if simulator is in temperature simulation function and 123.564 Ω if simulator is in resistance function.

If query „A?<cr>" is sent, simulator returns response in format „123.564<cr><lf>".

Simulator function setting

F <CPD> { 0 | 1 | 2 | 3 | 4 | 5 | 6 | S | O }

Following function is set:
- 0   resistance generation
- 1   Pt100 simulation
- 2   Pt200 simulation
- 3   Pt500 simulation
- 4   Pt1000 simulation
- 5   Ni100 simulation
- 6   Ni1000 simulation
- S   Short simulation (extra ordered option)
- O   Open simulation (extra ordered option)

M-612 confirms execution with string „Ok <cr><lf>".

Example :
„F1<cr>" sets Pt100 sensor simulation

I/D (device identification)
*IDN?

Response contains name of manufacturer, model type number, serial number and firmware version

Example :
If query „*IDN?<cr>" is sent, simulator returns response:
„MEATEST,M612,470221,2.7 <cr><lf>".

Switching off
P0

The command will switch the simulator off. The command is executed if simulator is supplied from internal battery only. Correct execution is confirmed with string „Ok <cr><lf>".

Example :
„P0<cr>" switches simulator off (if not used external power adapter).

Type of sensor setting
T <CPD> { 0 | 1 }

Standard according to is temperature sensor simulated can be set with this command.
- 0   type IEC 751 (1.385)
- 1   type US/JIS (1.3916)

M-612 confirms correct execution with string „Ok <cr><lf>".

Example :
„T0<cr>" sets Pt sensor type 1.385 (IEC 751).

Temperature scale setting
S <CPD> { 0 | 1 }
The command set temperature scale.
- 0 scale ITS90
- 1 scale IPTS68
M-612 confirms correct execution with string „Ok <cr><lf>".

Example :
„S1<cr>" sets scale IPTS68.

Status query
V?
M-612 returns device status in format „FxSxTx <cr><lf>", where „x" means characters corresponding to the real instrument status.

Example :
If query „V?<cr>" is sent, simulator returns response for example:
„F4S1T1<cr><lf>" (Pt1000, 1.385, IPTS68).

When unknown command is received M-612 returns string "? <cr><lf>". Correctly executed command is confirmed with string "Ok <cr><lf>. When correct query is received M-612 returns response in above described format. All commands must contain sign <cr> or <lf> at the end. Both small and large letters can be used.

8.3. Remote control RS232

Transmission baud rate can be selected from 300 to 19200 Bd. Number of data bits is 8, number of stop bits is 1, parity is not used. For data flow control neither hardware handshake (RTS/CTS) nor program handshake (XON/XOFF) is used. RS 232 line is from other electronic circuits galvanically isolated

RS-232 connection
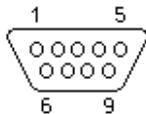
Pin	Label	I/O	Description
2	TXD	output	Transmitter
3	RXD	input	Receiver
5	GND	-	Ground

9 pin connector D-SUB MALE

Cable between simulator and computer description (configuration 1:1)

Computer	D-Sub 1	D-Sub 2	M-612
Receiver	2	2	Transmitter
Transmitter	3	3	Receiver
Ground	5	5	Ground

8.4.   Remote control GPIB

The list of commands is valid for version of simulator with GPIB interface.

The instrument performs the following functions based on GPIB bus commands:

SH1, AH1, T5, L3, RL1, DC1
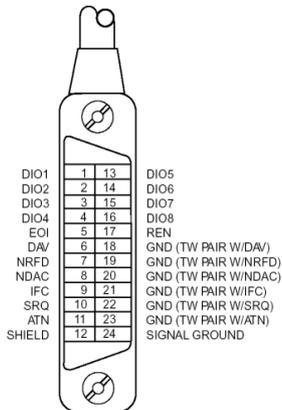
The instrument also recognizes the following general commands:
DCL Device Clear - resets the instrument to its basic state
SDC Selected Device Clear - resets the instrument to its basic state
GTL Go To Local - switches the remote control off
LLO Local Lock Out - switches the local control off, the instrument cannot be controlled from the front panel

DIO1	1	13	DIO5
DIO2	2	14	DIO6
DIO3	3	15	DIO7
DIO4	4	16	DIO8
EOI	5	17	REN
DAV	6	18	GND (TW PAIR W/DAV)
NRFD	7	19	GND (TW PAIR W/NRFD)
NDAC	8	20	GND (TW PAIR W/NDAC)
IFC	9	21	GND (TW PAIR W/IFC)
SRQ	10	22	GND (TW PAIR W/SRQ)
ATN	11	23	GND (TW PAIR W/ATN)
SHIELD	12	24	SIGNAL GROUND

8.5. Demo program

A simple operating program DecadeAssistant is supplied with the decade in order to provide easy operation of the instrument from the computer, and to check the RS-232 line (IEEE488 bus) of the instrument. The installation CD ROM contains a program (for MS WINDOWS only), you can communicate with the instrument through standard serial line (IEEE488) with. For example, you can set value or function on the decade. For IEEE488 connection this DecadeAssistant requires properly configured National Instruments IEEE488 card.

Download on www.meatest.com.

9. Module 19" (extra ordered option)

RTD simulator can be ordered as 19" module for easy assembling into a 19" rack. Module height is 3HE.

10. Electric function

Resistance elements are switched to the output terminals through reed relays in binary code system. The relays used are types with low thermoelectric voltage. The resistors are of foil or metal type with low temperature coefficient. Metal housing is connected to the ground terminal only. The board with resistors and relays creates independent mechanical block.

CPU unit with one-chip micro-controller generates all necessary internal control signals. Calibration data and set-up parameters are saved in EEPROM memory.

11. Mechanical construction

Simulator housing is standardised aluminium type one. Keyboard with display and output terminals are located on the front panel. External power supply connector and RS-232 connector are located on the rear panel. Internal battery is fixed to the rear panel inside the housing.

11.1. Battery maintenance

Period for fully battery charging is approx. 40 hours. If the instrument has been stored for more than 3 months without connected external power line adapter, battery should be charged.

11.2.   Battery replacement

Internal battery is sealed lead-acid maintenance-free long-life rechargeable battery with voltage 12V and capacity 2.6Ah.

To replace battery use following procedure:

- Disconnect external power supply adapter and RS-232 (GPIB) cable.
- Switch simulator off.
- Dismount 4 screws located in the corners of the rear panel.
- Remove slightly top cover.
- Disconnect connectors from the battery and dismount metal belt to release battery.
- Replace battery pack.
- Connect fresh battery and mount it into the case in opposite procedure.

12. Ordering information – options

Bus
M612-V1xxx   - RS232
M612-V2xxx   - GPIB

Additional functions
M612-Vx0xx   - none
M612-Vx1xx   - Short/Open function

Housing
M612-Vxx0x   - table version
M612-Vxx1x   - module 19", 3HE

<u>**Manufacturer**</u>

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Železná 509/3, 619 00 Brno   *fax: +420 – 543 250 890*
Czech Republic   *meatest@meatest.cz*
                                                   www.meatest.com

CE Certificate of conformity

According to EN ISO/IEC 17050-1:2010 standard as well as 2014/30/EU and 2014/35/EU directives of European Parliament and European Council, MEATEST, spol. s r. o., manufacturer of M-612 Precision RTD Simulator based in Železná 3, 619 00 Brno, Czech Republic, declares that its product conforms to following specifications:

Safety requirements

- EN 61010-1:08 ed. 2:2011

Electromagnetic compatibility

- EN 61000 part 3-2 ed. 3:2006 + A1:2010 + A2:2010
- EN 61000 part 3-3 ed. 2:2009
- EN 61000 part 4-2 ed. 2:2009
- EN 61000 part 4-3 ed. 3:2006 + A1:2008 + A2:2011
- EN 61000 part 4-4 ed. 3:2013
- EN 61000 part 4-5 ed. 2:2007
- EN 61000 part 4-6 ed. 3:2009
- EN 61000 part 4-11 ed. 2:2005
- EN 61326-1 ed. 2:2013

Brno	April 16th, 2014	
Place	Date	Signature