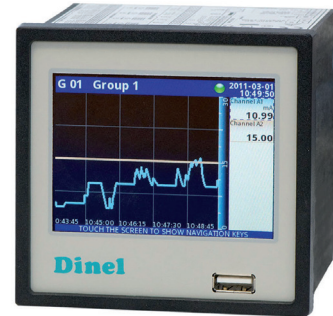


- For display, recording and evaluation of process instruments signals (level, temperature, pressure, etc.)
- 3.5" TFT display, multi-language menu
- Variety of possible configurations for I/O module
- Measured data recordable into internal memory (1,5 GB)
- Extensive ways of data communication
- The possibility of evaluating and processing of the measured data on PC



The **MGU-800** is a sophisticated multichannel unit which allows simultaneous measurement, visualisation and control of numerous channels. This device can operate autonomously or with cooperation with external measurement devices and actuators. MGU-800 is designed as modular device consisting of a base and optional input and output modules.

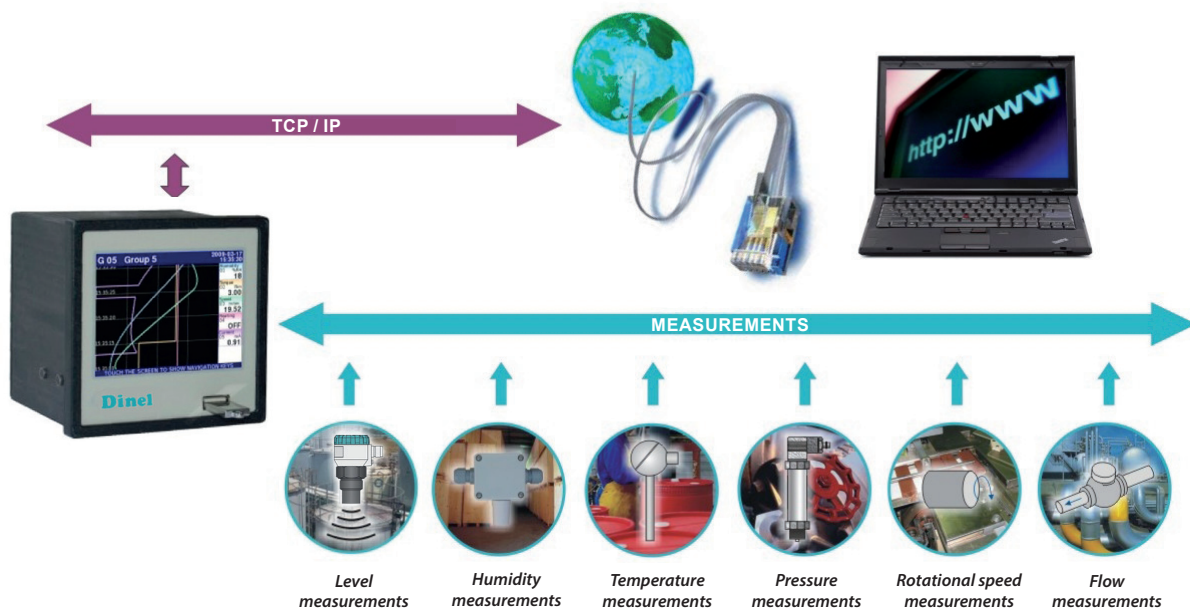
The MGU-800 displays all data and dialogue on a legible, 320x240 pixels, colour TFT screen. Full control of the device is realised using the built-in touch-panel which makes operating easy and intuitive.

All measurement and output modules are optional and can be installed inside the device according to the customer's needs.

OPTIONAL MODULES

IUI4	4 Current input, 4 Voltage input	IPI4	4 Pulse input (flowmeters) + 4 Current input
IUI8	8 Current input, 8 Voltage input	ICP4	4 Universal counter input
II16	16 Current input	ITC4	4 Thermocouple sensors input
ID8	8 Optoisolated digital (binary) input	ITC8	8 Thermocouple sensors input
IFI2	2 Current input (flowmeters) + 2 Current input	IRT4	4 Resistance temperature detectors (RTD) input
IFI4	4 Current input (flowmeters) + 4 Current input	OI2	2 Passive current output 4 ... 20 mA
IPI2	2 Pulse input (flowmeters) + 2 Current input	OR8	8 Relay output (1 A/250 V)

RANGE OF APPLICATIONS



DEVICE INSTALLATION

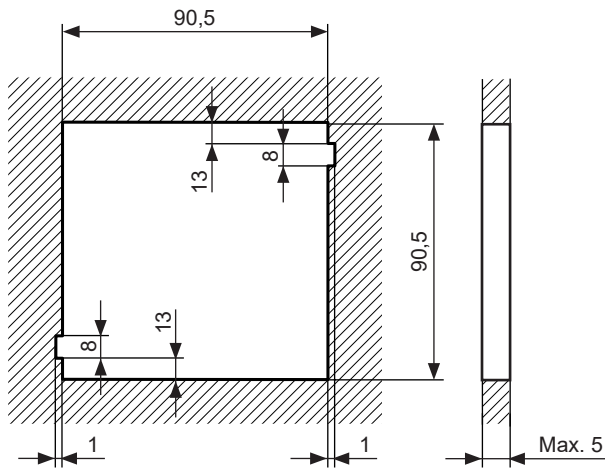


Fig. 1: Mounting hole dimensions

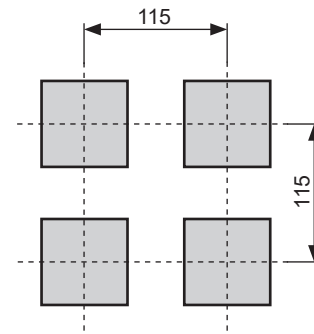


Fig. 2: Minimum distances when assembly of a number of units

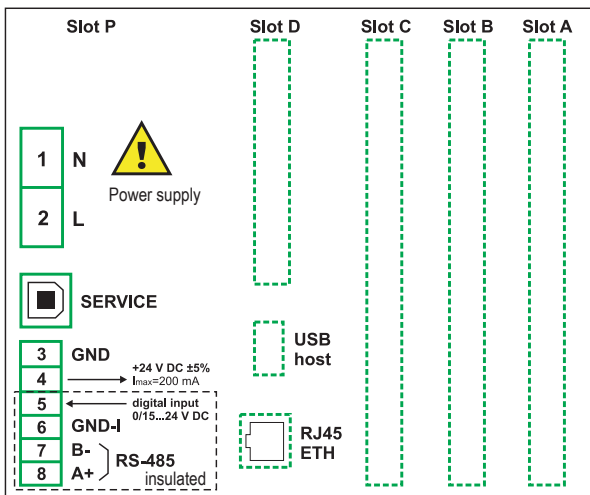


Fig. 3: Terminals description

The basic performance of the units (see Fig. 3) contains only the extreme left terminals:

- Power supply
- USB device port (front panel)
- Sensor supply output 24 V DC $I_{max} = 200\text{mA}$
- Digital input 0V...15...24 V DC (low state: 0...5 V, high state: 8...24 V)
- Interface RS-485

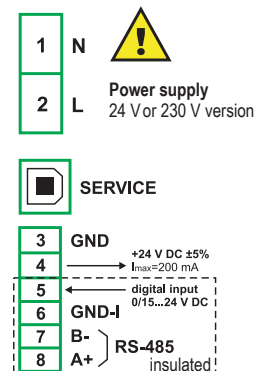
Depending on customer's needs, the basic version of the device can be upgraded with up to:

- Three I / O modules – installed in a place designated as Slot A, B, C.
- Advanced communication module (2x RS-232/485, USB and LAN) – installed in a place designated as Slot D.

TECHNICAL SPECIFICATIONS OF MODULE UNITS

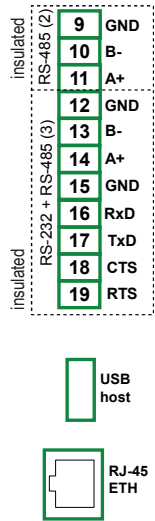
The **power supply module** is a component of MGU-800 which is present in all variants. It includes power supply that supplies the main parts of the MGU-800 and expansion modules. It provides also the basic data communication of the MGU-800 (RS-485 and USB port on front panel).

POWER SUPPLY MODULES		24 V version	230 V version
Power supply voltage		19 ... 50 V DC 16 ... 35 V AC	85 ... 260 V AC/DC 50 ... 60 Hz
USB		Servis port (Type B), Front panel (Type A)	
Sensor power supply output		24 V DC $\pm 5\%$ (0.2 A)	
Permissible Long time overload		20%	
Digital input	Parameters Power consumption Insulation	0 ... 24 V DC, with galvanic insulated 7.5 mA / 24 V 1 Min (500 V DC)	
Input signals voltage levels	Logical low state Logical high state	$U_{IN} < 5\text{ V}$ $U_{IN} > 8\text{ V}$ (Max. 24 V)	
Interface		RS-485 (Modbus RTU); 1200 ... 115200 b/s	



MGU-800 unit is equipped with basic communication module, which is located together with the power module. It includes RS-485 ports, USB port (front panel) and USB service port (on the rear panel). Additionally, the unit can be equipped with communication expansion module with 2 ports RS-485, 1x RS-232, USB (back panel) and Ethernet. A variant with the basic module only is marked with number **1**; with the basic and extension module is marked by **2**.

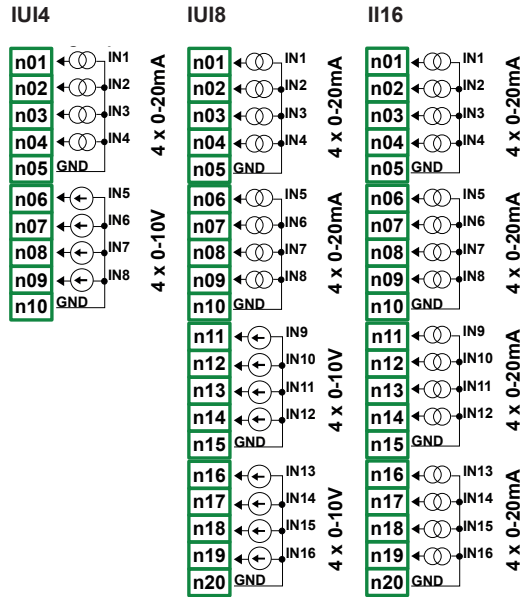
COMMUNICATIONS MODULES		
	Version 1	Version 2
Input/output type	1x RS-485 1x USB (front)	3x RS-485 1x RS-232 1x USB (front) 1x USB (back) 1x Ethernet (RJ45)
Hardware output limitation	Max. 100 mA (USB)	Max. 100 mA (USB)
Baudrate	USB host: 12 Mb/s RS-485 (RS-232): 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 b/s Ethernet: -	12 Mb/s 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 b/s 10 Mb/s
Data format RS-232/485	8N1, 8N2, 8E1, 8E2, 8O1, 8O2	8N1, 8N2, 8E1, 8E2, 8O1, 8O2



All ground terminals (GND) of a modules IUI4, IUI8 and I16 are common, but separated from power supply and other modules.

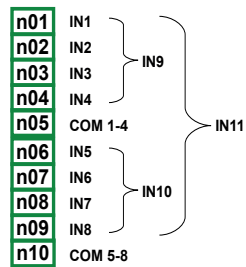
VOLTAGE AND CURRENT INPUT MODULES				
		IUI4	IUI8	I16
Number of inputs		4x U + 4x I	8x U + 8x I	16x I
Hardware measurement ranges	Voltage input	-2 ... 13 V	-2 ... 13 V	-
	Current input	-2 ... 30 mA	-2 ... 30 mA	-2 ... 30 mA
Hardware resolution	Voltage input	1 mV	1 mV	-
	Current input	1 µA	1 µA	1 µA
Precision		0.25 %	0.25 %	0.25 %
Permissible long time overload		20 %	20 %	20 %
Software measurement ranges		0 ... 5 V	0 ... 5 V	
		1 ... 5 V	1 ... 5 V	
		0 ... 10 V	0 ... 10 V	0 ... 20 mA
		2 ... 10 V	2 ... 10 V	4 ... 20 mA
		0 ... 20 mA	0 ... 20 mA	
Internal impedance	Voltage input	100 kΩ	100 kΩ	-
	Current input	Typ. 100 Ω	Typ. 100 Ω	Typ. 100 Ω
Protection	Voltage input	No	No	-
	Current input	50 mA ¹⁾	50 mA ¹⁾	50 mA ¹⁾

¹⁾ Auto-reset fuse



ID8 is module with 8 digital inputs respectively. Inputs are divided into groups of four input every.

All channels are galvanic separated from the device and from themselves.

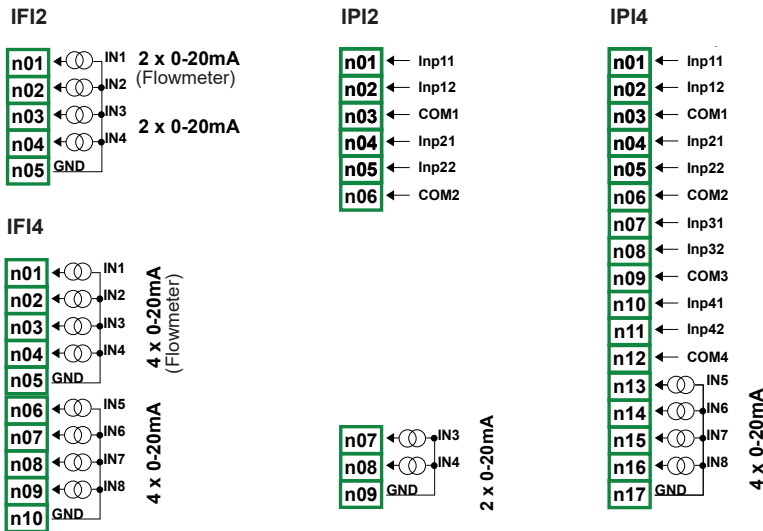


DIGITAL INPUT MODULE		ID8
Number of inputs		8 (2 groups 4 inputs every, optoisolated from others signals)
Input signals voltage levels	Logical low state	$U_{in} < 1 V$
	Logical high state	$U_{in} > 4 V$
Maximum input voltage		30 V
		20 %
Input current consumption		approx. 15 mA (24 V)
		approx. 5 mA (10 V)
		approx. 2 mA (5 V)
Insulation strength		500 V
Input signals representation		8 single bits IN1 – IN8
		2 nibbles IN9 – IN10
		1 byte IN11

FLOWMETER MODULES

	IFI2	IFI4	IPI2	IPI4
Number of inputs	2x F + 2x I	4x F + 4x I	2x P + 2x I	4x P + 4x I
Hardware measurement ranges (current input)	-2 ... 30 mA	-2 ... 30 mA	0 ... 24 mA	0 ... 24 mA
Hardware resolution (current input)	1 μ A	1 μ A	1 μ A	1 μ A
Software measurement ranges (current input)	0 ... 20 mA 4 ... 20 mA	0 ... 20 mA 4 ... 20 mA	0 ... 20 mA 4 ... 20 mA	0 ... 20 mA 4 ... 20 mA
Precision (current input)	0.25 %	0.25 %	0.25 %	0.25 %
Internal impedance (current input)	Typ. 100 Ω	Typ. 100 Ω	Typ. 100 Ω	Typ. 100 Ω
Sampling period	10 ms	10 ms	50 ms	50 ms
Protection (current input)	50 mA ¹⁾	50 mA ¹⁾	50 mA ¹⁾	50 mA ¹⁾

¹⁾ Auto-reset fuse



IFI module with 2 (4) currents inputs for flowmeters and 2 (4) current inputs for other sensor.

IPI module with 2(4) pulse inputs for flowmeters or ratemeters and 2 (4) current inputs for other sensor. Pulse flowmeters are used to liquid flow measurement, based on pulses from sensor and calculating total flow (balance) in selected channel.

Current inputs are used to current measurement in typ. ranges (0)4 ... 20 mA.

All channels are galvanic separated from the device and from themselves.

UNIVERSAL COUNTER MODULE

	ICP4
Number of inputs	4 groups of counter inputs
Input signals	logical LOW state
voltage levels	$U_{IN} < 1 V$ logical HIGH state $U_{IN} \geq 10 V$
Input frequency	max. 5 kHz
Input voltage	max. 30 V
Input current consumption	14 mA at 24 V (6 mA at 10 V)
Insulation strength	2 kV
Protection	50 mA ¹⁾

¹⁾ Auto-reset fuse

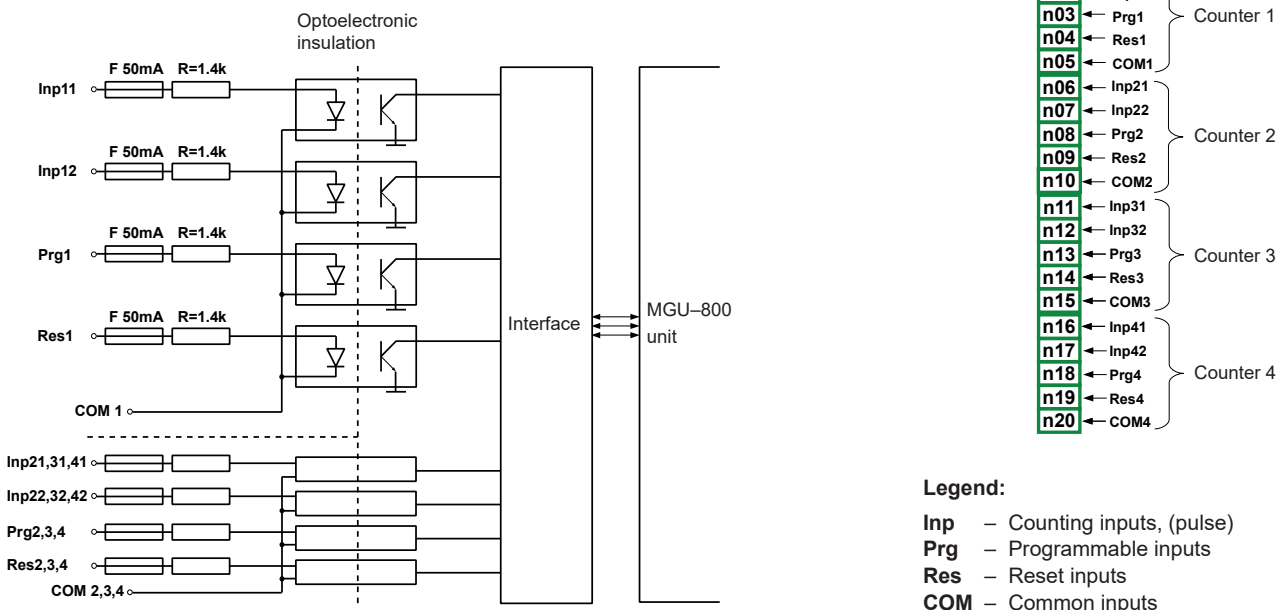
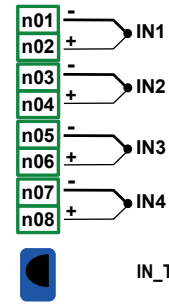


Fig. 4: ICP4 module block diagram

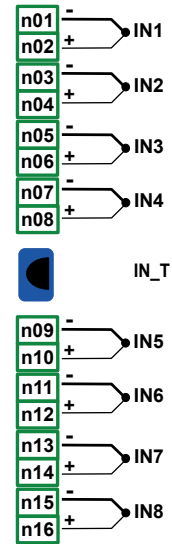
THERMOCOUPLE SENSOR MODULES

		ITC4	ITC8
Number of inputs		4	8
Hardware measurement ranges		-30 ... 30 mV -120 ... 120 mV	-30 ... 30 mV -120 ... 120 mV
Hardware resolution	Range ± 30 mV	1 μ V	1 μ V
	Range ± 120 mV	4 μ V	4 μ V
Permissible long time overload		20%	20%
Permissible voltage diff. between channels		0.5 V	0.5 V
Softw. measurement ranges		Thermocouple type K, S, J, T, N, R, B, E, L (GOST)	
		Voltage -10 ... 25 mV; ± 25 mV -10 ... 100 mV; ± 100 mV	
Input impedance		Typ. 1 M Ω	Typ. 1 M Ω
Sampling period		385 ms	385 ms

ITC4



ITC8

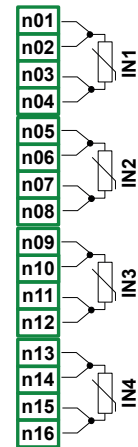


Type	Range	Resolution	Full range	Full range accuracy	Limited range	Limited range accuracy
K	± 120 mV	4 μ V	-200 ... 1370 $^{\circ}$ C	± 8 $^{\circ}$ C ± 0.51	-100 ... 1370 $^{\circ}$ C	± 4 $^{\circ}$ C ± 0.27 %
S	± 30 mV	1 μ V	-50 ... 1768 $^{\circ}$ C	± 7.5 $^{\circ}$ C ± 0.41	0 ... 1768 $^{\circ}$ C	± 6 $^{\circ}$ C ± 0.34 %
J	± 120 mV	4 μ V	-210 ... 1200 $^{\circ}$ C	± 6.3 $^{\circ}$ C ± 0.44	-100 ... 1200 $^{\circ}$ C	± 3 $^{\circ}$ C ± 0.23 %
T	± 30 mV	1 μ V	-200 ... 400 $^{\circ}$ C	± 1.9 $^{\circ}$ C ± 0.31	-100 ... 400 $^{\circ}$ C	± 1 $^{\circ}$ C ± 0.20 %
N	± 120 mV	4 μ V	-200 ... 1300 $^{\circ}$ C	± 12 $^{\circ}$ C ± 0.80	-100 ... 1300 $^{\circ}$ C	± 5.9 $^{\circ}$ C ± 0.42 %
R	± 30 mV	1 μ V	-50 ... 1768 $^{\circ}$ C	± 8.6 $^{\circ}$ C ± 0.47	0 ... 1768 $^{\circ}$ C	± 5.5 $^{\circ}$ C ± 0.31 %
E	± 120 mV	4 μ V	-200 ... 1000 $^{\circ}$ C	± 4.7 $^{\circ}$ C ± 0.40	-100 ... 1000 $^{\circ}$ C	± 2.7 $^{\circ}$ C ± 0.25 %
L	± 120 mV	4 μ V	-200 ... 800 $^{\circ}$ C	± 4.4 $^{\circ}$ C ± 0.44	-100 ... 800 $^{\circ}$ C	± 2.5 $^{\circ}$ C ± 0.28 %
B	± 30 mV	2 μ V	250 ... 1820 $^{\circ}$ C	± 15 $^{\circ}$ C 0.96	480 ... 1820 $^{\circ}$ C	± 6 $^{\circ}$ C 0.45 %

RESISTANCE TEMPERATURE DETECTORS MODULE

		IRT4
Number of inputs		4
Hardware measurement ranges		0 ... 325 Ω 0 ... 3250 Ω
Hardware resolution	Range ± 325 Ω	0.01 Ω
	Range ± 3250 Ω	0.1 Ω
Softw. measurement ranges		RTD type Pt100; Pt'100; Pt'50; Pt'500; Pt'1000; Cu50; Cu'50; Cu'100; Cu'100
		Resistance 0 ... 300 Ω 0 ... 3000 Ω

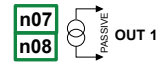
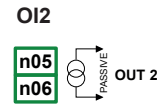
IRT4



Type	Range	Temp. range	Resolution	Accuracy	Accuracy
Pt100	0 ... 325 Ω	-100 ... 600 $^{\circ}$ C	0.01 Ω	± 1 $^{\circ}$ C	± 0.14 %
Pt500	0 ... 3250 Ω	-100 ... 600 $^{\circ}$ C	0.1 Ω	± 2 $^{\circ}$ C	± 0.3 %
Pt1000	0 ... 3250 Ω	-100 ... 600 $^{\circ}$ C	0.1 Ω	± 1 $^{\circ}$ C	± 0.14 %
Pt'50	0 ... 325 Ω	-200 ... 600 $^{\circ}$ C	0.01 Ω	± 2 $^{\circ}$ C	± 0.25 %
Pt'100	0 ... 325 Ω	-200 ... 600 $^{\circ}$ C	0.01 Ω	± 1 $^{\circ}$ C	± 0.12 %
Pt'500	0 ... 3250 Ω	-200 ... 600 $^{\circ}$ C	0.1 Ω	± 2 $^{\circ}$ C	± 0.25 %
Cu50	0 ... 325 Ω	-50 ... 200 $^{\circ}$ C	0.01 Ω	± 1.8 $^{\circ}$ C	± 0.73 %
Cu100	0 ... 325 Ω	-50 ... 200 $^{\circ}$ C	0.01 Ω	± 0.9 $^{\circ}$ C	± 0.37 %
Cu'50	0 ... 325 Ω	-200 ... 200 $^{\circ}$ C	0.01 Ω	± 1.6 $^{\circ}$ C	± 0.4 %
Cu'100	0 ... 325 Ω	-200 ... 200 $^{\circ}$ C	0.01 Ω	± 0.8 $^{\circ}$ C	± 0.2 %
Ni100	0 ... 325 Ω	-60 ... 180 $^{\circ}$ C	0.01 Ω	± 0.7 $^{\circ}$ C	± 0.3 %
Ni500	0 ... 3250 Ω	-60 ... 180 $^{\circ}$ C	0.1 Ω	± 1.4 $^{\circ}$ C	± 0.58 %
Ni1000	0 ... 3250 Ω	-60 ... 180 $^{\circ}$ C	0.1 Ω	± 0.7 $^{\circ}$ C	± 0.3 %

O12 is a module with two passive current outputs (4 ... 20 mA). These outputs require an external power supply through the loop. For its supplying can be used internal power source. The polarity of power can be arbitrary

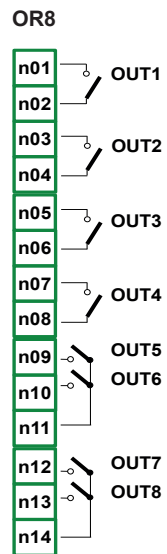
PASSIVE CURRENT OUTPUT MODULE	
	O12
Number of inputs	2
Output type	Passive current output 4 ... 20 mA
Hardware output limitation	3 ... 22 mA
Output voltage dropout	Max. 9 V
Overload protection	Internal resettable fuse 50 mA
Loop supply range	9 ... 30 V
Output current precision	0.1 % (25°C), 50 ppm/°C
Resolution	12 bit



OR8 is the output module with 8-relay switching contacts. The outputs are divided into two groups of 4, the first group has individual contacts electrically isolated, the second group is divided into pairs and each pair has a common contact (see block diagram).

RELAY MODULES	
	OR8
Number of relays	8x SPST NO
Maximum load per relay	1 A, $\cos \varphi = 1$ (resistive load)
Voltage switched by relay	Max. 250 V AC
Insulation strength ¹⁾	≥ 1000 V AC (60 s)

¹⁾ Relay to relay, relay to MGU-800 supply



TECHNICAL SPECIFICATIONS – UNITS		
Power supply voltage (depending on version) ¹⁾		230 V AC or 24 V AC/DC
Power consumption		Typically 15 VA
External Fuse (required)		T – type, Max. 2 A
Display		3.5" TFT colour graphic display with LED backlight
Display resolution		320 x 240 pixels
Sensor power supply output ¹⁾		24 V DC (Max. 0.2 A)
Data storage ²⁾		1.5 GB, up to 250M samples, min interval 0.1 seconds
Protection class	front panel - standard front panel with transparent doors housing and connection terminals	IP 40 IP 54 IP 20
Housing material		NORYL – GFN2S E1
Dimensions		96 x 96 x 100 mm
Mounting hole		90.5 x 90.5 mm
Panel thickness		Max. 5 mm
Ambient temperature range		0 ... +50 °C
Storage temperature		-10 ... +70 °C
Humidity		5 ... 90% No condensation
Altitude		Up to 2000 meters above sea level
Max. conductor size		2.5 mm ²
Weight		340 g (only base Fig. 3)

¹⁾ see the full specification in the appendix

²⁾ data from internal memory can be download to PC by USB flash disk or LAN

ELECTRICAL CONNECTION

Connections of power supply voltage and measurement signals are executed using the screw connections on the back of the unit's housing.

Avoid running signal cables and transmission cables together with power supply cables and cables controlling inductive loads (e.g. contactors). Such cables should cross at a right angle. Contactor coils and inductive loads should be equipped with interference protection systems, e.g. RC-type.

The unit is not equipped with an internal fuse or power supply circuit breaker. Because of this an external time-delay cut-out fuse with a small nominal current value must be used (recommended bipolar, Max. 2 A) and a power supply circuit breaker located near the unit. In the case of using a monopolar fuse it must be mounted on the active wire (L).

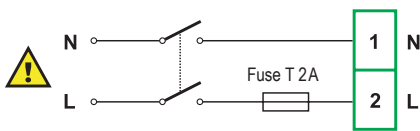


Fig. 5: Connection of power supply

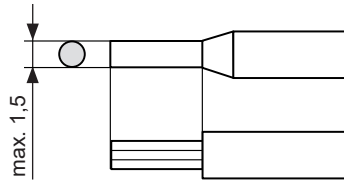


Fig. 6: Method of cable insulation replacing and cable terminals dimensions

Range of supply voltage:

Version 230 V: 85 ... 260 V AC/DC

Version 24 V: 19 ... 50 V DC

(16 ... 35 V AC)

EXAMPLES OF ELECTRICAL CONNECTIONS

Here are some examples of the connection unit MGU-800 with Dinrel level sensors (CLM, ULM, HLM).

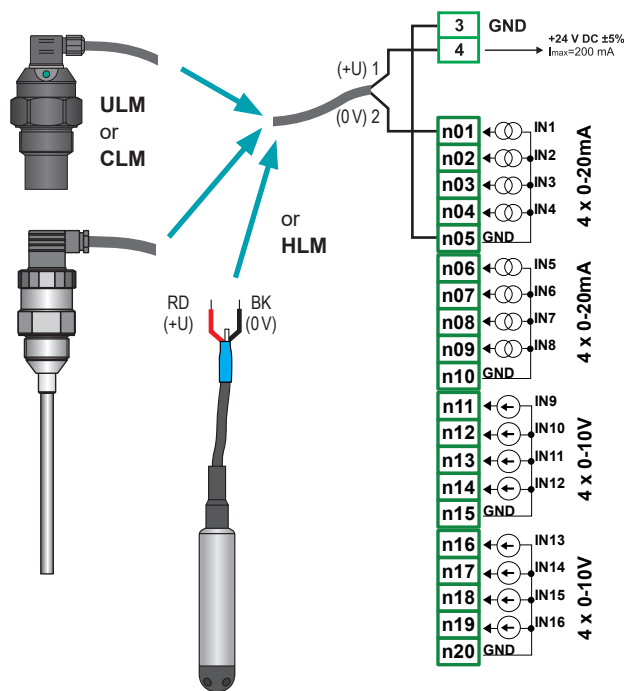


Fig. 7: Examples of the connection Dinrel level meters (output 4 ... 20 mA)

The individual connector pins (of dismantable connector) which is a standard accessory to level sensors ULM-53, CLM-36 are numbered (1 and 2). Hydrostatic level meter HLM has color-coded wires:

RD = 1, BK = 2.

The unit MGU-800 can be connected in the same way with other types of level meters. Specific connections are always given in instruction manuals of the product.

Applies to modules: IUI8, IUI4, IUI6

Legend:

RD – Red

BK – Black

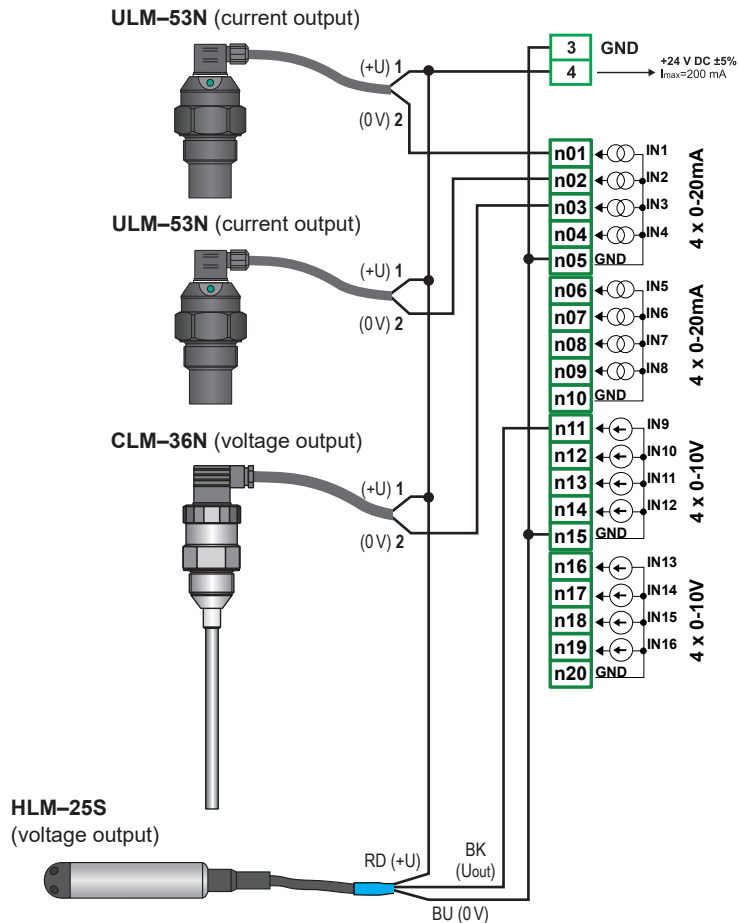


Fig. 8: Examples of the connection Dinzel level meters (output 4...20 mA and 0...10 V)

To terminals IN1 ... IN16 can be connected in the same way next level meters. In the configuration with the module IUI8 it can be 8 pieces of level sensors with the current output and 8 pieces with voltage output.

Applies to modules: IUI8, IUI4

Legend:

- BU – Blue
- RD – Red
- BK – Black

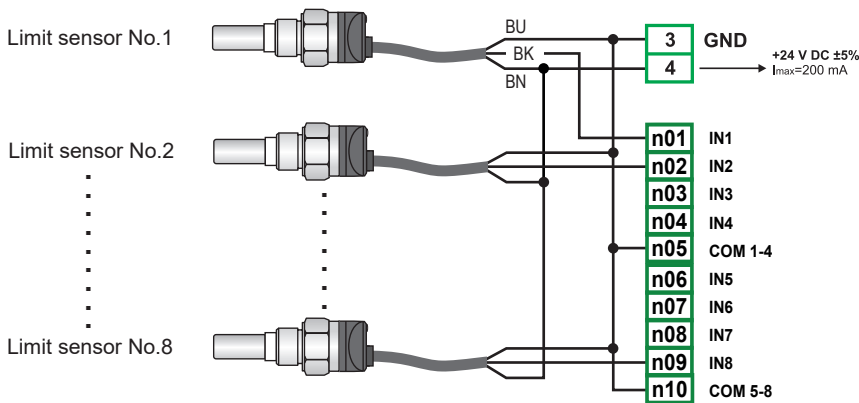


Fig. 9: Examples of the connection Dinzel limit level sensors

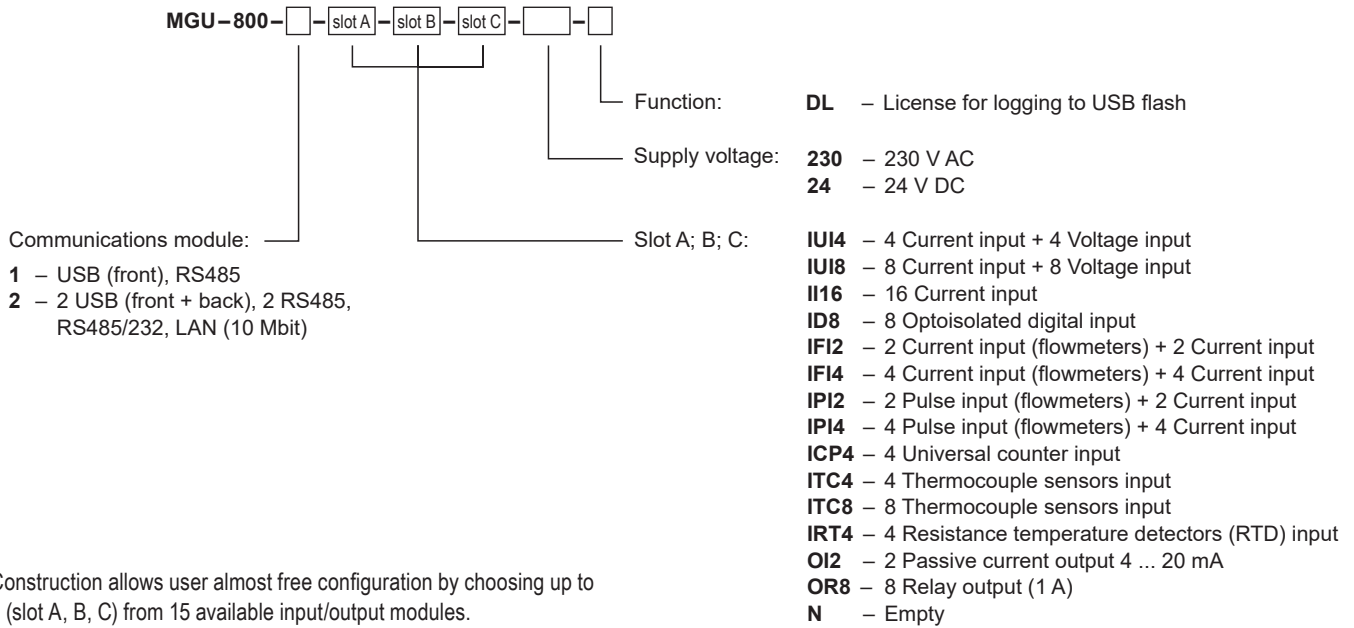
To terminals IN1 ... IN16 of module ID8 can be connected up to 8 limit level sensors with PNP output type (CLS-23, CLS-53, CPS-24, DLS-27, etc.).

Applies to module: ID8

Legend:

- BU – Blue
- BK – Black
- BN – Brown

ORDER CODE



Construction allows user almost free configuration by choosing up to 3 (slot A, B, C) from 15 available input/output modules.

CORRECT SPECIFICATION EXAMPLE

MGU-800-1-IUI8-IUI8-N-230V-DL

(1) USB + RS485; (**IUI8**) 8 Current input + 8 Voltage input; (**IUI8**) 8 Current input + 8 Voltage input; (**230V**) Supply voltage 230 V AC; (**DL**) License for logging

MGU-800-2-II16-N-N-24V

(2) 2 USB + 2 RS485 + RS485/232 + LAN; (**II16**) 16 Current output; (**24V**) Supply voltage 24 V DC

MGU-800-1-OR8-OI2-IFI4-230V

(1) USB + RS485; (**OR8**) 8 Relay output; (**OI2**) 2 Passive current output; (**IFI4**) 4 Current input for flowmeters + 4 Current input; (**230V**) Supply voltage 230 V AC

MGU-800-1-OR8-ITC4-IRT4-230V-DL

(1) USB + RS485; (**OR8**) 8 Relay output; (**ITC4**) 4 Thermocouple sensors input; (**IRT4**) 4 RTD input; (**230V**) Supply voltage 230 V AC; (**DL**) License for logging

PŘÍSLUŠENSTVÍ

Standard – included in the unit price

- 1pc of Touch pen
- 2pcs of Assembly brackets
- 1pc of USB protective cover

Optional – for extra charge

- Licence for logging

SAFETY, PROTECTION AND COMPATIBILITY

Connection to supply voltages must be done through fuse or circuit breaker (2 A). Electrical equipment of protection group II. Electrical safety according to EN 61010-1.

Electromagnetic compatibility is provided by conformity with standards EN 61326-1.

Insulation resistance >20MΩ, insulation strength between power supply and input/output terminal: 2300 V (1 min).