



Catalogue

Gineers Ltd. produces series of devices and software for complete setup of remote reading systems. We also produce various measuring and indicating devices for industrial use, standard and unique solutions in weight measurement. Gineers Ltd. is registered manufacturer of m-bus devices by "The Flag Association Limited".

The devices we offer are standard with various options, which allows flexible setup and upgrade of any m-bus remote reading system.

GINEERS Ltd. is also a manufacturer of various industrial panel meters. Devices from series 4100 and 4080 are functionally identical, with many options, but with different sizes and shapes. Industrial devices from 4080 and 4100 are designed to be mount on a front panel in command rooms of electrical substations, plants and other industrial buildings. It is possible to design and produce specific devices, to combine devices of the series in one single device with different possibilities - all depends on the client's request.

We also offer standard and unique solutions in the field of automation and process control, weight measurement, integrated systems for remote reading of data and physical quantities. Among that, we design and create suitable software, which can also be unique according to the requirements of particular client. Our weight measurement electronic indicators are generally two types - simplified weigh measure indicator, and a more complex one including many functions. Both are designed to be universal - they can be connected to random tensometric load cell and almost any kind of scale (according to OIML R76 standard) can be made. The additional functions are price calculating, counting functions, measuring in percent F.S., printing labels, connecting in network, sending data to a computer or PLC, controlling external devices such as relay switch. Every scale oriented parameter can be set up (access is both hardware and software way) by the user. Because we design it, of course we can change anything, if a client has request.

If you have any questions or need more information, please feel free to contact us!

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Remote reading of tax instruments

M-bus networks - definitions and setup

M-bus (Meter-bus) is new European standard for remote reading of tax instruments as well as various sensor types. The reading of the instruments can be implemented in various ways - from direct reading of device by human to fully automated remote reading of all devices in related networks by central server system using wireless GPRS-connection to each of the networks.

Remote reading by m-bus networks allows fully electronic reading of all data with all the advantages in consequence:

- avoids entering of supplier employees in private property
- avoids any human errors
- significantly reduces cost for both suppliers and customers
- allows fully automated remote reading of data in one or more networks (without any human intervention) and automated reports creation
- ensures high data security and prevents malicious attempts of manipulating the data
- allows minimizing readout intervals
- allows placement of meters in distant or hard- to-reach places
- allows fast data readout
- creation of databases for every consumer and possibility to make instant reports
- creation of statistic reports for consumption optimizing (fully automated)

Automated/remote reading requires the devices to be connected in a network. In one m-bus network can be connected up to 250 devices (tax meters, sensors, etc.). If it is needed for more devices to be connected, they can be either connected in more than one network or m-bus repeaters may be used, each doubling the number of devices in the network.

A m-bus network needs the three following device types:

- m-bus master devices/ converters

M-bus masters maintain the voltage and communications in a network. They connect the slave devices and the data collecting devices.

- m-bus slave devices

Slave devices are all tax and other meters that have m-bus interface for readout as well as all devices connecting various types of meters without m-bus connectivity to a m-bus network (as m-bus pulse counters for connecting water meters/ electricity/etc. meters to a m-bus network).

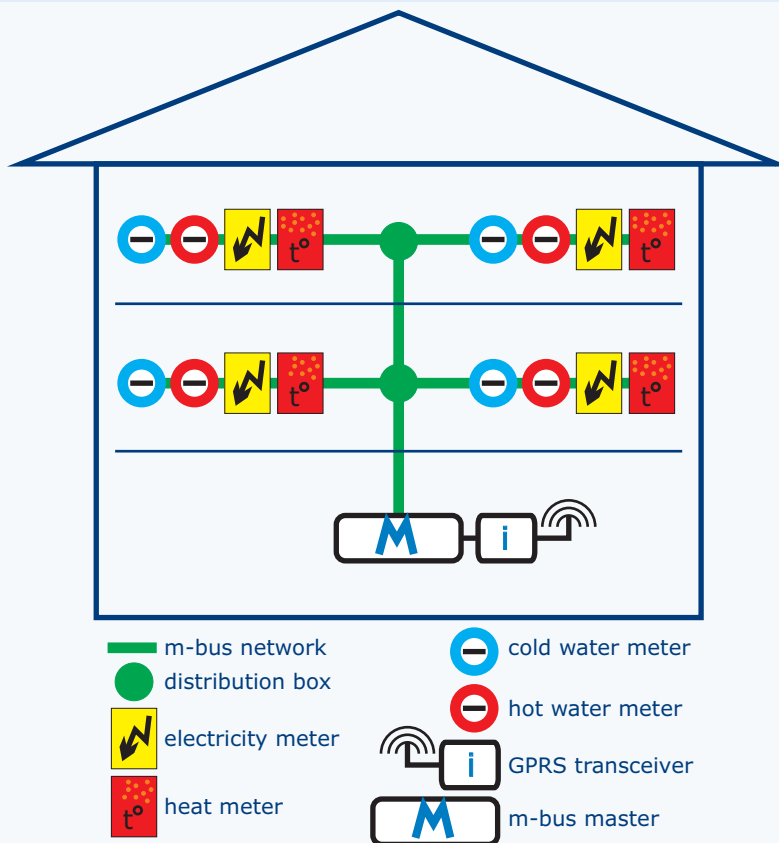
- data collecting devices

These devices save permanently the data read from tax- and other meters. Usually these are centralized computer systems or local displays.

Other types of devices exist as well to further enhance the functionality of data reading networks - m-bus repeaters used for network segmentation, various types of data converters, intermediate data saving devices for temporary data storage, wireless transceivers (like GPRS-transceivers), etc.

General Information

There is an example of various tax meters remote reading system of residential or office building shown on the figure. The connection shown is for meters with m-bus interface. If the meters have pulse output instead of m-bus interface, m-bus pulse counter is needed for their connection to the m-bus. M-bus pulse counters are devices which connect the devices with pulse outputs to the m-bus network. They usually have more than one pulse input for connection of some number of meters and are powered by the m-bus. The usage of GPRS-transceiver (as shown) is not obligatory. The data from all the meters may be read locally through m-bus master by some intermediate data device. The data may be read by connected to the master PC with LAN/WAN connectivity. The latter case is usually well-suited for use in office buildings for fast, low-cost and correct distribution of the consumption of the tenants.



Setting up devices in a m-bus network

The mounting of the tax meters has to be done according to their manufacturer specifications. If they have m-bus interface provided it is only needed to connect the devices and the master physically to the m-bus 2-wire cable network. If the network has branches it is convenient to use distribution boxes. If the meters have pulse outputs instead of m-bus interface, it is needed that m-bus pulse counters (like MBCS/MBSS) are used (our pulse counters have 2 to 8 pulse inputs thus providing the possibility for 2 to 8 tax meters to be connected to the single node of the m-bus network). After finishing the physical connections of all cables, devices, master, etc. it is needed the slave devices to be programmed. This includes setting the unique address of every slave device in order to be uniquely recognized in the m-bus network as well as date, time, tariffs, cost of tariffs, setting other parameters for user's convenience, etc. All parameters except the unique address of the slave in the network which is set once are not obligatory and are programmed by the data collecting device through the m-bus master and the m-bus network. They can be pre-programmed any time by the data collecting device and it is not allowed to be programmed directly by the device.

Normal operation of the devices in a m-bus network

Collecting data from the slave devices in m-bus network can be done only by request from data collecting device. It can be connected to the m-bus master permanently or only when reading data. If it is not connected to m-bus network master, it doesn't interfere the normal work of the network or the slaves in any way. If the m-bus network fails for any reason (electricity interruption, malfunction, cable break, etc.) slave devices continue their work normally. When reading data, the collecting device requests data from certain slave using its unique network address. If it is needed to change certain parameters of the slave, it is done automatically by the software of the data collecting device. All important parameters of slaves are also saved in data collecting device database.



M-bus devices

M-bus devices are produced for building remote reading systems for residential, office and industrial appliances. These systems are low-cost and easy to build and maintain. They also have high reliability. The data can be read locally as well as centrally, manually or fully automatically.

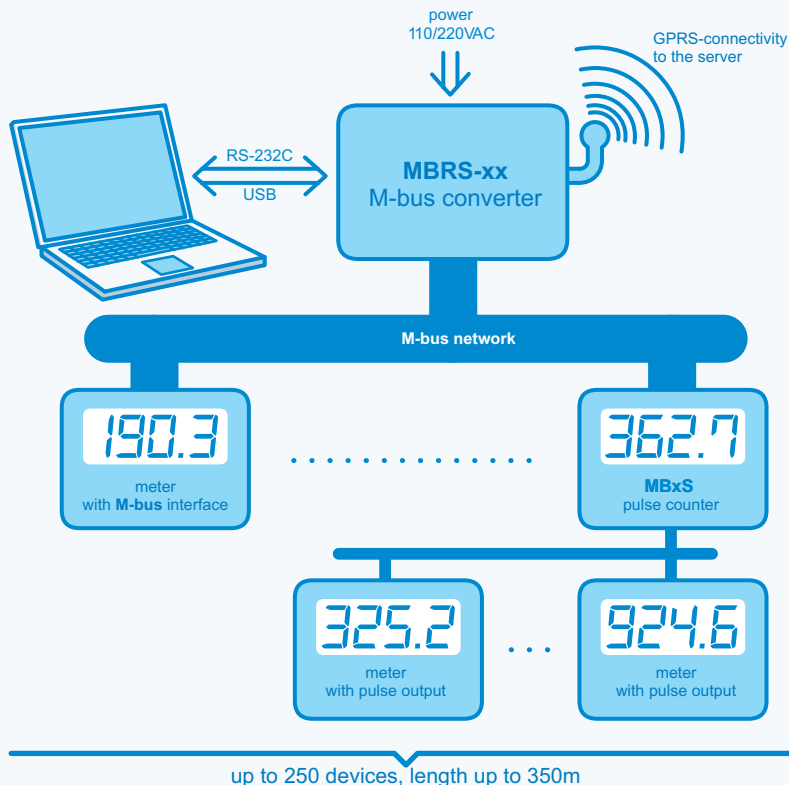
Gineers Ltd. produces the whole variety of devices and software for building any kind of m-bus remote reading system as well as transmitting the data to the centralized system.

M-bus devices produced by Gineers Ltd.

MBRS-10 to 250	m-bus masters/ m-bus to RS-232C converters for up to 10/32/64/128/250 slaves
MBRP-64/128/250	m-bus repeaters for up to 64/128/250 slaves
MMCR-64/128	intelligent m-bus master for 64/128 devices and modbus RTU and TCP interface
MBHS-2/4/6/8	simplified m-bus pulse counters with 2/4/6/8 inputs for connection of meters with pulse outputs to a m-bus network
MBSS-2/4/6/8	m-bus pulse counters with 2/4/6/8 inputs, tariffs, RTC and embedded backup battery
MBPT-2	Two-channel m-bus thermometer slave device. Designed to work with Pt-1000 sensors, with or without compensation
MPPS-2	Two-channel m-bus manometer slave device. Designed to work with 4-10mA pressure transducers (or 0-10V)
MBM-10/40/64/250	M-bus data central with local LCD display, combining m-bus master and local display in industrial enclosure
MBM-TFT 64/128/250	M-bus data central with 8" TFT display, combining m-bus master and local display in industrial enclosure. For 64, 128 or 250 slaves
WRM-TS	Wireless m-bus data concentrator for T and S modes. Can read and store data for up to 240 wireless slave devices

General Information

There is fully built tax meters remote data reading system shown on the figure. When designing the devices it is considered that setting up and maintaining the networks had to be made easier, thus keeping the cost low for both the service providers and the consumers. The maximum number of the slave devices in a network is limited to 250 and the maximum length of the network cable is limited to 350m (with no repeaters used), which is well enough to remote read the data from more than 60 households (both slave device number and distance may be increased by using m-bus repeaters).



Building m-bus network

For building m-bus network several components are needed:

- *M-bus master (MBRS-10/32/64/128/250, MBM-xxx or MMCR-64/128)*

A m-bus master maintain the voltage and communications within the network. They power all the slave devices and carry out the communication between slave devices and data collecting device (PC, laptop, PDA, central server station, etc.).

- *Slave devices*

These are all tax or other meters with m-bus interface or devices with a m-bus interface that connects meters/sensors without m-bus interface to a m-bus network (like m-bus pulse counters).

- *Data collecting devices*

These could be local displays, PC, PDA, laptop, central server stations. It is not needed these devices to be connected to the master all the time, connection is needed only when interchanging data. Sometimes communication devices are used as gate to the central station - ethernet or GSM/GPRS devices.

Security

When designing the devices, serious measures have been taken, against intentional manipulation of data collected. Thus m-bus masters do not save any data, pulse counters unique network address is programmed only once - when they are set up, then address programming is disabled (the device is locked). All other parameters are programmed through the network by the software of the data collecting device. When reading slave devices it is only the pulses counted that are actually read, all other parameters are for user's convenience (except tariff management). For higher safety it is recommended that pulse counters and tax meters with pulse outputs are used instead of tax meters with m-bus interface.



M-bus masters/ converters

M-bus masters are the main devices that every m-bus network is built around. They have the following functions:

- maintain the voltage of the network and power the slave devices
- carry out all communications between all slave devices and data collecting devices

Since m-bus converters provide power for all slave devices in the network, we produce converters with different power capability thus optimizing the cost of the networks.

We produce three types of m-bus masters:

- m-bus to RS-232 masters
- m-bus to modbus RTU/TCP masters
- m-bus masters with with display and storing capabilities (data centrals)

M-bus to RS-232 master converters produced by Gineers Ltd.

MBRS-10	Microcontroller-based m-bus master for max 10 slave devices (10 std. m-bus loads)/ M-bus to RS-232C converter
MBRS-32	Microcontroller-based m-bus master for max 32 slave devices (32 std. m-bus loads)/ M-bus to RS-232C converter
MBRS-64	Microcontroller-based m-bus master for max 64 slave devices (64 std. m-bus loads)/ M-bus to RS-232C converter
MBRS-128	Microcontroller-based m-bus master for max 128 slave devices (128 std. m-bus loads)/ M-bus to RS-232C converter
MBRS-250	Microcontroller-based m-bus master for max 250 slave devices (250 std. m-bus loads)/ M-bus to RS-232C converter

MBRS-type bus masters can be connected to the data collecting device or GPRS-transceiver by RS-232C interface. Anyway, it is possible that MBRS masters are connected to the data collecting devices by various types of standard interface converters:

- **RS-232C - USB** for using data collecting device with USB-interface
- **RS-232C <-> RS-485** converter for bigger cable distances to central location
- **RS-232C - IRDA** for using data collecting device (PDA/laptop) with IRDA-interface
- **GPRS-transceiver** with RS-232C interface for building fully automated remote reading system
- **Ethernet converter** with RS-232C interface for building fully automated remote reading system

General technical specifications of MBRS-10/32/64/128/250			
	MBRS-10/32	MBRS-64/128	MBRS-250
m-bus std. loads, max	10/32	64/128	250
output current, max	35/70 mA	120/210 mA	450 mA
output current protection, max	45/90 mA	140/230 mA	470 mA
output voltage (mark)	35-37 Vdc		
output voltage (space)	22-25 Vdc		
power supply	170-250 Vac		
power consumption, max *	< 2.5W/ < 5.5 W	< 8.5W/ < 11.5W	< 21 W
data rate, max	4800 bps		
working ambient temperature	-20 °C - +55 °C		
storage ambient temperature	-50 °C - +90 °C		
dimensions (H/W/D)	86/70/57 mm	105/107/74 mm	105/142/74 mm
display	5 led	7 led	7 led
IP protection class	IP30		
weight	145 g	340 g	475 g

* - at max. load

MBRS-10/32/64/128/250 short description

MBRS are m-bus masters with following functionality:

- power all devices in a m-bus network (tax meters, pulse counters, etc.)
- carry out the communications between all slave devices in a network and the data collecting device

They maintain the voltage of a m-bus network which supplies all slave devices and serves for communication. The RS-232C interface is isolated from the network (insulation voltage > 1000VDC). RS-232C is an industry-standard interface which allows linking the master to any type of data collecting or data transmitting device directly or by cheap standard converter.

All MBRS-type devices have output short-circuit protection.

MBRS-64/128/250 have LED signalization in case of following events:

- *turned on (ON)* - MBRS-xx is powered
- *output voltage (BUS)* - m-bus voltage is present
- *protection (PROT)* - output short circuit occurred
- *overload (OVER)* - overload (increased bus consumption)
- *collision (COLL)* - simultaneous multiple slave data transmit
- *receive (RX)* - slave->master data flow
- *transmit (TX)* - master->slave data flow

MBRS-10/32 has LED signalization in case of following events:

- output voltage/ transmit (*BUS/TX*) - light when output in "mark" state
- **ALARM** - in case of output short circuit or overload
- collision (*COLL*) - simultaneous multiple slave data transmit



M-bus repeaters

M-bus repeaters are m-bus master devices for expanding existing m-bus networks by segmentation. The existing network is expanded by providing the possibility to connect additional slave devices to the network as well as increasing the maximum length of the network cable. As the data is concerned, the repeaters are “transparent” devices.

M-bus repeaters have m-bus input for connection to the existing part of the network and m-bus output for powering the added segment. Their use in m-bus networks is unlimited. Since they provide power for all slave devices in the added segment, we produce repeaters with different power capability thus optimizing the cost of the networks.

M-bus repeaters produced by Gineers Ltd.

MBRP-64	Microcontroller-based m-bus repeater for max 64 slave devices (64 std. m-bus loads)
MBRP-128	Microcontroller-based m-bus repeater for max 128 slave devices (128 std. m-bus loads)
MBRP-250	Microcontroller-based m-bus repeater for max 250 slave devices (250 std. m-bus loads)

General technical specifications of MBRP-64 / 128 / 250

	MBRP-64	MBRP-128	MBRP-250
m-bus std. loads, max	64	128	250
output current, max	120 mA	210 mA	450 mA
output current protection, max	140 mA	230 mA	470 mA
output voltage (mark)	35-37 Vdc		
output voltage (space)	22-25 Vdc		
power supply	170-250 Vac / 200-350 Vdc		
power consumption, max *	< 8.5 W	< 12.0 W	< 21 W
m-bus input consumption, max	1.5 mA (1 std. m-bus loads)		
working ambient temperature	-20 °C - +55 °C		
storage ambient temperature	-50 °C - +90 °C		
dimensions (H/W/D)	105/107/74 mm	105/107/74 mm	105/142/74 mm
display	7 led		
IP protection class	IP30		
weight	340 g	340 g	475 g

* - at max. load

MBRP-64 / 128 / 250 short description

MBRP are m-bus repeaters with following functionality:

- power all devices in a m-bus segment they form (tax meters, pulse counters, etc.)
- carry out the communications between all slave devices in their segment and the master converter

They maintain the voltage of the m-bus segment they form which supplies all slave devices and serves for communication. The m-bus input and the m-bus output are isolated (insulation voltage > 1000VDC).

MBRP-64/128/250 have output short-circuit protection.

MBRP-64/128/250 have LED signalization in case of following events:

- *turned on (ON)* - MBRP-xx is powered
- *output voltage (BUS)* - m-bus voltage is present
- *protection (PROT)* - output short circuit occurred
- *overload (OVER)* - overload (increased bus consumption)
- *collision (COLL)* - simultaneous multiple slave data transmit
- *receive (RX)* - slave->master data flow
- *transmit (TX)* - master->slave data flow



M-bus masters to Modbus RTU/TCP

MMCR-64 is a microprocessor two-way full-duplex M-bus to Modbus converter, with ability to supply 64 or 128 M-bus slave devices. It has both modbus RTU and modbus TCP interfaces, which can work independantly of each other. It is intended for use in housing constructions and industrial buildings mainly for distance reading of tax instruments or different types of sensors. Since Modbus has very wide usage and M-bus is a "special" protocol often BMS engineers have difficulties embedding this two protocols in one system. This is where our converter take place - being smart bridge between two industrial protocols. Our converter is not just re-translating telegrams. Each activated device has dedicated modbus register area, which is read on demand through modbus. This gives simplicity and speed reading to BMS/SCADA system, since you can go at high-speed on modbus port (up to 115200), while m-bus stays at 2400 bps. MMCR regularly reads all m-bus devices and updates dedicated modbus registers for each device.

MMCR is protected for short circuit in the output and has autonomous switch power supply. Mounted on a standard M36 DIN-rail.

M-bus-to-Modbus converters produced by Gineers Ltd.

MMCR-64	Microcontroller-based m-bus master device for supply and data store for up to 64 slave devices. Equipped with Modbus RTU and TCP interfaces
MMCR-128	Microcontroller-based m-bus master device for supply and data store for up to 128 slave devices. Equipped with Modbus RTU and TCP interfaces

General technical specifications of MMCR-64 and 128

	MMCR-64	MMCR-128
m-bus std. loads, max	64	128
output current, max	120 mA	210 mA
output current protection, max	140 mA	230 mA
M-bus max speed	4800 bps	4800 bps
Modbus RTU max speed	115200 bps	115200 bps
power supply	150-250 Vac	150-250 Vac
power consumption, max *	< 7.0 W	< 12.0 W
Allowed Modbus RTU devices	250	250
working ambient temperature	-20 °C - +55 °C	-20 °C - +55 °C
storage ambient temperature	-50 °C - +90 °C	-50 °C - +90 °C
dimensions (H/W/D)	105/107/74 mm	105/107/74 mm
display	6 led	6 led
IP protection class	IP30	IP30
weight	340 g	340 g

* - at max. load

Generally, the device has three separate interfaces:

- M-bus master interface for up to 64 or 128 devices
- ModBus RTU (RS-485) interface for connecting to PLC, PC, etc.
- ModBus TCP (Ethernet 10/100) interface for connecting to PLC, PC, etc.

Since ModBus has wide usage and m-bus is a special protocol mainly for heat- and water meters, this device aims to connect heat-, water- and electricity meters in a building to the main SCADA. Selected m-bus devices can be activated in MMCR memory. Then, with programmed period, every m-bus device is read and information for it is updated in dedicated ModBus registers. This interval can be from 1 minute to 12 hours. For every device there is 24 register blocks, in which are saved different m-bus parameters.

All m-bus details are important and we keep them updated. Devices in ModBus memory can be activated or deactivated. For Heat meters there are some more parameters that are saved - Volume, Power, Temperature Inlet and outlet, etc. Automatic search and activate for m-bus is available. In ModBus memory devices are activated consequentially up to 64/128 devices, but primary m-bus addresses may not be from 1 to 64 (128) – this does not matter. In which data record which m-bus device stands can be read through special registers (see ModBus map).

Gineers offer free software for setting MMCR-64. With it user can set main parameters, read m-bus devices through Modbus, activate ModBus devices, etc.



M-bus simple pulse counters w/o display type MBHS

The m-bus pulse counters are slave devices that can connect different meters with pulse output to m-bus network. Tax meters with pulse outputs are relatively cheap and has the majority of market share compared to the devices with m-bus output. They are heat meters, water meters (hot/cold), electricity meters, heat cost allocators, etc. Pulse counters count and accumulate the number of pulses each of these device generates and send the count to the data collecting device upon request. Usually they have more than one pulse input thus more devices with pulse outputs can be connected to a single pulse counter - this keeps total cost of the network low. Our pulse counters are optionally supplied with embedded rechargeable battery providing more than one week of work if the m-bus fails (electricity interruption, cable break, m-bus master malfunction, etc.), otherwise they collect pulses only when powered by m-bus. MBHS-type counters support only main counter, no tariff data is collected, so they are suitable mainly for connection of water meters.

MBHS-type m-bus pulse counters produced by Gineers Ltd.

MBHS-2	Microcontroller-based two-input m-bus pulse counter
MBHS-4	Microcontroller-based four-input m-bus pulse counter
MBHS-6	Microcontroller-based six-input m-bus pulse counter
MBHS-8	Microcontroller-based eight-input m-bus pulse counter

General technical specifications of MBHS-2/4/6/8

	MBHS-2	MBHS-4	MBHS-6	MBHS-8
number of pulse inputs	2	4	6	8
bus voltage	12-42 Vdc			
m-bus current consumption, max	2 mA (1.3 std. m-bus loads)			
pulse and pause width	20, 50 or 100ms programmable, default 50 ms			
pulse input cable length, max	20 m			
input closed contact resistance, max	1 kOhm			
input open contact resistance, min	1 MOhm			
data rate	300/ 2400 (factory default)/ 4800 bps			
working ambient temperature	0 °C - +55 °C			
storage ambient temperature	-50 °C - +90 °C			
dimensions (H/W/D)	90/53/61 mm		90/71/61 mm	
weight	125 g		175 g	

MBHS are pulse counters for connection of pulse-output tax meters (or other pulse-output meters) to a m-bus network. They are intended to be used in mainly in civil homes, but sometimes can be used in office buildings.

MBHS are normally powered from the m-bus network. When the power fails for some reason, they store the current state of the counters for all inputs so they can start over when the power comes back. They can be supplied also with optional rechargeable battery, which allows working even if the power fails for more than several days (depends mainly on number of pulses).

MBHS supports no tariffs and can register pulses with minimum pulse length of 20ms. All main parameters can be set with standard m-bus telegrams, which allows usage of any m-bus related software.

We do provide free software for setting counters, with which user can:

- change primary address of each input
- change secondary address of each input
- change medium and unit measured (which can be seen in VIF and DIF bytes)
- change baud rate of the counter
- change pulse length for all inputs
- change value for an input (at special conditions)



M-bus pulse counters without display type MBSS

The m-bus pulse counters are slave devices that connect tax meters with pulse output to a m-bus network. Tax meters with pulse outputs are relatively cheap and has the majority of market share compared to the devices with m-bus output. They are heat meters, water meters (hot/cold), electricity meters, heat cost allocators, etc. Pulse counters count and accumulate the number of pulses each of these device generates and send the count to the data collecting device upon request. Usually they have more than one pulse input thus more devices with pulse outputs can be connected to a single pulse counter - this keeps total cost of the network low. Pulse counters are supplied with embedded rechargeable battery providing more than two weeks of work if the m-bus fails (electricity interruption, cable break, m-bus master malfunction, etc.) so there is no need for the pulse counters to be reprogrammed. These batteries are charged by the m-bus. There is option for a secondary non-rechargeable battery, which allows more than one year of work without power.

MBSS counters have extra functions compared to MBHS counters we produce. These are:

- pulses up to 5ms length can be count
- embedded real-time clock
- up to 4 tarriff intervals can be defined
- monitors state of each input and send that data in m-bus telegram
- have solid industrial enclosure

MBSS-type m-bus pulse counters produced by Gineers Ltd.

MBSS-2	Microcontroller-based two-input pulse counter without display, rechargeable battery and m-bus interface
MBSS-4	Microcontroller-based four-input pulse counter without display, rechargeable battery and m-bus interface
MBSS-6	Microcontroller-based six-input pulse counter without display, rechargeable battery and m-bus interface
MBSS-8	Microcontroller-based eight-input pulse counter without display, rechargeable battery and m-bus interface

General technical specifications of MBSS-2/4/6/8				
	MBSS-2	MBSS-4	MBSS-6	MBSS-8
number of pulse inputs	2	4	6	8
bus voltage	12-42 Vdc			
m-bus current consumption, max	2 mA (1.3 std. m-bus loads)		2 mA (1.3 std. m-bus loads)	
pulse and pause width, max	5/10/20/50/100 ms programmable, default 20ms			
pulse input cable length, max	20 m			
input closed contact resistance, max	1 kOhm			
input open contact resistance, min	1 MOhm			
data rate	300/ 2400 (factory default)/ 4800 bps			
working ambient temperature	0 °C - +55 °C			
storage ambient temperature	-50 °C - +90 °C			
dimensions (H/W/D)	75/45/105 mm		75/70/105 mm	
weight	125 g		175 g	

MBSS are pulse counters for connection of pulse-output tax meters (or other pulse-output meters) to a m-bus network. They are intended to be used in office buildings.

MBSS pulse counters are dual-powered - normally powered from the m-bus network, which also charges the battery and powered by the back-up battery when m-bus fails for any reason. The devices are designed in a way that back-up battery can power them for more than 168h - enough time to recover the malfunction of the network. MBSS has the option of adding an extra non-rechargeable battery, which can power the device more than a year with no network power. Upon readout request MBPS sends information about current state and the number of charge/discharge cycles of the back-up battery to the data collection device in order the battery to be changed if needed.

MBSS have realtime clock/calendar incorporated which allows them to have up to four tariffs for each input. Accumulated pulses for every tariff as well as total number of pulses for every input are kept in separate registers and are accessible for reading through the network. Tariff programming (start time, duration, cost) can be carried out only through the network.

Mounted on standard M36 DIN-rail.



M-bus analogue slaves

Although pulse counters with m-bus are most common, sometimes is needed different quantities to be measured and transferred to m-bus. For this reason we have developed two different analogue devices, which are acting as a standard m-bus slave device. One is for measuring temperature, the other has analogue inputs for 4-20mA (but easily can be changed to measure 0-10Vdc).

MBPT-2 is simplified microcontroller thermometer with m-bus interface. It is intended to measure temperature with Pt1000 sensors, with or without compensation. MBPT-2 has m-bus interface and 2 channels for connecting Pt1000 sensors. Since sometimes there are slight differences between Pt1000 sensors offset and angle correction through m-bus can be added (with manufacturer specific telegram) in order to calibrate thermometer correctly. Initial check and calibration are carried out in Gineers laboratory during manufacture of the device, assuring correct measurement on standard Pt1000 sensors (IEC870). Mounted on a standard M36 DIN-rail.

MPPS-2 is simplified microcontroller manometer with m-bus interface. It is intended to measure pressure from 4-20mA transducers, with maximum of 16 bars. MPPS-2 has m-bus interface and 2 channels for connecting 4-20mA pressure sensors. It is with autonomous power supply from the grid, making it ideal for both passive and active sensors. Measured value is transformed in range 0 - 16 bars, with precision of 0.01 bar. Linear correction can be carried through m-bus in order to calibrate manometer to a reference 4-20mA generator with special manufacturer specific telegrams. Device has short-circuit protection on both inputs, power supply and m-bus interface making it "hard-to-break". Mounted on a standard M36 DIN-rail.

Analogue m-bus slave devices produced by Gineers Ltd.

MBPT-2

Microcontroller-based two-channel thermometer. Intended to measure with Pt1000 sensors, with or without compensation

MPPS-2

Microcontroller-based two-channel manometer. Intended to measure with 4-20mA pressure transducers

General technical specifications of analogue m-bus devices		
	MBPT-2	MPPS-2
number of channels	2	2
bus voltage	12-42 Vdc	12-42 Vdc
m-bus current consumption, max	2 mA	3 mA
power supply	from m-bus	55-250Vac/85-350 Vdc
input sensors	Pt-1000 w/wo compensation	4-20mA transducers
display	m-bus led	bi-color leds for Input activity, m-bus led
measure range	-50 to +120 degrees Celsius	0 to 16 bar
precision	0.1 degree	0.01 bar
data rate	300/2400 bps	300/2400 bps
working ambient temperature	0 °C - +50 °C	0 °C - +55 °C
storage ambient temperature	-50 °C - +90 °C	-50 °C - +90 °C
dimensions (H/W/D)	86/53/61 mm	86/71/61 mm
weight	140 g	260 g

MBPT-2 are simplified 2-channel thermometers, intended to be connected in m-bus network. These devices do not have display and keyboard, but can simultaneously measure temperature on two separate channels. Device is designed for measuring with Pt1000 sensors, which are factory calibrated to comply with IEC870 standard. Device feeds only from m-bus network, that is why it is two standard m-bus loads. There is no backup battery because there is no point, since MBPT-2 returns only actual and instant measured temperature. Further processing of the data (like timestamps, etc.) should be taken from master device. It comes without Pt1000 sensor in the complete, but of course we can suggest suitable sensor, if asked.

MPPS-2 are simplified 2-channel manometers, intended to be connected in m-bus network. These devices do not have display and keyboard, but can simultaneously measure current 4-20mA on two separate channels and transform it to pressure. Device is designed for measuring from passive 4-20mA pressure transducers, that is why it has autonomous switching power supply inside. All devices are factory calibrated with reference current generator. However, there is a possibility user to carry out his own linear correction for a particular sensor. This is made with special m-bus telegram and can be done with Gineers software. According to m-bus device complies with basic m-bus telegrams (like SND_NKE, RSP_UD2, primary and secondary address change, etc.) and is two m-bus loads for the master converter (3mA). There is no backup battery because there is no point, since MPPS-2 returns only actual and instant measured pressure. Further processing of the data (like timestamps, etc.) should be taken from master device. Status of the inputs is signaled with two bi-color leds. They has three conditions - green (all OK), yellow (sensor not connected) and red (short-circuit). Presence of m-bus is signaled with additional standard LED. All inputs are protected against short-circuit - signal inputs, m-bus and power supply. Device is mounted on a M36 DIN-rail.



M-bus data centrals MBM-10/40/64/250

MBM data central is a combination between m-bus master device and local display with memory. It is designed to simplify and ease the installation for buildings where no external readout is needed. Of course, this reflects also on the price to build m-bus system, because two different devices are now united in one.

MBM is a standalone device, which is used to read all m-bus devices in a network and display the information, but without using external m-bus master. MBM for more than 40 slaves has very large 4x20 LCD display (about 3 times bigger than MBD-X250 display) and comes in industrial enclosure, ready to be mounted on a wall or desk.

MBM comes in two different enclosures and types:

- for 10 and 40 slave devices
- for 64, 128 and 250 slave devices

All functions of MBD-X250 are present except direct ethernet connectivity. Anyway, user still can connect Ethernet or GSM/GPRS transeiver to read remotely all MBM memory or supplied m-bus network.

M-bus Data Centrals, produced by Gineers Ltd.

MBM-10/40

Microcontroller-based m-bus master for storing and displaying information about up to 40 devices in m-bus network

MBM-64/250

Microcontroller-based m-bus master for storing and displaying information about up to 64, 128 or 250 devices in m-bus network

MBM is specially developed for use in remote reading systems to lower client expenses and ease the installation. By using it a fully automated centralized remote reading of one or several close networks can be achieved. The user can see all needed information on MBM's LCD display, or can connect other device to transmit data to a remote location.

MBM stores and remembers reports for a year back and this info can be reviewed any time.

This unit is completely programmable according to connection details, devices connected and info about every device. Up to 3 tarriffs can be read through m-bus. It comes in five versions - for 10/40/64/128/250 slaves.

General technical specifications of MBM data centrals

	MBM-10/40	MBM-64/250
maximum number of devices to read	10 or 40	64 or 250
power supply	180-240 Vac/ 80-350 Vdc	
output current protection, max	45/90 mA	140/470 mA
output voltage, m-bus interface	35-37 Vdc mark, 22-25 Vdc space	
maximum consumption	< 2.5 W/< 6.1 W	< 8.5 W/<21 W
display	LCD, 2x16 symbols	LCD, 4x20 symbols
keyboard	4 tactile buttons	6 tactile buttons
interface	1 x m-bus, 1 x RS-232C	
working ambient temperature	-10 °C - +50 °C	
storage ambient temperature	-50 °C - +80 °C	
dimensions (H/W/D)	90/105/76 mm	170/195/70 mm
data transmission speed, m-bus	300/2400/4800 bps	
data transmission speed, RS-232C	300/1200/2400/4800 bps	
weight	310 g	1.3 kg

MBM is developed for storing and displaying information for all devices in a m-bus remote reading system, so all the data in the network can be accessed at just one location. It incorporates m-bus master and additional functions. MBM does not have an ethernet option like MBD-X250 but can also retransmit data from the remote reading network to external device (GPRS/Ethernet/Phone modem) for automated centralized reading of multiple networks.

MBM reads all devices in the network every six hours and saves the data in non-volatile memory (including tariff data), so even if power is interrupted for long time, no data can be lost (except date/time). The internal clock can be maintained for about 20 days without power.

MBM saves historic data every month, so measured values for each device in the network can be monitored for up to 12 month back.

MBM can be programmed (date, time, network's devices parameters) only by special software, there is no user-accessible menu, so the device security is increased as the user cannot change any settings. Usually the device is programmed once, when setting the network and devices up.

We provide free software, which can read all MBM memory - info for every slave device, Total, Tariffs, Historic values. This report then can be exported in *.csv format for direct reading with MSEXcel.



M-bus data centrals MBM-TFT

MBM-TFT data central is a combination between m-bus master device and local display with memory. It is designed to simplify and ease the installation for buildings where no external readout is needed. This device also will give in near future very wide possibilities to the user, since it is next generation data central.

MBM-TFT is with 5" TFT touch-screen display (800x480 px), which allows far more information to be displayed than standard LCD display. It also allows some graphics to be shown and all needed information about the bus and devices in readable, strong format.

Device stores historical values, which can be read externally or visualized on the screen in table format. Supports heat meters with two main values - heat and cold. Due to heat meters - additional information can be turned on screen - Volume, Power, temperature inlet and outlet, etc.

MBM-TFT comes in industrial enclosure, ready to be mounted on a wall or desk. Furthermore, it can be connected to any of our communication converters to be read and set completely remotely.

MBM-TFT is produced for 64, 128 and 250 slave devices. USB and Ethernet connections will be available from year 2019.

M-bus TFT Centrals, produced by Gineers Ltd.

MBM-TFT 64

Microcontroller-based m-bus master for storing and displaying information about up to 64 devices in m-bus network

MBM-TFT 128

Microcontroller-based m-bus master for storing and displaying information about up to 128 devices in m-bus network

MBM-TFT 250

Microcontroller-based m-bus master for storing and displaying information about up to 250 devices in m-bus network

General technical specifications of MBM-TFT data centrals

	MBM-TFT 64/128/250
number of slave devices	64/128/250
power supply	55-250 Vac/ 80-350 Vdc
protection current 64/128/250	140/240/470 mA
output voltage, m-bus interface	35-37 Vdc mark, 22-25 Vdc space
maximum consumption	< 7.5 W/< 12 W/< 21 W
display	5" TFT, 800x480
keyboard	6 tactile buttons
interface	1 x m-bus, 1 x RS-232C
working ambient temperature	-10 °C - +50 °C
storage ambient temperature	-50 °C - +80 °C
dimensions (H/W/D)	170/195/70 mm
data transmission speed, m-bus	300/2400/4800 bps
data transmission speed, RS-232C	300/1200/2400/4800 bps
weight	1.0 kg

MBM-TFT is our next generation data central. With its TFT display it gives user much more information than standard MBM-64/250. It is allowed up to 50 symbols on each row (2 rows) user information to be programmed. In addition, special attention is paid to heat meters. MBM-TFT supports showing on main screen automatically additional values such as:

- second main value (Heat/Cool meters)
- up to two extra pulse inputs
- Volume
- Power
- temperatures

Historical values in table format can be visualized 'on screen' without using external readout devices or software. For remote communication external converter like MBET-2 or MBGP can be connected, but next step is to add Ethernet and USB communication in MBM-TFT for fully stand-alone remote device.



Wireless m-bus concentrator WRM-TS

WRM-TS is a wireless m-bus receiver, intended to collect data from various devices, working in modes T or S according to wireless m-bus standard (EN13757-4). This device has simple function – collect data from every wireless meter which is told to, and convert this data to normal m-bus telegram. This telegram can be read both through PC interface and/or m-bus interface by external controller. It is ideal for mixed type networks (wire and wireless m-bus) because it can read wireless devices and send needed data through standard m-bus interface. Supports Primary addressing of attached devices from 1 to 250 (defined by user), but can decrypt (if AES-128 data encryption) only addresses from 1 to 64.

WRM-TS works in similar way our collecting devices work. Each wireless meter/device of interest should be activated in WRM-TS memory with dedicated Primary m-bus address. Then, on regular basis WRM saves last read data from this device. If asked through wired m-bus interface or RS-232 interface - WRM responds with proper m-bus telegram.

Wireless telegrams are saved in format they come and can be also read if device is put in transparent mode. In normal mode wired m-bus telegram is constructed, using most of the data from wireless m-bus telegram.

WRM-TS can also work in Repeater mode. In this mode device re-translates automatically all incoming messages in range to next reading/transmission point.

Most of WRM-TS commands are ASCII-based, so setting can be done with simple terminal for RS-232. Anyway, there is special Gineers software for quick and easy setting of this device, including searching for wireless meters in range and activating them in WRM-TS memory.

General technical specifications of WRM-TS

RF band	868 MHz, 12 channels
wireless mode	T1, S
m-bus interface cons.	1.5mA
m-bus interface speed	300/1200/2400/4800 bps
Max devices allowed	240
power supply	12 Vdc/200mA, adapter 2 mm
power consumption @ 12Vdc	< 2.0W (online)
serial port bps	300/1200/2400/4800/9600/19200/38400 bps
display	3 leds (on/RF, RS-232 comm, m-bus)
working ambient temperature	-20 °C - +50 °C
storage ambient temperature	-50 °C - +85 °C
humidity	40 - 90%
dimensions (H/W/D)	125/70/30 mm
protection class	IP30
weight	170 g

WRM-TS starts work immediately after power-up. All leds are lit for 0.5 seconds during initial startup, then device enters normal mode of operation. This means that it is expecting commands on its serial and m-bus ports, while listening for incoming wireless messages from remote meters. WRM-TS are set only through serial interface commands. Serial interface can be set to different speeds to match external reading device. For wireless device data to become available particular device must be ACTIVATED in WRM-TS memory. Once activated it is regularly read and updated. WRM-TS itself keeps track of time and saves timestamp with each record. There are no historical values. Read period can be set in minutes or hours, with maximum value of 240 hours and minimum value of 5 minutes. Normally three scenarios can occur:

- Connect WRM-TS to master m-bus converter/display, like MBM-64/250 – then data will be visualized on display or read through wired m-bus interface
- Connect WRM-TS to communication device like Ethernet/GPRS/phone modem – then data can be read from remote location
- Connect portable computer to RS-232 port and read information manually

To start reading particular device there are two main steps that must be done:

- set WRM-TS in desired wireless m-bus mode
- activate a device in memory
- *set desired interval for memorizing

*by default this value is on every 6 hours



Modbus and communication devices

Probably modbus is one of the most popular protocols in the world of automation. Its simplicity both hardware and software allow easy install, read and maintain. That is why we do produce some pure modbus devices and of course, some devices to connect m-bus devices to modbus networks. These are pulse counters with modbus and protocol-to-modbus converters.

We also have wide range of communication devices in order to have flexibility when remote reading network is designed. We have covered the following communication methods:

- Ethernet 10/100 to RS-232, wired or wireless
- GSM/GPRS converters up to 4G
- analogue phone line modems
- Modbus TCP protocol

We will continue to upgrade and expand our communication devices due to modern technologies and services.

Modbus and communication devices produced by Gineers Ltd.

PCM-4/6/8D	Pulse counter with 4, 6 or 8 pulse inputs and modbus interface
ELM-07S	IEC62056-21 decoder to Modbus RTU and TCP (el. meters)
MBLM-2	Analogue phone line modem for connecting to RS-232 device
MBGP-3EP	GPRS-transceiver for connection of a m-bus network to a centralized system for remote reading, with 4 pulse inputs
MBET-2/MBET-3	Ethernet-transceivers wired or wireless for connection to m-bus master or other device through RS-232/RS-485
MBD-X250/xx	Local display for connecting to a network through m-bus master. Can read and store info for up to 250 slaves

General Information

These days more and more operations should be done remotely and automatically to save time and cost. There are four ways that generally a system could be read completely remotely:

- using Ethernet connectivity
- using GSM/GPRS connectivity
- using analogue phone lines
- using wireless communications like LoRA and others

We offer devices for three of these ways and developing also LoRA for future use. From our point of view most reliable and cheap solution is Ethernet 10/100 wired or wireless, but sometimes there is no choice and users should go to GSM/GPRS.

We develop our devices independent and with one main purpose. In some cases this may lead to additional cost for the customer, but in most of the cases this gives us flexibility to build a system, which exactly fits to customer needs and conditions.

All of our software (both free and paid) support all communication devices we produce, which also can give the customer a choice what to do. We do develop new devices or change existing ones due to customer requests.

Building m-bus remote communication network

To build communication with m-bus devices using or devices customer needs the following:

- *M-bus master - simple converter or data central*

A m-bus master maintain the voltage and communications within the network. They power all the slave devices and carry out the communication between slave devices and data collecting device (PC, laptop, PDA, central server station, etc.).

- *Communication device*

This can be Ethernet converters, GPRS converters, phone line converters or in some cases stationary PC with Internet access

- *Software*

This could be our free or paid software, or customer specific software. We can develop software on requests specially for certain customer. We also provide all needed information and support to customers, who wants to build their own software system

Building modbus remote communication network

Building modbus communication networks can be even easier due to Modbus specifications. User can use directly devices with modbus TCP (like MMCR-64 or ELM-07S) or connect communication converter with RS-485 - like MBET-3.

In any case, again on the other side should be a server with dedicated software to store data. More information at our website.



Modbus pulse counters with display type PCM

PCM-xD are microcontroller pulse counters with modbus interface and display. They read, display and transmit via modbus the values of all connected tax meters with pulse outputs. PCM-xD can be used in places, where it is not convenient to use m-bus systems, usually in buildings with already existing modbus network or small buildings, where m-bus would be more costly option. PCM-xD are standalone devices and do not need any type of converter for power supply and/or communication. They can work completely independent of other devices, or they can be connected in modbus network and read by a central device - controller, personal computer, etc.

PCM-xD has 2x16-digit LCD display, 4-button keyboard, and embedded real time clock. Up to four tariffs can be measured for every pulse input. PCM-xD can be mounted on a standard M35 DIN-rail - usually in industrial enclosures or on a wall, depending on waterproof requirements.

PCM-type modbus pulse counters produced by Gineers Ltd.

PCM-4D	Microcontroller-based four-input pulse counter with display, rechargeable battery, real time clock and modbus interface
PCM-6D	Microcontroller-based six-input pulse counter with display, rechargeable battery, real time clock and modbus interface
PCM-8D	Microcontroller-based eight-input pulse counter with display, rechargeable battery, real time clock and modbus interface

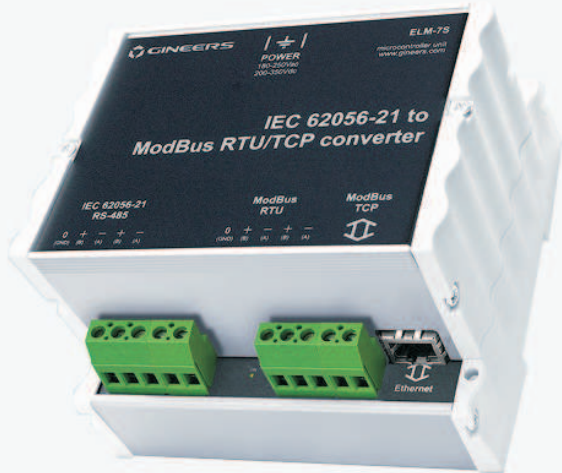
General technical specifications of PCM-4D/6D/8D			
	PCM-4D	PCM-6D	PCM-8D
number of pulse inputs	4	6	8
power supply	55-250 Vac/ 80-350 Vdc or 12/24Vdc		
maximum consumption	< 2W		
display	symbolic LCD, 2 lines, 16 symbols each		
keyboard	4 membrane buttons		
max frequency of pulses for each input	5/10/20/50/100 Hz programmable		
contact requirements	non-potential, Ron < 1k, Roff > 1000k, up to 20m cable length		
work time without power supply	backup battery LiMnO2 60mAh (~7 days)		
working ambient temperature	-10 °C - +50 °C		
storage ambient temperature	-50 °C - +90 °C		
dimensions (H/W/D)	75/70/105 mm		
data transmission speed	300/1.2k/4.8k/9.6k/19.2k/38.4k bps		
initial setup of serial interface	19.2kbps, even parity, 8 bit data, 1 stop		
weight	410 g		

PCM-4D/6D/8D are 4-/6-/8-input pulse counter, intended to collect data from tax instruments or other devices with pulse outputs. One PCM-4D/6D/8D can connect maximum of 4/6/8 devices with pulse output. They are double powered - normally drawing power from their power supply or the internal battery if main power supply fails for any reason. This backup battery assures minimum 96h work time w/o external power supply. When the power is up again, the battery is recharged to full capacity. Battery voltage is regularly displayed on the device's screen, so the user knows when he should replace the battery.

PCM-xD has embedded real time clock and calendar, which allows to track up to four tariffs for each input. The device collects pulse count for each tariff as well as total pulse count for each input. All collected pulse counts (total and tariffs) are saved in separate registers and can be read through the display or the modbus network. Tariff definition can be done only via modbus interface, all other parameters can be set through device keyboard.

PCM-xD have 2x16 symbol LCD display. The user can check any moment the total amount of the measured values in their respective units as well as collected pulses on each input or tariffs, medium, battery status, device's address in modbus network, etc.

PCM-xD can be connected to modbus network and set-up and reading of the whole network can be done centrally (controller with modbus, PC, etc). We provide free software for setting and reading PCM-xD devices.



IEC62056-21 converter to Modbus RTU and TCP

ELM-07S is specially designed to allow easy accommodation of electricity meters to global remote reading system. IEC 62056-21 (former 61107) is serial protocol for transmitting data, designed specially for electricity meters. Since it is ASCII-based, information in basic case is too heavy to be read and takes a lot of time (and cost). Here comes ELM-07S converter. Converter acts as a master that reads regularly all connected electricity meters through RS-485 interface. Read information is saved in modbus register map. For each meter is available memory space, where information from up to 63 registers from IEC 62056-21 can be transferred to modbus. Modbus is both RTU and TCP, which means that one can use ELM-07S as direct remote gateway to read electricity meters.

Normally RS-485 drivers in most of electricity meters allow up to 32 devices in the network, that is why our ELM-07S is designed exactly for 32 slaves. Nevertheless, ELM-07S comes with RS-485 driver for 250 devices, so if electricity meters allow it - we can increase number of supported electricity meters in one network.

Devices is produced in aluminum enclosure and is mounted on a standard DIN-rail, usually in industrial enclosures. Modbus RTU is on terminal blocks and Modbus TCP on standard RJ-45 plug.

General technical specifications of ELM-07S

IEC62056-21 devices	up to 32
converted values	up to 63
power supply	165-235 VAC (210-270 VDC)
power consumption	< 5.0 W
IEC interface bps	300/1200/2400/4800/9600/19200/38400/115200 bps, 7 db, Even
Modbus RTU bps	300/1200/2400/4800/9600/19200/38400/115200 bps, 8 db, None
display	3 LEDs (on, IEC activity, Modbus activity)
working ambient temperature	-20 °C - +50 °C
storage ambient temperature	-50 °C - +90 °C
humidity	40 - 90%
dimensions (H/W/D)	105/107/74 mm
protection class	IP30
weight	475 g

In normal mode ELM-07S waits predefined period of time and then reads all pre-programmed IEC62056-21 devices. For each device (32 meters at most) there are 128 16-bit Modbus registers (4096 registers total). These registers are updated on each device readout. The value of each IEC62056-21 register is split in two Modbus registers, which means that for every electricity meter can be saved up to 63 values. Before reading the IEC62056-21 devices user should activate each meter ID (since in IEC 62056 meters are read through their unique 8-digit ID) in ELM-07S internal memory. Then user should also program which registers/values he needs from every meter and on which modbus address he wants data to be written. Each activated meter has a memory space for up to 64 values (32-bit each) and this area is predefined (look at modbus map).

IEC62056-21 devices can be added, deleted, their registers changed any time when device is operational. The Modbus registers can be accessed any time either on Modbus RTU or TCP, as well as simultaneously via both RTU and TCP.

For easy setup and administration we provide free software, which can read and set configuration to ELM-07S both through modbus RTU and TCP.

All the connections of ELM-07S are on industrial terminal blocks except LAN connector, which is standard RJ-45 plug. Mounting should be made by qualified technicians and is on standard M-36 DIN-rail.



Phone modem MBLM-2

MBLM-2 is a micro controller-based V32.bis full-duplex phone modem, suited for remote transmission of m-bus, modbus or other networks for remote reading. It is equipped with RS-232C interface to connect to server (master modem) or to m-bus power supply converter (slave modem). It is intended to be used when the user wants centralized reading from different places, but is not reasonable to transmit the data via GPRS. That is because using GPRS can be in some countries more expensive than using simple phone line.

MBLM-2 works with reduced speed even when phone line is a noisy ADSL broadband.

MBLM-2 modems are produced in two variations - with "Global/European" interface circuit (CTR21) or "North American" interface circuit (FCC).

Phone modems produced by Gineers Ltd.

MBLM-2	Microcontroller-based phone modem for connecting a m-bus/modbus network to centralized remote reading system, European/Global interface
MBLM-2A	Microcontroller-based phone modem for connecting a m-bus/modbus network to centralized remote reading system, North American interface

MBLM-2 is specially developed for use in remote reading systems. By using it a fully automated centralized remote reading of multiple networks can be achieved. User needs one master modem and several slave modems (one for each network for remote reading) to transmit and receive data. Development is made keeping in mind two input phone line standards - European and American, and also that in these days phone lines are very noisy, related to ADSL transmissions over phone lines. The device's settings can be programmed/changed locally or remotely when phone connection is established.

General technical specifications of MBLM-2

connection protocol	V.32 bis / V.22
connection speed	300/1200/2400/4800/7200/9600/12000/14400 bps
power supply	9 Vac/150mA or 12 Vdc/150mA, adapter 2.5 mm
power consumption @ 12Vdc	< 0.4W (idle), < 0.8W (online)
serial port bps	300/2400/4800/9600/19200 bps
working ambient temperature	-20 °C - +50 °C
storage ambient temperature	-50 °C - +90 °C
humidity	40 - 90%
dimensions (H/W/D)	125/70/30 mm
protection class	IP30
weight	160 g

MBLM-2 starts work immediately after power supply is plugged in. After initialization (about 2s), MBLM-2 enters "command mode" (master modem) or waits for connection (slave modem). The work mode (master/slave) is determined by the condition of pin RTS (pin 7) of serial port, which is monitored constantly. The following commands can take place:

- info – returns information about MBLM-2 software version
- prm – returns information with values of all stored parameters. Also can be used to change parameter value
- reset – restarts and initializes again MBLM-2
- dial number – establishes connection with this 'number'. Only digits are allowed for 'number'. This command is accepted only from master modem and only tone dial is possible. Slave modem cannot dial.

Commands info and prm are valid with slave modem too, when they are send by master modem through the phone line. This way master modem can change the parameters of the slave modem remotely or to check their current value and software version of the remote modem.



GPRS - transceivers

GPRS-transceivers are intermediate communication devices, which connect existing remote reading network to centralized system for remote reading of multiple networks of same or different type.

They have RS-232C interface provided for connection to an m-bus converter type MBRS.

In order to establish communication with to the server, it is needed that the GPRS-transceiver is provided with SIM-card with activated GPRS-service of user-chosen mobile operator.

GPRS - transceiver produced by Gineers Ltd.

MBGP-3EP

Microcontroller-based GPRS-transceiver for connecting a m-bus network to centralized remote reading system

MBGP-3EP is specially developed for use in remote reading systems. By using it a fully automated centralized remote reading of multiple networks can be achieved. The data can be transmitted up to four different data operators, each one of which can access only its "own" data ("own" data is determined by the medium - water, electricity, heat, etc.). The device's settings (data operator access permissions, send/ping timeouts, etc.) can be programmed/changed by two "control" operators, which do not have access to the network devices' data.

MBGP-3EP also has 4 standard pulse inputs , for instance to connect pulse water-meters. So, it can be used also as a stand-alone device for remote reading.

Transmission packets are by Gineers protocol, encapsulated in TCP/IP telegrams.

General technical specifications of MBGP-3EP

frequency band	Quad-band (EGSM 850/900/1800/1900 MHz)
data operators, max	4
control operators, max	2 (control operator and manufacturer)
power supply	adapter 12VDC/1.0A (included)
power consumption	< 5 W
display	4 led (On, m-bus, GPRS context, GPRS communication)
pulse inputs	4
working ambient temperature	-10 °C - +55 °C
storage ambient temperature	-50 °C - +90 °C
dimensions (H/W/D)	105/107/74 mm (w/o antenna)
weight	340 g

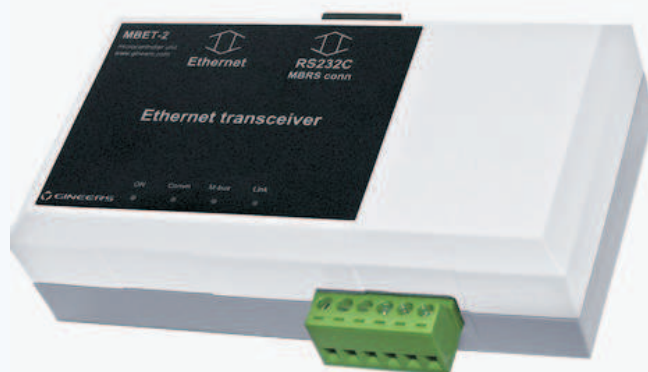
MBGP-3EP requires valid mobile operator's SIM-card with activated GPRS-service in order to work properly and the access parameters (SIM PIN, SIM PUC, Access Point Name, user name and password) must be programmed. We provide free software for parameters programming. This software can program also:

- IP (v4) of at least one data operator as well as mediums for this operator
- IP (v4) of the control operator (and manufacturer, if needed) - they can match each other and any data operator as well. Any further settings can be done by the control operator via GPRS.
- data send time interval
- next due-date time
- etc.

These parameters (without SIM and AP parameters) can be programmed at any time by each of the control operators. The data readout request is initiated by MBGP-3EP instead of the server-side application, because it is the only way it could be guaranteed that the device works independently of the mobile operator and the services this operator provides. MBGP-3EP contacts the server every "ping-timeout" time (1-24h) and at each of these sessions the server-side application can initiate data readout of part of or the whole network.

Communication is 'gineers protocol' over TCP/IP. In the protocol we have took measures to secure the information and to check validity of the data and operators, allowed to read information. Of course, we can provide to third-party integrators description of the protocol or libraries to read our device.

Device has 4 pulse inputs, which can count pulses with minimum pulse length of 20ms. Pulse inputs value are transferred in every telegram between MBGP-3EP and reading server.



Internet/Ethernet transceivers

Ethernet/Internet transceivers are intermediate communication devices, which connect existing remote reading network to centralized system for remote reading of multiple networks of same or different type.

They have RS-232C interface provided for connection to an m-bus converter type MBRS and connects to IPv4 LAN/WAN network.

Our devices can be set to work either as transparent Ethernet-to-RS232 converters or to use our specially developed protocol of communication. Devices come in two versions:

- wired 10/100Ethernet
- wireless Ethernet at 2.4GHz

Internet/Ethernet transceiver produced by Gineers Ltd.

MBET-2WR	Microcontroller-based IPv4 LAN/WAN transceiver for connecting a m-bus network to centralized remote reading system
MBWi-2	Microcontroller-based wireless ethernet transceiver for connecting a m-bus network to centralized remote reading system
MBET-3	RS-485 to Ethernet 10/100 converter

MBET and MBWi are specially developed for use in remote reading systems. By using it a fully automated centralized remote reading of multiple networks can be achieved. The data can be transmitted up to four different data operators, each one of which can access only its "own" data ("own" data is determined by the medium - water, electricity, heat, etc.). The device's settings (data operator access permissions, send/ping timeouts, etc.) can be programmed/changed by two "control" operators, which do not have access to the network devices' data.

Devices have DHCP, which can be turned On or Off (default On), which makes initial setting quick and easy. Each device has three standard pulse inputs, which can be used as main or side functions. MBET-2 can also be set as server, then it waits for connections at certain port (but then DHCP should be set Off). This gives flexibility to the user to read whenever he wants required information.

General technical specifications of MBET-2WR/MBWi-2

remote communication	TCP/IP 10/100T IPv4 network or Wireless LAN at 2.4GHz
data operators, max	4
control operators, max	2 (control operator and manufacturer)
power supply	6-12 Vdc / 0.5A
power consumption	< 2 W
display	4 led (On, m-bus, link, communication)
working ambient temperature	-10 °C - +55 °C
storage ambient temperature	-50 °C - +90 °C
dimensions (H/W/D)	57/100/30 mm
weight	100 g

MBET-2WR requires connection to a IPv4 LAN/WAN in order to work properly and the access parameters (IP, network mask, gateway IP) must be programmed. We provide free software for parameters programming. This software can program also:

- IP (v4) of at least one data operator as well as mediums for this operator
- IP (v4) of the control operator (and manufacturer, if needed) - they can match each other and any data operator as well. Any further settings can be done by the control operator via Internet.
- data send time interval
- next due-date time
- etc.

Initial parameters programming is essential and includes setting the LAN/WAN-network parameters (IP-address, gateway IP-address, network mask, IP-address of the control server, etc, including setting new MAC-address if MAC-conflict occurs) and remote reading network parameters (baud rate and parity of serial connection, remote reading network number). These parameters must be set first via RS-232 port, and after successful connection all the parameters can be set remotely by the server, if needed. Since device has DHCP on by default, if the user has a router with enabled DHCP he can skip most of the settings - IP address, Mask and Gateway will be set automatically.

Our Ethernet converters have their own protocol of communication, developed by Gineers. That way we are providing some kind of 'tunneling', which is increasing security issues. M-bus telegram is encapsulated in a higher level protocol, which is not available for the public.

MBET-2WR or MBWi-2 can be connected to m-bus network through m-bus master or to any device with serial RS-232C interface with speed from 300bps up to 38400bps.



Standalone report unit MBD-X250

Modbus/Comm

MBD-X250 is a standalone device, which is used to read all m-bus/modbus devices in a network and display the information. MBD-X250 is provided with large 4x20 LCD display. MBD-X250 shows current consumption in its respective unit, measured medium and some additional information (as user number and free text) for every device in the network. It also saves and shows historic consumption for maximum 12 months back. It can be connected to central reading server by GPRS transceivers, phone or ethernet modem, or ordered with direct ethernet connectivity option.

MBD-X250 is usually used when instant reading 'on place' has to be done repeatable by person and the client does not want to invest in software for reports or modules for transmitting data to a remote central location.

MBD-X250 can show information for up to 250 devices. Data is shown for 4-12 seconds (set by user) for each device separately, showing measured consumption and programmed info.

MBD-X250 can be mounted in industrial enclosures either on the front door or inside, maintaining visible access through transparent door.

Stand alone report units produced by Gineers Ltd.

MBD-X250

Microcontroller-based stand alone unit for connecting and displaying information about devices in a m-bus/modbus network

MBD-X250 is specially developed for use in remote reading systems. By using it a fully automated centralized remote reading of one or several close networks can be achieved. The user can see all needed information on MBD's LCD display, or can connect other device to transmit data to a remote location. MBD-X250 stores and remembers reports for a year back and this info can be reviewed any time.

This unit is completely programmable according to connection details, devices connected and info about every device. Up to 3 tariffs can be read through m-bus. It comes in three versions - for 40/120/250 slaves and ethernet connectivity as an option.

General technical specifications of MBD-X250

maximum number of devices to read	40/120/250
power supply	55-250 Vac/ 80-350 Vdc
maximum consumption	< 2W
display	symbolic LCD, 4x20 symbols, backlight
keyboard	6 tactile buttons
interface	2xRS-232C
working ambient temperature	-10 °C - +50 °C
storage ambient temperature	-50 °C - +80 °C
dimensions (H/W/D)	72/144/65 mm
mounting hole dimensions	67/137 mm, no roundings
data transmission speed	300/2.4k bps M-bus network, 300-9.6k bps control
initial setup of serial interfaces	2.4kbps, even parity, 8 bit data, 1 stop
weight	400 g
*direct ethernet connection	TCP/IP 10/100T IPv4 network

*must be ordered separately

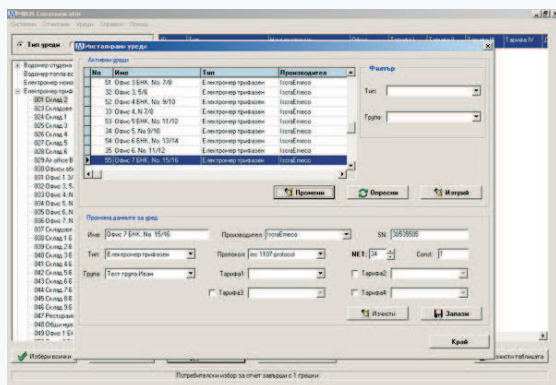
MBD-X250 is developed for displaying the information for all devices in a m-bus remote reading system, so all the data in the network can be accessed at just one location. MBD-X250 can also retransmit data from the remote reading network to external device (GPRS/Ethernet/Phone modem) for automated centralized reading of multiple networks.

MBD-X250 reads all devices in the network every six hours and saves the data in non-volatile memory (including tariff data), so even if power is interrupted for long time, no data can be lost (except date/time). The internal clock can be maintained for about 20 days without power.

MBD-X250 saves historic data every month, so measured values for each device in the network can be monitored for up to 12 month back.

MBD-X250 can be programmed (date, time, network's devices parameters) only by special software, there is no user-accessible menu, so the device security is increased as the user cannot change any settings. Usually the device is programmed once, when setting the network and devices up.

We provide free software, which can read all MBD-X250 memory - info for every slave device, Total, Tarriffs, Historic values. This report then can be exported in *.csv format for direct reading with MSEXcel.



Software for remote reading of m-bus and modbus

We provide software for remote reading which can cover the whole variety of network types and from direct readout of single network to centralized readout of multiple networks. These networks can be independent and can use several different data protocols. We provide also free software for configuring m-bus networks and read instantaneous values. The free software can read through RS-232C, ethernet and GSM/GPRS transceivers. We offer also web-based application, written on PHP, which reads from the main server database and can do period report for desired devices.

Software for remote reading systems

M-bus serial communicator

software for direct readout of remote reading network (RS-232, RS-485, ethernet)

M-bus GPRS server

server-side software for readout of multiple remote reading networks through GPRS

GMBus

free configuration software for our pulse counters and other standard m-bus slave devices

M-bus Serial Communicator

Software for direct readout of devices, connected in m-bus/RS485 networks. Database - SQL. Four-level user-defined groups, detailed reports, billing, automated readout, exports in *.csv, etc.. Can read and store data for electricity meters according to IEC61107. Different access levels for users, using several serial ports simultaneously. Can also read through phone modem MBLM-2 and ethernet modem MBET-2.

M-bus GPRS server

Server-side software for readout of multiple networks via GPRS. Database - SQL. Network definition, definition of devices in four levels for each network, automated readout, detailed reports, billing, different access levels for users, etc.

GMBus

Configuration software for Gineers' pulse counters as well as other standard m-bus slave devices. Capable of searching devices through primary and secondary addresses, readout of m-bus network and local displays MBD-X250 as well as data centrals MBM. Can read through RS-232C, Ethernet (both MBET-2 and ethernet option of MBD-X250) and GPRS transceiver MBGP-1A. Free release, we supply on demand.

M-bus Serial Communicator is developed for remote reading of devices in one/multiple networks via serial RS-232C/ RS-485 interface. Through serial interface software can control phone modem MBLM-2 and do automatic readouts of remote networks. Possible readout through ethernet is also possible if remote network has connect ethernet converter MBET-2. Program provides vast flexibility to define devices and their organization in groups and networks. It supports m-bus protocol (EN1434-3) and electricity meters readout protocol (IEC1107). Hours and dates for automated readouts can be set as well as manual readout can be performed on every device, group or network. Reports can be with or without billing with protocol printing and VAT calculation. Gineers' slave devices MBCS/MBSS/MBPS extra functions are fully supported. It has several access levels. M-bus Serial Communicator works on Windows 2000/XP/Vista/Win7 OS. It has several main modules:

- USERS module - 4 access levels
- SETTINGS module - communication settings; visualization of protocols, etc.
- DEVICES module - detailed definition of devices, tariffs and tariffs price definition (up to 4 tariffs)
- GROUPS module - definition of groups of devices, organized in 3 levels in tree-like structure
- AUTOMATED READOUT module - setting up automated readouts (w/o user interaction)
- REPORT module - detailed reports and billing for device/group/network.

The program communicates with the m-bus network via converter (like MBRS-10/32/64/128/250). Left standby, it monitors the time for automated readout, activates, reads the data and goes back stand-by. Manual readout can be started by the user at any time by selecting device/group/network and clicking "Read" button. All readouts are stored in SQL database. There are four user-access levels, lowest of which (operator) can only start manual readout and make report for given period of time. Program can be installed in two different modes - main or report mode. Report mode meaning is to be installed without database on remote PC, from where user can connect to the real database and make the report (i.e. from the office instead on-place).

Devices are organized in groups in three independent levels. There are also two extra user-defined fields for each defined device, where user can put any data he wishes to better distinguish the devices.

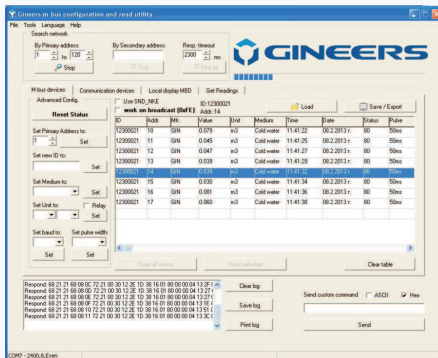
This program is multilingual and supports following languages at this moment:

- Bulgarian
- English
- Russian
- Estonian
- Latvian

Program comes with a licence for certain amounts of points - default is 90 slaves. For additional number of devices licence should be updated. Maximum number of slave devices for this version is 250. For bigger networks M-bus GPRS Server should be used. Further changes of the software are possible due to client requests.

M-bus GPRS Server has all the functionality of *M-bus Serial Communicator* and is capable of communicating with unlimited number of networks for remote reading over internet (and, subsequently, over GPRS). In this upgraded version user can define different networks/buildings, which are tied to certain ethernet or GPRS converter. Each network cannot exceed 250 slave devices, but the number of different networks is unlimited.

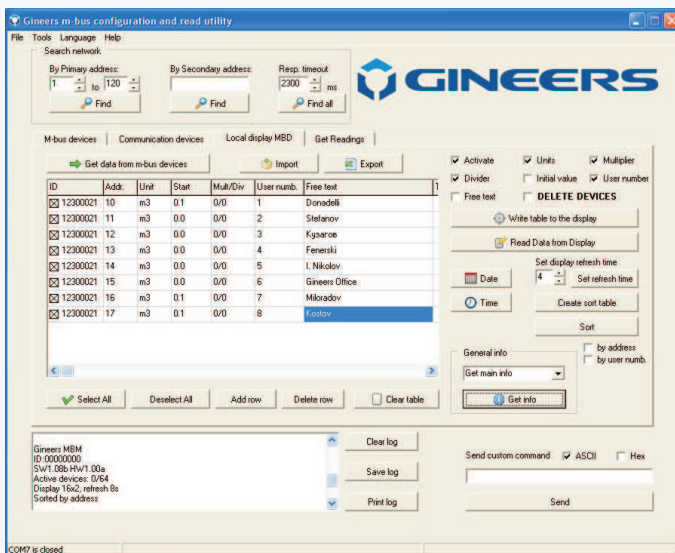
Both programs can be used with our simple web-based application, which connects and reads directly from the SQL database.



GMBus v1.0.1 for configuring m-bus devices and centrals

GMBus is specially developed configuration program for setting up m-bus devices in a m-bus network while already mounted. Although developed for our devices, it can program standard parameters of any vendor's m-bus devices. The other main function of the this software is to program or read our displays (MBD-X250) and m-bus data centrals (MBM-10/40/64/250). It is free and older version can be downloaded from our website (www.gineers.com, section "downloads"). The program works on Windows 95/98/2000/XP/Vista/Win7 and last version we supply on demand.

GMBus reads current connected devices and their instantaneous values. It does not support database, but list of devices can be exported to *.csv and imported again, if needed. It can search devices in the network either by primary or secondary addressing. Wildcard search for secondary addressing is available. The parameters, that can be set up, are: primary address, ID number (for some devices), baud rate change, medium and unit, pulse width, *tariff parameters (start time, duration and cost) as well as other Gineers' specific parameters.



The other purpose of the program to write and read data from MBD-X250/xx and m-bus centrals MBM-10/40/64/250. Program supports all client commands for these devices - activate device, set user number and free text, additional multiplier or divider, date and time, sorting by user number, etc.

It is capable also of reading all memory of MBD-X250 or MBM. This includes Total value, Tariff's Total value and all historic values (12 points back in time, each remembered at 00:00 every 1st day of the month). This is very useful, if the user wants simple free software.

All read data can be exported in *.csv format for further processing.

Although this software is free for use, it can read devices through RS-232C, RS-485, Ethernet (MBET-2 converter or direct connection to MBD-X250) and GPRS through MBGP-1A. This gives reasonable choices to our clients what to use. GMBus has another feature - you can use it as terminal, sending custom commands in ASCII or hex. Further upgrades/changes can be made by client requirements.

WEB REPORT



User: ivan
Name: Ivan Nedelchev
Group: Office Gineers
Created: 2011-08-07 17:43:22
Expires:
Notes: Office of GINEERS Ltd.



From date:
2011-02-01

To date:
2012-11-08

Devices, registered to this user group, are as follows:

Name	Serial ID	Net ID	Type	Constant	Building	Notes
<input checked="" type="checkbox"/> Cold water bathroom	10440009	1	Cold water meter	10.000	blank	
<input checked="" type="checkbox"/> Hot water bathroom	10440009	2	Hot water meter	10.000	blank	
<input checked="" type="checkbox"/> Main water-meter	10440009	5	Cold water meter	10.000	blank	

Please select devices from table, select period and then press button REPORT

WEB APPLICATION

Web application is developed to give additional flexibility to our clients. For now it is a test version and we provide it for free. It is written in plain PHP and reads from the central database. This means that client for sure must have M-bus Serial Communicator or M-bus GPRS server installed somewhere. Then web application is tuned to connect to this place with simple *.ini file, pointing IP and port for connection.

User levels and access are set in the central station, so from the web user will see only devices that he is allowed to see. With this account user cannot log in the central database and do harm to the system.

The application allows user to select period (from date to date), select desired devices and make simple consumption report. In the future this web application will become with more options, but we will try to keep it simple enough and complicate the central database.

WEB REPORT

User: ivan
User real name: Ivan Nedelchev
User group: Office Gineers

▼ Results for 10440009, Cold water bathroom

Name	Serial ID	Total	Tariff 1	Tariff 2	Time and Date	Notes
Cold water bathroom	10440009	0 m3	0 m3	0 m3	2011-08-07 17:40:10	
Cold water bathroom	10440009	1.72 m3	1.72 m3	0 m3	2011-08-12 11:45:34	
Cold water bathroom	10440009	1.91 m3	1.91 m3	0 m3	2011-08-13 18:00:14	
Cold water bathroom	10440009	2.12 m3	2.12 m3	0 m3	2011-08-14 18:02:11	
Consumed, m3		2.12 m3	2.12 m3	0 m3		

▼ Results for 10440009, Hot water bathroom

Name	Serial ID	Total	Tariff 1	Tariff 2	Time and Date	Notes
Hot water bathroom	10440009	0 m3	0 m3	0 m3	2011-08-07 17:40:33	
Hot water bathroom	10440009	1.39 m3	1.39 m3	0 m3	2011-08-12 11:45:38	
Hot water bathroom	10440009	1.48 m3	1.48 m3	0 m3	2011-08-13 18:00:18	
Hot water bathroom	10440009	1.68 m3	1.68 m3	0 m3	2011-08-14 18:02:15	
Consumed, m3		1.68 m3	1.68 m3	0 m3		

DEVICES SERIES 4080 AND 4100



Series 4080 and 4100 devices are programmable measuring units for industrial use. All of these devices can have potential-free relay contacts acting if measured value goes outside certain programmed range. At this moment we have devices for measurement of voltage, current, frequency, power, resistance. It is possible to order unit for measuring any other physical quantities (such as temperature, pressure, humidity, etc.). All series 4080/4100 units have four-digit display.

Series 4080 and 4100 devices:

AM4080	AM4100	Ammeter AC/DC up to 10 A* (overload up to 10 times for 100 ms)
V4080	V4100	Voltmeter AC/DC for up to 600 VAC/ 800 VDC
KV4080	KV4100	Kilovoltmeter for measuring AC voltage 100VAC (or other voltage) at the secondary side of voltage transformer in electric substations and power plants
F4080	F4100	Frequency meter (50/60Hz, other options available)
SI4080	SI4100	Step indicator with analogue/BIN/BCD input and BIN/BCD output
VA4080	VA4100	Active and reactive power meter
CF4080	CF4100	Current/voltage cosine phase angle meter

* - ammeter for any current can be produced by connecting external shunt resistor or special current sensor.

Please contact us if you have any questions or special requirements!

General information

Series 4080/4100 devices are microprocessor-controlled and are fully programmable. Service and user settings are saved in non-volatile memory. This memory has about 100000 write-erase cycles which makes it practically ever-lasting. Service settings are code-protected; so can be made the user settings.

Display

The display of all series 4080/4100 units is super bright red, covered with special purple filter for better readability in any cases and ambient light. Series 4080 devices have display with digit height of 28 mm (20mm visible) while the common viewable area is 76x25 mm. Series 4100 devices have display with digit height of 30 mm (25.3mm visible), while the common viewable area is 94x29 mm. The display sizes provide viewing distance of at least 4/6 m.

Measuring principle

The measuring principle of devices series 4080/4100 is based of the well known dual-slope method and further modified. It ensures incredible accuracy (error below 0.5%), displayed value stability while preserving fast reaction of the device if measured value changes rapidly.

If measured value goes outside certain programmed range the device signalizes by three potential-free relay contacts (if the device have option "R"). In this mode the display blinks with frequency about 2-3Hz (blinking can be turned on and off by user menu).

Power supply

Series 4080/4100 units can be powered by voltage 55-250 VAC/ 80-350 VDC.

Dimensions

The dimensions of series 4080 devices are (H/W/D) 48/96/85 mm (without plugs). It allows placing these units on moderately small surface area of the board and thus saving space. Delivery of units with dimensions 96/96/85mm is also available.

The dimensions of series 4100 devices are 144/144/64 mm (without plugs). It allows direct replacement of the old analogue meters in the substations and power plants without the need of any additional mounting devices.

Variety

Series 4080/4100 devices comprise rich variety of options for every single device: potential-free contacts for remote signalization; code-protected user menu; high-voltage measurement (up to 600VAC/800VDC for V4100); additional BIN/BCD outputs (for SI4xx0); dual display for simultaneous monitoring of active and reactive power (for VA4xx0) and so on; it is also available to deliver any special devices with customer-specific options.

Network wiring

In the future the series 4080 devices are going to be provided with RS-485 interface, thus allowing communication by MODBUS protocol.



AM4080

AM4100

AM4080 and AM4100 are digital measuring, fully programmable panel instruments from series 4080 and 4100. AM4080/4100 measure current up to 10 A AC/DC (any other current can be measured by connecting external shunt resistor or current sensor). AM4080/4100 can be directly connected to current transformer with maximum secondary current of 10 AAC. The devices have potential-free contacts for remote signalization if measured current goes out of certain specified range (option "R"). AM4080/4100 are designed to be mounted on boards in control

AM4080/AM4100 options:

- (A/D)	basic option, there are no any relay contacts, user menu is not code-protected
A	AC current measure
D	DC current measure
S	for measuring with external shunt resistor
E	for measure with external current sensor (it is needed the type of the sensor to be specified)
R	there are three relay contacts that provide remote signalization, acting when certain programmed levels are reached
C	code-protected user menu

Every option can be ordered in any combination with other options, excluding versions "A" and "D", which exclude each other as well as versions "S" and "E". One of the options - "A" or "D" must be specified.

AM4080/4100 technical specification

measurement of DC or/and AC current	AM4080	AM4100
maximum input current	10 AAC/ADC (overload up to 10 times for 100 ms)	
inner shunt resistance	0.010 Ohm @ 5 AAC/ ADC; 0.005 Ohm @ 10 AAC/ ADC	
power supply range	55-250 VAC/ 80-350 VDC	
display	4-digit super bright red with purple filter	
display size	76x25 mm	94x29 mm
measurement error	<0.8 % rgd + 2 digit	
measuring cycle	< 1 s	
number of relay contacts	3xNO	
power consumption	< 3 W	
operating temperature	0 °C to +55 °C	
storage temperature	-50 °C to +90 °C	
dimensions (H/W/D)	48/96/85 mm (w/o plugs)	144/144/65 mm (w/o plugs)
mounting hole	43/90 mm	136/136 mm
protection class	IP52 front (panel mounted), IP31 back	
weight	190 g	320 g

AM4xx0 operating mode

AM4xx0 continuously measures and shows its input current (referred to the primary side of current transformer if coupled with) and continuously signalizes if the current is in certain programmed range by light-emitting diodes and relay contacts. If the current is out of range, the display blinks with frequency of 2-3Hz (blinking can be turned off any time from user menu). The device signalizes that measured current has gone outside range after programmed amount of time (programmed as number of consecutive out-of-range measurements) thus eliminating random short-time switching of the relays. Hysteresis is also added to relay switch-off characteristics to further improve noise characteristics of the remote signaling. If the current goes again in the specified range plus hysteresis current, **AM4xx0** turns the relays off instantly without any delay.

User-defined parameters

- nominal (primary) current
- decimal point position
- low current level
- high current level
- display blinking
- hysteresis
- relay delay



V4080 V4100

V4080 and V4100 are digital measuring, fully programmable panel instruments from series 4080 and 4100. V4080/4100 measure voltage in range 0-270VAC/ 380VDC (up to 600VAC/ 800VDC available - option "H"). V4080/V4100 can measure its own supply voltage (basic option, minimum voltage 55VAC/80VDC) or it can measure the voltage applied to external voltage input (options "L" or "H"). The devices have potential-free contacts for remote signalization if measured voltage goes out of certain specified range (option "R"). V4080/4100 are designed to be mounted on boards in control rooms in electrical substations.

V4080/V4100 options:

- (A/D)	basic version - the unit measures its own power supply voltage, there are no potential-free contacts, user menu is not code-protected
A	AC voltage measurement
D	DC voltage measurement
L	additional voltage input, minimum input voltage is 0 VDC/VAC, maximum input voltage is 270 VAC/ 380 VDC
H	additional voltage input, minimum input voltage 0 VDC/VAC, maximum input voltage is 600 VAC/ 800 VDC
R	there are three relay contacts that provide remote signalisation, acting when certain programmed voltage levels are reached
C	code-protected user menu

Every option can be ordered in any combination with other options, excluding "A" and "D", which exclude each other as well as options "L" and "H". One of the options - "A" or "D" must be specified.

V4080/V4100 technical parameters

	V4080	V4100
measurement of DC and/or AC voltage		
minimum input voltage	0 VAC/ VDC; 55 VAC/ 80 VDC	
maximum input voltage	270 VAC/ 380 VDC; 600VAC/ 800VDC	
measuring circuit resistance	min. 200 kOhm	
display	4-digit super bright red with purple filter	
display size	76x25 mm	94x29 mm
measurement error	<0.5 % rgd + 2 digit	
measuring cycle	< 1 s	
number of relay contacts	3xNO	
power consumption	< 3 W	
operating temperature	0 °C to +55 °C	
storage temperature	-50 °C to +90 °C	
dimensions (H/W/D)	48/96/85 mm (w/o plugs)	144/144/65 mm (w/o plugs)
mounting hole	43/90 mm	136/136 mm
protection class	IP52 front (panel mounted), IP31 back	
weight	190 g	320 g

V4xx0 operating mode

V4xx0 continuously measures and shows its input voltage and continuously signalizes if the voltage is inside or outside programmed range by light-emitting diodes and relay contacts. If the voltage goes outside range, the display blinks with frequency 2-3Hz (blinking can be turned off any time from user menu). The device signalizes that measured voltage has gone outside range after programmed amount of time (programmed as number of consecutive out-of range measurements) thus eliminating random short-time switching of the relays. Hysteresis is also added to relay switch-off characteristics to further improve noise characteristics of the remote signaling. If the voltage goes again in the specified range plus hysteresis voltage, **V4080** turns the relays off instantly without any delay.

User-defined parameters

- high voltage level
- low voltage level
- display blinking
- hysteresis
- relay delay



KV4080 KV4100

KV4080 and KV4100 are digital measuring, fully programmable panel instruments from series 4080 and 4100. KV4080/4100 devices are used for middle/high voltage measurement in electrical substations and power plants. They measure the secondary voltage of a voltage transformer with nominal secondary voltage 100VAC (or other voltage in range of 60-220VAC) and show the primary voltage in kilovolts. KV4080/KV4100 are powered by the measured voltage. KV4080/4100 are designed to be mounted on boards in control rooms in electrical substations.

KV4080/KV4100 options:

- | | |
|----------|---|
| - | basic option, there are no any relay contacts, user menu is not code-protected |
| R | there are three relay contacts that provide remote signalization, acting when certain programmed voltage levels are reached |
| C | code-protected user menu |

KV4080 / KV4100 technical specification

	KV4080	KV4100
nominal input voltage	100 VAC	
minimum input voltage	55 VAC	
maximum input voltage	270 VAC	
measuring circuit resistance	min. 200 kOhm	
display	4-digit super bright red with purple filter	
display size	76x25 mm	94x29 mm
measurement error	<0.5 % rgd + 2 digit	
measuring cycle	< 1 s	
number of relay contacts	3xNO	
power consumption	< 3 W	
operating temperature	0 °C to +55 °C	
storage temperature	-50 °C to +90 °C	
dimensions (H/W/D)	48/96/85 mm (w/o plugs)	144/144/65 mm (w/o plugs)
mounting hole	43/90 mm	136/136 mm
protection class	IP52 front (panel mounted), IP31 back	
weight	190 g	320 g

KV4xx0 operating mode

KV4xx0 continuously measures and shows its input voltage, referred to the primary side of the voltage transformer and signalizes if the voltage is inside or outside programmed range by light-emitting diodes and relay contacts. If the voltage goes outside range, the display blinks with frequency 2-3Hz (blinking can be turned off any time from user menu). The device signalizes that measured voltage has gone outside range after programmed amount of time (programmed as number of consecutive out-of-range measurements) thus eliminating random short-time switching of the relays. Hysteresis is also added to relay switch-off characteristics to further improve noise characteristics of the remote signaling. If the voltage goes again in the specified range plus hysteresis voltage, **KV4xx0** turns the relays off instantly without any delay.

The nominal primary voltage of the voltage transformer can be displayed any time by pressing the arrow button.

User-defined parameters

- nominal primary voltage
- decimal point position
- high voltage level
- low voltage level
- display blinking
- hysteresis
- relay delay

F4080 F4100



F4080 and F4100 are digital, fully programmable panel instruments from series 4080 and 4100. F4080/F4100 devices are used for frequency measurement 50/60Hz in electrical substations and power plants. They are powered by the measured AC voltage. F4080/4100 have potential-free contacts for remote signalization if measured frequency goes out of certain specified range (option "R"). F4080/4100 are designed to be mounted on boards in control rooms in electrical substations.

F4080/F4100 options:

-	basic option - there are no potential-free contacts, user menu is not code-protected
R	there are three relay contacts that provide remote signalization, acting when certain programmed voltage levels are reached
C	code-protected user menu

F4080 / F4100 technical specification

	F4080	F4100
nominal input frequency	50/60 Hz	
input frequency range	20-100 Hz	
power supply range	55-270 VAC	
measuring circuit resistance	min. 200 kOhm	
display	4-digit super bright red with purple filter	
display size	76x25 mm	94x29 mm
measurement error	<0.3 % rgd + 2 digit	
measuring cycle	< 1 s	
number of relay contacts	3xNO	
power consumption	< 3 W	
operating temperature	0 °C to +55 °C	
storage temperature	-50 °C to +90 °C	
dimensions (H/W/D)	48/96/85 mm (w/o plugs)	144/144/65 mm (w/o plugs)
mounting hole	43/90 mm	136/136 mm
protection class	IP52 front (panel mounted), IP31 back	
weight	190 g	320 g

F4xx0 operating mode

F4xx0 continuously measures and shows its input voltage frequency and signalizes if the frequency is inside or outside programmed range by light-emitting diodes and relay contacts. If the frequency goes outside range, the display blinks with frequency 2-3Hz (blinking can be turned off any time from user menu). The device signalizes that measured frequency has gone outside range after programmed amount of time (programmed as number of consecutive out-of-range measurements) thus eliminating random short-time switching of the relays. Hysteresis is also added to relay switch-off characteristics to further improve noise characteristics of the remote signaling. If the frequency goes again in the specified range plus hysteresis frequency, **F4xx0** turns the relays off instantly without any delay.

User-defined parameters

- low frequency level
- high frequency level
- display blinking
- hysteresis
- relay delay



SI4080 SI4100

SI4080 and SI4100 are digital measuring, fully programmable panel instruments from series 4080 and 4100. SI4080/4100 shows the current position of the tap changer of the high-voltage transformer in electrical substations. These meters are part of tap changer-motor drive equipment. The position of the tap changer can be read either analogue (by resistor matrix) or digital (BIN or BCD input). SI4080/4100 are designed to be mounted on boards in control rooms in electrical substations.

SI4080/SI4100 options:

- (A/D)	basic option - reads and shows current tap changer step
A	analogue input (resistor matrix)
D	digital BIN or BCD input
B	digital BIN or BCD output for remote signalization
C	code-protected user menu

Every option can be ordered in any combination with other options, excluding versions "A" and "D". One of "A" and "D" options must be specified.

SI4080/SI4100 technical specification

	SI4080	SI4100
input	analogue/ BIN/ BCD	
digital input voltage range	5-48 VDC	
analogue input single resistor step	6/ 8/ 10 Ohm	
analogue input maximum matrix resistance	390 Ohm	
analogue input maximum steps	39 @ 10 Ohm; 48 @ 8 Ohm; 64 @ 6 Ohm	
digital input maximum steps	127 @ BIN-input; 79 @ BCD-input	
maximum wiring length	* 200 m @ 0.75mm ² ; 400 m @ 1.5 mm ² ; 700 m @ 2.5 mm ²	
power supply range	55-250 VAC/ 80-350 VDC	
display	4-digit super bright red with purple filter	
display size	76x25 mm	94x29 mm
measuring cycle	< 1 s	
number of output relays	7	
power consumption	< 3 W	
operating temperature	0 °C to +55 °C	
storage temperature	-50 °C to +90 °C	
dimensions (H/W/D)	48/96/85 mm (w/o plugs)	144/144/65 mm (w/o plugs)
mounting hole	43/90 mm	136/136 mm
protection class	IP52 front (panel mounted), IP31 back	
weight	190 g	320 g

* - at maximum matrix resistance 390 Ohm; at lower resistance maximum wiring length may reach over 3km. For further information please contact the manufacturer or authorized dealer.

SI4xx0 operating mode

The current position (step) of the tap changer is displayed. After changing the tap position the new position is displayed with reaction time lower than 1s and the new position is coded as programmed by the user (BIN or BCD) and sent to the output. While arrow button is pressed and the analogue input is selected, the maximum step number for the resistor matrix is displayed.

User-defined parameters

- input type - analogue/ BIN/ BCD
- output type - BIN/BCD
- steps number at analogue input
- delay after step change
- analogue input single resistor step and number of resistors
- set each step display

VA4080 VA4100



VA(R)4080 and VA(R)4100 are digital measuring, fully programmable panel instruments from series 4080 and 4100. VA(R)4080/4100 measure signed active (VA4xx0) and reactive (VAR4xx0) electric power in electrical substations and power plants. VA(R)4080/4100 are designed to be mounted on boards in control rooms in electrical substations.

VA4080/VA4100 options:

- basic option - measures and shows either active or reactive power
- D** dual display, active and reactive power are shown simultaneously
- R** free-potential relay contacts for remote signalization are provided
- C** code-protected user menu

VA4080/VA4100 technical specification

	VA4080	VA4100
voltage input range	0-120 VAC/ 0-250 VAC	
current input range	0-1 AAC/ 0-5 AAC/ 0-10 AAC	
power supply range	from input voltage	55-250 VAC/ 80-350 VDC
display	4-digit super bright red with purple filter	
display size	76x25 mm	94x29 mm
measurement error	< 1.5 % rgd + 6 digit (active), < 2.5 % rgd + 8 digit (reactive)	
measuring cycle	< 1 s	
number of relay contacts	3xNO	
power consumption	< 3 W	
operating temperature	0 °C to +55 °C	
storage temperature	-50 °C to +90 °C	
dimensions (H/W/D)	48/96/105 mm (w/o plugs)	144/144/85 mm (w/o plugs)
mounting hole	43/90 mm	136/136 mm
protection class	IP52 front (panel mounted), IP31 back	
weight	210 g	340 g

VA4xx0 operating mode

VA4xx0 displays currently measured power - active on the upper display and reactive on the lower display, if the device has dual display. If it has single display, it shows the manufacturer programmed type of power (active or reactive). While pressing the arrow button the display shows the nominal primary power, calculated from current and voltage transformers ratio.

VA4xx0 wiring

VA4xx0 can be connected to the current and voltage lines either directly (if voltage and current values are in the specified operating range) or by current and/or voltage transformers. It is recommended that at least one transformer is used (either current or voltage) as the current and voltage inputs are not isolated.

User-defined parameters

- nominal primary voltage and decimal point position
- nominal primary current and decimal point position
- show power sign (on/off)
- display blinking
- power high level
- power low level
- hysteresis
- relays delay

CF4080 CF4100



CF4080 and CF4100 are digital measuring, fully programmable panel instruments from series 4080 and 4100. CF4080/4100 measure signed value of cosine of phase angle between their voltage and current inputs. CF4080/4100 are designed to be mounted on boards in control rooms in electrical substations.

CF4080/CF4100 options:

- | | |
|----------|---|
| - | basic option - measures and shows phase angle cosine |
| R | free-potential relay contacts for remote signalization are provided |
| C | code-protected user menu |

CF4080/CF4100 technical specification

	CF4080	CF4100
voltage input range	0-120 VAC/ 0-250 VAC	
current input range	0-1 AAC/ 0-5 AAC/ 0-10 AAC	
power supply range	from input voltage	55-250 VAC/ 80-350 VDC
display	4-digit super bright red with purple filter	
display size	76x25 mm	94x29 mm
measurement error	< 1.5 % rgd + 4 digit	
measuring cycle	< 1 s	
number of relay contacts	3xNO	
power consumption	< 3 W	
operating temperature	0 °C to +55 °C	
storage temperature	-50 °C to +90 °C	
dimensions (H/W/D)	48/96/105 mm (w/o plugs)	144/144/85 mm (w/o plugs)
mounting hole	43/90 mm	136/136 mm
protection class	IP52 front (panel mounted), IP31 back	
weight	210 g	340 g

CF4xx0 operating mode

CF4xx0 continuously measures and displays the phase angle cosine between its voltage and current input. If the values of the input voltage and/or current are too small to provide correct measurement of the cosine of the phase angle, a "----" is shown on the display.

CF4xx0 wiring

CF4xx0 can be connected to the current and voltage lines either directly (if voltage and current values are in the specified operating range) or by current and/or voltage transformers. It is recommended that at least one transformer is used (either current or voltage) as the current and voltage inputs are not isolated.

User-defined parameters

- show cosine of phase angle sign (on/off)
- display blinking
- high level of cosine function
- low level of cosine function
- hysteresis
- relays delay

G1602



G1602 is a universal microcontroller unit for weighing. The unit general purpose is to measure mass in all kinds of applications, but could also be used in specific tasks. The user can change all metrological parameters of the scale (according to OIML R76-1), and also to use additional functions such as counting pieces, measure the weight in percent, connection to personal computer and so on. Special modes are implemented to protect the measurement against malicious acts. The unit comes in plastic box with protection class Ip55, but in special cases (special order from the client) the protection class can be up to IP67. The large display and ergonomic keyboard allows easy reading of the result and comfortable work. Applies the requirements of EN 45501:2001 (OIML R76-1).

G1602 adjustable parameters:

Number of measurement divisions	300 ÷ 30 000 divisions
Value of the division	1,2,5 *10 ^k gr, K=-1 ÷ +6
Decimal point position, from right to left	1..4
Button ZERO range	1 ÷ 20% F.S
Tracking zero for 1s	0 ÷ 1,9e
Button TARE range	0% ÷ 100% F.S
Maximum displayed measured value	Max + (1e ÷ 100e)
Tracking of load cell hanging for 20s	0,0e ÷ 1,9e
Counting function	On/Off
Percent function	On/Off
Choice of working with predefined articles	On/Off
Choice of working with labeling printer	On/Off
Choice of working with block condition after the measurement	On/Off

Technical specifications of G1602

weight measuring by means of converting resistance change to voltage

input resistance of the measuring circuit	>1 MΩ
output resistance of the load cell	82Ω - 10kΩ
display	Triple super red - 5 digits for weight, digit height 20,0mm, two 6-digit displays for single and total price, digit height 10 mm.
keyboard	16-button keyboard with metal-made buttons
serial interface	RS-232C included, RS-485 optional; Channel: 9600bps, 8, N, 1
measuring full cycle	< 2 s
measurement error	0,5e; for 3000 divisions according to OIML R76-1 (BDS EN 45501:2001)
power consumption	< 2 W
work temperature	от -10 °C до 40 °C
storage temperature	от -50 °C до +90 °C
dimensions (H/W/D)	170/190/70 mm
mounting	on horizontal or vertical surface
protection class	IP55, to IP67 - special order
own weight	0,7 kg
power supply	220VAC (+10/-15%), 50Hz(+2/-2Hz); 12V DC - special order

Additional functions and accessories:

With special order it is possible to build dosing and automation functions by means of additional controller, providing control to weigh unit and additional peripheral devices.

We also provide special software for reading measurements and controlling the scale, based on G1602. We offer different kinds of software, working on both DOS and Windows platforms. Thus, a special variant is the program for truck scales, providing ease of use .

Another options are several kinds of serial or parallel interfaces (RS-485, M-bus, etc) which are completed when special requirements are present from the client.

G5102



G5102 is a universal microcontroller device for weigh measurement. This is the simplified version of G1602 in cases, where only weight measurement is needed. Basic set-up for random tensometric cell can be made, but the options are limited, compared to G1602. The measurement principle here is based on the well-known theory of double integration. This gives the module incredible noise immunity to power supply. The standard unit comes in a high quality plastic box, with dimensions of 170x160x70mm, keyboard with four buttons and class of protection IP55. When special requirements are present, the class of protection can be up to IP67.

G5102 adjustable parameters:

Number of measurement divisions	500 ÷ 15 000 divisions
Value of the division	1,2,5 *10 ⁿ g, K=-1 ÷ +6
Decimal point position, from right to left	1..4
Tracking of load cell hanging for 20s	0,0e ÷ 1,9e
Counting function	On/Off
Settling time	10ms - 300ms
Serial channel baudrate	1200 - 19200bps

All other metrological parameters are non-changeable. They are:

- button ZERO range - 2% F.S.;
- button TARE range - 50% F.S., subtractive multi-tare;
- max indication - F.S. + 8e;
- initialization of zero position < 10% F.S.;
- speed of 'zero tracking' - 0,5e/1s;
- average measurements for standstill criteria - 16.

Technical specifications of G5102

weight measuring by means of converting resistance change to voltage

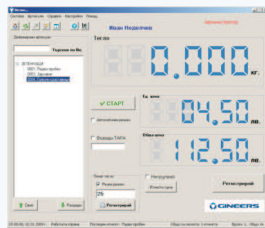
input resistance of the measuring circuit	>1 MΩ
output resistance of the load cell	82Ω - 10kΩ
display	5-digit display, digit height 25,4mm
keyboard	4-button membrane keyboard
serial interface	RS-232C standard, RS-485 optional; Set-up: 9600bps, 8, N, 1
measuring full cycle	according to service set-up and calibration
measurement error	0,5e; up to 3000 according to OIML R76-2 (БДС EN 45501:2001)
power consumption	< 1,5 W
work temperature	from -10 °C to +40 °C
storage temperature	from -50 °C to +90 °C
dimensions (H/W/D)	170/160/70 mm (w/o connectors)
mounting	on horizontal or vertical surface
protection class	IP55 standard, up to IP67 optional
own weight	1,9 kg
power supply	220VAC (+10/-15%), 50Hz(+2/-2Hz); 12V DC optional

Additional functions and accessories:

The idea behind this unit is simplifying, therefore - low-cost solution. For this reason there are not many additional functions or accessories except the mentioned one. Anyway, any changes and improvements of the functionality are possible upon customer request.

Various types of interfaces can be added for connection of the scale to net of other devices (labeling printers, data acquisition and control systems, etc.).

Software



Gineers Ltd. also develops scale software for different kinds of PC operating systems. In these computerized world it is normal solution for everybody to automate his production or measurement cycle, collecting all needed information for quick reports, print notes, bills, etc. It is essential to have good software, made by manufacturer, and to know that he will do changes for you, if needed. That is our main purpose - to give flexibility and usability to our clients.

We have several universal programs, intended to use with our scales, and a few very specific as well. We are always ready to change our programs or to write something new, if that will help client to organize better his production process.

Short description of our software, used with weigh scales

Autoscales v1.1 and v2.0b (Windows)	intended for use with truck scales up to 100t
Govedo 1.2 (Windows)	special software for animal processing
Scale collector v1.1 (DOS/Windows)	simple collector of measurements; articles; price calculation; simple reports
Scale collector v2.0 (Windows)	v1.1, plus client info, detailed reports, printing of weigh notes
Simple scale	another variant of scale collector
ViVenda Labels	program for label printing. Controls the scale and labeling printer. Detailed reports

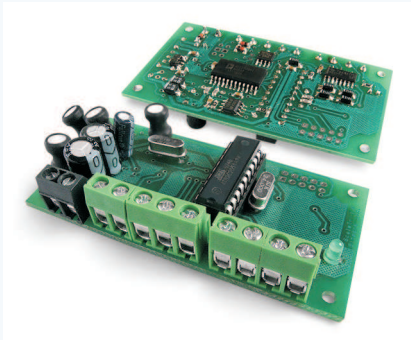
Scales

Connection between the scale and PC is through standard serial RS-232C/RS-485 interface. Our software uses either MySQL server or self-made database files. Requirements for a PC, running our software, are not high - for the windows software the requirement is MySQL server v.4.1.12 and higher to work satisfiable.

We can easily port our programs to Linux platform.

Anything in software can be changed, if you have any suggestions - please contact us!

SCT



Sct is a small PCB, intended to be embedded in bigger devices. The purpose of SCT is to measure signal from a load cell and to transmit continuously data to another controller or personal computer. SCT has modern sigma-delta ADC, EEPROM memory and serial RS-232/RS-485 interface. It is set and calibrated via personal computer, using GINEERS software. The size of the board are 77x50mm and is ideally suited in dosing and automation systems, where weight measurement is needed, but it is not the main part of the system. Additionally, there are four lines for controller-to-controller interface (one line on interrupt), but these can be also used for digital inputs/outputs by the user, to act when certain weight is reached. The biggest advantage of this unit is his price.

SCT adjustable parameters via RS-232:

Number of measurement divisions	500 ÷ 30 000 divisions
Value of the division	1,2,5 *10 ^k g, K=-1 ÷ +6
Calibration	0 - 60 000 g/kg
Selection of switching outputs for 2 loads	
ID on serial RS-485 network	1 - 63
Serial channel baudrate	4800/9600 bps

Scales

The other metrological parameters are constants, hard coded in firmware. These are:

- 10% initial zero load;
- 2% semi-automatic function ZERO (command via interface);
- 100% semi-automatic function TARE (command via interface);
- maximum load MAX + 8e;
- zero tracking - 0.5e/1s;
- equilibrium - less than 2 ADC divisions difference in two full measurement cycles
- measurement cycle = 1.0s

Anything in firmware can be changed, if you have any suggestions - please contact us!

4080 series

Series 4080 are industrial programmable measuring and indicating devices with four-digit LED-display (75/22mm) for panel mounting. Their dimensions are (H/W/D) 48/96/85 mm standard and may vary on special request. At this moment we have devices for measurement of voltage, current, frequency, power, resistance, weight. It is possible that unit for measuring any physical value (such as temperature, pressure, humidity, etc.) can be purchased. They can be purchased with free-potential contacts for remote signalization.

4100 series

Series 4100 are industrial programmable measuring and indicating devices with four-digit LED-display (94/29mm) for panel mounting. Their dimensions are (H/W/D) 144/144/65 mm standard. At this moment we have devices for measurement of voltage, current, frequency, power, resistance, weight. It is possible that unit for measuring any physical value (such as temperature, pressure, humidity, etc.) can be purchased. They can be purchased with free-potential contacts for remote signalization.

5036 series

Series 5036 are industrial programmable measuring and indicating devices with five-digit LED-display (35x12 mm) for panel mounting with dimensions (H/W/D) 48/48/72 mm. At this moment we have devices for measurement of voltage, current, frequency, programmable timers and (motor) hour meters. It is possible that unit for measuring any physical value (such as temperature, pressure, humidity, etc.) can be purchased.

Weight measurement

We offer standard and unique solutions in weight measurement area for industrial or commercial use. We produce standard and price-calculating weight-measuring units with standard interface for connection to PC with automatic blocking, measurement data saving, preparing detailed reports for all the data form the measurements, etc.

M-bus devices

M-BUS is reliable and cheap interface/protocol for connection and communication between different types of devices. It has become a standard in building networks for remote reading of tax meters. We produce variety of devices needed for complete building a m-bus network for remote reading of meters, including the software for processing the data read.

Industrial automation

We produce various kinds of automation control devices applicable in the industry. Although these devices are build on common base, as every device is unique we produce them only on special request. We also have the software to control these devices from PC.

Special software

We produce PC/embedded software for industrial control, creation and management of databases, preparing detailed reports, etc. We also make special software by client's specifications.



If you have any questions or special requirements, please feel free to contact us on our web-site www.gineers.com or by phone (+359-2) 975-81-05!

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