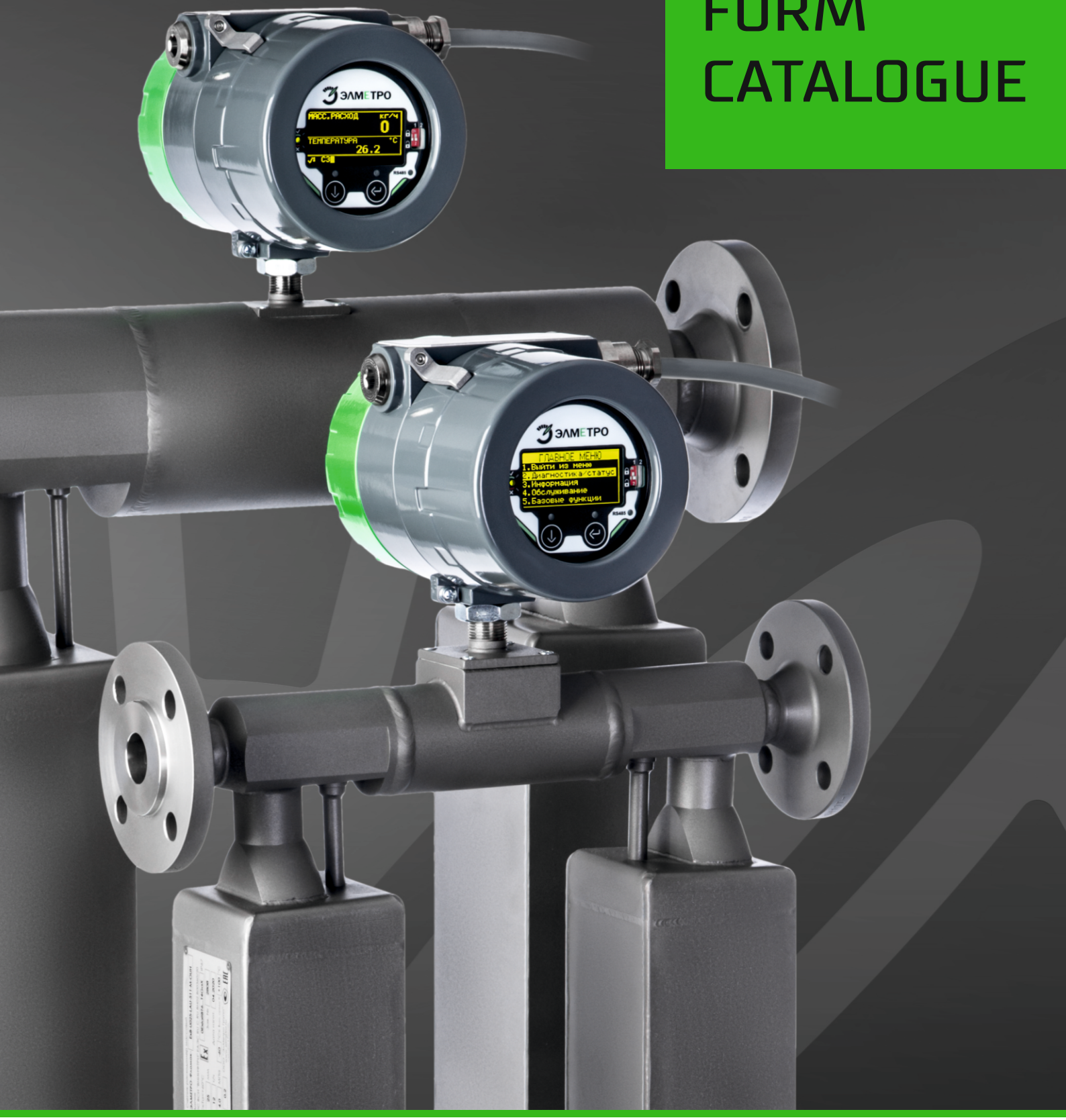
SHORT FORM CATALOGUE



ELMETRO
ENERGY OF INNOVATION

ELMETRO
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RECOGNITION OF COMPETENCE

Our solutions have received the positive reviews from the largest companies in Russia

ENERGOMASH

ROSATOM

Grodno Azot

ROSNEFT

RUSAL

fortum

GAZPROM

SIBUR

LUKOIL OIL COMPANY

NOVATEK

TRANSNEFT

УГМК UMMC

"NAFTAN" OPEN JOINT STOCK COMPANY

KAZAKHMYS Energy

EuroChem

TATNEFT

КазМунайГаз
ПАВЛОДАР МҰНАЙ-ХИМИЯ ЗАУЫТЫ

EXXON Mobil

HALLIBURTON

ArcelorMittal

...and 800 more companies

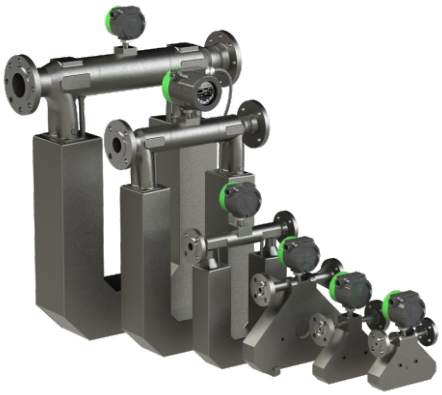
ELMETRO
ENERGY OF INNOVATION

"... creating and promoting advanced technology solutions for high-precision measurement at instrumentation and control equipment market"

ENERGY OF INNOVATION
is the motto of our company
since 2008

FIELDCOMM GROUP™
MEMBER

Our goal is to create and promote advanced technology solutions for high-precision measurement at instrumentation and control equipment market where the know-how is provided by world-class Research & Development. We are proud of our innovative products and solutions: DSP-technology based flow products (coriolis and gas ultrasonic), calibration benches and unique "Metrology engineering" concept-based diversified laboratories, videographic recorders, electric equipment, level meters, level switches and etc. We annually improve our devices in production and advance new products of ELMETRO brand to the former Soviet Union countries market. They successfully compete with products of global manufacturers. It is the result of jointed efforts of our customers, own Research and Development Center, production units, marketing and sales departments.



ELMETRO
ENERGY OF INNOVATION

MULTIVARIABLE CORIOLIS FLOWMETERS

Multivariable
Coriolis mass flowmeters
for liquid and gas
ELMETRO-Flomac

High speed digital signal processing (DSP) significantly improves measurement accuracy

Liquid flow ranges (nominal and maximum) (Water, T=20°C):

DN,mm	2	3	5	10	15	25	32	40	50	70	80	100	150	200
Fnom, t/h	0,04	0,1	0,25	0,8	3	12	21	21	45	110	126	175	280	740
Fmax, t/h	0,06	0,16	0,4	1,5	4,5	18	30	30	70	130	210	250	400	1100

ФОНД СОДЕЙСТВИЯ РАЗВИТИЮ
малых форм предприятий в научно-технической сфере

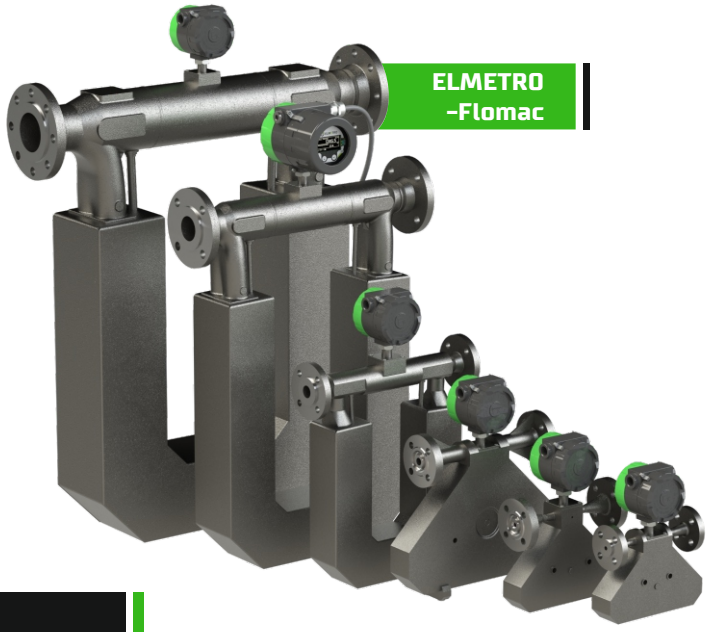
Innovative device for direct measurement of mass flow, density and temperature of liquids and gases as well as for calculation of volume flow, volume, concentration rate of two-components fluids in process control and custody transfer.

The only Coriolis flowmeter made in Russia registered in international HART association. Full support of HART rev.7. Backward compatibility with HART rev.5. Supplied DD file provides full functionality with AMS software and HART communicators.

HART COMMUNICATION PROTOCOL

HART REGISTERED

SIL2



- **Expansion of production in Chelyabinsk is supported by a grant from the State Fund for the Promotion of the Development of Small and Medium sized enterprises in the Sphere of Science and Technology**
- **Measured mediums:** liquids (including high-viscosity liquids and aggressive liquids), gas, gas mixtures and emulsions
- **Measurement accuracy:**
  - **of mass flow:** ±0,1%; ±0,15%; ±0,2%; ±0,5%;
  - **of density, kg/m³:** ±0,3; ±1,0; ±2,0;
  - **medium temperature, °C:** ±1,0
- **Range of density measurement:** 1...3000 kg/m³
- **Built-in advanced smart self-diagnostic system with built-in monitoring of metrological characteristics**
- **Pressure and temperature compensated**
- **Immunity to gas inclusions in liquids**
- **Detection and treatment of air bubbles and plugs leading to flow rupture**
- **Modbus register map compatibility with global manufactures products**
- **Capacitive keyboard for configuration in Ex-hazardous areas**
- **Concentration calculation for two component fluid**
- **Maximum working pressure of measured medium:** 4,0...50,0 MPa, process connection in accordance to **GOST, ANSI, DIN** and etc
- **Integral and remote** (up to 150 m) **types**
- **Temperature range of measured medium:** -200 ... +250°C
- **Flow path can be made** from stainless steel 12X18H10T and 316L; stainless steel lined with PTFE; Hastelloy
- **Ambient temperature range:** -60...+60 °C;
- **Explosion-proof class:**
  - **of sensor** 0Ex ia IIC T6 ... T2 Ga X or 0Ex ia IIB T6 ... T2 Ga X;
  - **of measurement module:** 1Ex db [ia Ga] IIC T6 Gb X or 1Ex db [ia Ga] IIB T6 Gb X;
  - **of processor module:** 1Ex db IIC T6 Gb X or 1Ex db IIB T6 Gb X
- **Output signals:**
  - 4...20 mA, status; frequency; pulse
  - HART v.5 / HART v.7; RS-485 (Modbus RTU)
- **Selftuning power supply:** 20...140 VDC / 80...250 VAC

ELMETRO
ENERGY OF INNOVATION

Gas flowmeters for process metering and custody transfer

Ultrasonic gas flowmeters ELMETRO-Flous

- **Measured mediums:** gases and gas mixtures
- **Pipeline mounting options:**
  - **full path structure** (Dn50...Dn300);
  - **probe type** (Dn100...Dn1000)
- **Built-in flow computer with input of component composition via ModBus registers**
- **Volume normalization to standard conditions with high accuracy**
- **Volume measurement accuracy under operating conditions:** ±0,5...±2,0 %
- **Dynamic range: from:** от 1:100 to 1:400
- **Self-test and signal quality self-diagnostic**
- **Solutions for aggresive fluids and gas with droplet fraction**
- **Capacitive keyboard for configuration in Ex-hazardous areas**
- **Absolute pressure of measured medium:** 0.05 ... 16.0 MPa with process connection in accordance to GOST, ANSI, DIN and etc
- **Minimum pressure losses**
- **Logging of readings, errors, setting changes and power interruptions with reference to real time**
- **Direct and reverse flow measurements**
- **Temperature range:**
  - **of measured medium:** from -70 to +120°C;
  - **of ambient:** from -50 to +50°C
- **Explosion-proof class:** 1Ex db IIB T6...T4 Gb X or 1Ex db IIC T6...T4 Gb X
- **Output signals:**
  - pulse-frequence; discrete; 4-20 mA+HART
  - RS-485 (Modbus RTU protocol)
- **Selftuning power supply:** 20...140 VDC / 80...264 VAC

Basic gas flow ranges under operating conditions (full path structure):

DN, mm	50	80	100	150	200	300
Qmin, m^3/h	2	5	7	17	35	80
Qmax, m^3/h	200	550	800	1900	3600	7600

ELMETRO-Flous measure gas volume flow value under operating and standard conditions, evaluate mass flow rate, mass and volume, heat value. The flowmeter displays the measurement results and registers them in a log with reference to real time (maintaining an archive of process parameters).

The flowmeter ELMETRO-Flous can be used in applications for oil gas, waste gas, flare gas and others.

Videographic recorders ELMETRO-ViER

Visualization of process parameters at any stage of the technological process

Type	Number of channels							ViER -104K	ViER -M7
	Analog inputs	Analog inputs AP/AVP*	Analog outputs	Frequency inputs	Discrete inputs	Discrete outputs R	Discrete outputs (RP, RS, T, SR)		
General purpose industrial	up to 20	up to 16	4/8	8/16	up to 32	up to 32	8/16/32	●	●
General purpose industrial 1-, 2-, 3-channels	1/2/3	-	1/2/3	-	0/4	4/8	-		●
General purpose industrial 1-, 2- channels	1 / 2	-	1 / 2	-	-	4/8/16	-	●	
Explosion proof	up to 10	up to 6	-	8/16	-	4/8/16	8/16	●	

*AVP are available for EX-type only;
AP – for general purpose type only

Videographic recorders ELMETRO-ViER are designed to convert, record and display signals of DC current load, DC voltage and resistance as well as to convert signals of thermal couples, resistance temperature detectors and other primary transducers into physical quantity measurements units via several channels.

Recorders perform functions of regulation, signaling, mathematical processing of measured parameters.

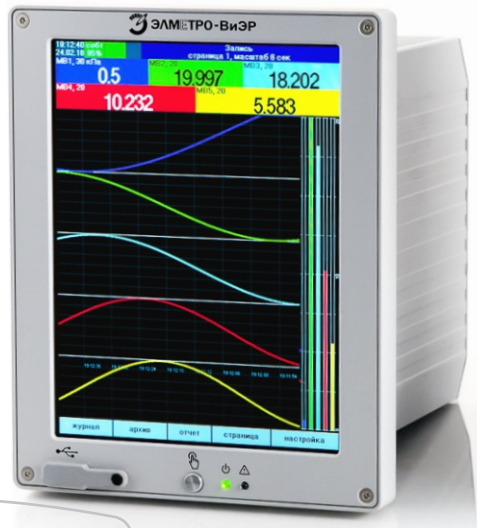
ELMETRO -ViER-M7 | 8" touch-sensitive screen

ELMETRO -ViER-104K | 10.4" Vandal-resistant design

Explosion proof type [Exia] IIC

ELMETRO -ViER-M5,7 | 5,6" low cost model

- **Calculation of flow rate under the differential pressure method according to GOST 8.586.(1-5)-2005**
- **Easy integration in automatic technological process control systems (ATPCS)**
- **PID control**
- **Extended self-test**
- **Options:** totalizers, tags, tables, timers, timing, mathematical logic
- **Mnemonic scheme support for visualization of the process technology**
- **Various signaling types support**
- **Archiving data with a large archive depth**
- **Low-channel-count designs for replacing paper recorders**
- **Time of channels simultaneous polling is up to 0.1 s**
- **Increasing the number of analog channels up to 64 by external ELMETRO-MVV/ELMETRO-MVV-02 I/O modules**
- **Interchannel galvanic isolation**
- **Universal analog inputs for signals of:**
  - thermal couples, resistance temperature detectors (RTD), pyrometers, DC resistance;
  - current: 4-20 mA; 0-20 mA; 0-5mA;
  - DC voltage: 0-100 mV; 0-1 V; 0-10 V
- **Discrete and pulse-frequency inputs:**
  - "dry" contact (open collector);
  - potential signal (in accordance to GOST R51841-2001);
  - pulse-frequency (in accordance to NAMUR);
  - signals of PNP type sensors.
- **Discrete outputs:**
  - Medium power relay – circuits up to 5A;
  - Signal relay – circuits up to 1A;
  - Polarised bistable relay;
  - Solid-stated relay;
  - Triac – only AC circuits
- **Analog current outputs:** 4-20, 0-5, 0-20 mA
- **Built-in flow computer function**
- **Built-in power supply source** (24V/100mA)x4
- **Available interfaces:** 2xRS485 (Modbus RTU), CAN 2.0, Ethernet (Modbus TCP)
- **OPC technology support**
- **Single and multi-user database mode (MySQL Server) support**



Input and output modules ELMETRO-MVV, MVV-02-Ex

Development of high-efficient and low cost process control systems

Type	Explosion proof type	Analog inputs/ outputs	Discrete/pulse-frequency inputs	Discrete outputs
ELMETRO -MVV	-	Up to 8/8	Up to 4/0	Up to 16+1
ELMETRO -MVV-02	-	Up to 6/0	Up to 12/12	-
ELMETRO -MVV-02-Ex	*	Up to 6/0	Up to 12/12	-

Note: application of modules ELMETRO-MVV(02) enables to increase number of channels in recorders ElMetro-ViER up to 64

Input-output modules ELMETRO-MVV are designed to receive and convert signals of various sensors of distributed data collection systems and transmit received data via RS-485, CAN, Ethernet interfaces or wireless inerface to the upper level of distributed control systems (DCS). Modules are aimed at building production process control systems for industries with severe operating conditions.

Modules could be applied independently as well as to be integrated into an external control system.

ELMETRO -MVV

- **Calculation of the flow rate under the differential pressure method in accordance with GOST 8.586. (1-5) -2005**
- **Easy integration in distributed control systems (DCS)**
- **Time of channels simultaneous polling is up to** 0.1 s
- **Interchannel galvanic isolation**
- **Sensors could be powered via** 4-20 mA interface
- **Explosion proof type** [Exia] IIB/IIC (ELMETRO-MVV-02-Ex)
- **Mathematical processing of input data**
- **Local regulation and signaling**
- **Compliance with up-to-date requirements to EMC**
- **Power supply is available via Ethernet (PoE)**
- **Wide range of configurations**
- **Universal analog, discrete and pulse-frequency channels (NAMUR, dry contact)**
- **Available interfaces:** RS-485 (Modbus RTU), CAN 2.0, Ethernet (Modbus TCP)
- **OPC technology support**
- **Perfect compatibility with recorders "ELMETRO-ViER"**

ELMETRO -MVV-02-Ex Explosion proof type [Exia] IIB/IIC

ELMETRO
ENERGY OF INNOVATION

Robust component of an effective controlling, signaling, protection system

Vibrating level switch ELMETRO-VSPU

- **Detection of liquids with a density** from 400 to 2500 kg/m^3
- **The temperature range of the operating medium is** -50...+150 ^{o}C
- **Ambient temperature range:** -40 (-50)...+80 ^{o}C
- **Process pressure** up to 6.3MPa
- **Work in highly viscous media** up to 10,000 cSt
- **Modification:** general industrial, explosion-proof (for zones 1 and 0 of explosive gas atmosphere, including the border of these zones)
- **All common types of output signals:**
  - **Electromechanical relay** (SPDT, two independent outputs);
  - **Transistor p-n-p type** (two independent outputs);
  - **Thyristor** (break AC ≈220V);
  - **Discrete DC 8/16 mA;**
  - **Discrete NAMUR**
- **The second output may be used for duplication of the main output or for signaling the second media boundary (liquid / liquid) of for signaling the status of signaling device**
- **The length of the sensor part is** from 65 to 6000 mm
- **Any type of process connection: standard (fittings, flanges) and customized**
- **Output Trigger Simulation for Testing Secondary Equipment**
- **Trip point stability:** up to ± 1mm
- **Adjustment of triggering delay to prevent false switching at waves on surfaces**
- **Protection against the absorption of moisture from the environment and accumulation in the plug**
- **The function of detecting the separation of media, such as air-oil-water, fuel-oil, oil products-produced water, etc.**
- **No foam and bubble effect on the detector**
- **IP rating IP67**

ELMETRO-VSPU signaling devices are designed for controlling and signaling the maximum levels of liquids in opened or closed tanks, including the tanks under pressure, in technological installations, and detecting liquid in pipelines. ELMETRO-VSPU signaling device can be used in regulation and control systems in various industries: metallurgy, oil refining, chemical, energy and others.

ELMETRO
-VSPU

Pneumatic pressure calibrator ELMETRO-Pascal-05

A unique device for accurate reproduction of low and ultra-low pressures

Reproducible pressure range, kPa	Accuracy class 0.01	Accuracy class 0.15	Accuracy class 0.02
0,02 ≤ Pn < 0,1	± 0,2 Pa	± 0,2 Pa	± 0,2 Pa
0,1 ≤ Pn < 2	± 0,4 Pa	± 0,45 Pa	± 0,5 Pa
2 ≤ Pn ≤ 40	± 0,01 %	± 0,015 %	± 0,02 %

Designed to accurately reproduce low gauge or differential pressure. The calibrator is used as a working pressure standard for checking and calibrating pressure measuring instruments in calibration laboratories.

- **High accuracy pneumatic pressure calibrator**
- **Calibrator accuracy class:** 0.01; 0.015; 0.02
- **Pressure generation range** from 0.02 to 40 kPa
- **Discreteness of pressure generation** 0.005 kPa
- **Reference port pressure nominal value** 0.3 kPa

ELMETRO -Pascal-05

ELMETRO
ENERGY OF INNOVATION

Convenient and reliable operation in field and in laboratories

Portable multifunctional calibrator/Pressure calibrator ELMETRO-Pascal-03/04

- **Portable multifunctional calibrator with pressure and current loop calibrator functions**
- **ELMETRO-Pascal-04 upper range gauge pressure values** from 1 kPa to 60 MPa, for absolute pressure from 100 kPa to 1 MPa, for underpressure from 1 kPa to 100 kPa
- **Reference modules ELMETRO-Pascal-04 are separate measuring instruments and can be used within automated stands, controllers and calibrators of the ELMETRO-Pascal series**
- **Data archive is maintained**
- **PC software "ARM-Pascal"**
- **Pressure measurement error:**
  - for overpressure over ±0,02%;
  - for absolute pressure over ±0,02%
- **Types: general purpose industrial type and explosion proof type 1ExiaIIBT4X**
- **Power supply for a transmitter under test:** 24 V x 25 mA
- **HART-compatible interface with smart pressure transmitter**
- **Output current signal generation modes:**
  - Generation of current or voltage value for verification of secondary instruments;
  - "Simulation" - the calibrator is connected to the measuring circuit with an external power supply instead of the pressure sensor and simulates its operation
- **Calibrator power supply:**
  - built-in power supply 4 x 1.2 V;
  - from the 9 ... 18V power supply unit (included)
- **Calibrator working time with fully charged replaceable battery (with display backlight on):**
  - more then 8 hours in measurement mode;
  - more then 4 hours in the verification mode with the sensor power supply from the calibrator (24 V x 20 mA);
  - more then 5 hours in 20 mA current generation mode

Parameter	Range	Basic permissible error limit
In measuring mode		
Current, mA	0...24	(0,00003TCV+0,2uA)
Voltage, V	-1...1	(0002|CV|+0,0001V)
	-50...50	(0004|CV|+0,0002V)
In reproduction mode		
Current, mA	0,001...24	(0,00003CV+0,2uA)

Note: CV – current value of measured (reproduced) parameter

Designed for accurate generation and measurement of absolute pressure and gauge pressure, under pressure and electrical voltage and current signals. It is used as a reference instrument when checking / calibrating pressure transmitters, manometers and other pressure devices - both in the laboratory and directly on site ("in the field").

ELMETRO -Pascal-03

Reference modules ELMETRO-Pascal-04

ELMETRO
ENERGY OF INNOVATION

METROLOGY ENGINEERING

ELMETRO
ENERGY OF INNOVATION

Complex task performace
in the field of
metrology engineering

From analysis of customer's requirements and capabilities to assembly contract supervision and operation maintenance

Equipping metrology laboratories with stands for verification and calibration of measuring devices

Comprehensive facilities for
metrology laboratories

- **Specialist on-site visit**
- **Analysis of devices subject to verification**
- **Preparation of technical and commercial proposals according to the customer's needs**
- **3D-modeling of metrology laboratories with arrangements of proposed facilities**
- **Development, production and supply of ready-to-operate benches/laboratories**
- **Application of advanced equipment**
- **Qualified contract supervision, precommisioning work and customer's specialists training**
- **Author's supervision and consultation**
- **Technical maintenance within warranty and post warranty period**
- **Development of new solutions for ensuring the uniformity of measurements**
- **More than 1000 developed projects**
- **Own reference units base**
- **Unique solutions in the field of metrological support**

Benches for verification and calibration of:

- **overpressure, absolute and differential pressure transmitters within** the range from -95 kPa to 160 MPa
- **manometric measuring devices within** the range from -95 kPa to 160 MPa
- **temperature measuring devices operated** from -90 °C to 1600 °C
- **all types of level meters** from 500 mm to 30 m with absolute error above 0.3 mm
- **gas analyzers**
- **reels** (up to 100 m), **gauging rods** (up to 5 m), **leveling rods and rulers** (up to 4 m)
- **electric switchboard instruments (of all types including relay automation), electrical quantities measuring devices and electricity meters**
- **thermocouple and ionization vacuum manometers within the range between** 10^{-3} and 10^{-9} mm Hg
- **PH-meters**
- **verification benches for the devices of linear and angular measurements**
- **vibration sensors**
- **conductometers and etc.**
- **more than 1000 successfully implemented projects**

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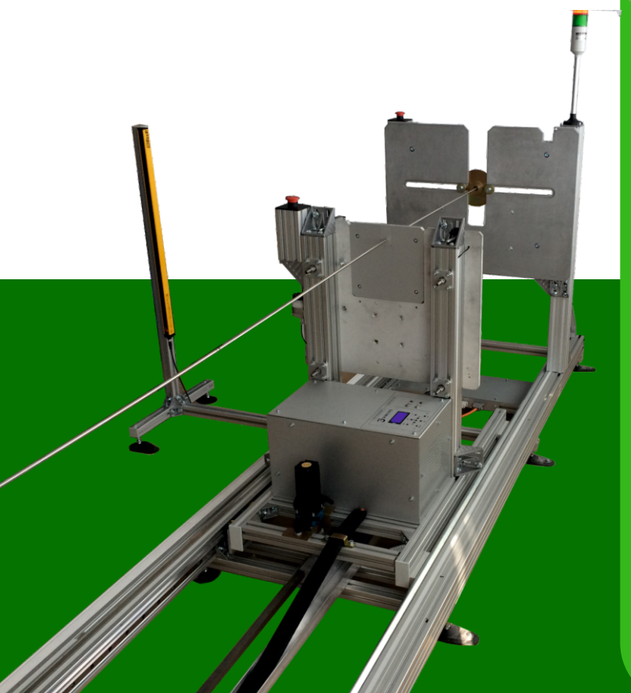

Verification equipment for oxygen pressure measuring devices

Present equipment is applied to carry out verification, calibration and repairing of various oxygen measuring devices which are operated in assembly with decontaminated reference measuring devices on basis of comparison technique. Inner working space is decontaminated by ultrasonic method.

- **Pneumohydraulic system** ELMETRO-SPG-700-K (0...70/100 (water/oil) 0...4 (air)
- **Hydraulic press with precise regulation unit** ELMETRO-PG-250-K/700-K (0...25/70)
- **Collector with 4 adjustment channels** ELMETRO-K4-250-K and ELMETRO-K4-700-K (up to 25 MPa (K4-250-K) up to 70 MPa (K4-700-K)
- **Upright** ELMETRO-S-700-K (up to 70 MPa)
- **Hose** ELMETRO-R-700-K (up to 70 MPa)
- **Quick-detach connection** ELMETRO-SBS-70 (up to70 MPa)
- **Collector with 2 adjustment channels** ELMETRO-K2-250-K and ELMETRO-K2-700-K (up to 25 MPa (K2-250-K) up to 70 MPa (K2-700-K)
- **Filter** ELMETRO-100B-K (up to 100 MPa)
- **Characteristics:** 60 MPa, 50 mkm

Pressure sources: pumps, uprights, presses and collectors

Pressure sources are intended for generation of gauge pressure, absolute pressure and vacuum inside a reference verified (calibrated) pressure measuring device. The source are included into pressure calibrator supply package or could be supplied separately.

- **Manual pneumatic pump**
  ELMETRO-PRN-2.5 (-0.095...0.25 MPa)
- **Manual pneumatic pump**
  ELMETRO-PRN-40/PRN-60 (-0,095...+4 / -0,095...+6 MPa)
- **Manual hydraulic pump**
  ELMETRO-GRN-350/GRN-700 (0...35/ 0...70 MPa)
- **Pneumohydraulic system**
  ELMETRO-SPG-700/1000
  (0...70/100 MPa (water/oil) 0...4 MPa (air))
- **Electric pump**
  ELMETRO-PEN-0.4 (-0.4...+0.4 bar)

ELMETRO -GRN-350/700

ELMETRO -PRN-40/60

ELMETRO -PRN-2,5

ELMETRO -SPG-700/1000M

ELMETRO -PEN-0.4

ELMETRO
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Electrical pneumatic power systems SPP

Electrical pneumatic power systems are designed to provide pneumatic networks and devices with compressed air of the 1st contamination grade in accordance to GOST 17433.
The system is suitable for pneumatic power of benches and laboratories and ensures convenient work of production personnel (low-noise operation up to 48 dB).

- **Regulation ranges of output pressure:**
  from 0.08 to 11 MPa;
  unregulated vacuum -0.1...0 MPa
- **Air contamination grade at output of power supply system:** 1st class in accordance to GOST 17433
- **Low noise level:**
  45...48 dB (EKD1, EKD4);
  59 dB (EKD2);
  48 dB (EKD3)
- **Filter fineness:** 5 mkm
- **Electric supply:** 220 ± 22 V, 50 ± 1,25 Hz
- **Overall dimensions (LxWxH), mm**:
  750x450x900 (EKD1);
  600x500x500 (EKD2);
  600x400x300 (EKD3);
  400x300x300 (EKD4)

Weight, kg			
EKD1	EKD2	EKD3	EKD4
26...70	40...120	40...120	18

Air-preparation units for pneumatic calibrators and pressure controllers BPV

Air-preparation units are applied for:
- fine filtration and dehumidification of air which is used to power pressure reference devices;
- protection against contamination from inner space of verified devices;
- regulation of output pressure to a required level if powered by a workshop network, gas bottle or compressor.

- **Productivity, Nl/min:**
  50, 100 (EKD1);
  10...50 (EKD2);
  10...50 (EKD3);
  1...2 (EKD4)
- **Regulation ranges of output pressure:**
  from 0.01 to 4 MPa;
  unregulated vacuum 0...-0.1 MPa
- **Air contamination grade at output of BPV:** 1st class in accordance to GOST 17433
- **Filter fineness:** 5 mkm
- **Condensate drainage system**
- **Overall dimensions (LxWxH):** 300x300x400 mm
- **Weight:** 15 kg

ELMETRO -BPV

ELMETRO -EKD2,3

ELMETRO -EKD4

ELMETRO -EKD1

Multichannel multimeter ELMETRO-Kelvin

Automatic calibration, high-precision measurement and temperature signals conversion

Designed for high-precision signal measurement and conversion of temperature transducers with normal and unified electric signals 0-5 mA and 4-20 mA etc. based on temperature sensors operating principle.

It is used for certification of temperature patterns of thermostats and technological equipment, as well as a working or reference multichannel measuring device for verification, calibration and adjustment of various measuring and measuring & computing systems.

It is used as a separate measuring device and as a part of automated metrological benches.

Function	Range	Error
Current load measurement	±(0-25) mA	0.0065%+0.25 mkA
Voltage measurement	±(0-200) mV ±(0-1.1) V	0.005%+2 mkV 0.005%+10 mkV
Resistance measurement	0-400 Ohm 400-2000 Ohm	0.0025%+0.0035 Ohm 0.0025%+0.02 Ohm

- **High-precision measurement of temperature, voltage, current load and resistance**
- **Measurement error:**
  - of temperature from 0.2 °C (TC);
  - of temperature from 0.015 °C (RTD);
- **Reference digital device for multichannel verification of temperature sensors**
- **Verification archives filing**
- **Capacitive touch keyboard**
- **Perfect to measure several devices in assembly with the metrology benches**
- **8 independed measuring channels**
- **Communication interface:** USB/RS232
- **Supply voltage:** 220 V ±10 %, 50 ±1Hz
- **PC software ARM-Kelvin**
- **Automation of the processing of temperature measuring devices verification results**
- **Working with the multimeter measurements archive**
- **Formation verification protocol**

ELMETRO -Kelvin

ELMETRO
ENERGY OF INNOVATION

Automatic calibration and high-precision pressure reproduction and measurement

Automatic pressure calibrator-controller **ELMETRO-Pascal**

Parameters \ Model no.	1	2	3	4
UML, MPa	0,2	0,7	2,0	3,5
Capability of generating vacuum	yes	yes	yes	no
Module type	Internal + external			
Instability	not more than ±(1 Pa or 0.002% UML of working module)	not more than ±(2 Pa or 0.002% UML of working module)	not more than ±(5 Pa or 0.002% UML of working module)	not more than ±(10 Pa or 0.002% UML of working module)

- **High-precision automatic pressure controller operated within the** range between -0,1 and 3.5 MPa
- **Modes of pressure setting:** overpressure and underpressure
- **Operation modes:** basic, semi-automatic and automatic
- **Working medium:** air/nitrogen
- **Overpressure range:** 0...3.5 MPa, 0...2 MPa; 0...0.7 MPa; 0...0.2 MPa; 0...0.1 MPa, 0...6.3 kPa
- **Underpressure ranges:** -0.1...2 MPa, -0.1...0.7 MPa, -0.1...0.2 MPa, -0.1...0.1 MPa, -6.3...6.3 kPa
- **Main error of pressure reproduction or measurements is** from 0.025%
- **Calibrator power supply:** 220V ±10%; 50-60 Hz; not more than 20V*A
- **Verified transmitter power supply:** 24V x 30 mA
- **Communication interfaces for PC:** RS232 / USB
- **Pneumatic pilot ports:** G1/8
- **Verification interval:** 1 year
- **Basic component of metrological benches for pressure measuring devices verification**
- **Compatibility with ELMETRO-Pascal-04 modules**
- **Ability to connect external pressure modules**

Designed for automatic calibration of pressure and vacuum measuring devices. It can be used as a reference device during verification of pressure transmitters, manometers and other pressure equipment. It enables to create high capacity metrology benches for automatic adjustment and calibration of pressure measuring devices during their mass production and in metrology laboratories.

Due to its high efficiency of verification/calibration the device is perfectly suitable for preparatory works and scheduled maintenance.

It is used as a separate measuring device and as a part of automated metrological benches.

ELMETRO -Pascal

Multifunction portable calibrator ELMETRO-PKM

Automatic calibration, reproduction and measurement of electric, RTD, TC signals with high precision

Function	Range	Limit of permissible main absolute error [1), 2)]	
		ELMETRO-PKM-A	ELMETRO-PKM-B
DC power measurement	from -22 to +22 mA	±(0,000075·|CV|+1 mkA)	±(0,00015·|CV|+1 mkA)
Generation of DC power	from 0 to 25 mA		
DC voltage measurement	from -100 to +100 mV	±(0,000075·|CV|+5 mkV)	±(0,00015·|CV|+5 mkV)
	from -1 to +1 V	±(0,000075·|CV|+0,05 mV)	±(0,00015·|CV|+0,05 mV)
	from -10 to +10 V	±(0,000075·|CV|+0,55 mV)	±(0,00015·|CV|+0,55 mV)
Generation of DC voltage	from 0 to 100 mV	±(0,000075·|CV|+5 mkV)	±(0,00015·|CV|+5 mkV)
	from 0 to 1 V	±(0,000075·|CV|+0,05 mV)	±(0,00015·|CV|+0,05 mV)
	from 0 to 5 V	±(0,000075·|CV|+0,25 mV)	±(0,00015·|CV|+0,25 mV)
Resistance measurement	from 0 to 400 Ohm	±(0,000075·|CV|+0,01 Ohm)	±(0,00015·|CV|+0,02 Ohm)
	from 0 to 2 kOhm	±(0,000075·|CV|+0,05 Ohm)	±(0,00015·|CV|+0,1 Ohm)
Generation of resistance	from 0 to 400 Ohm	±(0,000075·|CV|+0,01 Ohm)	±(0,00015·|CV|+0,02 Ohm)
	from 0 to 2 kOhm	±(0,000075·|CV|+0,05 Ohm)	±(0,00015·|CV|+0,1 Ohm)

Notes:
1) CV – current value of measured (reproduced) parameter
2) in temperature range from +15 to +35 °C, including drift of indications within 1 year

The ELMETRO-PKM portable multifunctional calibrator (hereinafter referred to as the calibrator) is designed to measure and reproduce signals of DC power and voltage, DC electrical resistance, transformation and simulation of signals from thermocouples and resistance temperature detectors.

It is used for diagnostics, calibration and verification of secondary equipment, measuring channels of industrial controllers, as well as measuring transducers directly at the site of operation and in laboratory conditions.

- **High-precision portable multifunction calibrator with a baseline error of 0.0075%**
- **Measurement and reproduction of electrical signals of power and voltage of direct current, electrical resistance to direct current;**
- **Conversion and simulation of signals:**
  - of resistance temperature detectors (RTD);
  - of thermo-electric converters (TC)
- **Simultaneous reproduction / simulation and measurement / conversion of signals with galvanic isolation of channels.**
- **Working temperature range:** from 0 to +50 °C
- **PC interface**
- **No additional temperature error** in the temperature range from 15 to 35 °C
- **Registration number of the Declaration of Conformity (TR CU 004/2011, TR CU 020/2011) RU Д-RU.HA10.B.00295/18**

ELMETRO -PKM

ELMETRO
ENERGY OF INNOVATION

Cost-effective mobile diagnostics, calibration and verification

Multifunctional calibrator ELMETRO-Volta

Function	Range	Limit of permissible main error
DC power measurement, I	±(0 – 24) mA	0,03%*I + 1mkA
Generation of DC power, I	(0 – 24) mA	0,03%* I + 1 mkA
DC voltage measurement, U	±(0-100) mV; ±(0.1-1) V; ±(1-10) V; ±(10-50) V	0.03%*U+7 mkV; 0.03%*U+0.07 mV 0.03%*U+0.7 mV; 0.03%*U+7 mV
Generation of DC voltage, U	(-10...99.999) mV; (0...999.99) mV (1-12) V	0.03%*U+7 mkV; 0.03%*U+0.07 mV 0.03%*U+0.7 mV
Resistance measurement, R	(0-400) Ohm; (0.4-2) kOhm	0.03%*R+0.04 Ohm; 0.03%*R+0.1 Ohm
Generation of resistance, R	(0-400) Ohm; (0.4-2) kOhm	0.02%*R+0.08 Ohm; 0.02%*R+0.4 Ohm

- **The best size-to-accuracy ratio**
- **Measured and generated physical quantities:**
  - of DC current, voltage and resistance;
  - of resistance temperature detectors (RTD);
  - of thermo-electric converters (TC)
- **Simultaneous generation and measurement of signals**
- **Working temperature range:** -10...+50 °C
- **Graphic LCD with backlight**
- **Creation of internal verification and measurement series archives**
- **Communication interfaces for PC:** USB and software ELMETRO-Volta-Lite
- **Power supply:**
  - by a network power supply unit (9V)
  - by replaceable built-in batteries (2*AA)

It is a portable device intended for precise generation and measurement of DC current, DC voltage and omnic resistance as well as signals of resistance temperature detectors (RTDs) and thermo-electric converters.

Calibrator is applied for diagnostics, calibration and verification of secondary equipment, measuring channels of industrial controllers and temperature transducers - both in laboratories and directly at the operation site.

ELMETRO -Volta

Integrated
Automation
and Monitoring

ELMETRO
system
integration

Oil depot automation

What can we offer:

- Inspection, preparation of detailed technical specifications;
- Metering system design and quantity monitoring of LPG, oil and oil products, gas stations, process automation systems
- Installation and installation supervision of complex instrumentation products, automation and monitoring of technological processes systems;
- Commissioning work of instrumentation products and technological processes automation and monitoring system;
- Design and manufacture of automation cabinets;
- Warranty and post-warranty servicing of running systems.

Experience in the development and implementation of projects:

- Drilling fluid level monitoring system;
- The control system of SDPS power plant boiler operation;
- Oil depot automation system;
- Service and commissioning of ELMETRO devices as part of measuring installations;
- Local process automation systems based on the ELMETRO-ViER controller;
- Design and manufacture of automation cabinets and data collection from field equipment.

Used equipment and components

We are flexible in approaching customer requirements and we are ready to offer appropriate equipment and materials. ELMETRO has decades of experience working with third-party equipment, such as Siemens, Schneider Electric, Pnoenix Contact, NPP Sensor, Limako and other data from field equipment.

Licenses and certificates for work:

- Self-regulatory organization “Union of Ural and Siberian Construction Companies”
- Self-regulatory organization “Project organizations union”
- Certificate of implementation of a quality management system ISO 9001:2015.

Main functions:

- Automation of railway discharge and auto-loading;
- Fuel metering at railway discharge and auto-loading based on multiparameter mass coriolis flowmeters ELMETRO-Flomac;
- Control of oil product mass, density, temperature in vertical (Vertical steel tank) and horizontal (Horizontal steel tank) tanks;
- Measurement of the level of oil in stationary objects with an error of not more than 1 mm.

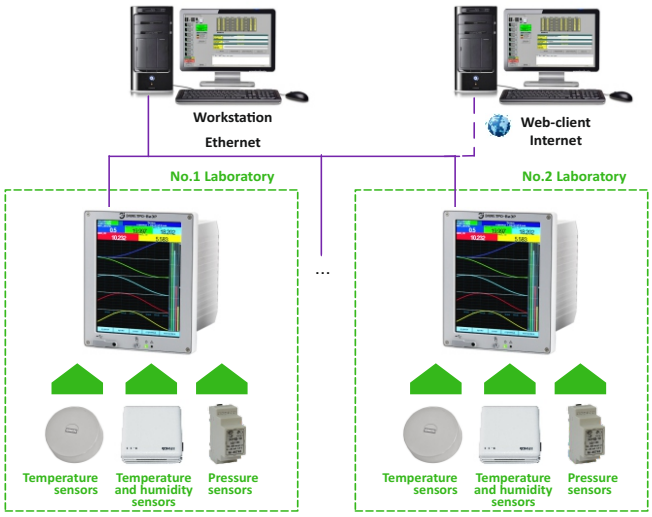
Equipment:

- Mass coriolis flowmeters ELMETRO-Flomac;
- Level meter PMP-201;
- Master-SCADA.

Detailed scheme:

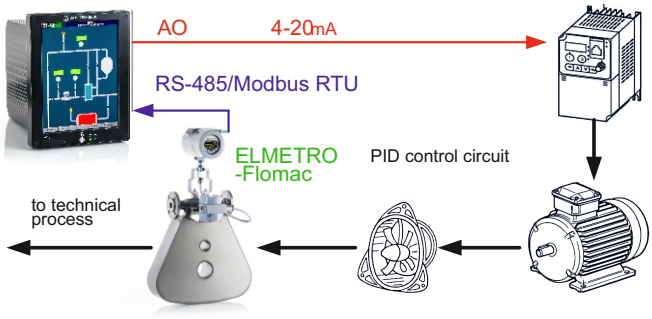
ELMETRO
ENERGY OF INNOVATION

Laboratory environmental **monitoring**

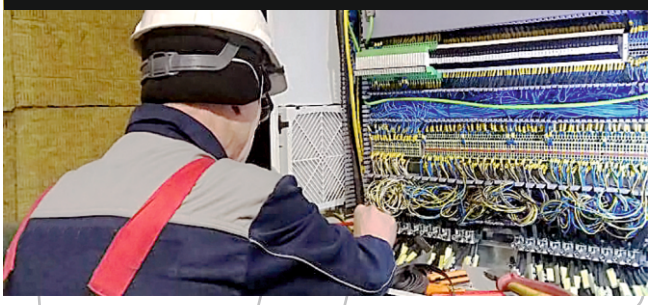


Hot air dosing system

Laboratory environmental **monitoring**



Design and manufacturing **control cabinets**



Local automation based on the videographic controller **ELMETRO-ViER**

- **Local process control, scheduling and archiving;**
- **Measurement, registration, visualization and conversion of electrical signals from sensors and devices, as well as digital signals (via interface);**
- **Ability to increase the number of channels and build distributed data collection systems using ELMETRO-MVV I/O modules;**
- **Display of technological process mnemonic diagrams;**
- **Regulation, signaling and mathematical processing of measured parameters;**
- **Ability to use up to 8 built-in PID controllers (control: current, pulsewidth modulation);**
- **Interfaces: RS-485 (Modbus RTU), CAN 1.0 / 2.0, Ethernet (Modbus TCP);**
- **Remote access from a computer for data exchange, processing of measurements archive and event log.**

Function:

Cabinets: distribution, automatic transfer, dispatching control, automation, with electric drives; control panels, etc.

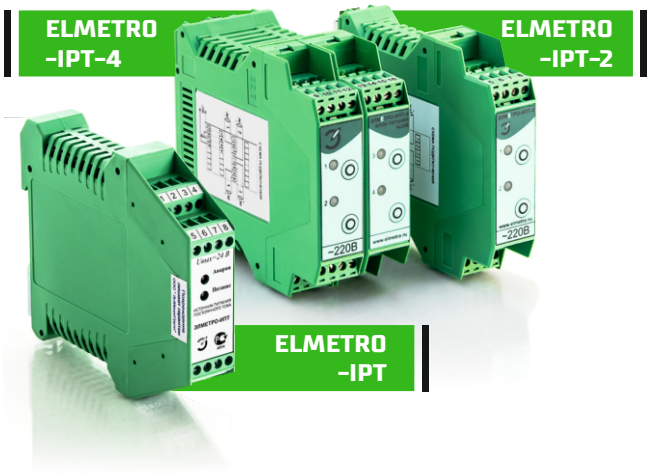
Design:

According to the requirements of the customer.

Single- and multichannel switched mode DC power supplies

Proper and effective power supply for your devices

DC power supplies ELMETRO-IPT/IPT2/IPT4 are designed for conversion of network voltage 220 V into stabilized voltage 24 V to power sensors with unified output signals.



- **1, 2 or 4 output channels**
- **Galvanic isolation between input and output circuits as well as between the channels**
- **Electronic protection against overload and short circuit**
- **LED indication of power supply level and overload**
- **Removable terminal block**
- **Compliance with HART protocol specifications on noise level**
- **Actuating current of electronic protection (1.3±0.2) A for IPT, (65±10) mA for IPT-2/4**
- **DIN rail mount is available**
- **Electromagnetic capability corresponds to group III of GOST R 50746-2000**
- **Output voltage: 24 V ±1% DC**
- **Protection from dust and moisture: IP20**
- **Working temperature from -25 to +60 °C**
- **"On / Off" buttons of an individual channel for the convenience of conducting commissioning work (lockable)**

HART-USB Interface converter ELMETRO-808M

Intended for communication between PC and devices with HART or RS-485 interface. Compatible with configuration software (ElMetro-HART, AMS, FieldCare and etc.).

The device could be used without an external power supply for sensors.

- Buit-in power supply for conected devices: 24V, 24 mA
- Built-in load resistance
- Up to 5 sensors could be powered simultaneously in multipoint mode
- 4-LED operation indication

Meter-regulator ELMETRO-TEIR

The ELMETRO-TeIR family of technological meterregulators is intended for measuring, visualizing, monitoring and regulating technological parameters in various industries.

Depending on the configuration, the devices perform the following functions:

- measuring and visualizing the value of a technological parameter;
- signaling devices;
- normalizing converter of output signals of resistance temperature detectors (RTD) and thermo-electric converters (TC);
- power supply of sensors through the current loop;
- temperature controller or other technological parameters according to algorithms: 2-position, 3-position, P, PI, PID, manual control is possible;
- transmission of measurement information to the control system via the digital RS-485 channel (ModBus RTU + OPC Server).

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Radar
lever meters
ELMETRO

NEW!

Accepting orders since the 1st quarter of 2021

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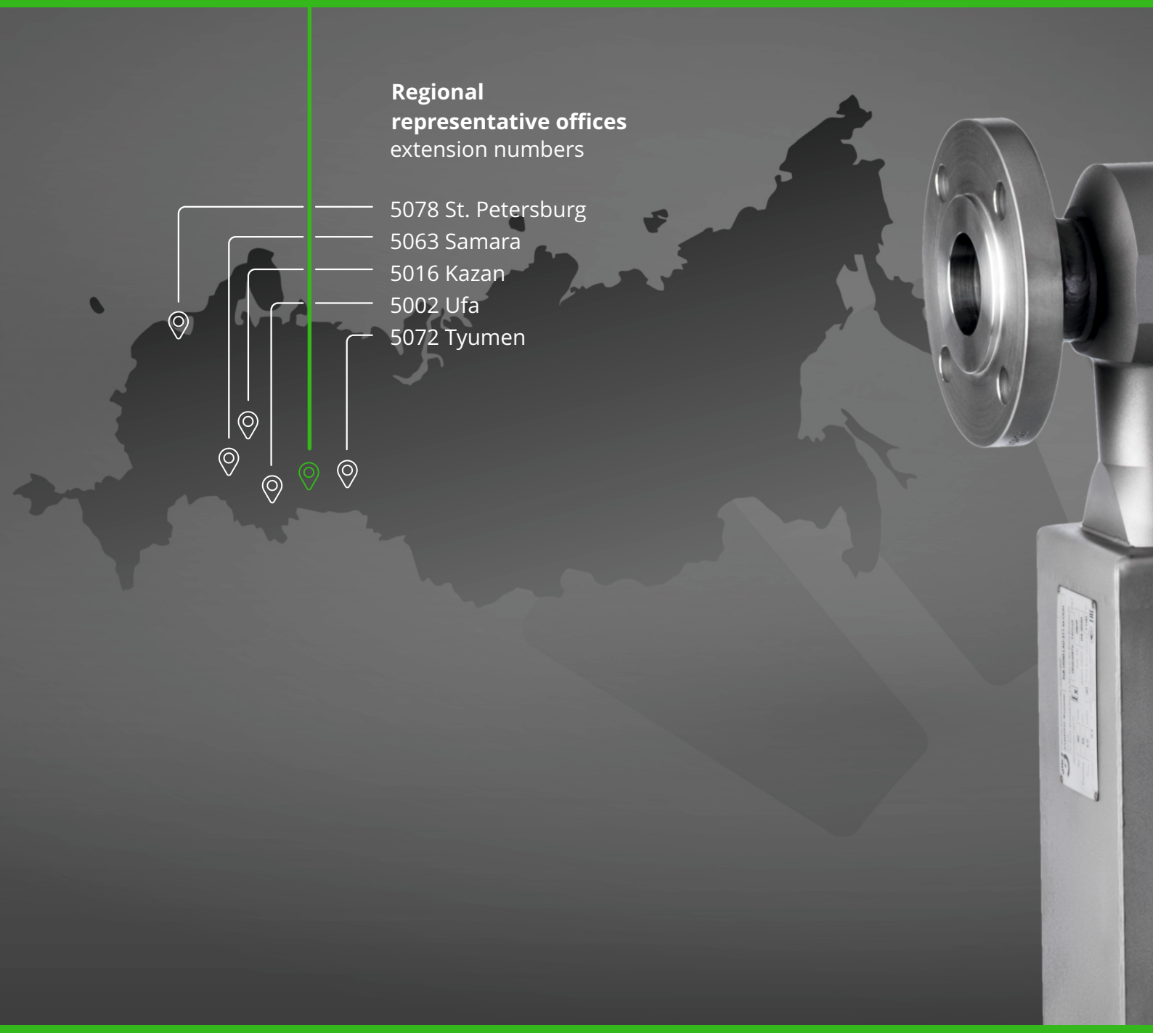

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Development and production of automation equipment, control and measuring, metrological equipment, metrological stands and laboratories