MFMC
group of companies

Programmable Logic Controllers

TITAN
CONTROL

+7-495-128-1-222
info@titanplc.ru

1.titanplc.ru

2.titanplc.ru

CONTENTS

ABOUT THE COMPANY

MFMC® – is a full-cycle engineering company engaged in comprehensive design, production, and supply of engineering equipment for all market segments, from residential construction to power-generating enterprises and heavy industry.

OUR MISSION

Supporting existing customers and **building** long-term partnerships with new ones.

Improving the quality of engineering equipment in the Russian market.

TODAY, MFMC® IS:

A leading company in the production of equipment for engineering systems;

16 years of experience in design, production, and equipment supply;

A team of highly qualified engineers in Moscow and other regions;

A wide range of manufactured equipment;

Significant production capacity (2 plants in Moscow, and Kimry);

An extensive network of regional branches across Russia;

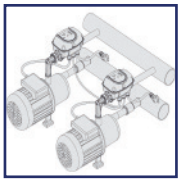
Certified equipment;

A quality management system;

A reliable partner in implementing projects of any complexity.

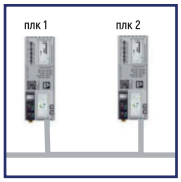
MANUFACTURED EQUIPMENT

PROGRAMMABLE LOGIC CONTROLLERS



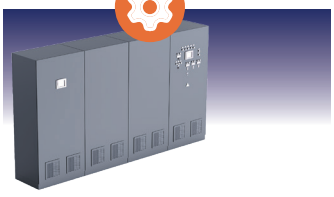
TITAN 1000
LOCAL PROCESS CONTROL
SYSTEMS (PCS)

TITAN 2000
DISTRIBUTED CONTROL
SYSTEMS (DCS)

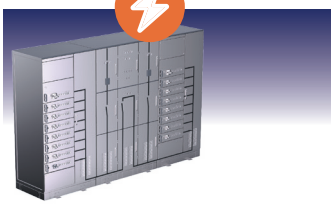


TITAN 3000
DCS WITH REDUNDANCY

AUTOMATION PANELS AND TURNKEY INSTALLATIONS



OMEGA CONTROL®
PUMP CONTROL SYSTEMS



OMEGA CONTROL® LOW-VOLTAGE
SWITCH UNIT.
POWER SUPPLY SYSTEMS
UP TO 6300A

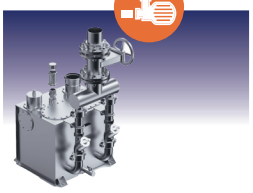
ALPHA STREAM®
TURNKEY PUMPING STATIONS

DELTA OS AQUA™
LOCAL WASTEWATER
TREATMENT PLANTS

SIGMA HEAT®
MODULAR HEATING UNITS

GAMMA ENERGY™
TURNKEY TRANSFORMER
SUBSTATIONS UP TO 6300 KVA

EPSILON FROST®
REFRIGERATION UNITS



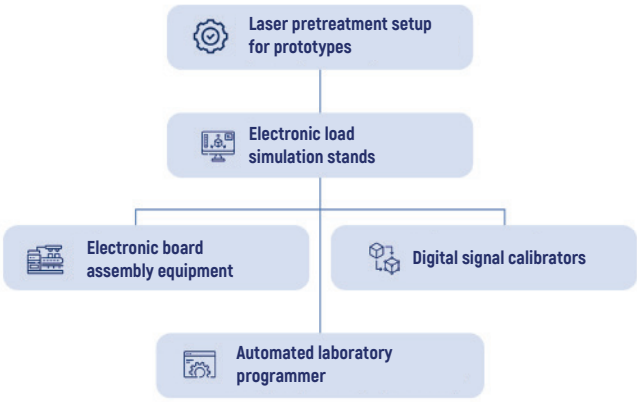
DELTA SPS LFT®
SEWAGE PUMPING STATIONS

RESEARCH AND DEVELOPMENT CENTER OF MFMC

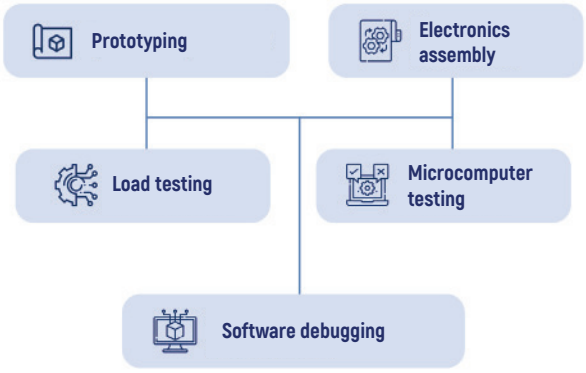
The research and development center of MFMC comprises over 50 highly qualified technical specialists, including:

- Design engineers for radio-electronic equipment
- Circuit design engineers
- Testing engineers
- Operating systems programmers
- Application software programmers

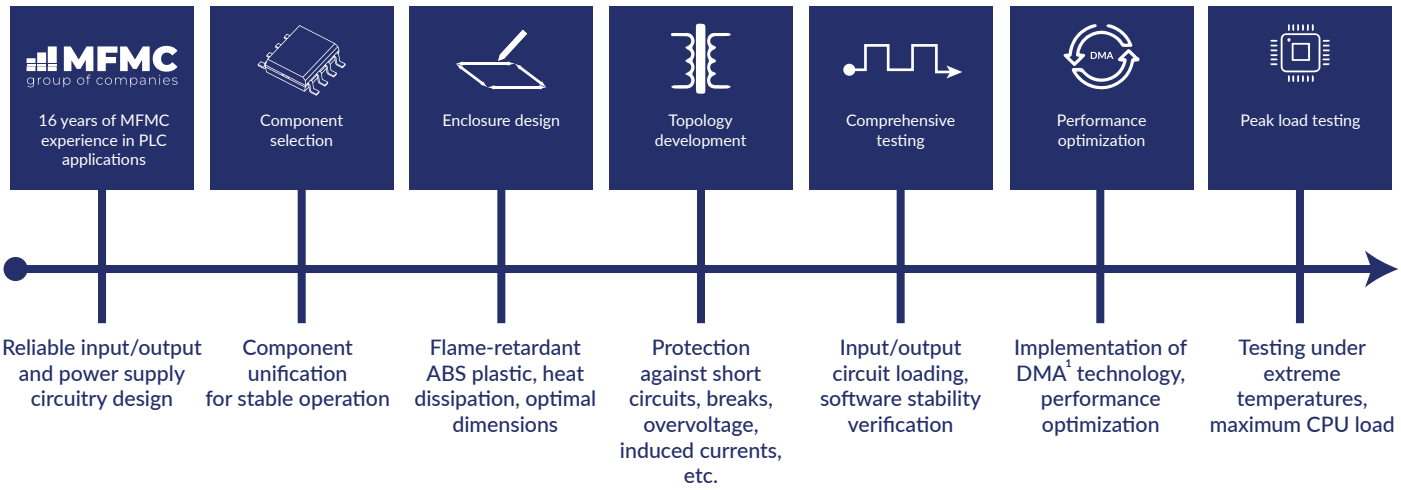
CENTER'S EQUIPMENT:



TYPES OF WORK PERFORMED:



THE CORE PRINCIPLE OF TITAN PLC DEVELOPMENT – RELIABILITY



[1] RESEARCH AND DEVELOPMENT CENTER OF MFMC

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group of companies

TITAN PLC

SECTION I

INDUSTRY STANDARDS

All products and software are developed and manufactured in the Russian Federation.

EAC TP TC 004/2011

Complies with the Technical Regulations of the Customs Union TR CU 004/2011 «On the Safety of Low-Voltage Equipment.»

EAC TP TC 020/2011

Complies with the Technical Regulations of the Customs Union TR CU 020/2011 «Electromagnetic Compatibility of Technical Equipment.»

Complies with noise immunity standards: GOST 30804.6.2–2013/IEC 61000–6–2:2005.

ГОСРЕЕСТР СРЕДСТВ ИЗМЕРЕНИЙ

Measuring instruments are registered in the State Registers of Measuring Instruments of the Russian Federation and CIS countries.

МИНПРОМТОРГ РОССИИ

In accordance with the Decree of the Government of the Russian Federation dated July 17, 2015, No. 719, the equipment is included in the register of Russian industrial products.

Минцифры России

Included in the register of domestic software of the Russian Ministry of Digital Development.

TITAN CONTROL® PROGRAMMABLE LOGIC CONTROLLER

TITAN CONTROL® modular programmable logic controller (PLC) is designed for building local and distributed process control systems (PCS). It ensures the collection and processing of data from primary sensors, the generation of control signals based on predefined algorithms, and the reception and transmission of information via serial communication channels.

TITAN 1000

TITAN 2000

TITAN 3000

LEVEL 4
ERP

LEVEL 3
MES

LEVEL 2
SCADA/HMI

LEVEL 1
Programmable Logic Controllers

LEVEL 0
Sensors and Actuators

The control program runs on the PLC, and management is monitored through input/output modules. The complex is designed for systems with varying numbers of I/O signals (up to 65,536), compact solutions, and remote I/O signal handling.

TITAN PLC COMPOSITION

THE TITAN PLC consists of hardware and software parts

HARDWARE SECTION

Central Processor Modules (Computing Modules)

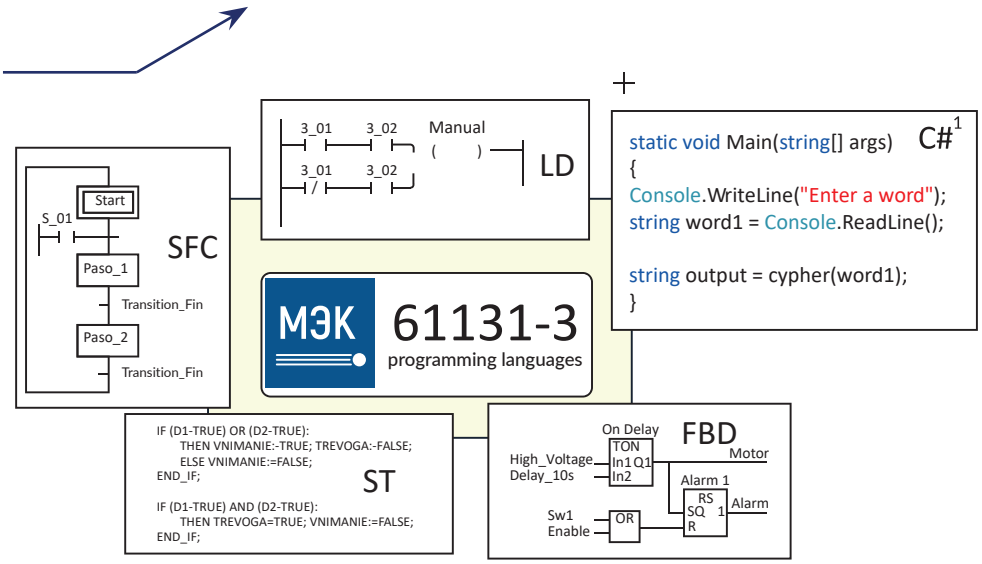
- Execution of the user program
- Communication with the higher-level AUTOMATIC PROCESS CONTROL SYSTEM (SCADA)
- Operation of the built-in self-diagnostics of the AUTOMATIC PROCESS CONTROL SYSTEM

TITAN 1000

TITAN 2000

TITAN 3000

Supported Programming Languages



[1] (The C# language is not part of the IEC 61131-3 standard but is supported by all TITAN PLC product lines)

Remote Input-Output (I/O) Modules

- Communication with the control object
- Collection and primary processing of signals from the lower level of the COMPUTER-AIDED PROCESS CONTROL SYSTEM
- Control of actuator mechanisms

Communication Processor Modules

- Exchange of information between the controller and third-party equipment
- Support for Modbus RTU, Modbus TCP, and many other protocols

OPTICAL ISOLATION

between channels
for module protection

11 TYPES

types of communication protocols supported, including PROFINet и BACnet

TITAN PLC COMPOSITION

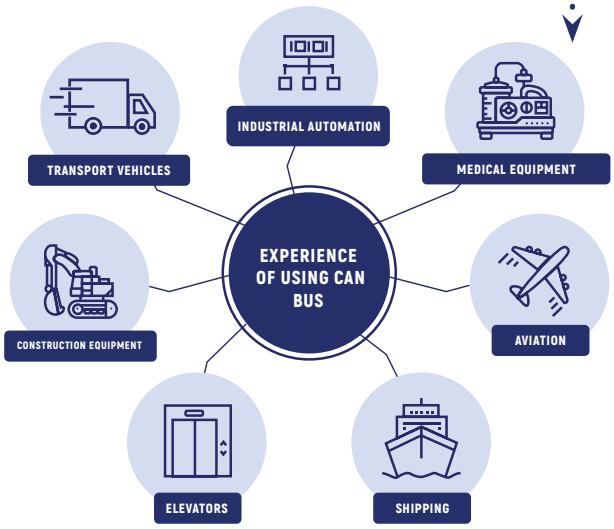
Communication Interface Modules

- Communication between the input/output module and the computing module
- Conversion of signals from input/output modules into communication interfaces and protocols

Power Supply Modules

- Power supply for internal controller circuits: U=5V DC
- Power supply for external circuits of controller input/output modules: U=24V DC

Inter-module communication is implemented via CAN bus



SOFTWARE COMPONENT

- Application software development environment is installed on a personal computer
- The controller's operating system continuously operates in the controller's computing modules

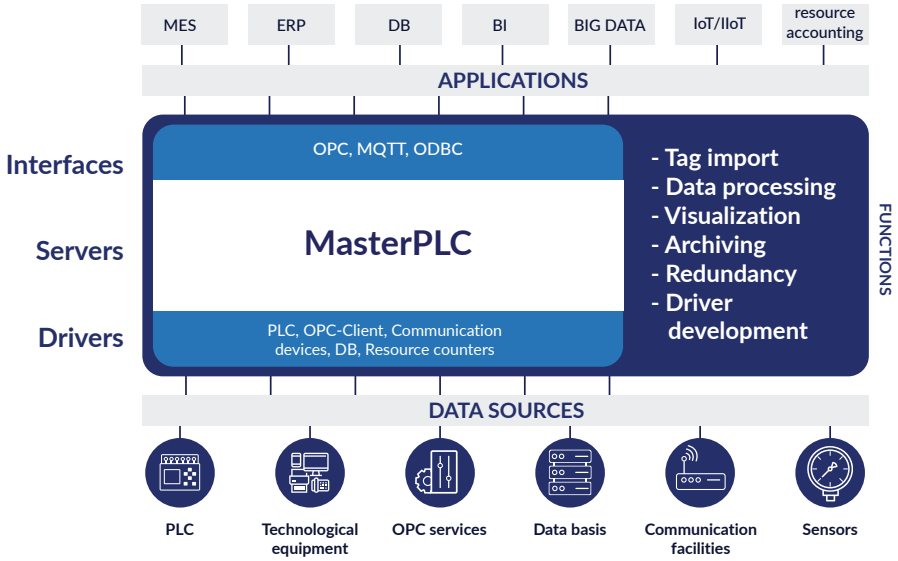
SPEED
- Message arbitration
- Real-time mode[1]

[1] The TITAN PLC supports «soft» real-time mode

RELIABILITY
- Complementary bits
- CRC

Development environment

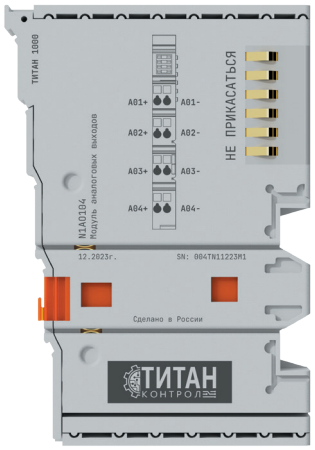
MasterPLC
100% Russian product from the developer MasterSCADA 4D



STRUCTURE OF THE CONVENTIONAL DESIGNATION FOR TITAN PLC PRODUCT LINES

END-TO-END MODULE MARKING

Guarantees quick identification
of the type and parameters of each module.



DESCRIPTION OF THE CODING SYSTEM FOR DESIGNATIONS

НП	ТТ	Х	КК
Type of the programmable logic controller (PLC)	Module type	Module revision, can take any values	Number of channels or ports in the module
N1-PLC TITAN 1000 — the first series for constructing small and medium-sized automated systems in terms of the number of input/output signals	CPU — cpu module		
	DI — discrete input module		
	DO — discrete output module		
	AI — analog input module		
	AO — analog output module		
	IM — interface module		
	IF — communication module		
	PS — additional power supply module		
	EN — terminal module		

TITAN PLC ADVANTAGES

FLEXIBILITY

MODULAR PLC ARCHITECTURE SUITABLE FOR BOTH LOCAL SCADA SYSTEMS AND DCS

- Up to 64 modules per 1 I/O unit
- Up to 9 types of interfaces, including wireless LTE communication
- Up to 255 I/O units in the system
- 12 signal types, 11 communication protocols

SPEED

SUPPORT FOR REAL-TIME OPERATION MODE [1]

- High-speed inter-module data bus (CAN)
- Parallel polling of I/O units
- DMA[2] technology for faster data processing (DMA)
- Automatic module addressing in the system

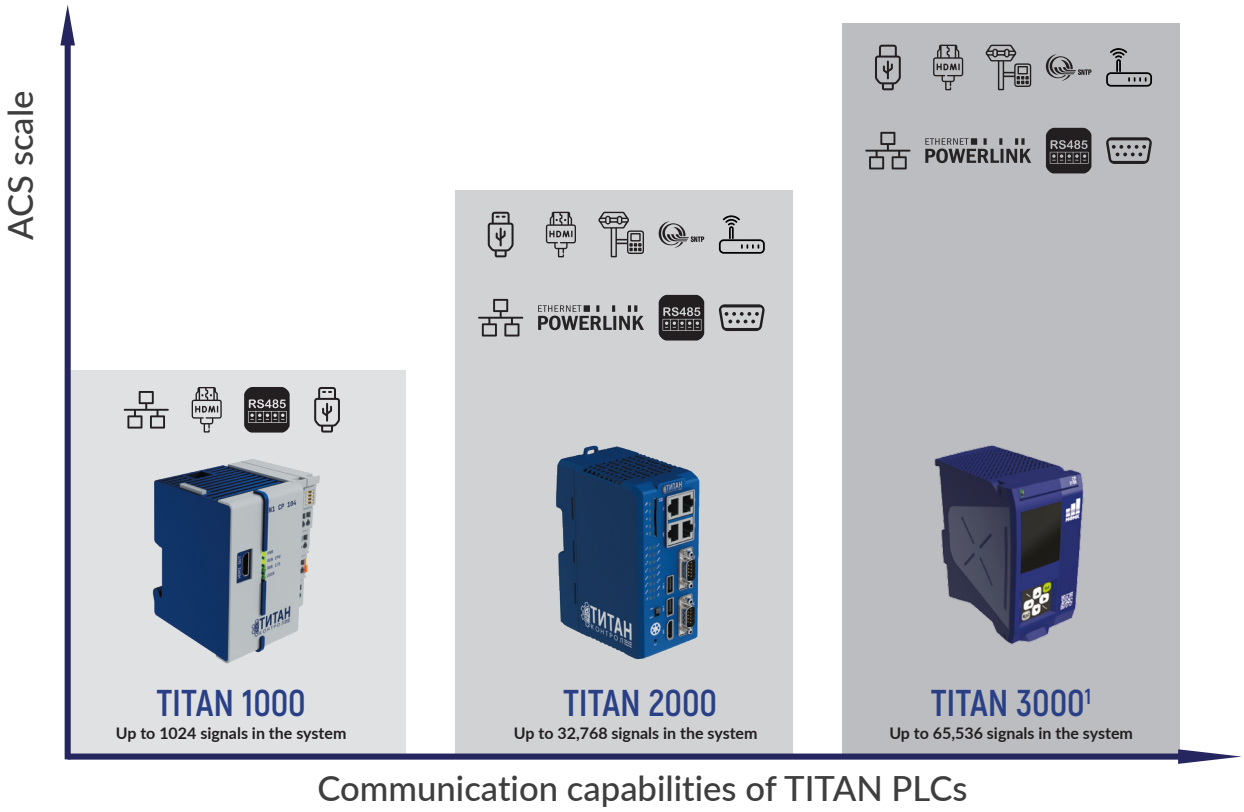
RELIABILITY

5-YEAR WARRANTY

- Galvanic isolation of I/O lines
- Built-in protection against short-circuit currents, voltage spikes, contact bounce, etc.
- Three-stage quality control in production (ГАРАНТИЯ КАЧЕСТВО 100% ГАРАНТИЯ)
- 15-year service life (15)

[1] Soft RealTime mode
[2] Direct Memory Access - direct data transfer from input lines to PLC memory

COMPARISON OF TITAN PLC PRODUCT LINES



TITAN PLCs are capable of managing distributed automated control systems (ACS) ranging from local installations to entire enterprises. Within a single ACS, different lines of TITAN PLCs can be combined. The communication capabilities of TITAN, especially the 2000 and 3000 series, ensure both the scalability of the ACS and compatibility with a wide range of equipment.

ADVANTAGES

100% COMPATIBILITY BETWEEN ALL LINES

The base line, TITAN 1000, already includes an HDMI port as standard, allowing cost-effective dispatching by connecting a monitor directly to the PLC.

CREATING UNIFIED PROCESS CONTROL SYSTEMS (PCS)

All three TITAN lines are equipped with a high-speed inter-module data transfer bus developed by MFMC. This solution enables the construction of PCS with real-time data transmission.

THE MAIN MODULE OF «HIGHER-END» LINES IS COMPATIBLE WITH MODULES FROM «LOWER-END» LINES

[1] The image shows a working prototype of the TITAN 3000 PLC.

COMPARISON OF TITAN PLC PRODUCT LINES

MAIN TECHNICAL SPECIFICATIONS


TITAN 1000


TITAN 2000


TITAN 3000

Processor Core	ARMv8 Cortex-A53	ARMv8 Cortex-A55	ARMv8 Cortex-A55
Processor Frequency, GHz	1,2	1,8	1,8
RAM (SDRAM DDR3), GB	1	2	2
System ROM, GB	-	16	32
User ROM (SDHC card), GB	Up to 64	Up to 128	Up to 128
Hot-swappable modules	No	Yes	Yes
Type of high-speed inter-module data bus MFMC	Type1	Type2	Type2
Number of modules connectable to the main PLC module (max)	32	64	64
Number of I/O units in the system (max)	32	255	255
Number of signals in the system (max)	1024	32768	65536
Support for system module redundancy	No	No	Yes
Protection rating against external influences	IP20	IP20	IP20
Power supply voltage	=24V	=24V	=24V / ~220V
Maximum current consumption (A)	0.35[2] / 1[3]	0.5[2] / 1.5[3]	0.5[2] / 1.5[3]
Dimensions (HxWxD), mm	97x54x69	142x62x106	200x100x150
Weight, g	140	400	800

RS485
RS – 485 with galvanic isolation

Protection against induced high voltage currents

Power supply with galvanic isolation

Supercapacitors for guaranteed preservation of important system settings and parameters

	TITAN 1000	TITAN 2000	TITAN 3000
PROGRAMMING LANGUAGE SUPPORT	ALL LANGUAGES ACCORDING TO IEC 61131-3, C#[5]		
RUNTIME ENVIRONMENT	MASTERSCADA 4D		
OPERATING SYSTEM	LINUX	LINUX	OCPB
Ethernet	2	2	4
PowerLink	-	2	2
RS-485	1	2	2
RS-232	-	2	2
USB 2.0	2	2	2
HDMI	1	1	1
LTE	-	Optional	1
GNSS (GLONASS)	-	1	1
SNTP	-	1	1

The high-speed inter-module data bus of TITAN PLC is a unique patented development by MFMC.

Thanks to this bus, TITAN PLC can ensure the operation of the control system in real-time[4] mode.

[1] Power supply current for computational parts of modules
[2] Average value
[3] Maximum value
[4] «Soft» real-time mode
[5] Excluding IL language

SUPPORTED PROTOCOLS AND DEVICES

[FOR ALL TITAN SERIES - 1000/2000/3000]

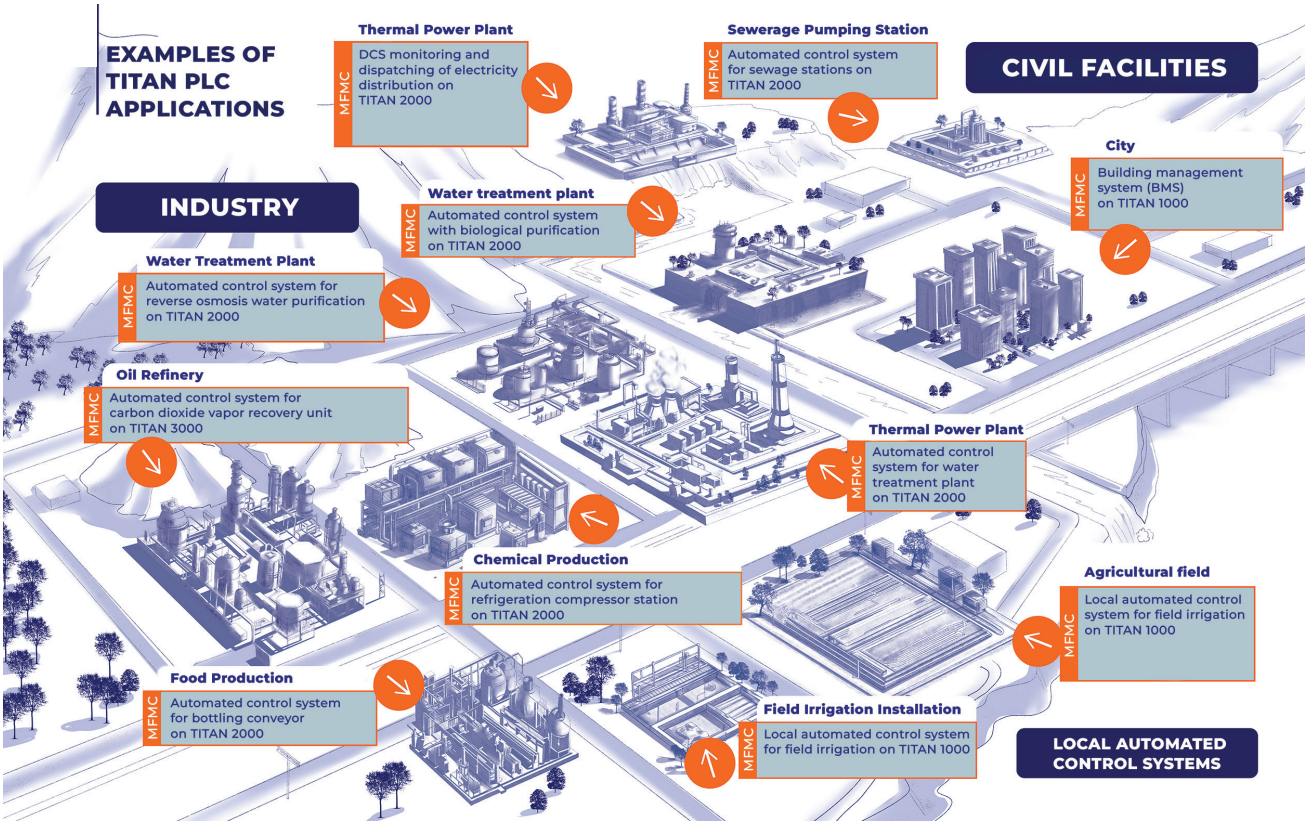
11 Supported Communication Protocols

- Modbus RTU Protocol (Master/Slave)
- Modbus TCP Protocol (Master/Slave)
- GOST R IEC 60870-5-101 Protocol (Master/Slave)
- GOST R IEC 60870-5-104 Protocol (Master/Slave)
- GOST R IEC-61850 Protocol
- FINS Protocol for Omron Equipment
- SLMP Protocol for Mitsubishi Equipment
- Profinet Protocol
- SNMP Protocol
- BACnet Protocol
- DLMS Protocol

12 Supported Devices for Communication

- Energomera Meters (CE301, CE303, CE304, Ts36850)
- H3IF Meters (C3T-4, PSC-4, C3B-1)
- Milur Meters
- Mercury Meters
- Mercury 225 Hub
- Heat Meters T3M-104, T3M-106, T3CMA-106
- Heat Meters VZLET TCP-024, TCP-027, TCP-042, TCP-043
- Heat Meters Teplocom VKT-7, VKT-9
- USPD UM-31
- Gas Volume Correctors EK-260, EK-270, EK-280
- Measuring Devices Elemer
- Pulsar Recorder Meters

EXAMPLES OF TITAN PLC APPLICATIONS

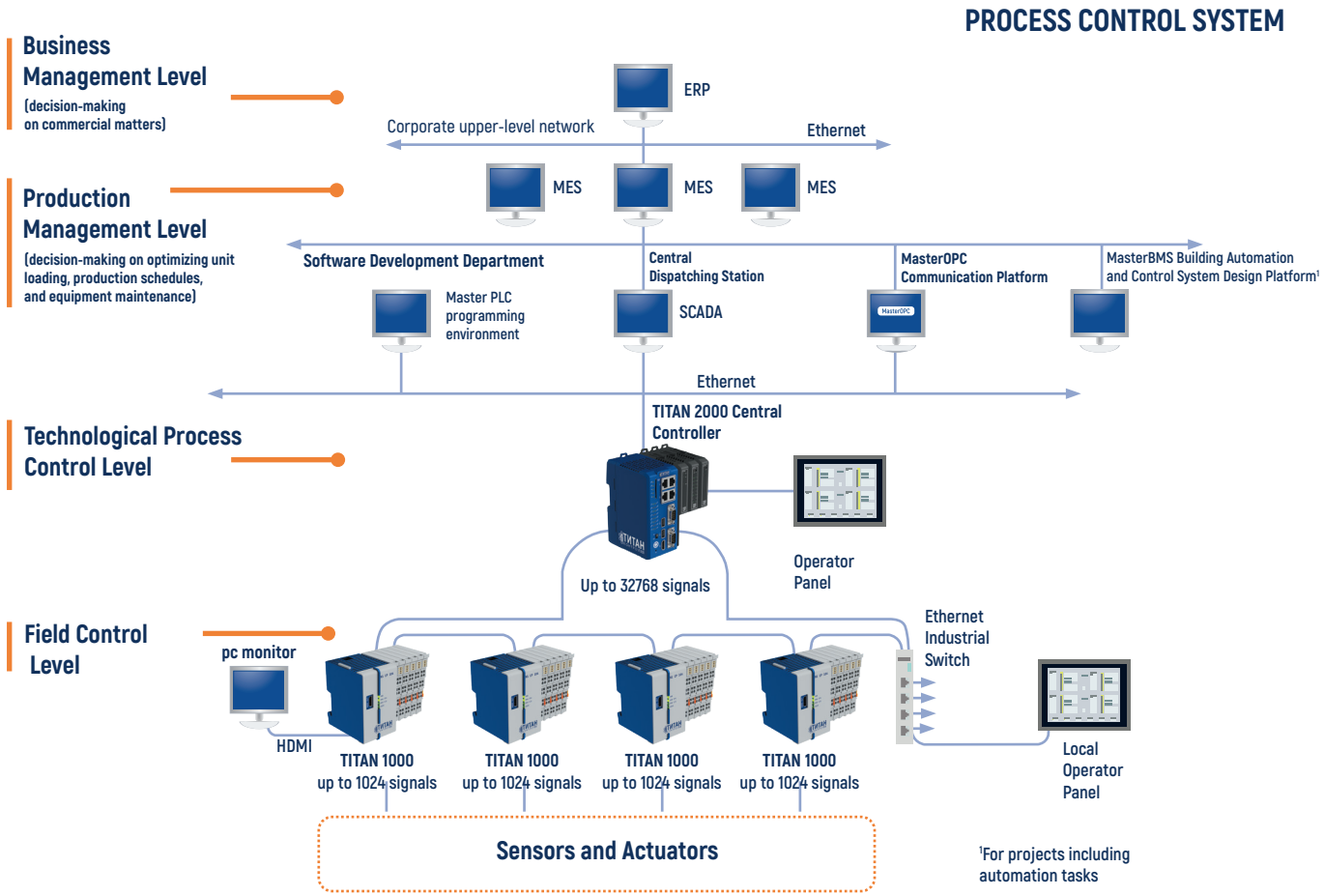


Ready-made engineering solutions for common civil and industrial automation facilities, supported at the hardware level by PLC (Built-in module self-diagnostics, Ethernet network status monitoring, data transfer to the upper level of SCADA).

Implementation of full-fledged BMS (Building Management System) solutions meeting global standards, including on TITAN 1000.

Capability to use TITAN 3000 in the most complex and critical technological processes requiring module redundancy (nuclear power, oil refineries, metallurgy, and others).

TYPICAL STRUCTURAL DIAGRAM OF TITAN PLC APPLICATION



TITAN ADVANTAGES

Computing modules TITAN 2000 can be networked with TITAN 1000 modules

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TITAN PLC

SECTION II

APPLICATION AREA OF TITAN PLC 1000

LOCAL AUTOMATED CONTROL SYSTEMS (ACS TP) FOR VARIOUS ENTERPRISES AND FACILITIES

WAREHOUSE MANAGEMENT AND CONVEYOR SYSTEMS

PUMPING STATIONS (WATER TREATMENT, DRAINAGE, ETC.)

POWER DISTRIBUTION STATIONS

HEATING AND COOLING INSTALLATIONS

AIR CONDITIONING AND VENTILATION EQUIPMENT

FIRE PROTECTION SYSTEMS

RESERVOIR FILLING AND DRYING

REMOTE LOAD MANAGEMENT AND MONITORING, DISPATCHER CONTROL OF BUILDING MANAGEMENT SYSTEMS

MIXING AND DESALINATION MECHANISMS

MIXING AND DESALINATION MECHANISMS

ELEVATORS, ESCALATORS, AND MATERIAL TRANSPORTATION SYSTEMS

ACCESS CONTROL AND SECURITY SYSTEMS

WASTEWATER TREATMENT EQUIPMENT

APPLICATION AREA OF TITAN PLC 1000

FULLY FUNCTIONAL BUILDING CONTROL SYSTEMS (BMS)[1]

AIR CONDITIONING AND COOLING SUPPLY

RESOURCE ACCOUNTING (AUTOMATED METER DATA COLLECTION, AUTOMATED RESOURCE MANAGEMENT AND CONTROL SYSTEM)

WATER SUPPLY, DRAINAGE

HEAT SUPPLY (INDIVIDUAL HEATING POINT, BOILER ROOM)

POWER SUPPLY (TRANSFORMER SUBSTATION, AUTOMATIC TRANSFER SWITCH, DIESEL GENERATOR SET, POWER DISTRIBUTION UNIT)

ENVIRONMENTAL PARAMETER CONTROL

UNINTERRUPTIBLE POWER SUPPLY

INCIDENT MANAGEMENT

IT EQUIPMENT

INTEGRATION WITH BIM

AUTOMATIC FIRE EXTINGUISHING SYSTEM

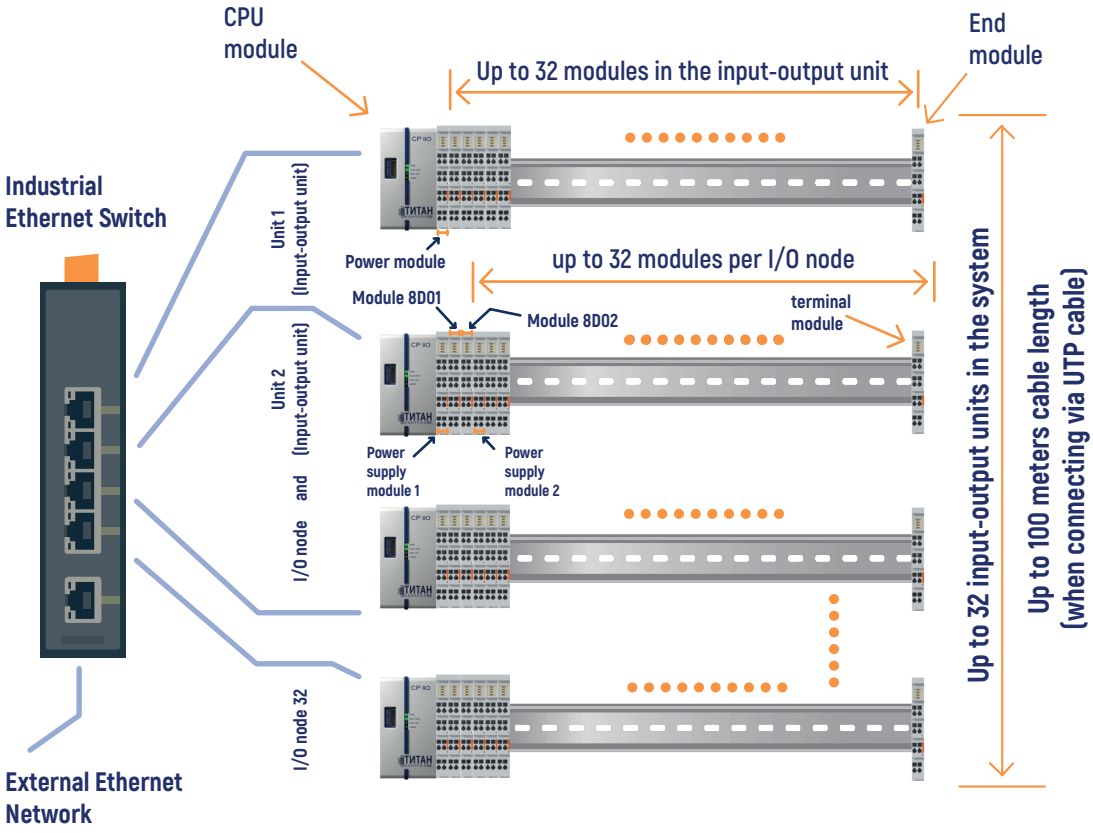
LIGHTING

VENTILATION

[1] BUILDING MANAGEMENT SYSTEMS

EXAMPLE CONFIGURATION OF INPUT-OUTPUT UNITS CONTROL CABINET AT TITAN PLC 1000

CONTROL CABINET



ADVANTAGES

The power module and terminal module are included by default in the standard package of each computing (main) module of the TITAN PLC 1000.

To connect input-output units into a network up to 100 meters long, it is enough to install a basic unmanaged third-level switch.

FEATURES OF CONFIGURING A SYSTEM AT TITAN PLC 1000:

- **Each input-output** unit requires the installation of at least one power module and one terminal module
- With **full load (500mA) per output channel**, after every two discrete output modules (BDO), it is necessary to install an additional power module.
- All **other types of modules** do not require the installation of additional power modules.

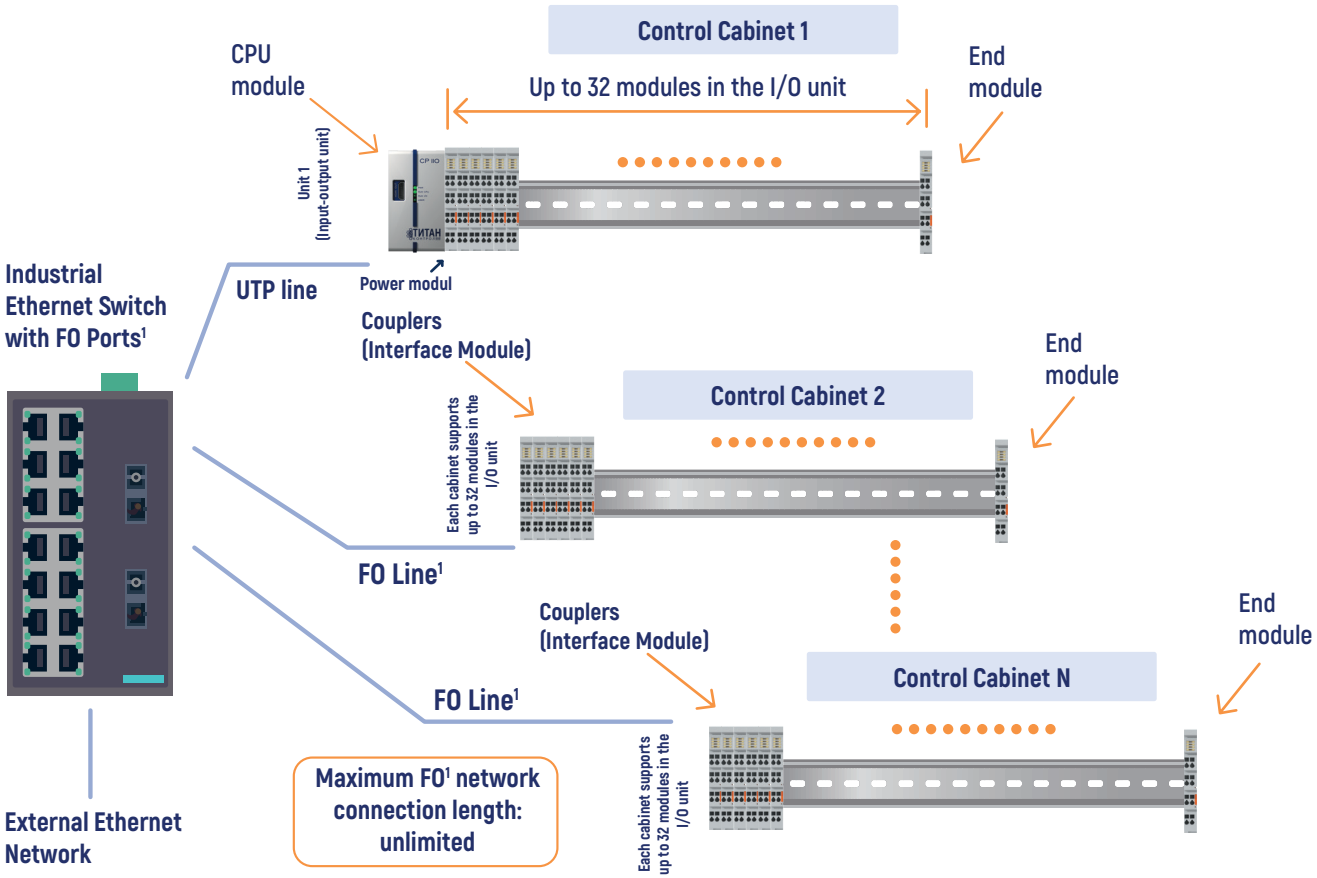
Maximum number of modules in one unit
up to 32

Maximum number of input-output units in the system
up to 32

Maximum number of signals in the system
up to 1024

EXAMPLE CONFIGURATION OF DISTRIBUTED CONTROL SYSTEM (DCS) AT TITAN 1000 PLC

DISTRIBUTED CONTROL SYSTEM



NOTES

Using FO (fiber optic) at TITAN 1000 PLC, you can build a DCS with unlimited length.

In one system, it is sufficient to install at least one CPU MODULE. The remaining I/O units can be built on couplers (interface modules).

[1] FO – Fiber optic communication line

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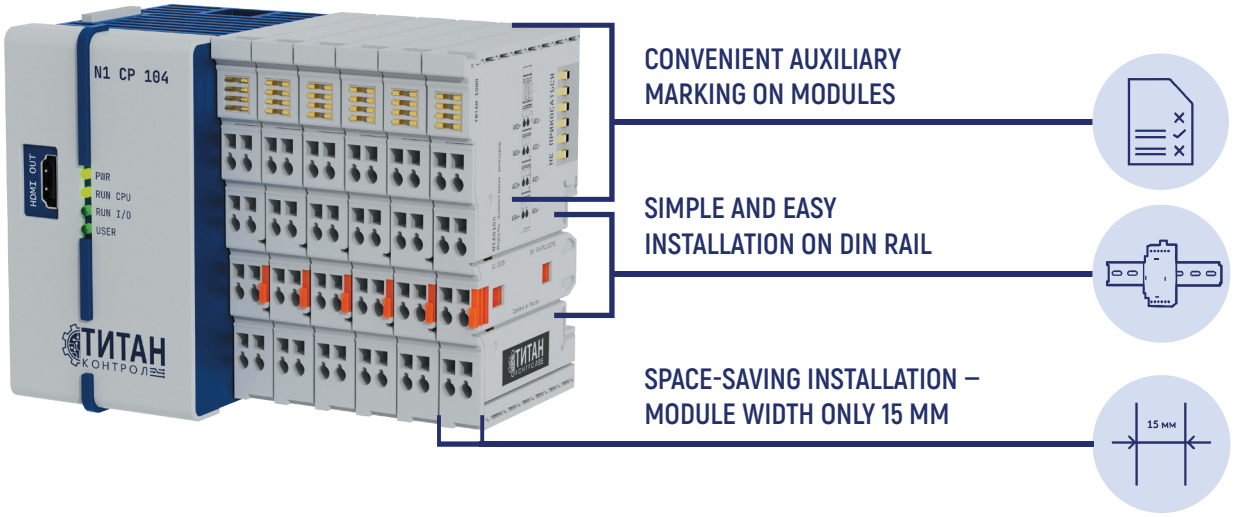
MODULES AS PART OF
TITAN 1000 PLC

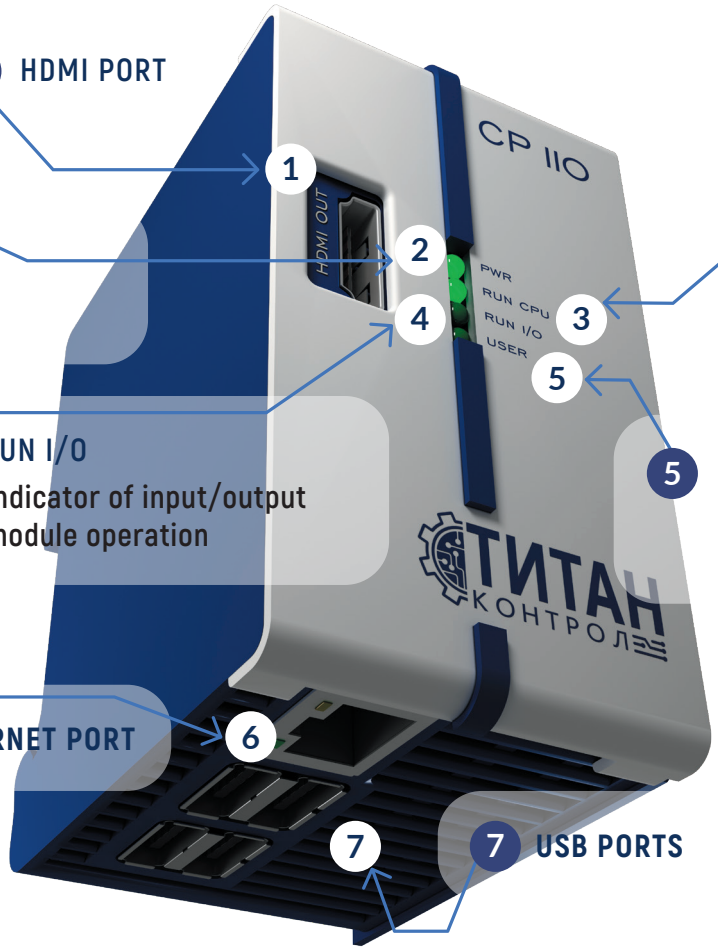
SECTION III

MODULES AS PART OF TITAN 1000 PLC



CPU MODULE OF TITAN PLC 1000

SKU: M1CP104



1 HDMI PORT

2 PWR
Power indicator

3 RUN CPU MODULE
Indicator for the operation of the CPU MODULE

4 RUN I/O
Indicator of input/output module operation

5 USER
User-programmable indicator

6 ETHERNET PORT

7 USB PORTS

SET

The power supply module and the end module are included in the standard set of each TITAN 1000 PLC CPU MODULE.

ADVANTAGES:

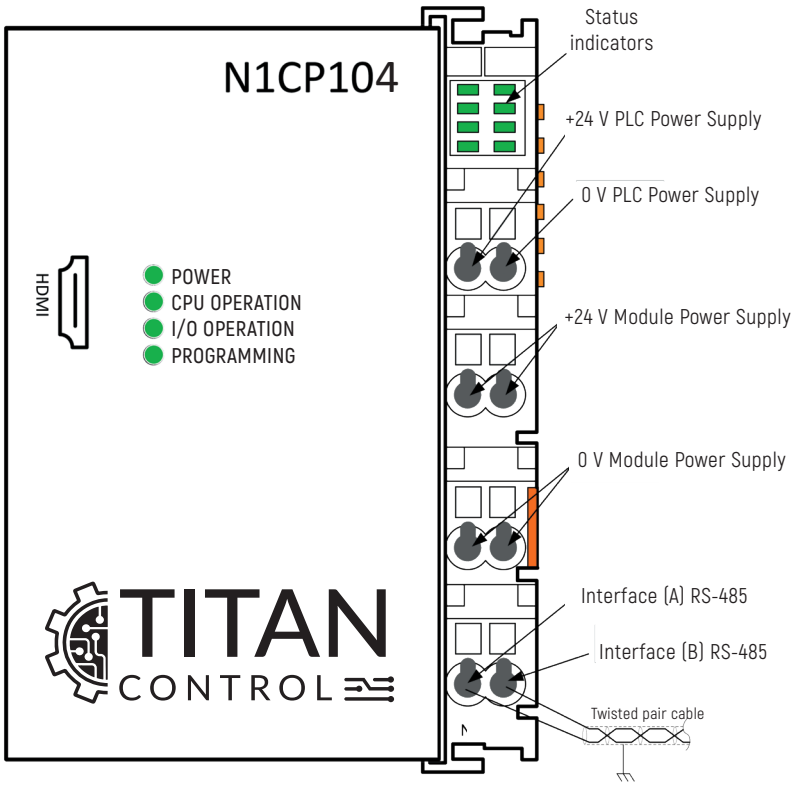
The HDMI port helps optimize costs for the creation of control rooms. It is enough to connect a standard monitor to TITAN 1000.

USB ports allow you to connect peripherals such as a keyboard and mouse directly to the PLC.

Built-in RS-485 ensures operation via the Modbus RTU protocol.

CPU MODULE. CONNECTION DIAGRAM AND SPECIFICATIONS

SKU: N1CP104



ADVANTAGES:

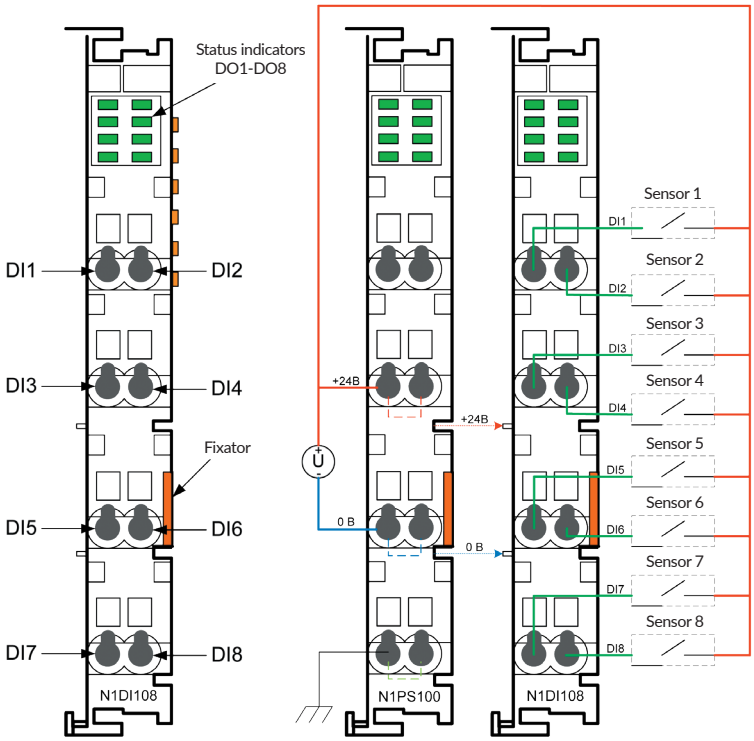
- **Galvanic isolation** of external sensor circuits and internal power supply circuits for computational components
- **Reverse polarity protection**
- **Built-in ionistor** to preserve current parameters

TECHNICAL SPECIFICATIONS

Timers	Two 16-bit extended timers, ten 16-bit general timers
Watchdog Timer	2 watchdog timers
Local Controller Network (CAN)	CAN 2.0 B interface, data rates up to 1 Mbit/s
Power Supply Voltage, V DC	24
Power Consumption	350 mA average, 1 A maximum
Dimensions (WxHxD), mm	97x54x69
Weight, kg	0.14

DISCRETE INPUT MODULE OF TITAN PLC 1000 (PNP)

SKU: N1DI108



- The module is designed for the input of eight discrete signals with a voltage of 0...+30 V DC.
- All channels are isolated from the system.
- Optical isolation is used to isolate the input signals from the system.
- Input signal debounce is eliminated via software.

ADVANTAGES:

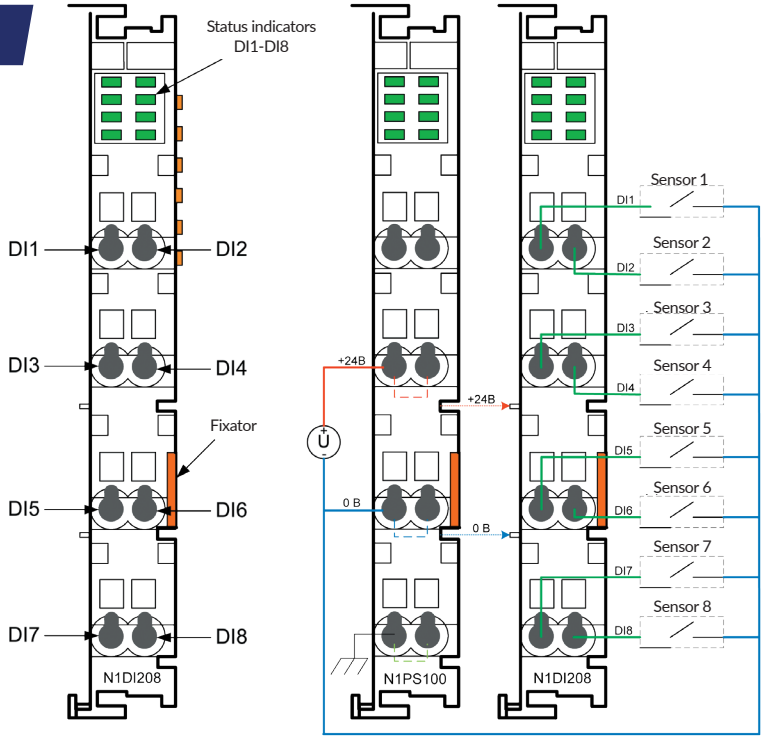
- Space saving during installation – 8 inputs on a single compact module with a width of 15 mm
- Galvanic isolation between sensors and the computational part of the module
- Contact bounce protection with a discreteness of 200 ms
- Resistance to overvoltage (up to 30 V)

TECHNICAL SPECIFICATIONS

Number of discrete input channels	8
Logical zero voltage level	0...+5 V DC
Logical one voltage level	15...30 V DC
Input channel current	Up to 10 mA
Input signal filtering	Software: 0, 200 ms; 3 ms
Channel-to-system isolation	Optical, 500 V (input/system); 500 V (input/DIN rail)

DISCRETE INPUT MODULE OF TITAN 1000 PLC (NPN)

SKU: NDI208



- The module is designed for the input of eight discrete signals with voltage of 0...+30 V DC.
- All channels are isolated from the system.
- Optical isolation is used to isolate the input signals from the system.
- Input signal debounce is handled in software.

ADVANTAGES:

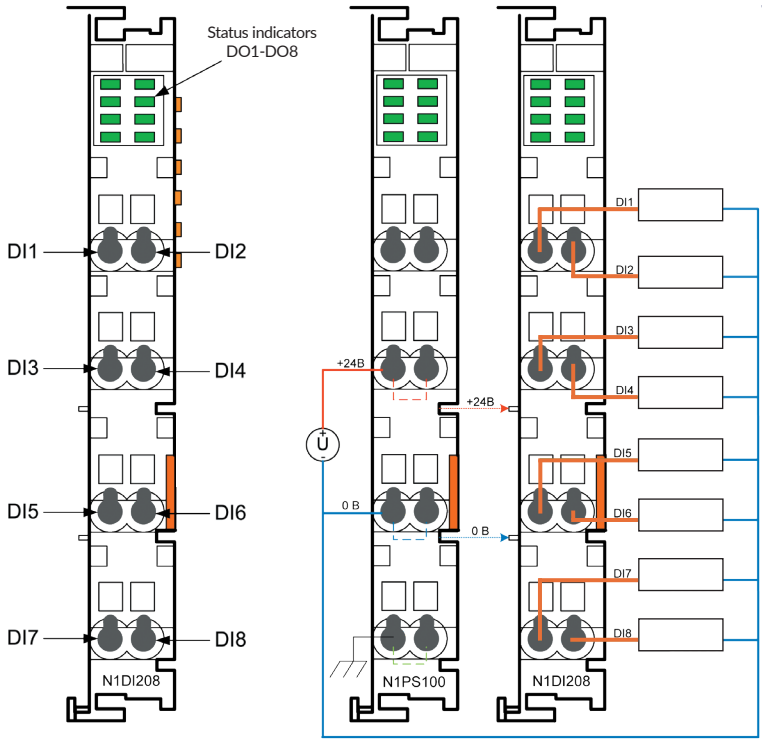
- Space saving during installation – 8 inputs on a single compact module with a width of 15 mm
- Galvanic isolation between sensors and the computational part of the module
- Protection from contact bounce with discreteness of 200 ms
- Resistance to overvoltage (up to 30 V)

TECHNICAL SPECIFICATIONS

Number of discrete input channels	8
Logic low level	15...30 V DC
Logic high level	-3...5 V DC
Input current per channel	Up to 10 mA
Input signal filtering	Software: 0, 200 µs; 3 ms
Input circuit isolation	Optical, 500 V (input/system); 500 V (input/DIN rail)

DISCRETE OUTPUT MODULE OF TITAN PLC 1000 (PNP)

SKU: N1D0108



- The module is designed for output of eight discrete signals at 24 V DC.
- All channels are isolated from the system.
- Optical isolation is used to separate the output signals from the system.

ADVANTAGES:

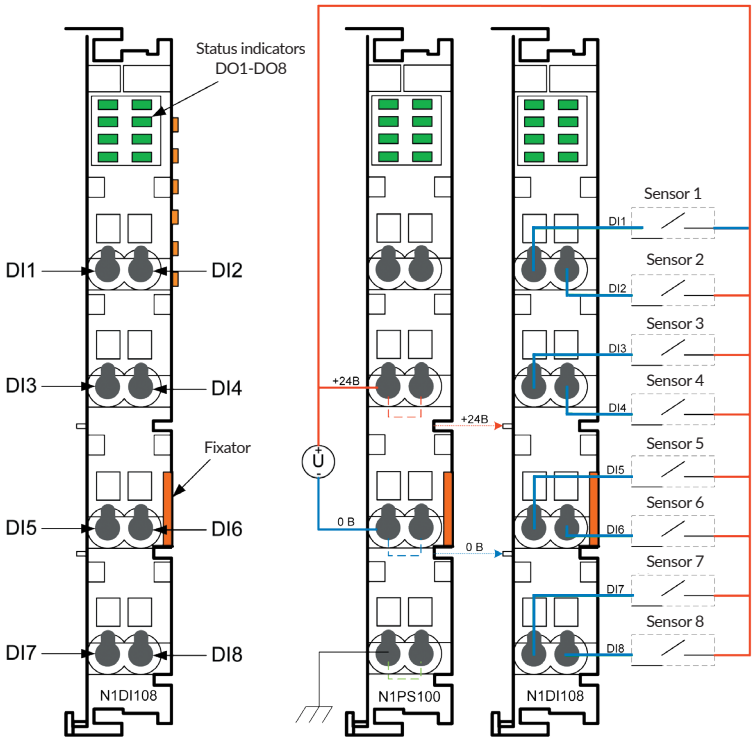
- Space-saving installation – 8 outputs in one compact module, only 15 mm wide
- Ability to connect both resistive and inductive loads
- Built-in protection against negative effects of inductive loads
- High signal density while maintaining channel load capacity (8 channels, each up to 500 mA)

TECHNICAL SPECIFICATIONS

Number of discrete output channels	8
Voltage at input power contacts	24 V (±20...-15%) DC
Output current per channel	0.5 A
Types of load	Resistive, inductive, lamps
Input signal filtering	Programmable: 0, 200 µs, 3 ms
Output circuit isolation	Optical, 500 V (input/system); 500 V (input/DIN rail)

DISCRETE OUTPUT MODULE FOR TITAN 1000 PLC (NPN)

SKU: N1D0208



- The module is designed to output eight discrete 24V DC signals.
- All channels are isolated from the system.
- Optical isolation is used to isolate the output signals from the system.

ADVANTAGES:

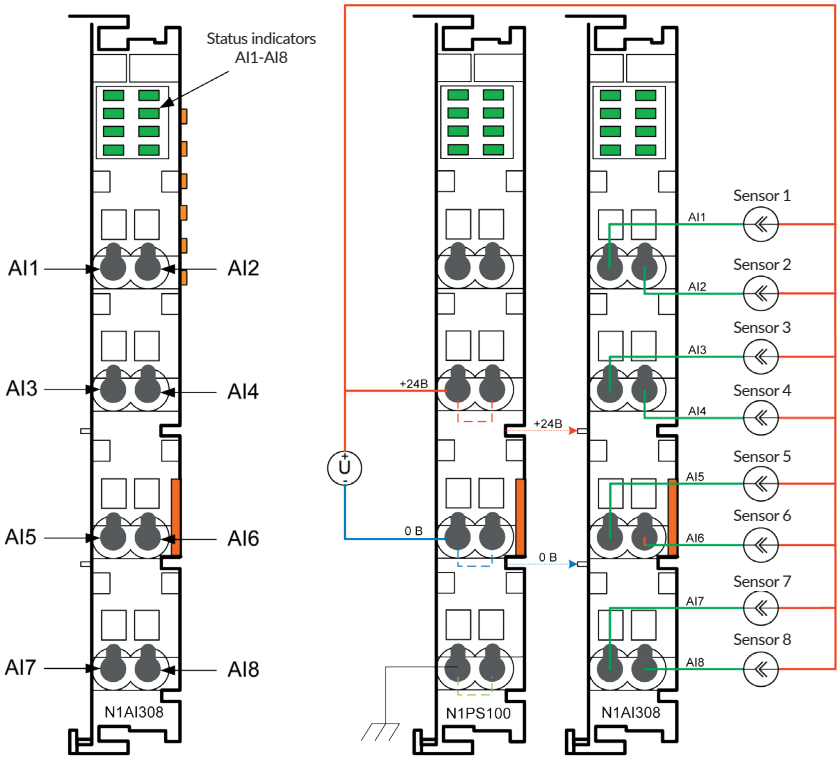
- Space-saving installation – 8 outputs in one compact module, only 15 mm wide
- Connection possibility for both resistive and inductive loads
- Built-in protection against negative effects of inductive loads
- High signal density while maintaining channel load capacity (8 channels, each up to 500 mA)

TECHNICAL SPECIFICATIONS

Number of discrete output channels	8
Power supply voltage at input contacts	24V DC (+20...-15%)
Output current per channel	0.5A
Types of loads	Resistive, inductive, lamps
Input signal filtering	Programmable: 0, 200µs, 3ms
Input circuits isolation	Optical, 500V (input/system); 500V (input/DIN rail)

MODULE FOR ANALOG INPUT OF TITAN 1000 PLC DC SIGNALS

SKU: NAI308



- The module has eight channels of analog input for measuring direct current signals in the range: 0...20 mA.
- A knife-type grounding contact is used to connect the “earth” to the common wire distribution potential.

Note that some sensors, due to design features or due to wiring layout on site, do not allow the circuits of analog inputs to be combined by “earth.” In such cases, it is necessary to separate the sensors into groups with unconnected analog “earth” potentials.

ADVANTAGES:

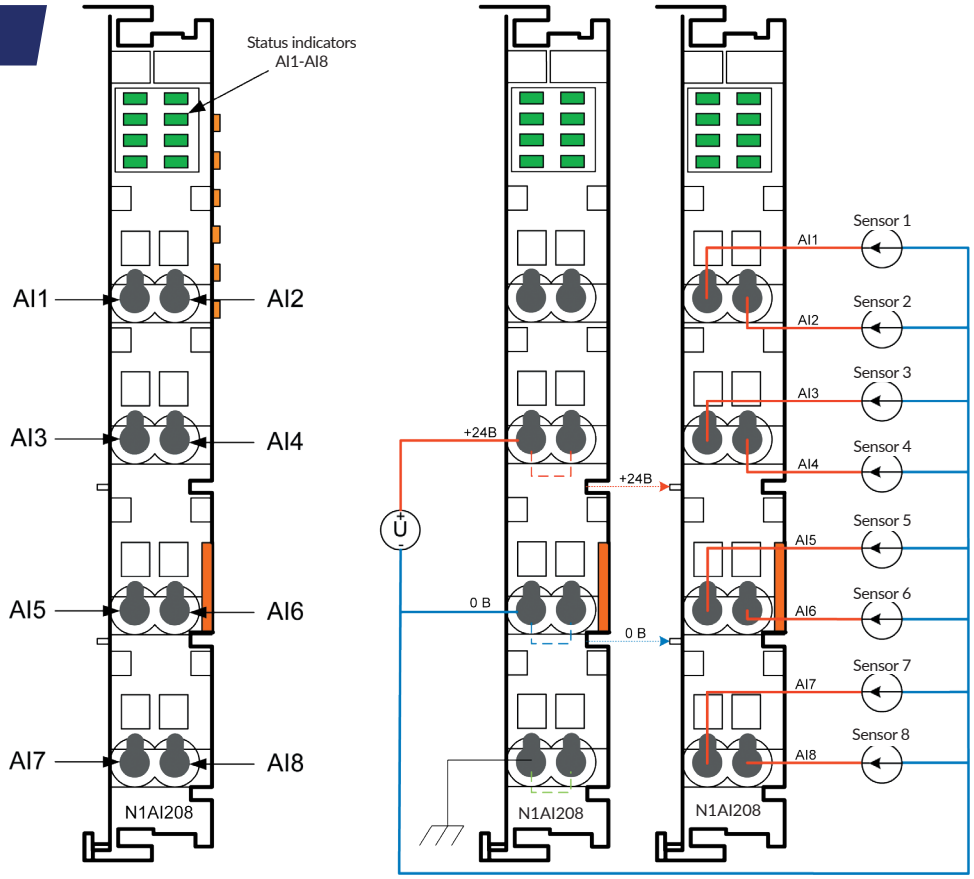
- Space-saving installation – 8 outputs in one compact module, only 15 mm wide
- Short circuit notification.
- Protection against short circuit (The module withstands a short circuit for at least 40 minutes at a voltage of up to 30V).
- The ability to configure output signals in engineering units.
- Galvanic isolation between sensors and the computational part of the module.

TECHNICAL SPECIFICATIONS

Number of current measurement channels	8
Measurement range	0...20 mA
ADC resolution	12 bits
Isolation voltage	500 V

MODULE FOR ANALOG INPUT OF TITAN 1000 PLC DC VOLTAGE SIGNALS

SKU: N1AI208



- The module has 8 analog input channels for voltage measurement in the range: 0...10 V.
- To connect the “ground”, a blade contact is used for the distribution of the common wire potential.

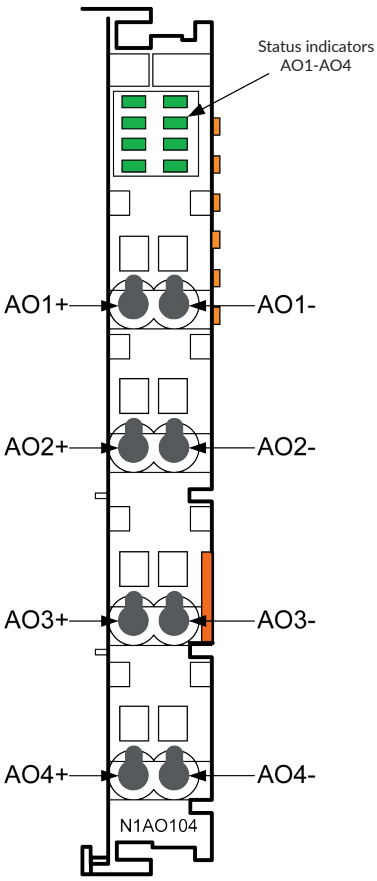
ADVANTAGES:

- Space-saving during installation: 8 inputs on a single compact module only 15 mm wide
- Protection against short-term short circuits (up to 60 min, voltage up to 30 V)
- Possibility to configure signal output in engineering units
- Indication of short circuit presence and location

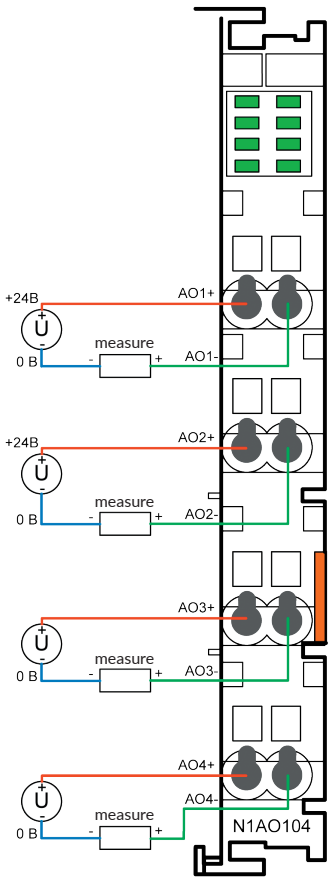
TECHNICAL SPECIFICATIONS

Number of current measurement channels	8
Measurement range	0...10 V
ADC resolution	12 bits
Isolation voltage	500 V

ANALOG OUTPUT MODULES FOR TITAN 1000 PLC, CURRENT TYPE



Current signals



SKU: N1A0104

ADVANTAGES:

- Protection against short circuits and overcurrent
- Built-in contact debounce filtering
- Galvanic isolation of communication channels

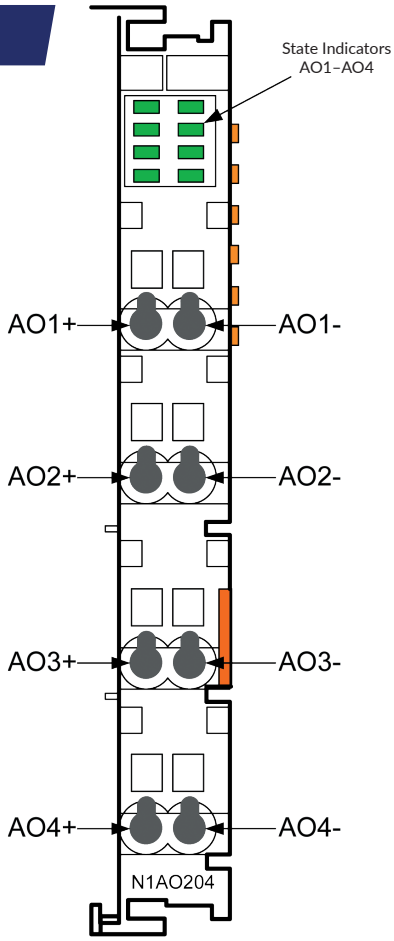
The module has four analog output channels for sending DC analog signals in the range of 0...20 mA.

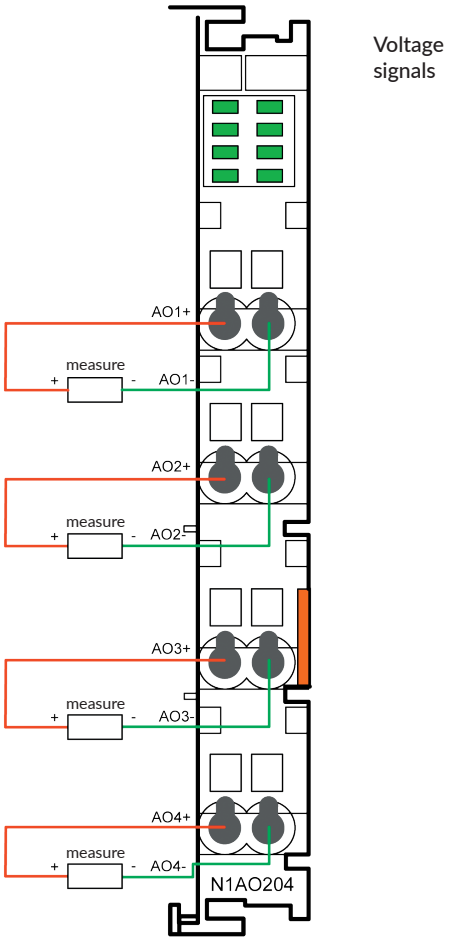
TECHNICAL SPECIFICATIONS

Number of channels	4
Output current, mA	4–20 mA
DAC resolution, bits	16
Isolation voltage, V	500

ANALOG VOLTAGE OUTPUT MODULES FOR TITAN 1000 PLC

SKU: N1AO204





ADVANTAGES:

- Built-in “contact bounce” filtering
- Galvanic isolation of communication channels

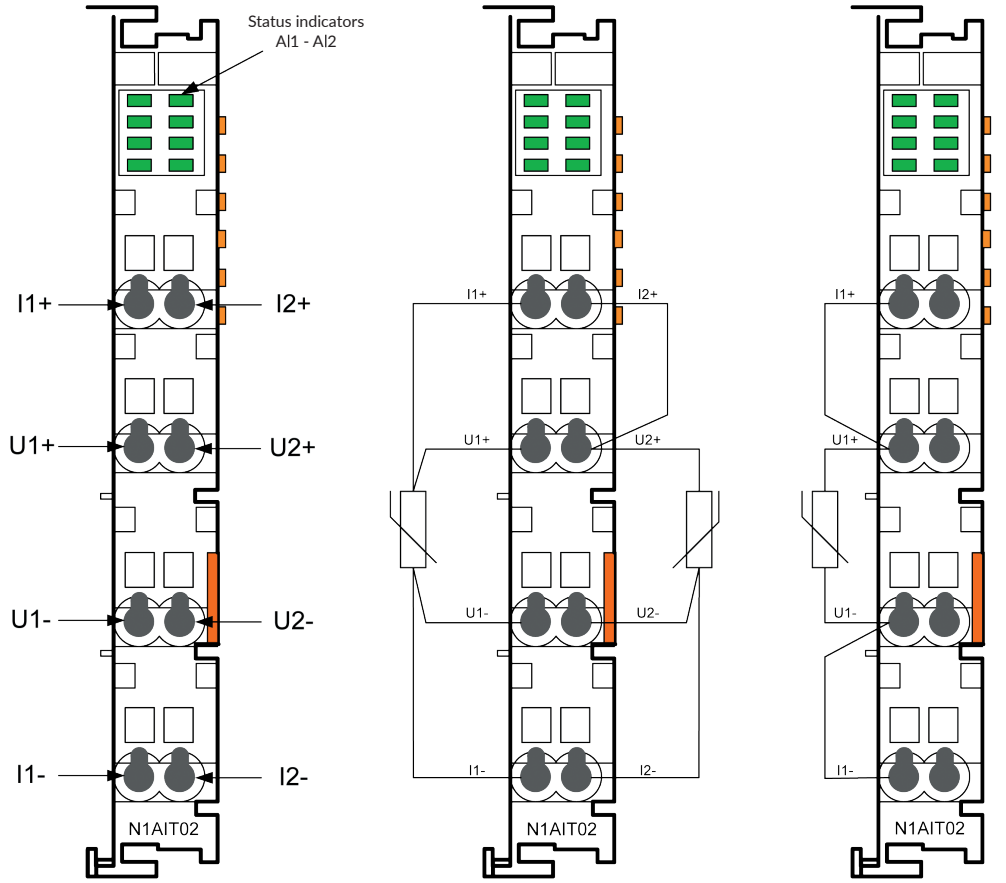
The module has four analog output channels for transmitting analog DC voltage signals in the range of 0...10V.

TECHNICAL SPECIFICATIONS

Number of channels	4
Output voltage, V	0–10
DAC resolution, bits	12
Isolation voltage, V	500

RESISTANCE TEMPERATURE DETECTOR (RTD) SIGNAL INPUT MODULE FOR TITAN 1000 PLC

SKU: N1AIT02



- The module is designed for measuring temperature using resistance temperature detectors (RTDs).
- The module has two measurement channels.
- Temperature measurement with resistance temperature detectors can be performed using a four-wire, three-wire, or two-wire circuit.
- Resistance measurement should only be performed using the four-wire circuit. All wires used to connect the detector must have the same length. Unused terminals on the connector should be shorted.

ADVANTAGES:

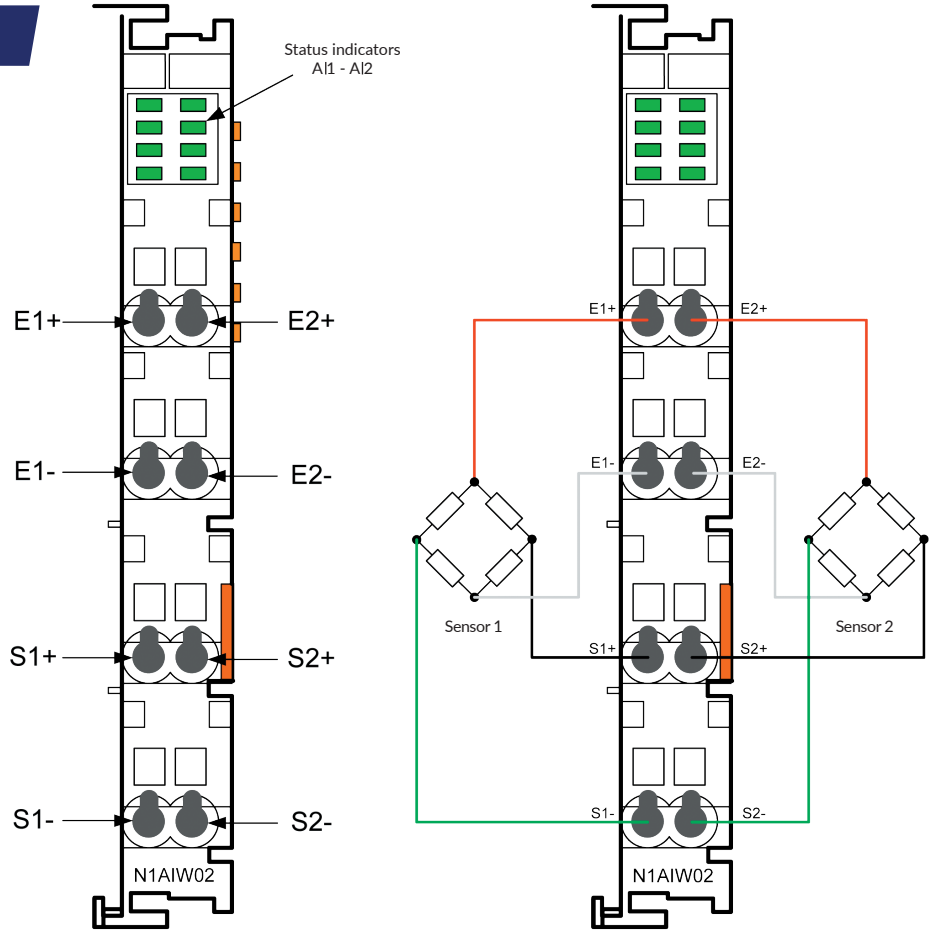
- Versatility (Pt100 and Pt1000 in one module, selectable via software)
- Built-in protection: galvanic isolation at 500V (between input channels and external devices)
- Built-in diagnostics for open circuit and short circuit

TECHNICAL SPECIFICATIONS

Number of temperature and voltage measurement channels	2
RTD sensor type	Pt100, Pt1000
ADC resolution	16 bits

MODULE FOR CONNECTING STRAIN GAUGE SENSORS, TITAN 1000 PLC

SKU: N1AIW02



ADVANTAGES:

Space-saving during installation – compact module with a width of 15mm

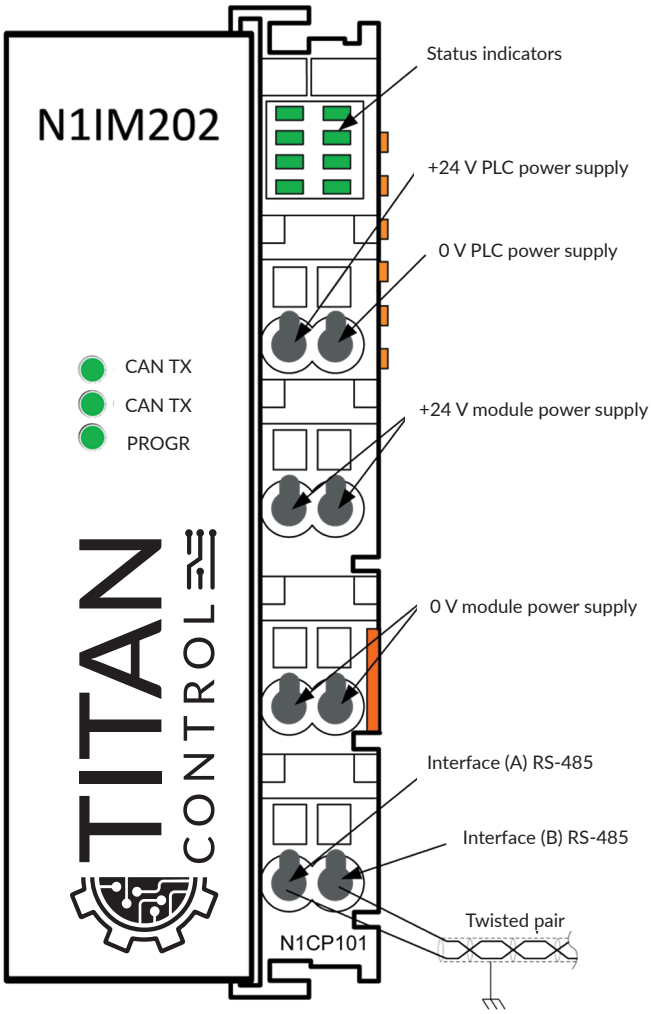
High data acquisition speed (data is immediately transmitted to the internal PLC data bus (CAN))

TECHNICAL SPECIFICATIONS

Number of channels	2
Bit resolution	24
Sensor connection type	Four-wire
Isolation	500 V

INTERFACE MODULE FOR TITAN 1000 PLC (NETWORK UNIT CONTROLLER)

SKU: N1IM202



ADVANTAGES:

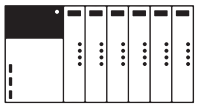
Development Acceleration

The interface module automatically determines the composition of the connected modules and configures the modules.

Reliability

The Ethernet interface circuits are galvanically isolated from the internal circuits of the controller.

The interface module can act as a coupler when building a distributed control system.



Wide range of modules in one I/O unit: up to 32 units.

The CAN bus provides high-speed data transfer between modules in the I/O unit.

The CAN bus provides high reliability in data transmission due to error control.

TECHNICAL SPECIFICATIONS[1]

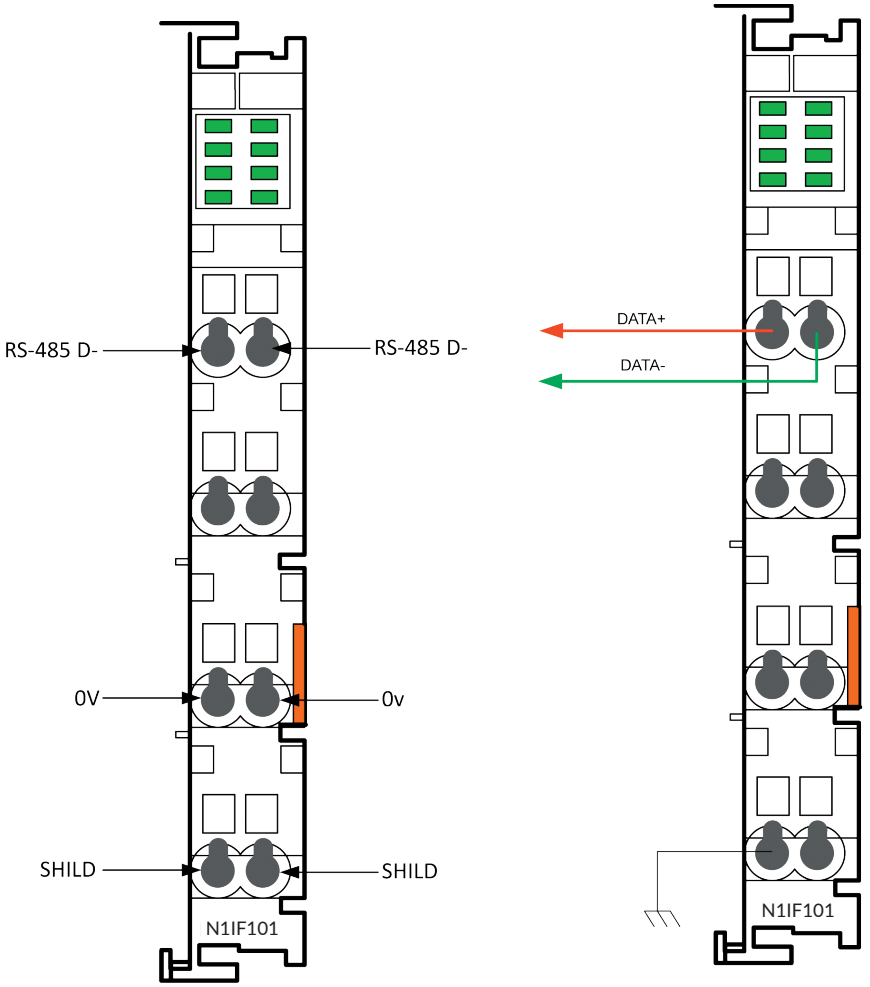
Number of I/O modules on the CAN bus	Up to 32
Data transfer rate via Ethernet	10/100 Mbps
Ethernet data transmission medium	Twisted pair UTP 100, category 5 or 6
Maximum cable length	100 m
Data transfer rate via RS-485	115200 bps
Maximum cable length	1200 m
Maximum current on the potential distribution bus	10A

- The network unit controller is designed to manage I/O modules of the TITAN CONTROL® system in data collection and processing systems, built on the basis of the Ethernet interface and the application-level protocols MODBUS TCP and MODBUS RTU (master/slave element of the network unit).
- The controller supports all TITAN CONTROL® modules.
- The controller has a built-in power supply for I/O modules installed on the internal bus.
- Connection to an external field bus is carried out using Ethernet and/or RS-485 connectors.
- The interface module acts as a coupler in distributed systems.

1 THE EXTERNAL APPEARANCE AND DIMENSIONS OF THE PRODUCT MAY CHANGE IN A NEW REVISION.

COMMUNICATION MODULE FOR TITAN 1000 PLC

SKU: N1IF101



ADVANTAGES:

Reliability
Galvanic isolation 500V

Protection
Protection against high voltage surges (discharge 500V)

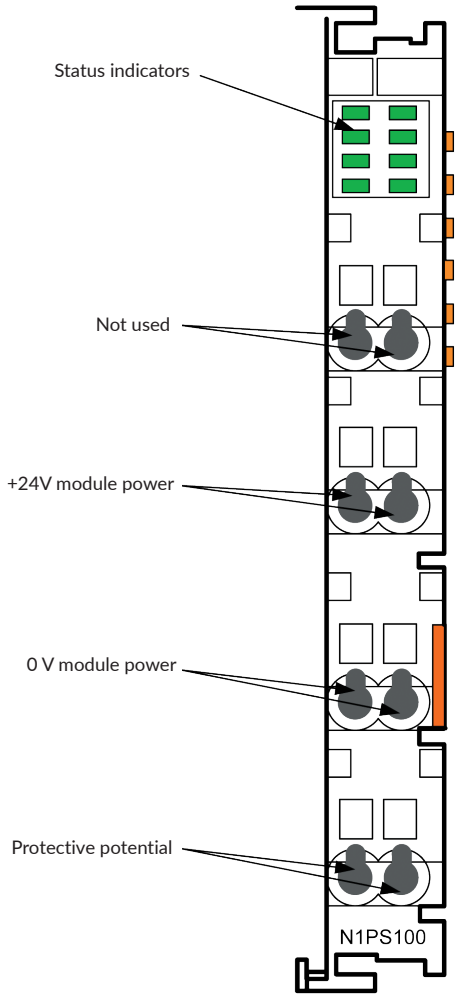
- The communication module provides connection between PLC modules and external devices via the RS-485 interface.

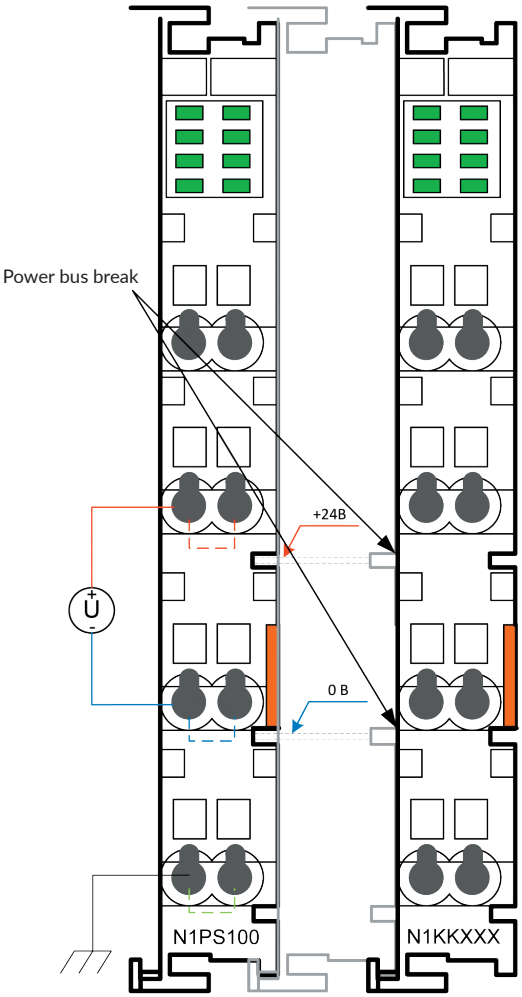
TECHNICAL SPECIFICATIONS

Type of data transmission interface	RS-485
Data transfer rate, bit/s	1200, 2400, 4800, 9600, 14400, 19200, 38400, 57600, 115200
Number of data bits	7 or 8
Number of stop bits	1 or 2
Parity control	None, Odd, Even
Built-in receive buffer, bytes	1024
Built-in transmit buffer, bytes	1024
Isolation voltage system/power, V	500
Power consumption, mA, not more than	70

ADDITIONAL POWER MODULE

SKU: N1PS100





- The module is intended for the input of 24 V DC voltage to organize the power bus of sensors and actuators through the blade contacts of the power distribution module.
- The module supplies power only to sensors and actuators. The power supply for electronic components is provided only from the network unit controller (interface module).

ADVANTAGES:

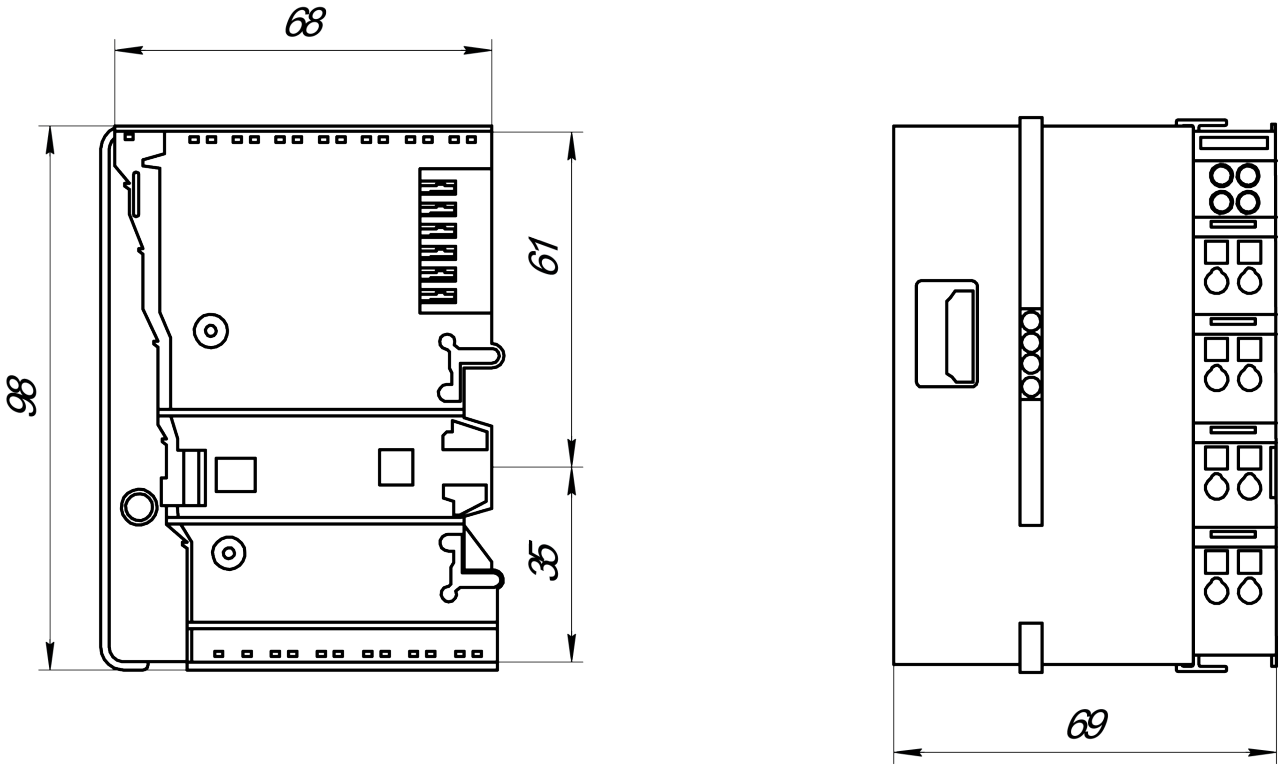
Protection against reverse polarity when connecting power

TECHNICAL SPECIFICATIONS

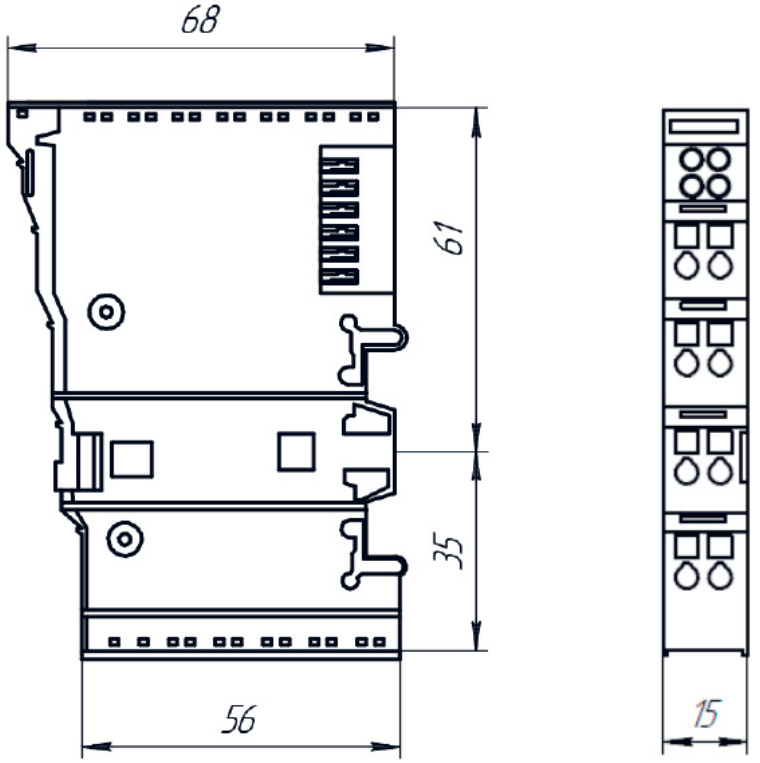
Maximum current in the input voltage circuit	10A
DC supply voltage	24V

DIMENSIONAL SPECIFICATIONS

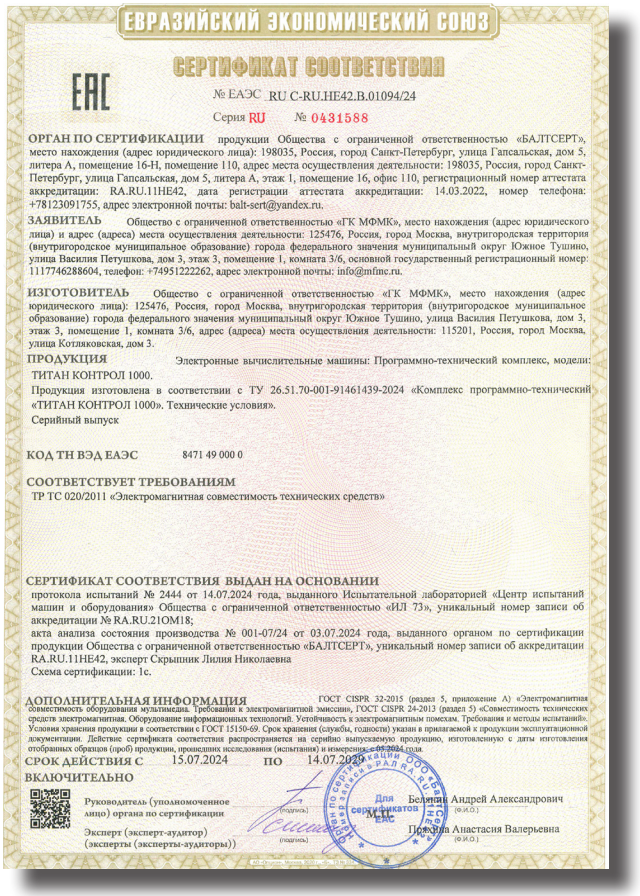
Overall dimensions of the CPU module, mm



Overall dimensions of the expansion module, mm



CERTIFICATES



ЕВРАЗИЙСКИЙ ЭКОНОМИЧЕСКИЙ СОЮЗ

СЕРТИФИКАТ СООТВЕТСТВИЯ

EAC

№ ЕАЭС RU C-RU.HE42.B.01094/24

Серия RU № 0431588

ОРГАН ПО СЕРТИФИКАЦИИ продукции Общества с ограниченной ответственностью «БАЛТСЕРТ», место нахождения (адрес юридического лица): 198035, Россия, город Санкт-Петербург, улица Гапсальская, дом 5, литера А, помещение 16-Н, помещение 110, адрес места осуществления деятельности: 198035, Россия, город Санкт-Петербург, улица Гапсальская, дом 5, литера А, этаж 1, помещение 16, офис 110, регистрационный номер аттестата аккредитации: RA.RU.11HE42, дата регистрации аттестата аккредитации: 14.03.2022, номер телефона: +78123091755, адрес электронной почты: balt-sert@yandex.ru.

ЗАЯВИТЕЛЬ Общество с ограниченной ответственностью «ГК МФМК», место нахождения (адрес юридического лица) и адрес (адреса) места осуществления деятельности: 125476, Россия, город Москва, внутригородская территория (внутригородское муниципальное образование) города федерального значения муниципальный округ Южное Тушино, улица Василия Петушкова, дом 3, этаж 3, помещение 1, комната 3/6, основной государственный регистрационный номер: 1117746288604, телефон: +74951222262, адрес электронной почты: info@mfmc.ru.

ИЗГОТОВИТЕЛЬ Общество с ограниченной ответственностью «ГК МФМК», место нахождения (адрес юридического лица): 125476, Россия, город Москва, внутригородская территория (внутригородское муниципальное образование) города федерального значения муниципальный округ Южное Тушино, улица Василия Петушкова, дом 3, этаж 3, помещение 1, комната 3/6, адрес (адреса) места осуществления деятельности: 115201, Россия, город Москва, улица Котляковская, дом 3.

ПРОДУКЦИЯ Электронные вычислительные машины: Программно-технический комплекс, модели: ТИТАН КОНТРОЛ 1000.

Продукция изготовлена в соответствии с ТУ 26.51.70-001-91461439-2024 «Комплекс программно-технический «ТИТАН КОНТРОЛ 1000». Технические условия».

Серийный выпуск

КОД ТН ВЭД ЕАЭС 8471 49 000 0

СООТВЕТСТВУЕТ ТРЕБОВАНИЯМ

ТР ТС 020/2011 «Электромагнитная совместимость технических средств»

СЕРТИФИКАТ СООТВЕТСТВИЯ ВЫДАН НА ОСНОВАНИИ

протокола испытаний № 2444 от 14.07.2024 года, выданного Испытательной лабораторией «Центр испытаний машин и оборудования» Общества с ограниченной ответственностью «ИЛ 73», уникальный номер записи об аккредитации № RA.RU.21OM18;

акта анализа состояния производства № 001-07/24 от 03.07.2024 года, выданного органом по сертификации продукции Общества с ограниченной ответственностью «БАЛТСЕРТ», уникальный номер записи об аккредитации RA.RU.11HE42, эксперт Скрыпник Лилия Николаевна

Схема сертификации: 1с.

ДОПОЛНИТЕЛЬНАЯ ИНФОРМАЦИЯ ГОСТ CISPR 32-2015 (раздел 5, приложение А) «Электромагнитная совместимость оборудования мультимедиа. Требования к электромагнитной эмиссии», ГОСТ CISPR 24-2013 (раздел 5) «Совместимость технических средств электромагнитная. Оборудование информационных технологий. Устойчивость к электромагнитным помехам. Требования и методы испытаний». Условия хранения продукции в соответствии с ГОСТ 15150-69. Срок хранения (службы, годности) указан в прилагаемой к продукции эксплуатационной документации. Действие сертификата соответствия распространяется на серийно выпускаемую продукцию, изготовленную с даты изготовления отобранных образцов (проб) продукции, прошедших исследования (испытания) и измерения, с 03.2024 года.

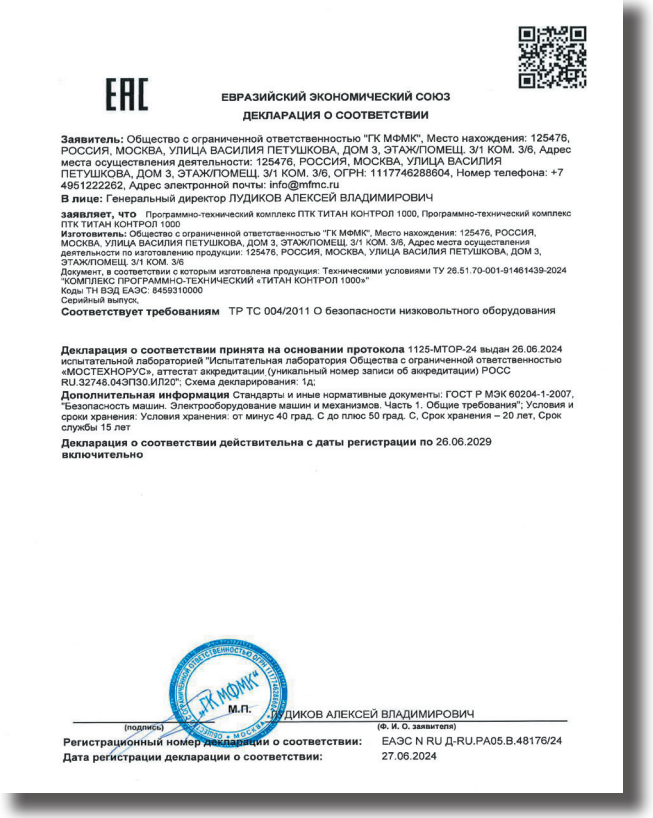
СРОК ДЕЙСТВИЯ С 15.07.2024 **ПО** 14.07.2029

ВКЛЮЧИТЕЛЬНО

Руководитель (уполномоченное лицо) органа по сертификации (подпись) Белкин Андрей Александрович (Ф.И.О.)

Эксперт (эксперт-аудитор) (эксперты (эксперты-аудиторы)) (подпись) Полякова Анастасия Валерьевна (Ф.И.О.)

Для сертификатов ЕАЭС



EAC

ЕВРАЗИЙСКИЙ ЭКОНОМИЧЕСКИЙ СОЮЗ

ДЕКЛАРАЦИЯ О СООТВЕТСТВИИ

Заявитель: Общество с ограниченной ответственностью "ГК МФМК", Место нахождения: 125476, РОССИЯ, МОСКВА, УЛИЦА ВАСИЛИЯ ПЕТУШКОВА, ДОМ 3, ЭТАЖ/ПОМЕЩ. 3/1 КОМ. 3/6, Адрес места осуществления деятельности: 125476, РОССИЯ, МОСКВА, УЛИЦА ВАСИЛИЯ ПЕТУШКОВА, ДОМ 3, ЭТАЖ/ПОМЕЩ. 3/1 КОМ. 3/6, ОГРН: 1117746288604, Номер телефона: +7 4951222262, Адрес электронной почты: info@mfmc.ru

В лице: Генеральный директор ЛУДИКОВ АЛЕКСЕЙ ВЛАДИМИРОВИЧ

заявляет, что Программно-технический комплекс ПТК ТИТАН КОНТРОЛ 1000, Программно-технический комплекс ПТК ТИТАН КОНТРОЛ 1000

Изготовитель: Общество с ограниченной ответственностью "ГК МФМК", Место нахождения: 125476, РОССИЯ, МОСКВА, УЛИЦА ВАСИЛИЯ ПЕТУШКОВА, ДОМ 3, ЭТАЖ/ПОМЕЩ. 3/1 КОМ. 3/6, Адрес места осуществления деятельности по изготовлению продукции: 125476, РОССИЯ, МОСКВА, УЛИЦА ВАСИЛИЯ ПЕТУШКОВА, ДОМ 3, ЭТАЖ/ПОМЕЩ. 3/1 КОМ. 3/6

Документ, в соответствии с которым изготовлена продукция: Техническими условиями ТУ 26.51.70-001-91461439-2024 "КОМПЛЕКС ПРОГРАММНО-ТЕХНИЧЕСКИЙ «ТИТАН КОНТРОЛ 1000»"

Коды ТН ВЭД ЕАЭС: 8459310000

Серийный выпуск.

Соответствует требованиям ТР ТС 004/2011 О безопасности низковольтного оборудования

Декларация о соответствии принята на основании протокола 1125-МТОР-24 выдан 26.06.2024 испытательной лабораторией "Испытательная лаборатория Общества с ограниченной ответственностью «МОСТЕХНОРУС», аттестат аккредитации (уникальный номер записи об аккредитации) РОСС RU.32748.04ЭП30.ИЛ20"; Схема декларирования: 1д;

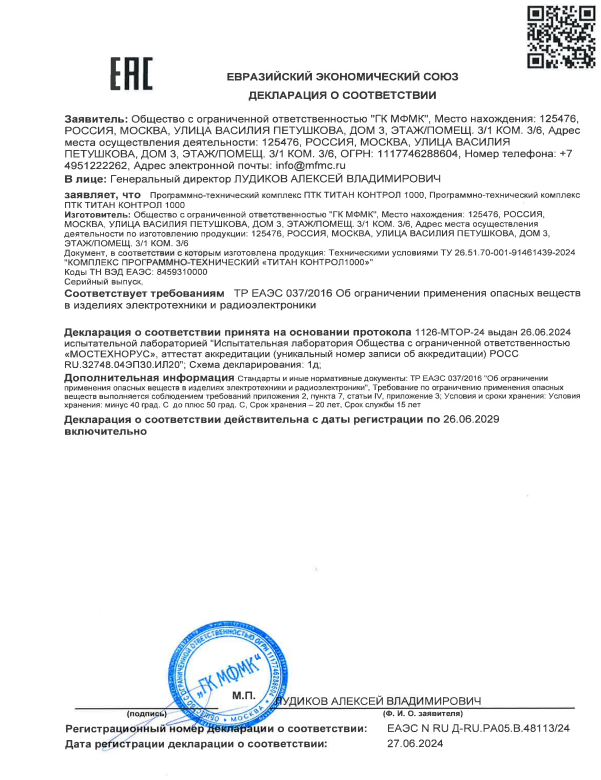
Дополнительная информация Стандарты и иные нормативные документы: ГОСТ Р МЭК 60204-1-2007, "Безопасность машин. Электрооборудование машин и механизмов. Часть 1. Общие требования"; Условия и сроки хранения: Условия хранения: от минус 40 град. С до плюс 50 град. С, Срок хранения – 20 лет, Срок службы 15 лет

Декларация о соответствии действительна с даты регистрации по 26.06.2029 **включительно**

М.П. (подпись) ЛУДИКОВ АЛЕКСЕЙ ВЛАДИМИРОВИЧ (Ф. И. О. заявителя)

Регистрационный номер декларации о соответствии: ЕАЭС N RU Д-RU.PA05.B.48176/24

Дата регистрации декларации о соответствии: 27.06.2024



EAC

ЕВРАЗИЙСКИЙ ЭКОНОМИЧЕСКИЙ СОЮЗ

ДЕКЛАРАЦИЯ О СООТВЕТСТВИИ

Заявитель: Общество с ограниченной ответственностью "ГК МФМК", Место нахождения: 125476, РОССИЯ, МОСКВА, УЛИЦА ВАСИЛИЯ ПЕТУШКОВА, ДОМ 3, ЭТАЖ/ПОМЕЩ. 3/1 КОМ. 3/6, Адрес места осуществления деятельности: 125476, РОССИЯ, МОСКВА, УЛИЦА ВАСИЛИЯ ПЕТУШКОВА, ДОМ 3, ЭТАЖ/ПОМЕЩ. 3/1 КОМ. 3/6, ОГРН: 1117746288604, Номер телефона: +7 4951222262, Адрес электронной почты: info@mfmc.ru

В лице: Генеральный директор ЛУДИКОВ АЛЕКСЕЙ ВЛАДИМИРОВИЧ

заявляет, что Программно-технический комплекс ПТК ТИТАН КОНТРОЛ 1000, Программно-технический комплекс ПТК ТИТАН КОНТРОЛ 1000

Изготовитель: Общество с ограниченной ответственностью "ГК МФМК", Место нахождения: 125476, РОССИЯ, МОСКВА, УЛИЦА ВАСИЛИЯ ПЕТУШКОВА, ДОМ 3, ЭТАЖ/ПОМЕЩ. 3/1 КОМ. 3/6, Адрес места осуществления деятельности по изготовлению продукции: 125476, РОССИЯ, МОСКВА, УЛИЦА ВАСИЛИЯ ПЕТУШКОВА, ДОМ 3, ЭТАЖ/ПОМЕЩ. 3/1 КОМ. 3/6

Документ, в соответствии с которым изготовлена продукция: Техническими условиями ТУ 26.51.70-001-91461439-2024 "КОМПЛЕКС ПРОГРАММНО-ТЕХНИЧЕСКИЙ «ТИТАН КОНТРОЛ1000»"

Коды ТН ВЭД ЕАЭС: 8459310000

Серийный выпуск.

Соответствует требованиям ТР ЕАЭС 037/2016 Об ограничении применения опасных веществ в изделиях электротехники и радиоэлектроники

Декларация о соответствии принята на основании протокола 1126-МТОР-24 выдан 26.06.2024 испытательной лабораторией "Испытательная лаборатория Общества с ограниченной ответственностью «МОСТЕХНОРУС», аттестат аккредитации (уникальный номер записи об аккредитации) РОСС RU.32748.04ЭП30.ИЛ20"; Схема декларирования: 1д;

Дополнительная информация Стандарты и иные нормативные документы: ТР ЕАЭС 037/2016 "Об ограничении применения опасных веществ в изделиях электротехники и радиоэлектроники". Требование по ограничению применения опасных веществ выполняется соблюдением требований приложения 2, пункта 7, статьи IV, приложение 3; Условия и сроки хранения: Условия хранения: минус 40 град. С до плюс 50 град. С, Срок хранения – 20 лет, Срок службы 15 лет

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М.П. (подпись) ЛУДИКОВ АЛЕКСЕЙ ВЛАДИМИРОВИЧ (Ф. И. О. заявителя)

Регистрационный номер декларации о соответствии: ЕАЭС N RU Д-RU.PA05.B.48113/24

Дата регистрации декларации о соответствии: 27.06.2024

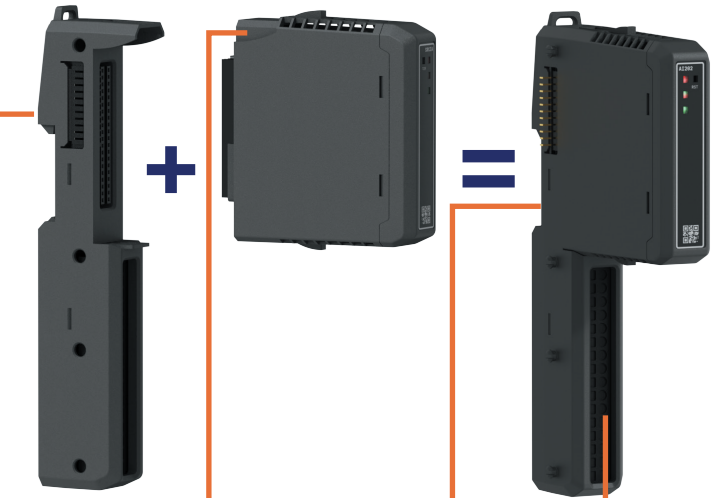
MFMC
group of companies

TITAN 2000 PLC

SECTION IV

FEATURES OF THE TITAN 2000 PLC DESIGN

Removable electronic parts of modules, hot-swap capability



Reinforced bus design made from high-quality copper

Removable electronic parts of the modules, possibility to install directly at the automation site

Convenient mounting to a standard DIN rail

«PUSH-IN» technology, easy tool-free conductor installation

ADVANCED INSTALLATION TECHNOLOGY

The TITAN 2000 bus design allows electronic parts of the PLC modules to be installed after the main cabinet assembly has been completed.

No time lost waiting for long-term PLC module deliveries to the assembler's warehouse

Saves working capital (no need to keep a large stock of PLC modules in the warehouse)

1 The assembler assembles the cabinet, installing only the chassis for the PLC modules

2 The cabinet is delivered to the automation site

3 PLC modules are installed onto the chassis directly at the automation site

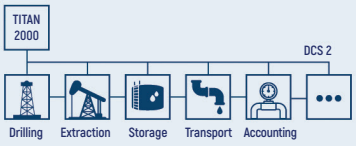
APPLICATION AREAS OF TITAN 2000 PLC

INDUSTRY

EXTRACTION

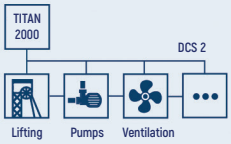
OIL AND GAS

The distributed architecture of TITAN 2000 in combination with FOCL* is well suited for large, geographically distributed enterprises in the oil and gas sector (such as oil extraction and oil refining).



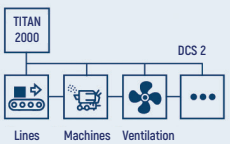
ORE MINING

TITAN 2000 is used in surface operations of mining enterprises, for example, in automatic process control systems (APCS) for lifting and transport mechanisms, as well as general utilities (water supply, ventilation).



MINING AND CHEMICAL

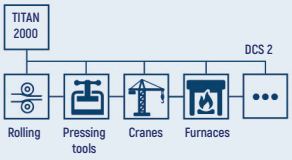
Aggressive environments of mining chemistry — these are specific requirements for reliability. TITAN 2000 meets them thanks to built-in continuous self-diagnostics systems for controller modules.



HEAVY INDUSTRY

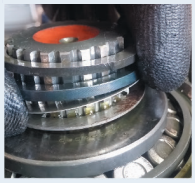
METALLURGY

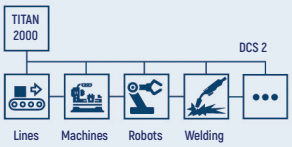
Control over complex, critical processes in metallurgy is achieved with TITAN 2000 thanks to the presence of PID regulation, as well as high response speed (inter-modular CAN bus). TITAN 2000



MECHANICAL ENGINEERING

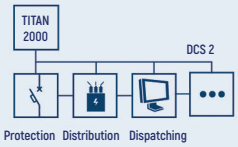
The task of automating a large number of discrete operations in mechanical engineering is solved by TITAN 2000 thanks to the ability to include up to 32768 signals in APCS, as well as the presence of 9 types of various communication interfaces.





ENERGY AND HOUSING & UTILITIES

TITAN 2000 makes it possible to build high-speed dispatching systems for large energy facilities.



[1] FIBER-OPTIC COMMUNICATION LINE
[2] DISTRIBUTED CONTROL SYSTEM

APPLICATION AREA OF TITAN 2000 PLC

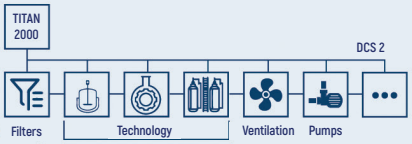
PROCESSING

LIGHT INDUSTRY

FOOD INDUSTRY

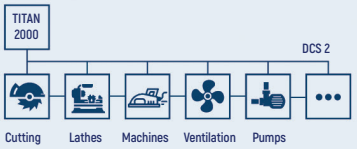
CHEMICAL INDUSTRY

High-speed, fast-acting ADCs* of TITAN 2000 and high-speed communication channels to remote peripherals allow the use of TITAN 2000 in the chemical industry, where especially high requirements are imposed on compliance with the technological process in terms of speed, responsiveness, and reliability.

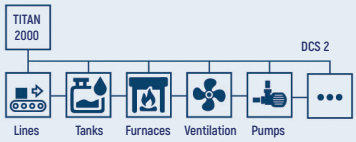


WOOD INDUSTRY

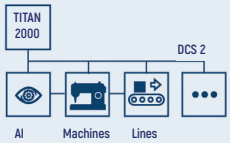
The variability of operations performed in woodworking requires a PLC with high speed. As such, TITAN 2000 ensures this, including implementation of the «soft» real-time mode when necessary.



For food production, TITAN 2000 enables building large-scale but cost-flexible Automated Process Control Systems (APCS) for Process Automation (PA), thanks to full compatibility with the junior, more affordable TITAN 1000 line.



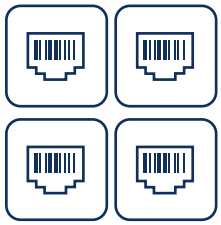
The light industry is actively being automated through the introduction of robotics and machine vision. TITAN 2000 is capable of managing these systems.



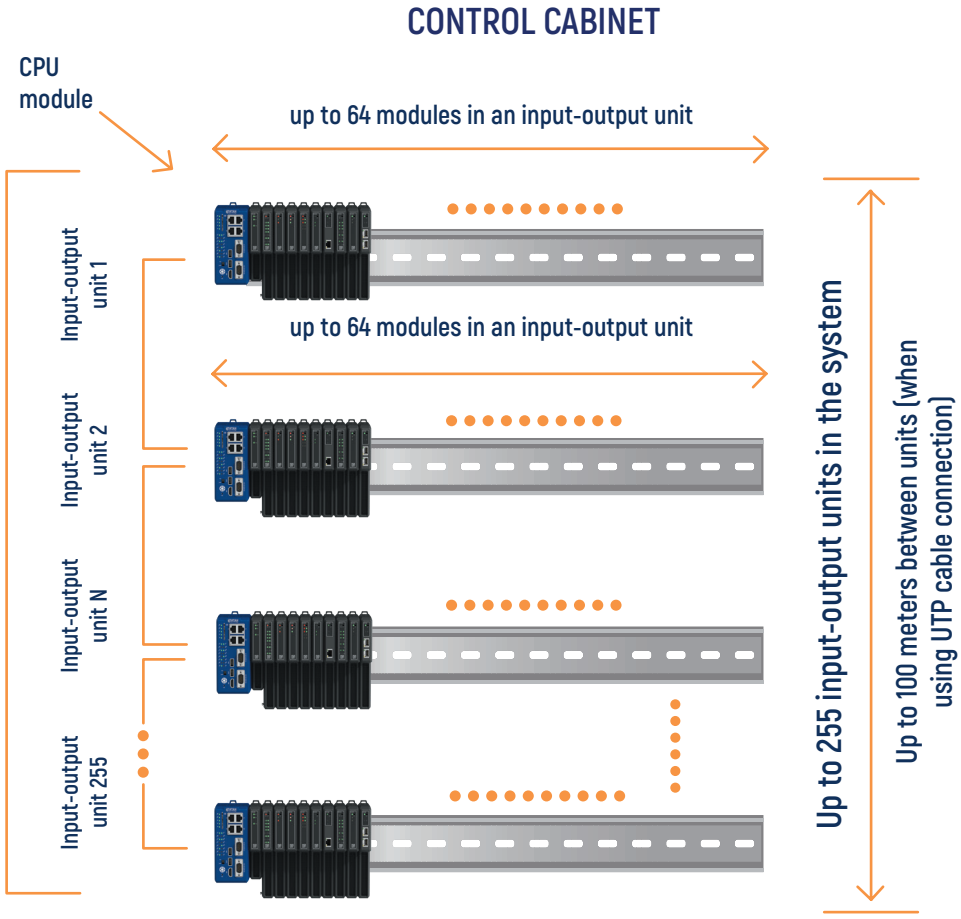
TITAN 2000 is intended for centralized control of large industrial systems, as well as for controlling production areas with high requirements in terms of speed and number of signals. The priority area of application for TITAN 2000 PLCs is industry, including critical infrastructure facilities. Some examples are given above.

[3] ARTIFICIAL INTELLIGENCE
[4] ANALOG-TO-DIGITAL CONVERTER

CONFIGURATION OF INPUT-OUTPUT UNITS AT THE TITAN 2000 PLC. CONTROL CABINET



The TITAN 2000 is equipped with two Ethernet ports and two PowerLink ports.



ADVANTAGES

Ability to connect input-output units without using switches

No need for end modules, as this function is performed by the TITAN 2000 chassis

Possibility of «hot-swap» module replacement

FEATURES OF CONFIGURING THE SYSTEM AT THE TITAN 2000 PLC:

- «Hot swap» replacement does not require removal from the DIN rail; it is sufficient to replace the electronic module.
- With full load on each discrete output channel of the discrete output module, each discrete output module DO requires the installation of an additional power module.
- All other types of module installation do not require additional power supplies.

Maximum number of modules in one input-output unit:

up to 64

Maximum number of input-output units in the system:

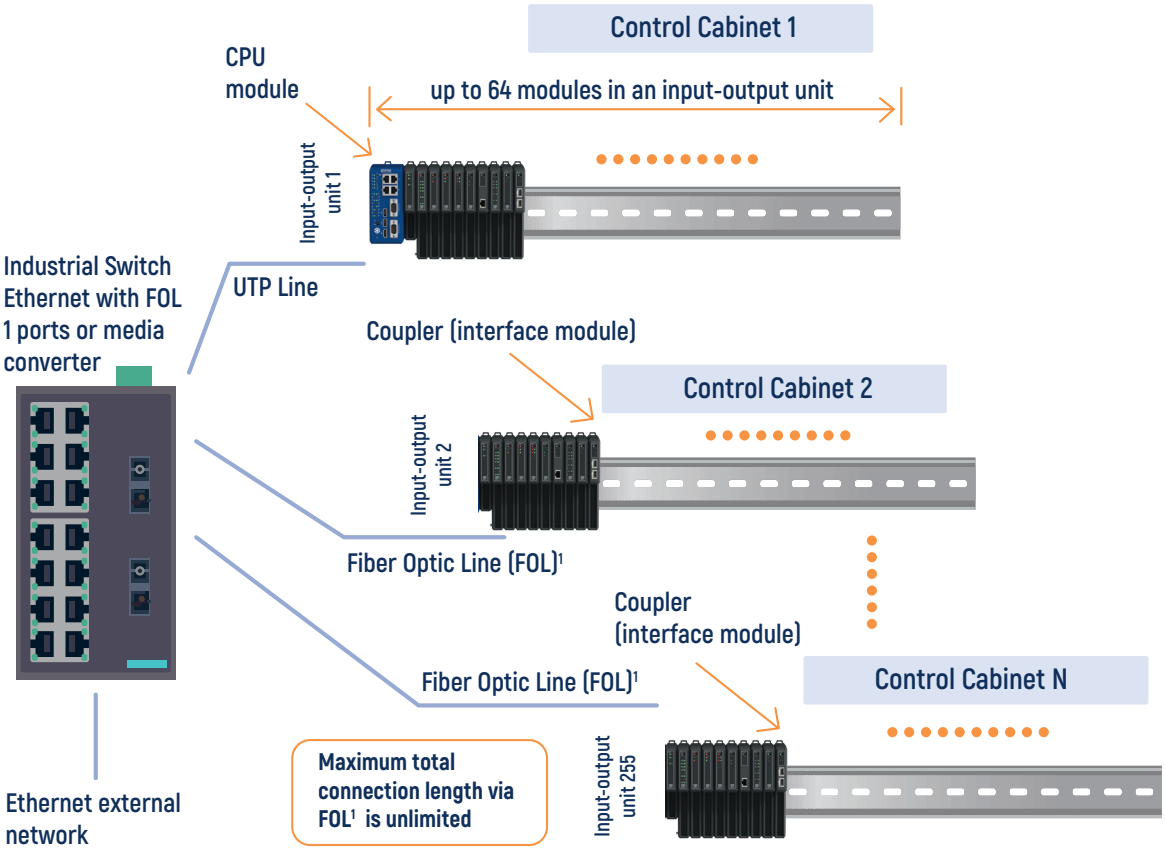
up to 255

Maximum number of signals in the system:

up to 32 768

EXAMPLE OF A DISTRIBUTED CONTROL SYSTEM (DCS) CONFIGURATION AT TITAN 2000 PLC

DISTRIBUTED CONTROL SYSTEM



NOTES

When using a fiber optic line (FOL)[1] on the TITAN 2000 PLC, you can build a distributed control system (DCS) of unlimited length.

In a single system, it is sufficient to install only one Computation Module. The remaining I/O units can be built on couplers (interface modules).

[1]FOL – fiber-optic communication line

MODULES INCLUDED IN TITAN 2000 PLC

CPU MODULE OF TITAN 2000 PLC

FUNCTIONALITY:

- Logical data processing and output of control signals according to the user's application program
- Information exchange with third-party equipment via built-in interfaces

ADVANTAGES:

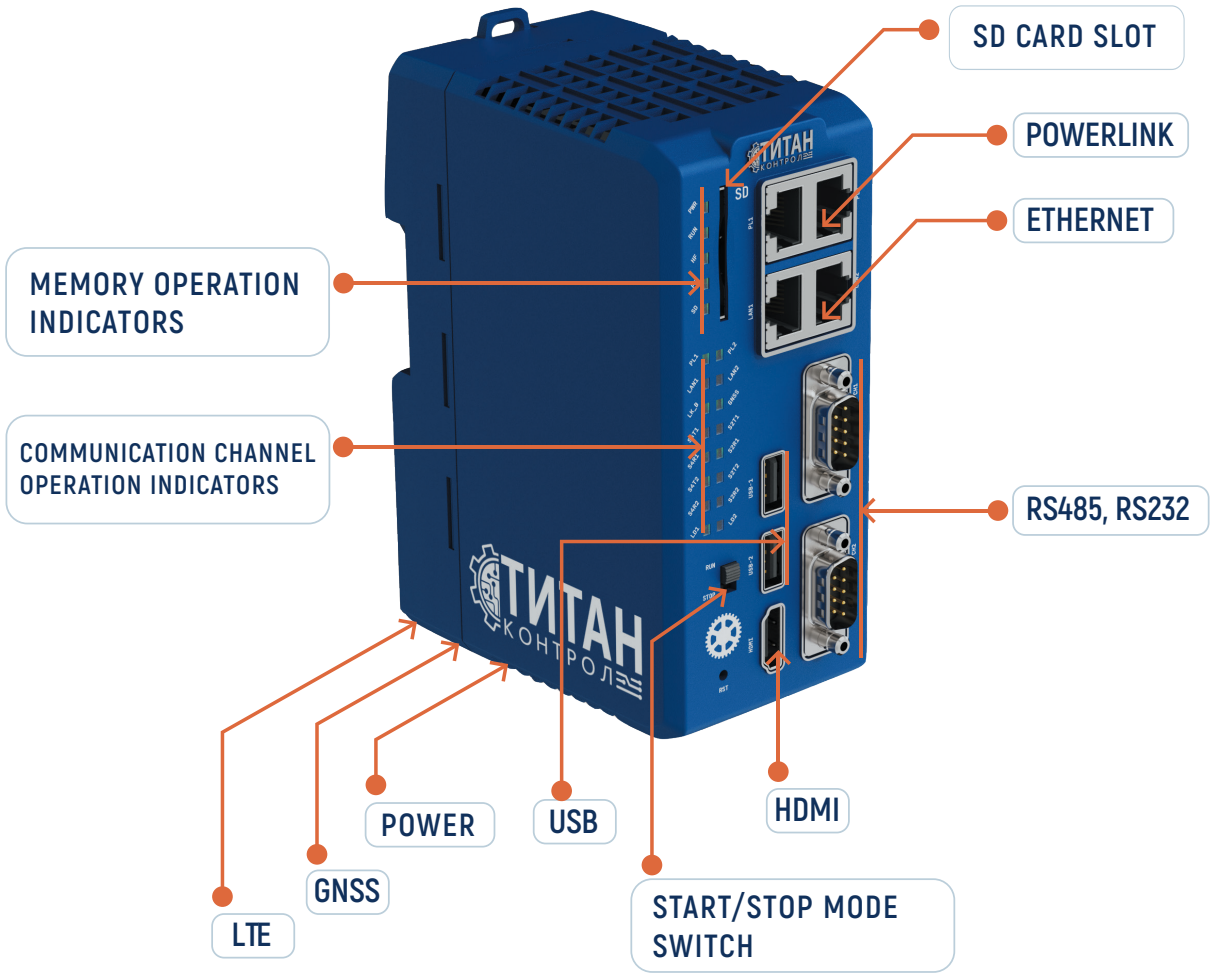
- Automatic controller reset when power is supplied or a fault occurs during operation
- Self-diagnostics, configuration check of the system, and operability of functional modules

TECHNICAL SPECIFICATIONS

Allowable peak voltage (100 ms), V	36
Dielectric strength voltage (galvanic isolation), V, at least: • between RS232/RS485 ports and the internal bus • between RS232 and RS485 ports	 1000 -
Degree of protection against external influences	IP20

CPU MODULE OF TITAN 2000 PLC. LAYOUT

SKU: N2CP113



ADVANTAGES:

Convenient physical “START/STOP” switch on the front panel

HDMI port enables direct connection of a regular monitor to the PLC

Efficient cooling thanks to perforated casing

DISCRETE INPUT MODULE

SKU: ND2DI16

The discrete input module contains 16 channels. The module is designed for the input of sixteen discrete signals with a direct current voltage of 24V. The first two out of eight channels can be used for frequency measurement and pulse counting.

ADVANTAGES:

- 2 high-speed inputs (10 kHz)
- Galvanic isolation
- Contact bounce protection

TECHNICAL SPECIFICATIONS

Number of channels	16	**Pulse count measurement range**	from 0 to 2^{64} (with overflow indication)
Number of channels for frequency measurement and pulse counting	2 (first and second in order)	**Pulse count measurement range, units:** • **in frequency meter mode up to 10 kHz**	from 0 to 2^{32} (with overflow indication)
Frequency measurement range, Hz	from 1 to 2500	**Insulation breakdown voltage (galvanic isolation), V at least:** • **between channels and internal power supply and data bar** • **between channels and external power supply bar** • **between channels and protection circuits** • **between channels**	 1000 - 1000 -

DISCRETE OUTPUT MODULE

SKU: N2D0116

The module is designed to output sixteen discrete signals, switching circuits with a voltage of 24 V DC.

The electronic unit of the module includes:

- Sixteen output signal blocks, each channel is galvanically isolated from the processing circuitry;
- Microprocessor;
- Power supply;
- Indication panel.

ADVANTAGES:

- Reliability: In case of communication loss, the module safely completes the operation of the actuator mechanism
- Short-circuit protection
- Surge protection

TECHNICAL SPECIFICATIONS

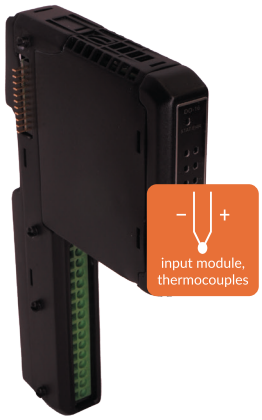
Number of channels	16
Nominal DC voltage per channel, V	24
Maximum switching current per channel, A, not more than	0,5
Insulation breakdown voltage (galvanic isolation), V, at least: • between channels and internal power and data circuits • between channels and external power bus • between channels and protective grounding	 1000 - 1000

If communication with the central processor is lost, channel control by the module can be carried out according to several configurable stages (maximum – 3, with the possibility of cyclic repetition of stages) with different time intervals (maximum 65.535 seconds per segment) and different management strategies at each stage.

ANALOG INPUT MODULE, THERMOCOUPLES, 2 CHANNELS

SKU: N2AI102

The module is designed for measuring resistance, signals from resistance temperature detectors (RTDs) and thermocouples, and DC voltage signals in the range of -400 to +400 mV.
Supports two-/three-/four-wire connection schemes for RTDs or any other sensors with an analog resistance output.



ADVANTAGES:

- Wide range of connection schemes for sensors (2-, 3-, 4-wire schemes)
- Increased measurement accuracy through lead wire resistance compensation
- Short-circuit protection (self-resetting fuse up to 100 mA)
- Noise immunity (signal rejection algorithm for spikes up to 100 ms)

TECHNICAL SPECIFICATIONS

Number of channels	2	**Limits of allowable basic relative measurement error for resistance, %**	±0,1
Resolution (including overload area), bits	24	**Limits of allowable change in measurement error for resistance, %/°C**	±0,002
Nominal range for resistance measurement, Ohm	from 1 to 450	**Weight, kg**	0,1
Nominal range for DC voltage measurement, mV	from – 400 to + 400	**Protection class against external influences**	IP20
Dielectric strength isolation voltage (galvanic isolation), V, not less: • between channels and internal power/data bar • between channels and external power bar • between channels and protective earthing • between channels	 1000 1500 1000 -	**Operating conditions:** • ambient temperature under normal conditions, °C • ambient temperature under operating conditions, °C • relative air humidity, %	 from +15 to +25 from 5 to 98 without condensation up to 98 without condensation

SIGNAL MEASUREMENT RANGES FROM THERMOCOUPLES

THERMOCOUPLE TYPE	MEASUREMENT RANGE, °C	MAXIMUM ALLOWABLE BASIC ABSOLUTE ERROR, °C	THERMOCOUPLE TYPE	MEASUREMENT RANGE, °C	MAXIMUM ALLOWABLE BASIC ABSOLUTE ERROR, °C
R	-50 to +1760	±3,0	K	-250 to +1370	±2,5
S	-50 to +1760	±3,0	N	-200 to +1300	±2,5
B	500 to +1820	±2,5	A-1	0 to +2500	±3,0
J	-210 to +1200	±2,5	A-2	0 to +1800	±3,0
T	-200 to +400	±1,5	A-3	0 to +1800	±3,0
E	-200 to +1000	±2,0	L	-200 to +800	±2,0

SIGNAL MEASUREMENT RANGES FROM RESISTANCE TEMPERATURE DETECTORS (RTDS)

RTD TYPE (α=)	MEASUREMENT RANGE, °C	MAXIMUM ALLOWABLE BASIC ABSOLUTE ERROR, °C	
		4-WIRE CONNECTION	3-WIRE CONNECTION
50M (0.00428)	-180 to +200	±0,5	±0,7
100M (0.00428)	-180 to +200	±0,5	±0,7
50M (0.00426)	-50 to +200	±0,5	±0,7
100M (0.00426)	-50 to +200	±0,5	±0,7
50P (0.00385)	-200 to +850	±0,5	±0,7
100P (0.00385)	-200 to +850	±0,5	±0,7
Pt50 (0.00391)	-200 to +850	±0,5	±0,7
Pt100 (0.00391)	-200 to +850	±0,5	±0,7
50H (0.00617)	-60 to +180	±0,5	±0,7
100H (0.00617)	-60 to +180	±0,5	±0,7
46I (grp. 21) (0.00385)	– 260 to +650	±0,5	±0,7
46I (grp. 21) (0.00385)	– 50 to +180	±0,5	±0,7

2-CHANNEL ANALOG INPUT MODULE

SKU: N2AI202

The module receives input of analog signals of DC current and/or DC voltage. The measurement channels of the module are galvanically isolated from each other.

The measurement channels are passive, meaning the power supply of analog circuits for any connection scheme is provided by an external power source.

ADVANTAGES:

- Galvanic isolation of each channel (up to 1000V)
- Built-in hardware and software measurement error compensator
- Increased measurement accuracy (2 times higher than the PLC TITAN 1000)
- Reverse polarity protection
- High signal processing speed (2 ADCs)

TECHNICAL SPECIFICATIONS

Number of Channels	2
Resolution (including overload area), bits	24

GENERAL CHANNEL CHARACTERISTICS

Channel conversion time, ms	2,0	Two-wire sensor connection (passive sensor)	available (when using an external power source)
Channel polling	ǁ	Four-wire sensor connection (active sensor)	available
Module conversion time (when channels are unlocked), ms	2,0	Operating conditions: • ambient air temperature under normal conditions (°C) • under extended conditions (°C) • relative humidity of the air, %	 + 15 to + 25 – 40 to + 60 5 to 98 up to 80, no condensation
Dielectric strength isolation voltage (galvanic isolation), V, not less: • between channels and internal power/data bar • between channels and external power bar • between channels and protective earthing • between channels	 1000 1500 1000 1000	Degree of protection against external influences	IP20
Permissible limit of basic error for channel conversion / current/voltage DC measurement / cooling sensor, %	±0,025	Dimensions (HxWxD), mm (preliminary)	120x22x85
Limits of permissible basic reduced error of voltage/DC conversion (in nominal ranges), %	±0,002	Weight, kg	0,1

ANALOG INPUT MODULE, 8 CHANNELS

SKU: N2AI308

The module is designed for inputting eight analog signals of direct current and/or direct voltage. The software-configurable signal measurement range lies within the following limits:

- from - 10 to + 10 B;
- from 0 to + 10 B;
- from 0 to 20 мА;
- from 4 to 20 мА.

The module's measurement channels are galvanically isolated from each other. The measurement channels are passive, meaning that powering the analog circuits must be provided by an external power source for any connection scheme.

TECHNICAL CHARACTERISTICS, 8 CHANNELS

Number of channels	8
Resolution (including overload area), bits	24

GENERAL CHANNEL CHARACTERISTICS

Conversion time per channel, ms	2,0	Four-wire sensor connection (active sensor)	Available
Channel polling	Sequential	Required power from controller's external supply bus, W, at least	0,8
Conversion time for module (all channels unlocked), ms	16,0	External supply voltage, V	24 (from 21.6 to 26.4)
Breakdown voltage of insulation (galvanic isolation), V, not less than: • between channels and internal power and data bus • between channels and external power bus • between channels and protective grounding • between channels	 1000 1500 1000 250	Operating conditions: • Ambient air temperature under normal conditions, °C • Ambient air temperature, °C • Relative air humidity, %	 from + 15 to + 25 from – 40 to + 60 from 5 to 98 without condensation formation
Limits of permissible basic reduced error of DC voltage/current conversion (within nominal ranges), %	±0,1	Degree of protection from external influences	IP20
Limits of permissible additional reduced error of DC voltage/current conversion due to changes in ambient air temperature, %/°C	±0,002	Dimensions (WxHxL), mm (preliminary)	120x22x85
Two-wire sensor connection (passive sensor)	Available (with the use of an external power supply)	Weight, kg	0,1

ANALOG OUTPUT MODULE, 2 CHANNELS

SKU: N2A0102

The module is designed for the output of two analog signals of direct current and/or direct current voltage. The measurement range of signals, configurable via software and hardware, is within the following limits:

- from 0 to + 5 B;
- from - 5 to + 5 B;
- from 0 to + 10 B;
- from - 10 to + 10 B;
- from 0 to 20 мА;
- from 4 to 20 мА.

ADVANTAGES:

- Reliability – double galvanic isolation
- High-speed operation – 2 DACs
- Protection against reverse polarity of supply voltage
- Accuracy – two independent power sources for DAC

TECHNICAL SPECIFICATIONS

Number of channels	2
Capacity, bits	16

GENERAL CHANNEL CHARACTERISTICS

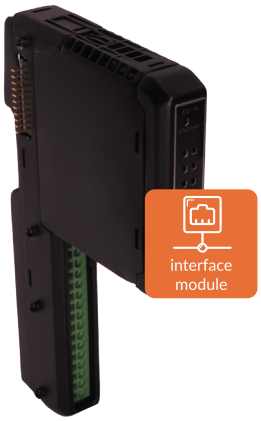
Breakdown voltage of insulation (galvanic isolation), V, not less than:		Operating conditions:	
• between channels and internal power and data bus	1500	• Ambient air temperature under normal conditions, °C	from +15 to +25
• between channels and external power bus	1500	• Ambient air temperature, °C	from –40 to +60
• between channels and protective grounding	1500	• Relative air humidity, %	from 5 to 98 without condensation
• between channels	1500		
Limits of permissible basic reduced error of DC voltage/current conversion (within nominal ranges), %	±0,1	Degree of protection from external influences	IP20
Limits of permissible additional reduced error of DC voltage/current conversion due to changes in ambient air temperature, %/°C	±0,0025	Dimensions (WxHxL), mm (preliminary)	120x22x85
Weight, kg	0,1		

INTERFACE MODULE

SKU: N2IM102

The interface module performs the following functions:

- connecting the expansion unit to the PLC communication bus;
- power supply of expansion unit modules via the power supply module.



The module includes the following elements located on the front panel:

- two RJ45 communication ports (IN and OUT) designed for organizing connections between controller blocks;
- an address switch intended for setting the block address in a distributed control system.

ADVANTAGES:

Two RJ45 ports allow you to build a PLC network without switches

Reverse polarity protection of the supply voltage

TECHNICAL SPECIFICATIONS

Power consumption, W, not more	2	**Degree of protection from external influences**	IP20
Operating conditions: • **ambient temperature, °C** • **ambient temperature, °C**	from -40 to +60 from 5 to 98 without condensation	**Weight, kg**	0,3

COMMUNICATION MODULE RS-485

SKU: N2IF101

The RS-485 communication processor module is designed to organize an independent communication channel via the RS-485 interface.
The module does not contain protocol drivers inside. It provides physical connection of external devices.

ADVANTAGES:

Galvanic isolation up to 1000V

TECHNICAL SPECIFICATIONS

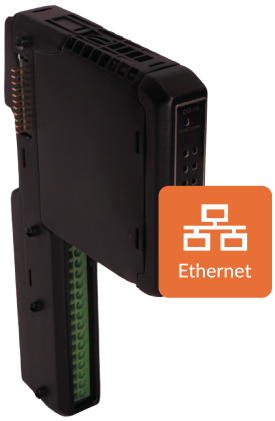
Number of ports	1
Data transfer rate, bit/s	from 150 to 115,200
Isolation breakdown voltage (galvanic isolation), V, not less than: • between channels and internal power/data bus	1000
Operating conditions: • Ambient temperature, °C • Relative air humidity, %	from -40 to +60 from 5 to 98, without condensation

Degree of protection against external influences	IP20
Dimensions (HxWxD), mm (approx.)	120x22x85

ETHERNET COMMUNICATION MODULE

SKU: N2IF102

The Ethernet communication processor module is designed to provide an independent communication channel via the Ethernet interface. The module does not contain protocol drivers; it provides only the physical connection for external devices. Protocol drivers for data transmission over these channels operate in the central processor module.



ADVANTAGES:

Galvanic isolation up to 1000 V

Ability to use up to 8 modules of this type in a single I/O node

TECHNICAL SPECIFICATIONS OF THE ETHERNET COMMUNICATION PROCESSOR MODULE

Number of ports	1	**Degree of protection against external influences**	IP20
Interface	1 x RJ45 (Ethernet 100BASE-T)	**Dimensions (H x W x D), mm (approximate)**	120x22x85
Isolation breakdown voltage (galvanic isolation), V, at least: • **between channels and the internal power and data bus**	1000	**Weight, kg**	0,1
Operating conditions: • **Ambient temperature, °C** • **Relative air humidity, % (non-condensing)**	from -40 to +60 from 5 to 98, without condensation		

ADDITIONAL POWER SUPPLY MODULE

SKU: N2PS100

The power supply module performs the following functions:

- Powers the internal consumers of the controller unit with a stabilized 5 V DC voltage;
- Powers the external circuits of the I/O modules of the controller with a 24 V DC voltage.

The input voltage connection is made via the terminal block on the chassis. 24V DC voltage is supplied to terminals (+) and (–).

ADVANTAGES:

The design of the power supply module allows galvanic isolation of modules in a single I/O node.

The power supply voltage monitoring system with feedback ensures its high stability.

Protection against reverse polarity of the supply voltage.

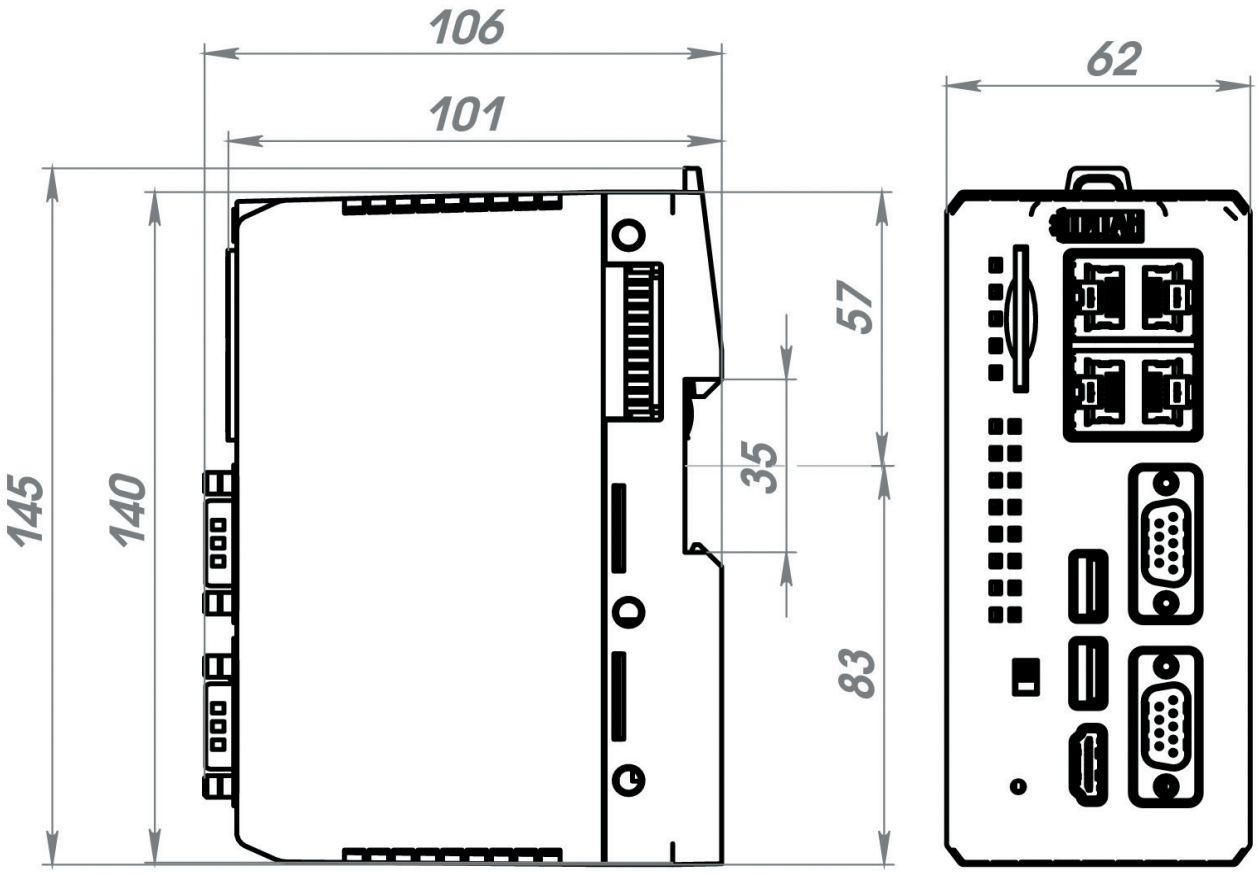
Overvoltage protection.

TECHNICAL CHARACTERISTICS

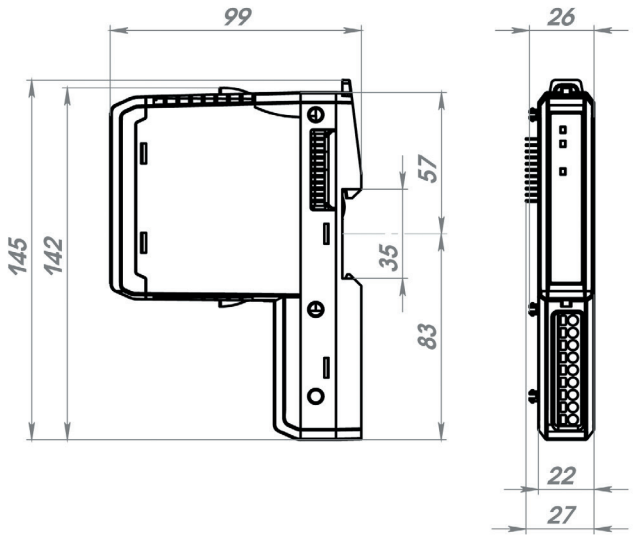
Input DC voltage, V: • **nominal value** • **permissible variation range**	24 From 18 to 33	**Degree of protection against external influences**	IP20
Nominal output power, W	15	**Dimensions (HxWxD), mm**	120x22x85
Input DC voltage, V: • **nominal value** • **permissible variation range**	24 from 21,6 to 26,4	**Weight, kg**	0,1
Operating conditions: • **Ambient air temperature, °C** • **Relative humidity, %**	from -40 to +60 from 5 to 98 without condensation		

OVERALL DIMENSIONS OF MODULES

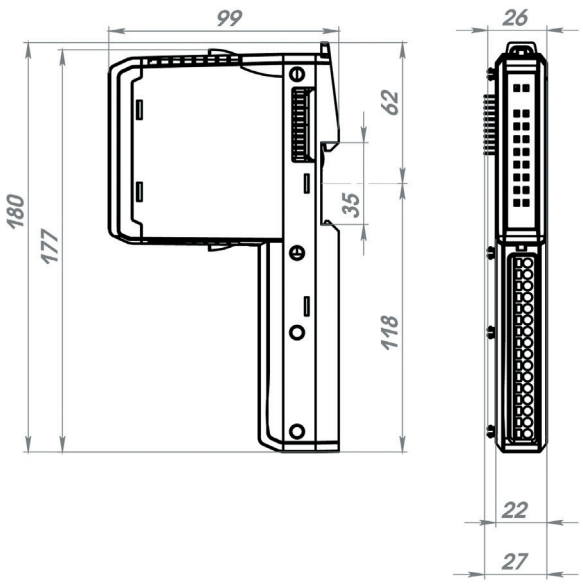
Overall dimensions of the CPU module, mm



Overall dimensions of power supply modules assembled with the chassis, mm

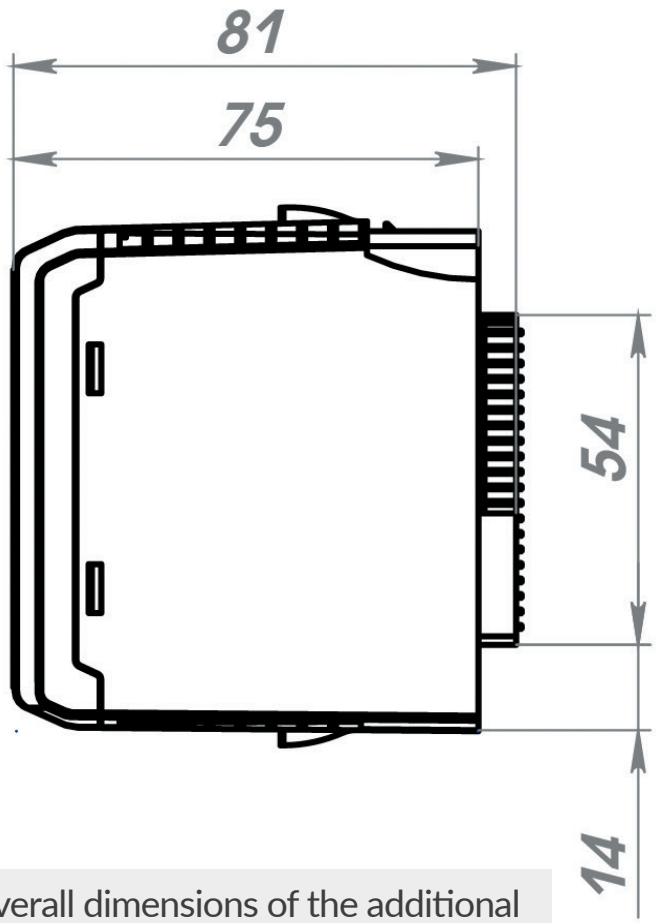


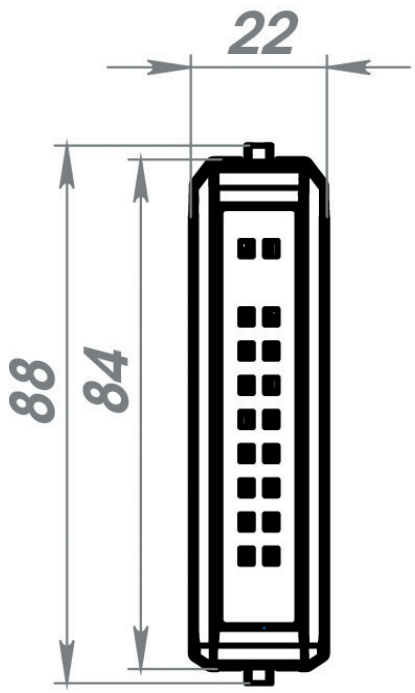
Overall dimensions of additional modules assembled with the chassis, mm



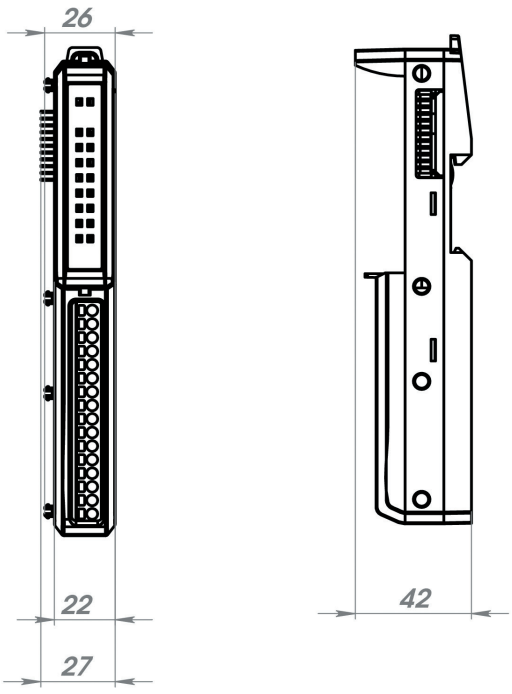
OVERALL DIMENSIONS OF MODULES

Overall dimensions of electronic modules removed from the chassis, mm

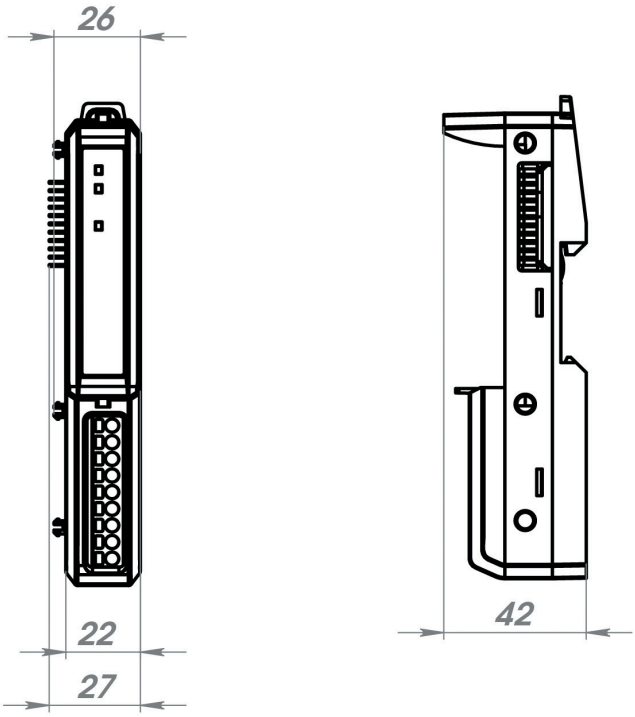




Overall dimensions of the additional modules' chassis, mm



Overall dimensions of the power modules' chassis, mm



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TITAN 3000 PLC

SECTION V

MODULES AS PART OF TITAN 3000 PLC

CPU MODULE

SKU: N3CP110

A key distinguishing feature of the TITAN 3000 PLC is the possibility of module redundancy.

Thanks to this, TITAN 3000 can be used at the most critical automation facilities in industry and energy sectors.

CENTRAL PROCESSOR MODULE PERFORMS THE FOLLOWING FUNCTIONS:

- Self-diagnosis, configuration check of the system and functional module operation check
- Logical data processing and output of control signals in accordance with the user application software
- Information exchange with third-party equipment via built-in interfaces
- Automatic controller reboot in case of power loss or malfunction
- The central processor module software optionally supports WEB visualization

TECHNICAL SPECIFICATIONS

Support for internal power bus redundancy	**Available**
OPERATING CONDITIONS:	
Ambient air temperature, °C	from -40 to +50
Relative air humidity, %	from 5 to 90 without condensation
Degree of protection against external influences	**IP20**
Dimensions (W×H×D), mm	200x100x150
Weight, kg	0,8

DISCRETE INPUT MODULES, 32 CHANNELS

SKU: N3DI132

SKU: N3DI232

SKU: N3DI332

Modules are designed for the input of thirty-two discrete signals with a DC voltage of 24 V.

ADVANTAGES:

- Galvanic isolation of channels and bus
- Galvanic isolation between channels
- Reverse polarity protection

TECHNICAL SPECIFICATIONS

PARAMETER NAME, UNIT OF MEASUREMENT	VALUE		
	N3DI132	N3DI232	N3DI332
Number of channels	32 (4 groups of 8 channels)		
Polarity of the common wire in each group	«minus»	«plus»	«minus»/«plus»
OPERATING CONDITIONS			
Ambient temperature in operating conditions, °C	-40 to +60		
Relative air humidity, %	5 to 98 (without condensation)		
Degree of protection against external influences	IP20		
Dimensions (HxWxD), mm	200x50x150		
Weight, kg	0.8		

DISCRETE INPUT MODULE, 16 CHANNELS

SKU: N3DI416

The module is designed for the input of sixteen discrete signals of AC or DC voltage of 220 V.

ADVANTAGES:

- Galvanic isolation of channels and bus
- Galvanic isolation between channels
- Reverse polarity protection

TECHNICAL SPECIFICATIONS

PARAMETER NAME, UNIT OF MEASUREMENT	VALUE
Number of channels	16
Rated DC/AC voltage per channel, V	220
Degree of protection against external impacts	IP20
Dimensions (HxWxD) mm	200x50x150
Weight, kg	0.48

DISCRETE OUTPUT MODULE, 32 CHANNELS

SKU: N3DO132

The modules are designed for the output of thirty-two discrete signals, switching circuits with a voltage of 24 V DC and/or AC.

If the module loses connection with the central processor, control of channels can occur in several configurable steps (maximum — 3, with the possibility of cyclic repetition of the steps) with different time intervals (maximum 65,535 seconds per interval) and different control strategies at each stage.

ADVANTAGES:

- Galvanic isolation of channels and bus
- Galvanic isolation between channels
- Reverse polarity protection

TECHNICAL SPECIFICATIONS

NAME OF PARAMETER, UNIT OF MEASUREMENT	VALUE
Number of channels	32 (4 groups of 8 channels each)
Channel type	PNP
Communication voltage of channel, DC (AC), V	
Rated	24
Maximum permissible	30
OPERATING CONDITIONS	
Ambient air temperature, °C	from -40 to +50
Relative air humidity, %	from 5 to 98 without condensation
Degree of protection against external influences	IP20
Dimensions (WxHxD) mm	200x50x150
Weight, kg	0.8

DISCRETE OUTPUT MODULE, 16 CHANNELS

SKU: N3D0216

The module is designed for the output of sixteen discrete signals, switching power circuits with a voltage of 220 V AC or DC.

ADVANTAGES:

- Galvanic isolation of channels and bus
- Galvanic isolation between channels

TECHNICAL SPECIFICATIONS

NAME OF PARAMETER, UNIT OF MEASUREMENT	VALUE
Number of channels	16
SPECIFICATIONS OF CHANNELS FOR SWITCHING AC CIRCUITS	
Rated voltage, V	220
Maximum voltage, V	250
Maximum power, W, at least	**75**
Maximum current (for resistive load), A, at least	0.3
SPECIFICATIONS OF CHANNELS FOR SWITCHING DC CIRCUITS	
Rated voltage, V	230
Maximum voltage, V	250
Maximum power, W, at least	500
Maximum current (for resistive load), A, at least	2.0

PARAMETER NAME, UNIT OF MEASUREMENT	VALUE
OPERATING CONDITIONS	
Ambient air temperature in operating conditions, °C	from -40 to +50
Relative air humidity, %	from 5 to 98 without condensation
Degree of protection against external influences	IP20
Dimensions (WxHxD), mm	200x50x150
Weight, kg	0.8

COMBINED DISCRETE OUTPUT MODULE

SKU: N3DC132

The module is designed for the input of twenty-four discrete DC signals with a voltage of 24 V and the output of eight discrete signals, switching circuits with a DC voltage of 24 V.

ADVANTAGES:

- Galvanic isolation of channels and bus
- Galvanic isolation between channel groups
- Surge protection

TECHNICAL SPECIFICATIONS

PARAMETER NAME, UNIT OF MEASUREMENT	VALUE
Number of channels	24 (3 groups of 8 channels)
Channel type	PNP
OUTPUT CHANNELS	
Number of channels	8 (1 group of 8 channels)
Channel type	Solid-state relay
| Rated DC voltage, V	24
OPERATING CONDITIONS	
Ambient air temperature, °C	from -40 to +50
Relative air humidity, %	from 5 to 98 without condensation
Degree of protection against external influences	IP20
Dimensions (WxHxD), mm	200x50x150
Weight, kg	0,8

IMPULSE COUNTER MODULE

SKU: N3DA115

Impulse counter module, 3 channels for impulse input with a frequency from 1 Hz to 500 kHz, channel-by-channel galvanic isolation of counting channels, rated signal voltage from 4 to 24 V, 6 channels of discrete output 24 V DC, 0.5A.

The module is designed for receiving three impulse signals with a frequency from 1 Hz to 500 kHz and rated signal voltage from 4 to 24 V. The module can operate in one of the following modes (selected in the programming environment IDE):

- Frequency meter up to 10 kHz with pulse counting;
- Frequency meter up to 500 kHz;
- Data processing from an encoder.

ADVANTAGES:

Galvanic isolation of channels and bus

Galvanic isolation between channel groups

TECHNICAL SPECIFICATIONS

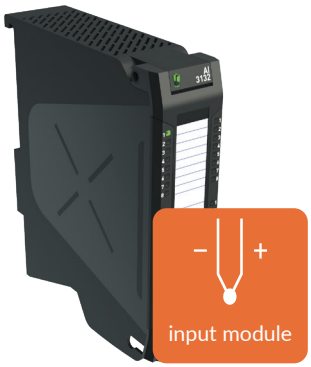
PARAMETER NAME, UNIT OF MEASUREMENT	VALUE
Number of frequency measurement channels	3
Frequency measurement range (counter mode up to 500 kHz), Hz	1 to 500 000
Frequency measurement range (other modes), Hz	1 to 10 000
IMPULSE COUNTING RANGE, pcs	
In the frequency meter mode, up to 10 kHz	0 to 2^{32}(with a sign of overflow) from 0 to 2^{64}
Rated input voltage range for impulse frequency measurement and counting, V	4 to 24 V
DISCRETE INPUTS	
Rated input voltage range for impulse frequency	6
Rated DC voltage of the channel, V	24
DISCRETE OUTPUTS	
Number of discrete outputs	6
Rated DC voltage of the channel, V	24
Switched channel current, A, at least	0,5

NAME OF PARAMETER, UNIT OF MEASUREMENT	VALUE
GENERAL MODULE SPECIFICATIONS	
Limits of permissible relative frequency conversion error (in operating mode - frequency up to 500 kHz), %	±0.01
Limits of permissible relative frequency conversion error (in other modes), %	When measured up to 2.4 kHz inclusive, ±0.01
Limits of permissible absolute error in pulse count, pulses	±
OPERATING CONDITIONS	
Ambient air temperature under normal conditions, °C	from +15 to +25
Ambient air temperature in working conditions, °C	from -40 to +60
Relative air humidity, %	from 5 to 98 without condensation
Degree of protection against external impacts	**IP20**
Dimensions (HxWxD), mm	200x50x150
Weight, kg	0,8

RESISTANCE THERMOMETER SIGNAL INPUT MODULES

SKU: N3AIT108

SKU: N3AIT208



The modules are designed for measuring resistance, signals from resistance temperature detectors (RTDs) and thermocouples, and DC voltage signals in the range from minus 400 to plus 400 mV. Two-/three-/four-wire connection schemes for RTDs or any other sensors with an analog resistance output are supported.

The sensor connection type and the connection scheme can be configured separately for each channel.

There are two types of these modules:

- The measuring channels of the module are not galvanically isolated from each other;
- The measuring channels of the module are galvanically isolated from each other.

ADVANTAGES:

Measurement accuracy - compensation for cold junction temperature

TECHNICAL SPECIFICATIONS

PARAMETER NAME, UNIT OF MEASURE	VALUE	
	N3AIT108	N3AIT208
Number of channels	8	
Resolution (including overload area), bits	24	

16-CHANNEL ANALOG INPUT MODULE, DIRECT CURRENT SIGNALS

SKU: N3AI116

The module is designed for the input of sixteen analog direct current signals in the range from 0 to 20 mA, or from 4 to 20 mA.

The measuring channels are passive, meaning the power supply of the measuring circuits should be provided by an external power source in any connection scheme.

ADVANTAGES:

- Galvanic isolation between channels and the bus
- Reverse polarity protection

TECHNICAL SPECIFICATIONS

PARAMETER NAME, UNIT OF MEASURE	VALUE
Number of channels	16
Resolution (including overload area), bits	24
Rated direct current signal conversion range, mA	from 0 to 20 / from 4 to 20
Permissible additional error of direct current signal conversion (within rated range), %	+ - 0.1
Permitted additional error of direct current signal conversion (within rated range) over temperature change of ±5°C, %	+ - 0.002
OPERATING CONDITIONS:	
Ambient air temperature, °C	from -40 to +50
Relative air humidity, %	from 5 to 95 without condensation
Degree of protection against external exposure	IP20
Dimensions (W×H×D) mm	200×50×150
Weight, kg	0.8

8-CHANNEL ANALOG INPUT MODULE, INDIVIDUAL ADC

SKU: N3AI208

The module is designed for input of eight analog signals of direct current and/or direct voltage. Each channel is equipped with its own ADC. The measurement channels are passive, that is, the power supply of analog sensors in any connection scheme must be provided by an external power source.

ADVANTAGES:

- Galvanic isolation of channels and bus
- Galvanic isolation between channels
- Reverse polarity protection
- Increased measurement accuracy - ADC in each channel

TECHNICAL SPECIFICATIONS

PARAMETER NAME, UNIT OF MEASUREMENT	VALUE
	N3AI208
Number of channels	8
Resolution (including overload area), bits	16
CURRENT CONVERSION CHANNEL FROM 0 TO 20 MA / 4 TO 20 MA	
Rated conversion range of DC current, mA	0 to 20 / 4 to 20
GENERAL SPECIFICATIONS OF CONVERSION CHANNELS	
Limits of permissible main reduced conversion errors of DC current, %	±0.025
Limits of permissible additional reduced conversion errors due to temperature change, %/°C	±0.002
OPERATING CONDITIONS	
Ambient air temperature in normal conditions, °C	from +15 to +25
Ambient air temperature in working conditions, °C	-40 to +60
Relative air humidity in working conditions, %	from 5 to 98 without condensation
Degree of protection from external influences	IP20
Dimensions (HxWxD), mm	200x50x150
Weight, kg	0.8

8-CHANNEL ANALOG INPUT MODULE, COMMON ADC

SKU: N3AI308

The modules are designed for input of eight analog signals of direct current and/or direct voltage. The module features a common ADC for all channels. The measurement channels are passive, i.e., the analog circuit power supply must be provided by an external source in any connection scheme.

ADVANTAGES:

- Galvanic isolation of channels and bus
- Galvanic isolation between channels

TECHNICAL SPECIFICATIONS

PARAMETER NAME, UNIT OF MEASUREMENT	VALUE
	N3AI308
Number of channels	8
Resolution (including overload range), bits	14
CURRENT CONVERSION CHANNEL FROM 0 TO 20 MA / FROM 4 TO 20 MA	
Rated DC current conversion range, mA	0 to 20 / 4 to 20
VOLTAGE CONVERSION CHANNEL FROM 0 TO +10 V	
Rated DC voltage conversion range, V	0 to 10 / 0 to +10
GENERAL SPECIFICATIONS OF CONVERSION CHANNELS	
Maximum permissible basic reduced conversion error for DC current (in rated ranges), %	±0.1
Additional maximum permissible reduced conversion error for DC current when ambient temperature changes, %/°C	±0.002
OPERATING CONDITIONS	
Ambient temperature under normal conditions, °C	from +15 to +25
Ambient temperature under working conditions, °C	from -40 to +60
Relative air humidity, %	up to 98 without condensation
Degree of protection against external influences	IP20
Dimensions (WxHxD), mm	200×50×150
Weight, kg	0.8

8-CHANNEL ANALOG INPUT MODULE, ACTIVE, INDIVIDUAL ADC

SKU: N3AI408

The module is designed for inputting eight analog DC current and/or DC voltage signals with a sampling frequency from 1 to 10 kHz, with a function to power sensors from the module. Measurement channels can operate in both passive and active modes. In passive mode, analog circuit powering must be provided by an external power source regardless of the connection scheme. In active mode, analog circuits can be powered from the module.

ADVANTAGES:

- Galvanic isolation between channels and the bus
- Galvanic isolation between channels
- Overcurrent protection
- Reverse polarity protection

TECHNICAL SPECIFICATIONS

PARAMETER NAME, UNIT	VALUE
Number of channels	8
Resolution (including overload), bits	18
CURRENT CONVERSION CHANNEL FROM 0 TO 20 MA / FROM 4 TO 20 MA	
Nominal DC current conversion range, mA	0 to 20 / 4 to 20
VOLTAGE CONVERSION CHANNEL FROM 0 TO +5 V	
Nominal DC voltage conversion range, V	0 to +5
VOLTAGE CONVERSION CHANNEL FROM -5 TO +5 V	
Nominal DC voltage conversion range, V	-5 to +5
VOLTAGE CONVERSION CHANNEL FROM 0 TO +10 V	
Nominal DC voltage conversion range, V	0 to +10
VOLTAGE CONVERSION CHANNEL FROM -10 TO +10 V	
Nominal DC voltage conversion range, V	-10 to +10
SENSOR POWER CHANNELS	
Limits of permissible basic (reduced to nominal) conversion error for DC current/voltage relative to the set value, %	±0.025
Limits of permissible additional (temperature) conversion error for DC current/voltage relative to the set value with ambient temperature change, %/°C	±0.002

PARAMETER NAME, UNIT OF MEASUREMENT	VALUE
OPERATING CONDITIONS	
Ambient air temperature, °C	from -40 to +50
Relative air humidity, %	from 5 to 98 without condensation
Degree of protection against external influences	IP20
Dimensions (WxHxD), mm	200x50x150
Weight, kg	0.8

ANALOG OUTPUT MODULE FOR CURRENT SIGNALS

SKU: N3A0108

The module is designed to output eight analog DC current signals in the ranges from 0 to 20 mA, from 4 to 20 mA.

ADVANTAGES:

- Galvanic isolation of channels and bus
- Galvanic isolation between channels
- Reverse polarity protection

TECHNICAL SPECIFICATIONS

PARAMETER NAME, UNIT OF MEASUREMENT	VALUE
Number of channels	8
Resolution (including overload zone), bits	16
CURRENT CONVERSION CHANNEL FROM 0 TO 20 MA / FROM 4 TO 20 MA	
NOMINAL RANGE OF DC CURRENT CONVERSION, mA	from 0 to 20 / from 4 to 20
GENERAL CHARACTERISTICS OF CONVERSION CHANNELS	
Permissible limits of the main reduced conversion error of DC current (in nominal ranges), %	± 0,1
Permissible limits of additional reduced conversion error of DC current under changes in ambient air temperature, %/°C	± 0,0025
OPERATING CONDITIONS	
Ambient air temperature, °C	from -40 to +50
Relative air humidity, %	from 5 to 98 without condensation formation
Degree of protection against external influences	IP20
Dimensions (WxHxD), mm	200x50x150
Weight, kg	0,8

ANALOG OUTPUT MODULE FOR CURRENT AND VOLTAGE SIGNALS

SKU:N3A0208

The module is designed to output eight analog signals of direct current and/or direct voltage.

ADVANTAGES:

- Galvanic isolation of channels and bus
- Galvanic isolation between channels
- Protection against reverse polarity

TECHNICAL SPECIFICATIONS

PARAMETER NAME, UNIT OF MEASUREMENT	VALUE
Number of channels	8
Resolution (including overload area), bits	16
CURRENT CONVERSION CHANNEL FROM 0 TO 20 MA / FROM 4 TO 20 MA	
Rated conversion range of direct current, mA	0 to 20 / 4 to 20
VOLTAGE CONVERSION CHANNEL FROM 0 TO +10 V	
Rated conversion range of direct voltage, V	0 to +10
VOLTAGE CONVERSION CHANNEL FROM -10 TO +10 V	
Rated conversion range of direct voltage, V	-10 to +10
GENERAL SPECIFICATIONS OF CONVERSION CHANNELS	
Limits of permissible main reduced conversion error for direct current (% of rated ranges)	±0.1
Limits of permissible additional reduced conversion error for direct current when ambient temperature changes (%/°C)	±0.0025
OPERATING CONDITIONS	
Ambient temperature, °C	-40 to +50
Relative humidity, % (without condensation)	5 to 98
Degree of protection against external influences	IP20
Dimensions (HxWxD), mm	200x50x150
Weight, kg	0.8

ANALOG COMBINED MODULE

SKU: N3AC108

The module intended for:

- input of six analog DC signals and/or DC voltage signals;
- output of two analog DC current and/or voltage signals.

Measurement channels are passive, meaning the power supply for analog circuits in any connection scheme must be provided by an external power source.

ADVANTAGES:

- Galvanic isolation of channels and bus
- Galvanic isolation between channels
- Protection against reverse polarity

TECHNICAL SPECIFICATIONS

PARAMETER NAME, UNIT OF MEASUREMENT	VALUE
ANALOG INPUT	
Number of channels	8
Resolution (including overload area), bit	14
CURRENT CONVERSION CHANNEL FROM 0 TO 20 MA / FROM 4 TO 20 MA	
Rated conversion range of DC current, mA	from 0 to 20 / from 4 to 20
VOLTAGE CONVERSION CHANNEL FROM 0 TO +10 V	
Rated conversion range of DC voltage, V	from 0 to +10
VOLTAGE CONVERSION CHANNEL FROM -10 TO +10 V	
Rated conversion range of DC voltage, V	from -10 to +10
Permissible basic reference error of DC current conversion (in rated ranges), %	± 0,1
Permissible additional reference error of DC current conversion due to ambient temperature change, %/°C	± 0,002
| ANALOG OUTPUT	
Number of channels	2
Resolution, bit	16
CURRENT REPRODUCTION CHANNEL FROM 0 TO 20 MA / FROM 4 TO 20 MA	
Rated range of DC current reproduction, mA	from 0 to 20 / from 4 to 20
VOLTAGE REPRODUCTION CHANNEL FROM 0 TO +10 V	
Rated reproduction voltage range, V	from 0 to +10

PARAMETER NAME, UNIT OF MEASUREMENT	VALUE
VOLTAGE REPRODUCTION CHANNEL FROM -10 TO +10 V	
Rated voltage reproduction range, V	from -10 to +10
Limits of allowable basic converted error of DC current conversion (in rated ranges), %	± 0.1
Limits of allowable additional converted error of DC current conversion with changes in ambient air temperature, %/°C	± 0.0025
OPERATING CONDITIONS	
Ambient air temperature in normal conditions, °C	from +15 to +25
Ambient air temperature in working conditions, °C	from -40 to +60
Relative humidity of air, %	from 5 to 98 without condensation
Degree of protection against external influences	**IP20**
Dimensions (WxHxD), mm	200x50x150
Weight, kg	0,8

COMMUNICATION MODULE RS-485

SKU:N3IF104

The module is designed for organizing four independent communication channels via the RS-485 interface. It does not contain protocol drivers inside.

It provides physical connection of external devices.

Protocol drivers for data transmission over these channels operate in the central processor module.

The module includes:

- microprocessor;
- four RS-485 microcircuits;
- power supply (DC/DC converter 24V/5V);
- indication panel.

TECHNICAL SPECIFICATIONS

PARAMETER NAME, UNIT OF MEASUREMENT	VALUE
Number of ports	4
Number of devices connectable to one port, at least than	32
Data transmission rate, bit/s	from 150 to 115200
Breakdown voltage of insulation (galvanic isolation), V, not less	
Between channels and internal power and data bus	1000
Between channels	1000
Support for internal power bus reservation	available

OPERATING CONDITIONS:	
Ambient air temperature, °C	from -40 to +50
Relative humidity, %	from 5 to 98 without condensation
Degree of protection against external impacts	IP20
Dimensions (WxHxD) mm	200x50x150
Weight, kg	0.4

ETHERNET COMMUNICATION MODULE

SKU: N3IF202

The communication processor module is designed to organize two independent communication channels via the Ethernet 100BASE-T interface. The module does not contain protocol drivers inside. It physically connects external devices.

Protocol drivers for data transmission via these channels function within the central processor module.

The module includes:

- microprocessor;
- two Ethernet PHY microchips – integrated microchips designed to implement the physical layer of the Ethernet 100BASE-T interface;
- power supply (DC/DC converter 24V/5V);
- indicator panel.

TECHNICAL SPECIFICATIONS

PARAMETER NAME, UNIT OF MEASUREMENT	VALUE
Number of ports	2
Interface	RJ45 (Ethernet 100BASE-T)
OPERATING CONDITIONS:	
Parameter	Value
Ambient air temperature, °C	from -40 to +60
Relative humidity, %	from 5 to 98 without condensation
Degree of protection against external impacts	IP20
Dimensions (WxHxD) mm	200x50x150
Weight, kg	0.3

AUXILLIARY POWER SUPPLY MODULES

SKU: N3PS100

SKU: N3PS200

Power supply modules provide power to the internal consumers of remote controller modules.

The TITAN 3000 series includes two types of power supply modules:

- N3PS100 – 24V DC;
- N3PS200 – 220V AC, converted to 24V DC.

ADVANTAGES:

- Overvoltage protection
- Reverse polarity protection
- Galvanic isolation of external and internal circuits

TECHNICAL SPECIFICATIONS

Support for internal power bus redundancy	**Available**
Rated output power (to internal power bus), W	**100**
OPERATING CONDITIONS:	
Ambient air temperature, °C	from -40 to +60
Relative humidity, %	from 5 to 98, no condensation
Degree of protection against external influences	**IP20**
Dimensions (HxWxD), mm	200x50x150
Weight, kg	0.5

THEY TRUST US.

TITAN CONTROL

MFMC group of companies

mfmc.ru

info@titanplc.ru
+7-495-128-1-222

1.titanplc.ru
2.titanplc.ru