

PRODUCT CATALOG





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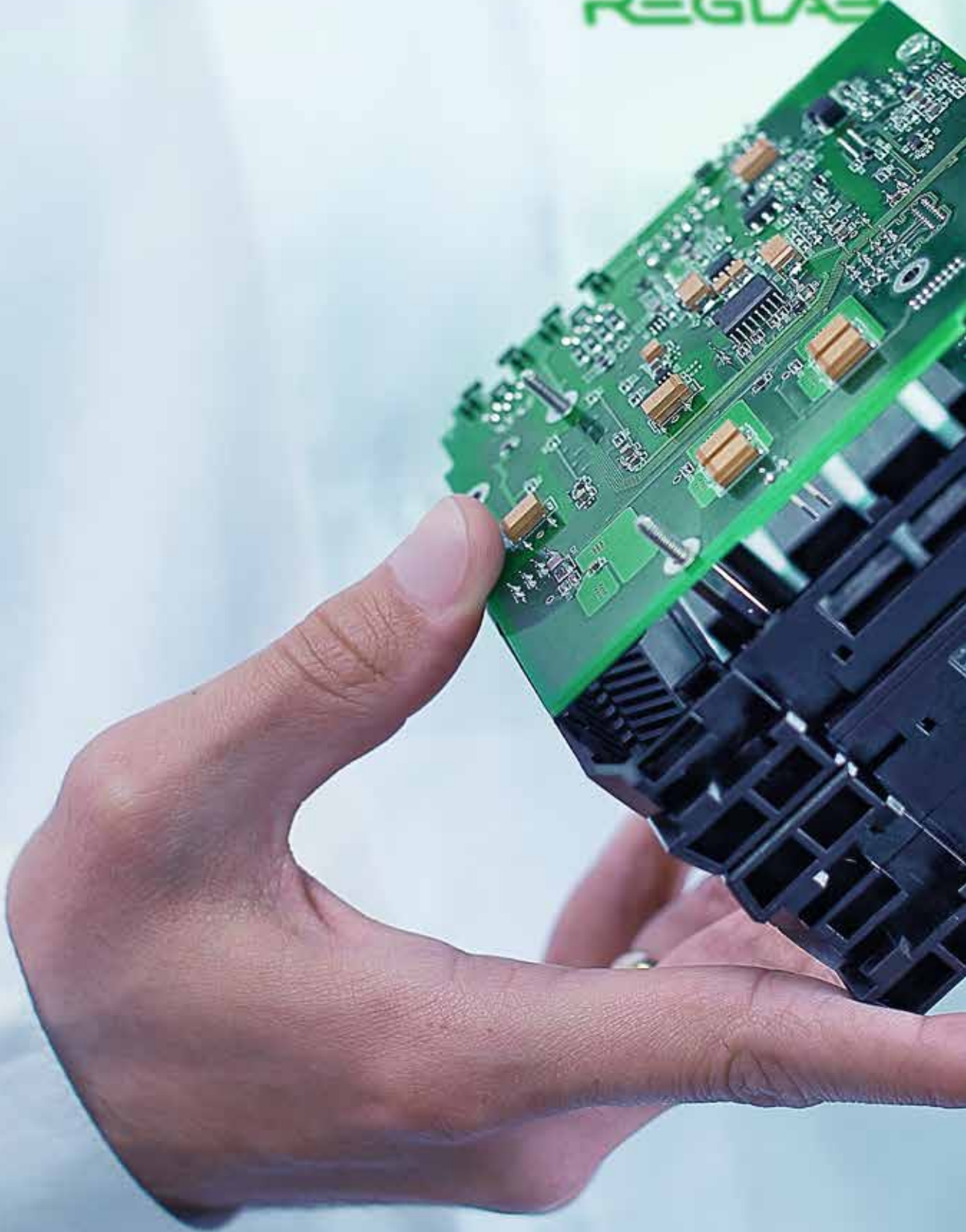
PROGRAMMABLE LOGIC CONTROLLER REGUL RX00

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INSTRUMENTAL SOFTWARE ASTRA.IDE **56**

INTEGRATED CONTROL SYSTEM ASTRAREGUL **58**

REGLAB





PART NUMBER FOR ORDER REGUL RX00

RX00 S AI 08881 (X)-000-A AA

PLC model:

R500, R500S, R400, R000

Additional symbol for special PLC's version
(only for R500):

G — gateway

S — safety

Тип модуля ПЛК:

Type of PLC's module:

CU — central processor unit

AI — analog input module

AO — analog output module

AS — analog input and output module

DI — digital output module

DS — digital input and output module

DO — digital output module

DA — frequency measurement / pulse counting module

CP — communication processor module

PP — power supply module

ST — terminal module

EU — extension CPU's net-ports module

PO — power supply module for sensors

CH — chassis module

CL — terminal block for I/O modules

DN — DIN-rail for PLC's modules mount

Number of channels in module

Serial number of the module in the model range (XX-)

and development number (--X)

Additional symbol for WEB-access option in CPU:

W - WEB-server embedded license

Code for the set of options applicable to the module:

000 — no options

Option code, applicable to PLC's model:

A - no options

C - protective coating of module boards

(against moisture, aggressive environments)

Code of options required by a specific Customer

PROGRAMMABLE LOGIC CONTROLLER REGUL R500



It's included in reestr of production,
which manufactured in Russia,
№ of note 140\1\2023.



Controller REGUL R500 is designed to build responsible,
fault-tolerant and distributed APCS in various industries.



MAIN CHARACTERISTICS

○ Purpose



important ACS is needed
to be strongly reliability
(supporting of different redundancy
schemes of CPU and remote I/O racks)



highly accurate measurements
(special measurement modules
with low error)



fault-tolerant control systems
for technological objects with quickly
changed processes (redundant control
systems with lowest application cycle,
special modules for high-speed
measurements of physical parameters)



distributed control systems

● Functional availability

- supporting of hot redundancy CPU, power supply, I/O modules
- dual high-speed internal data bus
- different schemes of PLC's redundancy (100% redundancy, redundancy of power supply modules and CPU)
- Hot swapping for any controller module (without power shutdown and application software stopping)
- discrete rack - extension of rack by one module is available
- remote I/O racks are connected to CPU's rack in different topologies: "double redundancy ring" "star", mixed topology
- power independent memory - up to 3 Gb (in basic version) for user archive
- web-visualization availability
- design software Astra.IDE supports all languages according to IEC 61131-3 and CFC

● Available communications

Communication protocols embedded:

- HART v6, v7;
- IEC 60 870-5-101 (Master / Slave);
- IEC 60 870-5-104 (Master / Slave);
- Modbus RTU (Master / Slave, including extension availability);
- Modbus TCP (Master / Slave, including extension availability);
- OPC DA, OPC UA;
- Profibus DP v1 Master;
- RegulBus, SQL, FTP, SNMP v3, SysLog;
- additional protocols, also non-standard protocols according to customer's task can be realized.

Interface support:

- USB host 2.0;
- DVI video output;
- RS-232;
- RS-485;
- Ethernet 100/1000 Mbps RJ-45 (full duplex) — up to 4 ports in CPU module;
- Ethernet 100/1000 Mbps FO (single-mode, multi-mode) — up to 2 ports in CPU module.

Construction



modern design of modules



flexible remount terminal blocks



quick mount on 105 mm DIN-rail



passive cooling

Technical characteristics

Minimal application cycle time	1 ms/10 ms in redundancy configuration
CPU switching time from Active to Stand-By	up to 5 ms
Accuracy of time synchronization	up to 50 μs
Power supply voltage	85...264 V AC / 120...370 V DC, 18...36 V DC
Operating temperature range	from -40 to + 60 °C

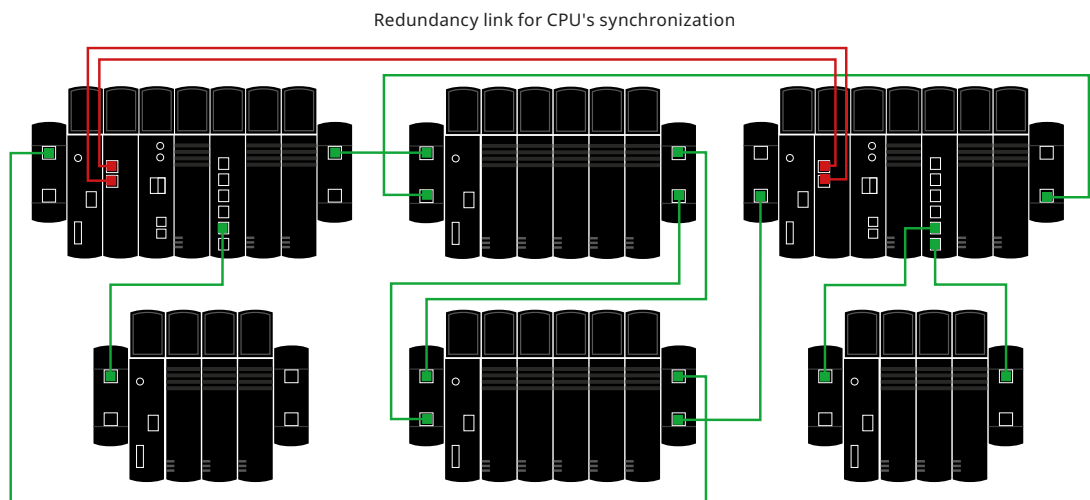
Part number for controller order see at page 6

Noise immunity see at page 52

HARDWARE CONFIGURATION OF CONTROLLER REGUL R500

- PLC redundancy is available with CPU's mounting in the one rack or in the different racks
- remote I/O racks are available
- up to 25 modules in one rack
- up to 10 km link between racks is available (by fiber optic link)

Figure 1. Example of REGUL R500 racks connection



PLC CONFIGURATION

PLC REG UL RS00 allows distributed configuration of racks. Up to 20 racks (electrical different units) can be configured in one controller. Each rack must have unicum address, that is configured by 8-position dip-switcher, that is located on terminal module (ST). PLC's racks can be connected between each other in any order, but interface connectors "OUT" of internal PLC's data bus - RegulBus always connect to interface connectors "IN".

PLC REGUL RS00 allows configuration with double internal data bus and double or one internal power bus. In CPU's redundancy configurations double RegulBus must be used.

RS00 rack includes modules of following types:

(ST) Terminal modules must included in each PLC's rack. They installed on both ends of the rack, provide fixation of the crate on the DIN-rail and protect the chassis electrical lateral connectors.

Terminal modules of the corresponding modification can support extension PLC's internal data bus (IN and OUT modules) via twisted pair or fiber optic line between racks. At communication via FO in the terminal modules must be installed are third-party SFP-modules. In PLC's configuration with rack expansion, then all terminal modules of all crates must support function of Regulbus extension.

(PP) Power supply modules. At least one module must be included in the each rack. Number of power supply modules selected depending on the internal power consumption of each rack. For providing redundant power to the rack PLC must apply an excess amount of power supply modules. Selection features chassis and PP-modules supporting two independent power buses are given in system manual for Regul R500.

(EU) Extension CPU's net-ports modules. EU modules further expand the number of CU series 151 /161 /171 /181 ethernet interfaces. Each CU may not have more than two EU. Data processing of devices connected to the EU is carried out in the CU modules. EU modules can only be installed in a rack to the right of CU series 151/161/171 /181 modules.

(CU) Central processor unit. CU modules have different types of modules and options.

(AI, AO, AS / DI, DA, DO) I/O modules have a wide nomenclature, provide processing of analog (including HART support) and digital signals (including NAMUR support), signals from TC/RTD, pulse signals (including incremental encoder signals and output PWM-signals).

(CP) Communication processor modules. CP modules provide reception and operation of signals via interfaces RS-485, Ethernet and protocols Mod bus RTU /TCP, IEC 60870-5-101/104, RegulBus, NVL, SQL,FTP, SNMP, Profibus DP v1 Master. CP modules can be installed in remote PLC's racks. CP modules provide only the physical connection devices, device driver processing executed in CU modules. Bandwidth of Ethernet CP modules is limited volumes of segments of the PLC's internal bus, allocated for data transmission via such CP modules.

(PO) Power supply modules for external sensors. PO modules provide power by 24 VDC (up to 70 mA on each channel) for circuits of external analog current sensors. PO modules are usually installed next to the AI modules.

(CH) Chassis modules. For each PP, CU, I/O, CP, PO, EU module chassis module must be mounted in rack. Chassis modules provide active data and power buses of PLC and provides hot swapping any of these modules in rack. PLC's R500 rack can be mounted by one chassis module. Chassis modules are not supplied with the PLC's modules and must be ordered separately.

(DIN) DIN-rail. Chassis mount on DIN-rail, which have 105 mm height. DIN-rail can be mount on mount panel or in 19"-cabinet. DIN-rails have standard sizes by 600, 800 or 1000 mm width. Chassis for CU I and III types have 80 mm width, other CH and ST modules have 40 mm width.

The installation location of the module type in the rack does not matter, except for terminal modules, which always mounted on both ends of the rack, and EU modules always mounted next to the CU's type of III.

Two redundant CU or PP modules can be installed in one rack. To increase reliability, it is recommended to: reserve PP modules in each crate, install redundant CUs and I/O modules in different crates, use chassis and interface modules with support for two power buses.

Figure 2. Example of PLC's REGUL R500 rack configuration



Types of central processor units

Central processor unit	CU 00 021	CU 00 031	CU 00 051	CU 00 061	CU 00 071	CU 00 151	CU 00 161	CU 00 171	CU 00 181
CPU's type	II		I			III			
Frequency, GHz, number of microprocessor cores	1 (1 core)		1,33 (2 cores) 1,93 (4 cores)			1,33 (2 cores) 1,93 (4 cores)			
RAM, Mb	512		2000			2000			
Flash memory, base modification, Gb	1		4			4			
Flash memory, extension option, Gb	-		Up to 64			Up to 64			
RS-232 / RS-485, pcs.	1 / 1								
Ethernet, 100 Mbps, pcs.	2 (RJ-45)	2 (SFP)	-	-	-	-	-	-	-
Ethernet 100/1000 Mbps, pcs.	-	-	4 (RJ-45)	2 + 2 (SFP)	2 + 2 (SFP)	4 (RJ-45)	2 + 2 (SFP)	2 + 2 (SFP)	4 (RJ-45)
Video output, DVI, pcs.	-	-	-	-	1	-	-	1	1
USB, 2.0**	-		2	2	2	2	2	2	2
SDHC-card slot, pcs.	1 (32 Gb, FAT32)		-						
Option for WEB-access	Yes								
EU connection is available	No		No			Yes			
GPS / GLONASS receiver	No		Embedded			Option			
Typical PLC's bus cycle	5 ms on each rack		1 ms on each rack			up to 1 ms by 350 I/O modules up to 3 ms by 1000 I/O modules			
Minimal application cycle time	10 ms / 20 ms at redundant configuration		5 ms / 10 ms at redundant configuration			5 ms / 10 ms at redundant configuration			
Typical number of PLC's channels at PLC's application cycle for 200 ms	Up to 800		Up to 3000			Up to 3000			
Typical number of tags for data transfer from PLC	Up to 5 000		Up to 30 000			Up to 30 000			
CPU's battery replace is available by user*	No			Yes					
Ad-processor for RegulBus	No			Yes					
Compatible chassis module	CH 02 032		CH 02 022, CH 02 023			CH 02 022, CH 02 023			

Note: * battery in CU module provides work only for internal clock, when external power shut off. When the CU module is powered on with a faulty battery, the date and time in the CU can be set manually, the CU module time synchronization can be done via NTP or from the built-in GPS / GLONASS receiver;

** an external flash drive up to 32 GB in size, or a touch-screen display, or a keyboard / mouse can be connected via USB.

REGUL R500 CONTROLLER MODULES

Part number	Module characteristics	Note
Central processor units		
R500 CU 00 021-000-AAA R500 CU 00 021(W)-000-AAA R500 CU 00 021-000-CAA R500 CU 00 021(W)-000-CAA	<ul style="list-style-type: none"> 1 GHz, 512 Mb RAM, 1 Gb Flash, RS-232, RS-485, 2xEthernet RJ-45. (W) - WEB-visualization support, C - protective covering 	Single slot, type II
R500 CU 00 031-000-AAA R500 CU 00 031(W)-000-AAA R500 CU 00 031-000-CAA R500 CU 00 031(W)-000-CAA	<ul style="list-style-type: none"> 1 GHz, 512 Mb RAM, 1 Gb Flash, RS-232, RS-485, 2xEthernet SFP (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 051-000-AAA R500 CU 00 051(W)-000-AAA R500 CU 00 051-000-CAA R500 CU 00 051(W)-000-CAA	<ul style="list-style-type: none"> 1,33 GHz (2 core), 2 Gb RAM, 1x4 Gb SSD, RS-232, RS-485, 4xEthernet RJ-45, 2xUSB, GPS/GLONASS (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 051-001-AAA R500 CU 00 051(W)-001-AAA R500 CU 00 051-001-CAA R500 CU 00 051(W)-001-CAA	<ul style="list-style-type: none"> 1,33 GHz (2 core), 2 Gb RAM, 1x16 Gb SSD, RS-232, RS-485, 4xEthernet RJ-45, 2xUSB, GPS/GLONASS (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 051-002-AAA R500 CU 00 051(W)-002-AAA R500 CU 00 051-002-CAA R500 CU 00 051(W)-002-CAA	<ul style="list-style-type: none"> 1,33 GHz (2 core), 2 Gb RAM, 1x32 Gb SSD, RS-232, RS-485, 4xEthernet RJ-45, 2xUSB, GPS/GLONASS (W) - WEB-visualization support, C - protective covering 	Dual slot, type I
R500 CU 00 051-003-AAA R500 CU 00 051(W)-003-AAA R500 CU 00 051-003-CAA R500 CU 00 051(W)-003-CAA	<ul style="list-style-type: none"> 1,33 GHz (2 core), 2 Gb RAM, 1x64 Gb SSD, RS-232, RS-485, 4xEthernet RJ-45, 2xUSB, GPS/GLONASS (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 051(W)-004-AAA R500 CU 00 051-004-AAA R500 CU 00 051(W)-004-CAA R500 CU 00 051-004-CAA	<ul style="list-style-type: none"> 1,93 GHz (4 core), 2 Gb RAM, 1x4 Gb SSD, RS-232, RS-485, 4xEthernet RJ-45, 2xUSB, GPS/GLONASS (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 051(W)-005-AAA R500 CU 00 051-005-AAA R500 CU 00 051(W)-005-CAA R500 CU 00 051-005-CAA	<ul style="list-style-type: none"> 1,93 GHz (4 core), 2 Gb RAM, 1x16 Gb SSD, RS-232, RS-485, 4xEthernet RJ-45, 2xUSB, GPS/GLONASS (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 051(W)-006-AAA R500 CU 00 051-006-AAA R500 CU 00 051(W)-006-CAA R500 CU 00 051-006-CAA	<ul style="list-style-type: none"> 1,93 GHz (4 core), 2 Gb RAM, 1x32 Gb SSD, RS-232, RS-485, 4xEthernet RJ-45, 2xUSB, GPS/GLONASS (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 051(W)-007-AAA R500 CU 00 051-007-AAA R500 CU 00 051(W)-007-CAA R500 CU 00 051-007-CAA	<ul style="list-style-type: none"> 1,93 GHz (4 core), 2 Gb RAM, 1x64 Gb SSD, RS-232, RS-485, 4xEthernet RJ-45, 2xUSB, GPS/GLONASS (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 051-008-AAA R500 CU 00 051-008-CAA	<ul style="list-style-type: none"> 1,33 GHz (2 core) / 8Gb eMMC flash, 2 Gb RAM, 1x4 Gb SSD, RS-232, RS-485, 4xEthernet RJ-45, 2xUSB, GPS/GLONASS C - protective covering 	

Part number	Module characteristics	Note
Central processor units		
R500 CU 00 051-009-AAA R500 CU 00 051-009-CAA R500 CU 00 051-009-CAA R500 CU 00 051(W)-009-CAA	<ul style="list-style-type: none"> 1,33 GHz (2 core), 2 Gb RAM, 1x4 Gb SSD, RS-232, RS-485, 4xEthernet RJ45, 2xUSB (W) - WEB-visualization support, C - protective covering 	Dual slot, type I
R500 CU 00 051-010-AAA R500 CU 00 051(W)-010-AAA R500 CU 00 051-010-CAA R500 CU 00 051(W)-010-CAA	<ul style="list-style-type: none"> 1,33 GHz (2 core), 2 Gb RAM, 1x16 Gb SSD, RS-232, RS-485, 4xEthernet RJ-45, 2xUSB (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 051-011-AAA R500 CU 00 051(W)-011-AAA R500 CU 00 051-011-CAA R500 CU 00 051 (W)-011-CAA	<ul style="list-style-type: none"> 1,33 GHz (2 core), 2 Gb RAM, 1x32 Gb SSD, RS-232, RS-485, 4xEthernet RJ-45, 2xUSB (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 051-012-AAA R500 CU 00 051 (W)-012-AAA R500 CU 00 051-012-CAA R500 CU 00 051 (W)-012-CAA	<ul style="list-style-type: none"> 1,33 GHz (2 core), 2 Gb RAM, 1x64 Gb SSD, RS-232, RS-485, 4xEthernet RJ-45, 2xUSB (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 051-013-AAA R500 CU 00 051(W)-013-AAA R500 CU 00 051-013-CAA R500 CU 00 051(W)-013-CAA	<ul style="list-style-type: none"> 1,93 GHz (4 core), 2 Gb RAM, 1x4 Gb SSD, RS-232, RS-485, 4xEthernet RJ-45, 2xUSB (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 051-014-AAA R500 CU 00 051 (W)-014-AAA R500 CU 00 051-014-CAA R500 CU 00 051 (W)-014-CAA	<ul style="list-style-type: none"> 1,93 GHz (4 core), 2 Gb RAM, 1x16 Gb SSD, RS-232, RS-485, 4xEthernet RJ-45, 2xUSB (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 051-015-AAA R500 CU 00 051(W)-015-AAA R500 CU 00 051-015-CAA R500 CU 00 051(W)-015-CAA	<ul style="list-style-type: none"> 1,93 GHz (4 core), 2 Gb RAM, 1x32 Gb SSD, RS-232, RS-485, 4xEthernet RJ-45, 2xUSB (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 051-016-AAA R500 CU 00 051(W)-016-AAA R500 CU 00 051-016-AAA R500 CU 00 051(W)-016-AAA	<ul style="list-style-type: none"> 1,93 GHz (4 core), 2 Gb RAM, 1x64 Gb SSD, RS-232, RS-485, 4xEthernet RJ-45, 2xUSB (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 061-000-AAA R500 CU 00 061(W)-000-AAA R500 CU 00 061-000-CAA R500 CU 00 061(W)-000-CAA	<ul style="list-style-type: none"> 1,33 GHz (2 core), 2 Gb RAM, 1x4 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB, GPS/GLONASS (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 061-001-AAA R500 CU 00 061(W)-001-AAA R500 CU 00 061-001-CAA R500 CU 00 061(W)-001-CAA	<ul style="list-style-type: none"> 1,33 GHz (2 core), 2 Gb RAM, 1x16 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB, GPS/GLONASS (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 061-002-AAA R500 CU 00 061(W)-002-AAA R500 CU 00 061-002-CAA R500 CU 00 061(W)-002-CAA	<ul style="list-style-type: none"> 1,33 GHz (2 core), 2 Gb RAM, 1x32 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB, GPS/GLONASS (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 061-003-AAA R500 CU 00 061(W)-003-AAA R500 CU 00 061-003-CAA R500 CU 00 061(W)-003-CAA	<ul style="list-style-type: none"> 1,33 GHz (2 core), 2 Gb RAM, 1x64 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB, GPS/GLONASS (W) - WEB-visualization support, C - protective covering 	

Part number	Module characteristics	Note
Central processor units		
R500 CU 00 061-004-AAA R500 CU 00 061(W)-004-AAA R500 CU 00 061-004-CAA R500 CU 00 061(W)-004-CAA	<ul style="list-style-type: none"> 1,93 GHz (4 core), 2 Gb RAM, 1x4 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB, GPS/GLONASS (W) - WEB-visualization support, C - protective covering 	Dual slot, type I
R500 CU 00 061-005-AAA R500 CU 00 061(W)-005-AAA R500 CU 00 061-005-CAA R500 CU 00 061(W)-005-CAA	<ul style="list-style-type: none"> 1,93 GHz (4 core), 2 Gb RAM, 1x16 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB, GPS/GLONASS (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 061-006-AAA R500 CU 00 061(W)-006-AAA R500 CU 00 061-006-CAA R500 CU 00 061(W)-006-CAA	<ul style="list-style-type: none"> 1,93 GHz (4 core), 2 Gb RAM, 1x32 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB, GPS/GLONASS (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 061-007-AAA R500 CU 00 061(W)-007-AAA R500 CU 00 061-007-CAA R500 CU 00 061(W)-007-CAA	<ul style="list-style-type: none"> 1,93 GHz (4 core), 2 Gb RAM, 1x64 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB, GPS/GLONASS (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 061-009-AAA R500 CU 00 061-009-CAA R500 CU 00 061-009-AAA R500 CU 00 061 (W)-009-CAA	<ul style="list-style-type: none"> 1,33 GHz (2 core), 2 Gb RAM, 1x4 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 061-010-AAA R500 CU 00 061 (W)-010-AAA R500 CU 00 061-010-CAA R500 CU 00 061 (W)-010-CAA	<ul style="list-style-type: none"> 1,33 GHz (2 core), 2 Gb RAM, 1x16 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 061-011-AAA R500 CU 00 061 (W)-011-AAA R500 CU 00 061-011-CAA R500 CU 00 061 (W)-011-CAA	<ul style="list-style-type: none"> 1,33 GHz (2 core), 2 Gb RAM, 1x32 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 061-012-AAA R500 CU 00 061 (W)-012-AAA R500 CU 00 061-012-CAA R500 CU 00 061 (W)-012-CAA	<ul style="list-style-type: none"> 1,33 GHz (2 core), 2 Gb RAM, 1x64 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 061-013-AAA R500 CU 00 061 (W)-013-AAA R500 CU 00 061-013-CAA R500 CU 00 061 (W)-013-CAA	<ul style="list-style-type: none"> 1,93 GHz (4 core), 2 Gb RAM, 1x4 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 061-014-AAA R500 CU 00 061 (W)-014-AAA R500 CU 00 061-014-CAA R500 CU 00 061 (W)-014-CAA	<ul style="list-style-type: none"> 1,93 GHz (4 core), 2 Gb RAM, 1x16 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 061-015-AAA R500 CU 00 061 (W)-015-AAA R500 CU 00 061-015-CAA R500 CU 00 061 (W)-015-CAA	<ul style="list-style-type: none"> 1,93 GHz (4 core), 2 Gb RAM, 1x32 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 061-016-AAA R500 CU 00 061 (W)-016-AAA R500 CU 00 061-016-CAA R500 CU 00 061 (W)-016-CAA	<ul style="list-style-type: none"> 1,93 GHz (4 core), 2 Gb RAM, 1x64 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB (W) - WEB-visualization support, C - protective covering 	

Part number	Module characteristics	Note
Central processor units		
R500 CU 00 071-000-AAA R500 CU 00 071(W)-000-AAA R500 CU 00 071-000-CAA R500 CU 00 071(W)-000-CAA	<ul style="list-style-type: none"> 1,33 GHz (2 core), 2 Gb RAM, 1x4 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB, DVI, GPS/GLONASS (W) - WEB-visualization support, C - protective covering 	Dual slot, type I
R500 CU 00 071-001-AAA R500 CU 00 071(W)-001-AAA R500 CU 00 071-001-CAA R500 CU 00 071(W)-001-CAA	<ul style="list-style-type: none"> 1,33 GHz (2 core), 2 Gb RAM, 1x16 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB, DVI, GPS/GLONASS (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 071-002-AAA R500 CU 00 071(W)-002-AAA R500 CU 00 071-002-CAA R500 CU 00 071(W)-002-CAA	<ul style="list-style-type: none"> 1,33 GHz (2 core), 2 Gb RAM, 1x32 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB, DVI, GPS/GLONASS (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 071-003-AAA R500 CU 00 071(W)-003-AAA R500 CU 00 071-003-CAA R500 CU 00 071(W)-003-CAA	<ul style="list-style-type: none"> 1,33 GHz (2 core), 2 Gb RAM, 1x64 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB, DVI, GPS/GLONASS (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 071-004-AAA R500 CU 00 071(W)-004-AAA R500 CU 00 071-004-CAA R500 CU 00 071(W)-004-CAA	<ul style="list-style-type: none"> 1,93 GHz (4 core), 2 Gb RAM, 1x4 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB, DVI, GPS/GLONASS (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 071-005-AAA R500 CU 00 071(W)-005-AAA R500 CU 00 071-005-CAA R500 CU 00 071(W)-005-CAA	<ul style="list-style-type: none"> 1,93 GHz (4 core), 2 Gb RAM, 1x16 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB, DVI, GPS/GLONASS (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 071-006-AAA R500 CU 00 071(W)-006-AAA R500 CU 00 071-006-CAA R500 CU 00 071(W)-006-CAA	<ul style="list-style-type: none"> 1,93 GHz (4 core), 2 Gb RAM, 1x32 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB, DVI, GPS/GLONASS (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 071-007-AAA R500 CU 00 071(W)-007-AAA R500 CU 00 071-007-CAA R500 CU 00 071(W)-007-CAA	<ul style="list-style-type: none"> 1,93 GHz (4 core), 2 Gb RAM, 1x64 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB, DVI, GPS/GLONASS (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 071-009-AAA R500 CU 00 071(W)-009-AAA R500 CU 00 071-009-CAA R500 CU 00 071(W)-009-CAA	<ul style="list-style-type: none"> Модуль центрального процессора, 1,33 GHz (2 core), 2 Gb RAM, 1x4 Gb SSD, RS-232, RS-485, 2 x Ethernet RJ45, 2 x Ethernet SFP, 2 x USB, DVI (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 071-010-AAA R500 CU 00 071(W)-010-AAA R500 CU 00 071-010-CAA R500 CU 00 071(W)-010-CAA	<ul style="list-style-type: none"> 1,33 GHz (2 core), 2 Gb RAM, 1x16 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB, DVI (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 071-011-AAA R500 CU 00 071(W)-011-AAA R500 CU 00 071-011-CAA R500 CU 00 071(W)-011-CAA	<ul style="list-style-type: none"> 1,33 GHz (2 core), 2 Gb RAM, 1x32 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB, DVI (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 071-012-AAA R500 CU 00 071(W)-012-AAA R500 CU 00 071-012-CAA R500 CU 00 071(W)-012-CAA	<ul style="list-style-type: none"> 1,33 GHz (2 core), 2 Gb RAM, 1x64 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB, DVI (W) - WEB-visualization support, C - protective covering 	

Part number	Module characteristics	Note	
Central processor units			
R500 CU 00 071-013-AAA R500 CU 00 071(W)-013-AAA R500 CU 00 071-013-CAA R500 CU 00 071(W)-013-CAA	<ul style="list-style-type: none"> • 1,93 GHz (4 core), 2 Gb RAM, 1x4 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB, DVI • (W) - WEB-visualization support, C - protective covering 	Dual slot, type I	
R500 CU 00 071-014-AAA R500 CU 00 071(W)-014-AAA R500 CU 00 071-014-CAA R500 CU 00 071(W)-014-CAA	<ul style="list-style-type: none"> • 1,93 GHz (4 core), 2 Gb RAM, 1x16 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB, DVI • (W) - WEB-visualization support, C - protective covering 		
R500 CU 00 071-015-AAA R500 CU 00 071(W)-015-AAA R500 CU 00 071-015-CAA R500 CU 00 071(W)-015-CAA	<ul style="list-style-type: none"> • 1,93 GHz (4 core), 2 Gb RAM, 1x32 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB, DVI • (W) - WEB-visualization support, C - protective covering 		
R500 CU 00 071-016-AAA R500 CU 00 071(W)-016-AAA R500 CU 00 071-016-CAA R500 CU 00 071(W)-016-CAA	<ul style="list-style-type: none"> • 1,93 GHz (4 core), 2 Gb RAM, 1x64 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB, DVI • (W) - WEB-visualization support, C - protective covering 		
R500 CU 00 151-000-AAA R500 CU 00 151(W)-000-AAA R500 CU 00 151-000-CAA R500 CU 00 151(W)-000-CAA	<ul style="list-style-type: none"> • 1,33 GHz (2 core), ad-processor for RegulBus, 2 Gb RAM, 1x8 Gb SSD, RS-232, RS-485, 4xEthernet RJ-45, 2xUSB • (W) - WEB-visualization support, C - protective covering 		Dual slot, type III
R500 CU 00 151-001-AAA R500 CU 00 151(W)-001-AAA R500 CU 00 151-001-CAA R500 CU 00 151(W)-001-CAA	<ul style="list-style-type: none"> • 1,33 GHz (2 core), ad-processor for RegulBus, 2 Gb RAM, 1x16 Gb SSD, RS-232, RS-485, 4xEthernet RJ-45, 2xUSB • (W) - WEB-visualization support, C - protective covering 		
R500 CU 00 151-002-AAA R500 CU 00 151(W)-002-AAA R500 CU 00 151-002-CAA R500 CU 00 151(W)-002-CAA	<ul style="list-style-type: none"> • 1,33 GHz (2 core), ad-processor for RegulBus, 2 Gb RAM, 1x32 Gb SSD, RS-232, RS-485, 4xEthernet RJ-45, 2xUSB • (W) - WEB-visualization support, C - protective covering 		
R500 CU 00 151-003-AAA R500 CU 00 151(W)-003-AAA R500 CU 00 151-003-CAA R500 CU 00 151(W)-003-CAA	<ul style="list-style-type: none"> • 1,33 GHz (2 core), ad-processor for RegulBus, 2 Gb RAM, 1x64 Gb SSD, RS-232, RS-485, 4xEthernet RJ-45, 2xUSB • (W) - WEB-visualization support, C - protective covering 		
R500 CU 00 151-004-AAA R500 CU 00 151(W)-004-AAA R500 CU 00 151-004-CAA R500 CU 00 151(W)-004-CAA	<ul style="list-style-type: none"> • 1,93 GHz (4 core), ad-processor for RegulBus, 2 Gb RAM, 1x8 Gb SSD, RS-232, RS-485, 4xEthernet RJ-45, 2xUSB • (W) - WEB-visualization support, C - protective covering 		
R500 CU 00 151-005-AAA R500 CU 00 151(W)-005-AAA R500 CU 00 151-005-CAA R500 CU 00 151(W)-005-CAA	<ul style="list-style-type: none"> • 1,93 GHz (4 core), ad-processor for RegulBus, 2 Gb RAM, 1x16 Gb SSD, RS-232, RS-485, 4xEthernet RJ-45, 2xUSB • (W) - WEB-visualization support, C - protective covering 		
R500 CU 00 151-006-AAA R500 CU 00 151(W)-006-AAA R500 CU 00 151-006-CAA R500 CU 00 151(W)-006-CAA	<ul style="list-style-type: none"> • 1,93 GHz (4 core), ad-processor for RegulBus, 2 Gb RAM, 1x32 Gb SSD, RS-232, RS-485, 4xEthernet RJ-45, 2xUSB • (W) - WEB-visualization support, C - protective covering 		
R500 CU 00 151-007-AAA R500 CU 00 151(W)-007-AAA R500 CU 00 151-007-CAA R500 CU 00 151(W)-007-CAA	<ul style="list-style-type: none"> • 1,93 GHz (4 core), ad-processor for RegulBus, 2 Gb RAM, 1x64 Gb SSD, RS-232, RS-485, 4xEthernet RJ-45, 2xUSB • (W) - WEB-visualization support, C - protective covering 		

Part number	Module characteristics	Note
Central processor units		
R500 CU 00 151-008-AAA R500 CU 00 151(W)-008-AAA R500 CU 00 151-008-CAA R500 CU 00 151(W)-008-CAA	<ul style="list-style-type: none"> • 1,33 GHz (2 core), ad-processor for RegulBus, 2 Gb RAM, 1x8 Gb SSD, RS-232, RS-485, 4xEthernet RJ-45, 2xUSB, GPS/GLONASS • (W) - WEB-visualization support, C - protective covering 	Dual slot, type III
R500 CU 00 151-012-AAA R500 CU 00 151(W)-012-AAA R500 CU 00 151-012-CAA R500 CU 00 151(W)-012-CAA	<ul style="list-style-type: none"> • 1,93 GHz (4 core), ad-processor for RegulBus, 2 Gb RAM, 1x8 Gb SSD, RS-232, RS-485, 4xEthernet RJ-45, 2xUSB, GPS/GLONASS • (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 161-000-AAA R500 CU 00 161(W)-000-AAA R500 CU 00 161-000-CAA R500 CU 00 161(W)-000-CAA	<ul style="list-style-type: none"> • 1,33 GHz (2 core), ad-processor for RegulBus, 2 Gb RAM, 1x8 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB • (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 161-001-AAA R500 CU 00 161(W)-001-AAA R500 CU 00 161-001-CAA R500 CU 00 161(W)-001-CAA	<ul style="list-style-type: none"> • 1,33 GHz (2 core), ad-processor for RegulBus, 2 Gb RAM, 1x16 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB • (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 161-002-AAA R500 CU 00 161(W)-002-AAA R500 CU 00 161-002-CAA R500 CU 00 161(W)-002-CAA	<ul style="list-style-type: none"> • 1,33 GHz (2 core), ad-processor for RegulBus, 2 Gb RAM, 1x32 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB • (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 161-003-AAA R500 CU 00 161(W)-003-AAA R500 CU 00 161-003-CAA R500 CU 00 161(W)-003-CAA	<ul style="list-style-type: none"> • 1,33 GHz (2 core), ad-processor for RegulBus, 2 Gb RAM, 1x64 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB • (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 161-004-AAA R500 CU 00 161(W)-004-AAA R500 CU 00 161-004-CAA R500 CU 00 161(W)-004-CAA	<ul style="list-style-type: none"> • 1,93 GHz (4 core), ad-processor for RegulBus, 2 Gb RAM, 1x8 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB • (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 161-005-AAA R500 CU 00 161(W)-005-AAA R500 CU 00 161-005-CAA R500 CU 00 161(W)-005-CAA	<ul style="list-style-type: none"> • 1,93 GHz (4 core), ad-processor for RegulBus, 2 Gb RAM, 1x16 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB • (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 161-006-AAA R500 CU 00 161(W)-006-AAA R500 CU 00 161-006-CAA R500 CU 00 161(W)-006-CAA	<ul style="list-style-type: none"> • 1,93 GHz (4 core), ad-processor for RegulBus, 2 Gb RAM, 1x32 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB • (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 161-007-AAA R500 CU 00 161(W)-007-AAA R500 CU 00 161-007-CAA R500 CU 00 161(W)-007-CAA	<ul style="list-style-type: none"> • 1,93 GHz (4 core), ad-processor for RegulBus, 2 Gb RAM, 1x64 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB • (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 161-008-AAA R500 CU 00 161(W)-008-AAA R500 CU 00 161-008-CAA R500 CU 00 161(W)-008-CAA	<ul style="list-style-type: none"> • 1,33 GHz (2 core), ad-processor for RegulBus, 2 Gb RAM, 1x8 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB, GPS/GLONASS • (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 161-012-AAA R500 CU 00 161(W)-012-AAA R500 CU 00 161-012-CAA R500 CU 00 161(W)-012-CAA	<ul style="list-style-type: none"> • 1,93 GHz (4 core), ad-processor for RegulBus, 2 Gb RAM, 1x8 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB, GPS/GLONASS • (W) - WEB-visualization support, C - protective covering 	

Part number	Module characteristics	Note
Central processor units		
R500 CU 00 171-000-AAA R500 CU 00 171(W)-000-AAA R500 CU 00 171-000-CAA R500 CU 00 171(W)-000-CAA	<ul style="list-style-type: none"> 1,33 GHz (2 core), ad-processor for RegulBus, 2 Gb RAM, 1x8 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB, DVI (W) - WEB-visualization support, C - protective covering 	Dual slot, type III
R500 CU 00 171-001-AAA R500 CU 00 171(W)-001-AAA R500 CU 00 171-001-CAA R500 CU 00 171(W)-001-CAA	<ul style="list-style-type: none"> 1,33 GHz (2 core), ad-processor for RegulBus, 2 Gb RAM, 1x16 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB, DVI (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 171-002-AAA R500 CU 00 171(W)-002-AAA R500 CU 00 171-002-CAA R500 CU 00 171(W)-002-CAA	<ul style="list-style-type: none"> 1,33 GHz (2 core), ad-processor for RegulBus, 2 Gb RAM, 1x32 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB, DVI (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 171-003-AAA R500 CU 00 171(W)-003-AAA R500 CU 00 171-003-CAA R500 CU 00 171(W)-003-CAA	<ul style="list-style-type: none"> 1,33 GHz (2 core), ad-processor for RegulBus, 2 Gb RAM, 1x64 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB, DVI (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 171-004-AAA R500 CU 00 171(W)-004-AAA R500 CU 00 171-004-CAA R500 CU 00 171(W)-004-CAA	<ul style="list-style-type: none"> 1,93 GHz (4 core), ad-processor for RegulBus, 2 Gb RAM, 1x8 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB, DVI (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 171-005-AAA R500 CU 00 171(W)-005-AAA R500 CU 00 171-005-CAA R500 CU 00 171(W)-005-CAA	<ul style="list-style-type: none"> 1,93 GHz (4 core), ad-processor for RegulBus, 2 Gb RAM, 1x16 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB, DVI (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 171-006-AAA R500 CU 00 171(W)-006-AAA R500 CU 00 171-006-CAA R500 CU 00 171(W)-006-CAA	<ul style="list-style-type: none"> 1,93 GHz (4 core), ad-processor for RegulBus, 2 Gb RAM, 1x32 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB, DVI (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 171-007-AAA R500 CU 00 171(W)-007-AAA R500 CU 00 171-007-CAA R500 CU 00 171(W)-007-CAA	<ul style="list-style-type: none"> 1,93 GHz (4 core), ad-processor for RegulBus, 2 Gb RAM, 1x64 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB, DVI (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 171-008-AAA R500 CU 00 171(W)-008-AAA R500 CU 00 171-008-CAA R500 CU 00 171(W)-008-CAA	<ul style="list-style-type: none"> 1,33 GHz (2 core), ad-processor for RegulBus, 2 Gb RAM, 1x8 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB, DVI, GPS/GLONASS (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 171-012-AAA R500 CU 00 171(W)-012-AAA R500 CU 00 171-012-CAA R500 CU 00 171(W)-012-CAA	<ul style="list-style-type: none"> 1,93 GHz (4 core), ad-processor for RegulBus, 2 Gb RAM, 1x8 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB, DVI, GPS/GLONASS (W) - WEB-visualization support, C - protective covering 	

Part number	Module characteristics	Note
Central processor units		
R500 CU 00 181-000-AAA R500 CU 00 181(W)-000-AAA R500 CU 00 181-000-CAA R500 CU 00 181(W)-000-CAA	<ul style="list-style-type: none"> 1,33 GHz (2 core), ad-processor for RegulBus, 2 Gb RAM, 1x8 Gb SSD, RS-232, RS-485, 4xEthernet RJ-45, 2xUSB, DVI (W) - WEB-visualization support, C - protective covering 	Dual slot, type III
R500 CU 00 181-001-AAA R500 CU 00 181(W)-001-AAA R500 CU 00 181-001-CAA R500 CU 00 181(W)-001-CAA	<ul style="list-style-type: none"> 1,33 GHz (2 core), ad-processor for RegulBus, 2 Gb RAM, 1x16 Gb SSD, RS-232, RS-485, 4xEthernet RJ-45, 2xUSB, DVI (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 181-002-AAA R500 CU 00 181(W)-002-AAA R500 CU 00 181-002-CAA R500 CU 00 181(W)-002-CAA	<ul style="list-style-type: none"> 1,33 GHz (2 core), ad-processor for RegulBus, 2 Gb RAM, 1x32 Gb SSD, RS-232, RS-485, 4xEthernet RJ-45, 2xUSB, DVI (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 181-003-AAA R500 CU 00 181(W)-003-AAA R500 CU 00 181-003-CAA R500 CU 00 181(W)-003-CAA	<ul style="list-style-type: none"> 1,33 GHz (2 core), ad-processor for RegulBus, 2 Gb RAM, 1x64 Gb SSD, RS-232, RS-485, 4xEthernet RJ-45, 2xUSB, DVI (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 181-004-AAA R500 CU 00 181(W)-004-AAA R500 CU 00 181-004-CAA R500 CU 00 181(W)-004-CAA	<ul style="list-style-type: none"> 1,93 GHz (4 core), ad-processor for RegulBus, 2 Gb RAM, 1x8 Gb SSD, RS-232, RS-485, 4xEthernet RJ-45, 2xUSB, DVI (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 181-005-AAA R500 CU 00 181(W)-005-AAA R500 CU 00 181-005-CAA R500 CU 00 181(W)-005-CAA	<ul style="list-style-type: none"> 1,93 GHz (4 core), ad-processor for RegulBus, 2 Gb RAM, 1x16 Gb SSD, RS-232, RS-485, 4xEthernet RJ-45, 2xUSB, DVI (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 181-006-AAA R500 CU 00 181(W)-006-AAA R500 CU 00 181-006-CAA R500 CU 00 181(W)-006-CAA	<ul style="list-style-type: none"> 1,93 GHz (4 core), ad-processor for RegulBus, 2 Gb RAM, 1x32 Gb SSD, RS-232, RS-485, 2xEthernet RJ-45, 4xEthernet RJ-45, 2xUSB, DVI (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 181-007-AAA R500 CU 00 181(W)-007-AAA R500 CU 00 181-007-CAA R500 CU 00 181(W)-007-CAA	<ul style="list-style-type: none"> 1,93 GHz (4 core), ad-processor for RegulBus, 2 Gb RAM, 1x64 Gb SSD, RS-232, RS-485, 4xEthernet RJ-45, 2xUSB, DVI (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 181-008-AAA R500 CU 00 181(W)-008-AAA R500 CU 00 181-008-CAA R500 CU 00 181(W)-008-CAA	<ul style="list-style-type: none"> 1,33 GHz (2 core), ad-processor for RegulBus, 2 Gb RAM, 1x8 Gb SSD, RS-232, RS-485, 4xEthernet RJ-45, 2xUSB, DVI, GPS/GLONASS (W) - WEB-visualization support, C - protective covering 	
R500 CU 00 181-012-AAA R500 CU 00 181(W)-012-AAA R500 CU 00 181-012-CAA R500 CU 00 181(W)-012-CAA	<ul style="list-style-type: none"> 1,93 GHz (4 core), ad-processor for RegulBus, 2 Gb RAM, 1x8 Gb SSD, RS-232, RS-485, 4xEthernet RJ-45, 2xUSB, DVI, GPS/GLONASS (W) - WEB-visualization support, C - protective covering 	

Part number	Module characteristics	Note
Analog input modules		
R500 AI 08 022-000-AAA R500 AI 08 022-000-CAA	<ul style="list-style-type: none"> 0/4...20 mA + HART, 8 channels, per-channel galvanic isolation, individual ADC and HART modem for each channel, error 0,1% C - protective covering 	Terminal block by 36 contacts ordered separately
R500 AI 08 031-000-AAA R500 AI 08 031-000-CAA	<ul style="list-style-type: none"> RTD/TC, 8 channels, common galvanic isolation, error 0,1% C - protective covering 	
R500 AI 08 042-000-AAA R500 AI 08 042-000-CAA	<ul style="list-style-type: none"> 0/4...20 mA, -10/0...+10 V, 8 channels, per-channel galvanic isolation, error 0,025%, two power bus support C - protective covering 	
R500 AI 08 052-000-AAA R500 AI 08 052-000-CAA	<ul style="list-style-type: none"> 0/4...20 mA, -10/0...+10 V, 8 channels, per-channel galvanic isolation, error 0,1% C - protective covering 	
R500 AI 08 131-000-AAA R500 AI 08 131-000-CAA	<ul style="list-style-type: none"> RTD/TC, 8 channels, per-channel galvanic isolation, error 0,1% C - protective covering 	
R500 AI 08 142-000-AAA R500 AI 08 142-000-CAA	<ul style="list-style-type: none"> 0/4...20 mA, -10/0...+10 V, 8 channels, per-channel galvanic isolation, sensor power supply function, error 0,025%, two power bus support C - protective covering 	
R500 AI 08 242-000-AAA R500 AI 08 242-000-CAA	<ul style="list-style-type: none"> 0/4...20 mA, -10/-5/0...+5/10 V, 8 channels, signal sampling rate 100 μs, per-channel galvanic isolation, error 0,025%, two power bus support C - protective covering 	Terminal block by 36 contacts ordered separately. Module can not be used with II type CPU
R500 AI 08 342-000-AAA R500 AI 08 342-000-CAA	<ul style="list-style-type: none"> 0/4...20 mA, -10/-5/0...+5/10 V, 8 channels, signal sampling rate 100 μs, per-channel galvanic isolation, sensor power supply function, error 0,025%, two power bus support C - protective covering 	
R500 AI 16 011-000-AAA R500 AI 16 011-000-CAA	<ul style="list-style-type: none"> 0/4...20 mA, 16 channels, common galvanic isolation, error 0,1% C - protective covering 	Terminal block by 36 contacts ordered separately
R500 AI 16 081-000-AAA R500 AI 16 081-000-CAA	<ul style="list-style-type: none"> 4...20 mA + HART, 16 channels (2 groups by 8 channels), group galvanic isolation, error 0,1% C - protective covering 	
Digital input modules		
R500 DI 16 021-000-AAA R500 DI 16 021-000-CAA	<ul style="list-style-type: none"> 220 VAC/VDC, 16 channels, per-channel galvanic isolation C - protective covering 	Terminal block by 36 contacts ordered separately
R500 DI 16 032-000-AAA R500 DI 16 032-000-CAA	<ul style="list-style-type: none"> NAMUR, 16 channels, group galvanic isolation C - protective covering 	
R500 DI 32 012-000-AAA R500 DI 32 012-000-CAA	<ul style="list-style-type: none"> 24 VDC, 32 channels (4 groups by 8 channels, common "minus"/"plus"), group galvanic isolation, two power bus support C - protective covering 	

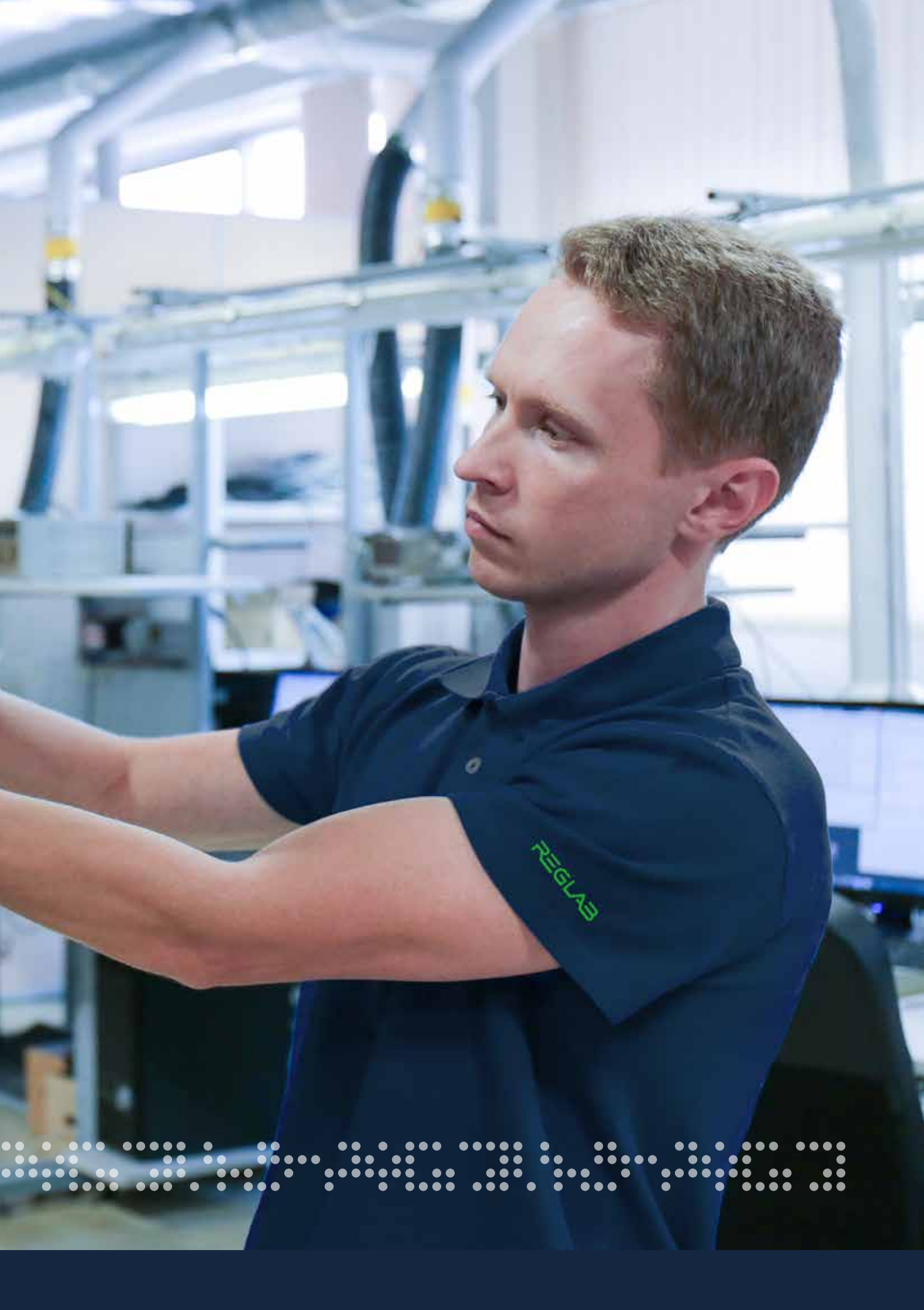
Part number	Module characteristics	Note
Frequency measurement / pulse counting modules		
R500 DA 03 011-000-AAA R500 DA 03 011-000-CAA	<ul style="list-style-type: none"> 3 channels 1 Hz...500 kHz, 6 channels DI 24 VDC, 6 channels DO 24 VDC, 0,5 A C - protective covering 	Terminal block by 36 contacts ordered separately
R500 DA 03 021-000-AAA R500 DA 03 021-000-CAA	<ul style="list-style-type: none"> 3 channels 1 Hz...500 kHz, 1 channel impulse generator 1 Hz...10 kHz, 6 channels DI 24 VDC, 6 channels DO 24 VDC, 0,5 A, availability of autonomous operation in the mode of an electronic safety-device C - protective covering 	Terminal block by 36 contacts ordered separately
Analog output modules		
R500 AO 08 011-000-AAA R500 AO 08 011-000-CAA	<ul style="list-style-type: none"> 0/4...20 mA, 8 channels, per-channel galvanic isolation, error 0,1% C - protective covering 	Terminal block by 20 contacts ordered separately
R500 AO 08 021-000-AAA R500 AO 08 021-000-CAA	<ul style="list-style-type: none"> 0/4...20 mA + HART, 8 channels, per-channel galvanic isolation, error 0,1% C - protective covering 	
R500 AO 08 031-000-AAA R500 AO 08 031-000-CAA	<ul style="list-style-type: none"> 0/4...20 mA, -10/0...+10 V, 8 channels, per-channel galvanic isolation, error 0,1% C - protective covering 	Terminal block by 36 contacts ordered separately
Analog input / output modules		
R500 AS 08 011-000-AAA R500 AS 08 011-000-CAA	<ul style="list-style-type: none"> 6 AI 0/4...20 mA, -10/0...+10 V, 2 AO 0/4...20 mA, -10/0...+10 V, per-channel galvanic isolation, error 0,1% C - protective covering 	Terminal block by 36 contacts ordered separately
Digital output modules		
R500 DO 16 021-000-AAA R500 DO 16 021-000-CAA	<ul style="list-style-type: none"> 220 VAC, 2 A / 220 VDC, 0,27 A, 16 channels, per-channel galvanic isolation C - protective covering 	Terminal block by 36 contacts ordered separately
R500 DO 32 012-000-AAA R500 DO 32 012-000-CAA	<ul style="list-style-type: none"> solid state relays, 24 V AC/DC, 0,5 A, 32 channels (4 groups by 8 channels), group galvanic isolation C - protective covering 	
R500 DO 32 041-000-AAA R500 DO 32 041-000-CAA	<ul style="list-style-type: none"> solid state relays, 24 VDC, 0,5 A, 32 channels (2 groups by 16 channels), group galvanic isolation, breakage of external circuits control, up to 4 channels in pulse width modulation mode (up to 30 kHz) C - protective covering 	

Part number	Module characteristics	Note
Digital input / output modules		
R500 DS 32 012-000-AAA R500 DS 32 012-000-CAA	<ul style="list-style-type: none"> 24 DI (3 groups by 8 channels) 24 VDC, 8 DO, solid state relays, (1 group), 24 VDC, 0,5 A, group galvanic isolation C - protective covering 	Terminal block by 36 contacts ordered separately
Communication modules		
R500 CP 02 021-000-AAA R500 CP 02 021-000-CAA	<ul style="list-style-type: none"> Ethernet 100BASE-T (Modbus TCP, IEC 60870-5-104), 2 ports C - protective covering 	-
R500 CP 04 011-000-AAA R500 CP 04 011-000-CAA	<ul style="list-style-type: none"> RS-485 (Modbus RTU, IEC 60870-5-101), 4 ports C - protective covering 	Terminal block by 20 contacts ordered separately
R500 CP 06 111-000-AAA R500 CP 06 111-000-CAA	<ul style="list-style-type: none"> RegulBus (extension module for PLC's bus), 6 ports RJ-45 C - protective covering 	-
Extension CPU's net-ports modules		
R500 EU 04 021-000-AAA R500 EU 04 021-000-CAA	<ul style="list-style-type: none"> 4xEthernet RJ-45 C - protective covering 	Only R500 CH 02 041 is used for this type of module. Also R500 CH 02 023 is used for CPU's module
R500 EU 04 031-000-AAA R500 EU 04 031-000-CAA	<ul style="list-style-type: none"> 4xEthernet SFP C - protective covering 	
Power supply module for sensors		
R500 PO 08 041-000-AAA R500 PO 08 041-000-CAA	<ul style="list-style-type: none"> 24 VDC, 70 mA (per channel), 8 channels, per-channel galvanic isolation C - protective covering 	Terminal block by 36 contacts ordered separately
Power supply modules		
R500 PP 00 011-000-AAA R500 PP 00 011-000-CAA	<ul style="list-style-type: none"> 24 VDC, 75 W C - protective covering 	-
R500 PP 00 021-000-AAA R500 PP 00 021-000-CAA	<ul style="list-style-type: none"> 24 VDC, 75W, galvanic isolation external from internal power circuits C - protective covering 	-
R500 PP 00 031-000-AAA R500 PP 00 031-000-CAA	<ul style="list-style-type: none"> 220 VAC/VDC, 75W, galvanic isolation external from internal power circuits C - protective covering 	-
R500 PP 00 051-000-AAA R500 PP 00 051-000-CAA	<ul style="list-style-type: none"> 24 VDC, 75W, smart, support for power bus selection C - protective covering 	-

Part number	Module characteristics	Note
Chassis and terminal blocks		
R500 CH 01 011-000-AAA R500 CH 01 011-000-CAA	<ul style="list-style-type: none"> Chassis for I/O and power supplies modules (one data bus, one power bus) C - protective covering 	-
R500 CH 02 011-000-AAA R500 CH 02 011-000-CAA	<ul style="list-style-type: none"> Redundant Chassis for I/O and power supplies modules (two data buses, one power bus) C - protective covering 	This type of chassis can not be used with R500 CH 02 811 chassis in one PLC's rack
R500 CH 02 022-000-AAA R500 CH 02 022-000-CAA	<ul style="list-style-type: none"> Redundant chassis for dual slot CPU, type III (two data buses, two power buses) C - protective covering 	-
R500 CH 02 023-000-AAA R500 CH 02 023-000-CAA	<ul style="list-style-type: none"> Redundant chassis for dual slot CPU, type III (two data buses, two power buses) C - protective covering 	-
R500 CH 02 032-000-AAA R500 CH 02 032-000-CAA	<ul style="list-style-type: none"> Redundant chassis for single slot CPU, type II (two data buses, two power buses) C - protective covering 	-
R500 CH 02 041-000-AAA R500 CH 02 041-000-CAA	<ul style="list-style-type: none"> Redundant chassis for EU modules (two data buses, two power buses) C - protective covering 	-
R500 CH 02 811-000-AAA R500 CH 02 811-000-CAA	<ul style="list-style-type: none"> Redundant chassis for I/O and power supplies modules (two data buses, two power buses) C - protective covering 	This type of chassis can not be used with R500 CH 02 011 chassis in one PLC's rack
R500 CL 20 001	<ul style="list-style-type: none"> Terminal block for I/O modules R500, 20 contacts (black) 	
R500 CL 36 001	<ul style="list-style-type: none"> Terminal block for I/O modules R500, 36 contacts (black) 	

Part number	Module characteristics	Note
Terminal modules		
R500 ST 00 001	<ul style="list-style-type: none"> without RegulBus extension 	-
R500 ST 01 012-000-AAA R500 ST 01 012-000-CAA	<ul style="list-style-type: none"> with single RegulBus extension (IN), RJ-45 connector C - protective covering 	-
R500 ST 01 022-000-AAA R500 ST 01 022-000-CAA	<ul style="list-style-type: none"> with single RegulBus extension (OUT), RJ-45 connector C - protective covering 	-
R500 ST 02 012-000-AAA R500 ST 02 012-000-CAA	<ul style="list-style-type: none"> with redundant RegulBus extension (IN), RJ-45 connector C - protective covering 	-
R500 ST 02 022-000-AAA R500 ST 02 022-000-CAA	<ul style="list-style-type: none"> with redundant RegulBus extension (OUT), RJ-45 connector C - protective covering 	-
R500 ST 02 111-000-AAA R500 ST 02 111-000-CAA	<ul style="list-style-type: none"> with redundant RegulBus extension (IN), SFP connector C - protective covering 	SFP-module ordered separately
R500 ST 02 121-000-AAA R500 ST 02 121-000-CAA	<ul style="list-style-type: none"> with redundant RegulBus extension (OUT), SFP connector C - protective covering 	SFP-module ordered separately
DIN-rails for PLC mount (height 105 mm)		
R500 DN 060	<ul style="list-style-type: none"> L=600 mm 	-
R500 DN 080	<ul style="list-style-type: none"> L=800 mm 	-
R500 DN 100	<ul style="list-style-type: none"> L=1000 mm 	-
Gateway of data transfer protocols		
R500G CU 00 021-000-AAA	<ul style="list-style-type: none"> RS-232, RS-485, 2xEthernet RJ-45 	-
R500G CU 00 031-000-AAA	<ul style="list-style-type: none"> RS-232, RS-485, 2xEthernet SFP 	-





REGLAB



MANAGED SWITCH FOR REGULBUS - REGUL R000



Managed switches REGUL R000 provide flexible structure of PLC REGUL racks.



It's included in reestr of production, which manufactured in Russia, № of note 140V1\2023.



The main purpose of switches is to split the PLC on different net nodes by territory and / or functional features.

The general net forms by internal PLC's bus (RegulBus), in which managed switch REGUL R000 splits its on following parts:

- upper domain of racks is a part of net before switches, in which CPU modules are located;
- lower domain of racks is a part of net under switches, in which switches can manage the activity of links.

Managed switches provide diagnostic of errors in net and block automatically, in some milliseconds from error occlusion, the lower parts of the PLC's net (RegulBus). Therefore it saves PLC's distributed net from failures in some node.

Managed switch do not read or modify RegulBus data, so it don't influent on data transfer time between upper and lower parts of ReglBus.

Also managed switches REGUL R000 can be used as media converter thus converted fiber optic RegulBus to twisted pair if it necessary.

Functional availability



it provides on their net-ports up to three "ring" schemes or up to six "star" schemes, also it allows the mix of these schemes



diagnostic information about link status available for users



fault or modify detection of data are available with following block these net section



two power supply connectors



remote control (opening and closing) of the switches ports available

Construction



Regul R000 has size of 40x180x145 mm, like R500 I/O modules



DIN-rail mount (height 105 mm)



passive cooling, there are no mechanical and spinning elements on construction

Technical characteristics

- | | |
|-------------------------------|-------------------|
| • power supply voltage | 18-32 VDC |
| • operating temperature range | from -40 to +60°C |

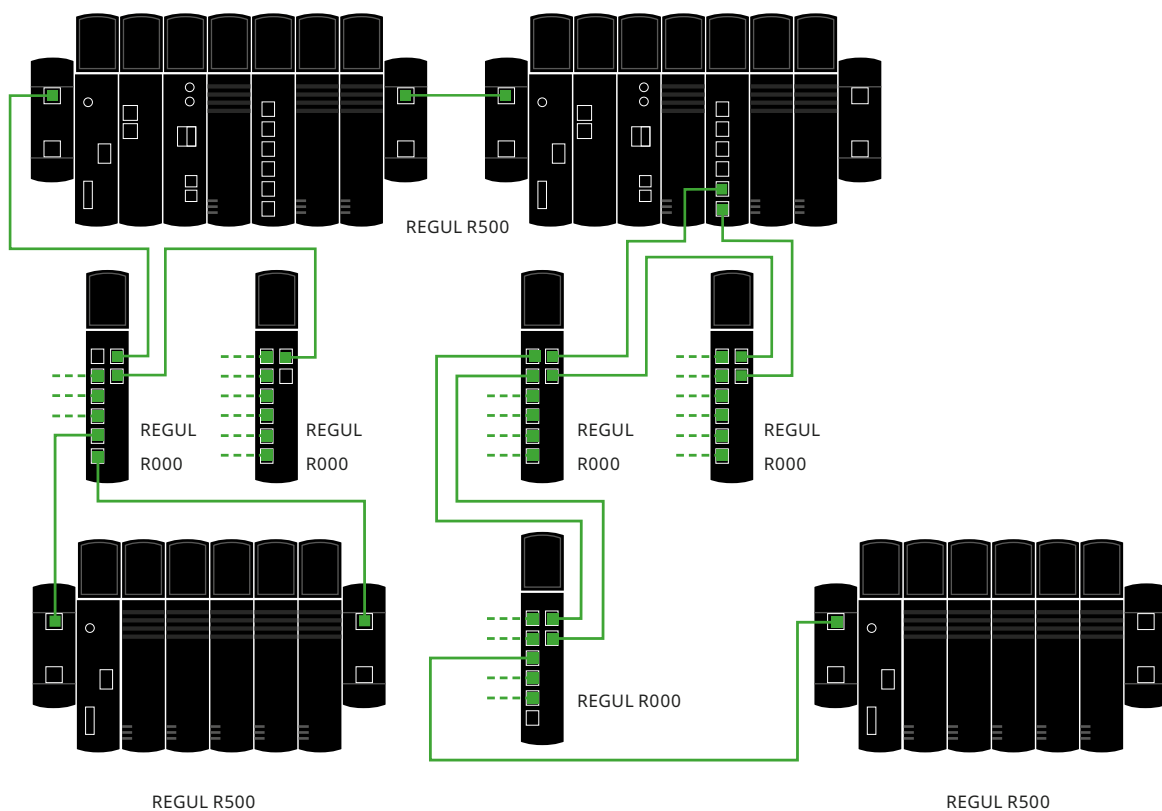
- **Part number for controller order**
see at page 6

- **Noise immunity**
see at page 52

MANAGED SWITCH MODULES R000

Part number	Module characteristics	Note
Managed switches for RegulBus with protective coating		
R000 CP 06 111-000-CAA	2 input ports RJ-45, 6 output ports RJ-45, two power input 24 VDC	-
R000 CP 06 121-000-CAA	2 input ports SFP, 6 output ports RJ-45, two power input 24 VDC	-

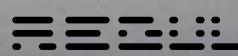
Figure 3. Example of REGUL R500 racks connection with R000 modules



PROGRAMMABLE LOGIC CONTROLLER FOR ESD-SYSTEMS REGUL R500S (R500 SAFETY)



It's included in reestr of production,
which manufactured in Russia,
№ of note 140\1\2023.



Controller REGUL R500S is designed to build emergency shutdown systems and safety systems (ESD, F&GDS, HIPPS, etc.).



MAIN CHARACTERISTICS

○ Purpose



special solution for ESD-systems for dangerous technological processes



designed in Russian Federation



approved for Safety Integrity Level 3 (SIL 3) according to IEC 61508, it has international certificate from TUV's engineer and calculated reliability parameters

For dangerous plants it's strictly important to protect staff, technological equipment and environment in case of emergency. For this purpose special safety system, independent from main control system, must be built.

Russian and international standards provide strictly requirements for safety systems and its controllers, including requirements for PLC's embedded software and its application. Thus for safety systems usual industrial PLC must not be used. Controller REGUL R500S is based on serial manufactured REGUL R500 platform, but R500S has absolutely new design according to IEC 61508 / 61511 standard requirements.

Hardware of REGUL R500S is approved for SIL 3 requirements by following solutions:

- component redundancy for each channel inside I / O modules;
- redundancy of I / O modules (double or triple)
- deep self-diagnostic is checked internal errors and guarantee turn the hole process in definitely safety stage;
- in each I / O module certified microprocessor is embedded, which provides in depends on module type initial input signal checking or final logic of output signal stage. Microprocessor also has independent watchdog timer;
- two redundancy internal PLC's power buses, I / O modules have an opportunity to terminate two external power lines to supply power for external circuits. Self-diagnostic of power supply is provided constantly. In case of power buses emergency diagnostic information is available to staff. In the same time R500S operates and provides safety functions, which lets the staff to correct failures;
- Regul R500S has double data bus for transfer data between CPU and I / O modules, in case of CPU's redundancy.

For providing of high level of self diagnostic in REGUL R500S for developers wide set of control instruments for parameters of measurement and control loops is available:

- monitoring for field sensors power with short circuit and overload protection;
- depending on module type, monitoring for external circuit of analog inputs by short circuit or open circuit, and diagnostic by signals range;
- monitoring for external circuit of digital input signals by short circuit and open circuit (digital input modules according to NAMUR specification);
- digital output modules with monitoring of current in the circuits.

This deep proactive diagnostic provides timely and accurate detection of failures, so the staff have a time to eliminate malfunctions in the systems.

To ensure uninterrupted operation of process equipment, the REGUL R500S controller provides for the possibility of using redundant I/O modules (redundant assemblies) consisting of two or three modules of the same type. The obtained redundancy makes it possible to reduce the number of safe failures, i.e. failures caused not by an emergency situation at the technological facility, but by a malfunction of the ESD system, including field and controller equipment. This makes it possible to quickly replace duplicated system components without stopping the process.

The creation of redundant assemblies is supported at the development environment level. For an assembly of two discrete input / output modules, it is possible to combine them with the logical functions "AND" and "OR", for an assembly of three modules, there is also the possibility of a majority choice - "2 out of 3".

For analog input modules, it is possible to select a value when combining signals, the minimum, maximum, or median value (for three modules).

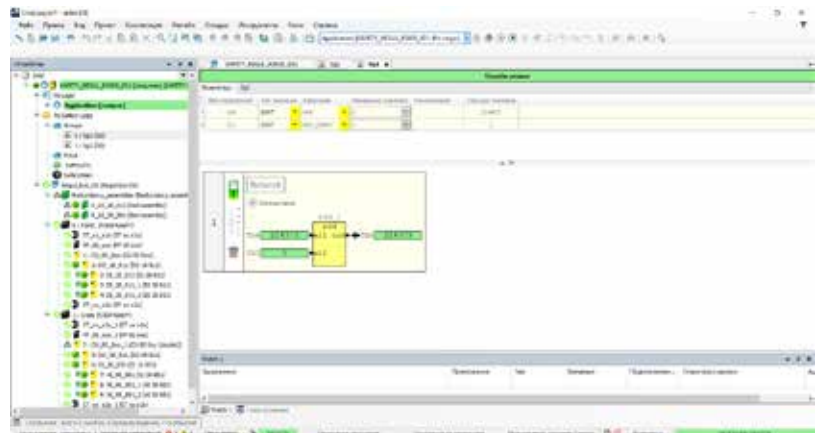
Signal processing logic in redundant assemblies takes into account the results of diagnostics of individual modules.

The presence in the controller of two independent data buses and support for duplication of CPU modules allows implementing SIL3 High Availability level systems on the basis of the controller. In systems assembled according to the 1oo2D scheme, any single failure will not lead to the issuance of a command to transfer the system to a safe state. Such systems are used at highrisk facilities with a continuous technological cycle.

REGUL R500S controller software:

- PLC operation is controlled by a specialized operating system certified for use in equipment with a functional safety level up to SIL3;
- built-in system software, including a secure data transfer protocol between the CPU and I / O modules, was developed by RegLab in accordance with the requirements of the IEC 61508 standard;
- the development environment is also a RegLab product created on the basis of Astra.IDE. It has its own built-in Safety editor and compiler, made in accordance with the requirements of the IEC 61508 standard.

Figure 4. Screenshot of Astra.IDE software interface



All developed software is checked by special certified static analysis tools for compliance with the MISRA C: 2012 standard.

● **Part number for controller order**
see at page 6

● **Noise immunity**
see at page 52

PLC CONFIGURATION

PLC REG UL RS00S allows distributed configuration of racks. Some racks (electrical different units) can be configured in one controller. Each rack must have unicum address, that is configured by 8-position dip-switcher, that is located on terminal module (ST). PLC's racks can be connected between each other in any order, but interface connectors "OUT" of internal PLC's data bus - RegulBus always connect to interface connectors "IN".

PLC REG UL RS00S allows configuration with double internal data bus and double internal power bus. In double CPU's configurations double RegulBus must be used.

In PLC's REGUL R500S racks R500 IO modules are also allowed. R500S rack includes modules of following types:

(ST) Terminal modules must included in each PLC's rack. They installed on both ends of the rack, provide fixation of the crate on the DIN-rail and protect the chassis electrical lateral connectors.

Terminal modules of the corresponding modification can support extension of PLC's internal data bus (IN and OUT modules) via twisted pair or fiber optic line between racks. At communication via FO in the terminal modules must be installed are third-party SFP-modules.

(PP) Power supply modules. At least one module must be included in the each rack. Number of power supply modules selected depending on the internal power consumption of each rack. To improve reliability, it is strongly recommended to install an excess number of power modules in each rack.

(CU) Central processor unit. CU modules have different types of modules.

(AI, AO, DI, DO) Input / Output modules. I/O modules provide processing of analog (including HART support) and digital signals (including NAMUR support).

(CP) Communication processor modules. CP modules provide reception and operation of signals via interfaces RS-485, Ethernet and protocols Modbus RTU / TCP, Profibus DP v0 Master, IEC 60870-5-101/104, RegulBus, NVL, SQL, FTP, SNMP. CP modules can be installed in remote PLC's racks. CP modules provide only the physical connection devices, device driver processing executed in CU modules. Bandwidth of Ethernet CP modules is limited volumes of segments of the PLC's internal bus, allocated for data transmission via such CP modules.

Attention! Data exchange by CP modules via standard protocols, are described earlier, is not safety. According to IEC 61508 / 61511 requirements this data can not be used in safety algorithms in R500S, inspire of technical opportunity is available.

(EU) Extension CPU's net-ports modules. EU modules further expand the number of CU 00 851 ethernet interfaces. Each CU may not have more than two EU. Data processing of devices connected to the EU is carried out in the CU modules. EU modules can only be installed in a rack to the right of CU 00 851 modules.

(CH) Chassis modules. For each PP, CU, I/O, CP, EU module chassis module must be mounted in rack. Chassis modules provide active data and power buses of PLC and provides hot swapping any of these modules in rack. PLC's R500S rack can be mounted by one chassis module. Chassis modules are not supplied with the PLC's modules and must be ordered separately.

(DIN) DIN-rail. Chassis mount on DIN-rail, which have 105 mm height. DIN-rail can be mount on mount panel or in 19"-cabinet. DINrails have standard sizes by 600, 800 or 1000 mm width. Chassis for CU 00 851 have 80 mm width, other CH and ST modules have 40 mm width.

The installation location of the module type in the rack does not matter, except for terminal modules, which always mounted on both ends of the rack, and EU modules always mounted next to the CU's.

Two redundancy PP modules can be mounted in the one rack. Double CU modules of REGUL R500S must be mounted in different racks because of protection from general failure reason is necessary.

If it necessary for redundant I/O modules, they must be mounted in the different racks or in one rack. Wherever redundant I/O modules are used they should be configured as redundant assembly. Redundant I/O modules can be mounted in duplicated CPU's racks.

Types of central processor units

Central processor unit	CU 00 821	CU 00 831	CU 00 851		
Frequency, GHz, number of service microprocessor cores	1 (1 core)		1,33 (2 core)		
Frequency, MHz, number of safety microprocessor cores	220 (2 core)		330 (2 core)		
RAM, Mb	512		2000		
Flash memory, Gb	1		4		
RS-232 / RS-485, pcs.	1 / 1				
Ethernet 100 Mbps, pcs.	2 (RJ-45)	2 (SFP)	-	-	-
Ethernet 100/1000 Mbps, pcs.	-	-	4 (RJ-45)		
USB 2.0**	-		2		
SDHC-card slot, pcs.	1		-		
EU connection is available	No		Yes		
GPS/GLONASS receiver	No		Option		
Minimal PLC's bus cycle	10 ms for each rack		0,5 ms for each rack		
Minimal application cycle time	50 ms		30 ms		
Number of I/O R500S modules, not over, pcs.	30		60		
Typical number of I/O channels, including redundant, pcs.	375		750		
CPU's battery replace is available for users*	No		Yes		
Compatible chassis module	CH 02 032		CH 02 022, CH 02 023		

Note: * battery in CU module provides work only for internal clock, when external power shut off. When the CU module is powered on with a faulty battery, the date and time in the CU can be set manually, the CU module time synchronization can be done via NTP;

** an external flash drive up to 32 GB in size, or a touch-screen display can be connected via USB.

REGUL R500S CONTROLLER MODULES

Part number	Module characteristics	Note
Central processor units		
R500S CU 00 821-000-AAA R500S CU 00 821-000-CAA	<ul style="list-style-type: none"> RS-232, RS-485, 2 x Ethernet RJ-45 C - protective covering 	Single slot
R500S CU 00 831-000-AAA R500S CU 00 831-000-CAA	<ul style="list-style-type: none"> RS-232, RS-485, 2 x SFP C - protective covering 	
R500S CU 00 851-000-AAA R500S CU 00 851-000-CAA	<ul style="list-style-type: none"> RS-232, RS-485, 4 x Ethernet RJ-45, 2 x USB C - protective covering 	Dual slot
Analog input modules		
R500S AI 04 841-000-AAA R500S AI 04 841-000-CAA	<ul style="list-style-type: none"> 0/4...20 mA, 4 channels, per-channel galvanic isolation, two ADC per-channel (work in pairs), power supply for sensors from module C - protective covering 	Terminal block by 20 contacts ordered separately
R500S AI 04 861-000-AAA R500S AI 04 861-000-CAA	<ul style="list-style-type: none"> -5/0...+5 V, -10/0...+10 V, 4 channels, per-channel galvanic isolation, two ADC per-channel (work in pairs), power supply for sensors from module C - protective covering 	
R500S AI 08 851-000-AAA R500S AI 08 851-000-CAA	<ul style="list-style-type: none"> -5/0...+5 V, -10/0...+10 V, 8 channels, per-channel galvanic isolation, two power inputs for sensors, common sensor power supply C - protective covering 	Terminal block by 36 contacts ordered separately
R500S AI 08 881-000-AAA R500S AI 08 881-000-CAA	<ul style="list-style-type: none"> 0/4...20 mA + HART, 8 channels, per-channel galvanic isolation, two power inputs for sensors, common sensor power supply C - protective covering 	
Analog output modules		
R500S AO 04 831-000-AAA R500S AO 04 831-000-CAA	<ul style="list-style-type: none"> 4...20 mA, 0...+10 V, -10...+10 V, 4 channels, per-channel galvanic isolation C - protective covering 	Terminal block by 20 contacts ordered separately
Digital input modules		
R500S DI 16 831-000-AAA R500S DI 16 831-000-CAA	<ul style="list-style-type: none"> NAMUR, external power supply 24 VDC, 16 channels, group galvanic isolation C - protective covering 	Terminal block by 36 contacts ordered separately
R500S DI 28 811-000-AAA R500S DI 28 811-000-CAA	<ul style="list-style-type: none"> 24 VDC, 28 channels (4 groups by 7 channels), group galvanic isolation C - protective covering 	

Part number	Module characteristics	Note
Digital output modules		
R500S DO 16 811-000-AAA R500S DO 16 811-000-CAA	<ul style="list-style-type: none"> • 24 VDC, 0,6 A, 16 channels (2 groups by 8 channels), group galvanic isolation • C - protective covering 	Terminal block by 36 contacts ordered separately
Power supply modules		
R500 PP 00 051-000-AAA R500 PP 00 051-000-CAA	<ul style="list-style-type: none"> • 24 VDC, 75 W, support for power bus selection • C - protective covering 	-
Chassis and terminal blocks		
R500 CH 02 023-000-AAA R500 CH 02 023-000-CAA	<ul style="list-style-type: none"> • Redundant chassis for dual slot CPU (two data buses, two power buses) • C - protective covering 	-
R500 CH 02 032-000-AAA R500 CH 02 032-000-CAA	<ul style="list-style-type: none"> • Redundant chassis for single slot CPU (two data buses, two power buses) • C - protective covering 	
R500 CH 02 811-000-AAA R500 CH 02 811-000-CAA	<ul style="list-style-type: none"> • Redundant chassis for I/O and power supplies modules (two data buses, two power buses, additional internal diagnostic) • C - protective covering 	
R500S CL 20 001	<ul style="list-style-type: none"> • Terminal block for I/O modules, 20 contacts (yellow) 	
R500S CL 36 001	<ul style="list-style-type: none"> • Terminal block for I/O modules, 36 contacts (yellow) 	
Terminal modules		
R500 ST 02 013-000-AAA	<ul style="list-style-type: none"> • Terminal module with redundant RegulBus extension (IN), two power buses, RJ-45 connector 	-
R500 ST 02 023-000-AAA	<ul style="list-style-type: none"> • Terminal module with redundant RegulBus extension (OUT), two power buses, RJ-45 connector 	
R500 ST 02 113-000-AAA	<ul style="list-style-type: none"> • Terminal module with redundant RegulBus extension (IN), two power buses, SFP connector 	SFP-module ordered separately
R500 ST 02 123-000-AAA	<ul style="list-style-type: none"> • Terminal module with redundant RegulBus extension (OUT), two power buses, SFP connector 	
DIN-rails		
R500 DN 060	<ul style="list-style-type: none"> • L = 600 mm 	-
R500 DN 080	<ul style="list-style-type: none"> • L = 800 mm 	-
R500 DN 100	<ul style="list-style-type: none"> • L = 1000 mm 	-

BUILDING A SAFETY INSTRUMENTED SYSTEM BASED ON REGUL R500S

Each separate Regul R500S module provides SIL 3 because of each its internal component is redundant and module has internal diagnostics. Due to this feature for SIS configuration up to SIL 3 single configuration of R500S is enough.

Only power supply modules must be doubled. And every power supply module must be configured to connection for one of double internal power buses.

For protection of safe failures in Regul R500S redundant assemblies of I/O modules are available. For convenience of redundant assemblies using special terminal panels can be used. This panels allow separating or summing of signals via third-party converters, also provides Ex-protection via third-party Exi-barriers. Terminal panels can separate internal signal from one sensor to several R500S modules or can summed several signals from output R500S modules to one control signal.

In case of using a redundant assembly input modules, at the application program level are available to the developer as individual data from each module from the redundant assembly, and the final value of the technological parameter obtained based on the sample and comparison of readings from each module. Setting the sampling algorithm itself is also available to the user and includes parameters such as decision-making scheme (1oo3, 2oo3), reliability limits, signal safety criteria (which signal is considered safer: large or less, "0" or "1"), etc.

For redundant assemblies of discrete output modules, the function of diagnosing the failure of external switching equipment can be implemented by alternately disconnecting the parallel contacts of the control circuits of the actuators. In such schemes, alternating switching with a large cycle (hours) makes it possible to timely detect sticking of equipment contacts and reduce the percentage of undiagnosed dangerous failures.

Figure 5. Single configuration of Regul R500S

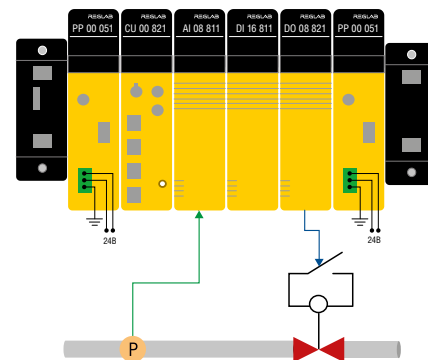


Figure 6. Redundant assembly of Regul R500S input modules

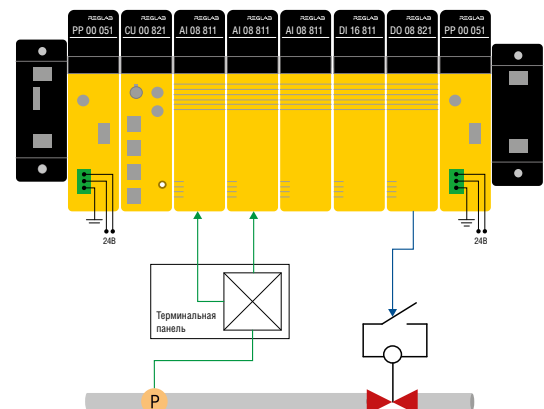
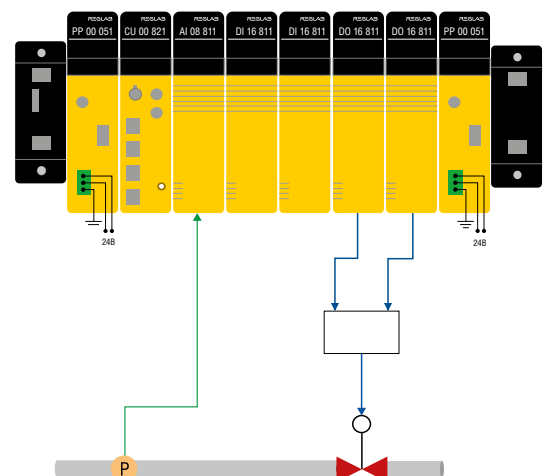


Figure 7. Redundant assembly of Regul R500S output modules



The use of a safety data channel in the REGUL RS00S controller for data exchange between controllers, as well as modules within the PLC, allows the use of standard means of communication, while separating data that is and is not involved in safety functions.

In general, the same rules for constructing racks and connecting racks to each other apply to the REGUL RS00S controller as for the REGUL RS00 controller. And the use of end modules with SFP-connectors allows users to install expansion racks at a distance up to 10 km from the central processor rack, bringing measurement and control modules closer directly to the technological object, thereby reducing the length of signal lines and increasing the reliability of the SIS as a whole.

As part of the REGUL RS00S controller, you can use all I/O modules and communication modules from the REGUL RS00 controller range. Information with these modules can be used to obtain additional diagnostic information or to transfer data from and to the DCS controller or at the SCADA-system level. But the architecture of the REG UL RS00S controller is designed in such a way that data from the REGUL RS00 controller module operating as part of it is guaranteed not to be used in the security algorithm.

For continuous production and technological processes, the shutdown of which leads to temporary losses, the architecture of the REG UL RS00S controller allows the development of duplicate control systems operating according to the 1oo2D scheme.

At the same time, in contrast to classical redundancy, in RS00S both central processors are leading and a qualified decision that a technological object needs to be transferred to a safe state is made by either of the central processors. But at the same time, any safe failure of the controller will not lead to a stop of the technological cycle - only degradation of the controller will occur from the 1oo2D circuit into a single-channel SIS controller. This gives the operating personnel time to carry out all the necessary manipulations to repair and replace failed equipment.

At the same time, again thanks to the REG UL RS00 controller platform, the developer has access to all the numerous schemes for constructing a duplicate system as with the standard RS00 controller. It is full duplication, duplication of only central processor modules, with central processor modules placed in different racks.

Figure 8. Regul RS00S configuration with full doubled of modules

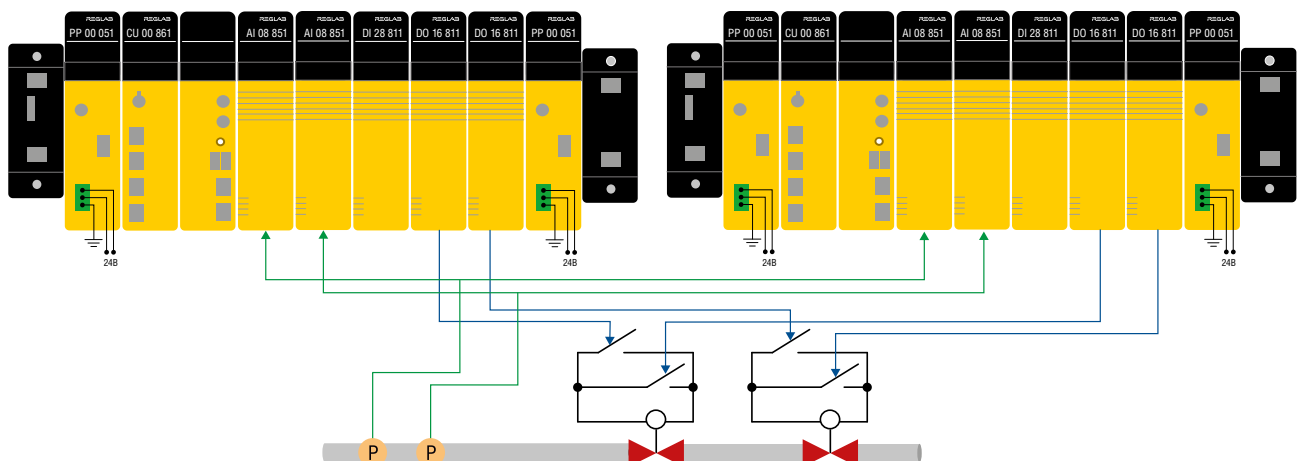
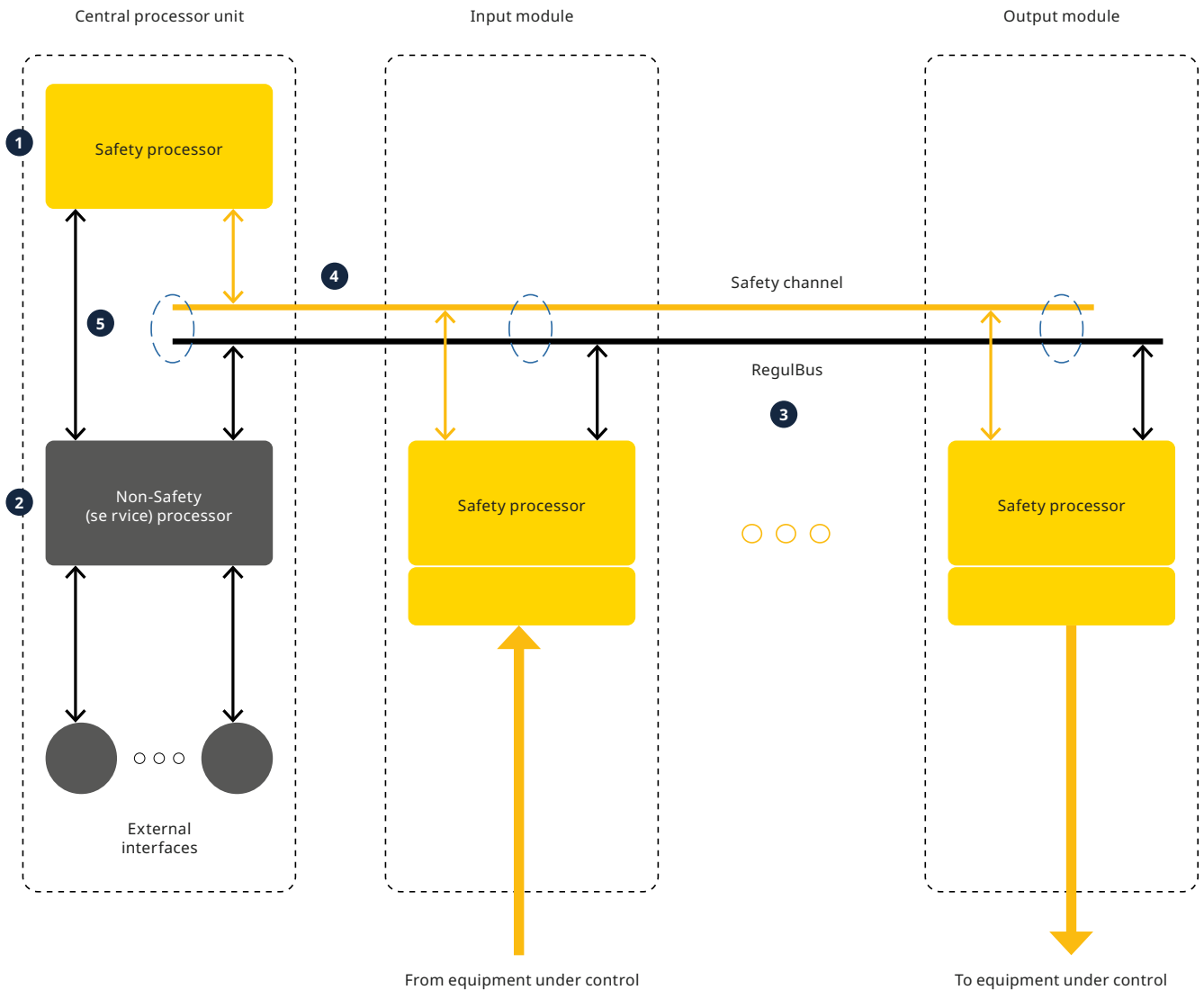


Figure 9. Regul RS00S architecture



- Safety subsystem
- Non-safety subsystem
- 1 Safety processor
- 2 Non-Safety processor
- 3 Non-Safety internal data bus - RegulBus
- 4 Internal safety bus ("black channel" over RegulBus, FSC technology)
- 5 Non-safety network between processors

Channel No. 5 is duplex. Transmission (recording) of data from Non-Safety part into Safety part of Regul R500S is available, but this procedure in "on-line" mode is prohibited by IEC 61508.

Data from Safety-modules can be transfer strictly to non-safety processor.

PROGRAMMABLE LOGIC CONTROLLER REGUL R400



It's included in reestr of production, which manufactured in Russia, № of note 140\1\2023.



Controller REGUL R400 is combination human-machine interface and central processor unit.

It works with any I/O modules of controllers REGUL RX00 series.



MAIN CHARACTERISTICS

○ Purpose

REGUL R400 controller is designed for local and distributed automation systems with visualization support.

○ Functional availability



capacitive touch-screen with a diagonal of 7"



ability to create a user archive on the built-in solid-state drive



film keyboard



connection of REGUL RX00 series controller expansion racks



degree of protection of the front panel against penetration of solid objects and water IP 66



web visualization capability



extended operating temperature range



instrumental software Astra.IDE with support for all IEC 61131-3 standard languages

Technical characteristics

Screen diagonal	7"
Screen permission	800 x 480 px
RAM	2 Gb
SSD	4 Gb
Interfaces:	
• RS-485	1
• USB host	2
• Ethernet	2
Input supply voltage range	18...36 V DC
Operating temperature range	from -20 to +60 °C

Part number for controller order
see at page 6

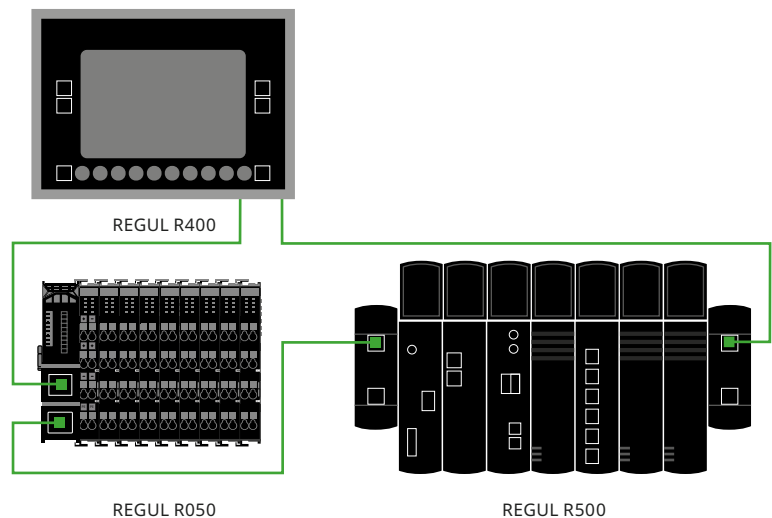
Noise immunity
see at page 52

REGUL R400 CONTROLLER MODULES

Part number	Module characteristics	Note
Central processor units		
R400 CU 00 071-000-AAA	<ul style="list-style-type: none"> Operator panel 7", capacitive touch-screen, permission 800x480, with CPU embedded, 1,46 GHz, 2 Gb RAM, 4 Gb SSD, 2xUSB host 2.0, RS-485, 2xEthernet RJ-45, 2xRegulBus 	-
R400 CU 00 071(W)-000-AAA	<ul style="list-style-type: none"> Operator panel 7", capacitive touch-screen, permission 800x480, with CPU embedded, 1,46 GHz, 2 Gb RAM, 4 Gb SSD, 2xUSB host 2.0, RS-485, 2xEthernet RJ-45, 2xRegulBus, WEB-visualization support 	-

Figure. 10. Hardware configuration of REGUL R400 controller

- support for remote extension racks
- available controller network topology as "star", "ring" or mixed scheme



PROGRAMMABLE LOGIC CONTROLLER REGUL R050



Controller REGUL R050 is a compact solution for building local control systems

MAIN CHARACTERISTICS

○ Purpose



local automation systems on industry and administrative objects



territory distributed systems (telemechanic systems), monitoring systems



distributed remote racks for input / output of field signals within REGUL R400 or non-redundant REGUL R500 configurations

Functional availability

- supporting of hot redundancy power supply modules for internal power bus
- high-speed internal data bus (for the racks connections)
- discrete rack - extension of rack by one module is available, rack mount on DIN-rail 35 mm height
- remote I/O racks are connected to CPU's rack in different topologies: "redundancy ring", "star", mixed topology
- power independent memory - up to 0,5 Gb for user archive
- design software Astra.IDE supports all languages according to IEC 61131-3 and CFC

Available communications

Communication protocols embedded:

- HART v6, v7;
- IEC 60870-5-101 (Master / Slave);
- IEC 60870-5-104 (Master / Slave);
- Modbus RTU (Master / Slave, including extension availability);
- Modbus TCP (Master / Slave, including extension availability);
- OPC DA, OPC UA;
- RegulBus, FTP, SNMP v3, SysLog;
- additional protocols, also non-standard protocols according to customer's task can be realized.

Interface embedded:

- USB host 2.0;
- RS-485;
- Ethernet 100 Mbps RJ-45 (full duplex) — up to 4 ports in CPU;
- Ethernet 100 Mbps FO (Single-mode, Multi-mode) — up to 2 ports in CPU.

Construction



fast mount
on DIN-rail 35 mm height



passive cooling

● **Technical characteristics**

Minimal application cycle time	10 ms
Accuracy of time synchronization no worse	50 μs
Power supply, voltage	18...30 VDC
Operating temperature range	from -40 to +60°C

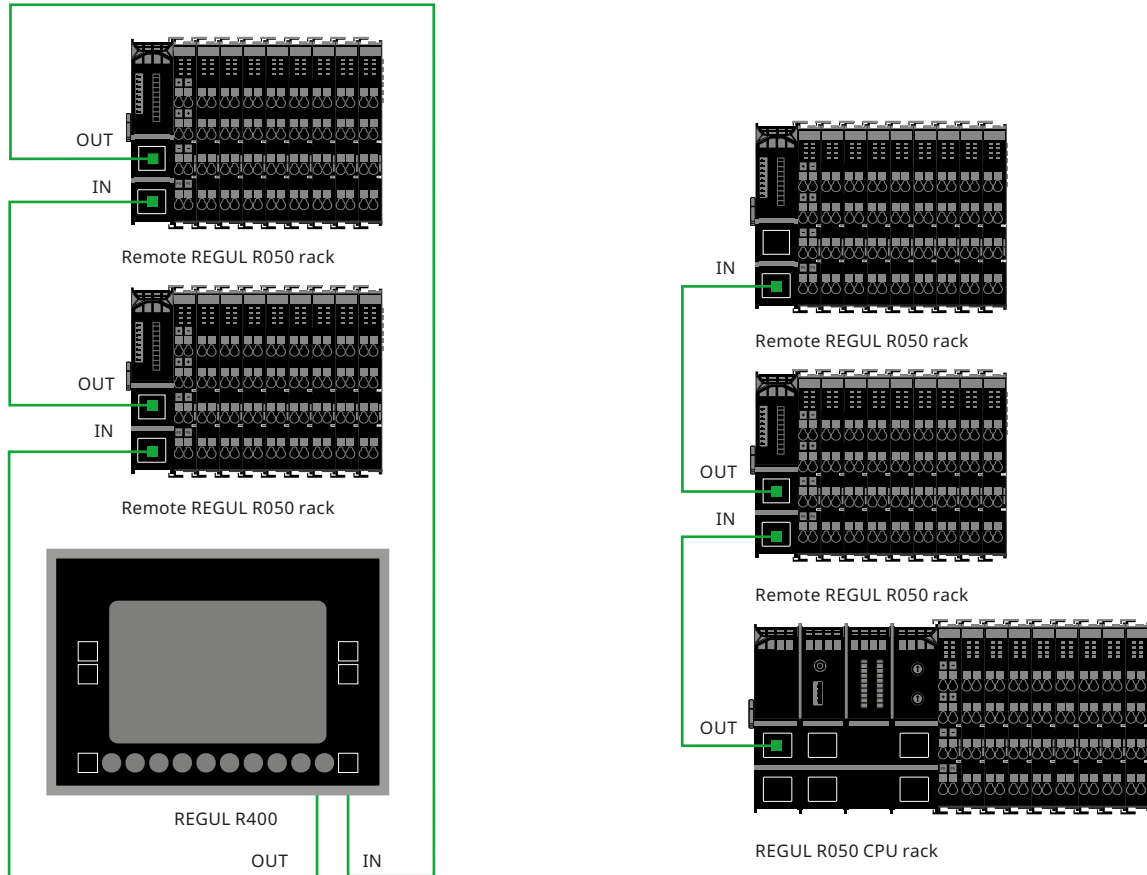
● **Part number for controller order**
see at page 6

● **Noise immunity**
see at page 52

HARDWARE CONFIGURATION OF CONTROLLER REGUL R050

- up to 70 modules in one rack
- remote I/O racks are available
- up to 10 km link between racks is available (by fiber optic link)

Figure 11. Example of REGUL R050 racks connection



PLC CONFIGURATION

PLC REGUL RS00 allows distributed configuration of racks. Up to 20 racks (electrical different units) can be configured in one controller. Each rack must have unicum address, that is configured by 8-position dip-switcher, that is located on terminal module (ST). PLC's racks can be connected between each other in any order, but interface connectors "OUT" of internal PLC's data bus - RegulBus always connect to interface connectors "IN".

ROSO rack includes modules of following types:

(ST) Terminal module must include in each PLC's rack. The module is installed in the extension rack on the left, the ST module supports extension of the internal PLC bus (IN and OUT connectors) via twisted pair or fiber optic line between racks. At communication via FO in the terminal modules must be installed third-party SFP-modules. Each ST module also comes with a power supply module (PP) and plug to protect the electrical contacts of the rightmost module in extension rack.

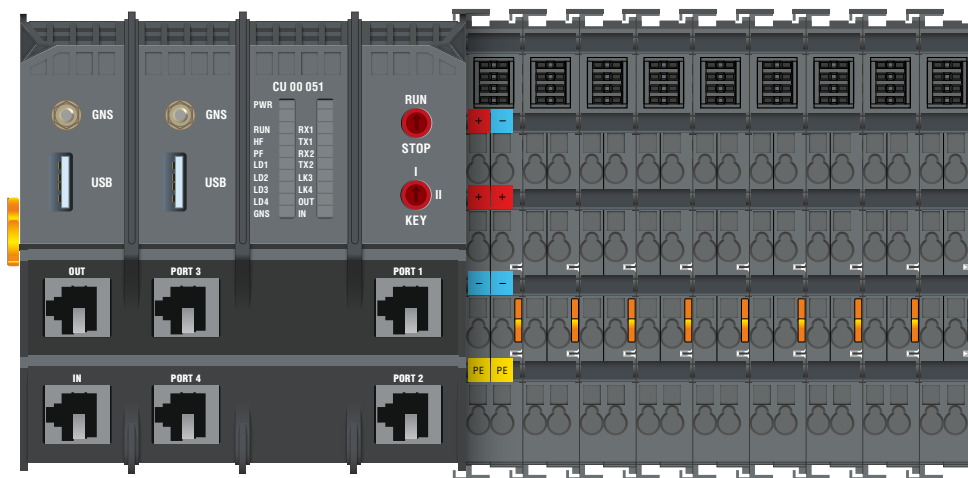
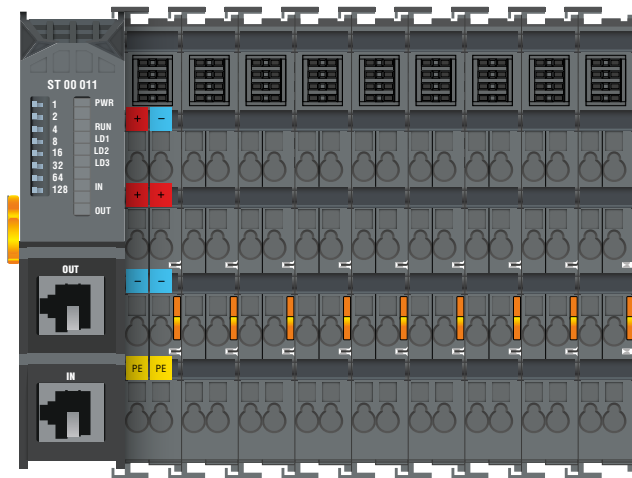
(PP) Power supply modules. At least one module must be included in each rack. Number of power supply modules selected depending on the internal power consumption of each rack. For providing redundant power to the rack PLC must apply an excess amount of power supply modules. Internal power bus into rack is the one, galvanic-linked element. External power bus into rack is interrupted at the location of the power supply module and external power connected to this module is supplied only to the I/O modules located on the right hand from PP.

(CU) Central processor unit. CU modules have different types of modules and options. Each CU module also comes with a power supply module (PP) and plug to protect the electrical contacts of the rightmost module in the CU module rack.

(AI, AO, DI, DA, DO) I/O modules have a wide nomenclature, provide processing of analog (including HART support) and digital signals (including NAMUR support), signals from TC/RTD, pulse signals (including output PWM-signals).

(CP) Communication processor modules. CP modules provide reception and operation of signals via interfaces RS-485 and protocols Modbus RTU, IEC 60870-5-101. CP modules can be installed in remote PLC's racks. CP modules provide only the physical connection devices, device driver processing executed in CU modules.

Figure 12. Example of PLC's REGUL RO50 rack configuration



Types of central processor units

Central processor unit	CU 00 021	CU 00 031	CU 00 041	CU 00 051	CU 00 061	CU 00 071	CU 00 151	CU 00 161
CPU's type	II							
Frequency, GHz, number of microprocessor cores	1 (1 core)							
RAM, Mb	512							
HDD, Gb	1							
• RS-232 / RS-485, pcs.	1							
• RS-485, pcs.	1							
• Ethernet, 100 Mbps, pcs.	1 (RJ-45)	1 (RJ-45)			1 (RJ-45) 1 (SFP)		4 (RJ-45)	2 (RJ-45) 2 (SFP)
• USB 2.0**	up to 2 ports (option)							
• GPS / GLONASS receiver	2 (option)							
• RegulBus (1xIN, 1xOUT)	-	2 (SFP)	2 (RJ-45)	2 (RJ-45)	2 (SFP)	-	-	
Typical PLC's bus cycle	5 ms for each rack							
Minimal application cycle time	10 ms							
Typical number of PLC's channels at PLC's application cycle for 200 ms	Up to 800							
CPU's battery replace is available by user*	Yes							

Note:* battery In CU module provides work only for Internal clock, when external power shut off. When the CU module Is powered on with a faulty battery, the date and time in the CU can be set manually, the CU module time synchronization can be done via NTP or from the built-in GPS / GLONASS receiver; ** an external flash drive up to 32 GB in size can be connected via USB.

REGUL R050 CONTROLLER MODULES

Part number	Module characteristics	Note
Central processor units		
R050 CU 00 021-000-AAA	<ul style="list-style-type: none"> 1 GHz, 512 Mb RAM, 1 Gb Flash, RS-232/485, RS-485, Ethernet RJ-45, complete with R050 PP 00 011-000-AAA and plug 	Type II
R050 CU 00 021-001-AAA	<ul style="list-style-type: none"> 1 GHz, 512 Mb RAM, 1 Gb Flash, RS-232/485, RS-485, Ethernet RJ-45, 2xUSB, complete with R050 PP 00 011-000-AAA and plug 	
R050 CU 00 021-002-AAA	<ul style="list-style-type: none"> 1 GHz, 512 Mb RAM, 1 Gb Flash, RS-232/485, RS-485, Ethernet RJ-45, 2xUSB, complete with R050 PP 00 011-000-AAA and plug 	
R050 CU 00 031-000-AAA	<ul style="list-style-type: none"> 1 GHz, 512 Mb RAM, 1 Gb Flash, RS-232/485, RS-485, Ethernet RJ-45, 2xUSB, complete with R050 PP 00 011-000-AAA and plug 	
R050 CU 00 031-001-AAA	<ul style="list-style-type: none"> 1 GHz, 512 Mb RAM, 1 Gb Flash, RS-232/485, RS-485, 2xEthernet RJ-45, 2xUSB, complete with R050 PP 00 011-000-AAA and plug 	
R050 CU 00 031-002-AAA	<ul style="list-style-type: none"> 1 GHz, 512 Mb RAM, 1 Gb Flash, RS-232/485, RS-485, 2xEthernet RJ-45, 2xUSB, GPS/GLONASS, complete with R050 PP 00 011-000-AAA and plug 	
R050 CU 00 041-000-AAA	<ul style="list-style-type: none"> 1 GHz, 512 Mb RAM, 1 Gb Flash, RS-232/485, RS-485, 2xEthernet RJ-45, 2xRegulBus SFP (IN/OUT), complete with R050 PP 00 011-000-AAA and plug 	Type II SFP-module ordered separately
R050 CU 00 041-001-AAA	<ul style="list-style-type: none"> 1 GHz, 512 Mb RAM, 1 Gb Flash, RS-232/485, RS-485, 2xEthernet RJ-45, 2xRegulBus SFP (IN/OUT), 2xUSB, complete with R050 PP 00 011-000-AAA and plug 	
R050 CU 00 041-002-AAA	<ul style="list-style-type: none"> 1 GHz, 512 Mb RAM, 1 Gb Flash, RS-232/485, RS-485, 2xEthernet RJ-45, 2xRegulBus SFP (IN/OUT), 2xUSB, GPS/GLONASS, complete with R050 PP 00 011-000-AAA and plug 	
R050 CU 00 051-000-AAA	<ul style="list-style-type: none"> 1 GHz, 512 Mb RAM, 1 Gb Flash, RS-232/485, RS-485, 2xEthernet RJ-45, 2xRegulBus RJ-45 (IN/OUT), complete with R050 PP 00 011-000-AAA and plug 	Type II
R050 CU 00 051-001-AAA	<ul style="list-style-type: none"> 1 GHz, 512 Mb RAM, 1 Gb Flash, RS-232/485, RS-485, 2xEthernet RJ-45, 2xRegulBus RJ-45 (IN/OUT), 2xUSB, complete with R050 PP 00 011-000-AAA and plug 	
R050 CU 00 051-002-AAA	<ul style="list-style-type: none"> 1 GHz, 512 Mb RAM, 1 Gb Flash, RS-232/485, RS-485, 2xEthernet RJ-45, 2xRegulBus RJ-45 (IN/OUT), 2xUSB, GPS/GLONASS, complete with R050 PP 00 011-000-AAA and plug 	

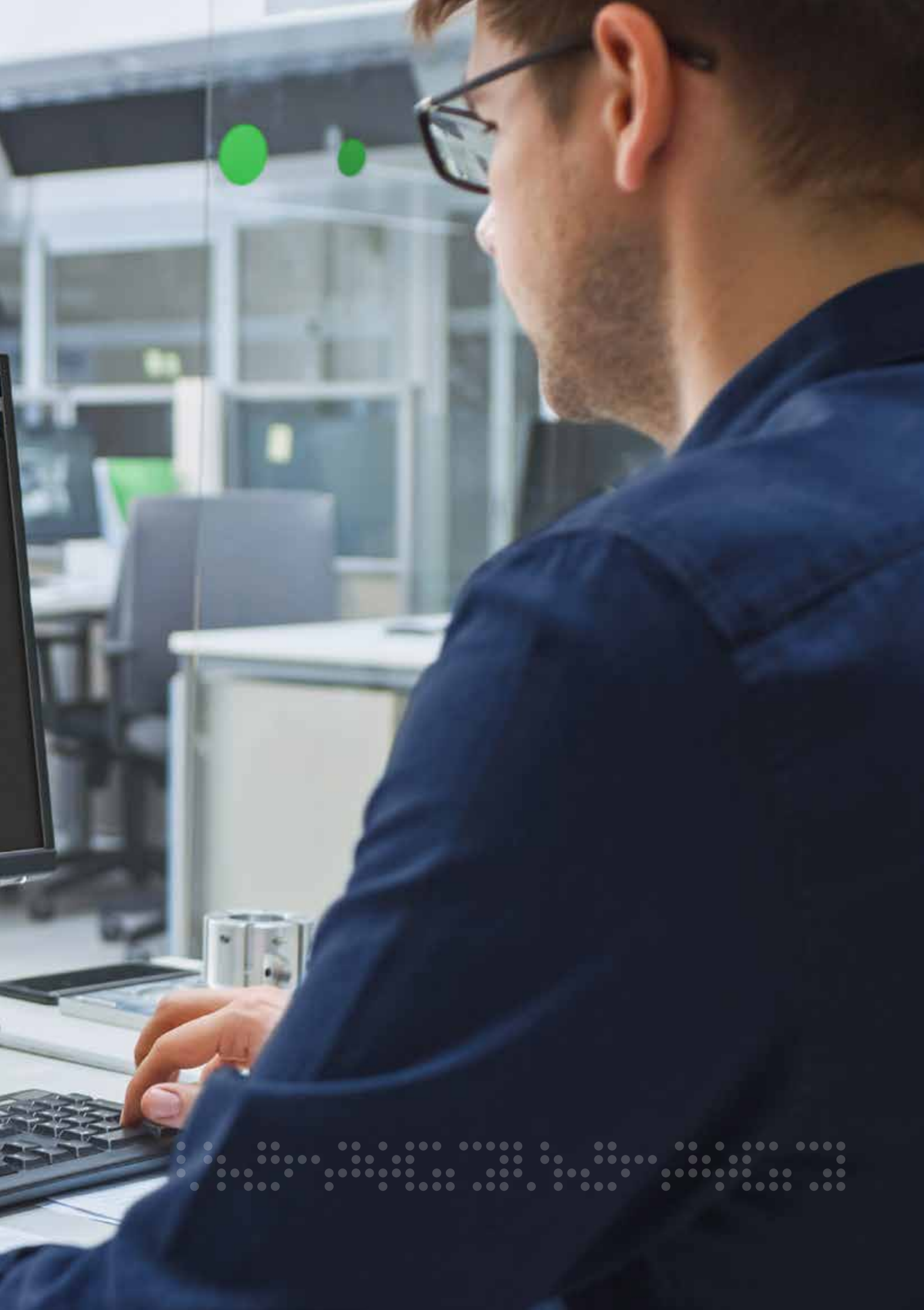
Part number	Module characteristics	Note
Central processor units		
R050 CU 00 061-000-AAA	<ul style="list-style-type: none"> 1 GHz, 512 Mb RAM, 1 Gb Flash, RS-232/485, RS-485, Ethernet RJ-45, Ethernet SFP, 2xRegulBus RJ-45 (IN/OUT), complete with R050 PP 00 011-000-AAA and plug 	Type II SFP-module ordered separately
R050 CU 00 061-001-AAA	<ul style="list-style-type: none"> 1 GHz, 512 Mb RAM, 1 Gb Flash, RS-232/485, RS-485, Ethernet RJ-45, Ethernet SFP, 2xRegulBus RJ-45 (IN/OUT), 2xUSB, complete with R050 PP 00 011-000-AAA and plug 	
R050 CU 00 061-002-AAA	<ul style="list-style-type: none"> 1 GHz, 512 Mb RAM, 1 Gb Flash, RS-232/485, RS-485, Ethernet RJ-45, Ethernet SFP, 2xRegulBus RJ-45 (IN/OUT), 2xUSB, GPS/GLONASS, complete with R050 PP 00 011-000-AAA and plug 	
R050 CU 00 071-000-AAA	<ul style="list-style-type: none"> 1 GHz, 512 Mb RAM, 1 Gb Flash, RS-232/485, RS-485, Ethernet RJ-45, Ethernet SFP, 2xRegulBus SFP (IN/OUT), complete with R050 PP 00 011-000-AAA and plug 	Type II SFP-module ordered separately
R050 CU 00 071-001-AAA	<ul style="list-style-type: none"> 1 GHz, 512 Mb RAM, 1 Gb Flash, RS-232/485, RS-485, Ethernet RJ-45, Ethernet SFP, 2xRegulBus SFP (IN/OUT), 2xUSB, complete with R050 PP 00 011-000-AAA and plug 	
R050 CU 00 071-002-AAA	<ul style="list-style-type: none"> 1 GHz, 512 Mb RAM, 1 Gb Flash, RS-232/485, RS-485, Ethernet RJ-45, Ethernet SFP, 2xRegulBus SFP (IN/OUT), 2xUSB, GPS/GLONASS, complete with R050 PP 00 011-000-AAA and plug 	
R050 CU 00 151-000-AAA	<ul style="list-style-type: none"> 1 GHz, 512 Mb RAM, 1 Gb Flash, RS-232/485, RS-485, 4xEthernet RJ-45, complete with R050 PP 00 011-000-AAA and plug 	Type II
R050 CU 00 151-001-AAA	<ul style="list-style-type: none"> 1 GHz, 512 Mb RAM, 1 Gb Flash, RS-232/485, RS-485, 4xEthernet RJ-45, 2xUSB, complete with R050 PP 00 011-000-AAA and plug 	
R050 CU 00 151-002-AAA	<ul style="list-style-type: none"> 1 GHz, 512 Mb RAM, 1 Gb Flash, RS-232/485, RS-485, 4xEthernet RJ-45, 2xUSB, GPS/GLONASS, complete with R050 PP 00 011-000-AAA and plug 	
R050 CU 00 161-000-AAA	<ul style="list-style-type: none"> 1 GHz, 512 Mb RAM, 1 Gb Flash, RS-232/485, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, complete with R050 PP 00 011-000-AAA and plug 	Type II SFP-module ordered separately
R050 CU 00 161-001-AAA	<ul style="list-style-type: none"> 1 GHz, 512 Mb RAM, 1 Gb Flash, RS-232/485, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB, complete with R050 PP 00 011-000-AAA and plug 	
R050 CU 00 161-002-AAA	<ul style="list-style-type: none"> 1 GHz, 512 Mb RAM, 1 Gb Flash, RS-232/485, RS-485, 2xEthernet RJ-45, 2xEthernet SFP, 2xUSB, GPS/GLONASS, complete with R050 PP 00 011-000-AAA and plug 	

Part number	Module characteristics	Note
Analog input modules		
R050 AI 04 011-000-AAA	<ul style="list-style-type: none"> 0/4...20 mA, 4 channels, common galvanic isolation, error 0,3% 	-
R050 AI 08 011-000-AAA	<ul style="list-style-type: none"> 0/4...20 mA, 8 channels, common galvanic isolation, error 0,3% 	
R050 AI 02 131-000-AAA	<ul style="list-style-type: none"> RTD/TC, -400...+400 mB, 1...1000 Ohm, 2 channels, per-channel galvanic isolation, error 0,1% 	
R050 AI 04 061-000-AAA	<ul style="list-style-type: none"> -10/-5/0...+5/10 V, 4 channels, per-channel galvanic isolation, error 0,1% 	
R050 AI 04 081-000-AAA	<ul style="list-style-type: none"> 4...20 mA + HART, 4 channels, common galvanic isolation, error 0,3% 	
Digital input modules		
R050 DI 08 011-000-AAA	<ul style="list-style-type: none"> 24 B DC, 8 channels, common "minus", common galvanic isolation 	-
R050 DI 16 011-000-AAA	<ul style="list-style-type: none"> 24 VDC, 16 channels (2 groups by 8 channels), common "minus ", group galvanic isolation 	
R050 DI 04 031-000-AAA	<ul style="list-style-type: none"> NAMUR, 4 channels, common galvanic isolation 	
Frequency measurement / pulse counting module		
R050 DA 01 011-000-AAA	<ul style="list-style-type: none"> 1 channel 1 Hz...500 kHz (error 0,01%), 2 channels DI 24 VDC, 2 channels DO 24 VDC, 0,5 A 	-
Analog output module		
R050 DA 01 011-000-AAA	<ul style="list-style-type: none"> 0/4...20 mA, 2 channels, per-channel galvanic isolation, error 0,1% 	-
Digital output modules		
R050 AO 02 011-000-AAA	<ul style="list-style-type: none"> 0/4...20 mA, 2 channels, per-channel galvanic isolation, error 0,1% 	-
R050 DO 08 011-000-AAA	<ul style="list-style-type: none"> solid state relays, 24 B AC/DC, 0,5 A, 8 channels, common galvanic isolation 	
R050 DO 16 011-000-AAA	<ul style="list-style-type: none"> solid state relays, 24 B AC/DC, 0,5 A, 16 channels (2 groups by 8 channels), group galvanic isolation 	
R050 DO 04 021-000-AAA	<ul style="list-style-type: none"> 220 B DC, 0,3 A / 220 B AC, 2 A, 4 channels, per-channel galvanic isolation 	
R050 DO 04 041-000-AAA	<ul style="list-style-type: none"> solid state relays, 24 VDC, 0,7 A, 4 channels, common galvanic isolation, breakage of external circuits control, channels work in pulse width modulation mode (up to 20 kHz) 	
Communication module		
R050 CP 01 011-000-AAA	<ul style="list-style-type: none"> RS-485 (Modbus RTU, IEC 60870-5-101), 1 port 	-
Power supply modules		
R050 PP 00 011-000-AAA	<ul style="list-style-type: none"> 24 VDC, 24 W (internal bus), 240 W (external bus) 	-
Terminal module with single RegulBus extension		
R050 ST 00 011-000-AAA	<ul style="list-style-type: none"> 2xRegulBus RJ-45 (IN/OUT) 	-
R050 ST 00 111-000-AAA	<ul style="list-style-type: none"> 2xRegulBus SFP (IN/OUT) 	SFP-module ordered separately

NOISE IMMUNITY OF REGUL RX00 CONTROLLERS

Equipment approved to standards GOST 30804.6.2-2013 / IEC 61000-6-2:2005						
Test method	Port	Test type	Test parameters values		Test severity level/ performance criterion	
			RX00	R050	RX00	R050
GOST R 50648 94 / GOST IEC 61000-4-8-2013 Immunity to power frequency magnetic fields	Housing port	Long (60 s) Briefly (3 s)	100 A/m 1000 A/m	100 A/m 1000 A/m	5/A	5/A
GOST R 50649 94 / GOST IEC 61000-4-9-2013 Immunity to pulsed magnetic field	Housing port		1000 A/m	1000 A/m	5/A	5/A
GOST 30804.4.2-2013 Electrostatic discharge immunity	Housing port	Contact Air	± 4 kV ± 8 kV	± 4 kV ± 8 kV	2/A 3/A	2/B 3/B
GOST 30804.4.3-2013 / GOST IEC 61000-4-3-2016 RF electromagnetic field immunity	Housing port	AM 1kHz, 80% (80-6000) MHz	10 V/m	3 V/m	3/A	2/A
GOST 30804.4.4-2013 / GOST IEC 61000-4-4-2016 Immunity to nanosecond impulse noise	Power supply port	Using a communication device 5 kHz / 100 kHz	± 2 kV	± 1 kV	3/A	2/B
	Analog / digital / inputs / outputs	Using capacitive coupling clamps 5 kHz/100 kHz	± 1 kV	± 0,5 kV	3/A	2/B
GOST R 51317.4.5-99 / GOST IEC 61000-4-5-2016 Immunity to microsecond impulse noise	Power supply port	At "wire-to-wire" scheme At "wire-to-ground" scheme	± 1 kV ± 2 kV	± 0,5 kV ± 1 kV	2/A 3/A	1/B 2/B
	Analog / digital / inputs / outputs					
GOST R 51317.4.6-99 Immunity to conducted interference induced by radio frequency electromagnetic fields in the frequency range from 0.15-80 MHz	Power supply port	Through communication device (0,15-80) MHz	10 B	3 V/m	3/A	2/A
	Analog / digital / inputs / outputs	Through communication device (0,15-80) MHz	10 B	3 V/m	3/A	2/A
GOST 30804.4.11-2013 / GOST IEC 61000-4-29-2016 Immunity to dips and short-term power interruptions	Power supply port (at power supply from direct and alternating current)	Power supply interruptions	0% Unom. 100 ms	-	3 (grade)	-
		Power supply voltage dips	40% Unom. 500 ms	-		
		Power supply voltage dips	70% Unom. 500 ms	-		
		Power supply surges	120% Unom. 500 ms	-		

Test method	Port	Test type	Test parameters values		Test severity level/ performance criterion	
			RX00	R050	RX00	R050
GOST R 51317.4.12-99 / GOST IEC 61000-4-12-2016 Ringing wave immunity	Power supply port	At "wire-to-wire" scheme At "wire-to-ground" scheme	±1 kV	±0,5 kV	2/A	1/A
	Analog / digital / inputs / outputs		±2 kV	±1 kV	3/A	2/A
GOST R 51317.4.14-2000 / GOST IEC 61000-4-14-2016 Immunity to conducted interference in the frequency range from 0 to 150 kHz	Power supply port (at power supply from alternating current)		±12% Unom.	±12% Unom.	2/A	2/A
GOST R 51317.4.16-2000 Immunity to conducted interference in the frequency range from 0 to 150 kHz	Power supply port	50 Hz (long) 50 Hz (briefly) 15-150 Hz 150 Hz — 1,5 kHz 1,5-15 kHz 15-150 kHz	30V	30V	4/A	4/A
	Analog / digital / inputs / outputs		100V	100V		
GOST R 51317.4.12-99 / GOST IEC 61000-4-18-2016 Damped vibration immunity 100 kHz/1 MHz	Power supply port	At "wire-to-wire" scheme At "wire-to-ground" scheme	±1 kV	±0,5 kV	2/A	1/A
	Analog / digital / inputs / outputs		±2 kV	±1 kV	3/A	2/A



INSTRUMENTAL SOFTWARE ASTRA.IDE



Astra.IDE



It's included in Government reestr of Russian software, № of note 14356

Software Astra.IDE provides hardware configuration and algorithm development for controllers REGUL RX00 series.



Functional availability

- visualization development kit embedded
- configuration of main PLC's parameters
- development of application program for PLC REGUL RX00
- PLC's redundancy configuration
- upload and download application to the PLC
- step-by-step debugging of application
- monitoring of PLC's operation

Programming languages

Astra.IDE provides development of application according to IEC 61131-3:

- FBD - functional block diagram
- LD - ladder diagram
- ST - structured text
- SFC - Sequential Function Chart
- and also CFC - Continuous Flow Chart

Screenshots examples of Astra.IDE

Figure 13. PLC's configuration example

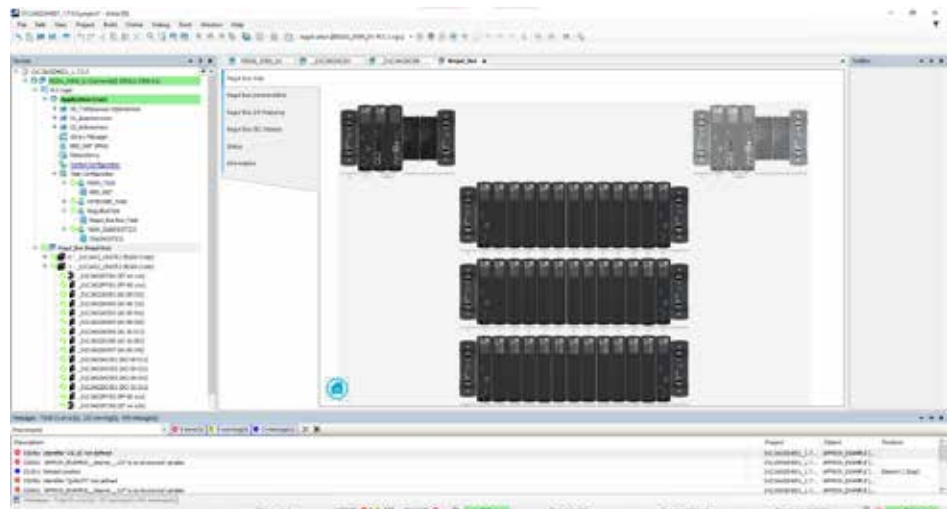


Figure 14.
Example of application
development on CFC

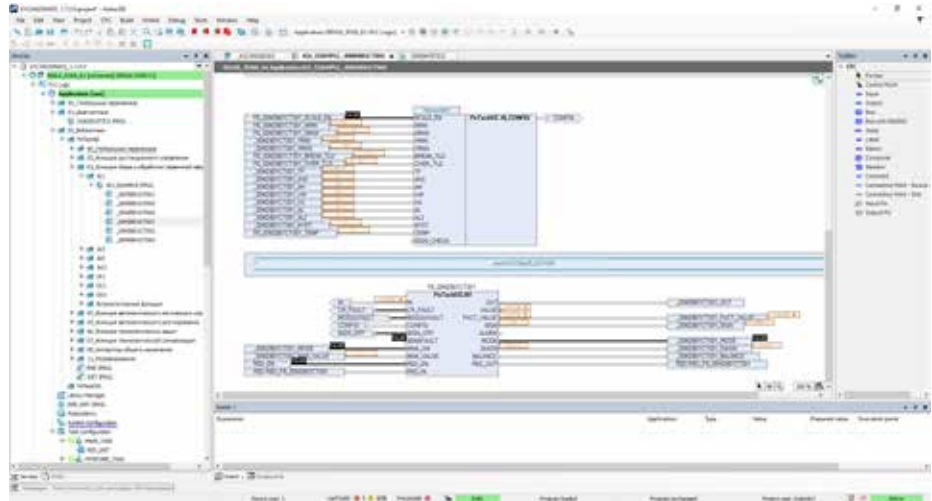


Figure 15.
Designer of module properties

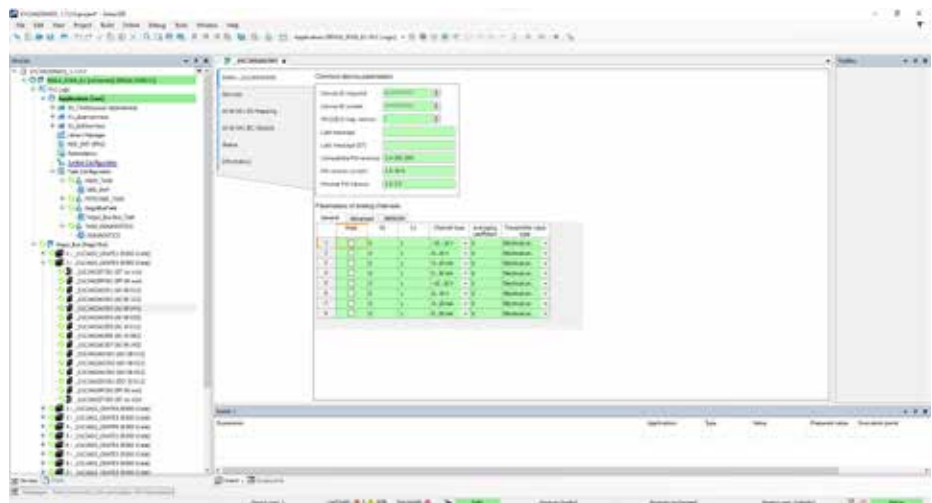
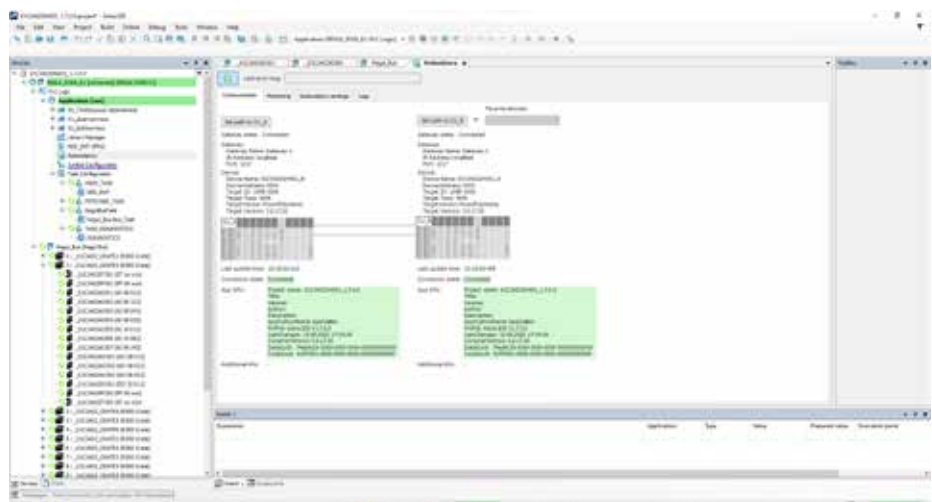


Figure 16.
Designer of PLC's redundancy



INTEGRATED CONTROL SYSTEM ASTRAREGUL



AstraRegul



It's included in Government reestr of Russian software, № of note № 949\1\2023.



It's included in reestr of production, which manufactured in Russia, № of note 949\1\2023.



ICS AstraRegul is modular project-design platform for development of APCS any scale and complexity level.

MAIN USING AREA OF ICS



distributed control systems (DCS)



machine monitoring systems (vibro diagnostics)



safety instrumented systems (SIS)



high-speed technological process control (from 5 ms cycle)

ICS COMPONENTS

In ICS software and hardware components are included. The hardware components are:



PLC REGUL R500 and R500S series



time synchronization servers



terminal panels



operator workstations



I/O servers



ICS engineer workstations



history servers



AMS workstations (with PACTware using)



network equipment (switches, firewalls, etc.)

Communications between PTC components are carried out over redundant channels using standard Ethernet-based protocols. The software components include operating systems with installed drivers and utilities that ensure the normal operation of hardware components and AstraRegul software.

ICS AstraRegul is build on PLC REGUL R500 and R500S series.



It's used for development of important, Fault-tolerant and distributed APCS in different manufacturing industries.



It's used for development of safety instrumented systems on dangerous plants and it's approved for SIL 3 level requirements.

MAIN FUNCTIONS



data polling and processing



software and hardware diagnostics



process control



cyber security and functional safety



redundancy



human-machine interface



saving history



reports forming



event registration

BENEFITS OF ICS ASTRAREGUL

Scalability

ICS AstraRegul provides the following scale characteristics in one domain:

- up to 50 workstations;
- up to 50 PLC's CPUs;
- up to 3000 physical I/O channels for one PLC REGUL R500;
- up to 750 physical I/O channels for one PLC REGUL R500S;

Reliability

- high reliability is archived by software and hardware component redundancy
- calculated mean time between failures (MTBF) for any PLC's module is over than 150 000 hours
- average time to restore system functionality by replacing any hardware ICS component from the spare parts kit is no more than 1 hour

Fast

REGUL PLC has one high-speed internal data bus - RegulBus, which provides data exchange cycle from 1 ms.



From 10 ms

Application cycle time



Up to 1 000 000 changes / second

I/O server performance



From 10 ms

Switching time between active and standby CPU's modules



up to 750 000 changes / second

History server performance

Cross-platform

ICS AstraRegul allows cross-platform and provides developing APCS on Windows or Linux operation systems.

In instrumental software of ICS Russian and English languages are supported.

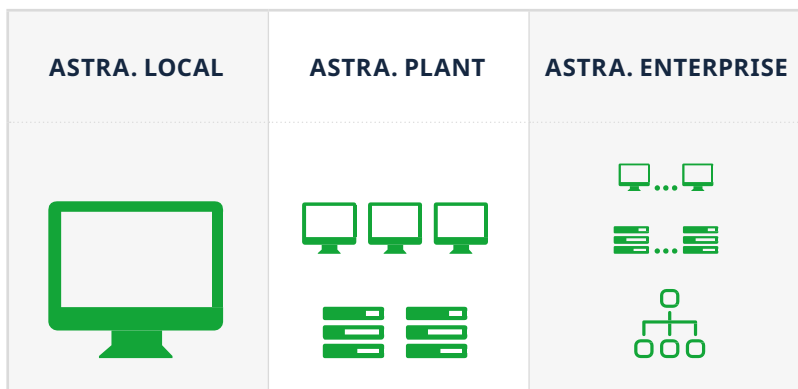


TYPICAL ARCHITECTURES

ICS has three typical architectures

For each architecture own licensing kit is needed

All licenses are valid for an indefinite period



Purpose	Architecture	Peer-to-peer systems, without redundancy	Client-server topology, redundancy support	Client-server topology, redundancy support
	Typical use	Local OWS or operator panels	APCS for plants with two redundant servers on one domain	Distributed multi-level system, above two servers in one domain
Functions	Events and alarms logger, trends of parameters	Yes	Yes	Yes
	Calculations (embedded language Om or JavaScript)	Yes	Yes	Yes
	Object-oriented model	Yes	Yes	Yes
	Data and events archive	Astra.Historian or external SQL-server	Astra.Historian or external SQL-server	Astra.Historian
	Publishing historical data for external applications (only from Astra.Historian)	OPC HDA, OPC UA, SQL		
	Upgrade to next level system	Yes	Yes	No
	WEB-access available	Yes (one client)	Yes	Yes
Client connections to servers outside the local PC (DA, A&E, HDA)	Astra.Local	No	No	No
	Клиент Astra.Plant	No	Yes, only for one pair of redundancy servers	No
	Клиент Astra.Enterprise	No	No	Yes, no limits

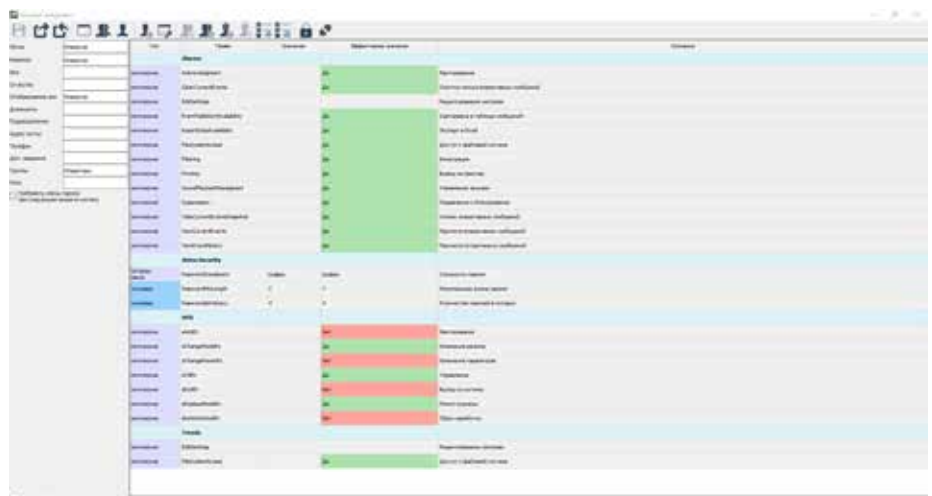
DEVELOPING

- support protocols OPC DA, OPC UA, IEC101/104, Modbus TCP/RTU, SQL, HART, etc.
- programming languages support according to IEC 61131-3
- the graphical mnemonic diagram editor has the Astra.Om programming language, which allows you to describe executable elements of scripts - procedures and formulas
- script language JavaScript support
- ability to connect ActiveX components (.NetFramework,.NetCore)
- system preinstalled libraries for developing APCS projects in various industries, the possibility of creating user libraries
- ability to debug using a virtual controller (only for REGUL R500)
- ability of multi-user development
- support for multi-monitor workstations
- ability to provide Web-access
- ability to integrate with MES and ERP systems

CYBER SECURITY

- user authorization systems with differentiation of access rights
- registration of user actions
- monitoring the integrity of the application project and its components
- setting up packet filters and “white” IP addresses for access
- using firewalls
- using anti-virus software compatible with ICS

Figure 17.
Security subsystem



SCREENSHOTS EXAMPLES OF ASTRAREGUL

Figure 18.
Mnemoscheme

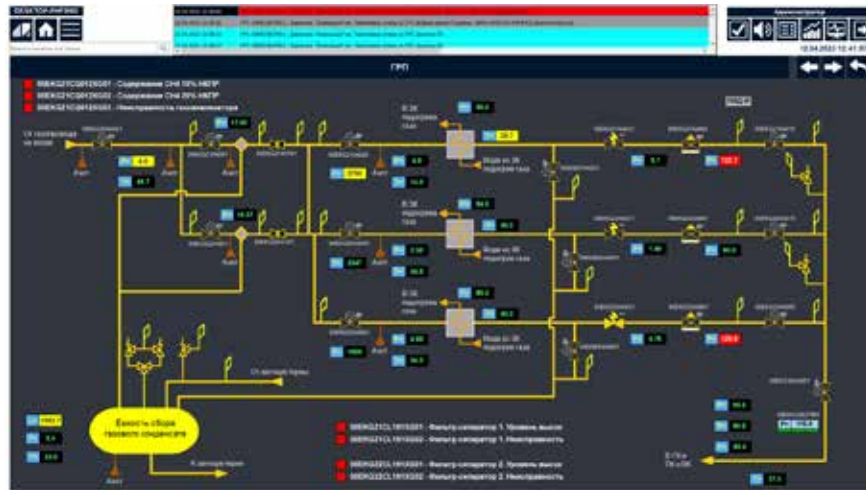


Figure 19.
Control faceplates
on mnemoscheme



Figure 20:
Control faceplates on mnemoschem

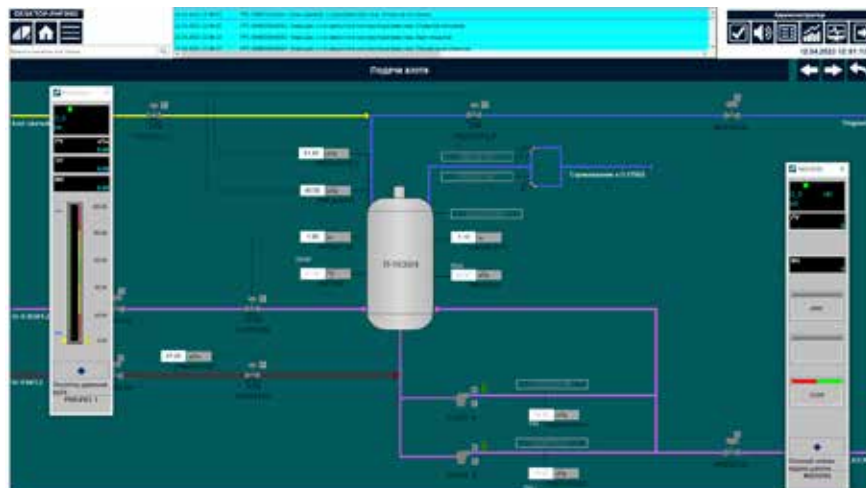


Figure 21:
Mnemoscheme

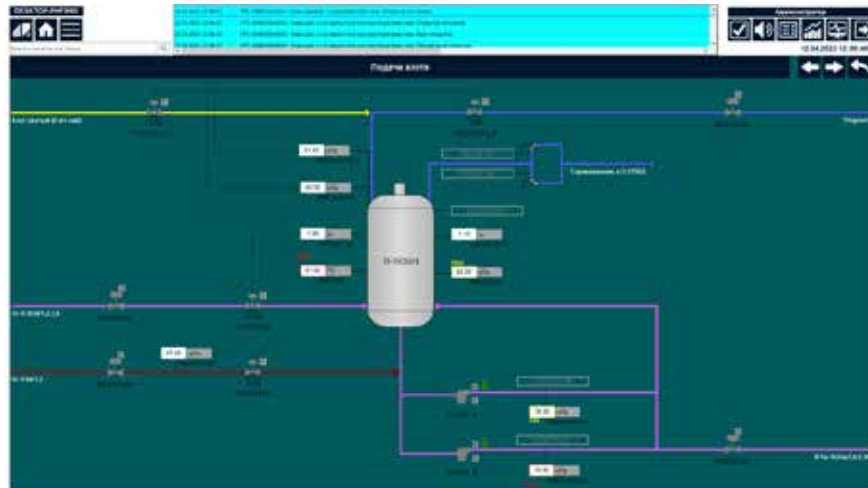


Figure 22.
Trends of parameters



Figure 23.
Event log

Time	Message	Severity	Source	Destination	Destination
2011-02-15 10:00:00	...	Warning	...	...	...
2011-02-15 10:00:01	...	Warning	...	...	...
2011-02-15 10:00:02	...	Warning	...	...	...
2011-02-15 10:00:03	...	Warning	...	...	...
2011-02-15 10:00:04	...	Warning	...	...	...
2011-02-15 10:00:05	...	Warning	...	...	...
2011-02-15 10:00:06	...	Warning	...	...	...
2011-02-15 10:00:07	...	Warning	...	...	...
2011-02-15 10:00:08	...	Warning	...	...	...
2011-02-15 10:00:09	...	Warning	...	...	...
2011-02-15 10:00:10	...	Warning	...	...	...
2011-02-15 10:00:11	...	Warning	...	...	...
2011-02-15 10:00:12	...	Warning	...	...	...
2011-02-15 10:00:13	...	Warning	...	...	...
2011-02-15 10:00:14	...	Warning	...	...	...
2011-02-15 10:00:15	...	Warning	...	...	...
2011-02-15 10:00:16	...	Warning	...	...	...
2011-02-15 10:00:17	...	Warning	...	...	...
2011-02-15 10:00:18	...	Warning	...	...	...
2011-02-15 10:00:19	...	Warning	...	...	...
2011-02-15 10:00:20	...	Warning	...	...	...
2011-02-15 10:00:21	...	Warning	...	...	...
2011-02-15 10:00:22	...	Warning	...	...	...
2011-02-15 10:00:23	...	Warning	...	...	...
2011-02-15 10:00:24	...	Warning	...	...	...
2011-02-15 10:00:25	...	Warning	...	...	...
2011-02-15 10:00:26	...	Warning	...	...	...
2011-02-15 10:00:27	...	Warning	...	...	...
2011-02-15 10:00:28	...	Warning	...	...	...
2011-02-15 10:00:29	...	Warning	...	...	...
2011-02-15 10:00:30	...	Warning	...	...	...
2011-02-15 10:00:31	...	Warning	...	...	...
2011-02-15 10:00:32	...	Warning	...	...	...
2011-02-15 10:00:33	...	Warning	...	...	...
2011-02-15 10:00:34	...	Warning	...	...	...
2011-02-15 10:00:35	...	Warning	...	...	...
2011-02-15 10:00:36	...	Warning	...	...	...
2011-02-15 10:00:37	...	Warning	...	...	...
2011-02-15 10:00:38	...	Warning	...	...	...
2011-02-15 10:00:39	...	Warning	...	...	...
2011-02-15 10:00:40	...	Warning	...	...	...

LICENSING KITS FOR ASTRAREGUL SOFTWARE

● Astra.Local - Local OWS

For data archive Astra.Historian, PostgreSQL or MS SQL can be used.

Availability for WEB-access - Astra.WEBportal embedded (one client without control)

Drivers in package:

Modbus RTU/TCP Master, Modbus RTU/TCP Slave, IEC 101/104 Master, IEC 101/104 Slave, OPC DA Client, OPC UA Client, OPC DA Server, OPC UA Server, SNMP Manager, SQL, Syslog Server/Client, MQTT.

Part number	License description	Note
LCL-N150	● Astra.Local license, 150 tags	-
LCL-N300	● Astra.Local license, 300 tags	-
LCL-N500	● Astra.Local license, 500 tags	-
LCL-N1k	● Astra.Local license, 1k tags	-
LCL-N1k5	● Astra.Local license, 1k5 tags	-
LCL-N3k	● Astra.Local license, 3k tags	-
LCL-N5k	● Astra.Local license, 5k tags	-
LCL-N15k	● Astra.Local license, 15k tags	-
LCL-N50k	● Astra.Local license, 50k tags	-
LCL-N-UP300	● Astra.Local. Upgrade from 150 to 300 tags	-
LCL-N-UP500	● Astra.Local. Upgrade from 300 to 500 tags	-
LCL-N-UP1k	● Astra.Local. Upgrade from 500 to 1k tags	-
LCL-N-UP1k5	● Astra.Local. Upgrade from 1k to 1k5 tags	-
LCL-N-UP3k	● Astra.Local. Upgrade from 1k5 to 3k tags	-
LCL-N-UP5k	● Astra.Local. Upgrade from 3k to 5k tags	-
LCL-N-UP15k	● Astra.Local. Расширение с 5k to 15k tags	-
LCL-N-UP50k	● Astra.Local. Расширение с 15k to 50k tags	-
LCL-N-Plant-500	● Upgrade Astra.Local, 500 tags Up to Plant.Server 500 tags & 1 Client Full	-
LCL-N-Plant-1k	● Upgrade Astra.Local, 1k tags Up to Plant.Server 1k tags & 1 Client Full	-
LCL-N-Plant-1k5	● Upgrade Astra.Local, 1k5 tags Up to Plant.Server 1k5 tags & 1 Client Full	-
LCL-N-Plant-3k	● Upgrade Astra.Local, 3k tags Up to Plant.Server 3k tags & 1 Client Full	-
LCL-N-Plant-5k	● Upgrade Astra.Local, 5k tags Up to Plant.Server 5k tags & 1 Client Full	-
LCL-N-Plant-15k	● Upgrade Astra.Local, 15k tags Up to Plant.Server 15k tags & 1 Client Full	-
LCL-N-Plant-50k	● Upgrade Astra.Local, 50k tags Up to Plant.Server 50k tags & 1 Client Full	-

● Astra.Plant - Client-server architecture

Two servers maximum (one redundant pair) in one domain.

For data archive Astra.Historian, PostgreSQL or MS SQL can be used.

Availability for WEB-access - Astra.WEBportal embedded (clients without control)

Drivers in package:

Modbus RTU/TCP Master, Modbus RTU/TCP Slave, IEC 101/104 Master, IEC 101/104 Slave, OPC DA Client, OPC UA Client, OPC DA Server, OPC UA Server, SNMP Manager, SQL, Syslog Server/Client, MQTT, IEC 61850 Client, TEM-104 Master.

Part number	License description	Note
PLN-SRV500	• Plant.Server, 500 tags	-
PLN-SRV1k	• Plant.Server, 1k tags	-
PLN-SRV1k5	• Plant.Server, 1k5 tags	-
PLN-SRV3k	• Plant.Server, 3k tags	-
PLN-SRV5k	• Plant.Server, 5k tags	-
PLN-SRV15k	• Plant.Server, 15k tags	-
PLN-SRV50k	• Plant.Server, 50k tags	-
PLN-SRV100k	• Plant.Server, 100k tags	-
PLN-SRV150k	• Plant.Server, 150k tags	-
PLN-SRV-UP1k	• Plant.Server. Upgrade from 500 to 1k tags	-
PLN-SRV-UP1k5	• Plant.Server. Upgrade from 1k to 1k5 tags	-
PLN-SRV-UP3k	• Plant.Server. Upgrade from 1k5 to 3k tags	-
PLN-SRV-UP5k	• Plant.Server. Upgrade from 3k to 5k tags	-
PLN-SRV-UP15k	• Plant.Server. Upgrade from 5k to 15k tags	-
PLN-SRV-UP50k	• Plant.Server. Upgrade from 15k to 50k tags	-
PLN-SRV-UP100k	• Plant.Server. Upgrade from 50k to 100k tags	-
PLN-SRV-UP150k	• Plant.Server. Upgrade from 100k to 150k tags	-
A-CL-F	• Plant/Enterprise.Client Full	Client license entitles for two servers connection (one redundant pairs) one of three ways: direct, terminal, by WEB. For WEB-access clients without control are used. ATTENTION! For more than 5 simultaneous WEB-connections, the separate physical server is recommended and separate Astra.WEBportal license
A-CL-RO10	• Plant/Enterprise.Client. Up to 10 connected clients without control (read only)	
A-CL-RO25	• Plant/Enterprise.Client. Up to 25 connected clients without control (read only)	
A-CL-RO50	• Plant/Enterprise.Client. Up to 50 connected clients without control (read only)	
A-CL-RO100	• Plant/Enterprise.Client. Up to 100 connected clients without control (read only)	
A-CL-ROUP25	• Plant/Enterprise.Client. Upgrade clients without control (read only) from 10 to 25	
A-CL-ROUP50	• Plant/Enterprise.Client. Upgrade clients without control (read only) from 25 to 50	
A-CL-ROUP100	• Plant/Enterprise.Client. Upgrade clients without control (read only) from 25 to 100	

● Astra.Enterprise - Client-server architecture

Total number of tags per domain, number of physical servers, and number of client connections are licensed.

For data archive Astra.Historian can be used.

Availability for WEB-access - Astra.WEBportal embedded (clients without control)

Drivers in package:

Modbus RTU/TCP Master, Modbus RTU/TCP Slave, IEC 101/104 Master, IEC 101/104 Slave, OPC DA Client, OPC UA Client, OPC DA Server, OPC UA Server, SNMP Manager, SQL, Syslog Server/Client, MQTT, IEC 61850 Client, TEM-104 Master, BACnet, S7 Client, Ethernet/IP, FINS Client.

Part number	License description	Note
EP-IOSRV	<ul style="list-style-type: none"> Additional separate I/O server license for one PC 	Enterprise only
EP-1k5	<ul style="list-style-type: none"> Astra.Enterprise. 1k5 tags, up to 2 x I/O SRV, 1 Client Full 	-
EP-3k	<ul style="list-style-type: none"> Astra.Enterprise. 3k tags, up to 2 x I/O SRV, 1 Client Full 	-
EP-5k	<ul style="list-style-type: none"> Astra.Enterprise. 5k tags, up to 2 x I/O SRV, 1 Client Full 	-
EP-15k	<ul style="list-style-type: none"> Astra.Enterprise. 15k tags, up to 4 x I/O SRV, 1 Client Full 	-
EP-25k	<ul style="list-style-type: none"> Astra.Enterprise. 25k tags, up to 4 x I/O SRV, 1 Client Full 	-
EP-50k	<ul style="list-style-type: none"> Astra.Enterprise. 50k tags, up to 6 x I/O SRV, 1 Client Full 	-
EP-100k	<ul style="list-style-type: none"> Astra.Enterprise. 100k tags, up to 8 x I/O SRV, 1 Client Full 	-
EP-200k	<ul style="list-style-type: none"> Astra.Enterprise. 200k tags, up to 10 x I/O SRV, 1 Client Full 	-
EP-300k	<ul style="list-style-type: none"> Astra.Enterprise. 300k tags, up to 12 x I/O SRV, 1 Client Full 	-
EP-500k	<ul style="list-style-type: none"> Astra.Enterprise. 500k tags, up to 14 x I/O SRV, 1 Client Full 	-
EP-1M	<ul style="list-style-type: none"> Astra.Enterprise. 1M tags, up to 24 x I/O SRV, 1 Client Full 	-
EP-2M	<ul style="list-style-type: none"> Astra.Enterprise. 1M tags, up to 40 x I/O SRV, 1 Client Full 	-
EP-UP3k	<ul style="list-style-type: none"> Astra.Enterprise. Upgrade from 1k5 to 3k tags, up to 2 x I/O SRV, 1 Client Full 	-
EP-UP5k	<ul style="list-style-type: none"> Astra.Enterprise. Upgrade from 3k to 5k tags, up to 2 x I/O SRV, 1 Client Full 	-
EP-UP15k	<ul style="list-style-type: none"> Astra.Enterprise. Upgrade from 5k to 15k tags, up to 4 x I/O SRV, 1 Client Full 	-
EP-UP25k	<ul style="list-style-type: none"> Astra.Enterprise. Upgrade from 15k to 25k tags, up to 4 x I/O SRV, 1 Client Full 	-
EP-UP50k	<ul style="list-style-type: none"> Astra.Enterprise. Upgrade from 25k to 50k tags, up to 6 x I/O SRV, 1 Client Full 	-
EP-UP100k	<ul style="list-style-type: none"> Astra.Enterprise. Upgrade from 50k to 100k tags, up to 8 x I/O SRV, 1 Client Full 	-
EP-UP200k	<ul style="list-style-type: none"> Astra.Enterprise. Upgrade from 100k to 200k tags, up to 10 x I/O SRV, 1 Client Full 	-

Part number	License description	Note
EP-UP300k	<ul style="list-style-type: none"> Astra.Enterprise. Upgrade from 200k to 300k tags, up to 12 x I/O SRV, 1 Client Full 	-
EP-UP500k	<ul style="list-style-type: none"> Astra.Enterprise. Upgrade from 300k to 500k tags, up to 14 x I/O SRV, 1 Client Full 	-
EP-UP1M	<ul style="list-style-type: none"> Astra.Enterprise. Upgrade from 500k to 1M tags, up to 24 x I/O SRV, 1 Client Full 	-
EP-UP2M	<ul style="list-style-type: none"> Astra.Enterprise. Upgrade from 1M to 2M tags, up to 40xI/O SRV, 1 Client Full 	-
A-CL-F	<ul style="list-style-type: none"> Enterprise.Client Full 	Client license entitles for two servers connection (one redundant pairs) one of three ways: direct, terminal, by WEB. For WEB-access clients without control are used. ATTENTION! For more than 5 simultaneous WEB-connections, the separate physical server is recommended and separate Astra.WEBportal license
A-CL-RO10	<ul style="list-style-type: none"> Enterprise.Client. Up to 10 connected clients without control (read only) 	
A-CL-RO25	<ul style="list-style-type: none"> Enterprise.Client. Up to 25 connected clients without control (read only) 	
A-CL-RO50	<ul style="list-style-type: none"> Enterprise.Client. Up to 50 connected clients without control (read only) 	
A-CL-RO100	<ul style="list-style-type: none"> Enterprise.Client. Up to 100 connected clients without control (read only) 	
A-CL-RO250	<ul style="list-style-type: none"> Enterprise.Client. Up to 250 connected clients without control (read only) 	
A-CL-ROUNL	<ul style="list-style-type: none"> Enterprise.Client. Unlimited number of clients without control (read only) 	
A-CL-ROUP25	<ul style="list-style-type: none"> Plant/Enterprise.Client. Upgrade clients without control (read only) from 10 to 25 	
A-CL-ROUP50	<ul style="list-style-type: none"> Plant/Enterprise.Client. Upgrade clients without control (read only) from 25 to 50 	
A-CL-ROUP100	<ul style="list-style-type: none"> Plant/Enterprise.Client. Upgrade clients without control read only) from 50 to 100 	
A-CL-ROUP250	<ul style="list-style-type: none"> Enterprise.Client. Upgrade clients without control (read only) from 100 to 250 	
A-CL-ROUPUNL	<ul style="list-style-type: none"> Enterprise.Client. Upgrade clients without control (read only) from 250 to unlimited 	

● Astra.Historian - Historian server with data base embedded

Part number	License description	Note
HIST-100	• Astra.Historian, 100 tags	-
HIST-200	• Astra.Historian, 200 tags	-
HIST-300	• Astra.Historian, 300 tags	-
HIST-500	• Astra.Historian, 500 tags	-
HIST-700	• Astra.Historian, 700 tags	-
HIST-1k	• Astra.Historian, 1k tags	-
HIST-2k	• Astra.Historian, 2k tags	-
HIST-3k	• Astra.Historian, 3k tags	-
HIST-5k	• Astra.Historian, 5k tags	-
HIST-7k	• Astra.Historian, 7k tags	-
HIST-10k	• Astra.Historian, 10k tags	-
HIST-15k	• Astra.Historian, 15k tags	-
HIST-20k	• Astra.Historian, 20k tags	-
HIST-30k	• Astra.Historian, 30k tags	-
HIST-50k	• Astra.Historian, 50k tags	-
HIST-100k	• Astra.Historian, 100k tags	-
HIST-200k	• Astra.Historian, 200k tags	-
HIST-300k	• Astra.Historian, 300k tags	-
HIST-500k	• Astra.Historian, 500k tags	-
HIST-1M	• Alpha.Historian, 1M tags	-
HIST-2M	• Alpha.Historian, 2M tags	-
HIST-UP200	• Astra.Historian. Upgrade from 100 to 200 tags	-
HIST-UP300	• Astra.Historian. Upgrade from 200 to 300 tags	-
HIST-UP500	• Astra.Historian. Upgrade from 300 to 500 tags	-
HIST-UP700	• Astra.Historian. Upgrade from 500 to 700 tags	-
HIST-UP1k	• Astra.Historian. Upgrade from 700 to 1k tags	-
HIST-UP2k	• Astra.Historian. Upgrade from 1k to 2k tags	-
HIST-UP3k	• Astra.Historian. Upgrade from 2k to 3k tags	-
HIST-UP5k	• Astra.Historian. Upgrade from 3k to 5k tags	-
HIST-UP7k	• Astra.Historian. Upgrade from 5k to 7k tags	-
HIST-UP10k	• Astra.Historian. Upgrade from 7k to 10k tags	-
HIST-UP15k	• Astra.Historian. Upgrade from 10k to 15k tags	-
HIST-UP20k	• Astra.Historian. Upgrade from 15k to 20k tags	-
HIST-UP30k	• Astra.Historian. Upgrade from 20k to 30k tags	-
HIST-UP50k	• Astra.Historian. Upgrade from 30k to 50k tags	-
HIST-UP100k	• Astra.Historian. Upgrade from 50k to 100k tags	-

Part number	License description	Note
HIST-UP200k	<ul style="list-style-type: none"> Astra.Historian. Upgrade from 100k Up to 200k tags 	-
HIST-UP300k	<ul style="list-style-type: none"> Astra.Historian. Upgrade from 200k Up to 300k tags 	-
HIST-UP500k	<ul style="list-style-type: none"> Astra.Historian. Upgrade from 300k Up to 500k tags 	-
HIST-UP1M	<ul style="list-style-type: none"> Astra.Historian. Upgrade from 500k Up to 1M tags 	-
HIST-UP2M	<ul style="list-style-type: none"> Astra.Historian. Upgrade from 1M Up to 2M tags 	-

Security keys for license

Part number	License description	Note
A-KEY-USB	<ul style="list-style-type: none"> Hardware security key 	-
A-KEY-SOFT	<ul style="list-style-type: none"> Software security key 	-
A-KEY-MOVE	<ul style="list-style-type: none"> Service for transferring licenses between hardware and software keys 	-

Communication protocols (additional packages)

Part number	License description	Note
DRV-ENERG	<ul style="list-style-type: none"> Additional driver package IEC 61850 Client, TEM-104 Master 	Astra.Local only
DRV-INDUSTRY	<ul style="list-style-type: none"> Additional driver package BACnet, S7 Client, Ethernet/IP, FINS, Client 	Only for Astra.Local / Astra.Plant
A-DRV-OPCDA-CL	<ul style="list-style-type: none"> External (additional Windows PC) OPC DA Client license 	For Astra.Local / Plant / Enterprise
A-DRV-OPCDA-SRV	<ul style="list-style-type: none"> External (additional Windows PC) OPC DA Server license 	For Astra.Local / Plant / Enterprise
DRV-HART-COM	<ul style="list-style-type: none"> License for Regul HART Communication for direct access to field smart sensors and actuators, connected to REGUL RX00 modules by HART. To work with field devices PACTware is required additional, also DTM-files from field devices manufactures are required 	Supplied complete with its own separate hardware security key

WEB-access - Separate server license for WEB-access

Part number	License description	Note
A-WEB-PORTAL	<ul style="list-style-type: none"> License for WEB-access to Plant and Enterprise servers (for data publishing by WEB separate WEB-server must be installed, for example IIS, Apache etc.) <p>Attention! Additional separate read-only client license are required</p>	Only for Plant/Enterprise

Development tools

Part number	License description	Note
A.Studio	<ul style="list-style-type: none"> Instrumental software for project development of I/O servers and history servers 	-
Astra.IDE	<ul style="list-style-type: none"> Instrumental software for development of PLC's application 	-





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