



USP-140

RTU controller

USP-140 performs controls and supervision in power industry automation systems, especially those operating in distributed architecture. The device may be deployed on:

- power substations
- power plants
- chemical plants
- wastewater treatment plants
- and other industrial facilities

Extended communication resources enable operation in various communication networks, based on Ethernet transmission, GPRS/UMTS/LTE, radio transmission in dedicated or open channels or modem transmission in public or local networks. USP-140 is most advantageous for application in SMART GRID solutions.

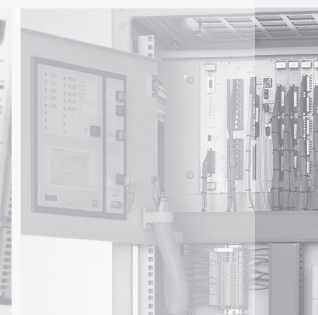
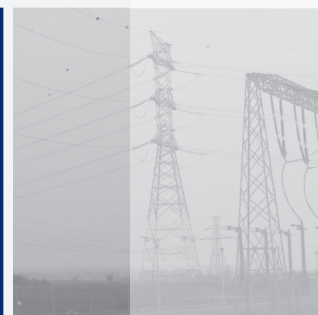
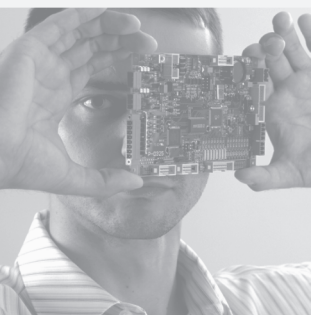
USP-140 is a high-tech solution based on a dual-core processor. The operating system is handled by ARM core, and DSP core supports specialized real-time system for control and automation.

Application software parameters can be edited using the specialized pConfig configuration program.

To ensure data protection and confidentiality, a number of mechanisms have been implemented in the controller, i.e. "Cyber security" in accordance with PN-EN 62351.

USP-140 is designed for mounting on 35mm DIN. All interfaces are available on the front.

USP-140 controller is intended for performing remote engineering functions required by SMART GRID technology, e.g. status acquisition and control functions for facilities and equipment operating within electric power grid.



Communication

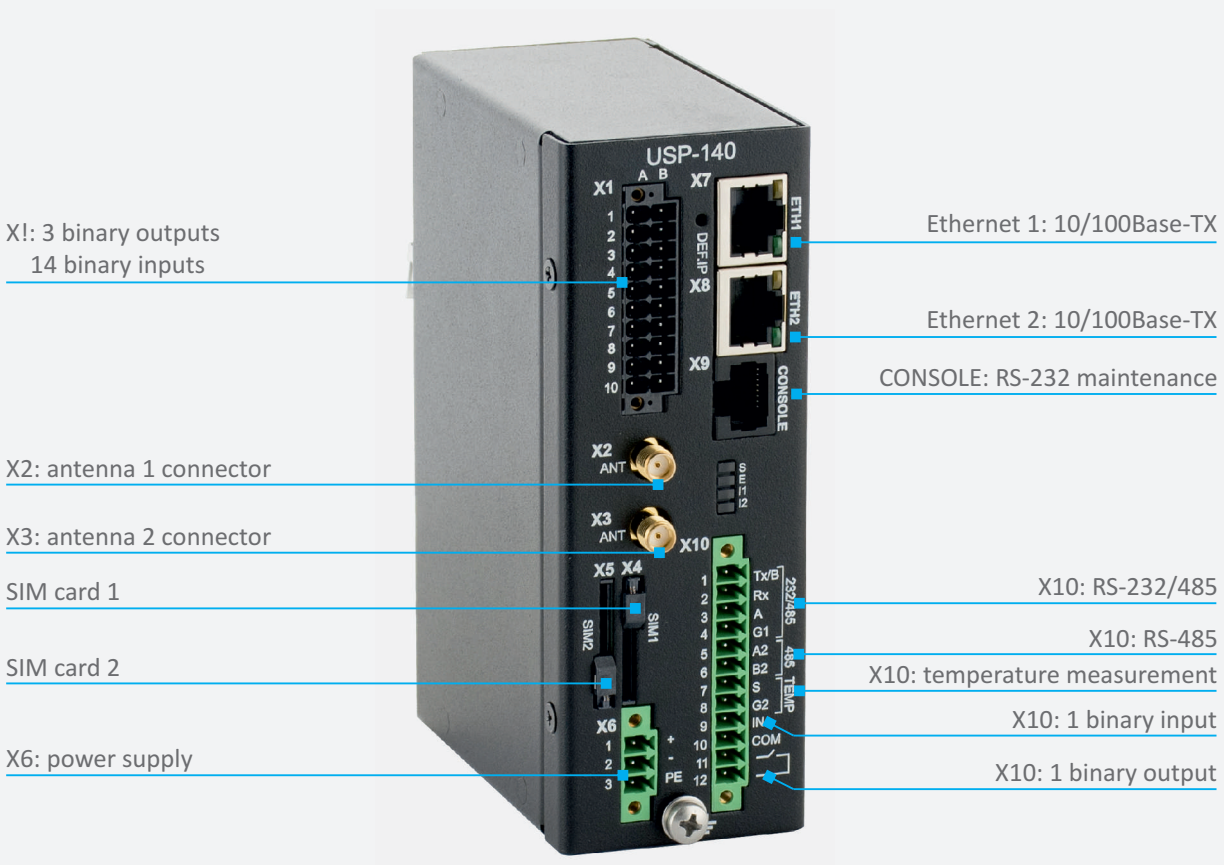
USP-140 is equipped with versatile communication resources, including:

- 2 separate Ethernet 10/100 Base-TX channels
- RS-232/485 channel
- RS-485 channel
- dedicated channel for local temperature measurement (1-Wire)
- RS-232 channel for local service

The controller is equipped with built-in 2 SIM cards' modem, thus enabling operation in two networks of different mobile network operators. USP-140 may communicate with SCADA system via built-in 2G/3G/4G modem, Ethernet or RS-485 and RS-232/485 connectors, by various communication protocols. Communication with SCADA system, as standard, is performed with the use of DNP 3.0 or IEC 60870-5-104 protocols. For these protocols, it is guaranteed the execution of command authentication functions in accordance with EN 62351.

USP-140 is also adapted to cooperate with TETRA system. External TETRA radio terminal may be connected to the controller via serial connection. The controller provides simultaneous communication with SCADA systems in TETRA and GPRS/UMTS/LTE-APN as well.

An integrated communication modem is designed to connect to networks operating in GSM/GPRS/EDGE/UMTS/HSPA+/LTE technologies, in 900/1800/1900/2100 MHz bands, class 10. In case of wireless networks communication is executed with the use of TCP/IP or UDP network protocols.



Inputs and outputs

The controller is equipped with 15 galvanically binary inputs for status acquisition and with 4 galvanically isolated binary outputs for controls. Binary inputs operate in 2 groups, each of 7 inputs with common „-“ or „+“ and 1 output is independent with common „-“ or „+“.



Functionality

- 2 channels for Ethernet 10/100Base-TX network communication
- communication with networks operating in GSM/GPRS/EDGE/UMTS/HSPA+/LTE
- supporting transmission in IEC 60870-5-101, IEC 60870-5-104, DNP 3.0 protocols
- supporting other protocols, if requested
- protocol conversion
- object state data acquisition
- control execution
- operation of local equipment via RS-232/RS-485 interface

Cyber security

Cyber security algorithms are based on ENISA, NIST, BDEW, BlueCrypt recommendations; their implementation conforms with ISO 62351, IEEE P1686, ISO/IEC 27001, BDEW White Paper „Requirement for Secure Control and Telecommunication Systems" standards. Cyber security mechanisms include:

- communication security
- access control
- sensitive data protection
- logging in / user activity monitoring

These mechanisms may be individually configured in pConfig configuration software.

Technical data

USP-140 meets the requirements for safety class 2 according to IEC 60950 standard.

As an option, controller may be produced as wall-mounted, after mounting additional brackets. The final design should be agreed with the supplier.

PARAMETER	VALUE
enclosure	DIN 35 or TS 35 mounting, in conformance to IEC 60715 standard
moving parts	no
protection class	IP51
weight	590g
dimensions	48 x 132 x 84 (W x H x D)

Power supply

PARAMETER	VALUE
nominal supply voltage	24V DC
tolerance range of supply voltage	24V DC, -20 to +15%, class DC3
maximum peak power consumption	6W
average power consumption	4W

Binary input parameters

PARAMETER	VALUE	COMMENTS
quantity of inputs	15	galvanic isolation
nominal voltage U_n	24V DC	
power consumption in active state	3mA	
guaranteed level „1"	>60% U_n	selected due to on-site conditions
guaranteed level „0"	<20% U_n	



Binary output parameters

PARAMETER	VALUE	COMMENTS
quantity of outputs	4	galvanic isolation
nominal voltage	24V DC	
maximum load current	6A/24V DC	
maximum switching power	1 500VA AC	for AgSnO ₂ connector

Communication

PARAMETER	NETWORK TRANSMISSION	RADIO TRANSMISSION	SERIAL TRANSMISSION
protocol	as standard: IEC 60870-5-104, DNP 3.0_TCP/UDP	as standard: IEC 60870-5-104, DNP 3.0_TCP/UDP	IEC 60870-5-101, DNP 3.0
physical layer	Ethernet TP10/100 channel	radio channel in GSM 2G/3G/4G network	UART 11:RS-232 UART 12:RS-485
type of connector	RJ45	SMA	DMC 1,5/10-G1F-3,5-LR/ DFMC 1,5/10-STF-3,5

Environmental conditions

PARAMETER	STANDARD AND CLASS	RANGE OF PARAMETERS
operation temperature	IEC 60870-2-2 class C1	from -25° up to 55°C
relative humidity	IEC 60870-2-2 class C1	5÷95%
atmospheric pressure	IEC 60870-2-2 class C1	86÷106kPa, 0....2000m
enclosure protection degree, no additional protection	IEC 60529	IP51

Isolation

PARAMETER	STANDARD	RANGE OF PARAMETERS
dielectric withstand	IEC 60870-2-1	1kV; RMS for 1 min
surge immunity	IEC 60664-1	2kV

Mechanical strength

PARAMETER	STANDARD AND CLASS	RANGE OF PARAMETERS
sinusoidal vibration displacements	class 1 according to IEC 60255-21	0.035mm
sinusoidal vibration accelerations		0.5g ($g=9.81 \text{ m/s}^2$)
max. acceleration in case of single bumps		5g/11ms