



## **CHARGING AND RECTIFYING UNIT VTEU AND UBP**

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## CHARGING AND RECTIFYING UNITS VTEU AND UBP

Charging and rectifying units VTEU and UBP are provided for conversion of AC into regulated DC for charging of accumulator batteries and feeding of consumers with DC voltage both at buffer connection from accumulator battery and directly.

UBP are designed and produced for rated output voltage 30; 60; 110 and 220V, rated load current is 5; 10A. AC single-phase supply voltage 220 V, 50 (60) Hz. UBP is implemented on the basis of pulse converter-stabilizer with high frequency modulation.

VTEU are developed and produced for rated output voltage 30; 60; 110; 230; 320 and 440 V, rated current 10; 25; 50; 100; 150 and 200A. AC single-phase supply voltage 220 V or three-phase 380 V, 50 (60) Hz. VTEU is implemented on the basis of thyristor rectifier with bridge rectification circuit, with isolating transformer from the side of supply network.

VTEU and UBP (hereinafter Rectifier) provide smooth adjustment of output voltage from 5% to 110% of rated voltage; provide IU-characteristics of output voltage in accordance with DIN41773 during operation with accumulator batteries. Deviations of rectifier output current in the mode of output voltage stabilization do not exceed  $\pm 1\%$  of output current setting value upon acceptable supply network voltage deviations. Deviations of output voltage in the mode of output voltage stabilization do not exceed  $\pm 1\%$  of output voltage setting value upon acceptable supply network voltage deviations.

Pulsation coefficient of rectifier output voltage is max. 0.08 without capacitive filter at the output and max. 0.04 with the installed capacitive filter upon operation for active load, rated output current and rated output voltage. Rectifier provides parallel operation with similar rectifiers for general load. It is dynamically and thermally stable to currents of internal and external short circuits.



### ADVANTAGES OF RECTIFIER APPLICATION

- increased rectifier reliability due to microprocessor control system and galvanic isolation from supply network;
- provision of several operation modes and several control logics;
- automatic voltage supply for load according to set parameters upon start-up, operation and switching of rectifier;
- availability of service programs for adjustment, repair and control of rectifier parameters;
- complete control of parameters and protection of rectifier and load in all steady and emergency modes.



### MODE OF OPERATION

Output parameters values of rectifier operation mode are set by the switch «Operation mode» installed on the cabinet door. It is possible to set two operation modes of rectifier: «Additional charge», «Recharge». Voltage setting can be adjusted in the range of 0.7 to 1.3 of rated output voltage of this mode. Load current setting can be adjusted in the range of 0.05 to 1.1 of rated output current of this mode.

### DESIGN GENERAL DATA

The rectifier is designed as a sheet steel cabinet with one-sided maintenance, with protection level no less than IP 43 in accordance with GOST 14254. Controls are located on the cabinet front door, including control terminal, measuring units and alarm lamps.

Power modules cooling is natural air. Power reducing transformer is installed inside the cabinet. Smoothing filter is installed in rectifier output.

External connections cables input is made through the holes in cabinet floor by compacted sealed inputs.

## RECTIFIER ARRANGEMENT, TYPE VTEU-100/230

Rectifier VTEU1-100/230 includes the following functional systems:

- power circuit;
- protection system;
- control, indication and alarm system.

Power part includes input unit, matching and isolating input transformer, which secondary windings have taps for two different voltages, contactors that switch necessary windings depending on operation mode, rectifying thyristor bridge, LC-filter.

Rectifier is fed from AC line with voltage of 380 V, frequency of 50 Hz. Rectifier thyristor bridge is modular. Each module is installed on individual cooler. Each cooler has thermosensor for thermal mode monitoring.

## MAIN TECHNICAL DATA

Name of parameter	Unit	Value	
Rated input voltage	V	380+15 %, -20 %	
Frequency	Hz	50±1	
Number of phases	pc.	3	
Number of inputs	pc.	1	
Operation mode	-	continuous	
DC output		Additional charge	Recharge
Rated rectified voltage	V	230	320
Rated rectified current	A	100	100
Range of output voltage regulation	V	0-260	0-360
Capacity coefficient, minimum (under rated parameters)	-	0.9	0.9
Efficiency coefficient, minimum (under rated parameters)	-	0.94	0.94
Overall dimensions (WxHxD) mm, maximum	mm	800 x 1800 x 600	
Weight (max)	kg	700	

## PROTECTIONS

The rectifier provides a number of protections tripping the rectifier upon appearance of emergency situations both in load and in rectifier:

- protection against internal and external short circuits;
- protection against short circuit in power transformer;
- protection upon charging rate loss;
- maximum accepted output voltage protection;
- overheating of power thyristors;
- wrong connection of accumulator battery;
- wrong input voltage phases interlacing;
- protection upon jump or disappearance of input power voltage, and also rectifier auto reclosing upon network recovery;
- a number of protections for supervision of control system separate elements condition;
- protection against faults in the rectifier power supply system.

Rectifier microprocessor control system provides:

- setting of necessary operation modes and parameters by buttons of control terminal (handles and buttons on the cabinet door) with monitoring of input values on the display (2-row 16-digit LCD);
- processing of input analog, discrete signals and forming of control pulses for rectifier power keys, as well as forming of a number of hardwire signals for the Customer protection and indication circuits;
- automatic voltage supply for load upon start-up, operation and stop of rectifier according to the set parameters;
- communication via CAN serial interface with upper level system;
- service operation modes for adjustment, repair and monitoring of rectifier systems.

All control system tasks are performed by means of software and hardware.

Peak setting of output current and voltage in control system is set with control terminal buttons or corresponding switches on the cabinet door with monitoring on the display.

Measuring units – voltmeter and ammeter – are located on the cabinet door for measuring of the rectifier output voltage and current.

Rectifier has system of insulation resistance control of output busbars "+" and "-" relative to "earth".

## OPERATION CONDITIONS

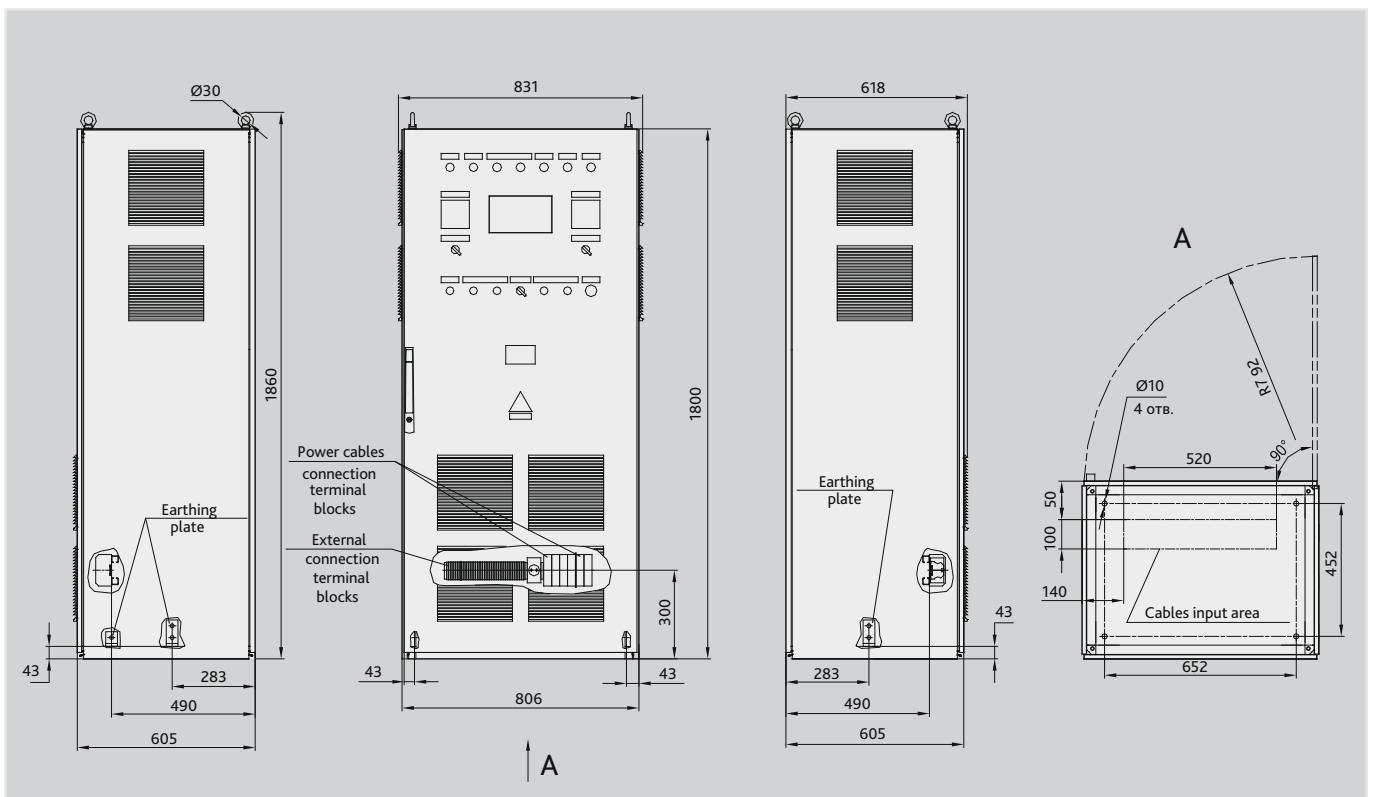
Name of parameter	Unit	Value
Height above sea level	m	up to 1000
Operation temperatures range	°C	0 °C ...+40 °C
Storage temperatures range	°C	- 40 °C...+60 °C
Upper value of relative humidity at 25 °C	%	90
Environment	-	Explosion-proof, not containing chemical active gas and vapor in concentration that destroy insulation.

## TYPE DESIGNATION

VTEU1 – XXX / XXX

**V** rectifier  
**T** thyristor  
**E** type of cooling - air natural;  
**U** universal, 1 - the first modification;  
**XXX** rated current, A;  
**XXX** rated voltage, V

## VTEU1-100/230 OUTLINE DRAWING



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