PLUTON TURN ON THE FUTURE

PUMPING UNIT AUTOMATIC CONTROL SYSTEM CABINET, TYPE SHSAU-NU

METRO

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Pumping unit automatic control system cabinet ShSAU-NU is provided for automatic cost-effective control of electric drives in pumping units of different purposes, types and capacity with one or several pumps. Power limit of one pump is 1,5…160 kW, number of pumps is unlimited.

ShSAU-NU fulfills functions of soft, shock-free startup and stop, regulation of technological parameters with the help of changing of drive motor rotation frequency in automatic mode, signaling, diagnostics, protection, local and remote control, auxiliary electric drives control.

ShSAU-NU provides current and overload protection for pumping unit main and auxiliary drives, protection against pump engine seizure, protection against earth fault, protection during feeding network or loading open-phase mode.

One of ShSAU-NU types is control of well pumping unit, at this ShSAU-NU operates together with valve drive, water pressure sensors in pressure pipeline, sensors of water level in well and tank tower, other control elements.

In addition to control of well pumping unit, ShSAU-NU is produced for drainage pumping units control, other units for transmission of liquids and gases.

In each case production is made according to the client's individual requirements or technological requirements of the unit.

ShSAU-NU can be installed in underground facilities and metro tunnels, at industrial and municipal facilities with especially severe operational conditions.

DESIGN GENERAL DATA

Structurally ShSAU-NU is a one-sided maintenance metal cabinet with an opening front door with viewing window.

Monitoring and alarm controls are located on the swing frame inside the cabinet. «Stop» button to stop the pump motor and light switch are located on the cabinet door. Power supply, load, monitoring and control circuits are input through cable glands at the bottom of the cabinet.

Cabinet cooling is forced by fan mounted on the cabinet door. Cooling air circulates through fine filters installed on the cabinet door. Air heating by a fan heater is provided inside the cabinet at low temperatures.

OPERATION MODE

Pumping unit automatic control cabinet provides three modes of pumping unit control:

- remote automatic control (RAC),
- local automatic control (LAC);
- local manual control (LMC).

RAC mode

ShSAU-NU pumping unit control and state alarms in RAC mode can be done in two ways: via industrial CAN interface and by discrete electrical signals through I/O terminals.

RAC mode provides two modes of water pressure maintaining in pressure pipeline:

- pressure - pump starts with a certain rate of acceleration; pressure before and after the valve is controlled in the process of acceleration and at the moment of pressures equaling the valve starts to be opened;

- speed – the pump accelerates up to the speed pre-set on PLC panel by selection of one of the five buttons. Each button corresponds definite frequency of motor rotation, set during the unit adjustment or operation.

LAC mode
Local automatic control (LAC) is done upon turning «Operation Mode» switch to «LAC».

Local control provides two operation modes:
- pressure control;
- level sensors control.

Level sensors control can be done both in drainage mode and water supply mode.

LMC mode
Local manual control provides control of all pumping unit mechanisms in random alternation and with parameters of full control range, with interlocks and stoppers switching off. This control mode is used during commissioning, repair, adjustment, disassembly and assembly, diagnostics, troubleshooting, etc.

SHSAU-NU STRUCTURE

ShSAU-NU consists of thee following functional systems:
- power circuit;
- operational control, indication and alarm system;
- system for monitoring and provision of microclimate inside the cabinet.

Power section is provided as separate units located on the mounting panel and the cabinet swing frame.

It provides pump motor acceleration, stopping with the set pace and current limitation, rotation speed change, motor protection, auxiliary drives control.

Power circuit includes the following units:
- input device;
- frequency converters;
- machine dU/dt-filters;
- auxiliary drives (valves, fans, greasing systems, etc.) automatic control circuits.

Input device provides voltage supply to the cabinet and protection against short-circuit and overload of devices located before frequency converter. Valves and other auxiliary drives control circuit provides control and protection against short circuits and overloads of these drives motors.

Frequency converter is used to supply the pump motor, providing motor start, break, motor current limiting.

Frequency converter microprocessor control system provides protection against:
- short circuit;
- earth fault;
- overload;
- overvoltage;
- network voltage drop or phase failure;
- motor shaft seizure;
- converter and motor overheating.

Machine dU/dt-filter is used to remove overvoltage and improve the shape of motor voltage.

Operational control, indication and alarm system is used to control the pump drive and to send ShSAU-NU condition alarms in all control modes.

Operational control system includes visualization panel, programmable logic controller (PLC), digital input signals module, analog input signals module, analog and digital output signals modules, controls, signal lamps.

MAIN TECHNICAL DATA

Name of parameter	Unit	Value
Input supply voltage (Uin) three-phase	V	380 +10/-15 %
Input voltage frequency	Hz	50 ± 2 %
Periodicity of connection to network	times/min	1 time per minute or rarer
Rated output voltage (Unom), three-phase	V	380 ± 2 %, but not more then Uin
Rated frequency (Fnom) of output voltage	Hz	50 ± 1 %
Rated power (Pnom) of controlled pump motor	kW	1.5 … 160
Current overload	-	1.1 I nom –1 min within 10 min
Output voltage regulation range	V	0 – Uin
Output frequency regulation range	Hz	0.5 – 50
Efficiency, minimum	-	0.95
Network current harmonic distortion factor, maximum	%	5
Protection level in accordance with GOST 14254-96, IEC 60529	-	IP54
Service lifetime, minimum	years	15
Average recovery time, maximum	min.	40

OPERATION CONDITIONS

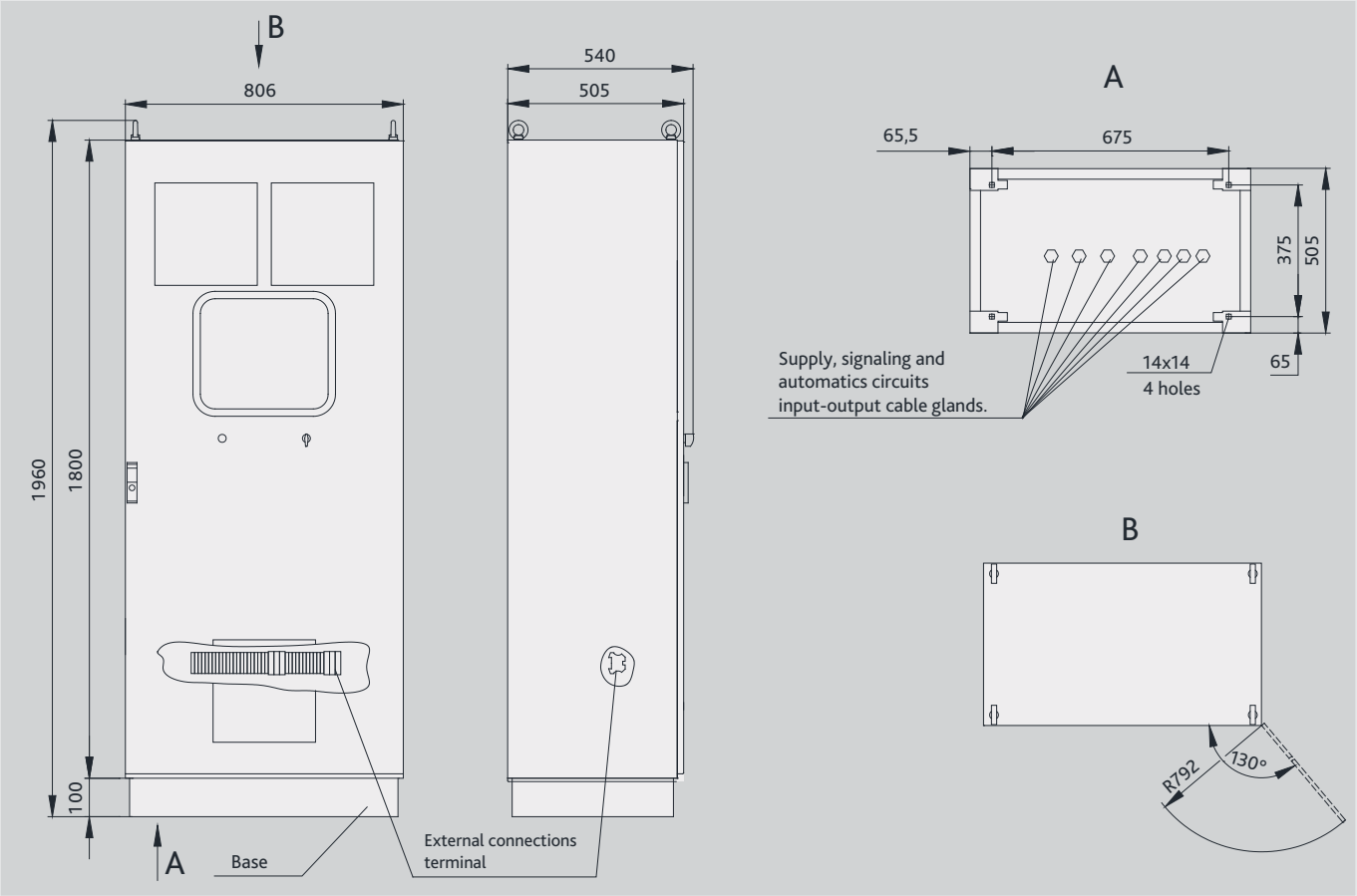
Name of parameter	Unit	Value
Height above sea level	m	up to 1000
Operation temperatures range	°C	-40 °C ...+50 °C
Storage temperatures range	°C	- 30 °C ...+50 °C
Upper value of relative humidity at 25 °C	%	98
Environment	-	Explosion-proof

TYPE DESIGNATION

ShSAU – NU - X

ShS cabinet of system
A automatic
U control
N pump
U unit
X biggest pump motor capacity, kW

OVERALL DIMENSIONS OF THE UNIT, GENERAL CAPACITY UP TO 75 KW



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