Application

Systems are used for control of ventilation equipment such as air curtains, air handling units, attachment heating sets, etc.

CVM Manufacturing Works reserves the right to change parameters and dimensions of released products as a continuous process of improvement.

General Information

Control systems provide:

- Plant manual start-up from control cabinet or using remote contact;
- Power circuit (fan motor, electric heat exchanger) overloading and short circuit protection;
- Secondary circuits overloading and short circuit protection;
- Independent infeed to power circuits and control circuits;
- Operation and emergency condition alarm;
- Protection against water-to-air heat exchanger (heating) freezing;
- Protection against electric heat exchanger overheating;
- Automatic restart after heat exchanger protection actuation, unless otherwise specified;
- For ABC (AVS) and CBAH (SVAN) units – Heating power adjustment: smooth (water-to-air or electric heat exchanger) or stepwise (electric heat exchanger);
- Active protection against freezing and improved control characteristic using hydraulic piping scheme together with circulation pump installation and mixing with return water (water-to-air heat exchanger) for ABC (AVS) and CBAH (SVAN).

Control systems include:

- Control cabinets;
- Gauges;
- Actuators.

A standard cabinet housing has IP40 protection class rating. IP54 or other option is available upon special request. Overall dimensions of cabinets depend on generating capacity and control system type.

For Air Curtains (ШАУЗ (ShAUZ)) and Power Cabinets (ШС (ShS)):

Cabinet Overall Dimensions (WxHxD)	Cabinet Switching power
340 x 420 x 155	ШАУЗ (ShAUZ) up to 2 x 11 kW, ШС (ShS) up to 45 kW
400 x 600 x 155	ШАУЗ (ShAUZ) up to 2 x 22 kW, ШС (ShS) up to 90 kW

For Standard ABC (AVS) and CBAH (SVAN) Sets (ШАУП (ShAUP)):

Cabinet Overall Dimensions (WxHxD)	Cabinet Switching power
400 x 505 x 155	up to 22 kW

Control cabinets are wall-mountable.

Power equipment (fan, electric motor, and pump) shall be connected with ВВГ (VVG), ПВС (PVS) or other wire with the same cross-section and power.

Heat regulators and gauges shall be connected with МКШ (MKSh), КВВГ (KVVG) or ПВС (PVS) wire with cross-section 0.75 mm^2 (3x0.75). Temperature gauges upon high levels of leakage or interference shall be connected with shielded cable.

Actuators (adjusting valve drive, air gate drive) shall be connected with МКШ (MKSh), КВВГ (KVVG), ПВС (PVS) or identical wire with cross-section 0.75 mm^2 (3x0.75).

Designation

System is designed for fan regulation (see pp.7-71). System has only essential functionality, which makes it multipurpose.

Main Characteristics

System is comprised of the following components:

- Automation and control cabinet ШУВ (ShUV);
- Remote control panel (optional);
- Room thermostat (optional);
- Gas analyzer (optional).

ShUV provides control of the fan motor and air throttle drive, as well as motor and automation circuitry protection against overload and short-circuit, along with indication of operation mode and alarms.

Functionality

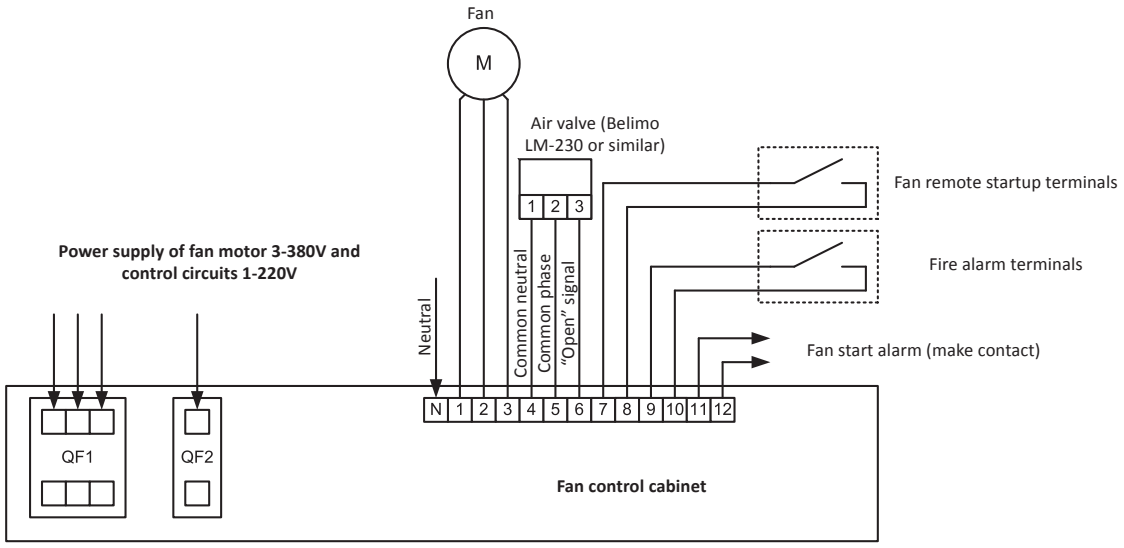
Control system provides the following standard functionality:

- Manual startup and shut down of fan using ШУВ (ShUV);
- Remote startup and shut down using external terminal;
- Fan motor control and protection (3 phases, ~380V or single-phase ~220V);
- Fan operation monitoring (closing contact by default);
- Fire alarm actuated shut down (closing contact by default).

Optionally available:

- Mounting of several ShUV as a single unit;
- Fan rotation speed control;
- Operation with automatic switching to a standby fan (ШУВ-РВ (ShUV-RV) – see p.192).

Connection Diagram

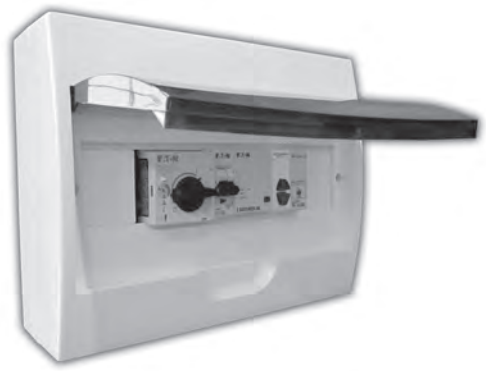


Example of reference designation:
ШУВ-380-1-5,5-1Р40 ТУ 3430-023-64600223-2011, where:
ШУВ – Fan control cabinet;
380 – Power supply voltage is 380V;
1 – Single operated device (single fan);
5,5 – Fan power is 5.5kW;
IP40 – Protection against small solid objects;
ТУ – Designation of specification.

ШУВ-380-7-7×5,5-IP40 ТУ 3430-023-64600223-2011, where:
ШУВ – Fan control cabinet;
380 – Power supply voltage is 380V;
7 – Seven operated devices (seven fans);
7×5,5 – Power of each fan is 5.5kW;
IP40 – Protection against small solid objects;
ТУ – Designation of specification.

Designation

System is designed for low power fan regulation (see pp.7-71). System has only essential functionality, which makes it multipurpose.



Main Characteristics

System is comprised of the following components:
- ◆ Automation and control cabinet ШУВ-Мод (ShUV-Mod);
- ◆ Remote control panel (optional);
- ◆ Room thermostat (optional).

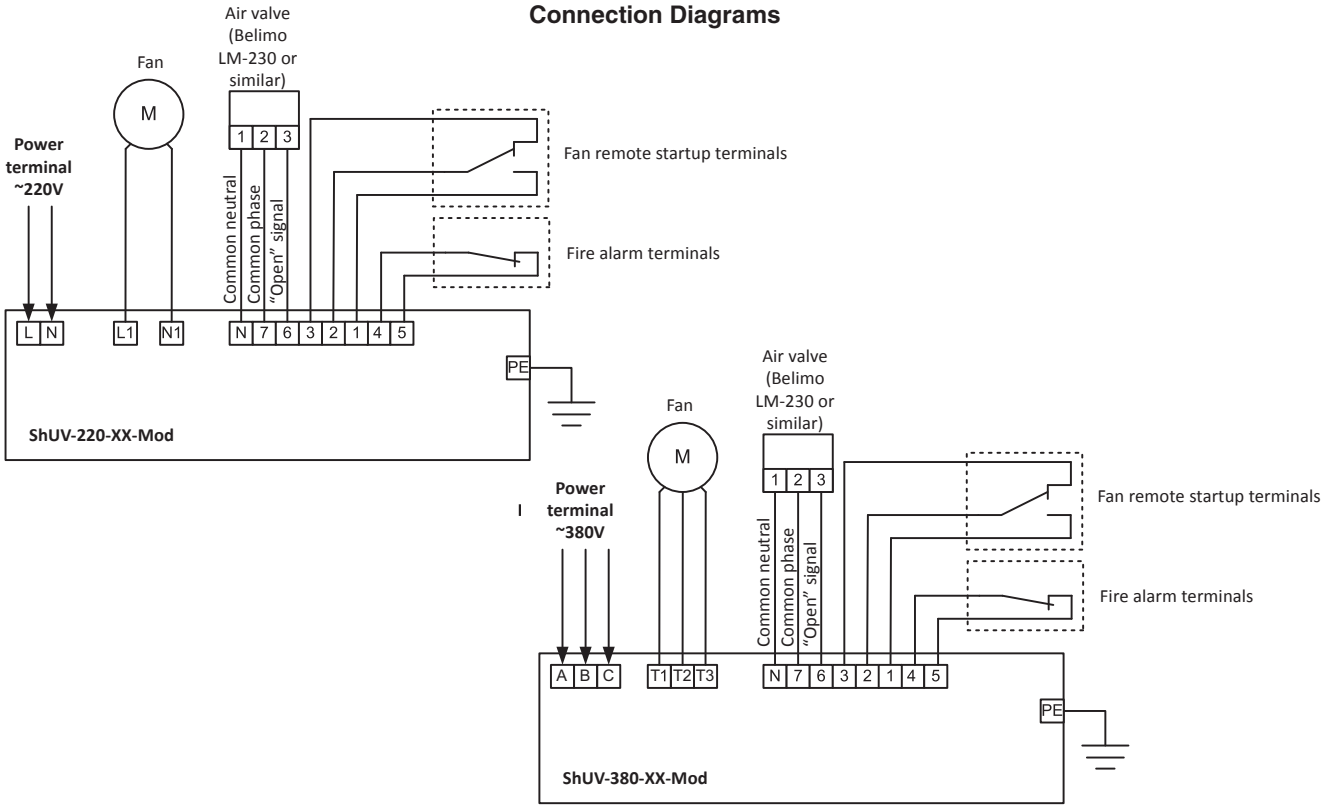
ШУВ-Мод (ShUV-Mod) provides control of the fan motor and air throttle drive, as well as motor and automation circuitry protection against overload and short-circuit, along with indication of operation mode and alarms.

Casing material: impact-resistant self-extinguishing ABS plastic.
Dimensions: 255×200×95 mm.
Weight, max: 1.7kg.

Functionality

Control system provides the following standard functionality:
- ◆ Manual startup and shut down of fan using ШУВ-Мод (ShUV-Mod);
- ◆ Remote startup and shut down using external terminal;
- ◆ Fan motor control and protection (single-phase, ~220V 0.25...4.0 kW or 3-phase ~380V 0.25...7.5 kW);
- ◆ Fire alarm actuated shut down (closing contact by default).

Connection Diagrams



Example of reference designation:

ШУВ-Мод-220-1-1,5-1P40 ТУ 3430-023-64600223-2011, where:
ШУВ – Fan control cabinet;
Мод – in a plastic modular casing;
220 – Power supply voltage is 220V;
1 – Single operated device (single fan);
1,5 – Fan power is 1.5kW;
IP40 – Protection against small solid objects;
ТУ – Designation of specification.

ШУВ-Мод-380-1-4,0-P55 ТУ 3430-023-64600223-2011, where:
ШУВ – Fan control cabinet;
Мод – in a plastic modular casing;
380 – Power supply voltage is 380V;
1 – Single operated device (single fan);
4,0 – Fan power is 4.0kW;
IP55 – Protection against dust limited ingress and water jets;
ТУ – Designation of specification.

Designation

System is designed for heavy-duty fan regulation (see pp.7-71). System has only essential functionality, which makes it multipurpose.

Main Characteristics

System is comprised of the following components:

- ◆ Automation and control cabinet ШУВ-2 с (ShUV-2s);
- ◆ Remote control panel (optional);
- ◆ Room thermostat (optional);
- ◆ Gas analyzer (optional).

ШУВ (ShUV) provides control of the fan motor and air throttle drive, as well as motor and automation circuitry protection against overload and short-circuit, along with indication of operation mode and alarms.

Functionality

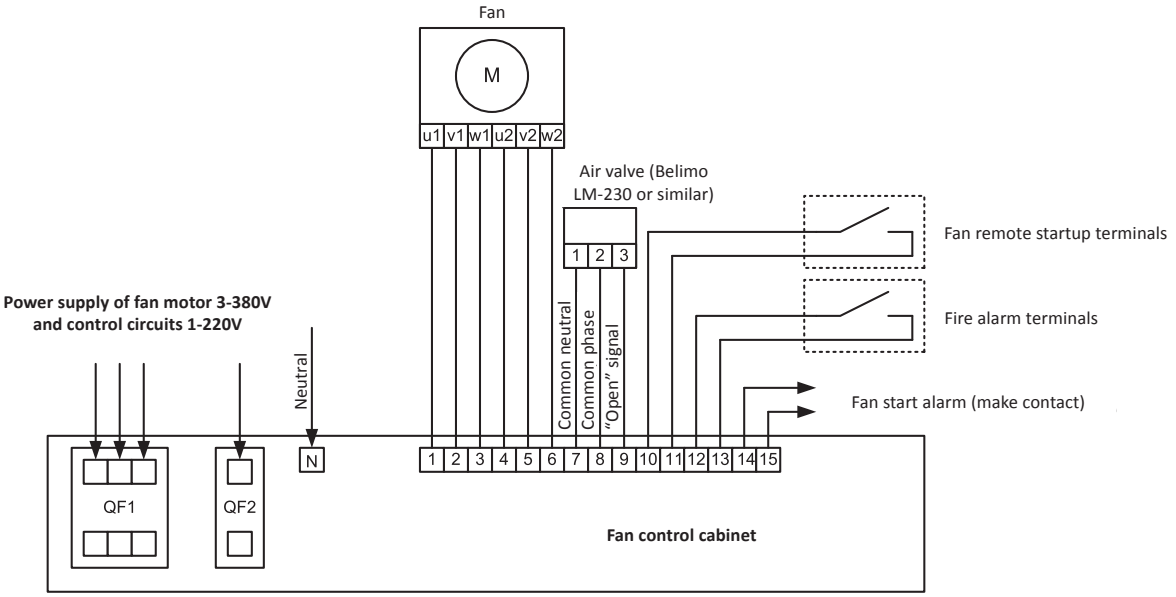
Control system provides the following standard functionality:

- ◆ Manual startup and shut down of fan using ШУВ-2 с (ShUV-2s);
- ◆ Remote startup and shut down using external terminal;
- ◆ Reduction of the fan motor inrush current using wye-delta reconnection;
- ◆ Fan motor control and protection (3-phase ~380V);
- ◆ Fan operation monitoring (closing contact by default);
- ◆ Fire alarm actuated shut down (closing contact by default).

Optionally available:

- ◆ Operation with automatic switching to a standby fan.

Connection Diagram



Example of reference designation:
ШУВ-2 с-380-1-30-Р40 ТУ 3430-023-64600223-2011, where:
ШУВ – Fan control cabinet;
2 с – Dual-speed (why-delta reconnection);
380 – Power supply voltage is 380V;
1 – Single operated device (single fan);
30 – Fan power is 30kW;
IP40 – Protection against small solid objects;
ТУ – Designation of specification.

Application

The system is designed for controlling water heated air handling units.

Main Characteristics

The control system includes the following components:

- Control cabinet ШАУП-В (ShAUP-V);
- Adjusting valve with electric drive for heating water;
- Adjusting valve for heat-absorbing medium;
- Circulation pump;
- Air temperature sensor;
- Return water temperature regulator;
- Capillary temperature regulator.

ШАУП-В (ShAUP-V) provides control of air shutter drive, fan motor, adjusting valve, and circulation pump, as well as control circuits and fan motor circuits overloading and short circuit protection, and circulation pump short circuit protection.

Heating power control method consists in alteration of heating water flow rate changing the position of adjusting valve.

Functions

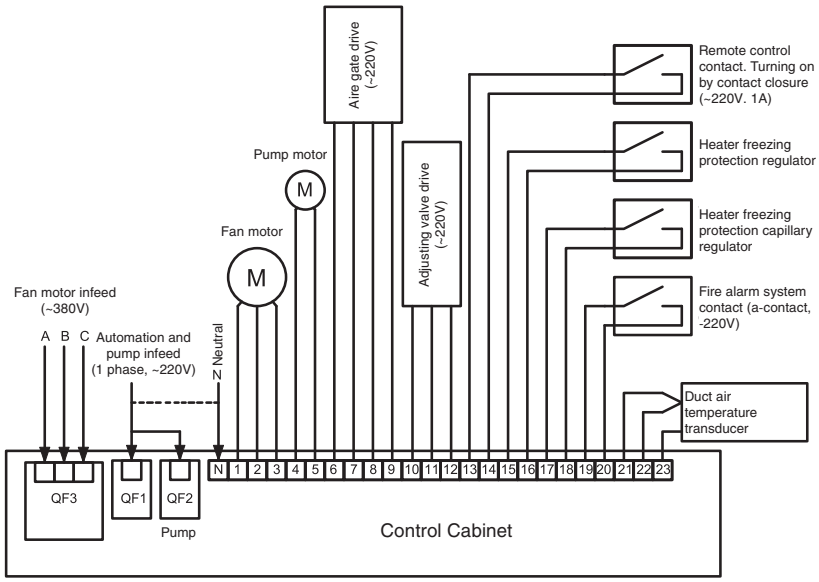
A standard control system provides the following functions:

- Air handling unit manual start-up and shut-down from ШАУП-В (ShAUP-V);
- Remote start-up and shut-down using external contact;
- Freezing protection;
- Operation without heating and freezing protection (summer mode);
- Control of adjusting valve drive for heating water (-220V);
- Control of adjusting valve drive for heat-absorbing medium;
- PI/PID power adjustment of water-to-air heat exchanger (heating);
- Air shutter drive control (- 220V)
- Fan motor control and protection (3 phases, -380V);
- Circulation pump control and protection (-220V);
- Shutting down on a signal from fire alarm system (closing contact by default).

The following functions are optionally available:

- Filter condition monitoring with dustiness indication by lamp on the front panel;
- Operation with automatic switching to the stand-by fan;
- Exhaust fan operation control;
- Fan (inclusive of exhaust fans) speed control both manually and on a signal from pressure transducer or air flow rate in characteristic point transducer.

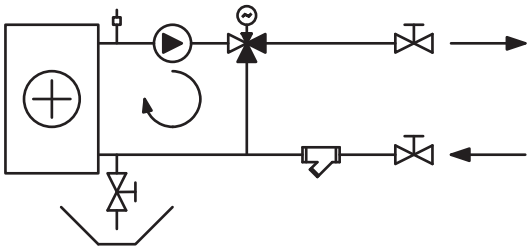
Water heated air handling unit control system wiring diagram



Example of reference designation:
ШАУП-В-Ф-380-1-2,2-IP40 ТУ 3430-023-64600223-2011, where:
ШАУП – Air Handling Unit Automatic Control Cabinet;
В – Water-heated air;
Ф – Filter clogging control;
380 – Power supply voltage is 380V;
1 – Single operated device (single fan);
2,2 – Fan power is 2.2kW;
IP40 – Protection against small solid objects;
ТУ – Designation of specification.

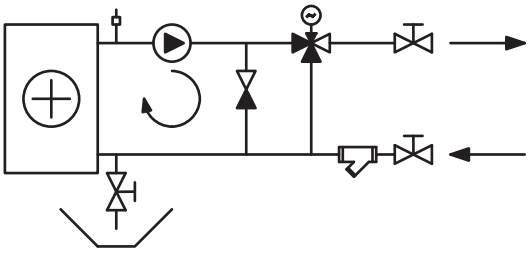
ШАУП-В-АВР-Ф-РВ-380-2-2x4,0-IP54 ТУ 3430-023-64600223-2011, where:
ШАУП – Air Handling Unit Automatic Control Cabinet;
В – Water-heated air;
АВР – Automatic circuit-breaker;
Ф – Filter clogging control;
РВ – Switching to standby fan;
380 – Power supply voltage is 380V;
2 – Two operated devices (two fans);
2x4,0 – Power of each fan is 4.0kW;
IP54 – Protection against dust limited ingress and water sprayed from all directions;
ТУ – Designation of specification.

Hydraulic Piping Scheme for Air Handling Unit Heat Exchanger



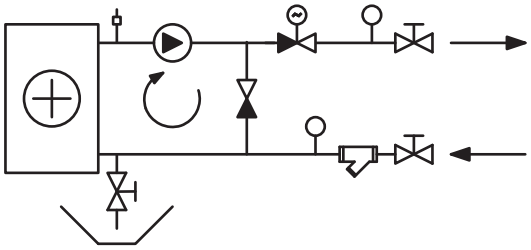
Scheme 1.

If heat exchanger selection is correct, then this piping scheme provides return water temperature not exceeding the value set up in operating mode. Practically constant water flow rate through the heat exchanger is also provided. Power adjustment is performed by means of alternating of heat-carrying medium temperature at the heat exchanger inlet. Optionally mixing line may be equipped with additional return valve for the purpose of piping survival in case of the pump breakdown. Piping elements: pump and adjusting valve are selected for operation within the scope of the present scheme.



Scheme 2.

This piping scheme provides constant supply water (direct and return) flow rate. This scheme may be implemented in the systems required constant hydraulic parameters concerning supply water, but free from limitations regarding return water temperature exceeding as a consequence.



Scheme 3.

In this case adjusting is performed using two-way valve.

Application

The system is designed for controlling air handling units with electric heat exchanger power stepwise regulation

Main Characteristics

The control system includes the following components:

- Control cabinet ШАУП-Э-3СТ (ShAUP-E-3ST);
- Power cabinet ШС-3СТ (ShS-3ST);
- Outside air temperature regulator;
- Room air temperature regulator or duct air temperature regulator.

ШАУП-Э-3СТ (ShAUP-E-3ST) provides control of air shutter drive and fan motor, control of 3 stages of electric heat exchanger power by means of ШС-3СТ (ShS-3ST), control circuits and fan motor circuits overloading and short circuit protection, and electric heat exchanger short circuit protection.

ШС-3СТ (ShS-3ST) provides commutation and electric heat exchanger protection against overloading and short circuit.

Heating power control method consists in turning on and off of electric heat exchanger control stage.

Functions

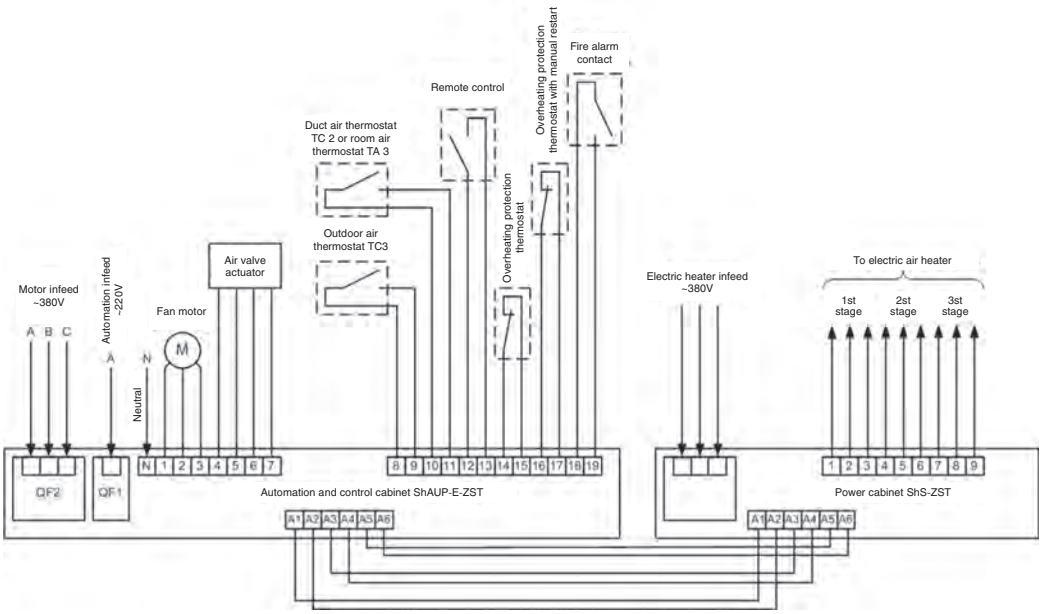
A standard control system provides the following functions:

- Air handling unit manual start-up and shut-down с ШАУП-Э-3СТ (ShAUP-E-3ST);
- Remote start-up and shut-down using external contact;
- Operation without heating (Summer mode);
- Air shutter drive control (-220V);
- Fan motor control and protection (3 phases, -380V);
- 3 stage control of electric heat exchanger power;
- Electric heat exchanger control and protection;
- Electric heat exchanger protection against overheating;
- Shutting down on a signal from fire alarm system (closing contact by default).

The following functions are optionally available:

- Filter condition monitoring with dustiness indication by lamp on the front panel;
- Operation with automatic switching to the stand-by fan;
- Exhaust fan operation control;
- Fan (inclusive of exhaust fans) speed control both manually and on a signal from pressure transducer or air flow rate in characteristic point transducer.

Wiring diagram of air handling units control system with electric heat exchanger power stepwise regulation



Example of reference designation:
ШАУП-Э-3СТ-Ф-380-1-7,5-IP40 ТУ 3430-023-64600223-2011, where:
ШАУП – Air Handling Unit Automatic Control Cabinet;
Э-3СТ – Three-stage electric air heating;
Ф – Filter clogging control;
380 – Power supply voltage is 380V;
1 – Single operated device (single fan);
7,5 – Fan power is 7.5kW;
IP40 – Protection against small solid objects;
ТУ – Designation of specification.

ШС-Э-3СТ-380-32-IP40 ТУ 3430-023-64600223-2011, where:
ШС – Power cubicle;
Э-3СТ – Three-stage electric air heating;
380 – Power supply voltage is 380V;
32 – Heating power is 32kW;
IP40 – Protection against small solid objects;
ТУ – Designation of specification.

Application

The system is designed for controlling air handling units with electric heat exchanger power smooth regulation.

Main Characteristics

The control system includes the following components:

- Control cabinet ШАУП-Э-С (ShAUP-E-S);
- Power cabinet ШСС (ShSS);
- Air temperature sensors.

ШАУП-Э-С (ShAUP-E-S) provides control of air shutter drive and fan motor, electric heat exchanger power smooth control by means of ШСС (ShSS), control circuits and fan motor circuits overloading and short circuit protection, electric heat exchanger protection against overheating.

ШСС (ShSS) provides commutation and electric heat exchanger protection against overloading and short circuit. ShSS shall be mounted without deepening providing free air flow for cooling of walls and radiator.

In general system is capable of providing control and maintaining of set-up air temperature in air duct within the accuracy of 0.5°C. Heating power control method consists in turning on and off of electric heat exchanger at the moment of supply phase zero crossing, i.e. with minimal interference in the grid. Commutation is performed with set frequency and variable duration on regulator signals providing smoothness and accuracy of adjustment.

Functions

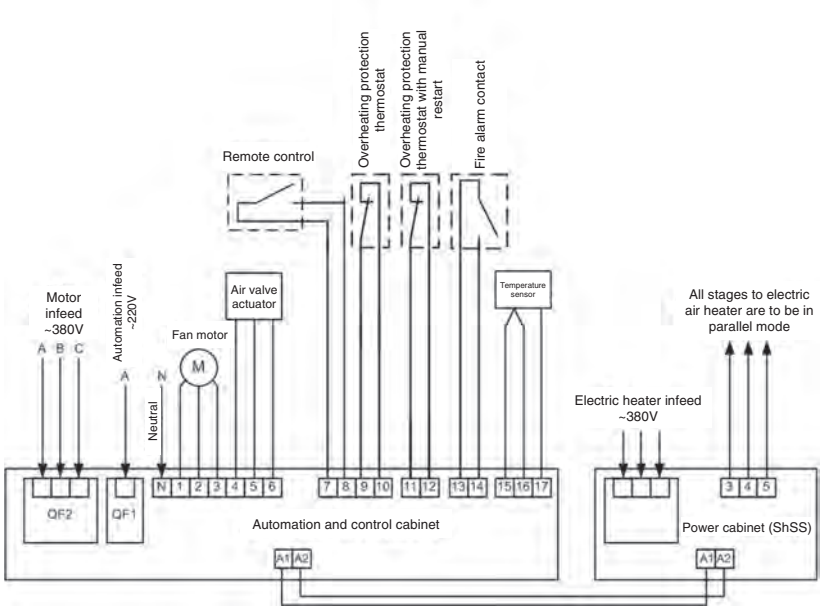
A standard control system provides the following functions:

- Air handling unit manual start-up and shut-down с ШАУП-Э-С (ShAUP-E-S);
- Remote start-up and shut-down using external contact;
- Operation without heating (Summer mode);
- Air shutter drive control (-220V);
- Fan motor control and protection (3 phases, -380V);
- PID power adjustment of electric heat exchanger;
- Electric heat exchanger control and protection;
- Electric heat exchanger protection against overheating;
- Shutting down on a signal from fire alarm system (closing contact by default).

The following functions are optionally available:

- Filter condition monitoring with dustiness indication by lamp on the front panel;
- Operation with automatic switching to the stand-by fan;
- Exhaust fan operation control;
- Fan (inclusive of exhaust fans) speed control both manually and on a signal from pressure transducer or air flow rate in characteristic point transducer.

Wiring diagram of air handling units control system with electric heat exchanger power smooth regulation



Example of reference designation:

ШАУП-Э-С-Ф-380-1-7,5-IP40 ТУ 3430-023-64600223-2011, where:
ШАУП – Air Handling Unit Automatic Control Cabinet;
Э – Electric air heating;
С – Triac (with smooth adjustment of temperature);
Ф – Filter clogging control;
380 – Power supply voltage is 380V;
1 – Single operated device (single fan);
7,5 – Fan power is 7.5kW;
IP40 – Protection against small solid objects;
ТУ – Designation of specification.

ШС-С-380-23-IP40 ТУ 3430-023-64600223-2011, where:
ШС – Power cubicle;
С – Triac (with solid-state relay);
380 – Power supply voltage is 380V;
23 – Heating power is 23kW;
IP40 – Protection against small solid objects;
ТУ – Designation of specification

Designation

System is designed for air handling units and central conditioners control (see p.84).

Functionality

Control system provides the following standard functionality:

- Manual startup and shut down of fan using ШАУК (ShAUK);
- Automatic startup and shut down in response to a signal from controller;
- Fan motor control and protection (3 phases, ~380V or single-phase ~220V);
- Fan motor control in response to the pressure drop;
- Control of air throttles on suction and exhaust fans;
- Daily schedule with night-time ventilation;
- Weekly schedule considering holidays and special days;
- Energy saving due to consideration for environment conditions, schedule, presence of people in a room, etc.;
- System operation monitoring via KNX protocol (RS-232, Ethernet, and USB interfaces are optional);
- Filter clogging indication;
- Fire alarm actuated shut down (closing contact by default);
- Alarm processing, dispatching, and storing in the alarm log.

Depending on configuration:

- Maintaining of air temperature in a room by means of water, freon, or electric-type unit heaters control;
- Maintaining air humidity in a room by means of humidifier or steam-generator unit control;
- Limitation of maximum and minimum levels of temperature and humidity of inlet air;
- Control of mixing air dampers for the purpose of air recirculation;
- Air heat-exchanger control;
- Manual startup and shut down of circulating pumps using ШАУК (ShAUK);
- Manual heating of water-type unit heater.

Depending on configuration system provides the following protection:

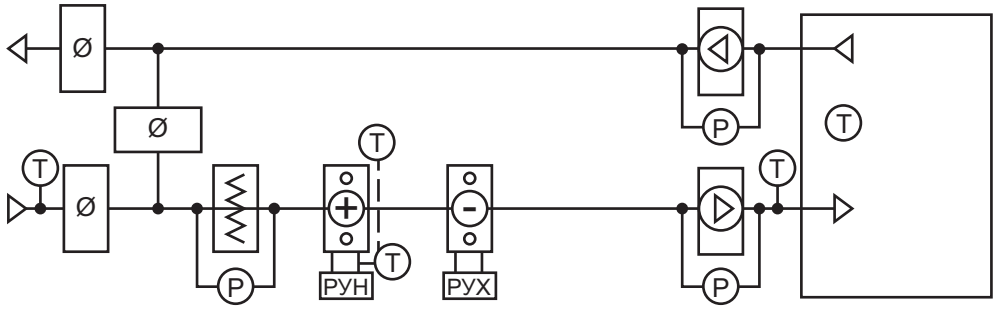
- Short-circuit protection of equipment;
- Protection against phase interruption, phase adjacency, phase sequence violation;
- Fan motor overcurrent protection;
- Water-type unit heater protection against freezing;
- Electric unit heater protection against overheating and ignition;
- Circulating pump protection against dry running;
- Ice protection of heat-exchangers.

Optionally available:

- Remote PLC control panel;
- Ethernet connectivity;
- Fan rotation speed control;
- Forced ventilation actuated by room air quality sensor;
- Operation with automatic switching to a standby fan.

A few diagrams illustrating ShAUK-series cabinets application selected from the vast variety of possible combinations of HVAC system functional units are shown below.

Diagram No.6в



Designation

System is designed for control of air handling units and central conditioners with air heating and cooling by water-type heat-exchangers.

Functionality

- Suction and exhaust fans control;
- Manual startup and shut down of fan using ШАУК (ShAUK);
- Automatic fan startup and shut down in response to a signal from controller;
- Maintaining inlet air temperature by means of heater and cooler control units regulation;
- Filter clogging indication;
- Active freezing protection.

Optionally:

- Mixing damper control actuated by air quality sensor;
- Fan rotation speed adjustment for the purpose of maintaining the constant pressure in ductwork or air flow rate.

Composition

System is comprised of the following components:

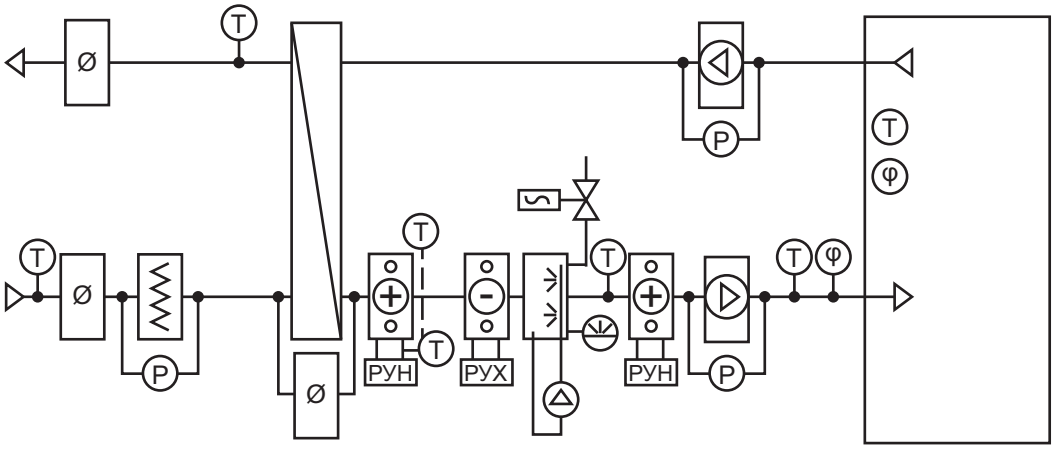
- ШАУК-Ф-В20-В30 (ShAUK-F-V20-V30) cabinet;
- Control unit РУН (RUN);
- Control unit РУЗ (RUZ);
- Room temperature sensor;
- x2 Duct temperature sensor;
- Room air quality sensor (optional);
- Capillary freezing protection thermostat;
- Portable freezing protection thermostat;
- Filter differential pressure switch;
- Fan differential pressure switch.

Note: in case of multi-room operation temperature may be controlled only in reference room or in exhaust duct. In the latter case room air temperature shall be replaced with another duct sensor during configuring the system make-up.

Designation

Example of control cabinet type designation used in order and technical documentation:
ШАУК-Ф-В20-В30-380-15+15-1Р66 ТУ 3430-023-64600223-2011, where:
ШАУК (ShAUK) – Central air-conditioner automatic control cabinet;
Ф – Built-in filter clogging control function;
В20 – Water-type air heater;
В30 – Water-type air cooler;
380 – Power supply voltage is 380V;
15 – Suction fan power is 15kW;
15 – Exhaust fan power is 15kW;
IP66 – Enclosure protection against dust ingress and strong jets of water;
ТУ – Designation of specification.

Diagram No.9в



Designation

System is designed for control of air handling units and central air-conditioners with heat recovery in plate recuperator, air heating and cooling by water-type heat-exchangers, and air humidification in air washer.

Functionality

- Suction and exhaust fans control;
- Manual startup and shut down of fan using ШАУК (ShAUK);
- Automatic fan startup and shut down in response to a signal from controller;
- Maintaining inlet air temperature by means of heater and cooler control units regulation;
- Dew point sequential regulation by means of heater and cooler control units regulation;
- Maintaining air humidity in a room by means of humidifier control;
- Control of room air dehumidification by means of shifting the dew point;
- Filter clogging indication;
- Active freezing protection;
- Ice protection of heat-exchangers;
- Maintaining the water level in humidifier.

Optionally:

- Fan rotation speed adjustment for the purpose of maintaining the constant pressure in ductwork or air flow rate.

Composition

System is comprised of the following components:

- ШАУК-Ф-Р75-В20-В30-У40-В20 (ShAUK-F-R75-V20-V30-U40-V20) cabinet;
- x2 Control unit РУН (RUN);
- Control unit РУЗ (RUZ);
- Circulating pump (for air washer);
- Solenoid valve;
- Room temperature and humidity sensor;
- Duct temperature and humidity sensor;
- x3 Duct temperature sensor;
- Capillary freezing protection thermostat;
- Portable freezing protection thermostat;
- Flow switch;
- x2 Fluid level sensor;
- Filter differential pressure switch;
- x2 Fan differential pressure switch.

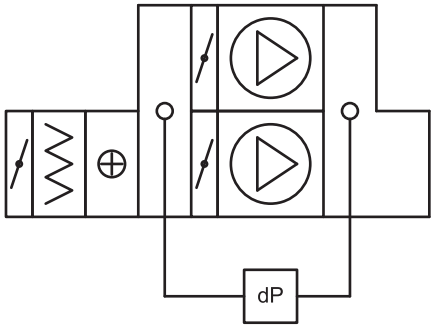
Note: in case of multi-room operation temperature may be controlled only in reference room or in exhaust duct. In the latter case room air temperature shall be replaced with another duct sensor during configuring the system make-up.

Designation

Example of control cabinet type designation used in order and technical documentation:
ШАУК-Ф-Р75-В20-В30-У40-В20-380-11+11-1Р66 ТУ 3430-023-64600223-2011, where:
ШАУК (ShAUK) – Central air-conditioner automatic control cabinet;
Ф – Built-in filter clogging control function;
Р75 – Plate recuperator;
В20 – Water-type air heater (1st stage heating);
В30 – Water-type air cooler;
У40 – Watering humidifier;
В20 – Water-type air heater (2nd stage heating);
380 – Supply voltage – 380 V;
11 – Suction fan power is 11kW;
11 – Exhaust fan power is 11kW;
IP66 – Enclosure protection against dust ingress and strong jets of water;
ТУ – Designation of specification.

CVM Manufacturing Works produces control cabinets based on controllers by third-party domestic and foreign manufacturers with various sets of service functions.

Standby fan operation control



Components:
- ◆ ШАУП-РВ (ShAUP-RV) or ШУВ-РВ (ShUV-RV) control cabinet;
- ◆ Fan differential pressure switch.

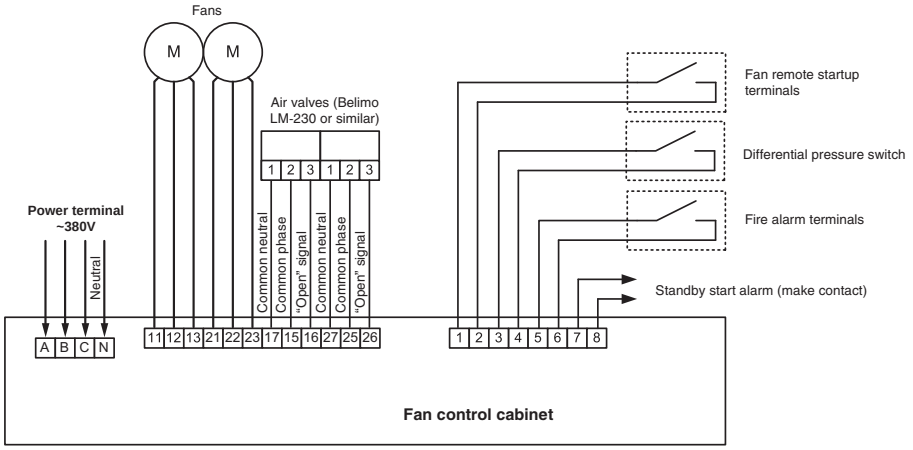
System provides functioning of fans (main and standby) and corresponding air throttles.

Front panel contains main fan selection switch (B1-0-B2), fan operation lamps, “Alarm” and “Standby” lamps.

Description of operation

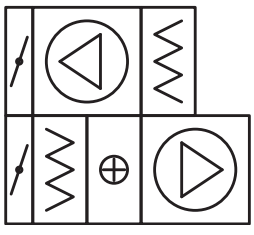
One of the fans (selected by switch) is started up in response to ШАУП (ShAUP) cabinet signal followed by opening of corresponding air throttle. If pressure drop cannot reach set value during specified time delay (set using timer in the cabinet), then system automatically switches to the second fan followed by “Standby” lamp lighting up. During fan running (not in the startup mode) switching initiated by pressure drop is performed without time delay. Switching back to the main fan is performed after system restart only.

Connection Diagram



Example of reference designation:
ШУВ-Ф-РВ-380-2-2×3,0-Р54 ТУ 3430-023-64600223-2011, where:
ШУВ – Fan control cabinet;
Ф – Filter clogging control;
РВ – Switching to the standby fan;
380 – Power supply voltage is 380V;
2 – Two operated devices (two fans);
2×3,0 – Power of each fan is 3.0kW;
IP54 – Protection against dust limited ingress and water sprayed from all directions;
ТУ – Designation of specification.

Exhaust Fan Control



Depending on fan power (or on request), system arrangement is available either in a single case (ShAUP cabinet) or in additional case (ShUV cabinet). Control provides simultaneous on/off of suction and exhaust fans, as well as opening/closing of inlet and outlet air throttles. Air handling unit shut down is performed upon actuation of thermal protection of any fan.

Fan Rotation Speed Control

Fan rotation speed is regulated by means of frequency converter or transformer regulator.

Application

The system is designed for pod-mount heating and ventilation unit NOVA control.

Main Characteristics

The control system includes the following components:

- Control cabinet ШАУН -В (ShAUN-V);
- Power cabinet;
- Room temperature regulator.

ШАУН-В (ShAUN-V) provides control of fan motor and adjusting valve in relation to the heating water, as well as control circuits and fan motor circuits overloading and short circuit protection.

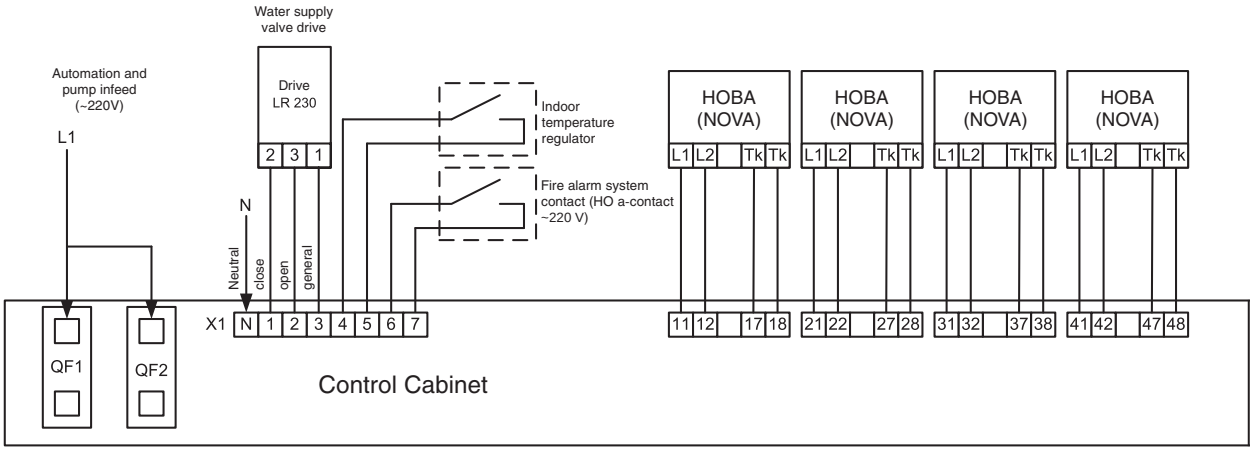
Heating power control method consists in alteration of heating water flow rate changing the position of adjusting valve.

Functions

A standard control system provides the following functions:

- Manual start-up and turning on of ШАУН-В (ShAUN-V) heating unit;
- Remote start-up and shut-down using external contact;
- Control of adjusting valve drive for heating water (~200V);
- PI/PID power adjustment of water-to-air heat exchanger (heating);
- Fan motor control and protection (3 phases, ~380V);
- Shutting down on a signal from fire alarm system (closing contact by default).

HOBA (NOVA) heating units control cabinet wiring diagram



Example of reference designation:
ШАУН-В-220-4-4х0,11-IP40 ТУ 3430-023-64600223-2011, where:
ШАУН – Heating Unit Automatic Control Cabinet;
В – Water-heated air;
220 – Power supply voltage is 220V;
4 – Four operated devices (four heating units);
4х0,11 – Fan power is 0.11kW per unit;
IP40 – Protection against small solid objects;
ТУ – Designation of specification.

ШАУН-В-380-6-6х0,25-IP40 ТУ 3430-023-64600223-2011, where:
ШАУН – Heating Unit Automatic Control Cabinet;
В – Water-heated air;
380 – Power supply voltage is 380V;
6 – Six operated devices (six heating units);
6х0,25 – Fan power is 0.25kW per unit;
IP40 – Protection against small solid objects;
ТУ – Designation of specification.

Designation

System is designed for dry cooler control (see p.101). System is available in two versions: with discrete or smooth adjustment of the coolant temperature.

Main Characteristics

System is comprised of the following components:

- Automation and control cabinet ШАУН-В-ГС (ShAUN-V-GS);
- Coolant immersion thermostat (in configuration with discrete temperature adjustment) or coolant temperature transducer (in configuration with smooth temperature adjustment).

ShAUN-V-GS maintains set coolant temperature by means of fan motors control as well as motor and automation circuits overload and short-circuit protection, and operation mode and alarm indication.

Coolant temperature is maintained by means of fans on/off switching (in case of discrete temperature adjustment) or regulation of the fan motors rotation speed using built-in variable frequency drive(in case of smooth temperature adjustment).

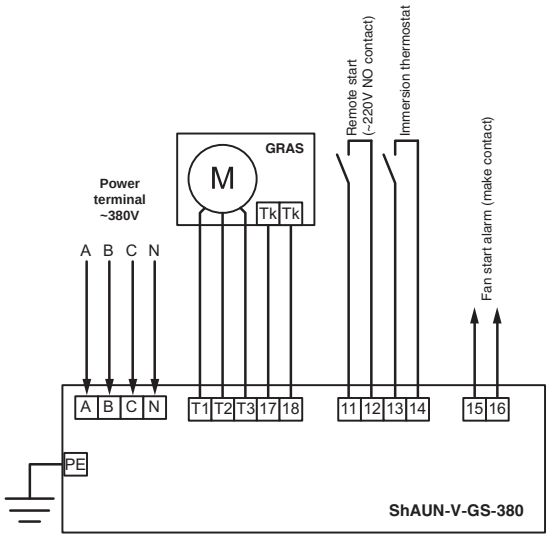
Functionality

Control system provides the following standard functionality:

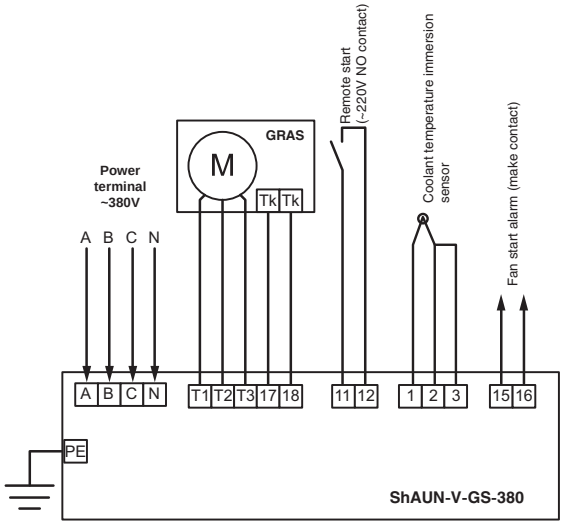
- Manual startup and shut down of fan using ShAUN-V-GS;
- Remote startup and shut down using external terminal;
- Fan motor control and protection;
- System operation monitoring.

Connection Diagram

ШАУН-В-ГС-380-1 (ShAUN-V-GS-380-1) with Discrete Adjustment Connection Diagram



ШАУН-В-ГС-380-1 (ShAUN-V-GS-380-1) with Smooth Adjustment Connection Diagram



Example of reference designation:
ШАУН-В-ГС-380-1-1x2x1,1-IP40 ТУ 3430-023-64600223-2011, where:
ШАУН-В-ГС – Dry cooler control cabinet;
380 – Power supply voltage is 380V;
1 – One section of GRAS;
1x2x1,1 – One section of GRAS comprising two fans with power of 1.1kW per fan;
IP40 – Protection against small solid objects;
ТУ – Designation of specification.

ШАУН-В-ГС-380-3-3x2x1,5-3x005H-P40 ТУ 3430-023-64600223-2011, where:
ШАУН-В-ГС – Dry cooler control cabinet;
380 – Power supply voltage is 380V;
3 – Three GRAS sections;
3x2x1,5 – Three GRAS sections, each section is equipped with two fans with power of 1.5kW per fan;
3x005H – Three built-in variable frequency drives E3-9100-005H;
IP40 – Protection against small solid objects;
ТУ – Designation of specification.

Application

The system is designed for control of air curtains with water-to-air heat exchanger.

Main Characteristics

The control system includes the following components:

- Control cabinet ШАУЗ-В (ShAUZ-V);
- Adjusting valve with electric drive;
- Return water temperature regulator – one for each heat exchanger;
- Room air temperature regulator (shut-down delay);
- Terminal switch.

Functions

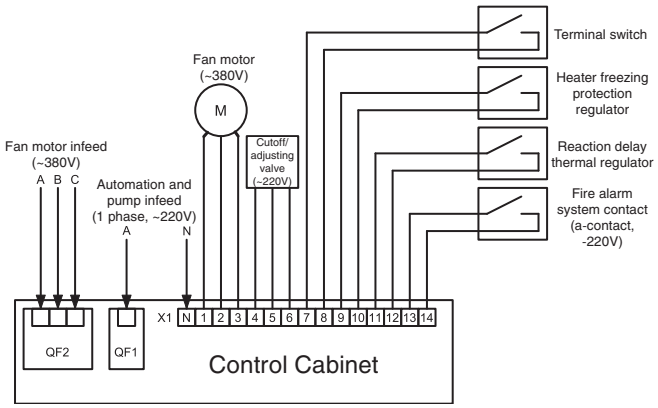
A standard control system provides the following functions:

- Manual air curtain start-up and shut-down using ШАУЗ-В (ShAUZ-V);
- Remote start-up and shut-down using external contact (Terminal switch);
- Heat exchanger freezing protection;
- Control of adjusting valve drive for heating water in open/close mode (-220V);
- Fan motor control and protection (3 phases, -380V);
- Shut-down delay until reaching of set temperature in gateway area;
- Shutting down on a signal from fire alarm system (closing contact by default).

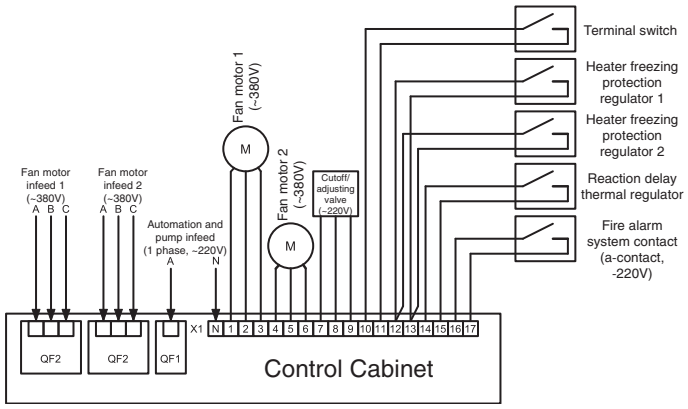
The following functions are optionally available:

- Control of circulation pump installed instead of the valve.

Control system of air curtains with water-to-air heat exchanger wiring diagram (1 motor connection option)



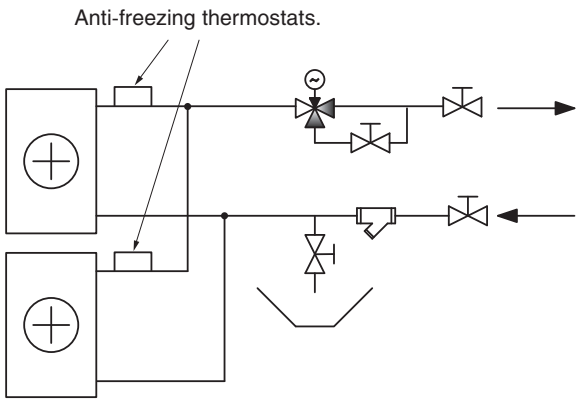
Control system of air curtains with water-to-air heat exchanger wiring diagram (2 motors connection option)



Hydraulic Piping Scheme for Air Curtain Heat Exchanger

Two system configurations with 2 racks for one gateway: heat exchangers shall be connected in parallel.

Hand operated valve is required for setting of minimum water flow rate in idle mode for the purpose of heat exchanger temperature maintaining and freezing protection. Flow rate is set upon system adjustment. Minimum flow rate may be set by means of stop (terminal position) setting on the drive. In that case hand operated valve is not required.



Example of reference designation:
ШАУЗ-В-380-2-2х1,5-IP54 ТУ 3430-023-64600223-2011, where:
ШАУЗ – Air Curtain Automatic Control Cabinet;
В – Water-heated air;
380 – Power supply voltage is 380V;
2 – Two operated devices (two air curtain sections);
2х1,5 – Fan power is 1.5kW per section;
IP54 – Protection against dust limited ingress and water sprayed from all directions;
ТУ – Designation of specification.

Designation

System is designed to control water-heated air curtains (see pp. 77-82).

Основные характеристики

Control system is comprised of the following components:

- Automation and control cabinet ШАУЗ-В-Мод (ShAUZ-V-Mod);
- Coolant control unit RUZ (see p.198);
- Return water thermostat;
- Room thermostat (shut down delay);
- Limit switch.

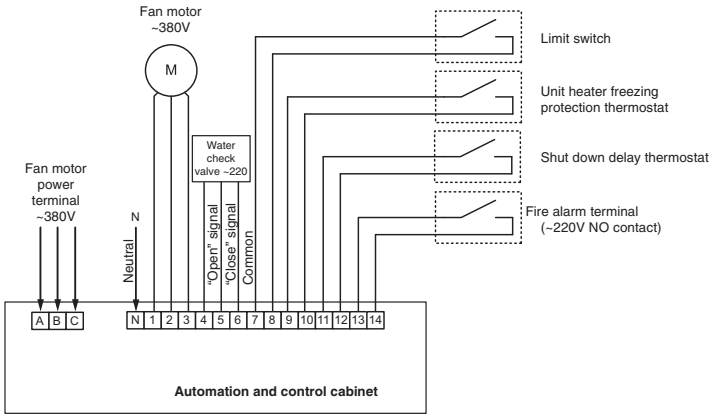
Casing material: impact-resistant self-extinguishing thermoplastic.
Overall dimensions: 300x410x153 mm.
Weight, max: 3.7kg.

Functionalit

Control system provides the following standard functionality:

- Manual startup and stop of air curtain with ШАУЗ-В-Мод (ShAUZ-V-Mod);
- Automatic startup and stop using external contact (limit switch);
- Fan motor control and protection (3 phases, ~380V);
- Heating water check valve actuator control in open/close mode (~220V);
- Unit heater freezing protection;
- Operating mode indication;
- Shut down delay until the specified temperature in the gate area is reached;
- Fire alarm actuated shut down (closing contact by default).

Water-heated air curtain control and automation cabinet connection diagram



Example of reference designation:
ШАУЗ-В-Мод-380-1-1,1-IP55 ТУ 3430-023-64600223-2011, where:
ШАУЗ – Air Curtain Automatic Control Cabinet;
В – Water-heated air;
Мод – in a plastic modular casing;
380 – Power supply voltage is 380V;
1 – single operated device (single air curtain section);
1,1 – Fan power is 1.1kW per section;
IP55 – Protection against dust limited ingress and water sprayed from all directions;
ТУ – Designation of specification.

Application

The system is designed for control of air curtains with electric heat exchanger.

Main Characteristics

The control system includes the following components:

- Control cabinet ШАУЗ-Э (ShAUZ-E);
- Power cabinet ШС (ShS);
- Room air temperature regulator (shut-down delay);
- Terminal switch.

ШАУЗ-Э (ShAUZ-E) provides fan motor control, electric heat exchanger control using ШС (ShS), electric heat exchanger protection against overheating, as well as control circuits and fan motor circuits overloading and short circuit protection.

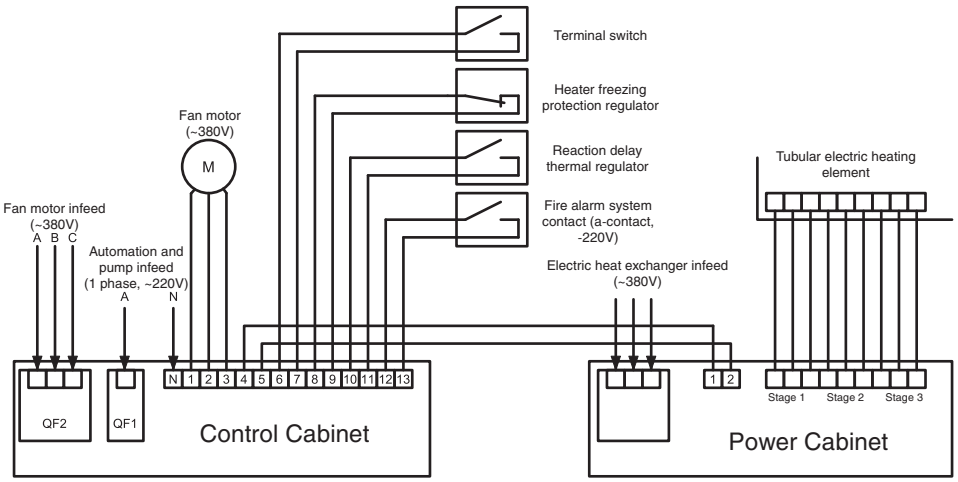
ШС (ShS) provides electric heat exchanger commutation and protection against overloading and short circuit.

Functions

A standard control system provides the following functions:

- Manual air curtain start-up and shut-down using ШАУЗ-Э (ShAUZ-E);
- Remote start-up and shut-down using external contact (Terminal switch);
- Electric heat exchanger protection against overheating;
- Fan motor control and protection (3 phases, -380V);
- Shut-down delay until reaching of set temperature in gateway area;
- Shutting down on a signal from fire alarm system (closing contact by default).

Control system of air curtains with electric heat exchangers wiring diagram (1 motor connection option)



Example of reference designation:
ШАУЗ-Э-380-2-2x1,5-IP54 ТУ 3430-023-64600223-2011, where:
ШАУЗ – Air Curtain Automatic Control Cabinet;
Э – Electric air heating;
380 – Power supply voltage is 380V;
2 – Two operated devices (two air curtain sections);
2x1,5 – Fan power is 1.5kW per section;
IP54 – Protection against dust limited ingress and water sprayed from all directions;
ТУ – Designation of specification.

ШС-380-45-IP54 ТУ 3430-023-64600223-2011, where:
ШС – Power cubicle;
380 – Power supply voltage is 380V;
45 – Heating power is 45kW;
IP54 – Protection against dust limited ingress and water sprayed from all directions;
ТУ – Designation of specification.

Designation

PRUZ is designed for adjustment of heating water flow rate in heat-exchangers of air curtains and unit heaters (see p.195).

Composition

RUZ is comprised of the following components:
- ◆ Electrically actuated water three-way check valve;
- ◆ x2 lever-action ball valve;
- ◆ Strainer;
- ◆ Hand-operated water regulation valve;
- ◆ Air relief cock;
- ◆ Water drain cock;
- ◆ Pipe connections and fittings.

RUZ provides control of heating water flow through heat-exchanger and accordingly adjustment of air temperature at the outlet of heat-exchanger. Hand-operated regulation valve is used on bypass to setup coolant minimum flow through the heat-exchanger for temperature maintenance in the standby mode.

Functionality

CRUZ provides the following standard functionality:
- ◆ Opening and closing of the check valve using 3-position electric actuator (~220V);
- ◆ Maintenance of the air heater temperature and protection against freezing in standby mode;
- ◆ Inlet water treatment using strainer;
- ◆ Hand-operated blocking of the forward and return pipelines;
- ◆ Manual air drain;
- ◆ Manual water discharge.

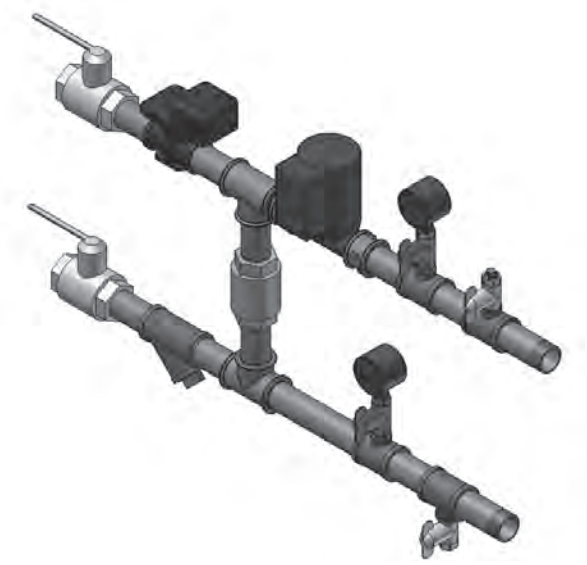
Optionally:
- ◆ Installation of circulating pump instead of the check valve;
- ◆ Installation of additional thermal gages in the forward and return pipelines.

Specification

РУЗ 3-XX-1 (RUZ 3-XX-1)									
Control Unit Designation	Coolant			Valve Kvs	Connection dimensions G	Actuator			
	Maximum Flow Rate [m³/hours]	Maximum Operating Pressure [MPa]	Maximum Operating Temperature [°C]			Supply voltage [V]	Control		Torque [N/m]
РУЗ 3-1,0-X	0,6	1,0	130	1	1”	220	2-х поз.	0-10 В	4
РУЗ 3-2,5-X	1,7	1,0	130	2,5	1”	220	2-х поз.	0-10 В	4
РУЗ 3-4,0-X	2,5	1,0	130	4	1”	220	2-х поз.	0-10 В	4
РУЗ 3-6,3-X	3,5	1,0	130	6,3	1 ¼”	220	2-х поз.	0-10 В	4
РУЗ 3-8,0-X	4,5	1,0	130	8	1 ¼”	220	2-х поз.	0-10 В	4
РУЗ 3-17-X	9	1,0	110	17	1 ¼”	220	2-х поз.	0-10 В	4
РУЗ 3-24-X	14	1,0	110	24	1 ¼”	220	2-х поз.	0-10 В	4

Designation

RUN is designed for adjustment of heating water flow rate in heat-exchangers of air handling units and central air conditioners (see p.185 and p.189).



Composition

RUN is comprised of the following components:

- Electrically actuated water two-way check valve;
- Circulating pump;
- x2 lever-action ball valve;
- Back-flow valve;
- Strainer;
- x2 Thermal gage;
- Air relief cock;
- Water discharge cock;
- Pipe connections and fittings.

RUN provides control of heating water flow through heat-exchanger and accordingly adjustment of air temperature at the outlet of heat-exchanger.

Functionality

RUN provides the following standard functionality:

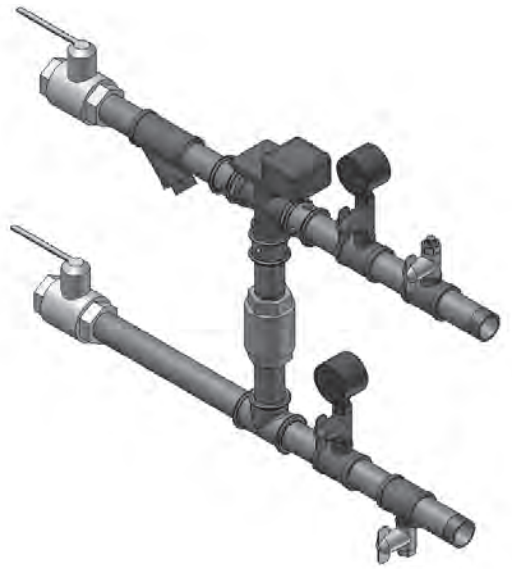
- Opening and closing of the check valve using 3-position electric actuator (~24V) or proportional electric drive (0-10V);
- Inlet water treatment using strainer;
- Hand-operated blocking of the forward and return pipelines;
- Measurement and indication of coolant pressure and temperature in forward and return pipelines;
- Manual air drain;
- Manual water discharge.

Specification

РУН-2-XX-1 (RUN-2-XX-1)									
Control Unit Designation	Coolant			Valve Kvs	Connection dimensions G	Actuator			
	Maximum Flow Rate [m³/hours]	Maximum Operating Pressure [MPa]	Maximum Operating Temperature [°C]			Supply voltage [V]	Control		Torque [N/m]
РУН-2-1,0-X	0,6	1,6	185	1,0	1”	~24В	3-х поз.	0-10В	6
РУН-2-1,6-X	1,0	1,6	185	1,6	1”	~24В	3-х поз.	0-10В	6
РУН-2-2,7-X	1,7	1,6	185	2,5	1”	~24В	3-х поз.	0-10В	6
РУН-2-4,2-X	2,2	1,6	185	4,0	1”	~24В	3-х поз.	0-10В	6
РУН-2-5,6-X	3,1	1,6	185	6,3	1 ¼”	~24В	3-х поз.	0-10В	6
РУН-2-10-X	5,5	1,6	185	12	1 ¼”	~24В	3-х поз.	0-10В	6
РУН-2-16-X	10	1,6	185	16	2”	~24В	3-х поз.	0-10В	6
РУН-2-27-X	15	1,6	185	24	2”	~24В	3-х поз.	0-10В	6
РУН-2-39-X	21	1,6	185	41	2 ½”	~24В	3-х поз.	0-10В	7

Designation

RUH is designed for adjustment of cold water flow rate in heat-exchangers of air handling units and central air conditioners (see p.189).



Composition

RUH is comprised of the following components:

- Electrically actuated water three-way check valve;
- x2 lever-action ball valve;
- Back-flow valve;
- Strainer;
- x2 Thermal gage;
- Air relief cock;
- Water discharge cock;
- Pipe connections and fittings.

RUH provides control of heating water flow through heat-exchanger and accordingly adjustment of air temperature at the outlet of heat-exchanger.

Functionality

RUH provides the following standard functionality:

- Opening and closing of the check valve using 3-position electric actuator (~24V) or proportional electric drive (0-10V);
- Inlet water treatment using strainer;
- Hand-operated blocking of the forward and return pipelines;
- Measurement and indication of coolant pressure and temperature in forward and return pipelines;
- Manual air drain;
- Manual water discharge.

Specification

РУХ-3-XX-1 (RUH-3-XX-1)									
Control Unit Designation	Coolant			Valve Kvs	Connection dimensions G	Actuator			
	Maximum Flow Rate [m³/hours]	Maximum Operating Pressure [MPa]	Maximum Operating Temperature [°C]			Supply voltage [V]	Control		Torque [N/m]
РУХ-3-8-X	5	1,0	185	8	1”	~24В	3-х поз.	0-10В	6
РУХ-3-15-X	9	1,0	185	15	1 ¼”	~24В	3-х поз.	0-10В	6
РУХ-3-17-X	12	1,0	185	17	2”	~24В	3-х поз.	0-10В	6
РУХ-3-24-X	17	1,0	185	24	2”	~24В	3-х поз.	0-10В	6
РУХ-3-31-X	21	1,0	185	31	2”	~24В	3-х поз.	0-10В	6
РУХ-3-41-X	29	1,0	185	41	2”	~24В	3-х поз.	0-10В	6
РУХ-3-63-X	36	1,0	185	63	2 ½”	~24В	3-х поз.	0-10В	6