WELLHEAD HEATING UNIT

Operation and Maintenance Instruction Manual

Shandong Beichen Mechanical&Electrical Equipment Co.,Ltd.

Contents

1. Purpose

The wellhead heating unit is a complete heat exchange device composed of an organic combination, capable of performing steam-air and water-air heat exchanges. Users only need to connect the pipes and power supply to use it. This series of units is used to heat the incoming air in coal mine shafts during winter, with the heated air mixed with natural wind before entering the mine, keeping the underground temperature above 2°C.

2. Structural Features

The wellhead heating unit mainly consists of an air heater (finned tube heat exchanger), fan, valve piping, frame, instruments, and electric control cabinet. It has the following features:

2.1 Low resistance, low power consumption of the fan.

2.2 Automatic control of outlet air temperature, energy-saving.

2.3 Heat exchanger is not prone to dust accumulation.

2.4 The unit is easy to clean, with both ends of the heat exchanger visible.

2.5 The unit is equipped with manholes for easy maintenance.

2.6 Multiple control modes (automatic, manual, fixed frequency manual, variable frequency manual).

2.7 Can automatically control the wind temperature in the shaft, adjusting the number of fans based on temperature.

2.8 The inverter allows for soft starting of the fan, extending its service life.

2.9 Intelligent modification of operating parameters is possible.

2.10 Self-diagnosis and self-handling of faults, with sound and light alarm functions and remote transmission capabilities.

2.11 Simple operation, no need for dedicated supervision.

3. Unit Installation

3.1 The unit can be directly placed horizontally on a concrete foundation indoors (100mm above the ground) or on the ground, fixed with anchor bolts.

3.2 Pay attention to the direction of pipe connections and ensure ease of operation, leaving 500mm of working space around.

3.3 When installed on an upper floor, only verify the load capacity of the floor.

3.4 All interface connections on the unit must be cleaned before piping connections.

3.5 During installation and lifting, ensure smooth lifting to avoid twisting, deformation, and damage to the unit.

3.6 Install a damper at the connection between the unit's outlet and the main duct for easy maintenance.

3.7 Electrical Installation

3.7.1 This electric control cabinet is a vertical cabinet.

3.7.2 Please install the electric control cabinet vertically on a flat

installation surface.

3.7.3 Since some electrical components inside the control cabinet may generate heat, ensure there is space around the cabinet.

3.7.4 Leave more than 400mm of maintenance space at the back of the control cabinet.

3.7.5 Installation method: embed the conduit needed for each monitoring and control point at the installation trench of the control cabinet, securely fix the U-shaped steel channel to the trench, and then firmly secure the control cabinet.

4. Unit Operation

4.1 The heat source system connected to the unit must be unobstructed and leak-free before the unit can be started.

4.2 Before starting the unit, all valves must be closed. First, start the fan, then gradually open the steam inlet valve, condensate discharge valve, and bypass valve. After draining the water, open the valves before and after the condensate separator and close the bypass valve.

4.3 Once the system reaches stable operation, record various temperature and pressure values regularly.

4.4 When stopping operation, first close the steam inlet valve and then turn off the fan after five minutes.

4.5 In winter, it is essential to close the interface valves and drain the water to

prevent pipes from freezing and bursting.

5. Control System

The control system is divided into the operational electric control cabinet and the backup electric control cabinet. The operational control cabinet is for normal operation. When a fault occurs in the operational control cabinet, the backup control cabinet is used to manually start the heater.

5.1 The operational electric control cabinet is equipped with a touch screen, PLC, inverter, and instruments. It has both manual and automatic control modes, selectable on the touch screen.

5.2 Manual: Users can select fixed frequency or variable frequency startup for each fan via the touch screen.

Note: The four fans have interlocking in variable frequency mode, allowing only one fan to start in variable frequency at the same time.

5.3 Automatic: When users select automatic, the PLC automatically controls the number of fans based on the temperature in the shaft, enabling automatic cyclic operation of the fans for balanced operation.

5.4 The operational electric control cabinet is equipped with intelligent instruments that can display the shaft temperature and set temperature in real time, allowing users to set the shaft temperature as needed.

5.5 The inverter code must be set by skilled operators according to the inverter manual and should not be changed arbitrarily.

5.6 The backup electric control cabinet only has manual startup for the four fans. Users can start and stop the fans using the start-stop button on the cabinet door and monitor fan operation through the indicator lights.

6. Unit Maintenance

6.1 During normal operation, regular maintenance and cleaning should be performed.

6.2 Check whether the fan is overheating and if the filter is clogged.

6.3 Observe for any abnormal vibrations or sounds.

6.4 Ensure there are no abnormalities in the equipment placement area.

6.5 Conduct regular electrical checks:

6.5.1 Check for any abnormalities in the electric control cabinet.

6.5.2 Check for any abnormalities in the on-site instruments.

7.Important Notices

7.1 Operating Instructions

All personnel involved in the installation and maintenance of the heating unit should carefully read this manual and fully understand each requirement.

7.2 Safety Instructions

The heat exchange unit operates with high-temperature or low-temperature fluids under certain pressures. Therefore, safety must be the top priority when operating the unit!

To ensure safety, please follow these instructions:

a) Operate the unit completely according to the environment planned for its use.

b) Do not operate this device alone until all necessary protective devices are installed.

c) Maintenance and repair work can only be conducted when the unit is at zero pressure, power to the unit and heat source is turned off, and the temperature is between 10°C and 40°C.

d) Prevent unauthorized personnel from accessing the equipment. Maintenance under operating conditions is strictly prohibited; measures must be in place to prevent burns from high temperatures, injuries from high pressure, and electric shocks.

f) It is strictly forbidden to operate the equipment beyond designed parameters, such as overheating or overpressure.

Note: Any technical changes to this product will not be further notified; please refer to the accompanying product documentation.