HKS 5.5KW (7.5HP 220V)

HKS 5.5KW (7.5HP 220V) Variable Frequency Drive User Manual

Brand: HKS | **Model:** 5.5KW (7.5HP 220V)

1. Introduction and Overview

This manual provides essential information for the safe and efficient operation of your HKS 5.5KW (7.5HP 220V) Variable Frequency Drive (VFD). This VFD is designed for precise motor speed control in various applications, including CNC routers and spindle motors. It features advanced PMW control technology for low noise and electromagnetic interference, along with robust protection mechanisms to ensure a long service life. The HKS VFD supports both single-phase and three-phase 220V input, providing a three-phase 0-400Hz output. It has an input current of 25A and an output current of 36A.

2. Safety Information

ATTENTION:

- Please select a VFD model with a power rating greater than 15% of the load. If you intend to control a motor, ensure it is a 3-phase asynchronous motor before purchasing.
- To protect the VFD, always press the red "Stop" button and turn off the power when you finish using it. Be aware that when the VFD is operating, the internal heat sink may reach approximately 176°F (80°C), please pay attention to the protection measures!
- No switch should be installed directly between the VFD and the load. For switch functionality, refer to the specific wiring diagram section in this manual.
- Always use the Δ (Delta) wiring method for the load terminals.
- Refer to the provided diagrams for proper 220V single-phase power connection methods.

3. Product Features

- **Intuitive Display and Buttons:** The VFD features a user-friendly display and control buttons for quick setup and operation. The control panel is detachable for remote control applications.

- **Various Protection Mechanisms:** Includes overload protection, fuse protection, overvoltage protection (DC voltage > 400V), undervoltage protection (DC voltage < 200V), restart protection, stall protection, short circuit protection, and overheat protection.
- **Good Noise Control:** Achieves low noise and electromagnetic interference through excellent PMW control technology and optimized component compatibility design.
- **Efficient Cooling:** Designed with ample space for cooling between components and multiple ventilation holes in the casing, contributing to a longer service life.

4. Specifications

Specification	Value
Model Name	VFD 5.5KW 7.5HP
Power	5.5KW (7.5HP)
Input Voltage	AC 220V (180-250V)
Output Voltage	220V
Input Current	25A
Output Current	36A
Input Frequency	40-60HZ
Output Frequency	0-400HZ
Input Phase	Single-phase or Three-phase
Output Phase	Three-phase
Product Dimensions	10 x 7 x 6 inches
Item Weight	6.29 pounds
Manufacturer	HKS
Recommended Uses	CNC router, Spindle motor, Industrial machinery

Figure 1: HKS VFD with key dimensions for installation planning.

5. Setup and Installation

5.1. Power Connection

Before connecting power, ensure the VFD is powered off and disconnected from any power source. Remove the terminal cover to access the wiring terminals.

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Video 1: Demonstration of how to connect power to the VFD (0:56 - 1:33).

This video illustrates the process of connecting the power supply to the VFD's terminals. It shows the removal of the terminal cover, the connection of wires to the R, S, and T terminals for three-phase power, and emphasizes ensuring a 220V (±15%) voltage difference for single-phase connections.

Wiring Tip: Connect the 3-phase power to the R, S, T terminals. If using single-phase power, connect to R and T terminals separately to ensure a voltage difference of approximately 220V (±15%) between the two lines.

Figure 2: Simplified power connection diagram for the VFD.

5.2. Basic Connection Diagram

The following diagram illustrates the internal and external wiring connections for the VFD, including control signals and motor connections.

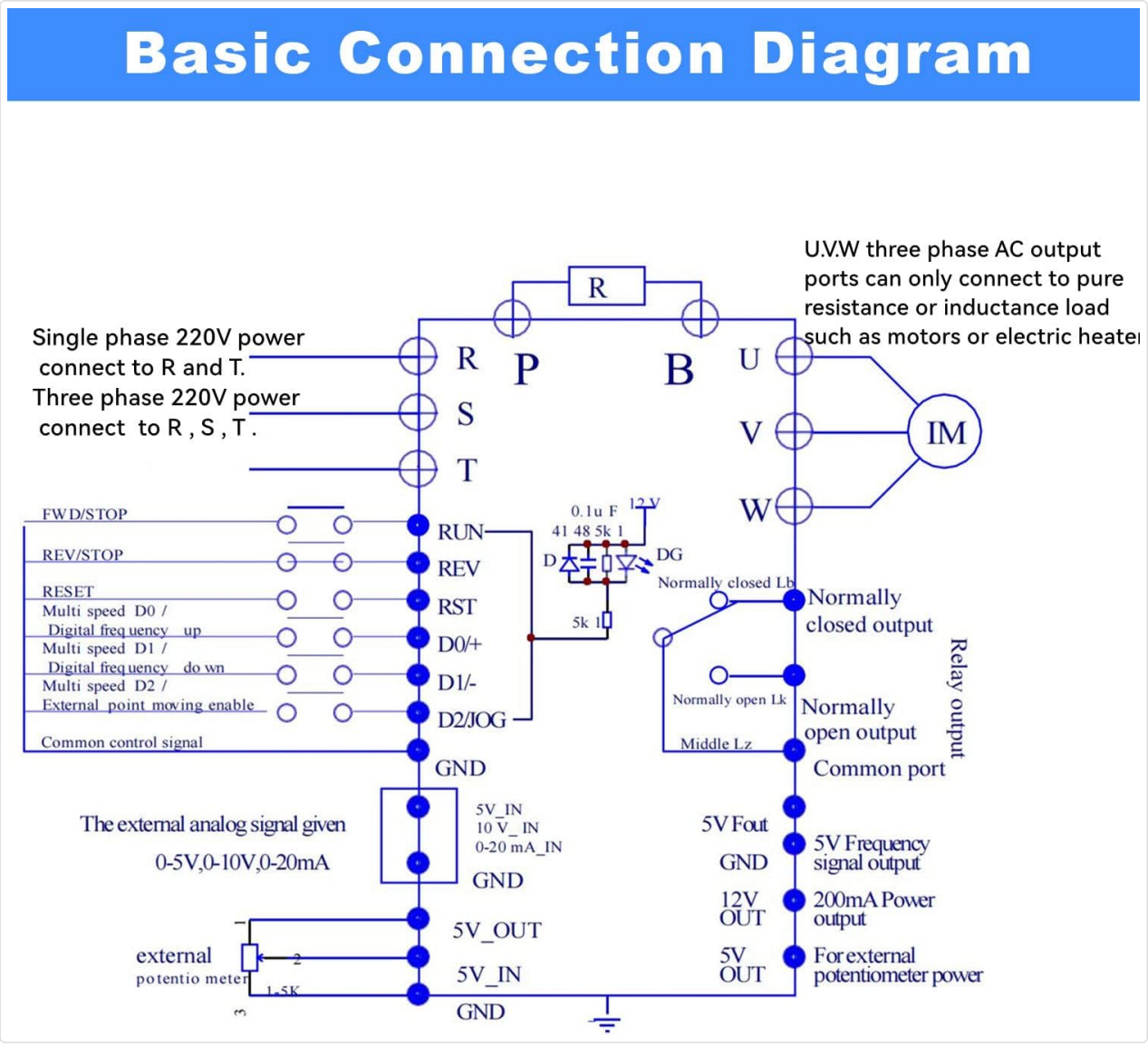

Figure 3: Comprehensive basic connection diagram for the HKS VFD.

5.3. Control Panel Overview

The VFD features an intuitive control panel for easy operation and parameter adjustments. The panel can also be detached for remote control.

Figure 4: Detachable control panel for the HKS VFD.

Button	Description
RUN STOP	When the inverter is idle, press this key to start the inverter running, and press it again to stop the inverter running.
STOP RESET	It has different meanings to push this button during different modes: 1.if the inverter is running, it would stop; 2. If a fault happens, the inverter would be reset; 3. If it is operated on menu, it returns to parent menu.
REV	Change the inverter's direction. It also works during the runtime.
SET	Press this key to enter the menu setting, if in the menu sub item, press this key to save this menu parameter and go to the next level menu item.
▲▼	Menu item selection and sub item data modification.
◀▶	Menu item content modification select -ion or inverter jogging button.
Adjustment Knob	To control the frequency.

Content	Description
ERROR	Fault indicator.
FWD	Clockwise rotation indicator.
REV	Anticlockwise rotation indicator.
ANALOG	Analog input frequency indicator.
SEGMENT	Segment input frequency indicator.
PANEL	Panel input frequency indicator.
Digital LCD	Inverter runtime frequency. If inverter stops, it flashes. The display data is given by "Pn01" data.

Figure 5: HKS VFD Control Panel with button and indicator descriptions.

6. Operating Instructions

6.1. VFD Initialization Parameter Setting Guide

Follow these steps to initialize and set basic parameters for your VFD. This guide is primarily for 50Hz parameters and three-phase asynchronous motors. For other loads or complex needs, consult the manual chapters 5 to 7 or contact customer service.

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Video 2: VFD Initialization Parameter Setting Guide (1:34 - 2:54).

This video demonstrates the step-by-step process of setting initial parameters on the VFD's control panel, including parameter management, initial start-up frequency, source of runtime frequency, source of runtime command, maximum runtime frequency, and motor rating frequency.

1. Set **pn32** (Parameter management) = **6** (initialization for 50Hz parameters).
2. Set **pn02** (Initial start up frequency by panel or other external signal) =**Load rating frequency**.
3. Set **pn03** (Source of runtime frequency) = **2** (Panel button).
4. Set **pn04** (Source of runtime command) = **1** (Panel button control).
5. Set **pn10** (Maximum runtime frequency) = **Load rating frequency**.
6. Set **pn12** (Motor rating frequency).

6.2. Jog Function

The Jog function allows for momentary operation of the motor. Use the JOG buttons on the control panel.

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Video 3: Jog Function Demonstration (2:55 - 3:13).

This video demonstrates how to use the JOG function. Pressing the FWD button illuminates the green FWD light, indicating forward rotation. Pressing the REV button illuminates the red REV light, indicating reverse rotation.

6.3. VFD Use Parameter Setting Guide Flowchart

Figure 6: Flowchart for VFD Parameter Setting.

7. Maintenance

Regular maintenance ensures the longevity and optimal performance of your HKS VFD. Perform the following checks periodically:

- **Cleaning:** Keep the VFD unit clean and free from dust and debris. Use a soft, dry cloth for external cleaning. Ensure ventilation openings are clear.
- **Connection Inspection:** Periodically check all wiring connections (power input, motor output, control signals) for tightness and signs of wear or corrosion. Loose connections can lead to overheating or malfunction.
- **Environmental Conditions:** Ensure the VFD operates within its specified environmental conditions (temperature, humidity, vibration). Avoid exposing the unit to excessive moisture or corrosive substances.
- **Fan Check:** Verify that the cooling fan is operating correctly and is not obstructed. A malfunctioning fan can lead to overheating.

8. Troubleshooting

This section provides guidance for common issues you might encounter with your HKS VFD. For more complex problems, refer to the detailed manual or contact customer support.

Common Issues and Solutions:

- **No Power/Display Off:**
  - Check input power supply and circuit breaker.
  - Verify all power connections are secure.
- **Motor Not Running:**
  - Ensure the VFD is in RUN mode.
  - Check motor wiring (Delta connection recommended).
  - Verify parameter settings (e.g., pn02, pn03, pn04, pn10, pn12) are correct for your motor and application.
  - Check for any error codes on the display.
- **Overcurrent (OC) Error:**
  - This can occur if the motor load is too high or during rapid acceleration/deceleration.

- Ensure the VFD's power rating is sufficient for your motor (at least 15% higher than load).
- Adjust acceleration/deceleration times (pn08, pn09) to be longer.
- Check for motor short circuits or ground faults.

- **Overvoltage (OV) Error:**
  - Often occurs during rapid deceleration.
  - Increase deceleration time (pn09).
  - Consider adding an external braking resistor if the issue persists and rapid deceleration is required.

- **Overheat (OH) Error:**
  - Check for proper ventilation around the VFD. Ensure cooling fan is working.
  - Clean any dust or obstructions from the heat sink and fan.
  - Reduce ambient temperature if possible.

9. Warranty and Support

For any questions or technical assistance beyond the scope of this manual, please contact HKS customer service. Our professional engineers are available to help resolve any issues you may encounter as quickly as possible.
Please note that the demonstration in this manual is primarily for three-phase asynchronous motors. If you are connecting other types of loads, specific parameter settings (pn parameters) may need to be adjusted according to your application's requirements. Detailed information can be found in chapters 5 to 7 of the full manual (if available).