Fafeicy AT1-4000X

Fafeicy AT1-4000X Variable Frequency Drive User Manual

Model: AT1-4000X

1. Introduction

This manual provides detailed instructions for the installation, operation, and maintenance of the Fafeicy AT1-4000X Variable Frequency Drive (VFD). This VFD is designed for controlling 3-phase 4kW AC motors using a single-phase 220V input. It features optimized PWM control technology for low noise and electromagnetic interference, high torque, high accuracy, and a wide speed regulating range.
Key features include:

- Simple operation and wiring.
- Optimized PWM control technology for low noise and EMI.
- Good anti-trip performance and stability in various environments.
- High moment of force, high accuracy, and wide speed regulating range.



Figure 1.1: Fafeicy AT1-4000X Variable Frequency Drive, front angled view.



Figure 1.2: Key features of the AT1-4000X Variable Frequency Drive, highlighting high torque, accuracy, wide speed range, and anti-trip performance.

2. Safety Precautions

WARNING: Failure to follow these safety instructions may result in death, severe injury, or property damage.

- Always ensure the power supply is disconnected before wiring or performing any maintenance.
- Do not connect the U/V/W output terminals to the AC power supply; doing so will cause irreparable damage to the inverter.
- The inverter must not be installed on flammable surfaces or near flammable materials to prevent fire hazards.
- Ensure the ground terminal of the inverter is properly and securely grounded.
- Do not install the inverter in environments with explosive gases to avoid explosion risks.
- Only qualified professionals should perform wiring and internal work on the converter. The internal components operate under high voltage. Do not attempt to open the shell without proper training and precautions.

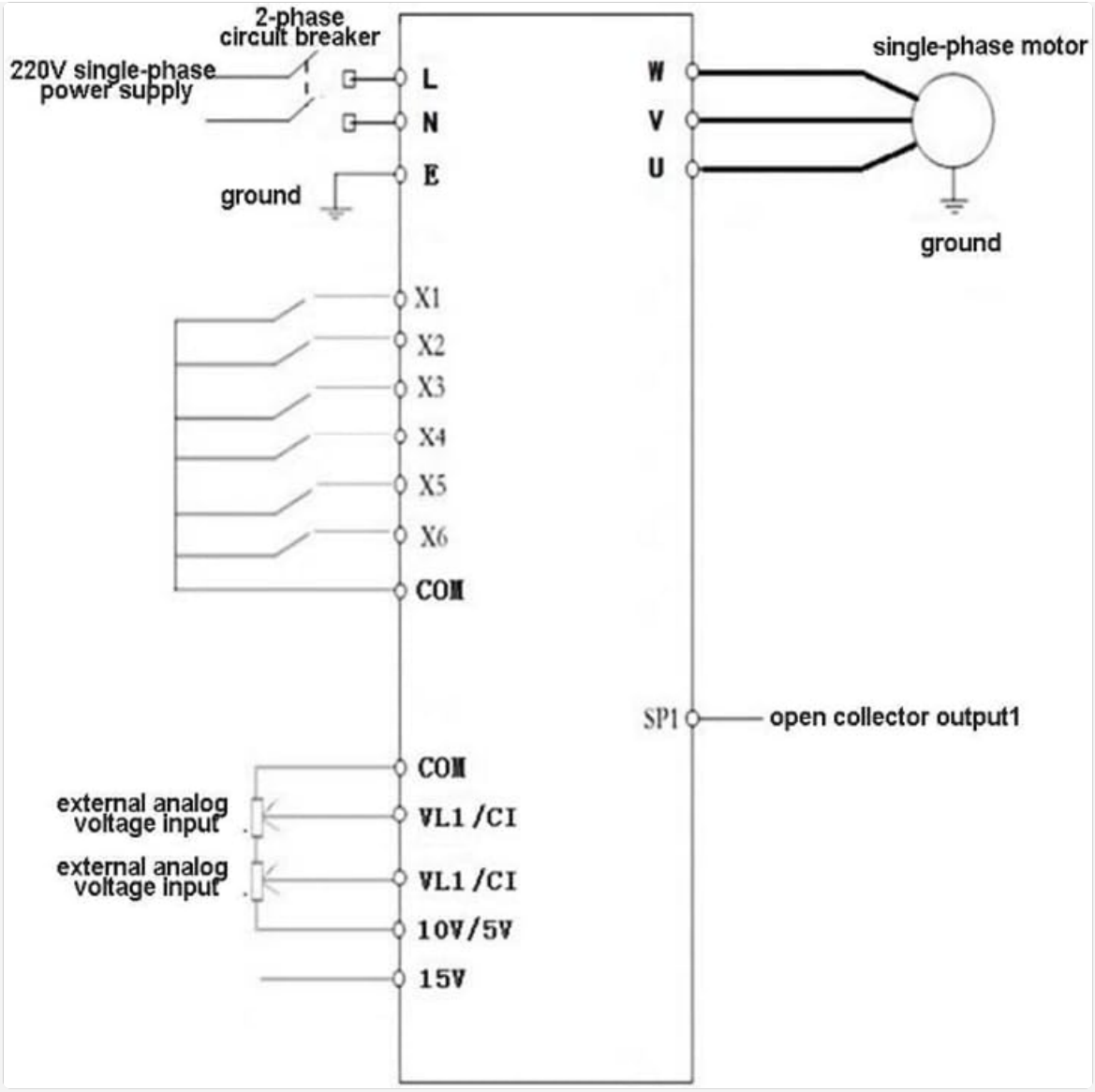


Figure 2.1: Safety precautions label located on the VFD unit.

3. Product Overview and Components

The Fafeicy AT1-4000X VFD consists of the main unit, a control panel with an LED display, and various input/output terminals.



Figure 3.1: Front view of the VFD, showing the control panel and safety label.



Figure 3.2: Top view of the VFD with the control panel removed, revealing the internal connection points.



Figure 3.3: Rear view of the VFD, showing the product label with model and capacity information.

3.1 Control Panel Layout

The control panel provides the interface for operating and programming the VFD. It features a 5-digit LED display and several control buttons.

Name	Function Description
DISP	Program mode shift, normal mode jog
FWD/REV	Forward and reverse switch keys
PROG	Select the normal mode or the programming mode (wh en the inverter is running or stopped, pressing this key is valid). When modifying the parameters, you must press this key to enter the programming mode.
FUNC/DATA	Normal mode: Press this key to display various information of inverter status, such as target frequency, output frequen cy and current temperature: Programming mode: Press this key to display the paramete r content, and press this key again to save the changed para meter value.
▲	Parameter number or parameter value incremented
▼	Parameter number or parameter value decreased
RUN	Operation in keyboard operation mode
STOP/RESET	Stop operation, fault reset

Figure 3.4: Detailed diagram of the control panel with button labels.

The main components of the control panel are:

- **5-digit LED display:** Shows operational data and parameter values.
- **DISP Button:** Program mode shift, normal mode jog.
- **FWD/REV Button:** Forward and reverse switch keys.
- **PROG Button:** Selects normal or programming mode. Press to enter programming mode when inverter is running or stopped.
- **FUNC/DATA Button:** In normal mode, displays information like target frequency, output frequency, current temperature. In programming mode, displays parameter content and saves changed parameter values.
- **Up Arrow (▲) Button:** Increments parameter number or value.
- **Down Arrow (▼) Button:** Decrements parameter number or value.
- **RUN Button:** Initiates operation in keyboard operation mode.
- **STOP/RESET Button:** Stops operation, performs fault reset.

Function Indicator Light

FWD= CW indicator------light on when it is rotating clockwise
REV= CCW indicator------light on when it is rotating counterclockwise
r/min=speed indictor------light on when it displays speed
H=frequency indictor------light on when it displays frequency
V=voltage indictor------light on when it displays voltage
A=current indictor------light on when it displays current

Figure 3.5: Table detailing the functions of each control panel button.

3.2 Function Indicator Lights

The LED display includes indicator lights to show the current status of the VFD:

- **FWD:** Clockwise (CW) indicator – lights up when rotating clockwise.
- **REV:** Counter-clockwise (CCW) indicator – lights up when rotating counter-clockwise.
- **r/min:** Speed indicator – lights up when displaying speed.
- **H:** Frequency indicator – lights up when displaying frequency.
- **V:** Voltage indicator – lights up when displaying voltage.
- **A:** Current indicator – lights up when displaying current.

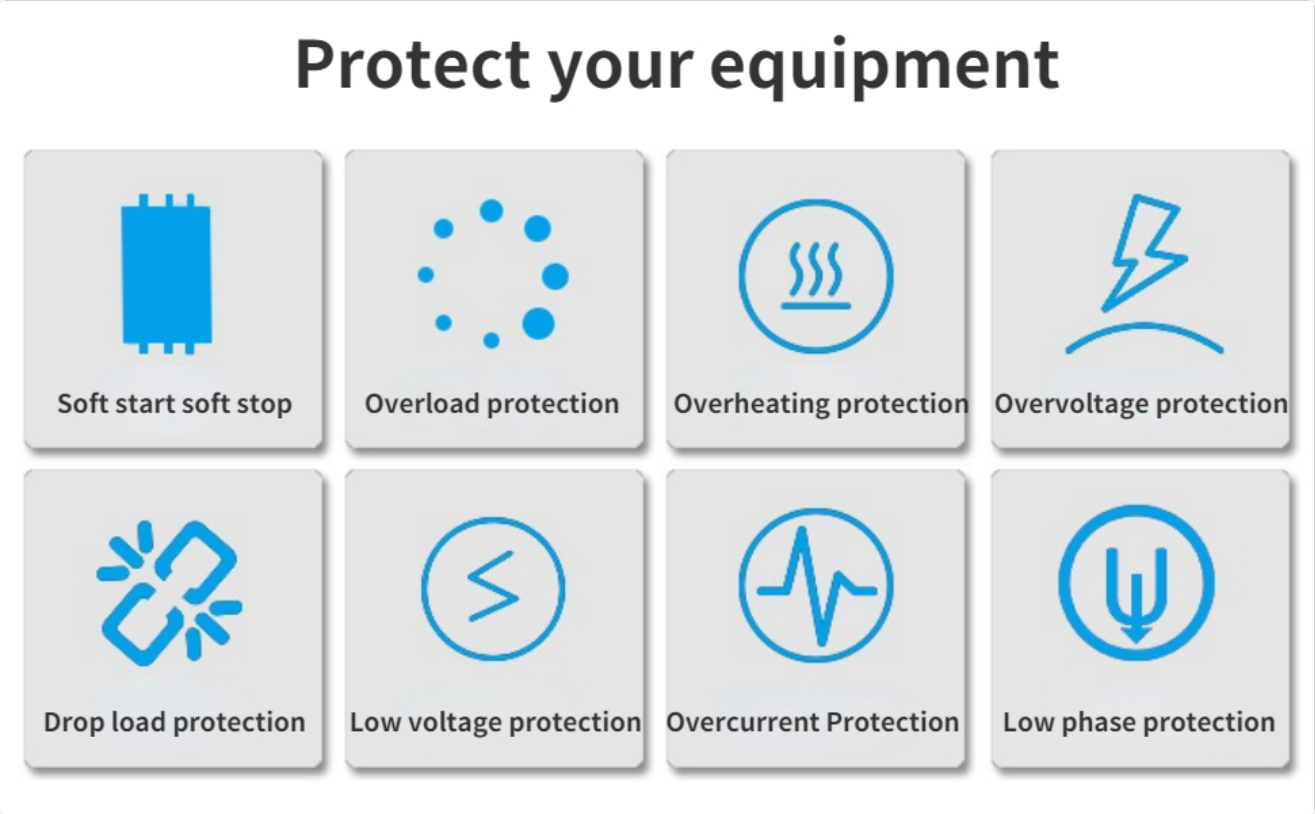


Figure 3.6: Diagram illustrating the function indicator lights on the VFD display.

4. Specifications

Attribute	Value
Model	AT1-4000X
Rated Voltage	AC220V (single phase)
Suitable Motor Power	4kW
Control Method	V/F open loop
Output Voltage Adjustable Method	PWM control
Material	Plastic + Aluminum
Item Weight	3.38 pounds
Product Dimensions	4.72 x 6.69 x 5.91 inches

Attribute	Value
Country of Origin	China

5. Setup and Installation

Proper wiring is crucial for the safe and effective operation of the VFD. Refer to the wiring diagram below for connections.

5.1 Wiring Connection Diagram



Figure 5.1: Basic wiring connection diagram for the AT1-4000X VFD.

Wiring Instructions:

- **Power Input (L, N, E):** Connect the 220V single-phase power supply to the L and N terminals. Ensure the ground (E) terminal is properly connected to earth ground. A 2-phase circuit breaker should be installed upstream for safety.
- **Motor Output (U, V, W):** Connect the 3-phase 4kW AC motor to the U, V, and W terminals. Ensure the motor's ground is also properly connected.
- **Control Terminals (X1-X6, COM):** These are input terminals for external control signals.
- **Analog Input (VL1/CI, 10V/5V, 15V, COM):** For external analog voltage input, typically for speed control.
- **Open Collector Output (SP1):** Provides an open collector output signal.
- **Relay Output (TA, TB, TC):** Optional relay output for control.

Note: This model (AT1) is designed for single input and three outputs. If connecting a 380V star connection motor, it needs to be reconfigured to a 220V delta connection for compatibility with this VFD.

6. Operation

Operating the Fafeicy AT1-4000X VFD involves using the control panel buttons to set parameters and control motor speed and direction.

6.1 Basic Operation

1. **Power On:** Ensure all wiring is correct and secure, then apply power to the VFD.
2. **Display Check:** The 5-digit LED display will light up, showing the current status or default frequency.
3. **Run/Stop:**
    - Press the **RUN** button to start the motor.
    - Press the **STOP/RESET** button to stop the motor.
4. **Forward/Reverse:** Press the **FWD/REV** button to switch the motor's rotation direction. The FWD or REV indicator light will illuminate accordingly.
5. **Adjusting Frequency/Speed:** Use the **Up Arrow (▲)** and **Down Arrow (▼)** buttons to adjust the output frequency, which in turn controls the motor speed.
6. **Display Information:** Press the **DISP** button to cycle through different display modes (e.g., frequency, speed, voltage, current).

6.2 Programming Mode

To access and modify advanced parameters:

1. Press the **PROG** button to enter programming mode. The display will show a parameter code.
2. Use the **Up Arrow (▲)** and **Down Arrow (▼)** buttons to navigate through parameter numbers.
3. Press the **FUNC/DATA** button to view the current value of the selected parameter.
4. While viewing the parameter value, use the **Up Arrow (▲)** and **Down Arrow (▼)** buttons to change the value.
5. Press the **FUNC/DATA** button again to save the new value.
6. Press the **PROG** button to exit programming mode and return to normal operation.

7. Protection Features

The Fafeicy AT1-4000X VFD is equipped with multiple protection features to ensure safe and reliable operation of both the VFD and the connected motor.

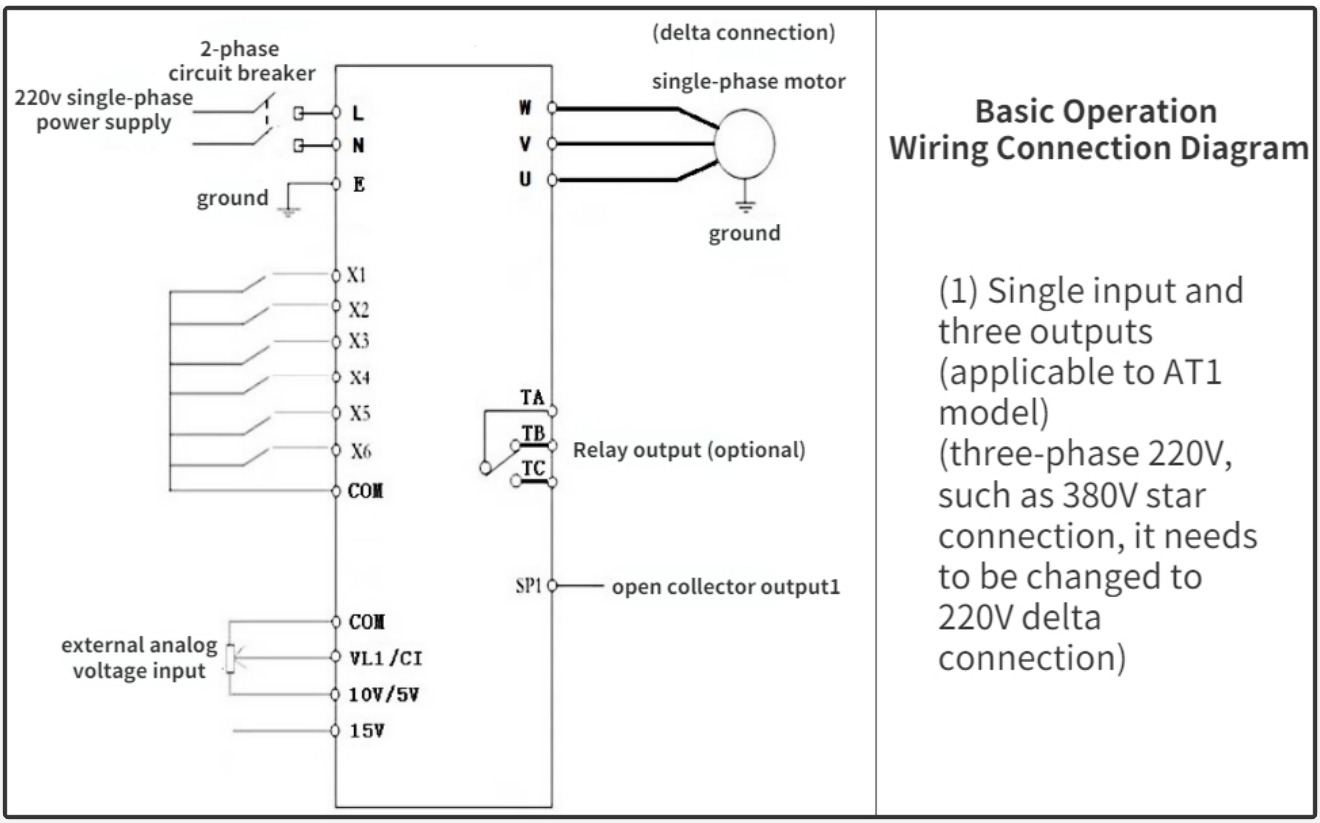


Figure 7.1: Icons representing the various protection features of the VFD.

- **Soft Start/Soft Stop:** Gradually ramps up and down motor speed to reduce mechanical stress and current surges.
- **Overload Protection:** Protects the motor and VFD from excessive current draw.
- **Overheating Protection:** Monitors internal temperature and shuts down if overheating occurs.
- **Overvoltage Protection:** Protects against excessive input voltage.
- **Drop Load Protection:** Detects and protects against sudden loss of motor load.
- **Low Voltage Protection:** Shuts down if input voltage drops below a safe operating level.
- **Overcurrent Protection:** Protects against sudden spikes in output current.
- **Low Phase Protection:** Detects and protects against missing input phases.

8. Maintenance

Regular maintenance helps ensure the longevity and optimal performance of your Fafeicy AT1-4000X VFD.

- **Cleaning:** Periodically clean the exterior of the VFD with a soft, dry cloth. Ensure ventilation openings are free from dust and debris to prevent overheating. Do not use liquid cleaners.
- **Connections:** Regularly check all wiring connections for tightness. Loose connections can lead to poor performance or damage.
- **Environment:** Ensure the VFD is operated within its specified environmental conditions (temperature, humidity, dust). Avoid excessive vibration.
- **Inspection:** Visually inspect the unit for any signs of damage, discoloration, or unusual odors.
- **Power Off Before Maintenance:** Always disconnect power to the VFD and wait for residual voltage to dissipate before performing any maintenance or inspection.

9. Troubleshooting

This section provides basic troubleshooting steps for common issues. For complex problems, contact Fafeicy customer support.

Problem	Possible Cause	Solution
VFD does not power on	No input power; Blown fuse/breaker; Incorrect wiring.	Check power supply; Inspect fuses/breakers; Verify wiring connections.
Motor does not run	VFD in stop mode; Incorrect frequency setting; Motor wiring issue; Overload.	Press RUN; Adjust frequency; Check motor connections; Reduce load.
Motor runs in wrong direction	Incorrect FWD/REV setting; Motor phase sequence.	Press FWD/REV button; Reverse two of the motor output phases (U, V, W).
Overload error displayed	Motor drawing too much current; Load too heavy.	Reduce motor load; Check motor for issues; Verify VFD capacity matches motor.
Overheat error displayed	Insufficient ventilation; High ambient temperature; Fan malfunction.	Ensure proper airflow; Lower ambient temperature; Check cooling fan.

If the problem persists after attempting these solutions, please contact Fafeicy customer support for further assistance.

10. Warranty and Support

For information regarding warranty coverage, technical support, or replacement parts, please refer to the warranty card included with your product or visit the official Fafeicy website. You can also contact Fafeicy customer service directly through their Amazon store page or contact information provided with the product packaging.
Fafeicy Store: Visit Fafeicy Store on Amazon

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