fanTR
TECHNOLOGY RESOURCES

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WE ALWAYS
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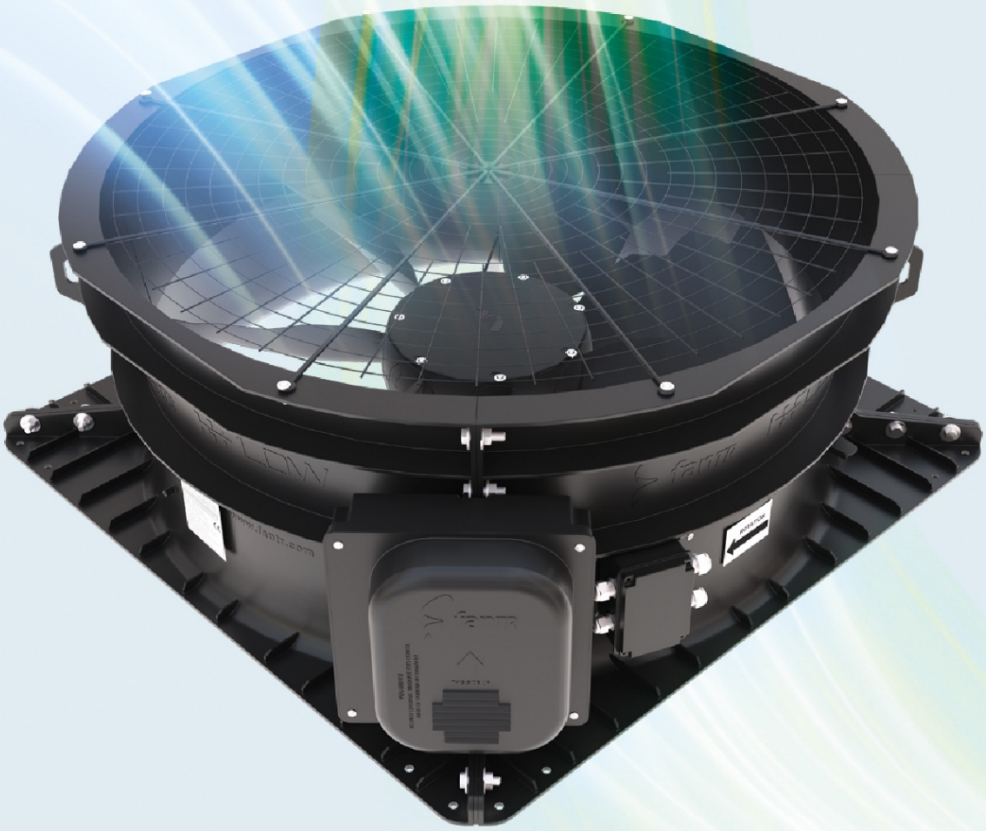
# OPERATION MANUAL

## FanTR H-FLOW Axial EC Fans

## with Synchronous Motor

Technical manual of industrial fans applied in cooling systems.

Description of the equipment, technical characteristics,
installation and maintenance.



Version 00

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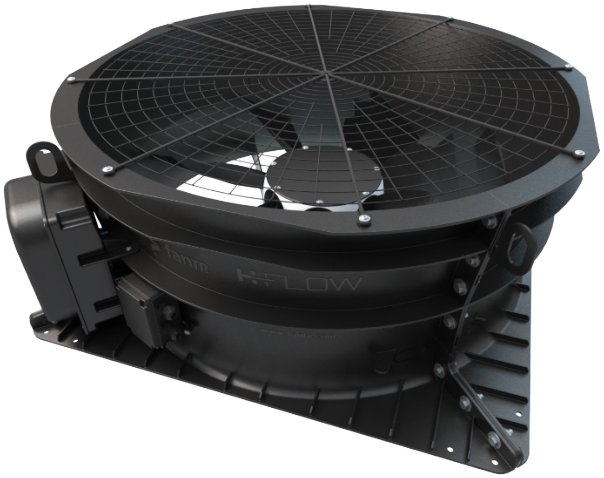
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# 1. Safety Instructions

## 1.1. Scope

This manual applies to FanTR H-FLOW Axial EC Fans with Synchronous Motors, designed for integration into industrial or commercial ventilation systems. Check the nameplate to verify the model and specifications.



## 1.2. Purpose

This document provides guidance on safe transport, installation, operation, maintenance, and disposal of the fan, ensuring compliance with safety and performance standards. It must be read before any interaction with the equipment.

## 1.3. Target Audience

Intended for qualified professionals in electrical, mechanical, or ventilation fields responsible for planning, installation, commissioning, or maintenance. Trainees must work under supervision.

# 2. Safety Instructions

## 2.1. Intended Use

The H-FLOW Axial EC Fan from FanTR was designed for circulating air or non-aggressive gases in ventilation systems. Any other use (e.g., conveying liquids, solids, or explosive gases) is prohibited unless expressly agreed with the manufacturer.

## 2.2. Improper Use

The following are prohibited:

- Operation in explosive atmospheres.
- Unauthorized modifications to the equipment.
- Use with frozen blades or outside specified conditions (e.g., temperature or voltage).
- Use as a standalone household appliance.

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## 2.3. Warning Symbols

**DANGER**
Immediate risk of death or serious injury.

**WARNING**
Potential risk of serious injury.

**CAUTION**
Risk of minor injury or equipment damage.

**NOTE**
Additional information for proper use.

## 2.4. Safety Requirements

**DANGER**

**Electrical hazards**
Disconnect power before any work, to prevent electric shock, which can cause death or serious injury.

**WARNING**

**Mechanical hazards**
Avoid contact with moving blades. Moving parts can cause severe injuries. Imperative to maintain the safety screen.

**WARNING**

**Thermal hazards**
Surfaces can become hot during operation; allow cooling before handling.

**CAUTION**

**Noise**
Sound levels may exceed 80 dB(A); wear hearing protection to prevent hearing damage.

**NOTE**

Only qualified personnel may perform installations or repairs. All operations must comply with applicable local and international safety regulations.

**NOTE**

The equipment was designed to perform with its original characteristics; it is not allowed any modifications without previous authorization from FanTR.

## 2.5. Operator Responsibilities

**NOTE**

Ensure the equipment is operated in perfect condition.

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**NOTE**

Keep this manual accessible and legible at the point of use.

**NOTE**

Conduct regular safety inspections.

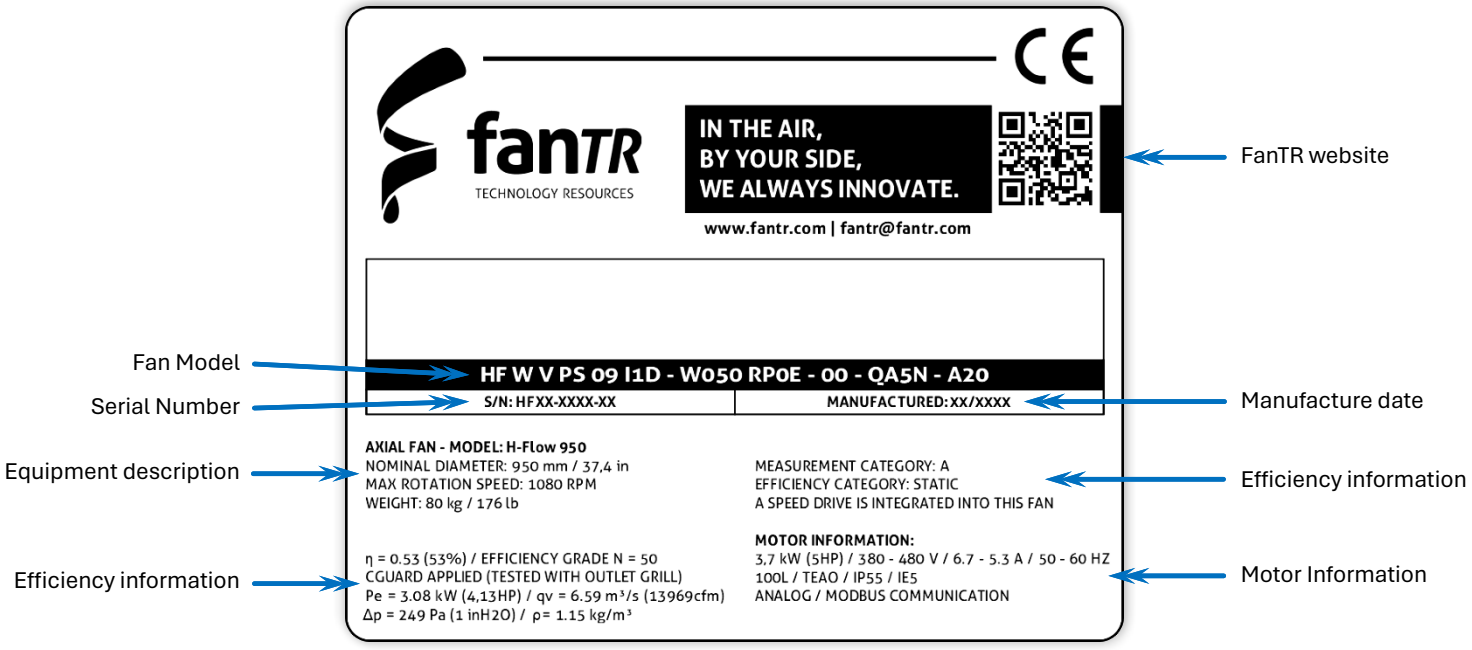
# 3. Product Description

## 3.1. Application

The fan is a component for ventilation systems, suitable for air circulation in industrial or commercial environments. It is not a standalone product and requires proper integration.

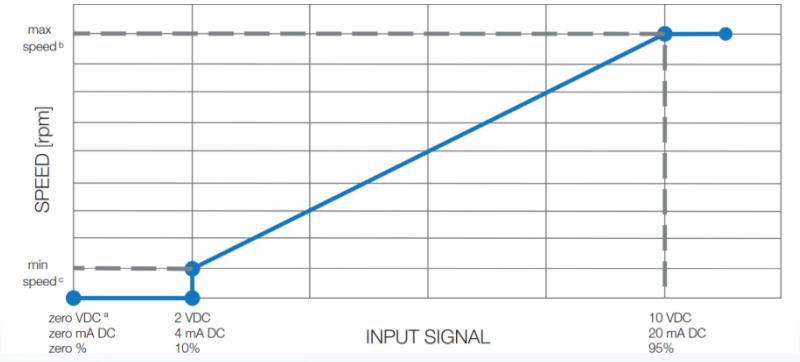
## 3.2. Fan Identification nameplate

The Fan Nameplate lists equipment information such as the Fan model, Serial Number (S/N), manufacture date, equipment description, weight and efficiency information, and motor information.




## 3.3. Operation

Equipped with a synchronous motor, the fan supports speed can be adjusted by DC voltage signal, DC current signal or frequency signal. The operating speed of the motor will be according to the figure below:




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## NOTE

The standard factory preset value for the maximum speed is the rated speed informed in the product nameplate.

The standard factory preset value for the minimum speed is 200 rpm for the rated 1500 rpm and 1800 rpm product and 500 rpm for the rated 3000 rpm product.

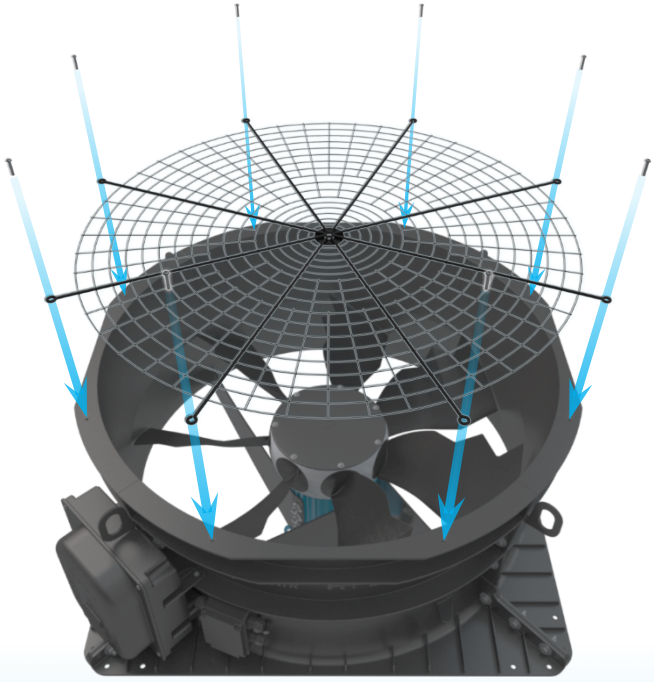
## NOTE

The H-FLOW fan is equipped with a VFD, it is protected inside a casing (highlighted in blue in picture below), it is imperative that air inlets are not obstructed and this casing is closed. To operate without this casing or with missing parts will affect fan capacity and the life of the VFD.



## WARNING

The H-FLOW is shipped without its outlet safety screen assembled. It is imperative to assemble it before starting the fan. High risk of injuries.



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### 3.4. Safety Features

- Protective screens to prevent contact with moving parts.
- Durable materials, resistant to vibration and corrosion.
- Thermal protection system to prevent overheating.

**WARNING**

Do not operate fan if protective guards are not properly installed.

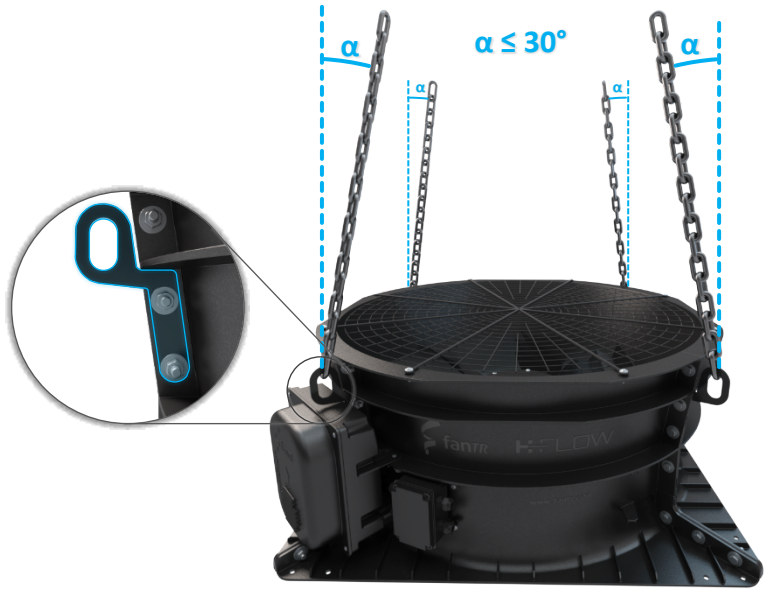
## 4. Transport and Storage

### 4.1. Transport

Check the weight on the nameplate and use appropriate lifting equipment.

**CAUTION**

- Do not lift the cable by the connection to prevent electrical damage. Use all four lifting slugs provided with the equipment. (highlighted in blue in picture below).
- Keep lifting equipment aligned vertically. Misalignment angles (α) must not exceed 30° (see picture below).
- Protect against impacts and moisture during transport. Risk of damaging the electric motor bearings.




**DANGER**

Do not walk under suspended loads.

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### 4.2. Storage

- The fans must be stored in a clean and dry room protected against dust, vibrations, gases and corrosive agents, and with temperatures between -25 ºC and 60 ºC and relative humidity not exceeding 60%.
- Maintain the fan in the position as it was delivered in the transport crate. Only remove the fan from the crate when ready to install.

**NOTE**

Rotate the rotor manually (10 rotations/month) if stored for over 6 months to prevent bearing damage.

- If it is necessary to remove the fan from the original crate, it is important to place the fan in a flat surface with blocks that allow to support the fan by its casing. Keep the electrical motor from touching the ground (illustrative suggestion below) to prevent motor damage.



## 5. Installation

### 5.1. General Precautions

- Inspect the fan for damage (e.g., cracks, damaged cables) before installation.
- Use high-strength bolts (class 8.8 or stainless steel A2-70) with recommended torques to attach the fan to the structure:
    - M10 Bolt, 25 N·m




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- Ensure a flat surface to prevent vibrations.

**WARNING**

Be sure that the fan is properly assembled with its protective screens.

**CAUTION**

Be sure that the fan inlet region is free from debris, loose parts, and other light materials that can be sucked by fan rotor, and damage fan internal components.

### 5.2. Installation Instructions

**CAUTION**

Lift the fan by its lifting slugs. Always use all four lifting lugs to lift the equipment.

**CAUTION**

Check the name plate to double check equipment weight. Use proper lifting equipment to withstand loads.

**NOTE**

Position the fan base on a flat surface properly designed to receive and withstand equipment weight and loads.

**NOTE**

Apply design torque to fixing bolts according to values described in section 5.1.

**CAUTION**

Remove debris, if any, (e.g., screws) from the intake area before operation.

**NOTE**

Make sure that after installation the rotor is free to rotate, and the fan is not touching the fan casing, under risk of severe damage to the impeller.

## 6. Electrical Connection

### 6.1. Safety Precautions

**DANGER**

Make sure the AC power supply is disconnected and protected against accidental energization before starting the installation. Contact with live parts can result in fatal injury.

Several components may remain charged with high voltage and/or in movement and may cause injuries to people, even after the AC power supply has been disconnected or turned off. Wait at least 10 minutes to guarantee the full discharge of capacitors. Always connect the equipment to the ground protection (PE).

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**WARNING**

- Contains permanent magnets. For pacemaker users, it is recommended to avoid close or prolonged contact with this product, as it may interfere with the proper operation of the device. Only qualified electricians may perform connections, per EN 50110.
- Regularly check for damaged cables and tighten loose connections.
- Ensure that local regulations regarding electrical installations are followed.
- To prevent accidents, ensure that the grounding connection has been performed according to the applicable standards.

## 6.2. Electrical Connection

**DANGER**

Connect the motor properly to the power supply by means of safe and permanent contact, always considering the data informed on the nameplate, such as rated voltage, wiring diagram, drive inputs, among others.

For power cables, switching and protection devices dimensioning, consider the rated motor current, the service factor, and the cable length, among others.

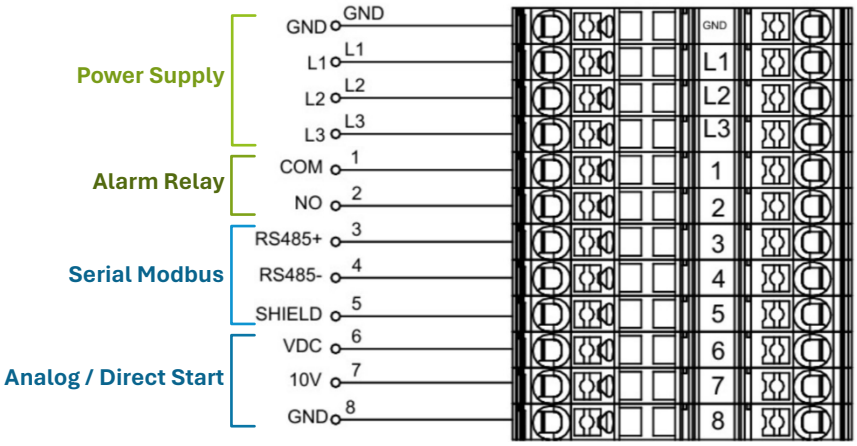
- Use voltage and frequency as specified in the Fan nameplate (e.g., 230/400 V, 50/60 Hz).
- Make the power connections following the terminals indicated, following the picture below.
- Three-phase (please find picture of connection terminals):
  - Power input: L1, L2 and L3 terminals
  - Protective earth: GND terminal

**DANGER**

Always connect the equipment to the ground protection (GND).

**CAUTION**

The power supply that feeds the inverter shall have a solid grounded neutral.




## 6.3. Control Connections

Make the connections according to the desired control type, according to the picture above.

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- Analog Control/Direct Start: terminals 6, 7 and 8 (VDC, 10V and GND).
- Serial Modbus Communication: terminals 3, 4 and 5 (RS485+, RS485- and SHIELD).
- Alarm relay: COM and NO terminals.

# 7. Commissioning

## 7.1. Prerequisites

Before starting the fan, verify:

1. Mechanical and electrical installation completed correctly.
2. Grounding connected.
3. Area free of debris or foreign objects.
4. Rotor rotates freely without abnormal noise.
5. Protective screens installed.
6. Nameplate data matches the electrical supply.

## 7.2. During Startup

- Confirm rotation direction (indicated on the nameplate or blades).
- Monitor vibrations; stop immediately if operation is irregular.

**WARNING**

Keep people and objects away from the danger zone during testing.

## 7.3. Serial Modbus Communication

The H-FLOW can be controlled through an RS-485 serial communication network using the Modbus RTU protocol. RS-485 communication allows remote monitoring, start/stop commands, speed reference adjustment, rotation direction selection, and diagnostic reading directly from a Building Management System (BMS), PLC, or supervisory controller.

To connect the H-FLOW to a computer, PLC, or BMS:

1. Disconnect the fan power supply.
2. Connect the RS-485 converter or controller terminals as follows:

| RS-485 Converter | Connection Terminal |
|---|---|
| A / D+ | RS 485+ |
| B / D- | RS 485- |
| GND | SHIELD |

3. Reconnect the fan power supply.

**NOTE**

Verify that the communication device uses Modbus RTU protocol.

The factory default communication parameters are:

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| Parameter | Default value |
|---|---|
| Protocol | Modbus RTU |
| Node Adress | 85 |
| Baud rate | 19200 bps |
| Data bits | 8 |
| Parity | Even |
| Stop bits | 1 |

Basic fan control registers are:

| Function code | | Register Address | | Description | Values (D): Default Value |
|---|---|---|---|---|---|
| Read | Write | Hex | Multicom V3 | | |
| R (04) | - | 0x0002 | 0002 | Read motor actual speed | |
| R (03) | W (06) | 0x01C3 | 0451 | Target speed | |
| R (03) | W (06) | 0x01C4 | 0452 | Modbus control run/stop | 0: stop 1: run |
| R (01) | W (05) | 0x00DF | 0223 | Target direction | 0: CW 1: CCW |
| R (04) | - | 0x0032 | 0050 | Read fault code | 0: no error |

**WARNING**

The H-FLOW shall only operate within the allowable speed range and parameters defined on the fan nameplate. values outside the permitted range may generate faults or unstable operation.

The full Modbus register map can be found below.

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### 7.3.1. Modbus Register Map

| Function code | | Register Address | | Description | Values (D): Default Value |
|---|---|---|---|---|---|
| Read | Write | Hex | Multicom V3 | | |
| R (04) | - | 0x0002 | 0002 | Read motor actual speed | |
| R (04) | - | 0x0003 | 0003 | Read LINK DC motor current | |
| R (04) | - | 0x0004 | 0004 | Read LINK DC bus voltage | |
| R (04) | - | 0x0005 | 0005 | Read frequency (motor) | |
| R (04) | - | 0x0007 | 0007 | Read output voltage (motor) | Calculation based on approximations from ventilation application -15 % tolerance. For other applications is required to consult WEG. |
| R (04) | - | 0x0008 | 0008 | Read analog input (VSP) | mV resolution |
| R (04) | - | 0x0009 | 0009 | Read analog input (ISP) | mA resolution |
| R (04) | - | 0x000A | 0010 | Read analog input (PWM) | 1 % resolution |
| R (04) | - | 0x0017 | 0023 | Read software version of mid-controller | |
| R (04) | - | 0x0018 | 0024 | Read firmware version of motor driver MCU | |
| R (04) | - | 0x0019 | 0025 | Read FCT max speed | |
| R (04) | - | 0x001A | 0026 | Read motor number | |
| R (04) | - | 0x001E | 0030 | Read IPM temperature | °C |
| R (04) | - | 0x0032 | 0050 | Read fault code | 0: no error |
| R (01) | W (05) | 0x00DC | 0220 | Local/Remote mode | 0: local mode<br>1: remote mode |
| R (01) | W (05) | 0x00DD | 0221 | Modbus control enable | 0: disable (D)<br>1: enable |
| R (01) | W (05) | 0x00DF | 0223 | Target direction | 0: CW<br>1: CCW |
| R (03) | W (06) | 0x0134 | 0308 | Modbus address | Valid range 0-99<br>85 (D) |
| R (03) | W (06) | 0x0136 | 0310 | Serial configure: baud rate | |
| R (03) | W (06) | 0x0137 | 0311 | Serial configure: parity & stop | |
| R (02) | - | 0x015E | 0350 | Relay state | 0: open<br>1: close |
| R (02) | - | 0x015F | 0351 | Motor status: running or stopped | 0: motor stopped<br>1: motor running |
| R (03) | W (06) | 0x0190 | 0400 | Safety speed | |
| R (01) | W (05) | 0x0191 | 0401 | Fire mode | 0: out fire mode<br>1: in fire mode |
| R (01) | W (05) | 0x0192 | 0402 | New serial configure enable | 0: no action<br>1: enable configure |
| R (03) | W (06) | 0x0193 | 0403 | Communication time-out period (Seconds) | Value in seconds<br>(Default: 0 - disabled) |
| R (03) | W (06) | 0x0194 | 0404 | Communication time-out period (ms) | Value in milliseconds<br>(Default: 0 - Disabled) |
| R (03) | W (06) | 0x01C2 | 0450 | Max speed | |
| R (03) | W (06) | 0x01C3 | 0451 | Target speed | |
| R (03) | W (06) | 0x01C4 | 0452 | Modbus control run/stop | 0: stop<br>1: run |

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## 7.4. Monitoring and Fault Diagnosis

Fault codes returned by register 0x0032 correspond to the motor protection system. Common fault cases and solutions are available below.

| Modbus Code (Hex) | Fault Description | Probable Causes | Solution | Fault Recovery |
|---|---|---|---|---|
| 0x01 | Under voltage | - Voltage supply lower than nameplate limitation- Input power cable connection problem- Hardware problem (Contact WEG) | - Check the power supply voltage- Check the input power cable connection | Recovers automatically after power supply recovers |
| 0x02 | Over voltage | - Voltage supply higher than specified in the nameplate | - Waiting power supplier recovered | Recovers automatically after power supply recovers |
| 0x03 | Over current | - Output drive current over the limit- Output drive short circuit | | Recovers automatically after power supply recovers |
| 0x04 | IPM over temperature | - High ambient temperature or lower cooling conditions than the minimum. (See user manual) | - Wait temperature recovery- Consult WEG if this problem persists | Recovers automatically after temperature gets lower than the limitation |
| 0x05 | Locked rotor | - Rotor blocked by mechanical problem- Load overload | - Check the motor / application status- Power on again | Reset the power supply |
| 0x06 | Communication timeout | - Communication fault between the user interface MCU and motor control MCU | - Reset the power supply- Consult WEG if this problem persists | Recovers automatically |
| 0x07 | Over load | - Load used over the motor maximum value- Higher ambient temperature than limitation | - Check the real load application (Measure current from drive to motor (2)- Measure the ambient conditions (temperature and air over the motor) | Recovers automatically after power supply recovers |
| 0x08 | Over speed | - Software detects 300 rpm higher than rated speed | | Recovers automatically. Software clears motor fault condition after 30 Sec |
| 0x09 | Watchdog | - Failure in the drive processor / software | If you get frequency fault, then power cycle motor.Consult WEG if this problem persists | Recovers automatically. Software clears motor fault condition after 60 Sec |
| 0x0A | Safety software | Periodic MCU check fail | If you get frequency fault, then power cycle motor.Consult WEG if this problem persists | Recovers automatically. Software clears motor fault condition after 10 Sec |
| 0x0B | Input phase loss | Software detects input AC supply phase loss when motor is running on 2-PH (1 phase supply loss) | Check 3 phase AC supply to motor | Recovers automatically. Software clears motor fault condition after 60 sec |
| 0x0C | Software Mismatch | If UL safety software do not match with motor number | Need to re-program motor control MCU firmware | |
| 0x0D | Motor control failed | Motor control firmware can’t calculate correct run time parameters | If you get frequency fault, then power cycle motor. Consult WEG if this problem persists | Recovers automatically. Software clears motor fault condition after 30 sec |
| 0x0E | Speed feedback failed | Motor sensorless speed control fail | If you get frequency fault, then power cycle motor. Consult WEG if this problem persists | Recovers automatically. Software clears motor fault condition after 30 sec |

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# 8. Maintenance and Cleaning

## 8.1. Maintenance

**DANGER**

Disconnect power and wait for the fan to stop before any work. Several components may remain charged with high voltage and/or in movement and may cause injuries to people, even after the AC power supply has been disconnected or turned off. Wait at least 10 minutes to guarantee the full discharge of capacitors. Always connect the equipment to the ground protection (PE)

- Inspect every 6 months for vibrations, corrosion, or dirt buildup.
- Check the bearings and replace them after 40,000 hours, if needed.

**CAUTION**

Do not modify blades or any item in the fan; only authorized personnel may perform repairs.

## 8.2. Cleaning

- Clean blades, screens, and motor drainage holes are clear.
- After cleaning, run for 2 hours to ensure complete drying.

**CAUTION**

Avoid water ingress into the motor and aggressive cleaning chemicals.

# 9. Troubleshooting

| Problem | Possible Causes | Solution |
|---|---|---|
| Fan does not start. | Power failure or blown fuse. | Check voltage and replace fuses. |
| Rotor locked. | Dirt or obstruction. | Remove debris and clean blades. |
| Excessive vibration. | Imbalance or damage. | Inspect blades and rebalance, if needed. |
| Abnormal noise. | Worn bearings. | Replace bearings. |
| Low airflow. | Incorrect rotation direction. | Correct electrical connection. |

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## 10. Disposal

- Disassemble the fan and separate materials (metals, plastics, electrical components).
- Dispose in accordance with local recycling regulations.
- Engage specialized companies, if necessary.

## 11. Technical Data

- **Voltage**: As per nameplate .
- **Frequency**: 50/60 Hz.
- **Protection**: IP55 (EN 60529)
- **Operating temperature**: -25°C to +60°C
- **Weight**: See nameplate.
- **Bearing life**: Approx. 40,000 hours under normal conditions.
- **Sound level**: Refer to product catalog.

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