
# VFD's IP 66/ NEMA 4
# .5 to 90 KW .5 to125 HP
# Enviroment Happy

**UL and CE**

# EP66

0.4 kW/.5 HP - 90 kW/125 HP

## UL & CE VFDS FREQUENCY INVERTER

## NEMA 4 or IP66

## HIGHLIGHTS 200 Volt to 480 Volts

DSP based high-tech motor control concept, suitable for V/Hz, SENSORLESS VECTOR, PMM synchronous motor control,SPEED/TORQUE control mode

Intelligent AUTOTUNING functions for quick and easy set-up

Rugged construction, IP66/NEMA 4

Flexible configurable 4 line character display – ready for any common field bus

Removable cable conduit plate, including vent with humidity barrier

Space inside the drive for customer options like, main/emergency switch, start/stop selectors, potentiometer and brake resistor

Optional BYPASS switch built in

C3 class filter standard – optional C1 EMC filter build in for 1. Environment (residential area)

All standard inverter functions built in, to make it suitable for various industrial,civil,and retrofit applications

Smart PC-tools, for inverter control, parametrization and troubles hooting. parameter-duplication stick

Ready for the worldwide market, due to approved international standards

CE UL LISTED CCC ISO 9001


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## Naming rule

### Model naming rule

UL-EP66 - 0007 T3 I1

| Mark | Structure Code |
|---|---|
| I1～I6 | Wall hanging type |

| Mark | Input Power Type |
|---|---|
| S2 | Single-phase 230V AC |
| T2 | Three-phase 230V AC |
| T3 | Three-phase 400V AC |

Motor power

| Mark | 0007 | 0015 | 0022 | ..... |
|---|---|---|---|---|
| Motor power(kW) | 0.75 | 1.5 | 2.2 | ..... |

Product series：EP66

### Function naming rule

U1 F15 AD01 G1 B1 R3

| | | | |
|---|---|---|---|
| Filter | R3 | EMC C3 level filter | Note 1 |
| Braking mode | B1 | Dynamic braking | Note 2 |
| Control unit type | G1 | Master switch | Note 5 |
| Keypad type | AD01 | Segment LCD | Note 3 |
| Communication | F15 | Modbus terminal block | Note 4 |
| Certificate type | U5 | CE | Note 4 |

Note 1: R3: EMC C3 level, test condition: power cable is 25m shielded wire.

Note 2: Dynamic braking: The inverter model for S2 and T2 is optional; The inverter model for T3:

Standard (≤15kW); Optional (≥18.5kW)

Note 3: EP66 supports 4 kinds of keypad type, user can select as needed;

| Keypad code | Keypad definition |
|---|---|
| AD01 | AD English 1-line LCD keypad without potentiometer |
| AD02 | AD English 4-line LCD keypad without potentiometer |

**Note 4: certification and communication type**

| Structure code | Certificate | Certificate code | Communication | Communication code |
|---|---|---|---|---|
| I1～I3 | U5 | CE+UL | F2 | Modbus |
| | U1 | CE | F15 | CAN communication (free protocol) +Modbus |
| I4～I6 | U1 | CE | F15 | CAN communication (free protocol) +Modbus |

# Technical Specifications

| Items | | Contents |
|---|---|---|
| Input | Rated Voltage Range | T3 380V-480V +10%/-15%； S2/T2 220V-240V ±15% |
| | Rated Frequency | 50/60Hz |
| Output | Rated Voltage Range | 3-phase 0-Input |
| | Frequency Range | 0.50～650.0Hz |
| Control Mode | Carrier Frequency | 800~16000Hz; Fixed carrier-wave and random carrier-wave can be selected by F159. |
| | Input Frequency Resolution | Digital setting: 0.01Hz;<br>Analog setting: Max frequency 0.1% |
| | Control Mode | Sensorless Vector Control (open-loop vector control)<br>V/F control, PMSM sensorless vector control |
| | Start Torque | 0.5 Hz / 150% (SVC), 5% of rated speed / 100% of rated torque (PMSM) |
| | Speed-control Scope | 1:100 (SVC), 1:20 (PMSM) |
| | Steady Speed Precision | ±0.5%（SVC） |
| | Torque Control Precision | ±5%（SVC） |
| | Overload Capacity | 150% rated current, 60 seconds. |
| | Torque Elevating | Auto torque promotion, manual torque promotion includes 1-20 curves. |
| | V/F Curve | 3 kinds of modes: beeline type, square type and under-defined V/F curve. |
| | Startup mode | Direct startup, speed track startup (V/F control) |
| | DC Braking | DC braking frequency: 0.2~50.00 Hz, braking time: 0.00~30.00s |
| | Jogging Control | Jogging frequency range: Min frequency~ Max frequency, Jogging acceleration/ deceleration time: 0.1~30.00s |
| | Auto Circulating Running and multi-stage speed running | Auto circulating running or terminals control can realize 15-stage speed running. |
| | Built-in PID adjusting | Easy to realize a system for process closed-loop control |
| | Auto voltage regulation (AVR) | When the source voltage changes, the modulation rate will be adjusted automatically, resulting in an unchanged output voltage |
| Operation Function | Frequency Setting | Potentiometer or external analog signal (0～5V, 0～10V, 0～20mA); keypad (terminal)▲ / ▼ keys, external control logic and automatic circulation setting. |
| | Start/Stop Control | Terminal control, keypad control or communication control. |
| | Running Command Channels | 3 kinds of channels from keypad panel, control terminal and MODBUS. |
| | Frequency Source | Frequency sources: given digit, given analog voltage, given analog current and given MODBUS |
| | Accessorial frequency Source | 6 kinds of accessorial frequency |
| Optional | Built-in EMI filter, built-in braking unit, Modbus, tele-control panel | |
| Protection Function | Input phase loss, Output phase loss, input under-voltage, DC over-voltage, over-current, inverter over-load, motor over-load, current stall, over-heat, external disturbance, under-load, pressure control, analog line disconnected, oPEn fault, STO function. | |
| Display | Output frequency, rotate-speed (rpm/min), output current, output voltage, DC bus voltage, PID feedback value, PID setting value, linear-velocity, types of faults, and parameters for the system and operation; LED indicators showing the current working status of inverter. | |
| Environment Conditions | Equipment Location | In harsh conditions, prevent dust of other thing from entering inverter totally. Completely protected against jets of water and heavy waves. Meeting EN 60529 standard. |
| | Environment Temperature | -10℃～+40℃ |

| Items | | Contents |
|---|---|---|
| Environment Conditions | Vibration Strength | Below 0.5g (acceleration) |
| | Height above sea level | 1000m or below (derating use if higher than 1000m) |
| Protection level | IP66 | |
| Class of pollution | PD2 | |
| Applicable Motor | 0.4～90kW | |

# Functions of Control Terminals

| Terminal | Type | Description | Function | |
|---|---|---|---|---|
| DO1 | Output signal | Multifunctional output terminal 1 | When token function enabled, the value between this terminal and CM is 0V, 24V when disabled; The max output frequency is 100KHz when high-frequency output; DO1 is high frequency output and it is not recommended to use intermediate relay. | The functions of output terminals shall be defined per manufacturer's value. Their initial state may be changed through changing function codes. |
| DO2 | | Multifunctional output terminal2 | When the token function is valid, the value between this terminal and CM is 0V; when disabled, the value is 24V. | |
| TA | | Relay contact | TC is a common point, TB-TC are normally closed contacts, TA-TC are normally open contacts. The contact capacity of 15Kw and below 15Kw inverter is 10A/125VAC, N0/NC 3A or 250VAC/30VDC. | |
| TB | | | | |
| TC | | | | |
| AO1[note1] | Analog output | Running frequency | It is connected with frequency meter, speedometer or ammeter externally, and its minus pole is connected with GND. See F423～F426 for details. | |
| AO2[note1] | | Current display | It is connected with ammeter externally, and its minus pole is connected with GND. See F427～F430 for details. | |
| 10V | Analog power supply | Self contained power supply | Internal 10V self-contained power supply.When used externally,it can only be used as the power supply for voltage control signals with restricted current below 20mA. | |
| AI1[note2] | Input Signal | Voltage analog input port | When analog speed control is adopted, the voltage signal is inputted through this terminal. The range of voltage input is 0～10V, grounding: GND. When potentiometer speed control is adopted, this terminal is connected with center tap, earth wire to be connected to GND. | |
| AI2[note2] | | Voltage / Current analog input port | When analog speed control is adopted, the voltage or current signal is input through this terminal. The range of voltage input is 0~5V or 0~10V and the current input is 0～20mA, the input resistor is 500Ohm, and grounding: GND. If the input is 4～20mA, it can be realized through adjusting parameter F406. The voltage or current signal can be chosen by coding switch. See table 4-2 for details, the current channel (0-20mA) is chosen before delivery. | |
| 24V | Power supply | Control power supply | Power: 24±1.5V, grounding is CM; current is restricted below 50mA for external use. | |
| CM | Common port | Grounding of control power supply | The grounding of 24V power supply and other control signals. | |
| DI1 | Digital input control terminal | Jogging terminal | When this terminal is valid, the inverter will have jogging running. The jogging function of this terminal is valid under both at stopped and running status. This terminal can also be used as high-speed pulse input port. The max frequency is 50K. | The functions of input terminals shall be defined per manufacturer's value. Other functions can also be defined by changing function codes. |
| DI2 | | External Emergency Stop | When this terminal is valid, "ESP" malfunction signal will be displayed. | |
| DI3 | | "FWD" Terminal | When this terminal is valid, inverter will run forward. | |
| DI4 | | "REV" Terminal | When this terminal is valid, inverter will run reversely. | |
| DI5 | | Reset terminal | Make this terminal valid under fault status to reset the inverter. | |
| DI6 | | Free-stop | Make this terminal valid during running can realize free stop. | |
| DI7[note3] | | Running terminal | When this terminal is in the valid state, inverter will run by the acceleration time. | |
| DI8[note3] | | Stop terminal | Make this terminal valid during running can realize stop by the deceleration time. | |

| Terminal | Type | Description | Function |
|---|---|---|---|
| GND | Analog grounding | Self-contained Power supply Ground | Ground terminal of external control signal (voltage control signal or current source control signal) is also the ground of 10V power supply of this inverter. |
| +5V | Power | Self-contained power | Grounding for digital signal |
| A+ | 485 communication terminals | Positive polarity of differential signal | Standard: TIA/EIA-485(RS-485)<br>Communication protocol: Modbus<br>Communication rate: 1200/2400/4800/9600/19200/38400/57600bps |
| B- | | Negative polarity of Differential signal | |

Note:

1.AO1 can output voltage and current signal, and AI2 can only output current.

2.AI1 can only accept voltage signal, AI2 can only accept voltage signal and current signal.

3.15 kW and below 15 kW inverters have no DO2, AO2, DI7 and DI8 terminals.

| TA | TB | TC | DO1 | 24V | CM | DI1 | DI2 | DI3 | DI4 | DI5 | DI6 | 10V | AI1 | AI2 | GND | AO1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

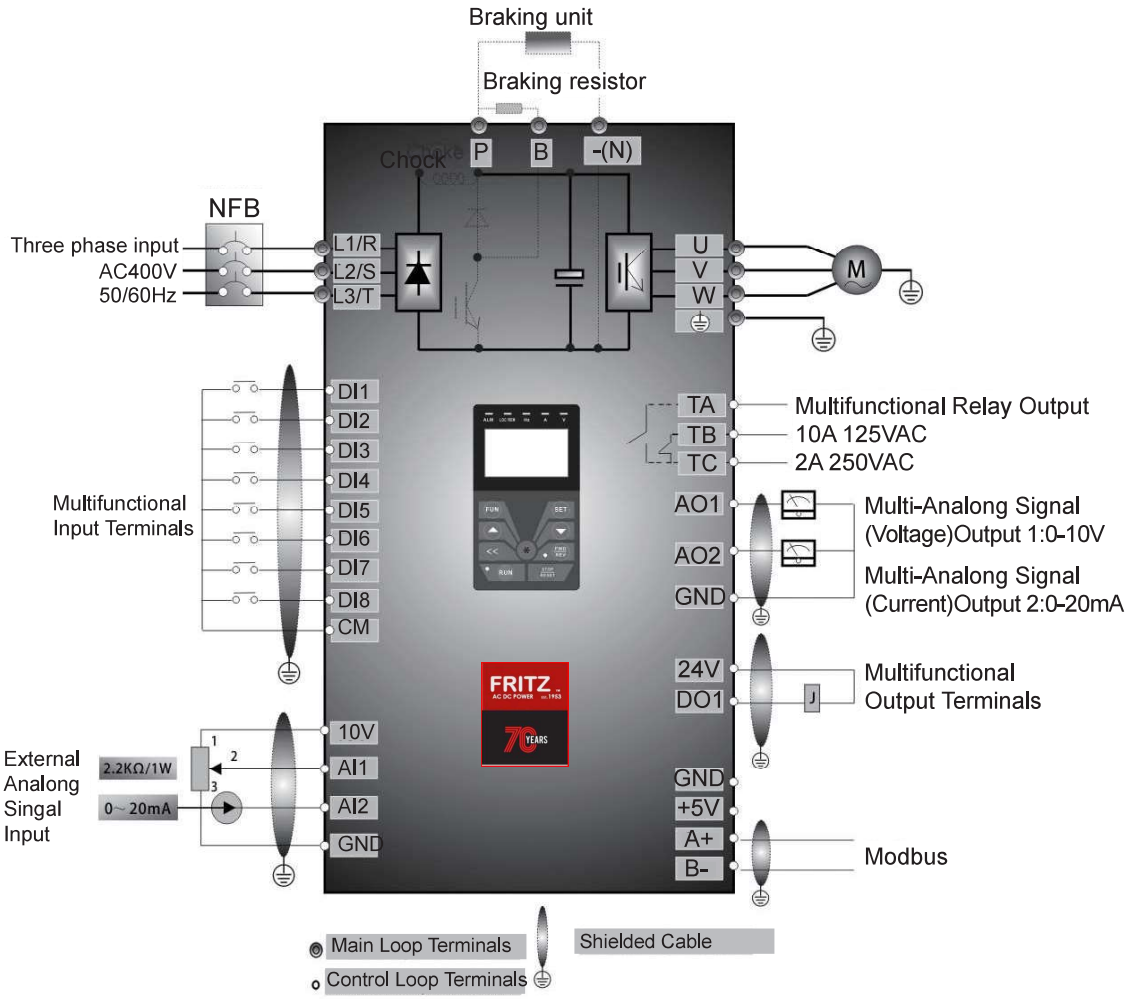
| TA | TB | TC | DO1 | DO2 | 24V | CM | DI1 | DI2 | DI3 | DI4 | DI5 | DI6 | DI7 | DI8 | +10V | AI1 | AI2 | GND | AO1 | AO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| GND | +5V | A+ | B- |
|---|---|---|---|

# Product List

| Model | Rated current | Remote Keypad | Structure code | Weight (kg) | Dmensions (W×H×D-mm) | Cooling mode | Remarks |
|---|---|---|---|---|---|---|---|
| ULEP66-0004S2 | 0.4kW-2.5A | AD-A-1 Or AD-A-2 | I1 | 6.2 | 200×412×198 | Self cooling | Single-phase plastic hanging |
| ULEP66-0007S2 | 0.75kW-4.5A | | I1 | 6.2 | 200×412×198 | Self cooling | |
| ULEP66-0015S2 | 1.5kW-7A | | I1 | 6.2 | 200×412×198 | Self cooling | |
| ULEP66-0022S2 | 2.2kW-10A | | I1 | 6.2 | 200×412×198 | Air cooling | |
| ULEP66-0004T2 | 0.4kW-2.5A | | I1 | 6.2 | 200×412×198 | Self cooling | Three-phase plastic hanging |
| ULEP66-0007T2 | 0.75kW-4.5A | | I1 | 6.2 | 200×412×198 | Self cooling | |
| ULEP66-0015T2 | 1.5kW-7A | | I1 | 6.2 | 200×412×198 | Self cooling | |
| ULEP66-0022T2 | 2.2kW-10A | | I1 | 6.2 | 200×412×198 | Air cooling | |
| ULEP66-0004T3 | 0.4kW-1.2A | | I1 | 6.2 | 200×412×198 | Self cooling | |
| ULEP66-0007T3 | 0.75kW-2A | | I1 | 6.2 | 200×412×198 | Self cooling | |
| ULEP66-0015T3 | 1.5kW-4A | | I1 | 6.2 | 200×412×198 | Self cooling | |
| ULEP66-0022T3 | 2.2kW-6.5A | | I1 | 6.2 | 200×412×198 | Air cooling | |
| ULEP66-0030T3 | 3.0kW-7A | | I1 | 6.2 | 200×412×198 | Air cooling | |
| ULEP66-0040T3 | 4.0kW-9A | | I1 | 6.2 | 200×412×198 | Air cooling | |
| ULEP66-0055T3 | 5.5kW-12A | | I2 | 8.2 | 242×418×198 | Air cooling | |
| ULEP66-0075T3 | 7.5kW-17A | | I2 | 8.2 | 242×418×198 | Air cooling | |
| ULEP66-0110T3 | 11kW-23A | | I3 | 11.3 | 242×471×228 | Air cooling | |
| ULEP66-0150T3 | 15kW-32A | | I3 | 11.3 | 242×471×228 | Air cooling | |
| ULEP66-0185T3 | 18.5kW-38A | | I4 | 25 | 242×650×325 | Air cooling | Three-phase metal hanging |
| ULEP66-0220T3 | 22kW-44A | | I4 | 25 | 242×650×325 | Air cooling | |
| ULEP66-0300T3 | 30kW-60A | | I4 | 25 | 242×650×325 | Air cooling | |
| ULEP66-0037T3 | 37kW-75A | | I5 | 40 | 308×680×379 | Air cooling | |
| ULEP66-0450T3 | 45kW-90A | | I5 | 40 | 308×680×379 | Air cooling | |
| ULEP66-0550T3 | 55kW-110A | | I5 | 40 | 308×680×379 | Air cooling | |
| ULEP66-0750T3 | 75kW-150A | | I6 | 57 | 370×770×404 | Air cooling | |
| ULEP66-0900T3 | 90kW-180A | | I6 | 57 | 370×770×404 | Air cooling | |

# Wiring diagram




Basic Wiring Diagram for Three-phase AC drives (NPN type)

Note:

1. Connect power terminals L1 and L2 with power grid for single-phase inverters.
2. Remote-control panels are connected with 8 core telephone wire. 485 communication port is on the control terminals.
3. 485 communication port has built-in standard MODBUS communication protocol. The terminal sequence is GND, +5V, A+, B-.
4. Inverter(≤15kW) has 6 multifunctional input terminals DI1~DI6.
5. The contact capacity of inverter is 10A/125VAC, NO/NC: 3A 250VAC/30VDC.