

GUIDE

Stock Code: 301633

Guide the Drive Innovation

Intellectualize the Future of Industry

Become a Top-Ranking Supplier of Industrial Automation Products and Solutions

GUIDE

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WeChat



HF650N Series AC Drive

COMPANY PROFILE

Wuhan Guide Technology Co., Ltd.

Wuhan Guide Technology Co., Ltd. (Stock name: Guide Technology; **Stock code: 301633**) is a nationally accredited "Little Giant" enterprise. It is primarily recognized and supported by the Ministry of Industry and Information Technology with its specialized, professional and innovative high-tech features. It has three subsidiaries: Wuhan Guide Intelligent Technology Co., Ltd., Wuhan Guide Software Information Technology Co., Ltd., and Wuhan Guide Drive Science and Technology Co., Ltd. as well as branches in Shenzhen, Hainan and Shanghai.

GUIDE focuses on the field of industrial automation and informatization. There are three segments of our business: automatic drive products, intelligent control systems, and smart port management system software. GUIDE is committed to the localization of core drive components for various mechanical equipment, the automation of industrial equipment operation procedures, and the digitalization and informatization of enterprise management.

Guide Technology is engaged in the research and development, production, sales, and related technical services of industrial automation products such as VFDs, inverters, regenerative rectifier units, and industry-dedicated drives. Guide Intelligent provides solutions for the intelligent and unmanned operation of lifting and transportation equipment in fields such as ports, cement, metallurgy, railways, and warehousing. Guide Software is devoted to the development and service of software products such as

production operation management systems, asset management systems, and integrated control systems. GUIDE has a nationwide sales and service network, and its products and services are widely used in industries such as ports, shield machinery, petroleum, construction machinery, ships, petroleum, cement, metallurgy, overhead cranes, railways, logistics, textiles, mining, chemical engineering, thermoelectricity generation.

GUIDE is recognized as an "Outstanding High-tech Enterprise in Wuhan". It has been successively honored as one of the "Top 10 Intelligent and Informatized Enterprises in the Chinese Cement Industry", one of the "Chinese Top 100 Innovative Construction Enterprises", and an "Advanced Demonstration Enterprise for Port Science and Technology Innovation". The VFD products have won the "Top 3 of China Communications and Transportation Association Science and Technology Progress Award". Its intelligent control system products have garnered the "Champion of China Port Association Science and Technology Award".

GUIDE will uphold the business philosophy of "Quality and Service" continuously, implement our core values of "Achieving Customers, Benefiting Employees, Rewarding Shareholders and Contributing to Society", and develop firmly towards the mission of "Guide the Drive Innovation, Intellectualize the Future of Industry" to realize the vision of "Become a top-ranking supplier of industrial automation products and solutions".




PRODUCT HIGHLIGHTS

- ▲ Safe and Reliable
- ▲ Convenient and Easy to Use
- ▲ Powerful Performance

1 Safe and Reliable

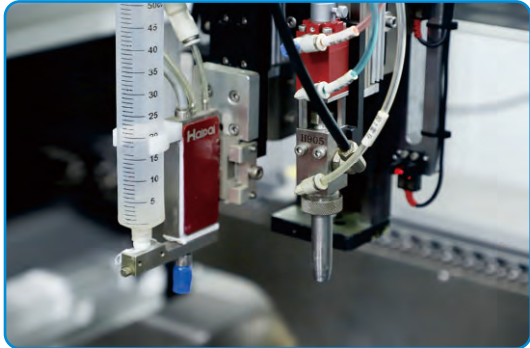
1

The independent air duct design effectively prevents dust, particles, and other pollutants from entering the drives. It prevents internal sparking and short circuits, enhancing product reliability and prolong service life.



2

Fully automated conformal coating spraying process ensures more stable and uniform coating coverage, improving the protection of single board.



3

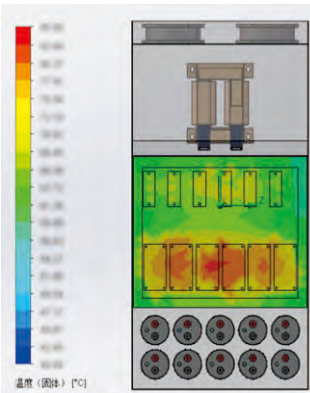
A comprehensive reliability testing program ensures that the product meets the requirements of complex application environments.

| Test Type | Test Name | Test Project |
|--------------------------------|---------------------------|---|
| Mechanical reliability test | Vibration and shock test | Half-sine shock test (Working/non-working state) |
| | | Sinusoidal vibration test (Working status) |
| | | Random vibration test (Working/non-working state) |
| Environmental reliability test | Temperature test | Low-temperature storage test |
| | | High-temperature storage test |
| | | Low-temperature operation test |
| | | High-temperature operation test |
| | | Rapid temperature change test |
| | | Thermal shock test |
| | Humidity and thermal test | Constant heat test |
| | | Temperature and humidity cycling test |
| | Salt spray test | Neutral salt spray test |
| | | Acid salt spray test |
| Protection level test | Dust and waterproof test | Dustproof test |
| | | Waterproof test |

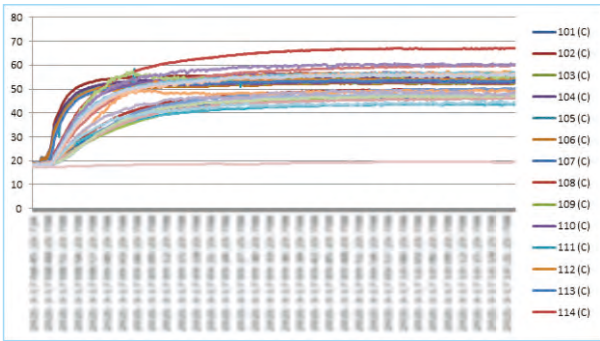


4

Accurate design simulation and rigorous testing and certification.



Use scientific thermal simulation technology to ensure that the thermal design in the product development stage is more reasonable and reliable.



The entire machine has undergone rigorous thermal testing, ensuring reliable operation for extended periods under various load conditions.

Safe and Reliable


5

The drives are equipped with a built-in DC reactor and braking units.

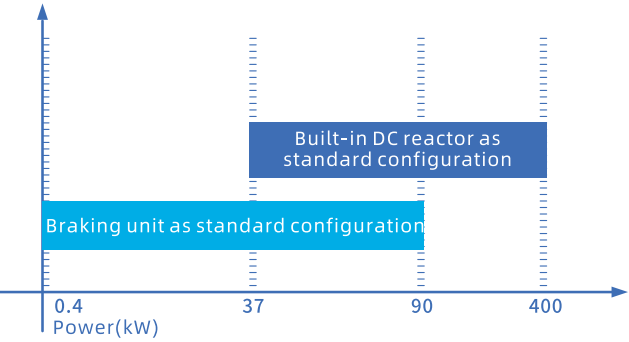
During operation, almost all the heat generated by the dedicated liquid-cooled drive for shield tunneling is absorbed by the cooling liquid, thus providing high-level protection for the drive. Compared to drives of the same power level, it can remove heat faster due to the higher heat transfer efficiency of the liquid cooling medium. Since there is no need for air ducts for heat dissipation, the structure of the liquid-cooled drive is very compact, saving space in the cooling system.

6

The drive is equipped with a built-in DC reactor and braking components.



The built-in DC reactor can effectively improve the power factor on the input side of the drive, enhancing overall efficiency and thermal stability. It can effectively eliminate higher-order harmonics and external conducted and radiated interference, improving the reliability in the process of

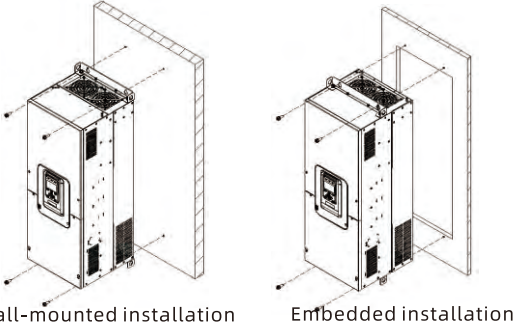


Standard built-in braking unit for 0.4 kW-90 kW;
Standard built-in DC reactor for 37 kW-400 kW.

Convenient and Easy to Use

1

Supports multiple installation methods.




Wall-mounted installation Embedded installation

The product is compatible with both wall-mounted and embedded installation methods. The installation components are independently designed, removable, and flexible to accommodate various on-site usage scenarios.

2

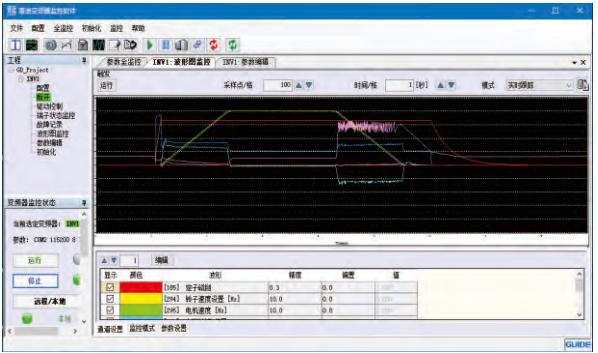
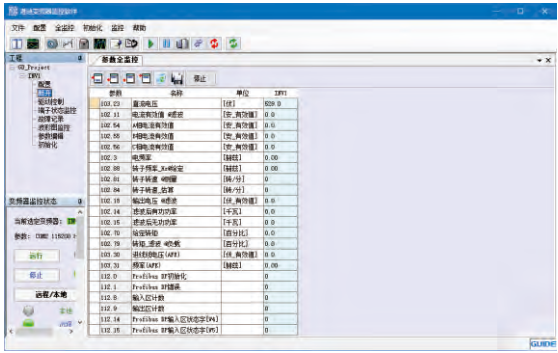
A multi-language handheld LCD panel equipped with full functions such as upload and download.



Multi-language handheld LCD panel, size: 240 mm*160 mm, supports display in multiple languages such as Chinese, English and Russian. It has the ability to upload and download parameters, making commissioning more convenient and efficient.

3

Fully functional GuideInvSoft host computer software.



GUIDE drives are equipped with a powerful background monitoring software, GuideInvSoft, which allows real-time monitoring of various operational data of the converter on a computer, including online oscilloscope functionality. It also enables configuration and management of the parameters of converter, making commissioning more convenient and efficient.

Powerful Performance

1

High-performance vector control, with open and closed-loop vector zero-speed 200% torque output.

Frequency (Hz) Output torque Torque (Nm)

The rated torque is 230 Nm. It shows 200% torque output at closed-loop 0 rpm.

Frequency (Hz) Output torque Torque (Nm)

The rated torque is 230 Nm. It shows 200% torque output at open-loop 0 rpm.

(A 45 kW drive controls a 37 kW motor, with a rated torque of 230 Nm.)

Both closed-loop vector control and open-loop vector control can control the motor to output up to 200% of its rated torque at zero speed.

2

Real-time load monitoring function.

When there is a wide-range sudden change in load during motor operation, the drive exhibits excellent dynamic response characteristics, ensuring the precision of motor speed control.

3

Multi-motor rigid coupling synchronous control technology.

GUIDE drive adopts master-slave control or DROOP control to ensure the synchronization of current, torque, and speed of multiple motors under closed-loop or open-loop vector control modes. It can maintain the synchronization of multiple motors under various conditions such as sudden changes in load, unbalanced load, low speed and high speed.

4

Black box function, quickly analyzing the cause of the fault.

The powerful black box function can store data of key variables (such as voltage, speed, torque, current, etc.) at the moment of fault occurrence, as well as the previous 100 historical data of corresponding variables (the historical data sampling period can be set according to parameters). By utilizing the background monitoring software to view the change trend and waveform of these variables before the fault occurs, it helps to quickly analyze the cause of the fault.

5

Self-tuning of motor with load.

GUIDE drive can perform self-tuning under 50% rated load of the motor; and consistent with the motor parameters obtained from the motor self-tuning without load. It is suitable for retrofit projects where motor shaft cannot be easily disconnected from the load.

No need to remove the shaft

Powerful Performance

6

Custom programming function.

Input module

DI
DO
AI
Output current
Motor torque
⋮

Arithmetic module

$f(x)$
 $f(x,y)$
 $f(x,y,z)$
 $\text{logic}(x,y)$
 $\text{mux}(x,y)$
 $\text{compare}(x,y)$
⋮

Output module

Speed setting
Torque setting
DO output
Torque limit
⋮

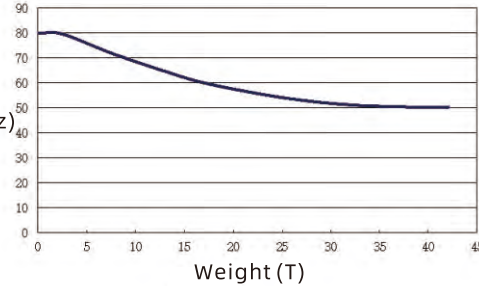
- PID regulator module, timer module
- Basic mathematical function module: $+-\times\div$
- Unary, binary, ternary logical operations
- Sum of squares, maximum, minimum value modules
- Selection and comparison function modules
- Filter, samples storage module
- Minimum execution cycle: 10 ms
- Numerous variables available for custom programming

The drive is equipped with a powerful custom programming function. Users can perform secondary programming of relevant logic through parameter settings according to the on-site working conditions without changing the software code.

7

Equipped with a built-in constant power control module,it enhances the operational efficiency of the equipment.

Constant Power Curve



GUIDE drive is equipped with a built-in constant power control module, which can automatically adjust the output frequency according to the load size, achieving high speed under light load and low speed under heavy load, greatly improving the working efficiency of the equipment.

HF650N Series AC Drive

HF650N LC XXX - 4 - XXX + X

1

2

3

4

5

6



Customized Model

1

Product Series

2

Cooling Method

Default: Air-cooled
LC: Liquid-cooled

3

Power

Example:
5R5 = 5.5 kW
055 = 55 kW
110 = 110 kW

4

Voltage Level

4: 380 V

5

Spare

6

Optional Accessories

| Code | Note | Code | Note |
|-----------------------------|---|-----------------------------|---|
| MB01 | Modbus RTU communication card | DP01 | Profibus DP communication card |
| PN01 | Profinet communication card | CAN01 | CANopen communication card |
| PG02 | Incremental encoder card suitable for standard drives | | |
| IO01 (IO expansion card) | 7 DI+4 DO+Modbus RTU communication (Applicable to standard drives) | IO02 (IO expansion card) | 5 DI+2 DO (Applicable to standard drives) |

Example:

1. HF650N-5R5-4: 400 V/5.5 kW standard drive, without built-in DC reactor, built-in braking unit, and LCD panel;

2. HF650N-090-4: 400 V/90 kW standard drive, featuring a built-in DC reactor, built-in braking unit, and an LCD panel;

3. HF650N-250-4+MB01: 400 V/250 kW standard drive, featuring a built-in DC reactor, no built-in braking unit, LCD panel, and an optional Modbus RTU communication card.

Power and Dimensions of HF650N Standard AC Drive

| Model | Output Current (A) | Applicable Motor Capacity (kW) | Type | Dimensions (mm) (H*W*D) | Weight (kg) |
|----------------|--------------------|--------------------------------|---|-------------------------|-------------|
| HF650N-0R4-4 | 1.8 | 0.4 | N1 | 260*140*191 | 3.5 |
| HF650N-0R7-4 | 2.6 | 0.75 | | | |
| HF650N-1R1-4 | 3.3 | 1.1 | | | |
| HF650N-1R5-4 | 4.8 | 1.5 | | | |
| HF650N-2R2-4 | 5.7 | 2.2 | | | |
| HF650N-3R7-4 | 10.2 | 3.7 | N2 | 260*140*191 | 4 |
| HF650N-5R5-4 | 15 | 5.5 | | | 5 |
| HF650N-7R5-4 | 18 | 7.5 | | | |
| HF650N-011-4 | 24 | 11 | | | |
| HF650N-015-4 | 32 | 15 | | | |
| HF650N-018-4 | 41 | 18.5 | N4 | 375*279*236 | 12.5 |
| HF650N-022-4 | 47 | 22 | | | |
| HF650N-030-4 | 65 | 30 | | | |
| HF650N-037-4 | 75 | 37 | N5 | 766*235*345.5 | 38 |
| HF650N-045-4 | 94 | 45 | | | |
| HF650N-055-4 | 115 | 55 | | | |
| HF650N-075-4 | 155 | 75 | N6 | 885*315*331.5 | 55 |
| HF650N-090-4 | 188 | 90 | | | |
| HF650N-110-4 | 215 | 110 | N7 | 965*390*345.5 | 80 |
| HF650N-132-4 | 265 | 132 | | | |
| HF650N-160-4 | 330 | 160 | N8 | 1093*492*376 | 120 |
| HF650N-185-4 | 365 | 185 | | | |
| HF650N-200-4 | 396 | 200 | | | |
| HF650N-220-4 | 438 | 220 | N9 | 1200*490*395.5 | 150 |
| HF650N-250-4 | 485 | 250 | | | |
| HF650N-280-4 | 545 | 280 | N10 | 1305*700*415 | 240 |
| HF650N-315-4 | 610 | 315 | | | |
| HF650N-355-4 | 668 | 355 | | | |
| HF650N-400-4 | 720 | 400 | | | |
| HF650N-560-4-C | 1090 | 560 | | | |
| HF650N-630-4-C | 1220 | 630 | Cabinet-built drive (2 parallel drives) | / | / |
| HF650N-710-4-C | 1336 | 710 | | | |
| HF650N-800-4-C | 1440 | 800 | | | |

Note:

1. 0.4 kW-30 kW: No built-in DC reactor, 37 kW-500 kW: Built-in DC reactor;

2. 90 kW and below are equipped with built-in braking unit as standard, 110 kW and above are not equipped with built-in braking unit, and external braking unit can be selected separately if necessary;

3. The standard configuration includes an LCD panel in both Chinese and English.

Technical Parameters of HF650N Standard AC Drive

| Item | | Description |
|-------------------------|------------------------------------|--|
| Input | Input voltage | Three-phase 380 V-480 V |
| | Rated frequency | 50/60 Hz |
| | Allowable voltage fluctuation | -15% to +10% |
| | Allowable frequency fluctuation | The allowable range of frequency variation is fLN ±2% (±4% for independent power supply grids). Frequency variation rate: ≤2% fLN/s. |
| Output | Output voltage range | 0 V-Input voltage, error less than 5% |
| | Asymmetry of output voltage | Under normal operating conditions, within the entire range of output frequency adjustment, and under symmetrical load conditions for each phase, the asymmetry of the output three-phase voltage should not exceed 1%. |
| | Output frequency range | 0-300 Hz |
| Control characteristics | Operation command mode | Panel control, terminal control, communication control. |
| | Carrier frequency | 1.5 kHz-4 kHz, adjustable according to temperature and load characteristics. |
| | Frequency resolution | Digital setting: 0.01 Hz, analog setting: maximum frequency ×0.1% |
| | Control mode | Permanent magnet synchronous motors and asynchronous motors, closed-loop vector control (VC), open-loop vector control (SVC), and V/F control. |
| | V/F control | Linear type, multi-point type, quadratic type. |
| | Torque control | With PG torque control/without PG torque control. |
| | Maximum speed | 300 Hz, relying on the electrical and mechanical characteristics of the motor. |
| | Starting torque | 0 Hz/200% (VC and SVC), 0.8 Hz/150% (V/F) |
| | Torque response | <5 ms(SVC), <5 ms(VC) |
| | Torque control accuracy | ±5% (SVC), ±3% (VC) |
| | Speed range | 1:500 (SVC), 1:1000 (VC) |
| | Speed accuracy | ±0.02% rated speed (VC), ±0.2% rated speed (SVC), ±0.5% rated speed (V/F). |
| | Overload capacity | 180% of the rated output current, with an overload allowed for 1 minute every 5 minutes. |
| | Torque compensation | Automatic torque compensation function. |
| | Acceleration and deceleration mode | Linear and customized multi-point curve. |
| | Automatic voltage regulation | When the power grid experiences fluctuations, it can automatically maintain a constant output voltage. |
| | DC braking mode | DC braking during startup and DC braking during shutdown. |
| | Built-in process PID | It can facilitate the implementation of a closed-loop control system for process variables (pressure, temperature, flow rate, etc.). |
| | Bus options | CANopen, Modbus RTU, Profibus DP, Profinet |
| | Special features | Free functional modules for user-programmable applications: logic function module, mathematical function module, timer module, PID module, etc. |
| | | Motion control: multi-curve acceleration/deceleration function, timer-controlled operation/stop control, etc. |
| | | Crane functions: power optimization, and the function of opening and closing the brake of the crane. |
| | | Synchronization control: master/slave synchronization control, speed/torque control. |
| Input/output terminal | Input terminal | 5 digital inputs and 2 analog inputs (voltage 0 to +10 V or current 0 mA/4 mA-20 mA) are standard on the terminal board. |
| | Output terminal | 3 digital outputs (1 collector output and 2 relay outputs), 2 analog outputs (voltage 0 to +10 V or current 0 mA/4 mA-20 mA) is standard on the terminal board. |

Technical Parameters of HF650N Standard AC Drive

| Item | | Description |
|---------------------|---------------------|---|
| HMI | Operation panel LCD | Relevant parameters can be set and copied, and various parameters such as output frequency, output voltage, and output current can be displayed; the operating state, fault state, and parameter setting state should all have corresponding displays. Content: function, data, unit. |
| Protection function | | Overcurrent protection, overvoltage protection, undervoltage protection, overheat protection, overload protection, STO function, PTC protection, etc. |
| Place of use | | It should be stored in an environment that is protected from direct sunlight, free from dust, and non-corrosive. |
| Environment | Altitude | Below 1000 meters, no derating is required. For locations with an altitude exceeding 1000 meters, please reduce the rated power and rated output current by 1% for every additional 100 meters. For altitudes exceeding 3000 meters, consult the manufacturer for guidance. |
| | Ambient temperature | -10 °C to +40 °C. If the ambient temperature exceeds 40 °C, derating is required. For every 1 °C increase in ambient temperature, the derating is 1%. If the ambient temperature exceeds 50 °C, it is necessary to consult the manufacturer for guidance. When the ambient temperature falls below -10 °C, it is necessary to add additional auxiliary heating equipment. |
| | Humidity | Less than 95% RH, no condensation. |
| | Storage | Storage temperature: -20 °C to +60 °C. |
| Other | Efficiency | > 98% |
| | Option card | It can accommodate communication cards, IO expansion cards, and PG cards. |
| | Other interfaces | External panel interface. |
| | Ingress protection | IP20 |
| | Cooling method | Natural cooling is applied for power levels of 0.75 kW and below, while forced air cooling is used for power levels of 1.1 kW and above. |
| | Pollution degree | 2 |

Optional Accessories (With Package)

| Item | Code | Specification and Model | Note |
|-------------------------------|-------|-------------------------|--|
| Modbus RTU Communication Card | MB01 | GDHF-AMBX1 | Modbus RTU communication card |
| DP Communication Card | DP01 | GDHF-ADPX1 | Profibus DP communication card |
| PN Communication Card | PN01 | GDHF-APNX1 | Profinet communication card |
| CAN Communication Card | CAN01 | GDHF-ACNX1 | CANopen communication card |
| PG Card | PG02 | GDHF-APGX1 | Incremental encoder card suitable for standard drives |
| IO Expansion Card 1 | IO01 | GDHF-AIOX1 | 7 DI+4 DO+Modbus RTU communication (Applicable to standard drives) |
| IO Expansion Card 2 | IO02 | GDHF-AIOX2 | 5 DI+2 DO (Applicable to standard drives) |
| STO Expansion Card | STO01 | GDHF-STOX1 | STO expansion card (2 STO, 2 PTC) |