Midea | HICONICS

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HCH100 Series Low Voltage VFD

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CONTENTS

Product introduction

Brief Introduction of HCH100 VFD Series

As a high-performance general-purpose VFD series that adopts a book-type design and meets needs of more installation regions, HCH100 has rich hardware configuration and powerful software and accommodate multiple communication protocols, providing excellent driving performance and control functionality and enabling the application of automatic production equipment in various industries such as metallurgy, hoisting, machine tools, printing, wiredrawing, glass, food, fans, water pumps, etc.

Book-type design

Ease of Use and Reliability

Green & High-efficiency

Multi-drive & Versatile

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Industry Application

Machine tool industry

Elevators

Centrifuges

Textile

Ceramics

Woodworking

Logistics

Rubber and plastic

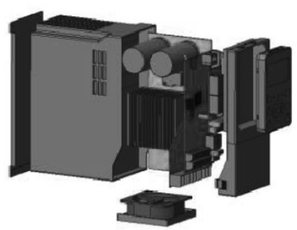
Mining

Food processing

Product advantage

Book-type design

Narrow-body devices : with the power density up by 20% and the footprint down by 30%
Independent vertical straight-through air duct for heat dissipation
Side-by-side installation to save the footprint



Multi-drive & Versatile

① Multiple motor control types such as SPM, IPM, SynRM, and IM are supported to meet the diversified motor needs of the customers

② Rich peripherals are available, multiple encoder cards, multiple bus cards (Profibus DP.CANopen, EtherCAT, Profinet, Etheret IP, etc.), and multiple industrial application macrosare supported; friendly human-machine interaction is provided

The VFDs are multi-drive and versatile and can be used for various permanent-magnet motors

The VFDs are multi-drive and versatile and can be used for various induction motors

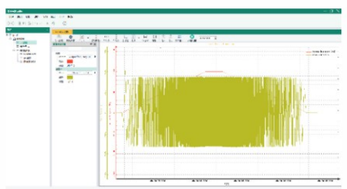
Green & High-efficiency

① Automatic energy saving control:
improve the control efficiency for no-load motors in fans and water pumps
their no-load current values can be reduced by 30%
② Energy recovery control:
the deceleration time can be shortened to increase the operational efficiency

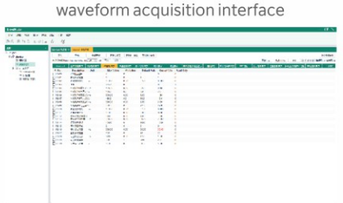
Ease of Use and Reliability

Standard-configuration LCD keypad
parameter classification
quick parameter copying
switching between Chinese and English interfaces
Monitoring software in host computer that monitors faults and the running status
The STO safety protection function meeting the SIL2 safety design requirements

LCD keypad



Monitoring software in host computer: waveform acquisition interface



Monitoring software in host computer: function code interface

Characteristic function

Zero-speed hold

① Motor observer design for crane application:
A dopted to support the open-loop zero-speed hold function of asynchronous motors
② Support high-speed running, with the default maximum frequency of 599Hz
(w/ the potential of supporting higher frequency values, such as 2,000Hz);
such VFDs can beused to control magnetic suspension centrifuges and machine tool spin dles

Cranes

Tension control

Tension control algorithm eliminate the necessity of purchasing a tension controller when tension control is wanted
4 available modes:
tension closed-loop speed mode
linear speed closed-loop speed mode
tension closed-loop torque mode
tension open-loop torque mode

various reluctance motors

rewinders

Position control

①Position control algorithm for positioning function
②Point-to-point control: the location of the target is sent through communication, a pulse signal, etc. to implement the position control

storage stackers

machine tools

Synchronous reluctance motor control

Synchronous reluctance motors feature high robustness

High reliability

High efficiency

Energy saving

Wide speed range

And easy maintenance

- Rotor without any winding: higher efficiency compared with conventional AC asynchronous motor, due to no rotor copper loss
- No permanent magnet / accordingly lower cost compared with a permanent magnet motor, due to easy flux weakening and no demagnetization risk

SynRM

for various reluctance motors

Product selection

HCH100 - 4T 4R0 G B

Identification	Product name
HCH	General-purpose VFD

Identification	Voltage level
4T	Three-phase 380V-480V

Identification	Power level (kW)
R75	0.75
...	...
450	450

Identification	Output AC inductor
None	None
(-L)	Optional output AC inductor

Identification	Brake unit
None	None
B	w/ a brake unit
(B)	Optional brake unit

Identification	Applicable motor type
G	Heavy-duty or over-duty motor

* Nameplate identification and product model

Description:

1. All the VFDs have the three-phase voltage grade of 380V~480V: C2~C5 VFDs have no inductors; ≥C6 VFDs have a standard-configuration DC reactor each.
2. All the VFDs have the three-phase voltage grade of 380V~480V: C2~C4 VFDs have a standard-configuration brake unit; for C5~C7 VFDs, a brake unit can be selected.
3. (-L) indicates that there is a pedestal; for C9~C11 VFDs, an output AC inductor can be selected each.

Models and Technical Parameters of HCH100 VFDs

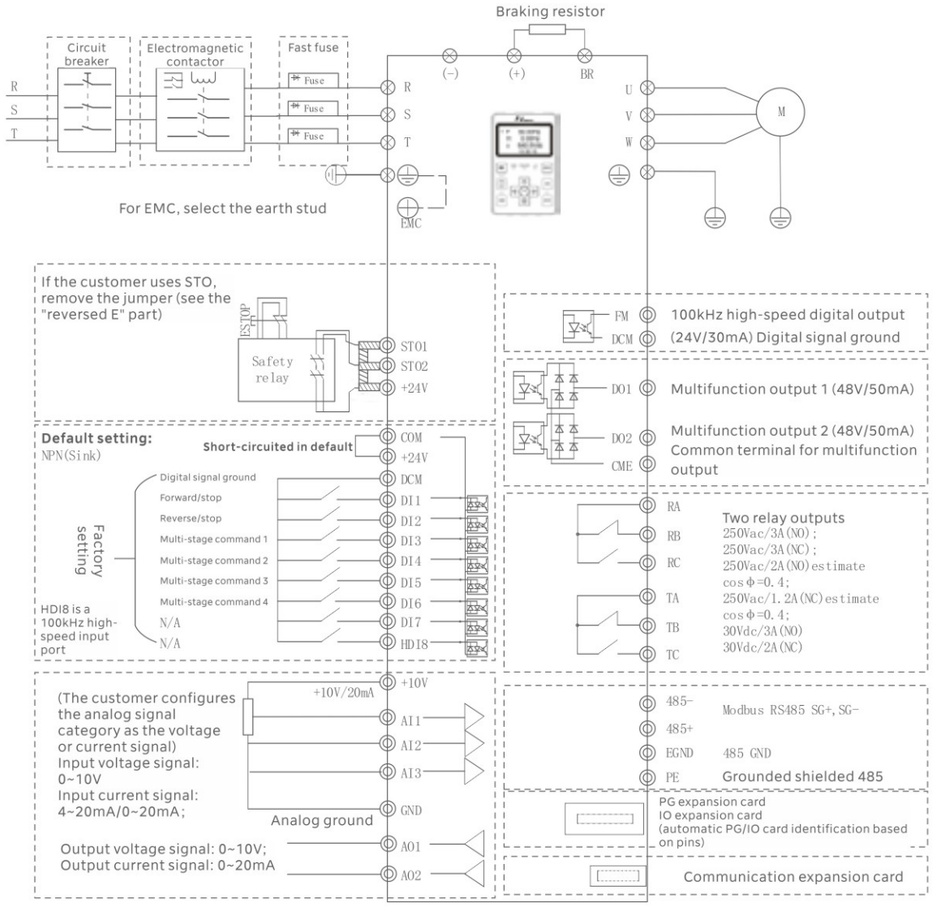
Identification	VFD model	Input voltage (V)	Input current (A)	Output current (A)	Applicable motor (kW)	SIZE W*D*H(mm)	NET WEIGHT (kg)
C2	HCH100-4T4R0GB	Three-phase 380V-480V Range: -15% ~ +10%	11.4	9.0	4.0	100 * 178 * 235	2
	HCH100-4T5R5GB		16.7	13.0	5.5	100 * 178 * 235	2
	HCH100-4T7R5GB		21	17.0	7.5	100 * 178 * 235	2
C3	HCH100-4T011GB		32	25.0	11.0	118 * 200 * 320	3.5
	HCH100-4T015GB		41	32.0	15.0	118 * 200 * 320	3.5
C4	HCH100-4T018GB		47	37.0	18.5	140 * 245 * 365	6
	HCH100-4T022GB		56	45.0	22.0	140 * 245 * 365	6
	HCH100-4T030GB		72	60.0	30.0	140 * 245 * 365	6
C5	HCH100-4T037G(B)		88	75.0	37.0	180 * 260 * 430	13
	HCH100-4T045G(B)		110	90.0	45.0	180 * 260 * 430	13
C6	HCH100-4T055G(B)		106	110.0	55.0	250 * 362 * 593	47.5
	HCH100-4T075G(B)		139	152.0	75.0	250 * 362 * 593	47.5
	HCH100-4T093G(B)		165	176.0	93.0	250 * 362 * 593	47.5
C7	HCH100-4T110G(B)		190	210.0	110.0	270 * 370 * 640	49.5
	HCH100-4T132G(B)		230	253.0	132.0	270 * 370 * 640	49.5
C8	HCH100-4T160G		276	304.0	160.0	290 * 425 * 780	80.5
	HCH100-4T185G		314	340.0	185.0	290 * 425 * 780	80.5
C9	HCH100-4T200G		346	380.0	200.0	300 * 506 * 1101	121.5
	HCH100-4T220G		380	426.0	220.0	300 * 506 * 1101	121.5
	HCH100-4T250G		435	465.0	250.0	300 * 506 * 1101	121.5
C10	HCH100-4T280G		478	520.0	280.0	340 * 545 * 1248	167.5
	HCH100-4T315G		534	585.0	315.0	340 * 545 * 1248	167.5
	HCH100-4T355G		598	650.0	355.0	340 * 545 * 1248	167.5
C11	HCH100-4T400G		672	725.0	400.0	340 * 545 * 1389	207.5
	HCH100-4T450G		742	820.0	450.0	340 * 545 * 1389	207.5

Technical parameter

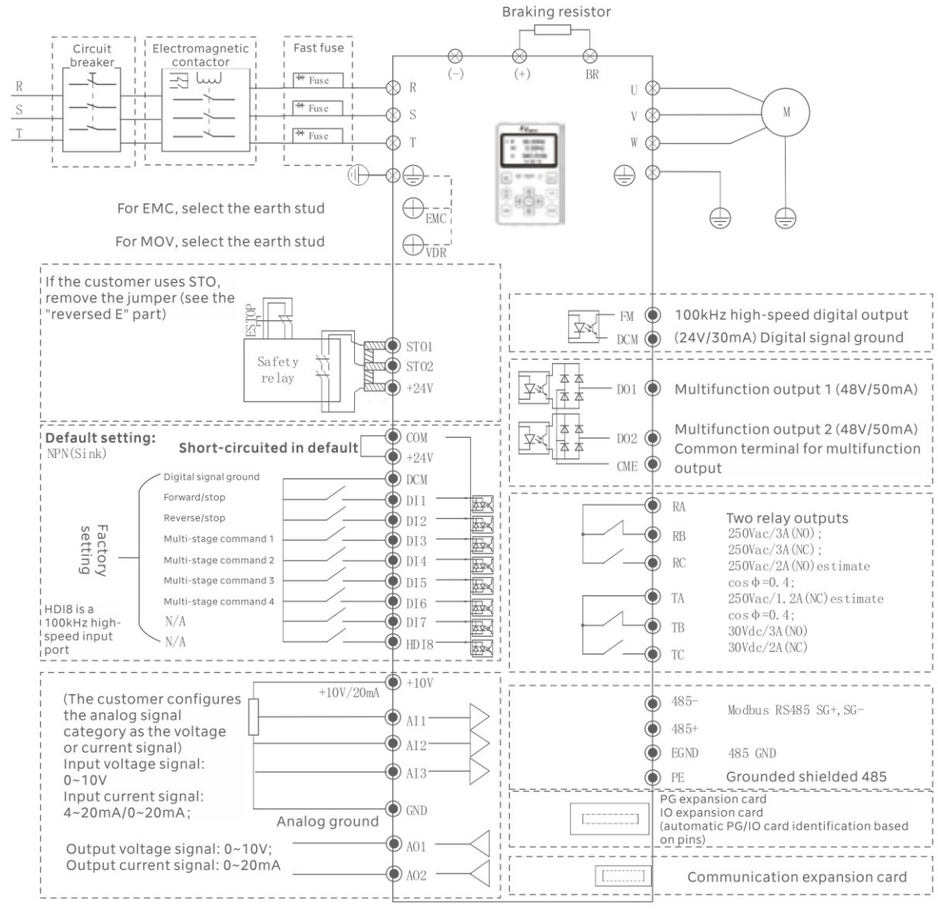
Item		Specification
Main control functions	Maximum output frequency	599.00Hz
	Carrier frequency	7.5kW and below: 2kHz~15kHz 11kW~93kW: 2kHz~10kHz 110kW~450kW: 2kHz~6kHz Automatic carrier frequency adjustment can be done according to the load characteristics
	Input frequency resolution	Digital setting: 0.01Hz; analog setting: maximum frequency × 0.025%
	Control mode	Asynchronous motors: V/F, VVC , SVC , andFVC
		Permanent magnet motors: SVC, VVC, and FVC
	Starting torque	SVC: 150%; FVC: 180%
	Speed regulation range	SVC: 1:200; FVC: 1:1000
	Speed stability accuracy	SVC: ≤±0.5%; FVC: ≤±0.3%
	Torque response	Torque step response < 20ms
	Torque accuracy	SVC: ±10%; FVC: ±5%
	Overload capacity	150% of rated current (60s)
	Torque boost	Automatic and manual torque boost modes are included
	V/F curve	Multi-point V/F curve; 1.5-power V/F curve; square V/F curve
	Acceleration and deceleration curve	Linear or S-shaped acceleration/deceleration modes: there are four groups of acceleration/deceleration time values Acceleration/deceleration time range: 0.00s~600.00s or 0.0s~6000.0s
	DC braking	Start DC braking and shutdown DC braking are included (0.0s~60.0s)
	Jog control	Jog frequency range: 0.00Hz~599.00Hz; Jog acceleration/deceleration time range: 0.00s~600.00s or 0.0s~6000.0s
	Tension control	Four control modes are included: tension closed-loop speed mode, linear speed closed-loop speed mode, tension closed-loop torque mode, and tension open-loop torque mode
	Multi-speed running	Up to 16-speed running can be realized through terminals
	Built-in PID	Can easily realize closed-loop process control
Personal-ized functions	Peripheral safety self-test	A safety test is performed on the peripherals to timely identify any problems, such as a grounding problem or a short-circuit, and improve the reliability of the system
	Common DC busbar function	A common DC bus can be shared by multiple VFDs
	JOG key	The JOG key on the operation panel can be used for jog running

Item		Specification
Personal-izedd functions	Fast current limiting function	A quick current limiting algorithm is embedded to reduce the probability that an overcurrent fault happens to the VFD
	Motor parameter identification	Automatic motor parameter identification
	Standardized panel extension cable	A constant voltage output can be maintained in case of grid voltage variations
	Communication buses	At least six kinds are supported (Modbus, Profinet, CANopen, Profibus-DP, EtherCAT, and Ethernet)
	Expansion function	I/O expansion card; bus communication expansion cards; PG cards (incremental sin/cos encoder cards)
	STO	Safe torque off in case of emergency
Operation	Frequency sources	Multiple frequency setting sources: operation panel setting, analog setting, control terminal setting, communication setting, etc.
	Auxiliary frequency sources	Multiple auxiliary frequency sources: operation panel setting, analog setting, control terminal setting, communication setting, etc.; auxiliary frequency fine tuning and synthesis can be flexibly realized
	Universal terminals	Eight DI terminals (one high-speed terminal), three DO terminals (one high-speed terminal), and two relay output terminals Three AI terminals (one supporting PT100), two AO terminals, two STO terminals, and one RS485 terminal
	Automatic acceleration/ deceleration	Automatic acceleration/deceleration time adjustment based on the load torque
Display and panel operation	LCD display	Chinese and English are supported
	LCD parameter copying	Quick parameter copying can be accomplished on the LCD panel
Protec-tions and options	Protection functions	Motor short-circuit detection, input/output phase loss protection, overcurrent protection, overvoltage protection, undervoltage protection, overtemperature protection, overload protection, etc.
	Options	Brake assembly
Environ-ment	Use place	Indoor, free from direct sunlight, dust, corrosive gas, flammable gas, oil mist, water vapour, dripping water or salt, etc.
	Altitude	When the elevation is lower than 1000m, it is unnecessary to use the VFD with its working current lower than its rated current; when the elevation is 1,000m or above, use it with its working current being 1% lower or with the ambient temperature being 0.5°C lower for each 100mm increase The maximum application elevation is 3,000m; when the elevation is higher than 3,000m, contact the manufacturer
	Ambient temperature	-10~+50°C (in case the environment temperature ranges from 40°C to 50°C, please use it with its working current lower than its rated current.)
	Humidity	< 95% (RH), w/o water droplets
	Vibration	< 5.9m/s2 (0.6g)
	Storage temperature	-20°C ~ + 60°C
	Pollution degree	2
Product standards	Applied safety standard	IEC61800-5-1:2007
	Applied EMC standard	IEC61800-3:2005

Electrical wiring diagram

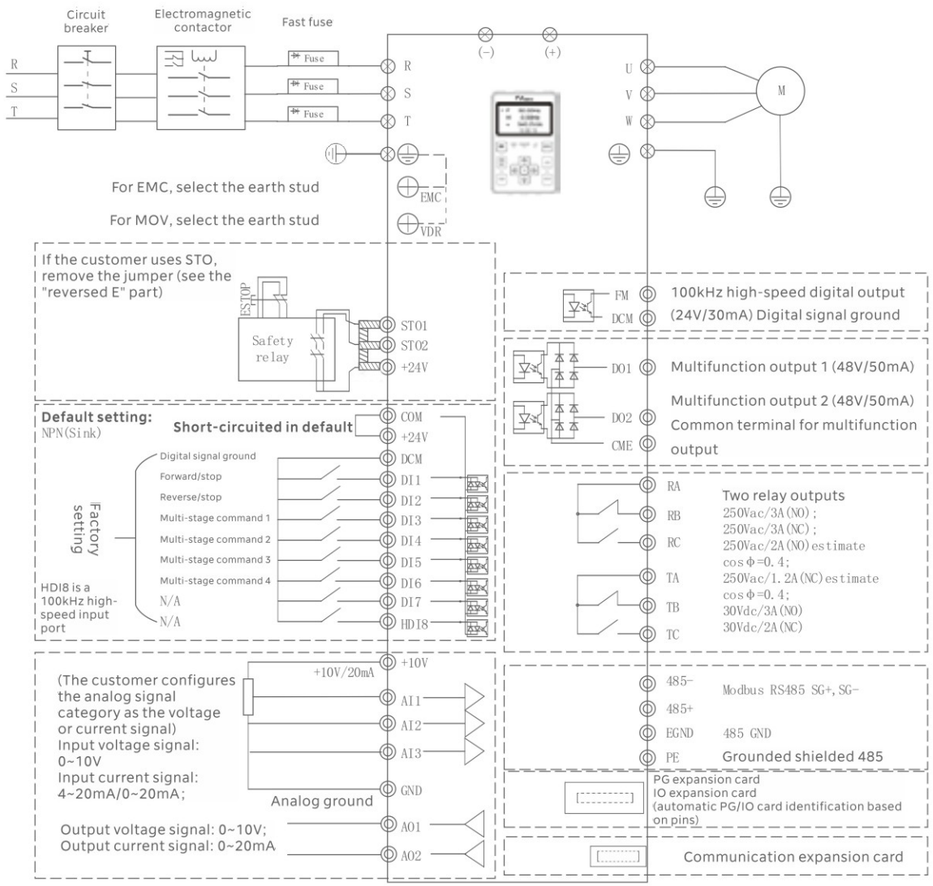


4.0~7.5kW three-phase VFDs



11kW~132kW VFDs

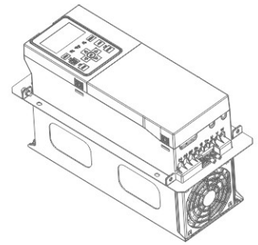
Electrical wiring diagram



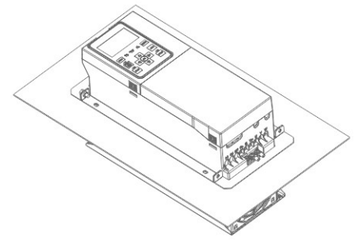
HCH100 Series 160KW~450KW VFDs

Installation mode

① Through-wall installation mode for plastic housing structure:



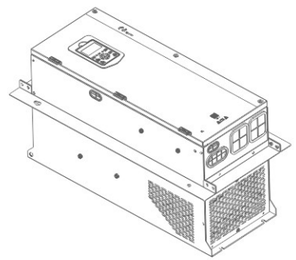
Through–wall bracket for plastic housing structure



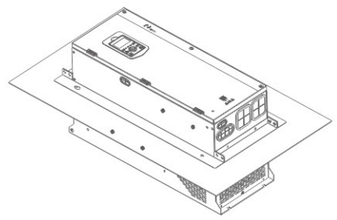
Through–wall bracket for plastic housing structure

Through-wall installation

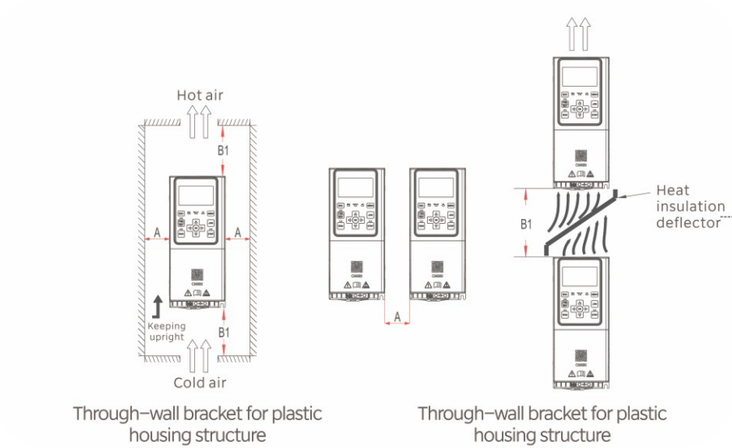
② Through-wall installation mode for sheet metal structure:



Through–wall bracket for plastic housing structure



Through–wall bracket for plastic housing structure



Through–wall bracket for plastic housing structure

Through–wall bracket for plastic housing structure

Wall mounting

Select accessories

Inductors (input DC inductor and output AC inductor)

① Input DC inductor: improves the input-side power factor of the VFD and suppresses higher harmonic currents
② Output AC inductor: increases the effective transmission distance of the VFD, suppresses output harmonic currents, increases the output high-frequency impedance, and effectively suppresses dv/dt.

Input DC inductor

Output AC inductor

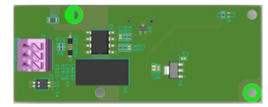
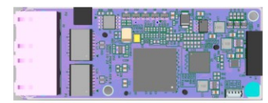
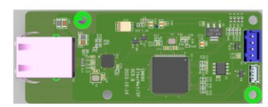
Braking resistor

The resistance is used to consume the regenerated energy of the motor so as to shorten the deceleration time;

(for ≤30kW HCH100 series VFDs, the resistance is a standard-configuration part; for 37kW~132kW HCH100 series VFDs, the resistance is an optional part)

EMC filter

Input filter: suppresses the pulses from the VFD through the input power cable Electromagnetic interferences into a public power grid
Install the filter as close as possible to the input terminal of the VFD

Functional module expansion cards			
Type	**Model**	**Description**	
Encoder card	HCH100-PG-INC	ABZ encoder card	
	HCH100-PG-R	Rotary encoder card	
Communi-cation bus cards	HCH100-CANopen	CANopen communication expansion card	
	HCH100-PROFIBUS	PROFIBUS-DP communication expansion card	
	HCH100-PROFINET	PROFINET Industrial Ethernet communication expansion card	
	HCH100-EtherNetIP	EtherNet/IP Industrial Ethernet communication expansion card	
	HCH100-EtherCAT	EtherCAT Industrial Ethernet communication expansion card