

NISTRO

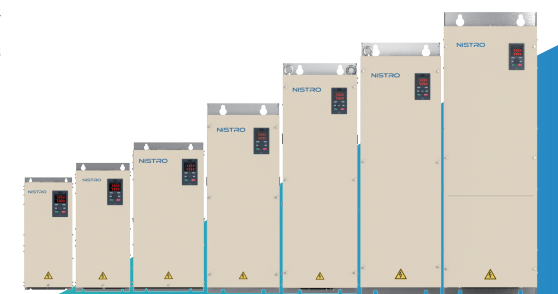
GA310 Series High-performance Vector AC Drive



GA310 series high-performance AC drive

Building on the proven GA300-series platform, the GA310-series drives elevate performance with next-generation enhancements. Featuring advanced magnetic field-oriented vector control technology, they deliver precise control for both asynchronous and synchronous motors, supporting multiple control modes including voltage-frequency split.

The optimized component layout retains the compact, book-style design while improving thermal performance and usability. With multiple extension ports and accessories, these drives offer exceptional power density, reliability, and application flexibility – simplifying selection and integration for diverse industrial needs.



Simple outside while fine inside

Industry-leading vector technology
AM/PM compatibility
Integration of multi-industry applications and optimized selection

Reduced operations

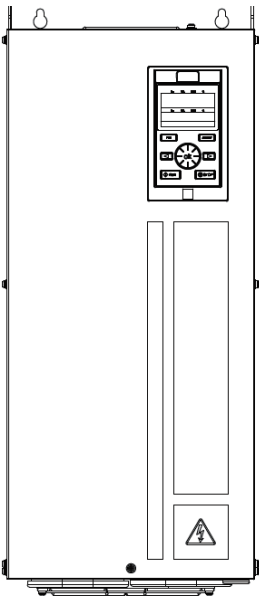
Simple wiring & European-style terminals to reduce wiring time and cost
Simple use by common parameter layout and optimize keys on the keypad
Simple debugging via special upper software to minimize time and difficulty

A “book” among drives

Book-like design with narrow housing, volume reduced by up to 60% .
Up and down straight-through heat dissipation enabling side-by-side installation of several drives and thus reducing the volume of the electrical cabinet.



Product Features



Features overview

- 01

High-performance vector universal platform,new motor control algorithm
- 02

Synchronous and asynchronous motor control integrated, open loop and closed loop supported
- 03

Precise torque excitation decoupling, excellent dynamic response performance
- 04

Booklet design for full series to minimize installation space
- 05

Safe and reliable new air duct design of DC fan cooling for full series
- 06

Comprehensive thermal simulation for rational hardware layout
- 07

Innovative grounding method for GA310 series to quickly solve electromagnetic interference
- 08

Modular design of software and hardware for powerful extension capability
- 09

Overall three-proofings for the product and tri-proof paint on PCBA for stable and reliable operation
- 10

Comprehensive expansion ports and accessories for all sorts of applications
- 11

Optimized external keypad design
- 12

Simpler on-site debugging methods for field firmware upgrade

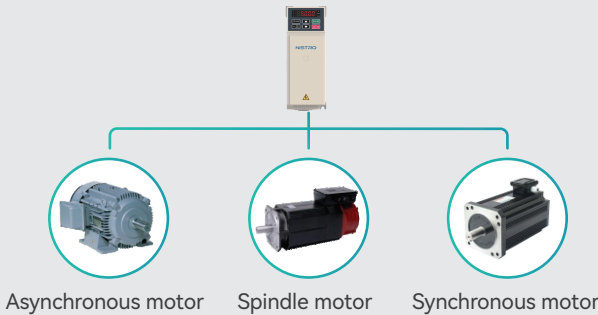
General specification

Power level	Single phase 220V 50/60Hz	0.75kW-15kW
	Three phase 220V 50/60Hz	0.75kW-220kW
	Three phase 380V 50/60Hz	0.75kW-1120kW
	Three phase 660V 50/60Hz	22kW-1120kW
Input	Allowable voltage fluctuation	T/S2: -10%~10%; T3: -15%~10%; T6: -10%~10%; Voltage imbalance rate<3%
	Allowable frequency fluctuation	Frequency: ±5%
	Distortion rate	IEC61800-2
Output	Output voltage	0~Input voltage,deviation lower than 5%
	Output frequency range	0-600Hz
	Overload capacity	T/S2: 150% rated current for 24s, 180% rated current for 3.4s
		T3: 150% rated current for 89s, 180% rated current for 10s, 200% rated current for 3s T6: 150% rated current for 89s, 180% rated current for 10s, 200% rated current for 3s

Performance features

Multiple types of motors/loads

The GA310 series drives deliver unmatched versatility, supporting a comprehensive range of motor types including:standard three-phase asynchronous motors, variable frequency motors, AC servo motors, permanent magnet synchronous motors, high-speed synchronous motors, spindle motors, torque motors, and liner motors. This extensive compatibility ensures optimal performance across diverse applications, providing customers with a single, flexible solution for all their motor control requirements.



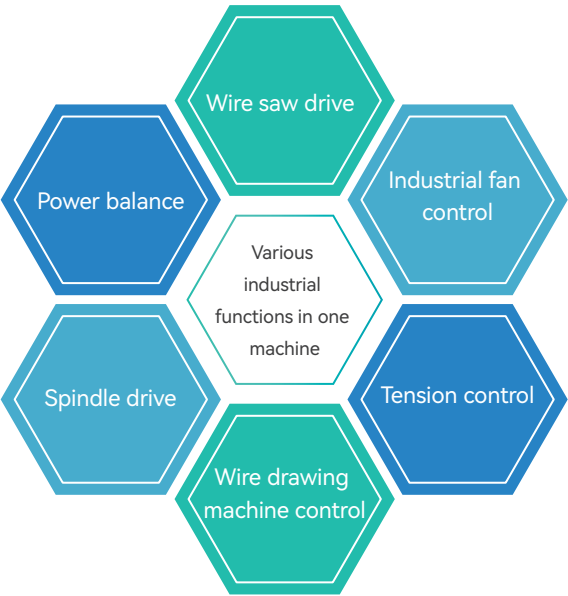
Control mode

Control mode	Speed control	Torque control	Position control	Applicable motor
VF mode	●			Asynchronous motor
Voltage frequency split	●			Torque motor, EPS power supply,series resonance
SVC	●	●		Asynchronous, permanent magnet synchronous
FVC	●	●	●	Asynchronous, permanent magnet synchronous, synchronous reluctance

Excellent control performance

Control mode	Speed control range	Starting torque	Applicable motor
SVC	1:200	150%	Permanent magnet synchronous motor
SVC	1:100	150%	Asynchronous motor
FVC	1:1000	200%	Asynchronous, permanent magnet synchronous motor

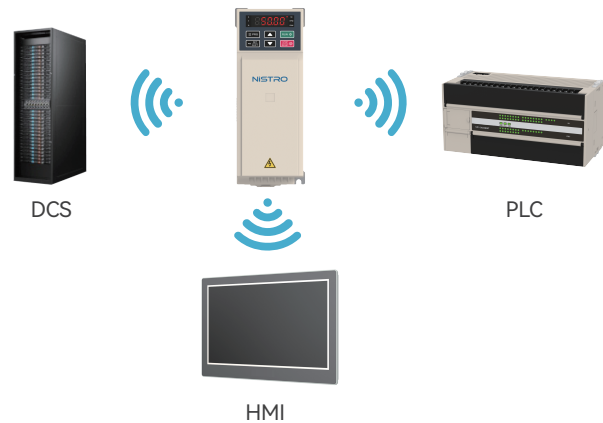
Abundant industrial applications



Active response to industry 4.0

As intelligent production systems evolve toward centralized control architectures, the GA310 series delivers universal connectivity to streamline system integration. The drives feature:

- Native interoperability with major DCS and PLC systems
- Direct HMI communication across multiple protocols
- Standard MODBUS-RTU interface
- Optional fieldbus modules (PROFIBUS-DP/CANOPEN/PROFINET)

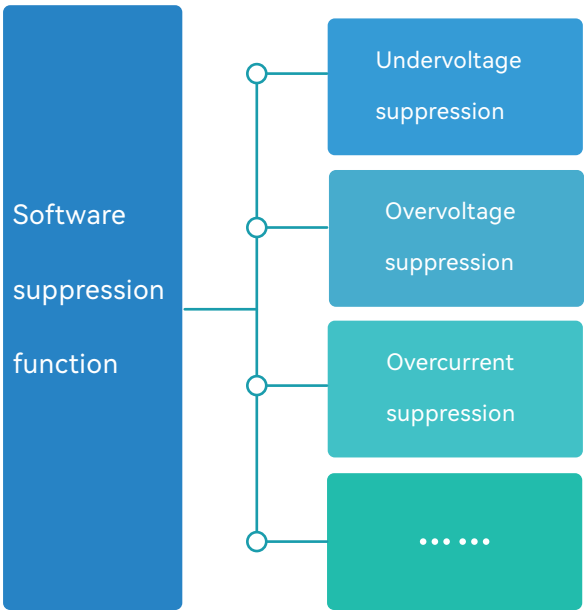


Voltage frequency split

The GA310 series delivers exceptional torque motor control with stable EPS power supply regulation, ensuring precise steady-state performance. Specifically engineered for demanding power applications, it serves as the ideal solution for high-voltage insulation test equipment.

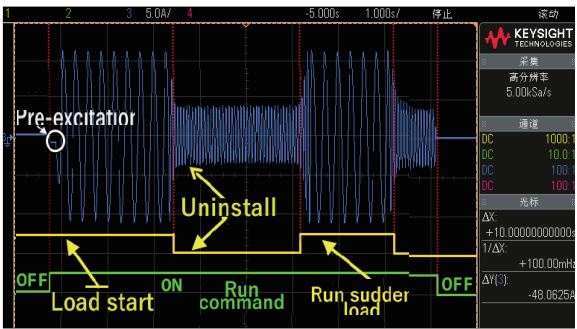


Software suppression function



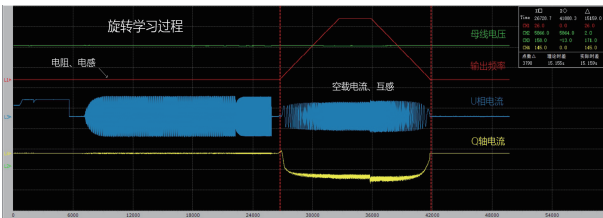
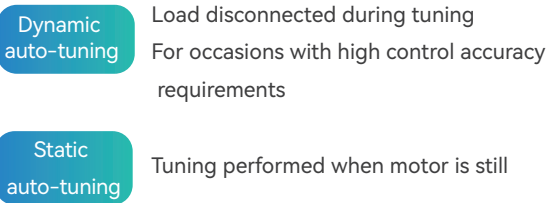
High starting torque characteristics

- 200% torque at 0Hz - Industry-leading low-frequency performance for demanding applications
- 0.01Hz stable operation - Ensures smooth starts and precise control under full load conditions

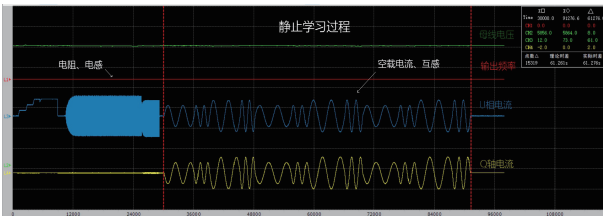


Motor parameter auto-tuning

- Smart auto-tuning - Accurate parameter identification whether running or stationary
- Simplified commissioning - Maintains peak control accuracy and dynamic response with minimal setup

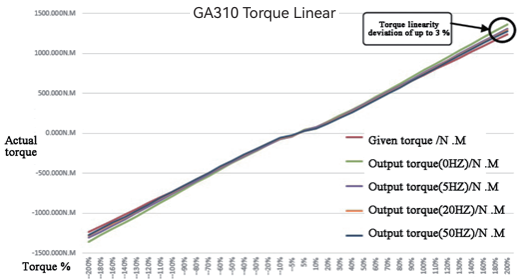


Rotary self-tuning



Static self-tuning

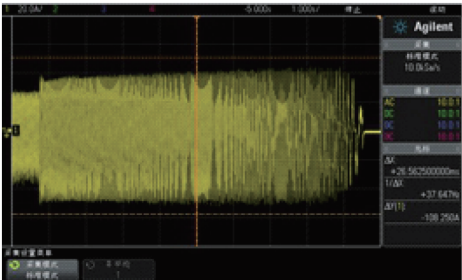
- Precision torque control - Maintains $\pm 3\%$ linearity for ultra-stable operation
- Consistent output performance - Ensures equipment reliability in demanding applications



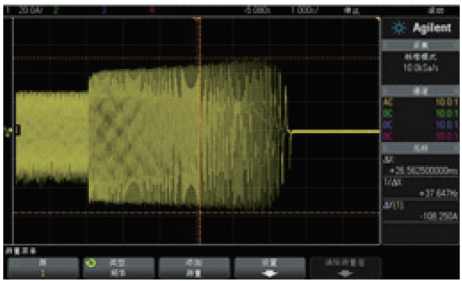
Overexcitation braking function

The AC drive's innovative overexcitation braking function delivers rapid deceleration without requiring external braking resistors. This intelligent system:

- Achieves instant stopping during partial inertia conditions
- Eliminates bus voltage spikes during deceleration
- Prevents overvoltage faults through active voltage control
- Enables power-loss emergency stopping for safety compliance



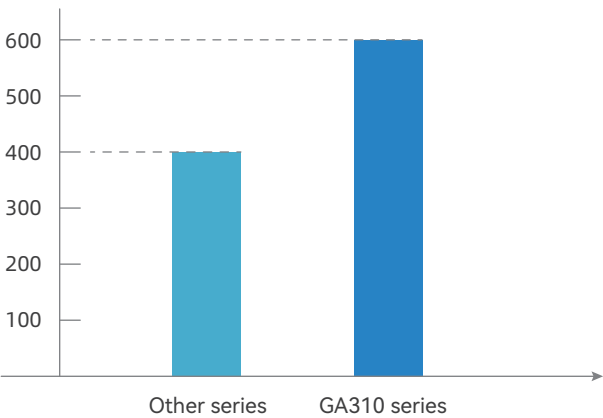
Overexcitation braking function is invalid



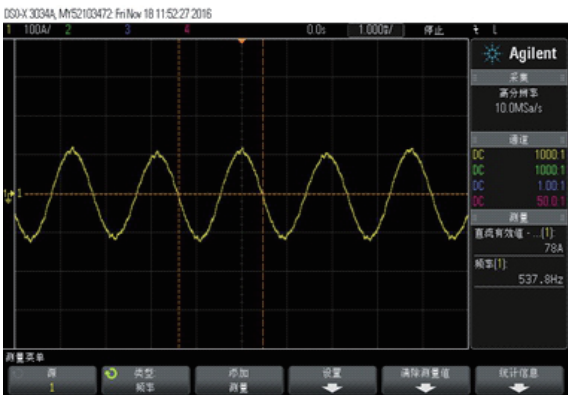
Overexcitation braking function is effective

Stable high-speed weak magnetic control

New weak magnetic control algorithm plus high bandwidth current vector control algorithm ensures stable high-speed weak magnetic running and highly precise weak magnetic output twelve-fold at most.



- Other series: The maximum output frequency under vector control is 320/400Hz;
- GA 310 series: The maximum output frequency under vector control is 600Hz.

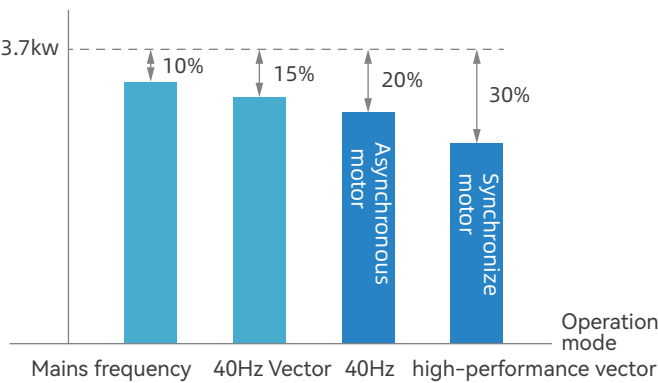


current waveform under 12-fold weak magnetic field

High energy saving

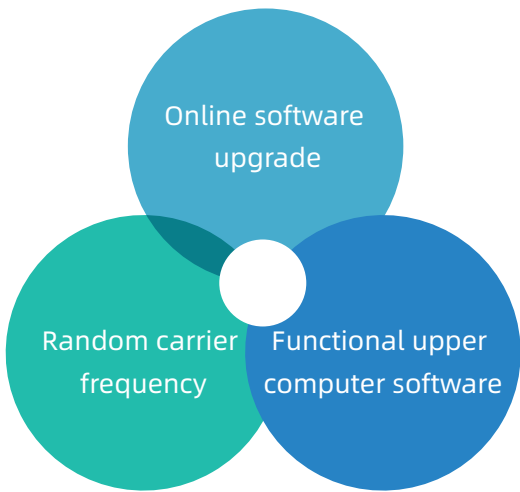
Our advanced energy-saving algorithm dynamically optimizes motor performance by:

- Intelligently adjusting excitation current based on real-time load demands
- Reducing energy losses by up to 30% compared to standard drives
- Maintaining optimal efficiency across all operating conditions



Fan energy saving comparison chart

Other software functions



Structural Hardware Characteristics

Concise internal layout and convenient wiring

- Slim-profile housing - Packed with full-featured connectivity
- User-friendly layout - Organized terminals for straightforward wiring

SPI-A
For any extension board

Terminal resistance, input/output selection

RJ45
Using network cables

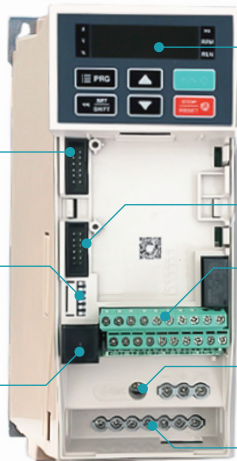
Keypad
The indicator light is integrated with the five-digit digital tube

SPI-B
For any extension board

Control terminals

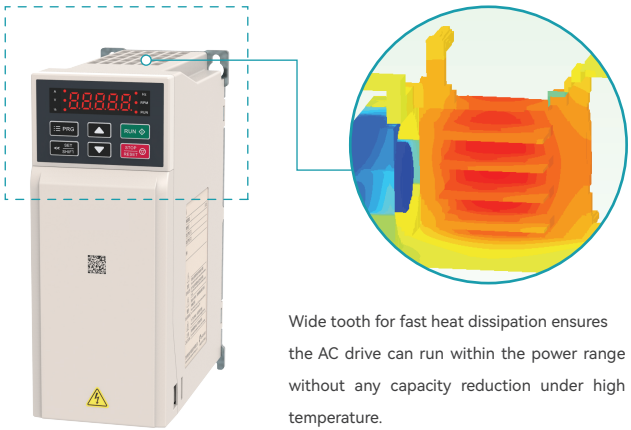
EMC terminal
Quick disconnection to ground

Main terminal



New structure design

Electronic devices are separated from the radiator air duct while capacitors, MOS tubes, relays are designed with stronger protection and both sides of the machine are sealed to raise environmental resistance.



Wide tooth for fast heat dissipation ensures the AC drive can run within the power range without any capacity reduction under high temperature.

Number of standard terminals

No.	Unit circuit	Quantity	Remarks
1	X terminal	5	Bidirectional input
2	Y terminal	1	Open collector output
3	Relay output	1	Normally open/ normally closed
4	10V power output	1	50mA
	24V power output	1	100mA
5	Voltage/current analog input	2	V/A support free switching
6	Analog output (optional)	1	0-10V
			0-20mA
			0-100kHz pulse output
7	RS485	1	ModBus-RTU
8	Low speed pulse input	1	X5 0-5kHz pulse input

New book-like housing

Dubbed the "book-sized drive" for 60% space savings with its innovative narrow-body design.

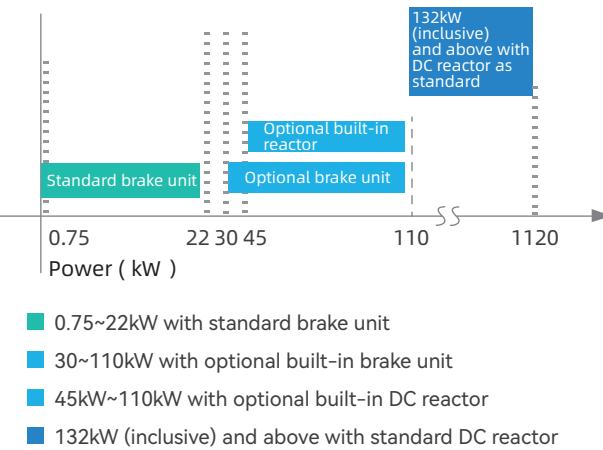


Optimized structure design

Reduced cabinet space, installation footprint and costs.



Braking unit and reactor configuration



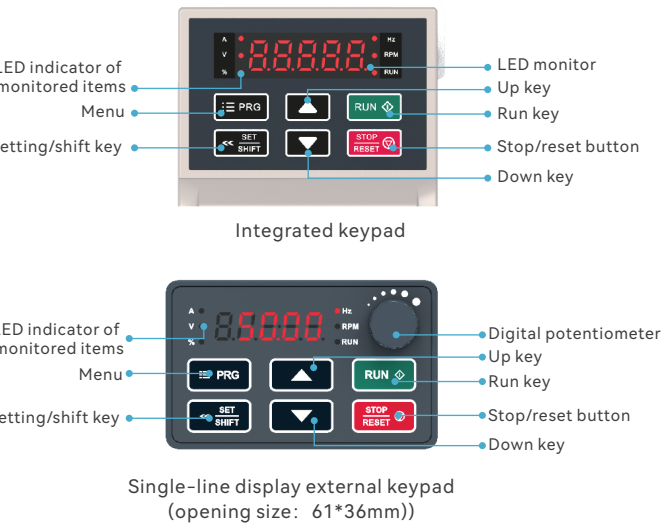
Port characteristics selection via DIP switch

Customers can quickly select the input and output port characteristics via the DIP switch with a screwdriver.

Dialing diagram	Tag	Select location	Function description
	RS485	485 terminal resistance	RS485 to120Ω terminal resistance
	AO-F	AO frequency	0.0~100kHz frequency output
	AO-I	AO current	AO interface 0~20mA current output or 4~20mA current output
	AO-U	AO voltage	0~10V voltage output
	AI1	AI1 current/voltage	0~20mA or 4~20mA or AI1 input 0~10V
	AI2	AI2 current/voltage	0~20mA or 4~20mA or AI2 input 0~10V

Keypad operation

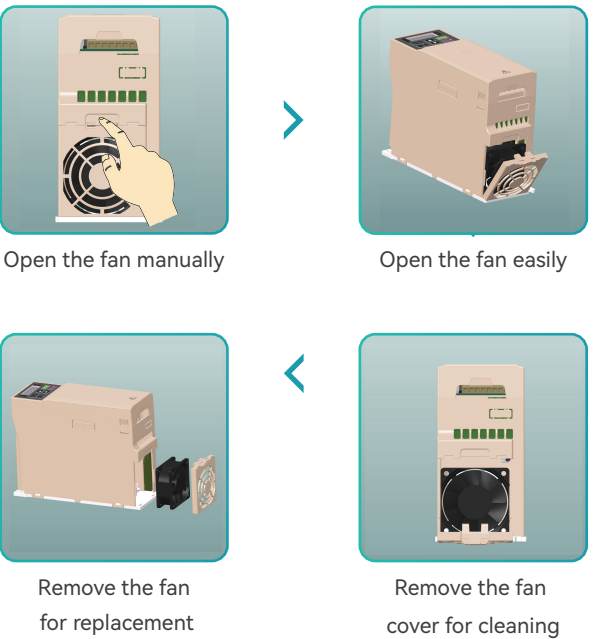
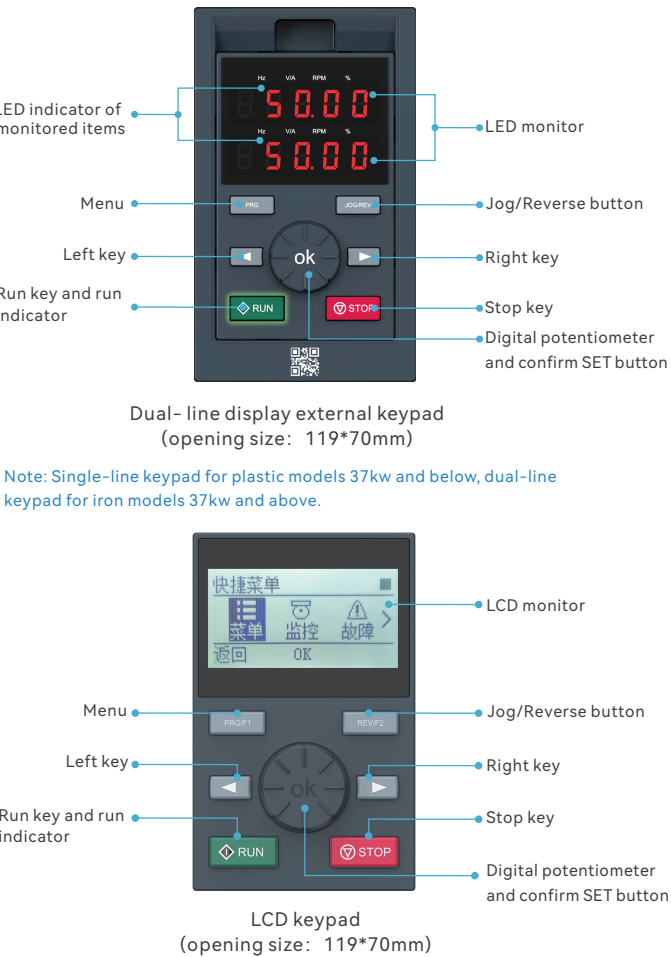
The newly engineered high-sensitivity keypad delivers exceptional tactile response and operational precision. Featuring dual-display capability, the system supports simultaneous use of built-in and external keypads - switching via parameter selection.



Name	Status	Meaning
Unit indicator	Hz	Flashing/on
	A	on
	V	Flashing/on
	RPM	on
	%	Flashing/on
Status Indicator	RUN	on
	RUN	Flashing
	RUN	off

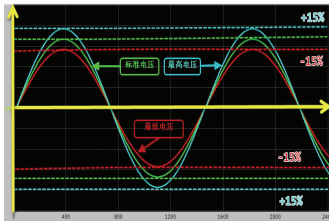
Fast disassembly and assembly design of the fan

The innovative design of the fan structure on GA310-series ensures the stability and efficiency of the fan and it can be quickly replaced and cleaned without any external tools.



Wide voltage design

±15% voltage tolerance and protection systems for stable performance in unstable grids.



European-style terminals

Safe & Reliable
European-style terminals comply with IEC 60998-2-1, UL 1059, and UL 486E standards, ensuring secure electrical connections.

Quick Wiring
Simple 3-step installation: strip → label → tighten. Fast and hassle-free.

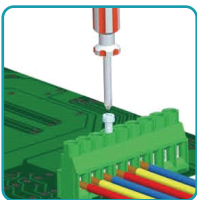
Time-Saving
When used in low-power GA310 drive main circuits, they cut wiring time by 50% versus standard terminals, boosting assembly efficiency.

Stripping → setting wire number → crimping cable lugs → screw locking

Stripping → Setting wire No. → Screw locking



Old-fashioned terminal block



European terminal

GA310 model		Wire diameter (mm)	Wire cross-sectional area S (mm²)	Stripping length L (mm)
Main circuit terminal	0.75kW-2.2kW	0.25-2.5	0.05-5.2	7-8
	4.0kW-5kW	0.5-2.5	0.2-5.2	6-7
Main circuit terminal	7.5kW-11kW	0.8-4	0.5-13	10-11
Wire stripping diagram				

EMC function

Fast grounding via terminals for effective interference suppression.



EMC grounding

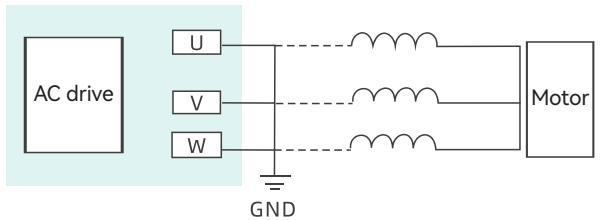
Protection function

The AC drive ensures full protection for internal and peripheral equipment through multiple safeguards, including:

System abnormality	Input phase loss	Stall protection	Accelerating overcurrent	Output phase lost
Load protection 1	Accelerating over-voltage	Fault type	Overheat	PID feedback malfunction
Running under-voltage	Current detection fault		Motor overload	Motor detection failure
	Excessive speed deviation			

New motor grounding short-circuit detection

- Real-time ground fault monitoring - Active protection from power-on with instant fault response
- Automatic startup prevention - Immediately blocks operation upon short-circuit detection



STO



Certain advanced models feature the optional STO function.

Expandability

Superb expansion capability

Smart expansion made simple - Dual SPI interfaces with auto-detection for plug-and-play customization
Future-ready design - Expandable architecture adapts to your evolving application needs.

Function Extension

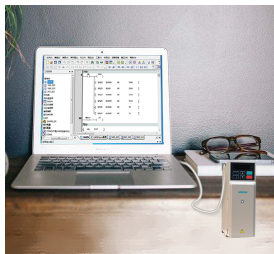
Model	Note
IO	Optional, high-speed pulse, relay
RT	optional, default software tracking
PG	Optional, multi-type encoder
RT	Optional
Simple logic board	Optional
GPRS	Optional

IO Extension

Attribute	Terminal	Description
Input IO	X6/X7/X8/X10	PLC/COM
High-speed pulse input	X10	0-100KHz
Digital output	Y2	DC24V/50mA
Relay output	TA2/TB2/TC2	3A/240VAC
Temperature detection	PK+/PK-	Support PT100/PT1000/KTY84, Motor temperature detection
Common port	COM/PLC2	External common port
Switch	S7	External common port

Logic board extension

- PLC-Free Control Solution - AC drive integrates basic PLC functionality.
- Familiar Programming Environment-Mitsubishi MELSEC-compatible development interface with preloaded function blocks.

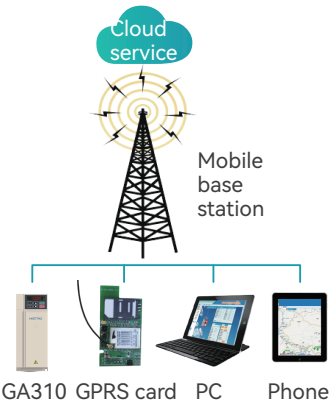


IOT

Precision & Easy Deployment
High-accuracy intelligent modules with tool-free installation.

Dual-Mode Connectivity
Reliable GPRS/GSM communication for uninterrupted operation.

Smart Remote Services
Real-time monitoring and remote diagnostics for predictive maintenance.



Communication extension



Model	Note
Modbus-RTU	Optional
PROFIBUS-DP	Optional
CANopen	Optional
PROFINET	Optional
.....	

Model Description

GA310-T3-037 G/45 P-B (L)

Series name
GA310

Voltage level

Codename	Definition	Codename	Definition
S	Single phase	2	220V
T	Three phase	3	380V
		6	660V

Integrated accessories

B: Built-in braking unit
L: Built-in DC reactor
BL: Built-in braking unit and DC reactor
LD: Cabinet units with built-in DC reactors

Drive type

G: Heavy load
P: Light load

Power level

2R2: 2. 2kW
004: 4kW
.....

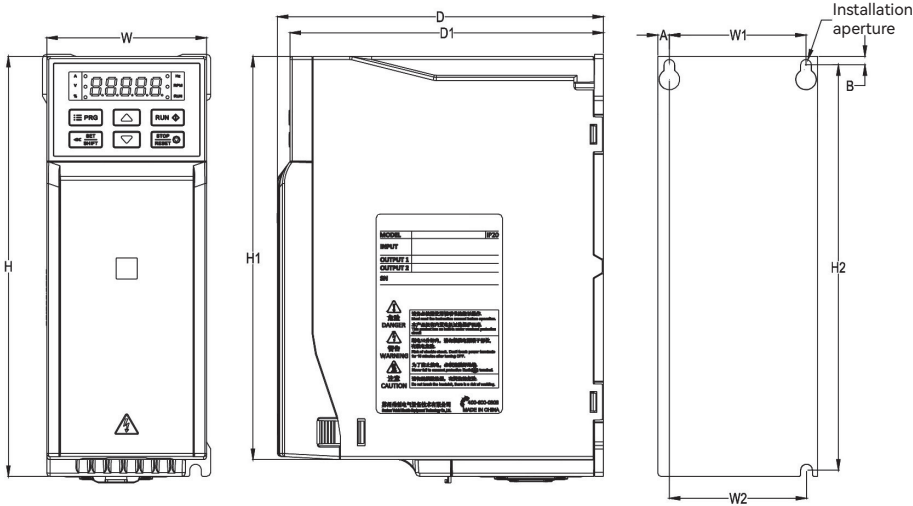
Rated output current

Voltage	220V	380V	660V
Power level(kW)	Rated output current (A)		
0.75	4	3	
1.5	7	4	
2.2	10	6	
4	16	10	
5.5	20	13	
7.5	30	17	
11	42	25	
15	55	32	
18.5	70	38	
22	80	45	28
30	110	60	35
37	130	75	45
45	160	90	52
55	200	110	63
75	260	150	86
90	320	180	98
110	380	210	121
132	420	250	150

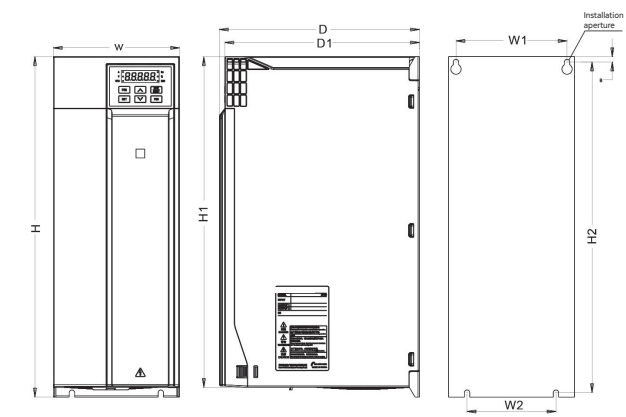
Voltage	220V	380V	660V
Power level(kW)	Rated output current (A)		
160	550	310	175
185	600	340	198
200	660	380	218
220	720	415	235
250		470	270
280		510	330
315		600	345
355		670	380
400		750	430
450		810	466
500		860	540
560		990	600
630		1200	690
710		1340	760
800		1500	860
900		1600	932
1000		1720	1080
1120		1980	1200

Installation Dimension Diagram

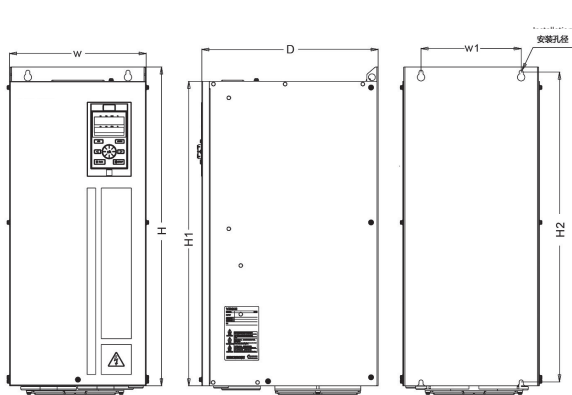
Plastic case model



Model	Dimension (mm)					Installation size (mm)					Installation aperture
	W	H	H1	D	D1	W1	W2	H2	A	B	
GA310-T/S2-R75G-B	76	200	192	155	149	65	65	193	5.5	4	3-M4
GA310-T/S2-1R5G-B						84	86.5	231.5	8	5.5	
GA310-T/S2-2R2G-B	100	242	231	155	149	98	100	307.5	9	6	3-M5
GA310-T/S2-004G-B						65	65	193	5.5	4	
GA310-T/S2-5R5G-B	116	320	307.5	175	169	98	100	307.5	9	6	3-M5
GA310-T3-R75G/1R5P-B	76	200	192	155	149	65	65	193	5.5	4	3-M4
GA310-T3-1R5G/2R2P-B						84	86.5	231.5	8	5.5	
GA310-T3-2R2G-B	100	242	231	155	149	98	100	307.5	9	6	3-M5
GA310-T3-004G/5R5P-B						65	65	193	5.5	4	
GA310-T3-5R5G/7R5P-B	116	320	307.5	175	169	98	100	307.5	9	6	3-M5
GA310-T3-7R5G/011P-B	116	320	307.5	175	169	98	100	307.5	9	6	3-M5
GA310-T3-011G/015P-B						65	65	193	5.5	4	

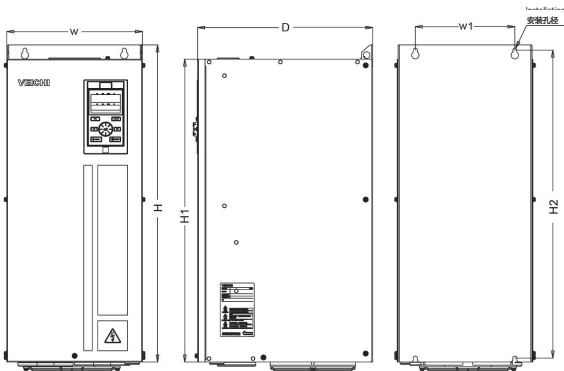


Model	Dimension (mm)					Installation size (mm)				Installation aperture
	W	H	H1	D	D1	W1	W2	H2	B	
GA310-T/S2-7R5G-B	142	383	372	225	219	125	100	372	6	4-M5
GA310-T/S2-011G-B										
GA310-T/S2-015G	172	430	/	225	219	150	150	416.5	7.5	4-M5
GA310-T2-018G										
GA310-T2-022G										
GA310-T3-015G/018P-B	142	383	372	225	219	125	100	372	6	4-M5
GA310-T3-018G/022P-B										
GA310-T3-022G/030P-B										
GA310-T3-030G/037P	172	430	/	225	219	150	150	416.5	7.5	4-M5
GA310-T3-037G/045P										



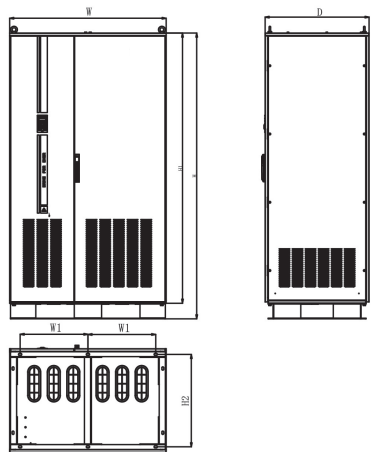
Model	Dimension (mm)				Installation size (mm)		Installation aperture
	W	H	H1	D	W1	H2	
GA310-T3-315G/355P-L	400	1250	1140	545	240	1213	4-M16
GA310-T3-355G/400P-L							
GA310-T3-400G/450P-L							
GA310-T3-450G/500P-L	460	1400	1293	545	300	1363	4-M16
GA310-T3-500G/560P-L							
GA310-T3-560G/630P-L							
GA310-T6-315G/355P-L	400	1250	1140	545	240	1213	4-M16
GA310-T6-355G/400P-L							
GA310-T6-400G/450P-L							
GA310-T6-450G/500P-L	460	1400	1293	545	300	1363	4-M16
GA310-T6-500G/560P-L							
GA310-T6-560G/630P-L							

Iron case model



Model	Dimension (mm)				Installation size (mm)		Installation aperture
	W	H	H1	D	W1	H2	
GA310-T2-030G	240	560	535	310	176	544	4-M6
GA310-T2-037G							
GA310-T2-045G							
GA310-T2-055G	270	638	580	350	195	615	4-M8
GA310-T3-045G/055P	240	560	535	310	176	544	4-M6
GA310-T3-055G/075P							
GA310-T3-075G/090P							
GA310-T3-090G/110P	270	638	580	350	195	615	4-M8
GA310-T3-110G/132P							
GA310-T3-132G/160P-L	350	738	680	405	220	715	4-M8
GA310-T3-160G/185P-L							
GA310-T3-185G/200P-L	360	940	850	480	200	910	4-M16
GA310-T3-200G/250P-L							
GA310-T3-220G/250P-L							
GA310-T3-250G/280P-L	370	1140	1050	545	200	1110	4-M16
GA310-T3-280G/315P-L							
GA310-T6-022G/030P	240	560	535	310	176	544	4-M6
GA310-T6-030G/037P							
GA310-T6-037G/045P							
GA310-T6-045G/055P							
GA310-T6-055G/075P							
GA310-T6-075G/090P							
GA310-T6-090G/110P	270	638	580	350	195	615	4-M8
GA310-T6-110G/132P							
GA310-T6-132G/160P-L	350	738	680	405	220	715	4-M8
GA310-T6-160G/185P-L							
GA310-T6-185G/200P-L	360	940	850	480	200	910	4-M16
GA310-T6-200G/220P-L							
GA310-T6-220G/250P-L							
GA310-T6-250G/280P-L	370	1140	1050	545	200	1110	4-M16
GA310-T6-280G/315P-L							

Cabinet model

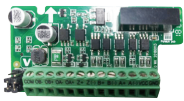


Model	Dimension (mm)				Installation size (mm)		Installation aperture
	W	H	H1	D	W1	H2	
GA310-T3-630G/710P-LD	1201	2198	2078	798	520	711	φ14
GA310-T3-710G/800P-LD							
GA310-T3-800G/900P-LD							
GA310-T3-900G/1000P-LD							
GA310-T3-1000G/1120P-LD							
GA310-T3-1120G-LD							
GA310-T6-630G/710P-LD							
GA310-T6-710G/800P-LD							
GA310-T6-800G/900P-LD							
GA310-T6-900G/1000P-LD							
GA310-T6-1000G/1120P-LD							
GA310-T6-1120G-LD							

Accessory List

GA310PG01

5V and 12V power PG cards available here for the incremental differential output encoder and the open collector output encoder.



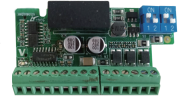
GA310IO1

4 × DI (50kHz at X10)
1 × DO + 1 × AI
1 × RO



GA310RT1

Four different ratios of 0.219, 0.286, 0.5(by default) and 0.58



KBD27-15

External LED keypad with potentiometer



GA310CAN1

CANopen board



GA310PN

For standard Profinet communication



GA310DP01

Profibus communication expansion card



GA310-GPRS

Equipment positioning and maintenance, real-time monitoring ,data collection



KBD310-25

Dual-line external keypad with silicone buttons and digital potentiometer

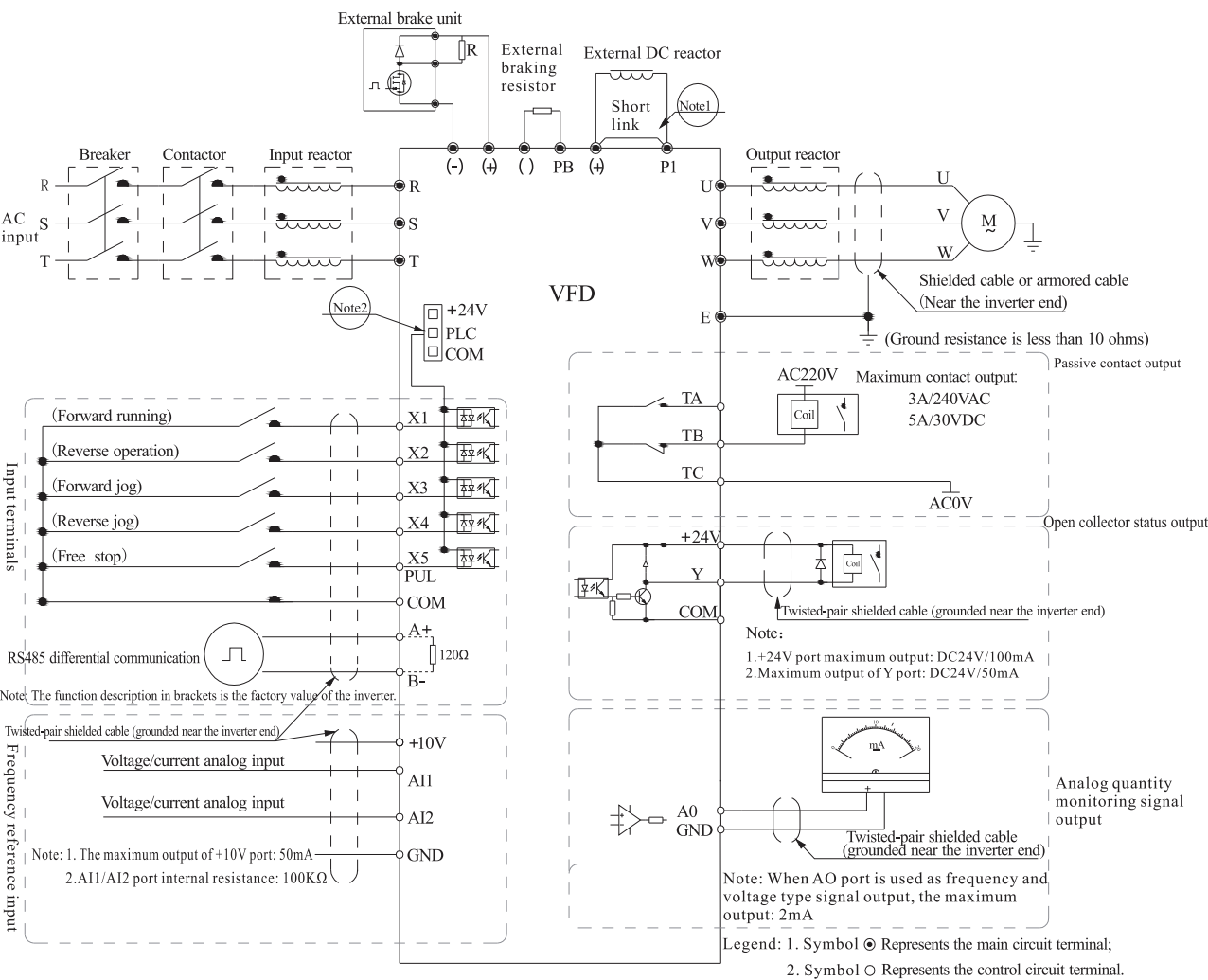


KBD310-L1 LCD keypad

User-friendly LCD interface



Wiring Diagram



Note:1.When installing the DC reactor, be sure to remove P1 (+) shorting tab between terminals.
2. Choose NPN or PNP transistor signal as input for multi-function input terminals (X1~ X5/PUL), and choose the drive internal power supply (+24V terminal), or the external power supply (PLC terminal) for bias voltage. The factory default "+24V" and "PLC" are shorted, and the position of the shorting tab is placed between RJ45 and the terminal.

Applications

 Automated production line	 Industrial mining	 Machine tool	 Municipal environmental protection
 Lifting	 Oilfield	 Wires and cables	 Woodworking machinery
 Printing and packaging	 Chemical industry	 Industrial power	 Plastics machinery
 Textile	 Elevator	 Ceramics machinery	 Food processing