

**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



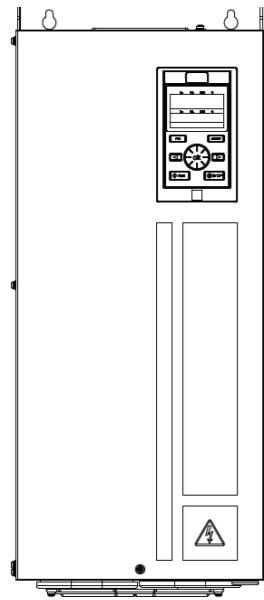
### Reduced operations

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-proofs 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

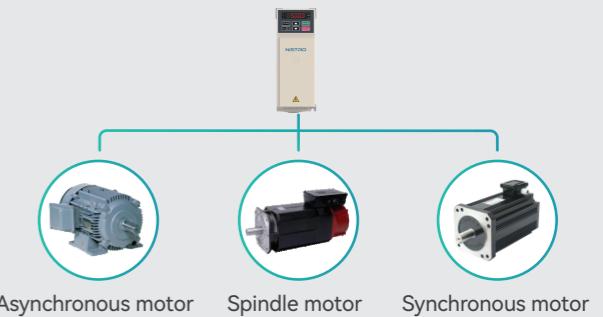
### General specification

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
	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	
Overload capacity		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.



Asynchronous motor      Spindle motor      Synchronous motor

#### 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

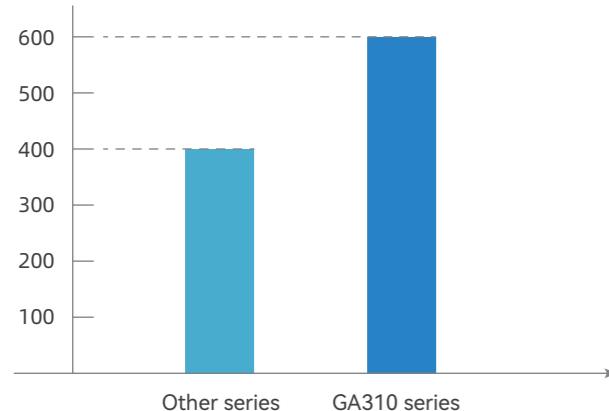
#### Excellent control performance

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

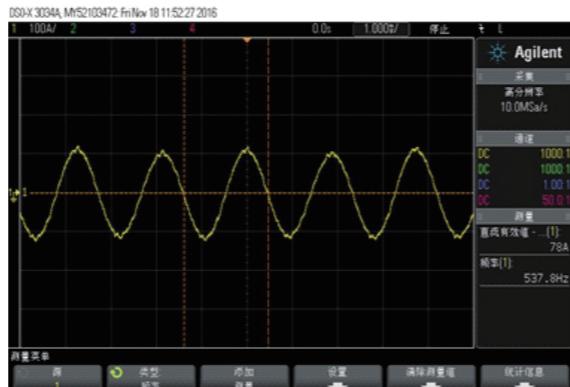


## Stable high-speed weak magnetic control

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.

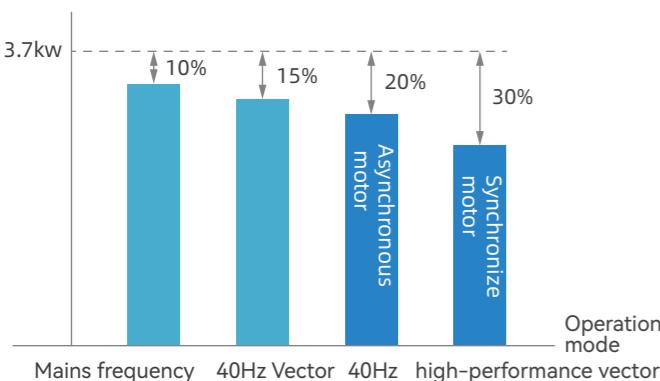


current waveform under 12-fold weak magnetic field

## High energy saving

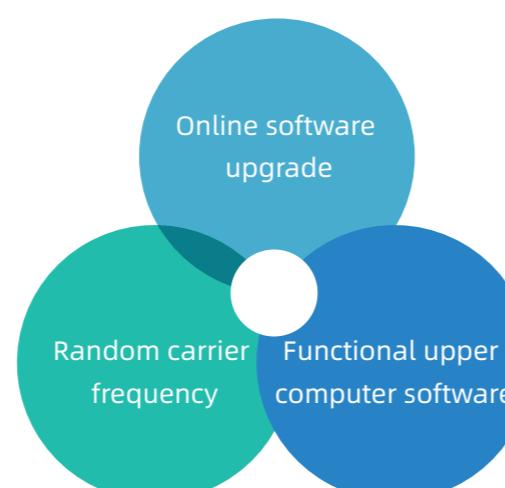
Our advanced energy-saving algorithm dynamically optimizes motor performance by:

- 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

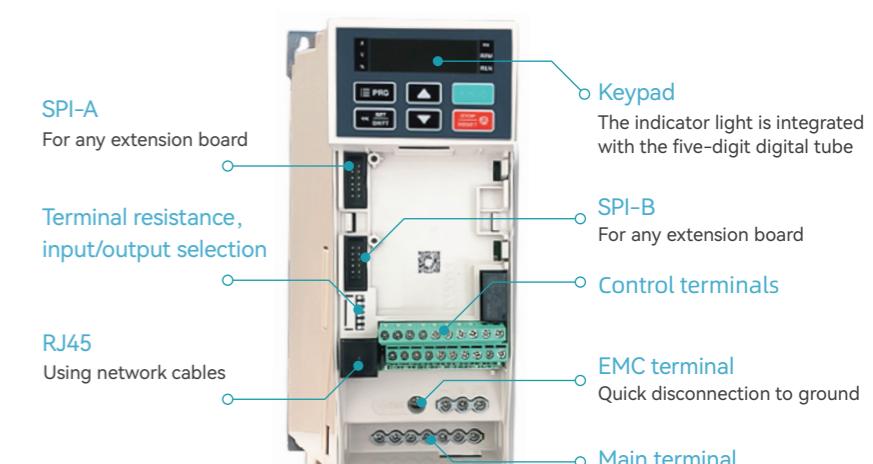


Fan energy saving comparison chart

## Other software functions



## Structural Hardware Characteristics

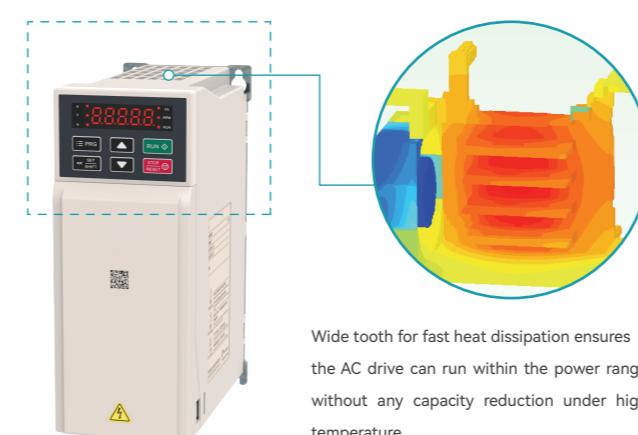


### Concise internal layout and convenient wiring

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

### 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.



### 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 0-10V 0-20mA 0-100kHz pulse output
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

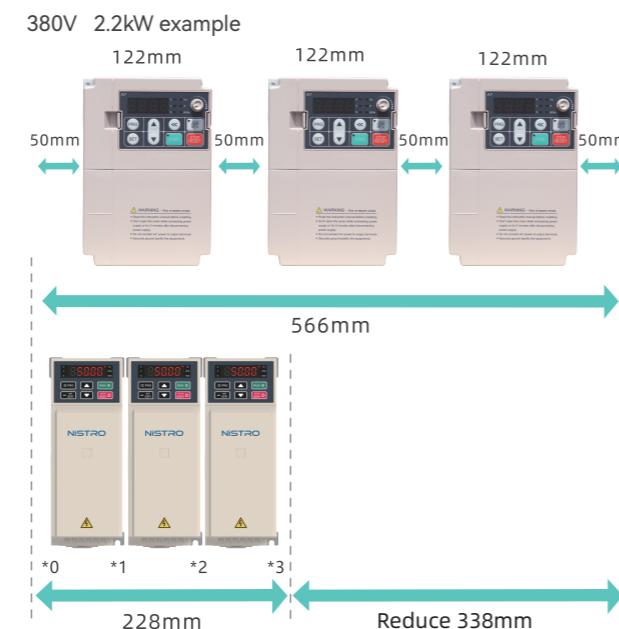
Dubbed the "book-sized drive" for 60% space savings with its innovative narrow-body design.



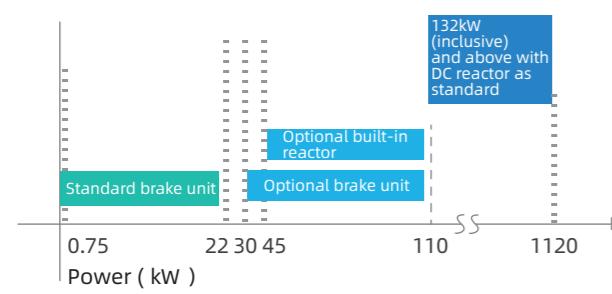
Reduce 60%

## Optimized structure design

Reduced cabinet space, installation footprint and costs.



## Braking unit and reactor configuration



- 0.75~22kW with standard brake unit
- 30~110kW with optional built-in brake unit
- 45kW~110kW with optional built-in DC reactor
- 132kW (inclusive) and above with standard DC reactor

## 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 OFF	RS485	485 terminal resistance	RS485 to 120Ω terminal resistance
AO-F OFF	AO-F	AO frequency	0.0~100kHz frequency output
AO-I OFF	AO-I	AO current	AO interface 0~20mA current output or 4~20mA current output
AO-U OFF	AO-U	AO voltage	0~10V voltage output
A11 U	AI1	AI1 current/voltage	0~20mA or 4~20mA or AI1 input 0~10V
A12 U	AI2	AI2 current/voltage	0~20mA or 4~20mA or AI2 input 0~10V

RS485

AO-F

AO-I

AO-U

A11

A12

ON

ON

ON

ON

I

I

ON

ON

ON

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RS485 to 120Ω terminal resistance

0.0~100kHz frequency output

AO interface 0~20mA current output or 4~20mA current output

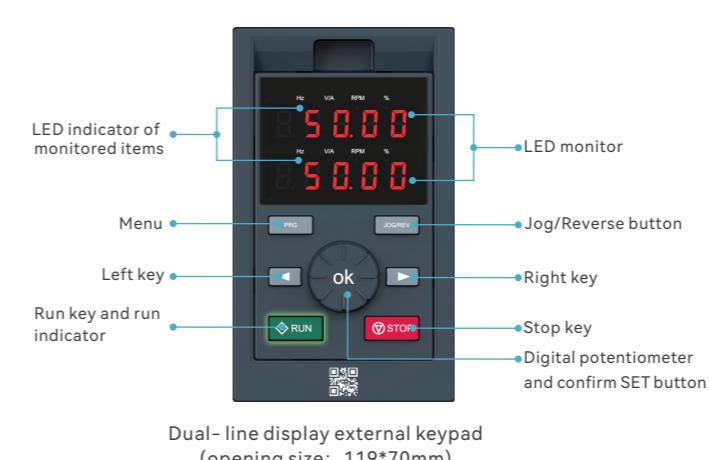
0~10V voltage output

0~20mA or 4~20mA or AI1 input 0~10V

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.



Note: Single-line keypad for plastic models 37kW and below, dual-line keypad for iron models 37kW and above.



Name	Status	Meaning
Hz	Flashing/on	Frequency unit
A	on	Current unit
V	Flashing/on	Voltage unit
RPM	on	Speed unit
%	Flashing/on	Percentage unit
Status Indicator	RUN on	Forward running
	RUN Flashing	Reverse running
	RUN off	Stop

## 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.



Open the fan manually



Open the fan easily



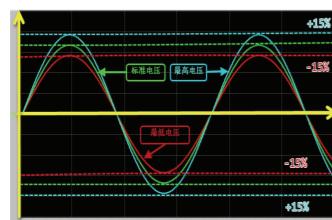
Remove the fan cover for cleaning



Remove the fan for replacement

## Wide voltage design

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



## European-style terminals

## Safe &amp; 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

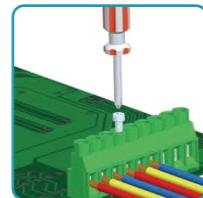
When used in low-power GA310 drive main circuits, they cut wiring time by 50% versus standard terminals, boosting assembly efficiency.

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



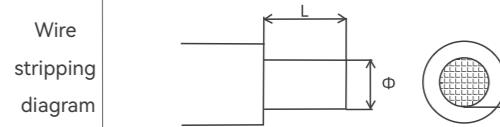
Old-fashioned terminal block

Stripping → Setting wire No. →Screw locking



European terminal

GA310 model	Wire diameter (mm)	Wire cross-sectional area S (mm <sup>2</sup> )	Stripping length L (mm)
Main circuit terminal	0.75kW-2.2kW	0.25-2.5	0.05-5.2
	4.0kW-5kW	0.5-2.5	0.2-5.2
	7.5kW-11kW	0.8-4	0.5-13



## EMC function

Fast grounding via terminals for effective interference suppression.



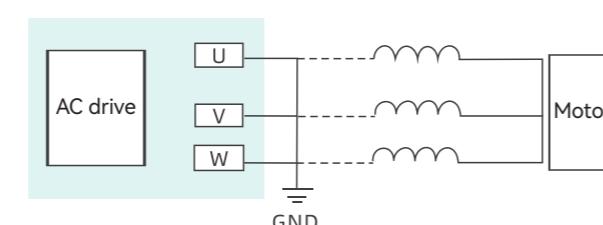
## Protection function

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

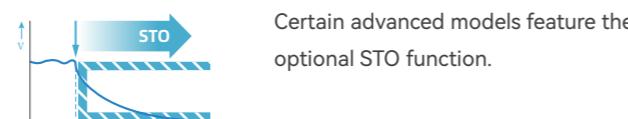
System abnormality	Input phase loss	Stall protection	Accelerating overcurrent	Output phase lost
Load protection 1	Accelerating over-voltage	Fault type	Overheat	PID feedback malfunction
Running under-voltage	Current detection fault	Excessive speed deviation	Motor overload	Motor detection failure

## 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.

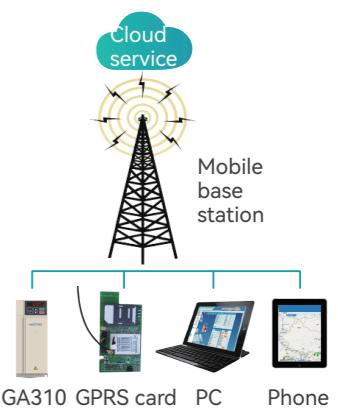


## IOT

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
  - .....

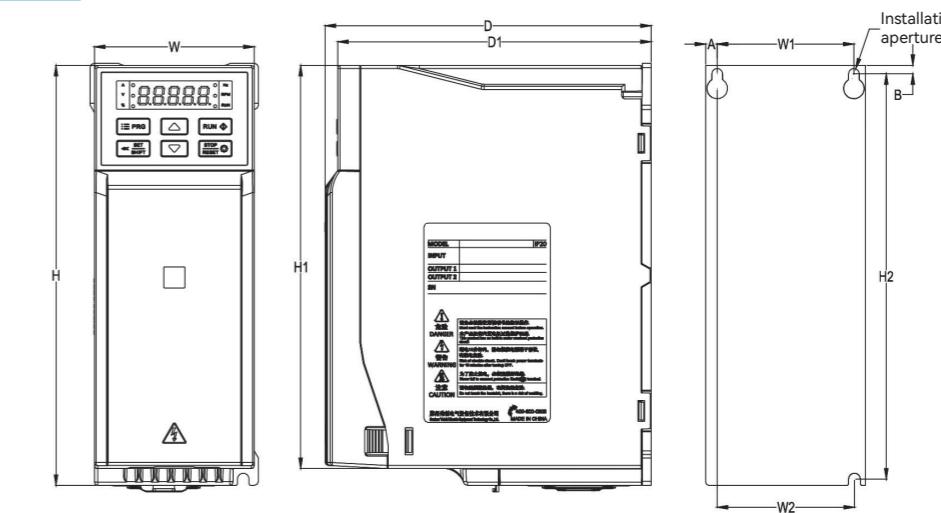
### Rated output current

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

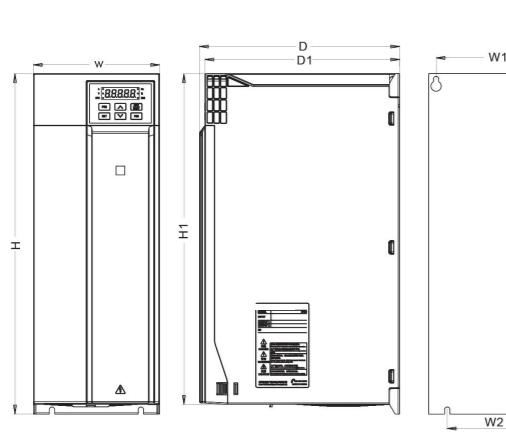
Voltage	220V	380V	660V
Power level(kW)	Rated output current (A)		
160	550	310	175
185	600	340	198
200	660	380	218
220	720	415	235
250		470	270
280		510	330
315		600	345
355		670	380
400		750	430
450		810	466
500		860	540
560		990	600
630		1200	690
710		1340	760
800		1500	860
900		1600	932
1000		1720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

## Installation Dimension Diagram

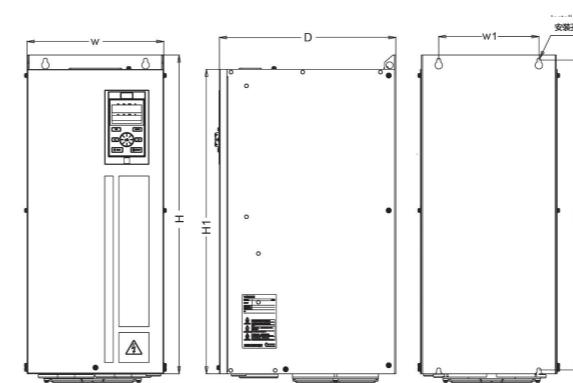
### Plastic case model



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											
GA310-T/S2-2R2G-B	100	242	231	155	149	84	86.5	231.5	8	5.5	3-M4
GA310-T/S2-004G-B											
GA310-T/S2-5R5G-B	116	320	307.5	175	169	98	100	307.5	9	6	3-M5
GA310-T3-R75G/1R5P-B											
GA310-T3-1R5G/2R2P-B	76	200	192	155	149	65	65	193	5.5	4	3-M4
GA310-T3-2R2G-B											
GA310-T3-004G/5R5P-B	100	242	231	155	149	84	86.5	231.5	8	5.5	3-M4
GA310-T3-5R5G/7R5P-B											
GA310-T3-7R5G/011P-B	116	320	307.5	175	169	98	100	307.5	9	6	3-M5
GA310-T3-011G/015P-B											



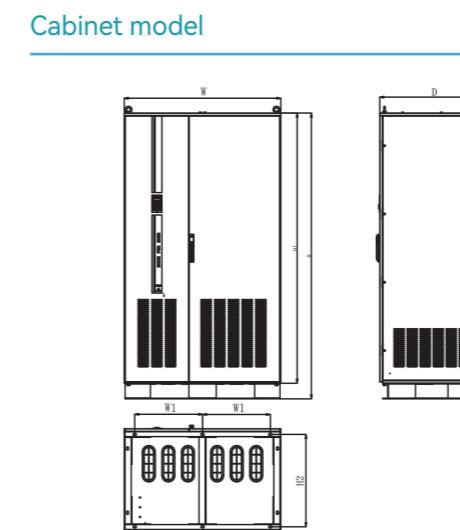
Model	Dimension ( mm )					Installation size ( mm )			Installation aperture
	W	H	H1	D	D1	W1	W2	H2	
GA310-T/S2-7R5G-B									4-M5
GA310-T/S2-011G-B	142	383	372	225	219	125	100	372	6
GA310-T/S2-015G									
GA310-T2-018G	172	430	/	225	219	150	150	416.5	7.5
GA310-T2-022G									
GA310-T3-015G/018P-B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



Model	Dimension ( mm )					Installation size ( mm )		Installation aperture
	W	H	H1	D	W1	H2		
GA310-T3-315G/355P-L								
GA310-T3-355G/400P-L	400	1250	1140	545	240	1213		4-M16
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								
GA310-T6-355G/400P-L	400	1250	1140	545	240	1213		4-M16
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								



Model	Dimension ( mm )					Installation size ( mm )			Installation aperture
	W	H	H1	D	D1	W1	W2	B	
GA310-T2-030G									
GA310-T2-037G	240	560	535	310		176	544		4-M6
GA310-T2-045G									
GA310-T2-055G	270	638	580	350		195	615		4-M8
GA310-T3-045G/055P									
GA310-T3-055G/075P	240	560	535	310		176	544		4-M6
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	370	1140	1050	545		200	1110		4-M16
GA310-T6-022G/030P									
GA310-T6-030G/037P	240	560	535	310		176	544		4-M6
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	370	1140	1050	545		200	1110		4-M16
GA310-T6-250G/280P-L									
GA310-T6-280G/315P-L									



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



### 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

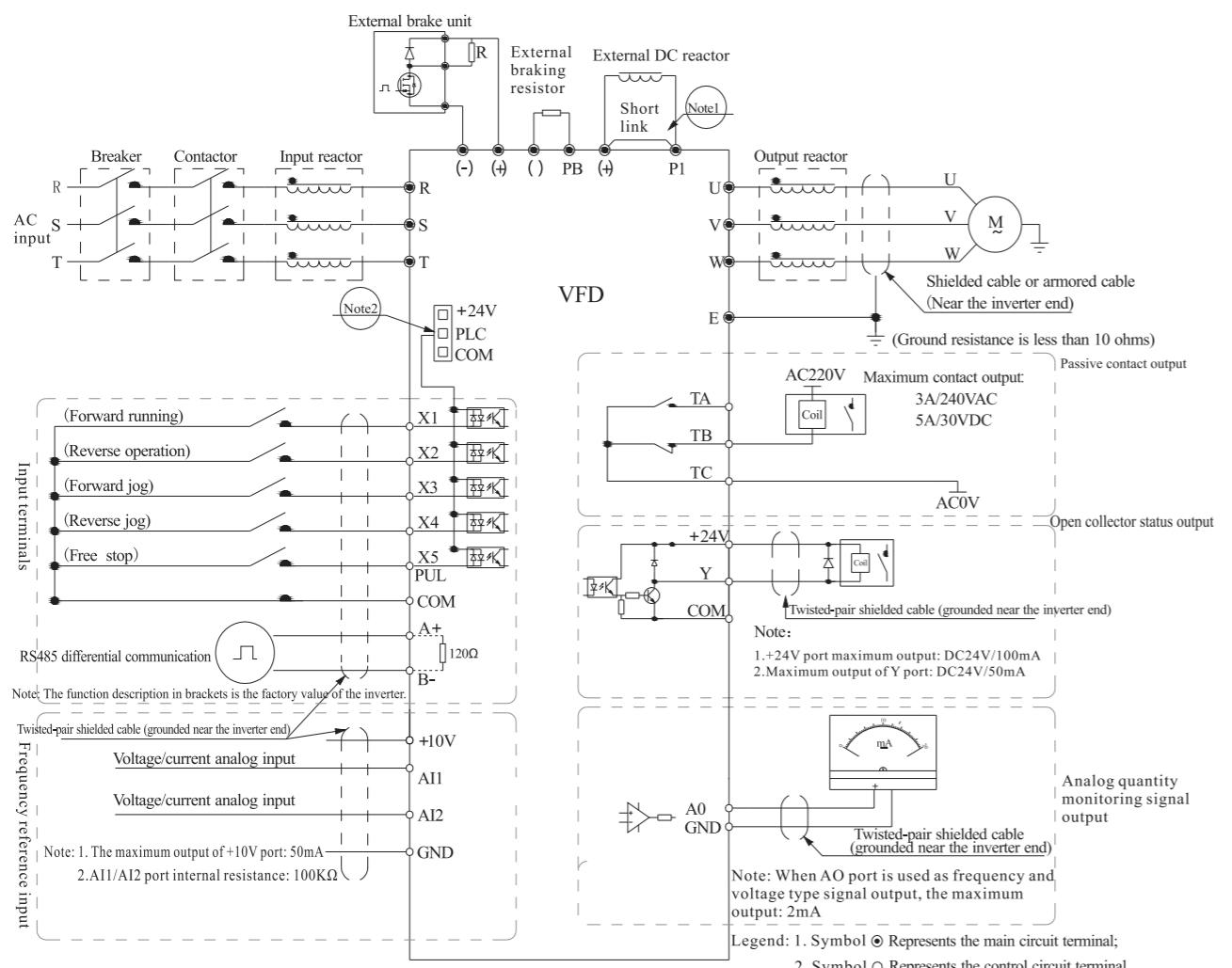


KBD310-L1 LCD keypad

User-friendly LCD interface



## Wiring Diagram



Note: 1. When installing the DC reactor, be sure to remove P1 (+) shorting tab between terminals.

- 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