

## Inverter & Soft-Starter

### Inverter



**NVF2  
Inverter**

Page H-01

### Soft-Starter



**NJR2  
Soft-Starter**

Page H-07



## NVF2 Inverter

### 1. General

NVF2 series inverter is a high-performance open-loop vector inverter developed by our company. It features high starting torque (0.5Hz, 1.5 times rated torque), high overload capacity, convenient operation and forward and reverse PID control. It has smaller volume and good environmental adaptability.

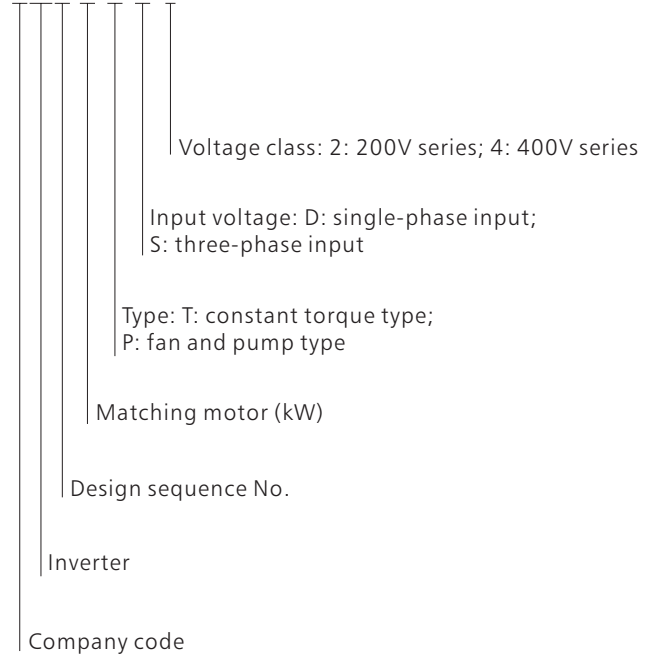
This series includes two types of frequency converters, constant torque type and fan and pump type, and features good load adaptability, stable and reliable operation and automatic energy-saving operation. The products are widely used in electric drive and automation control fields, such as paper making, textile, water supply, municipal administration, food, cement, printing and dyeing and plastic machinery.

The products are designed and tested in accordance with international standards and tested by simulating the actual service conditions.

The products comply with the standards IEC 61800-2.

### 2. Type designation

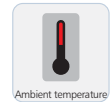
NVF2-□/□ □ □



### 3. Operating conditions

#### 3.1 Temperature

The inverter should be used at an ambient temperature of  $-10^{\circ}\text{C} \sim +40^{\circ}\text{C}$  and derated by 1% per  $1^{\circ}\text{C}$  above  $40^{\circ}\text{C}$ .



#### 3.2 Humidity

The relative air humidity should be  $\leq 95\%$ , and no condensation should occur.



#### 3.3 Altitude

The inverter can produce the rated power when installed below the altitude of 1000m. It should be derated by 10% per 1000m above 1000m.



#### 3.4 Impact and vibration

The inverter should not be dropped to the ground or subjected to sudden impact. It should not be installed in places where vibration may occur.



#### 3.5 Electromagnetic radiation

The inverter should not be installed adjacent to electromagnetic radiation sources.



#### 3.6 Water and vapor protection

The inverter should not be installed in places where drenching or condensation occurs.

#### 3.7 Air pollution

The inverter should not be installed in places with air pollution, such as dust or corrosive gas atmosphere.



#### 3.8 Storage environment

The inverter should not be stored in places with direct sunlight, oil mist, steam or vibration.

#### 4. Technical data

##### 4.1 NVF2 Series Inverter - Specifications

Input voltage class	three-phase 380V													
Model NVF2-/T(P)S4	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	
Applicable motor power (kW)	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	
T Type, Rated output current (A)	1.2	2.5	3.7	5	9	13	17	25	32	37	45	60	75	
P Type, Rated output current (A)	1.2	2.5	3.7	5	9	11	17	22	32	37	45	60	75	
Max. output voltage (V)	Corresponding three-phase input voltage													
Output frequency range (Hz)	Constant torque type: (0~400)Hz; fan and pump type: (0~120)Hz													
Carrier frequency kHz (1~15)	8								4					
Cooling	Forced air cooling													

Input voltage class	three-phase 380V													
Model NVF2-/T(P)S4	45	55	75	90	110	132	160	185	200	220	245	280	315	
Applicable motor power (kW)	45	55	75	90	110	132	160	185	200	220	245	280	315	
T Type, Rated output current (A)	90	110	150	176	210	253	300	340	380	420	470	520	600	
P Type, Rated output current (A)	90	110	140	176	210	253	300	340	380	420	470	520	600	
Max. output voltage (V)	Corresponding three-phase input voltage													
Output frequency range (Hz)	Constant torque type: (0~400)Hz; fan and pump type: (0~120)Hz													
Carrier frequency kHz (1~15)	4		2											
Cooling	Forced air cooling													

##### 4.2 NVF2 Series Inverter - Standard Technical Characteristics

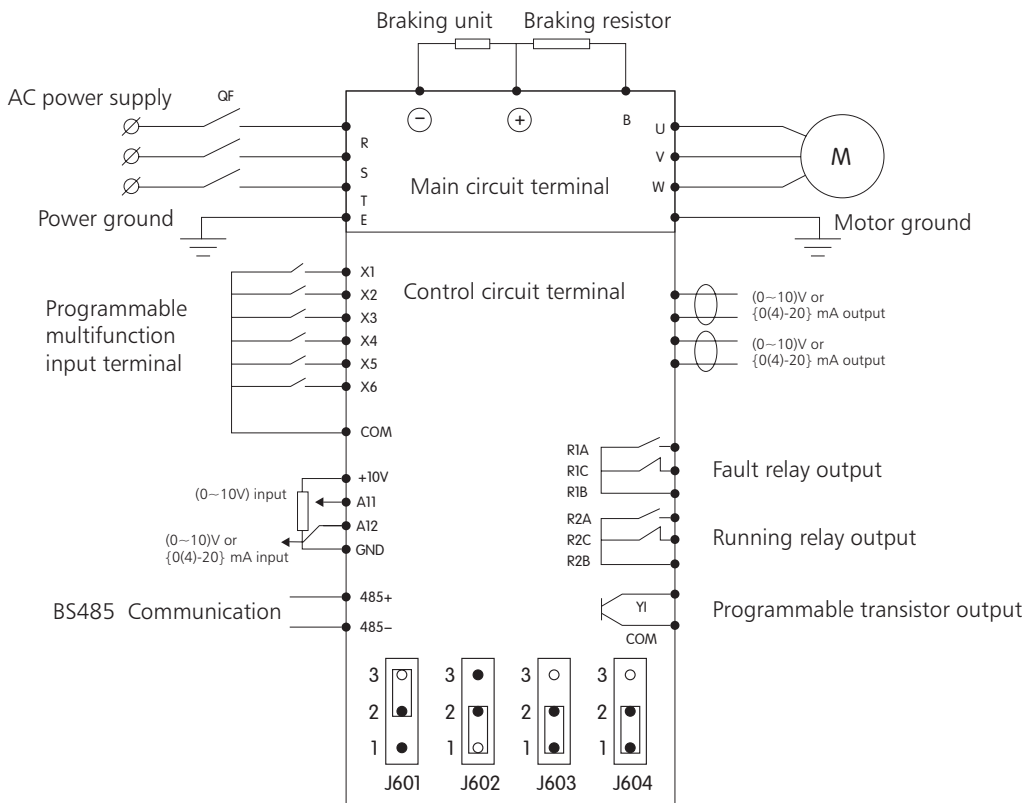
Input and Output Characteristics	Input Voltage Range: 440V/380V/220V(±15%)
	Input Frequency Range: (47~63)Hz
	Output Voltage Range: 0~Rated input voltage
	Output Frequency Range: Constant torque: (0~400)Hz Fans, pump: (0~120)Hz
Peripheral Interface Characteristics	Programmable Digital Input: 6 inputs
	Programmable Analog Input: AI1: (0~10)V input, AI2: (0~10)V or (0/4~20)mA input; A11+A12
	Open Collector Output: 1 output
	Relay Output: 2 outputs
Functional Characteristics	Analog Output: 2 outputs, (0/4~20)mA or (0~10)V optional
	Frequency Setting: digital setting, analog setting, serial communication setting, multi-speed, PID setting, etc.
	Forward & Reverse PID Control Function
	Multi-speed Control Function: 8-speed control
	Wobble frequency control function for textile machine
	Auto Voltage Regulation Function: automatically maintain the constant output voltage when the grid voltage varies
	Over 20 Failure Protection Functions: over-current, over-voltage, under-voltage, over-temperature, phase loss, overload, PID wire breakage, etc.
Technical Characteristics	Control Method: Non-PG vector control, V/F control
	Overload Capacity: Constant torque, 60s at 150% rated current; Fans, pump: 60s at 120% rated current;
	Starting Torque: Non-PG vector control: 0.5Hz 150% (starting torque)
	Speed Ratio: Non-PG vector control: 1:100: V/F 1:50
	Speed Control Precision: Non-PG vector control: ±0.5% max. speed
Carrier Frequency: (1.0~15.0)kHz	

5 Product features

- 5.1 Open-loop vector technique with motor self-learning function, which enables accurate and stable operation of the motor.
- 5.2 Large low-frequency torque (1.5 times rated torque at 0.5Hz) and high overload capacity, suitable for low-speed high-load and high-speed discontinuous load operation.
- 5.3 Independent air duct design, high heat dispersion performance, moulded case design, high dustproof performance, good environmental adaptability.
- 5.4 Low inductance structural design, high immunity.
- 5.5 Standard RS485 MODBUS communication.
- 5.6 Built-in simple PID and swing frequency control function, which makes the machine suitable for various applications.
- 5.7 Operating time accumulation function, which enables switching between display of relevant data.
- 5.8 Automatic energy-saving operation function, which achieves significant energy-saving effect in specific light load applications.
- 5.9 Compact and smooth appearance, which meets the aesthetic features of industrial products.
- 5.10 Detachable keyboard, which can be pulled out and realize remote monitor.



5.11 Standard connection diagram



J601 position (AI1 interface): 1 connected to 2: 0V~10V analog voltage input; 2 connected to 3: 0 (4) mA~20mA analog current input

J602 position (AI2 interface): 1 connected to 2: 0V~10V analog voltage input of AI1; 2 connected to 3: panel potentiometer input

J603 position (AO1 interface): 1 connected to 2: 0V~10V analog voltage output; 2 connected to 3: 0 (4) mA~20mA analog output

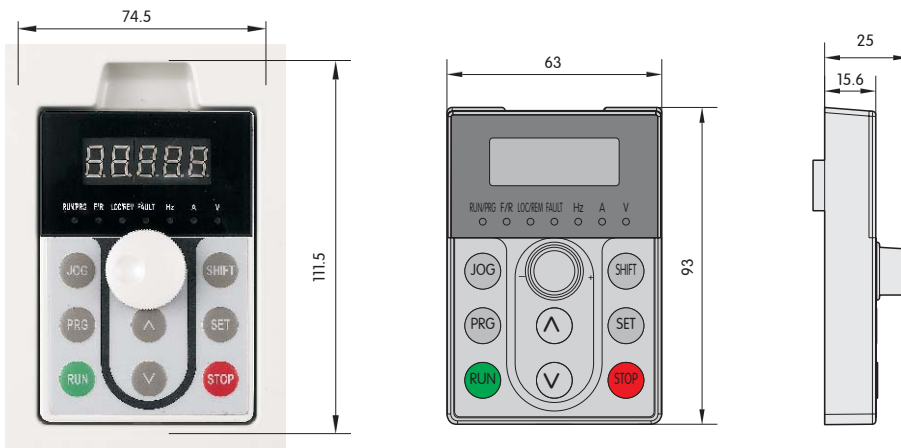
J604 position (AO2 interface): 1 connected to 2: 0V~10V analog voltage output; 2 connected to 3: 0 (4) mA~20mA analog output

5.12 Description of control circuit terminals

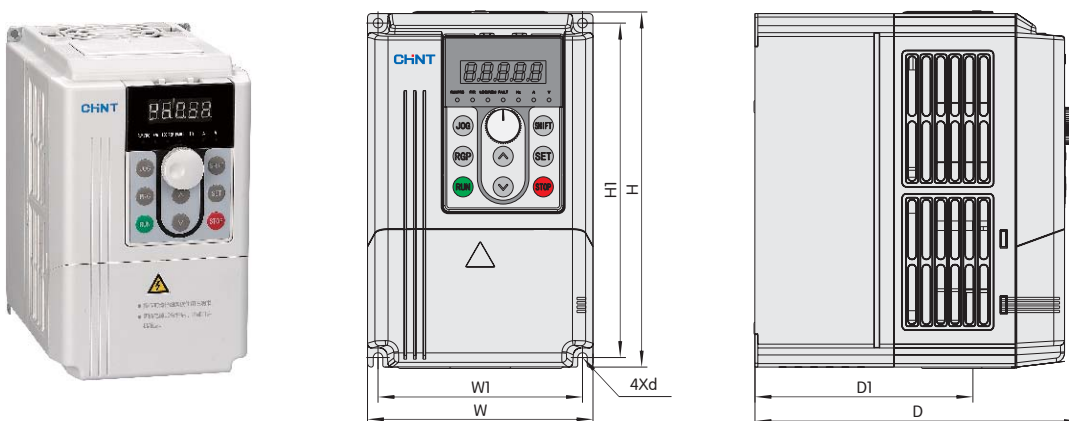
Terminal marking	Terminal name	Description
R1A,R1B,R1C R2A,R2B,R2C	Relay contact output	RB and RC are a group of N/O contacts, RA and RB are a group of N/C contacts, whose functions are set via parameters F6.01 and F6.02. The default value is fault state signal output.
Y1,CCOM	Open collector output	The function is set via parameter F6.00, the default value is forward rotation signal output.
485+,485-	Serial communication terminal	Terminal for serial communication with the outside.
+10V	Power supply for frequency setting	Connect to the potentiometer together with AI1, AI2, GND (4.7kΩ~10kΩ)
AI1,GND	Analog signal input terminal	Connect to the potentiometer or 0V~10V signal, as frequency setting, PID setting or PID feedback
A01,A02,GND	Analog signal output terminal	Input 0V~10V/0(4)mA~20mA signal, as frequency setting, PID setting or PID feedback
AO,GND	Multifunction input terminal	Connect to DC10V 0mA~20mA (4mA~20mA) voltmeter between AO and GND Can be used to indicate operating frequency, output current, output voltage, etc.
X1	Multifunction input terminal	The default setting is forward rotation operation
X2	Multifunction input terminal	The default setting is forward rotation inching
X3	Multifunction input terminal	The default setting is fault reset
X4	Multifunction input terminal	The default setting is no function
X5	Multifunction input terminal	
X6	Multifunction input terminal	
COM	Multifunction input terminal common ground	Common ground of X1-X6, the common ground is used in combination with X1-X6
24V,COM	24V auxiliary power supply output	24V DC power supply output (≤50mA)

5 Overall and mounting dimensions

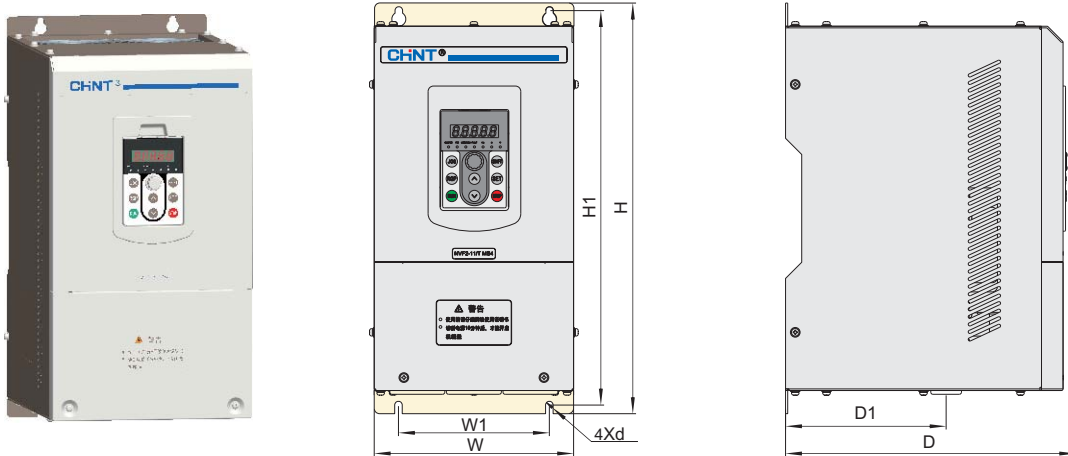
Opening size of NVF2 display box



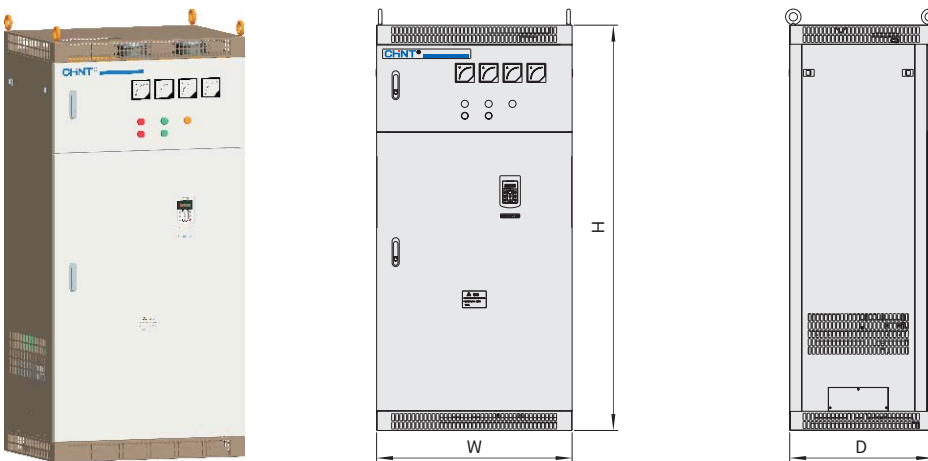
NVF2-0.4/TS4~11/PS4



NVF2-11/TS4~220/PS4



NVF2-220/TS4~355/PS4



Model	Dimensions						
	W	H	D	W1	H1	D1	d
NVF2-0.4/TS4							
NVF2-0.75/TS4							
NVF2-1.5/TS4							
NVF2-2.2/T(P)S4	118	187	173	107	175	110	5
NVF2-3.7/T(P)S4							
NVF2-5.5/PS4							
NVF2-5.5/TS4							
NVF2-7.5/T(P)S4	155	247	189	140	232	125	6
NVF2-11/PS4							
NVF2-11/TS4	194	381	270	140	366	150	7
NVF2-15/PS4							
NVF2-15/TS4							
NVF2-18.5/PS4							
NVF2-18.5/TS4	222	426	290	140	410	168	7
NVF2-22/PS4							
NVF2-22/TS4							
NVF2-30/PS4							
NVF2-30/TS4	300	596	345	210	568	210	9
NVF2-37/PS4							
NVF2-37/TS4							
NVF2-45/PS4							
NVF2-45/TS4							
NVF2-55/PS4							
NVF2-55/TS4	355	701	395	280	664	220	9
NVF2-75/PS4							
NVF2-75/TS4							
NVF2-90/PS4							
NVF2-90/TS4	395	750	410	300	716	190	9
NVF2-110/PS4							
NVF2-110/TS4							
NVF2-132/PS4							
NVF2-132/TS4	485	920	445	400	880	230	12
NVF2-160/PS4							
NVF2-160/TS4							
NVF2-185/PS4							
NVF2-185/TS4							
NVF2-200/PS4							
NVF2-200/TS4	590	1080	(475	450	1040	230	12
NVF2-220/PS4							
NVF2-220/TS4							
NVF2-245/PS4							
NVF2-245/TS4							
NVF2-280/PS4							
NVF2-280/TS4	850	1800	600	—	—	—	—
NVF2-315/PS4							
NVF2-315/TS4							





## NJR2 Series Soft-Starter

### 1. General

With advanced double CPU control as its core technology, NJR2 series soft-starter is especially designed to control high-power thyristor modules and enable soft starting & stopping of (squirrel cage) three-phase AC asynchronous motors.

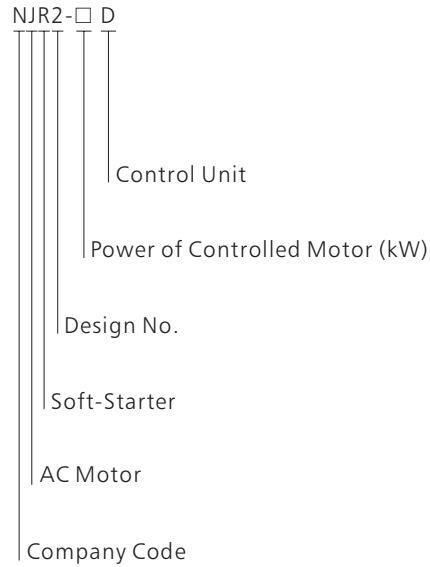
It has optional protection functions such as overload, input phase loss, output phase loss, process over-current, process under-current, over-voltage and under-voltage.

This product is mainly used with package control cabinet, where an AC contactor of corresponding specifications must be connected during the operation.

With specifications covering 7.5kW 500kW (squirrel cage) three-phase AC asynchronous motors, and being extensively applied in motor transmission equipment in metallurgy, petroleum, fire control, mining, petrochemical fields, this product is an ideal substitute for those with traditional star-delta starting mode and self-coupled reduced-voltage starting mode.

The performance indicators of this product fully comply with the standard specifications of GB14048.6-2008.

### 2. Type Designation



### 3. Technical data

3.1 Power Voltage: 3-phase AC380V(±15%), 50Hz/60Hz(±2%)

3.2 Starting Current: 0.5~ 5 times starting current limited.

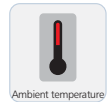
3.3 Ramp Falling Time: (0~60)s

3.4 Soft starting Reference Voltage: 30%Ue~70%Ue

3.5 Kick Start Time: 0.1s

3.6 Environmental Requirements

At an altitude above 1000m, the capacity should be reduced, and the current will decrease 0.5% for every increase of 100m; Ambient temperature is -10°C~40°C; relative humidity is ≤ 95% (20°C~65°C); Well-ventilated indoor environment, without dewing, flammable and explosive gas, conductive dust.



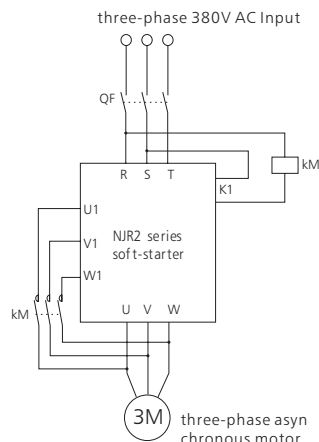


## 4. Elementary wiring diagram

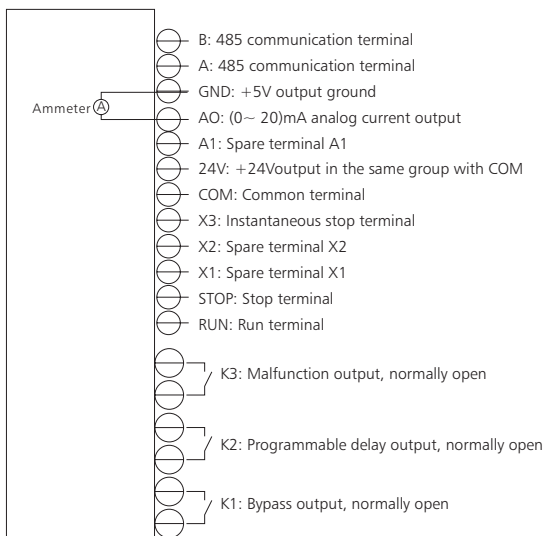
### 4.1 Elementary wiring diagram



Bottom of NJR2 series soft-starter



### 4.2 Schematic diagram of external terminals



## 5. Product characteristics

- 5.1 Intelligent optimized control by digital dual single-chip computer
- 5.2 Advanced varied soft starting modes
  - 5.2.1 Voltage starting mode
  - 5.2.2 Current-limiting starting mode
  - 5.2.3 Kick voltage + current-limiting starting mode
  - 5.2.4 Kick voltage + voltage starting mode
  - 5.2.5 Current ramp starting mode
  - 5.2.6 Dual-closed-loop starting mode
- 5.3 Built-in protection functions such as overload, input phase loss, output phase loss, load short circuit, current-limiting start overtime over-voltage, under-voltage and radiator overheating.

5.4 More human-oriented large wide LCD display and operation, easier and clearer operation and parameter setting, man-machine dialogue (see ①, ②)



5.5 Display of operating voltage and current; display and memory of malfunction name and code (see ③)

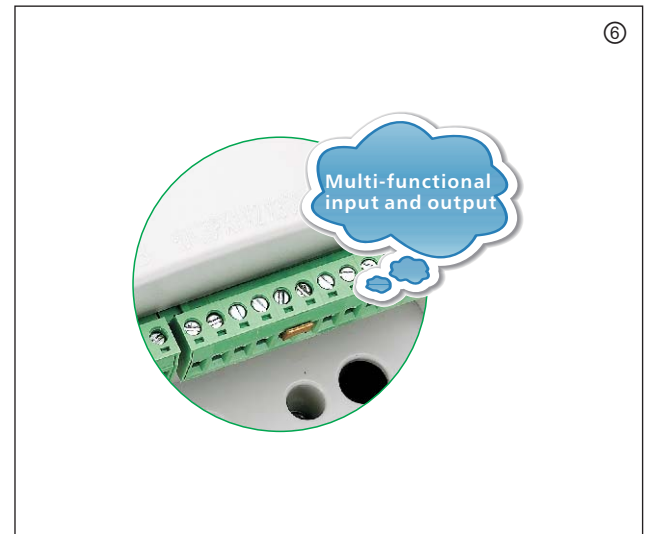
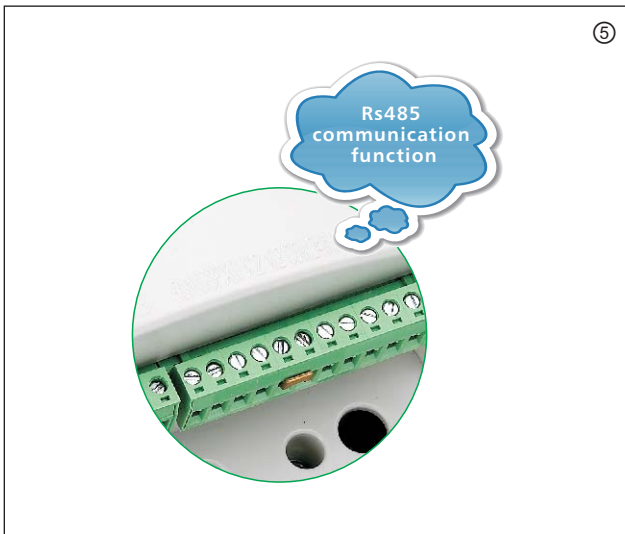


5.6 Patented design of full aluminum case (below 75kW), better radiation effect, natural air cooling, space saving (see ④)



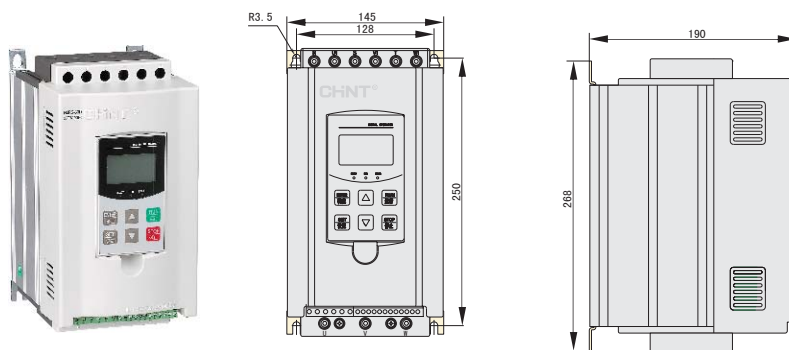
5.7 RS485 communication function, facilitating networked control and automation engineering transformation; providing three relay outputs, i.e. run, ramp to top and malfunction, for external interlocking control (see ⑤, ⑥)

5.8 Unique soft starting main/sub linkage function, facilitating the equipment manufacturing process control.



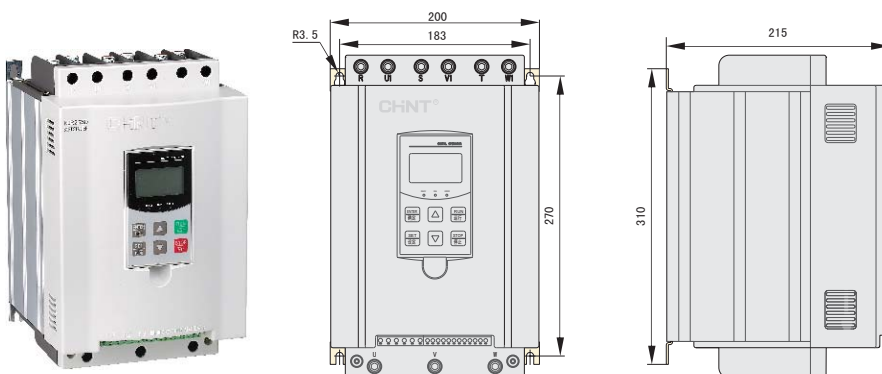
**6. Overall and Installation Dimensions**

NJR2-7.5D~45D



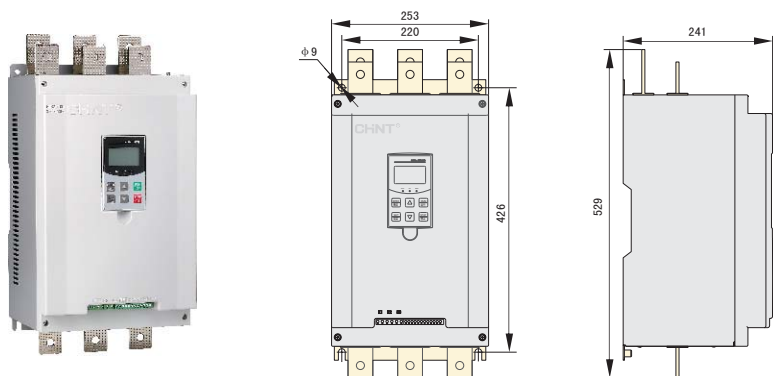
Model	Rated Current (A)	Power of Controlled Motor (kW)	Weight (kg)
NJR2-7.5D	15	7.5	5
NJR2-11D	22	11	
NJR2-15D	29	15	
NJR2-18.5D	36	18.5	5
NJR2-22D	42	22	
NJR2-30D	57	30	5
NJR2-37D	70	37	
NJR2-45D	84	45	

NJR2-55D~75D



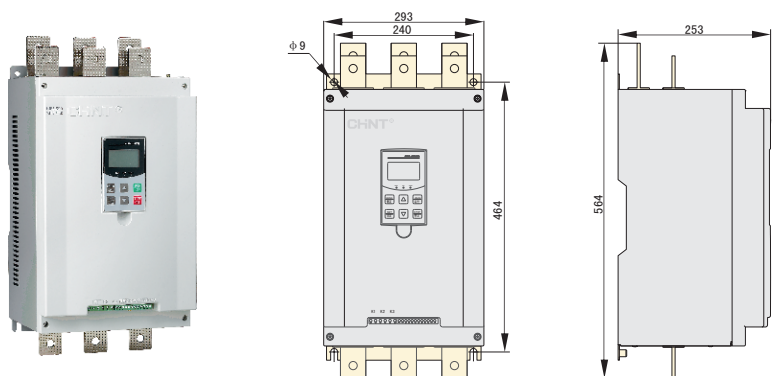
Model	Rated Current (A)	Power of Controlled Motor (kW)	Weight (kg)
NJR2-55D	103	55	8
NJR2-75D	140	75	

NJR2-90D~185D



Model	Rated Current (A)	Power of Controlled Motor (kW)	Weight (kg)
NJR2-90D	167	90	20
NJR2-110D	207	110	
NJR2-132D	248	132	
NJR2-150D	280	150	
NJR2-160D	300	160	
NJR2-185D	349	185	

NJR2-200D~315D



Model	Rated Current (A)	Power of Controlled Motor (kW)	Weight (kg)
NJR2-200D	375	200	25
NJR2-220D	404	220	
NJR2-250D	459	250	
NJR2-280D	514	280	
NJR2-315D	579	315	

## 7. order information

Example 1:

the controlled motor has power of 45kW, used with soft start cabinet or power distribution cabinet.

Order Model: NJR2-45D

Example 2:

the controlled motor has power of 90kW, used with soft start cabinet or power distribution cabinet.

Order Model: NJR2-90D

### Model Selection Instructions

This soft starter is especially designed for four-pole (squirrel-cage) 3-phase AC asynchronous motor.

a. For motors of other than 4 poles, it is recommended to select a soft starter of one size larger.

Example: the controlled motor has power of 90kW, used with soft start cabinet or power distribution cabinet.

Order Model: NJR2-110D

b. When used for two-pole motors, since the starting current is large, please set up the parameters correctly according to Operating Instructions before use.