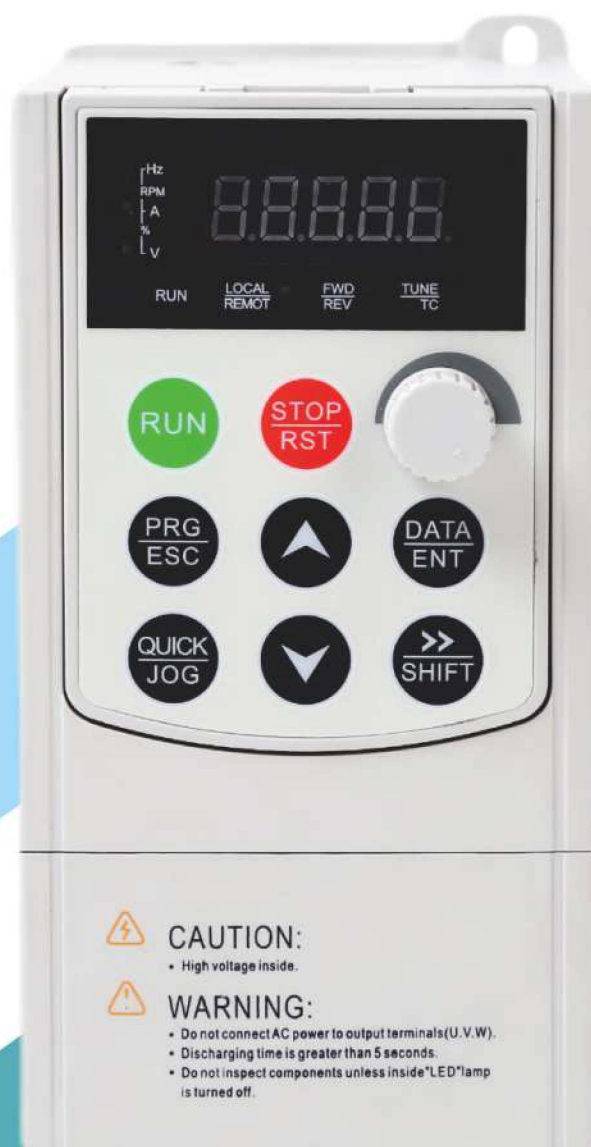




## ZN160MN Series Economic Frequency Inverter

### Selection Guide





Product Description

A new generation of general -purpose frequency inverter SN160MN is used to control asynchronous AC induction Motors.

The product adopts space voltage vector control technology and DSP control system to strengthen the reliability and stability of the product.It also has the following features:

Two control modes: V/F control, sensorless vector control

Automatic torque boost and slip compensation

Starting 0.5Hz provides 150% torque

Stable operation in full speed range, steady speed accuracy <0.5%

Adapt to grid voltage range 200V ~ 460V

Anti-electromagnetic interference ability conforms to 1EC 61800-3:C3 standard

The circuit board is coated with conformal coating to resist dust, heat, moisture and corrosion, etc.

Built-in RS485 communication

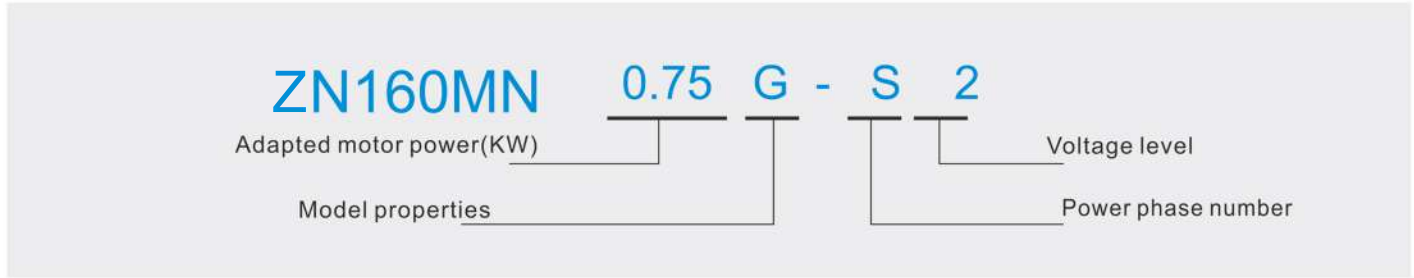
Support external keyboard



Product Specification

Product Ratings					
Model	Rated capacity (KVA)	Rated input current (A)	Rated output current (A)	Adapter motor(KW)	Adapter motor (HP)
single phase power 220V 50/60Hz					
ZN160MN0.75G-S2	1.5	8.2	4	0.75	1
ZN160MN1.5G-S2	3	14	7	1.5	2
ZN160MN2.2G-S2	4	23	9.6	2.2	3
Three-phase power 380V 50/60Hz					
ZN160MN0.75G-T4	1.5	3.4	2.1	0.75	1
ZN160MN1.5G-T4	3	5	3.8	1.5	2
ZN160MN2.2G-T4	4	5.8	5.1	2.2	3
ZN160MN3.7G-T4	6	10.5	9	3.7	5
ZN160MN5.5G-T4	11	13.9	13	5.5	7.5
ZN160MN7.5G-T4	15	18.9	17	7.5	10
ZN160MN11G-T4	30	27.8	25	11	15
ZN160MN15G-T4	37	37.9	32	15	20
ZN160MN18.5G-T4	44	46.7	37	18.5	25

Model Descriptions



Model properties	G:Gtype machine (heavy duty type):150% Rated current 60s 180%Rated current 6s
	P:P-type machine(universal): 120% Rated current 60s 150% Rated current 6s
Power phase number	S:means single phase
	T:means three-phase
Voltage level	2:Indicates 220V
	4:Indicates 380V
Note: Some models support attribute switching between G/P models,take 15KW as an example:Users can change the 15KW G model to 18.5KW P model through settings	

General Specifications

Display and function keys	
Keyboard	Standard detachable keyboard
LED display	Display parameters
Key lock and function selection	Part or all of the keys can be locked, and the scope of action of some keys can be defined to prevent misoperation
Protective function	Power-on motor short circuit detection, output phase loss protection, overcurrent protection, overvoltage protection,undervoltage protection, overheat protection, overload protection, etc.
Environment	
Storage environment	-20°C ~ 60° C
Working temperature	-10°C ~ 50° C ( Over 40°C, please derate by 1% for every 1°C increase )
Storage temperature	< 90%RH
Working humidity	< 90%RH
Noise	50dBA max.
Other	
EMC	Standards:IEC 61800-3, C3
Safety	Standards:IEC 61800-5-1
Communication	
Communication port	RS-485

Functional Specifications

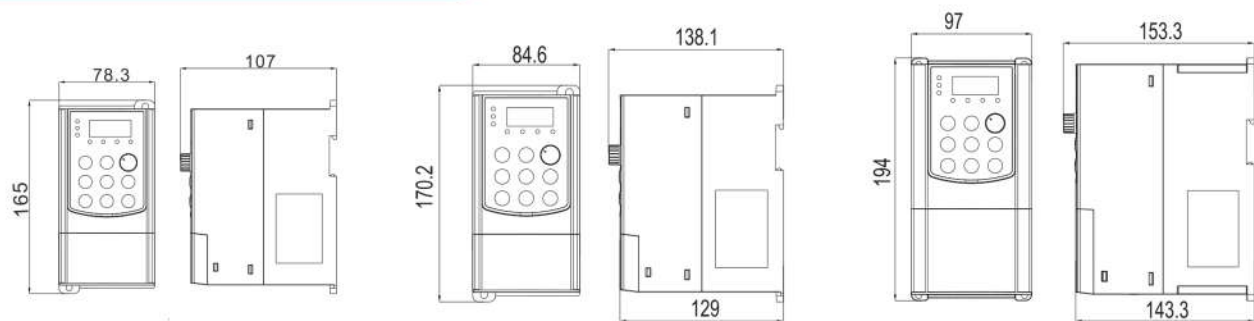


Model	0.75KW-18.5KW
Personality function	
Nonstop during instant outage	In the case of instantaneous power drop, use the load feedback energy to compensate the voltage drop to control the motor to decelerate to a stop state to prevent mechanical damage
Fast current limiting	Avoid frequent over current faults of the inverter
Timing control	Timing control function: set time range from 0.0Min to 6500.0Min
Multithreaded bus support	Supports one fieldbus: Modbus
Input/output	
Command source	Operation panel given, control terminal given, serial communication port given. Switchable in a variety of ways
Frequency source	5 kinds of frequency sources: digital given, analog voltage given, analog current given, pulse given, serial port given. Switchable in a variety of ways
Auxiliary frequency source	5 auxiliary frequency sources. Auxiliary frequency fine-tuning and frequency synthesis can be flexibly realized
Input terminal	5 digital input terminals, one of which supports high-speed pulse input up to 50kHz
	1 analog input terminal, support 0~10V voltage input or 0~20mA current input
	1 rotary potentiometer analog input
Output terminal	1 high-speed pulse output terminal, support 50kHz square wave signal output
	1 relay output terminal
	1 analog output terminal, support 0~20mA current output or 0~10V voltage output

Model	0.75KW-2.2KW	3.7KW-18.5KW
Power input		
Input voltage	AC,1PH,220V(-15%)~40V(+10%) AC,3PH,380V(-15%)~440V(+10%)	AC, 3PH, 380V(-15%) ~ 480V(+10%)
Rated frequency	50/60 Hz	
Frequency Range	±5% (47.5 ~ 63Hz)	
Power output		
Output voltage	0-input voltage	
Output frequency	0.1 ~ 500HZ	
Output Power	Please refer to "ratings"	
Output current	Please refer to "ratings"	
Basic skills		
Highest frequency	Vector control:0~500Hz	
	V/F control : 0~500Hz	
Carrier frequency	0.8KHz~8KHz (Can support the highest carrier frequency 16KHz)	
	The carrier frequency can be automatically adjusted according to the load characteristics	
Input frequency resolution	Digital setting: 0.01Hz	
	Analog setting: maximum frequency× 0.025%	
Control method	SVCOpen loop vector control V/F open loop speed control	
Starting torque	0.5Hz/150% ( SVC )	
Speed range	1 : 100 ( SVC )	
Steady speed accuracy	±0.5% ( SVC )	
Overload capacity	150% rated current 60s; 170% Rated current 12s ; 190% rated current 1.5s	
Torque boost	Automatic torque boost; manual torque boost 0.1%~30.0%	
V/F curve	Three ways: straight line; multi-point; N-th power V/F curve	
	(1.2 power, 1.4 power, 1.6 power, 1.8 power, 2 power)	
V/F separation	2 ways: full separation, half separation	
Acceleration and deceleration curve	Linear or S-curve acceleration and deceleration methods. Two kinds of acceleration and deceleration time, the range of acceleration and deceleration time is 0.0~6500.0s	
DC braking	DC braking frequency: 0.00Hz~maximum frequency	
	Braking time: 0.0s~36.0s	
	Braking action current value: 0.0%~100.0%	
Jog control	Jog frequency range: 0.00Hz~maximum frequency (default 5Hz). Jog acceleration and deceleration time 0.0s~6500.0s	
Built-in PID	Process control closed-loop control system can be easily realized	
Automatic Voltage Adjustment (AVR)	When the grid voltage changes, it can automatically keep the output voltage constant	
Overvoltage and overcurrent stall control	Automatically limit current and voltage during operation to prevent frequent overcurrent and overvoltage tripping	
Fast current limiting function	Minimize overcurrent faults and protect the normal operation of the inverter	
Torque Limiting and Control	"Excavator" feature, automatic torque limit during operation to prevent frequent overcurrent tripping	
Brake unit	Built-in braking unit (except Lite version)	



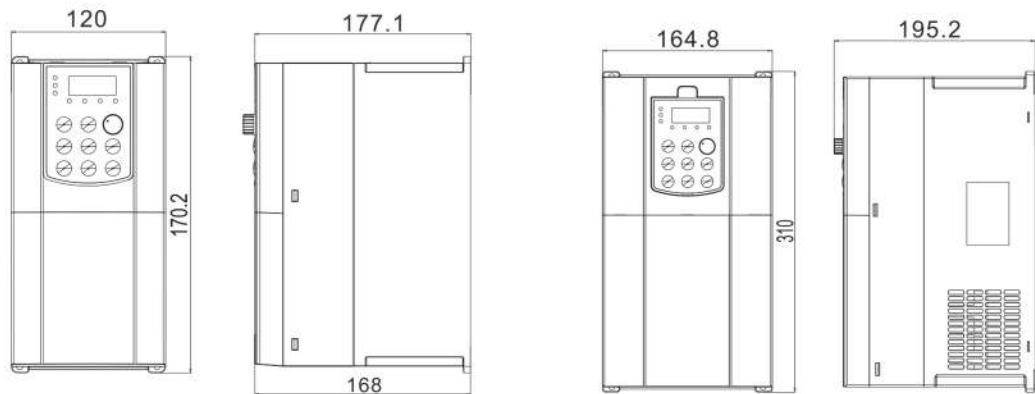
# Installation Dimension



0.75KW-2.2KW(T4)  
0.75-1.5(S2)

0.75KW-2.2KW(T4)  
2.2KW(S2)

3.7KW-5.5KW(T4)



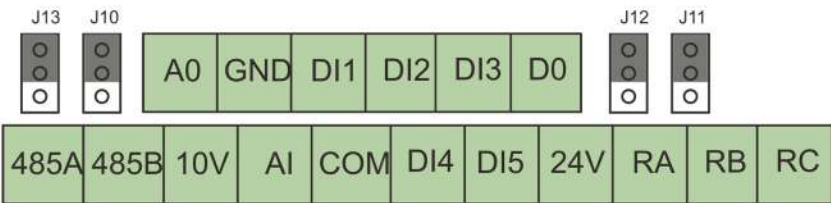
7.5KW-11KW(T4)

15KW-18.5KW(T4)

0.75KW-18.5KW Installation size

VFD type	Mounting hole mm		Dimensions mm			Mounting Aperture mm	Weight Kg
	A	B	H	W	D		
ZN160MN 0.75G-S2	66	155	165	78.3	107	5	0.73
ZN160MN 1.5G-S2							
ZN160MN 2.2G-S2	67.3	157.5	170.2	84.6	138.1	5	1
ZN160MN 0.75G-T4							
ZN160MN 1.5G-T4							
ZN160MN 2.2G-T4							
ZN160MN 3.7G-T4	85	184	194	97	153.5	4	1.5
ZN160MN 5.5G-T4							
ZN160MN 7.5G-T4	107	235	245	124	168	5.5	3.5
ZN160MN 11G-T4							
ZN160MN 15G-T4	216	336	310	164.8	195.2	5.5	5.5
ZN160MN 18.5G-T4							

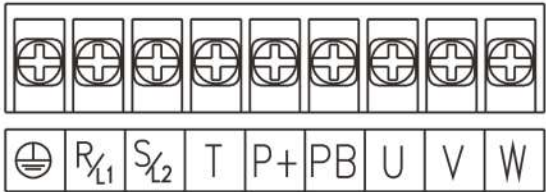
# Control Terminal



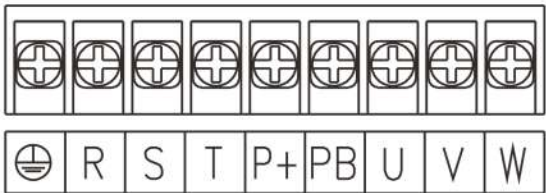
Schematic diagram of control terminals

category	Terminal designation	Name	Terminal function description
communication	485A	Rs485 communication interface	Rs485 differential signal positive terminal
	485B		Rs485 differential signal negative terminal
analog input	AI	Analog input terminal	Receive analog voltage/current input
Analog output	AO	Analog output terminal	Provides analog voltage/current output
digital input	DI1	Digital input terminal 1	Ordinary digital input
	DI2	Digital input terminal 2	Ordinary digital input
	DI3	Digital input terminal 3	normal digital input
	DI4	Digital input terminal 4	normal digital input
	DI5	Digital input terminal 5	Ordinary digital input / high frequency pulse input
digital output	DO	Digital output terminal	Ordinary digital output/high frequency pulse output
power supply	10V	External +10V power supply	Provides +10V power supply
	GND	External +10V power ground	
	24V	External +24v power supply	Provides +24V power supply
	COM	External +24V power ground	
relay output	RA/RB	relay output	Normally closed terminal
	RA/RC		Normally open terminal

0.75KW~18.5KKW Power terminal location and function description



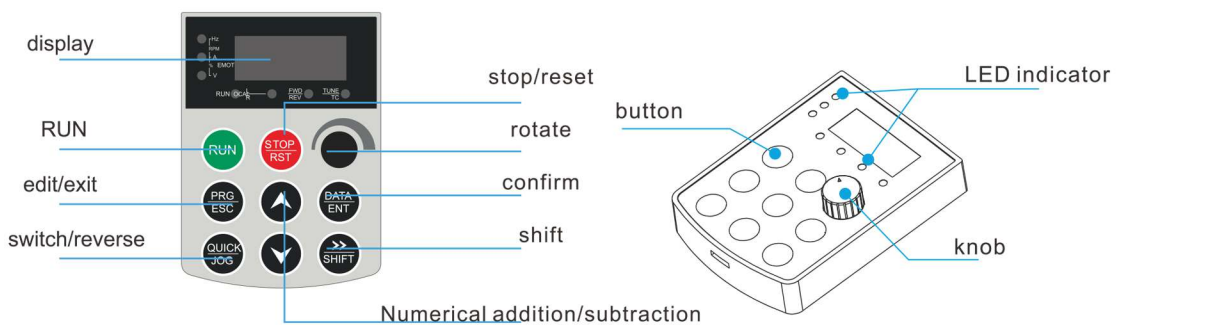
0.75KW-2.2KWMain circuit terminal diagram



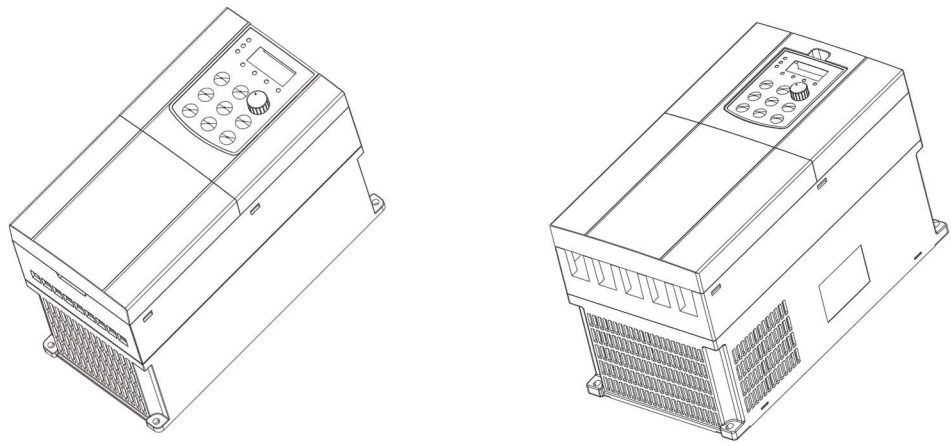
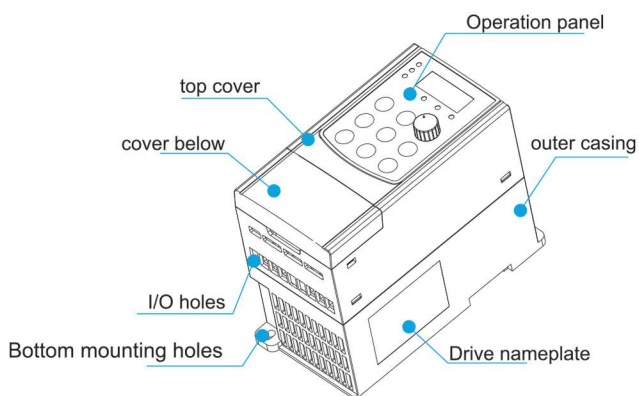
3.7KW-18.5KW Main circuit terminal diagram

Terminal symbol	Terminal name and function description
	Safety ground terminal
R 、 S 、 T L1 、 L2	Three-phase AC input terminal Single-phase AC input terminal
P+ 、 PB	External braking resistor terminal
U 、 V 、 W	Three-phase AC output terminal

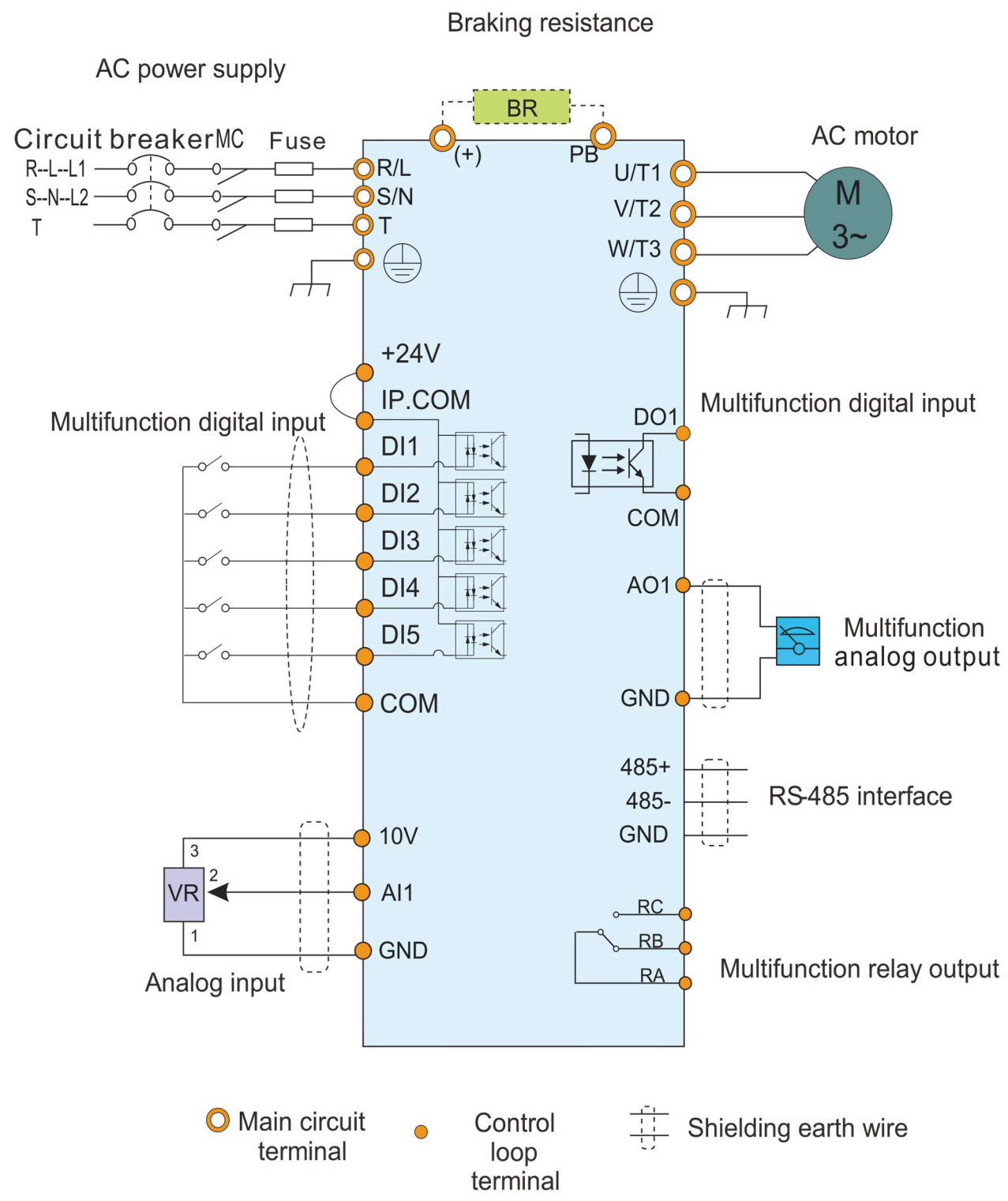
Operation Panel



Name	Function Description
edit/exit	First level menu entry or exit
confirm	Enter the menu screen, set the parameters to confirm
Numerical +/-	Increment/decrement of data or function code
shift	In the shutdown display interface and the running interface, You can move left to cycle to select display parameters, When modifying parameters, the parameter modification bit can be selected
run	In keyboard mode, it is used to run operations
stop/reset	In running state, pressing this key can be used to stop the running operation, When the fault alarm state is restricted by function code P.04, All control modes can be used with this key to reset operation
rotate	adjust the rate, adjust the frequency



Standard Wiring Diagram





# Advantageous Characteristics

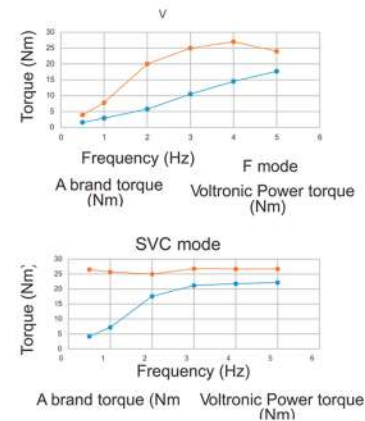
### Flexible space use

Highly flexible configuration helps improve installation efficiency.



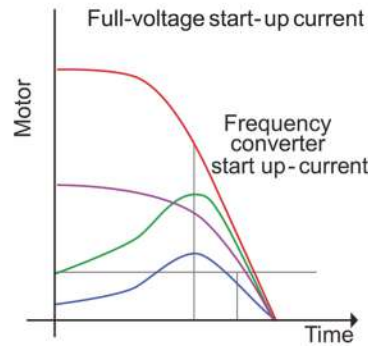
### Low-speed and high-torque

150% of starting torque and 0.5 Hz of low-speed control help improve low-speed control performance of the equipment.



### Current control for the purpose of prolonging the motor life

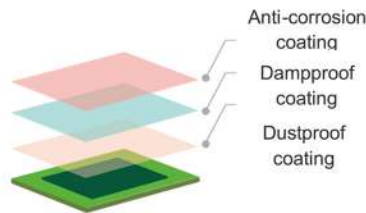
After the frequency converter is mounted, the current does not increase at the moment when the motor starts, helping save cost and prolong motor life.



Current change chart from start to stop

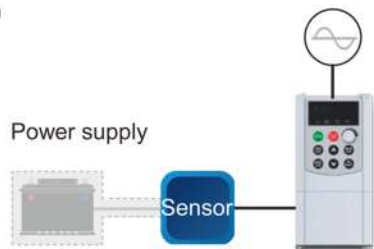
### Three coatings of anti-varnish

The operation stability and safety are ensured under key environments.



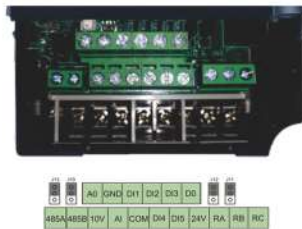
### Built-in auxiliary sensor power supply

Auxiliary power supply of 10 V and 24 V can meet the needs of the sensor under different voltage levels.



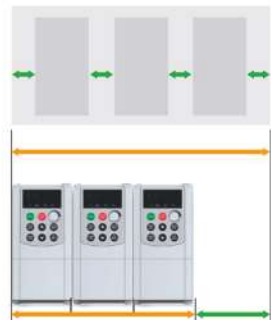
### Multiple programmable I/O terminals

VFD provides multiple programmable digital and analog input and output terminals to meet different application requirements.



### Seamless parallel installation

The seamless parallel installation helps save the installation space.



Installation space is saved!

### External digit operation panel

It supports the industry parameter setting with one key and can be used for remote operation when pulled outwards.



# Braking Resistor Selection Table

Inverter model	Brake unit	100% braking torque adaptive braking Resistance value (Ω)	Brake resistive dissipation Power (KW) (10% braking amount)	Brake resistor dissipation Power (KW) (50% braking amount)	Brake resistor dissipation Power (KW) (80% braking amount)	Minimum allowed Braking resistance (Ω)
ZN160MN 0.75G-S2	Standard built-in	192	0.11	0.56	0.90	42
ZN160MN 1.5G-S2		96	0.23	1.10	1.18	30
ZN160MN 2.2G-S2		65	0.33	1.7	2.64	21
ZN160MN 0.75G-T4		635	0.1	0.6	0.9	240
ZN160MN 1.5G-T4		326	0.23	1.1	1.8	170
ZN160MN 2.2G-T4		222	0.33	1.7	2.6	130
ZN160MN 3.7G-T4		122	0.6	3	4.8	80
ZN160MN 5.5G-T4		89	0.75	4.1	6.6	60
ZN160MN 7.5G-T4		65	1.1	5.6	9	47
ZN160MN 11G-T4		44	1.7	8.3	13.2	31
ZN160MN 15G-T4		32	2	11	18	23
ZN160MN 18.5G-T4		27	3	14	22	19

## Apply to industry

Food packaging machinery, forging machine tools, chemical fiber equipment, fans, metallurgical equipment, machine tools, Wire drawing machine, oil pumping unit, brick press, extruder, compressor, etc.



compressor



sewage treatment



Injection molding machine



Crusher



blender



Forging machine