DAKOL
Soluções em Automação

Astro Variable Frequency Drive

0.75KW ~ 22KW

Product Overview

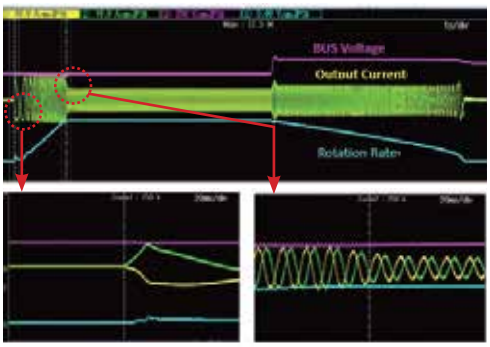
- V/F Control , Sensor-less Vector Control (SVC) and Feedback Vector Control (FVC) selectable
- Automatic torque boost and slip compensation
- Fast acceleration and deceleration performance
- 150% torque at 0.5Hz
- Provide precise speed control <0.5%
- Acceptable wide input voltage from 300V to 480V
- Conformal coating to withstand harsh environment
- Built-in RS-485 MODBUS communication
- In-Built dynamic braking unit
- Simplified parameter setting for easy startup
- Standard potentiometer and support external keypad
- Flexible programmable I/O connection
- Control motor to deceleration to stop while sudden power failure to prevent damage

Outstanding Drive Performance

Unit with same rating and same setting (Acceleration 0.1 sec, deceleration 1 sec) Performance Comparison

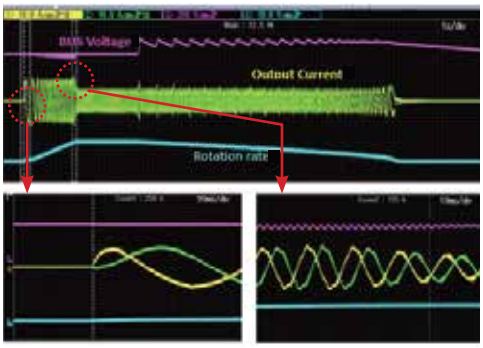
Acceleration Waveform

Astro



Actual Acceleration 1.06s
Short acceleration time, precise current response

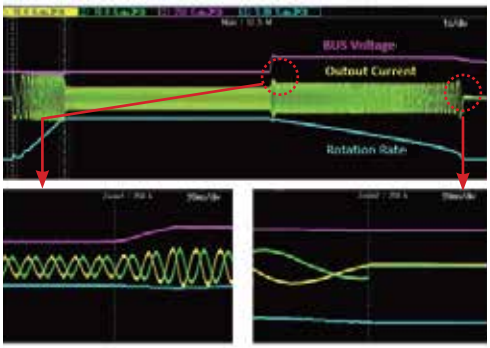
Other Brand



Actual Acceleration 1.21s
Long acceleration time, slow current response

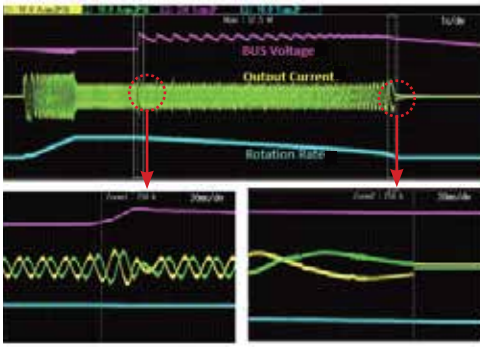
Deceleration Waveform

Astro



Actual Deceleration 3.94s
BUS voltage stable & straight, waveform smooth

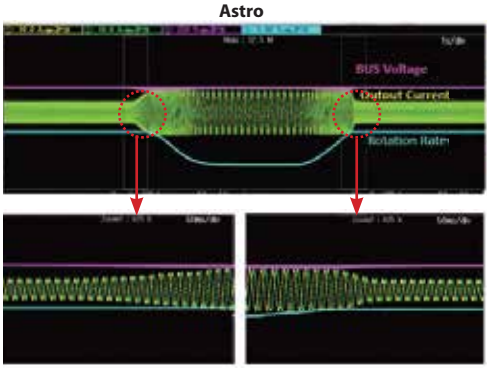
Other Brand



Actual Deceleration 5.25s
BUS voltage oscillates, current fluctuates, motor noise

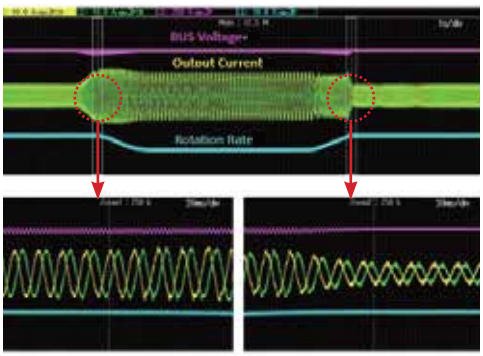
Waveform Performance for sudden loading and sudden unloading at 150% load

Astro



Fast dynamic response, perfect current limiting

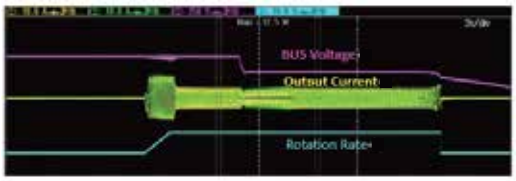
Other Brand



Slow dynamic response, oscillate waveform, current fluctuates

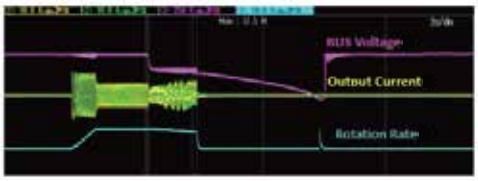
Waveform Performance while sudden power failure

Astro



At power failure, unit runs for 10s, motor winds down

Other Brand



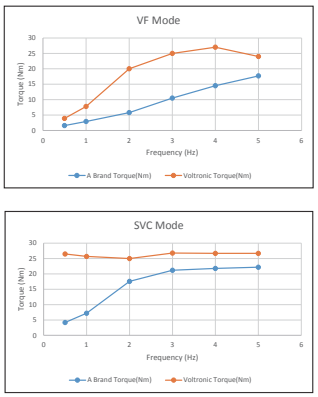
At power failure, unit runs for 3s, UV alarm motor stops freely

Removable Fan Design

Big silent fan allows heat dissipation quickly and quiet operation. Removable fan design supports quick maintenance and on-line replacement.

High Starting Torque

150% starting torque with a low speed control of 0.5Hz provides outstanding machine stability, suitable for low loading applications.



Current Control for optimized lifecycle

After installing the VFD, startup current of the motor will not increase, which not only saves the cost, but also prolongs lifecycle.

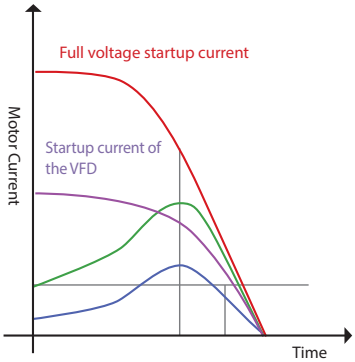
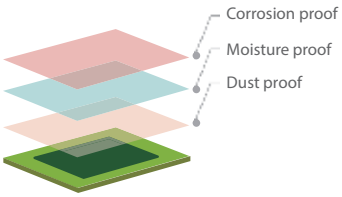


Diagram of changing current from startup to stop

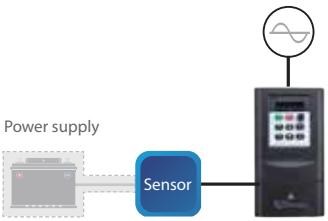
Conformal Coating

Ensures operation stability and safety in critical environment.



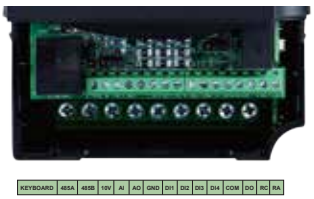
Built-in Power Supply for Sensor

Separate power supply not required because it's already built in 10Vdc and 24Vdc output for external sensors.



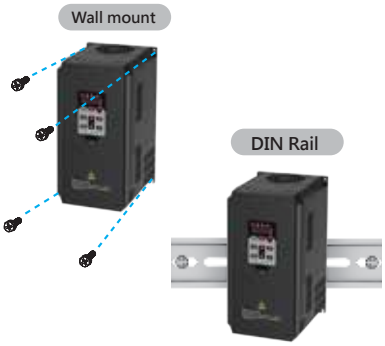
Multiple Programmable I/O Terminals

Astro provides multiple programmable digital and analog input and output terminals to meet diverse applications.



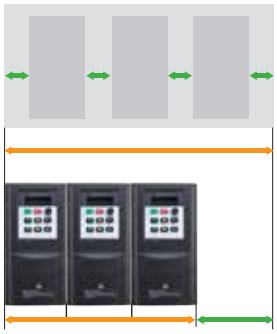
Flexible Installation

Provide high configuration flexibility and improve installation efficiency.



Seamless Installation

Support seamless side-by-side installation, saving installation space.



Detachable Operation Keypad

The keypad supports the one-click setting of industry parameters and can be pulled out for remote operation. (For 5.5-22K Model)

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Product Quality Assurance

Professional R & D team

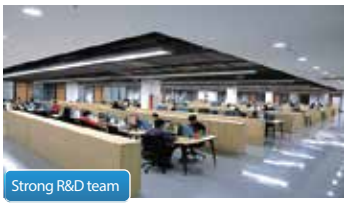
- Over 300 professional R&D engineers with rich experience in UPS and inverter industry
- Promote intellectual property, encourage patent application, and advocate and educate all employees about intellectual property
- Professional laboratory with strict production verification to ensure quality products.

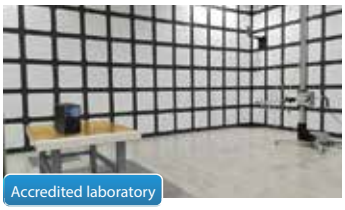
Key components only use international well-known brands

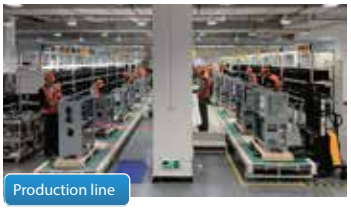
All important parts adopt international leading brands to ensure product quality and life cycle

Scalable and proficient manufacturing

- Four production sites: Shenzhen China, Zhongshan China, Vietnam and Taiwan with over 123,000 M^2
- Economic scale by utilizing automation equipment, semi-automated production and highly vertical integration of in-house production


Strong R&D team


Accredited laboratory


Production line

Applicable Industries

Food Packaging Machinery / Forging Machine Tool / Chemical Fiber Equipment / Fan / Metallurgical Equipment
Machine Tool / Drawing Machine / Pumping Unit / Brick Machine / Plastic Extruding Machine / Compressor


Compressor


Sewage processor


Injection molding machine


Crusher


Blender


Forging machine

VFD Model Naming Rules

Model Attributes	**G:** G type model (heavy load model): 150% overload for 60s, 180% overload for 6s
	P: P type model (general-purpose model): 120% overload for 60s, 150% overload for 6s
Power Phase	**S:** Single phase
	T: Three phase
Voltage Grade	**2:** 220V
	4: 380V

Note: 11KW and above models support attribute switching between G/P types, take 11KW model as an example:The user can switch the machine from 11KW G type to 15KW P type by setting.

Models Selection Guide

Rated Parameters					
MODEL	Nominal Capacity (KVA)	Input Current (A)	Output Current (A)	Applicable Motor Output (KW)	Applicable Motor Output (HP)
Single Phase 220V 50/60Hz					
Astro 0.75G-S2	1.5	8.2	4	0.75	1
Astro 1.5G-S2	3	14	7	1.5	2
Astro 2.2G-S2	4	23	9.6	2.2	3
3-Phase 380V 50/60Hz					
Astro 0.75G-T4	1.5	3.4	2.1	0.75	1
Astro 1.5G-T4	3	5	3.8	1.5	2
Astro 2.2G-T4	4	5.8	5.1	2.2	3
Astro 3.7G-T4	6	10.5	9	3.7	5
Astro 5.5G-T4	11	13.9	13	5.5	7.5
Astro 7.5G-T4	15	18.9	17	7.5	10
Astro 11G/15P-T4	30	27.8	25	11	15
Astro 15G/18.5P-T4	37	37.9	32	15	20
Astro 18.5G/22P-T4	44	46.7	37	18.5	25
Astro 22G/30P-T4	60	55.6	45	22	30

Product Specification

Model	0.75K-3.7K	5.5K-22K
INPUT		
Input Voltage	AC,1PH,220V(-15%)~240V(+10%) AC,3PH,380V(-15%)~440V(+10%)	AC, 3PH, 380V(-15%) ~ 480V(+10%)
Rated Frequency	50/60 Hz	
Frequency Range	±5% (47.5 ~ 63Hz)	
OUTPUT		
Output Voltage	0- Input Voltage	
Maximum Output Frequency	0.1 ~ 500HZ	
Output Power	Please refer to Rated Parameter table	
Output Current	Please refer to Rated Parameter table	
BASIC PARAMETERS		
Highest frequency	Vector control: 0 ~ 500Hz	Vector control: 0 ~ 320Hz
	V/F control: 0 ~ 500Hz	
Carrier frequency	0.8KHz~8KHz (Support up to 16KHz carrier frequency)	0.8KHz~16KHz
	Adjusted automatically according to the load characteristics	
Input frequency resolution	Digital setting: 0.01Hz	
	Analog setting: Highest frequency×0.025%	
Control mode	Open-loop vector control (SVC) V/F control	Close-loop vector control (FVC) Open-loop vector control (SVC), V/F control
Starting torque	0.5Hz/150% (SVC)	0.5Hz/150% (SVC) ; 0Hz / 180% (FVC)
Adjustable speed ratio	1 : 100 (SVC)	1 : 100 (SVC) ; 1 : 1000 (FVC)
Speed control accuracy	±0.5% (SVC)	±0.5% (SVC) ; ±0.02% (FVC)
Overload capability	150% of rated current: 60 seconds 170% of rated current: 12 seconds 190% of rated current: 1.5 seconds	150% of rated current: 60 seconds 220% of rated current: 1 second
Torque boost	Auto torque boost; Range of manual torque boost 0.1%~30.0%	
V/F curve	Three types: Linear, Multi-point, square curve	
	(1.2 power, 1.4 power, 1.6 power, 1.8 power, 2 power)	
V/F separation	Full separation, Half separation	
Acceleration and deceleration time	Linear and S-curve acceleration and deceleration modes available. The range of acceleration and deceleration time is 0.0~6500.0s.	Linear and S-curve acceleration and deceleration modes available. Four 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 current value: 0.0%~100.0%	
JOG control	JOG frequency range: 0.00Hz ~ Maximum frequency (5Hz in default). JOG acceleration and deceleration time: 0.0s~6500.0s.	
Built-in PID	Simplify the establishment of a closed-loop control system	
Automatic voltage regulation (AVR)	Keep the output voltage in stable when the grid voltage fluctuates.	
Stall prevention from overvoltage and overcurrent	The current and voltage are limited automatically during operation to prevent frequent tripping due to over-current and over-voltage.	
Rapid current limit	Reduce the risk of over-current faults to keep VFD operated normally.	
Torque limit and control	Limit the torque automatically during operation to prevent frequent tripping due to over-current.	
Brake unit	Built-in braking unit for 22KW and below models	

Model	0.75K-3.7K	5.5K-22K
SPECIAL FEATURES		
Deceleration to stop	In case of power loss, the energy from load feedback is used to compensate and decelerate the motor until standstill, to prevent mechanical damage.	
Rapid current limit	Reduce the risk of over-current faults to keep VFD operated normally.	
Timer control	Setting range: 0.0Min ~ 6500.0Min	
Communication	Modbus	Modbus、CANLink、CANOpen、Profibus-DP、ProfiNET
INPUT/OUTPUT		
Command source	Operation panel, control terminal and serial communication port.	
Frequency source	Digital setting, Analog voltage setting, Analog current setting, Pulse setting and Serial port setting.	Keyboard setting (saving/not saving when power-off), analog voltage setting, analog current setting, pulse setting, serial port setting, panel encoder setting, multi-speed running setting, simple PLC setting, PID setting, analog A13 setting (key knob).
Auxiliary frequency source	5 options to provide flexible auxiliary frequency fine-tuning and frequency synthesis.	10 options to provide flexible auxiliary frequency fine-tuning and frequency synthesis.
Input terminals	4 digital input terminals, one of which supports high-frequency pulse input up to 50kHz	7 digital input terminals, one of which supports high-speed pulse input up to 100kHz
	1 analog input terminal supporting 0 ~ 10V voltage input or 0 ~ 20mA current input	2 analog input terminals, support 0 ~ 10V voltage input or 0 ~ 20mA current input
	1 rotary potentiometer analog input	
Output terminals	1 high-speed pulse output terminal supporting 50kHz step-wave signal output	1 high-speed pulse output terminal, support 100kHz square wave signal output
	1 relay output terminal	1 digital output terminal
	1 analog output terminal supporting 0~20mA current output or 0~10V voltage output	2 analog output terminals, support 0~20mA current output or 0~10V voltage output

General Specifications

DISPLAY BUTTONS	
Keypad	0.75K-3.7K model: standard keypad (Optional detachable keypad can be purchased seperately)
	5.5K-22K model: standard detachable keypad
Copy parameters (Only for 5.5-22K model)	Parameters can be copied through the standard external keyboard
LED display	Display parameters
Key lock and function selections	It allows users to partially or fully lock the keys or define operated range for partial keys to prevent misoperation
Protective function	Motor short-circuit detection at power-on, output phase loss protection, over-current protection, over-voltage protection, under-voltage protection, overheat protection, overload protection and etc.
ENVIRONMENT	
Storage temperature	-20°C ~ 60°C
Operation temperature	-10°C ~ 50°C (If temperarture is higher than 40°C, the output capacity will be derated 1% per 1°C increase)
Storage humidity	< 90%RH
Operation humidity	< 90%RH
Noise Level	50dBA max.
STANDARD	
EMC	Standards:IEC 61800-3, C3
Safety	Standards:IEC 61800-5-1
INTERACE	
Communication Port	RS-485

Product specifications are subject to change without further notice

CE RoHS Compliant

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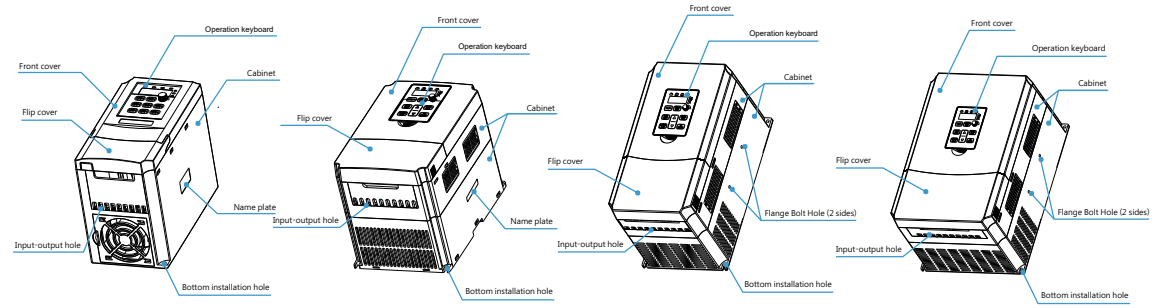
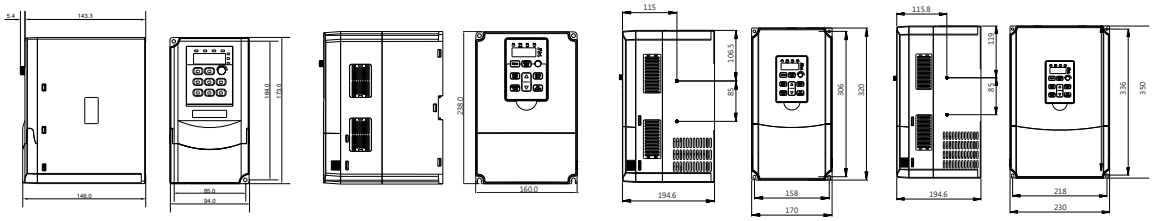
Dimensions (mm)



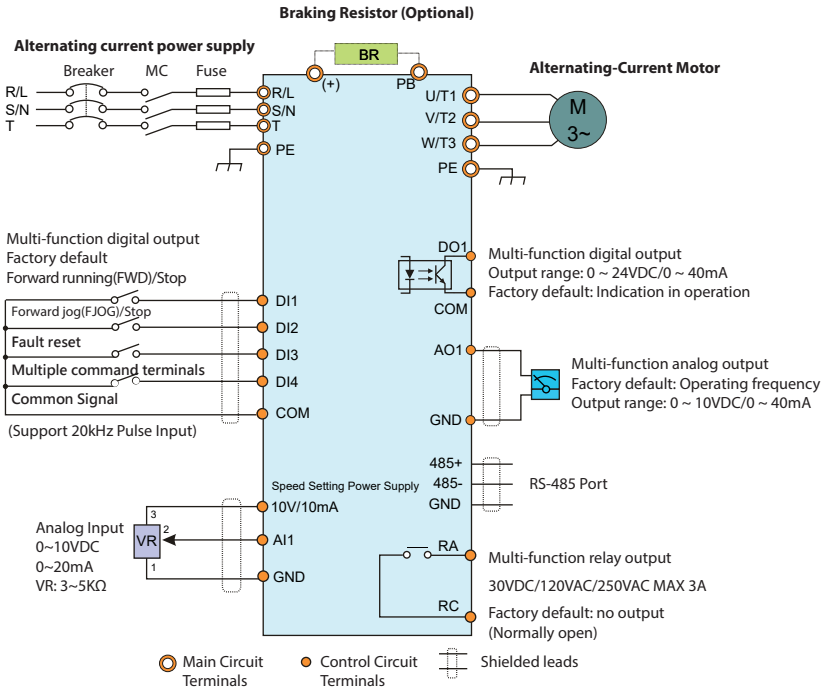


0.75W-3.7KW | 5.5W-7.5KW | 11W-15KW | 18.5W-22KW

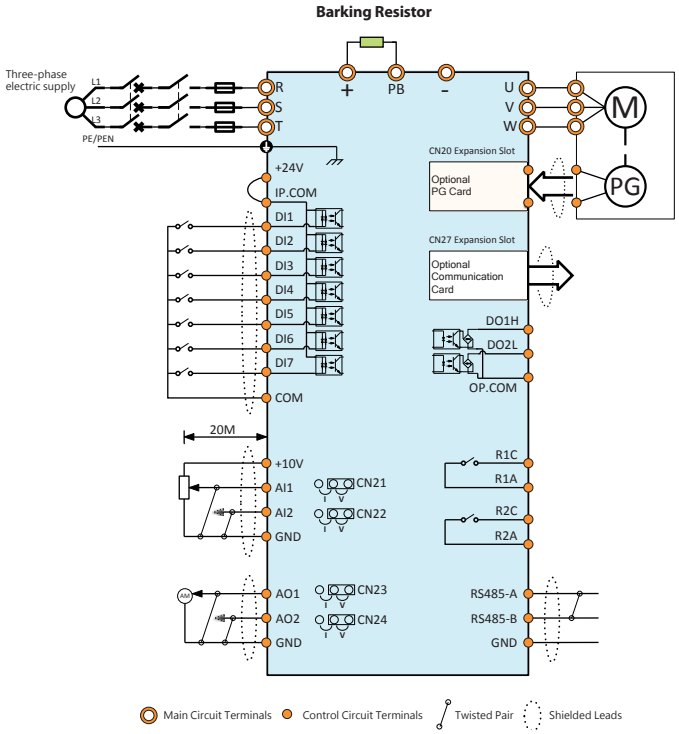
Astro 0.75W-22KW Installation Dimension

MODEL	Instillation Position(mm)		Overall Dimensions(mm)			Instillation Position (mm)	Weight (kg)
	A	B	H	W	D		
Astro 0.75G-S5	85	164	173	94	146	4	1.4
Astro 1.5G-S2							
Astro 2.2G-S2							
Astro 0.75G-T4							
Astro 1.5G-T4							
Astro 2.2G-T4							
Astro 3.7G-T4							
Astro 5.5G-T4	149.5	227.5	238	160	187	4.5	3.5
Astro 7.5G-T4							
Astro 11G/15P-T4	156	316	320	170	194.6	5.5	7.2
Astro 15G/18.5P-T4							
Astro 18.5G/22P-T4	216	336	350	230	194.6	5.5	10
Astro 22G/30P-T4							

0.75-3.7K Wiring Diagram



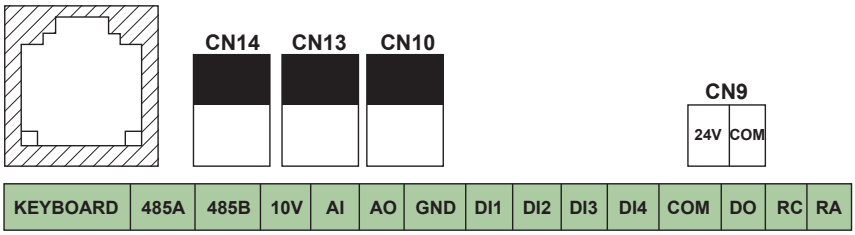
5.5-22K Wiring Diagram



Recommended Power Cable Selection Guide

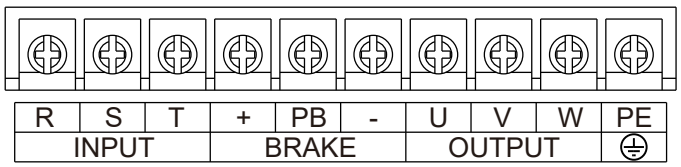
MODEL	Recommended cable size (mm^2)				Set Screws	
	RST / UVW	PE	P1 (+)	PB (+) / (-)	Screw spec	Torque (Nm)
Astro 0.75G-S2	1.5	1.5	1-4	1-4	M3	0.8
Astro 1.5G-S2	2.5	2.5	1-4	1-4	M3	0.8
Astro 2.2G-S2	2.5	2.5	1-4	1-4	M3	0.8
Astro 0.75G-T4	1.5	1.5	1.5	1.5	M4	1.2~1.5
Astro 1.5G-T4	1.5	1.5	1.5	1.5	M4	1.2~1.5
Astro 2.2G-T4	2.5	2.5	2.5	2.5	M4	1.2~1.5
Astro 3.7G-T4	2.5	2.5	2.5	2.5	M4	2~2.5
Astro 5.5G-T4	2.5	2.5	2.5	2.5	M4	1.3-1.5
Astro 7.5G-T4	4	4	4	4	M4	1.3-1.5
Astro 11G/15P-T4	6	6	6	6	M5	2.0-2.5
Astro 15G/18.5P-T4	10	10	10	10	M5	2.0-2.5
Astro 18.5G/22P-T4	10	10	10	10	M5	2.0-2.5
Astro 22G/30P-T4	16	16	16	16	M5	2.0-2.5

0.75-3.7K Control Terminal Location and Function Description

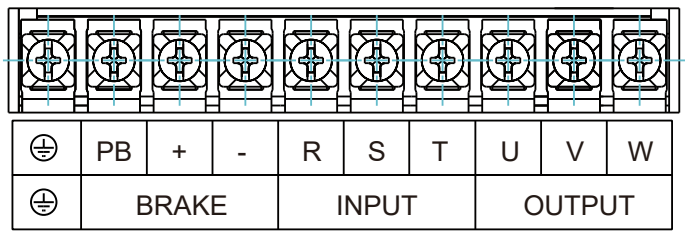


Category	Terminal label	Name	Description
Communication	RS485A	RS485 COM port	RS485 differential signal positive terminal
	RS485B		RS485 differential signal negative terminal
Analog input	AI1	Analog input terminal 1	Analog voltage/current input
Analog output	AO1	Analog output terminal 1	Analog voltage/current output
Digital input	DI1	Digital input terminal 1	Normal digital input
	DI2	Digital input terminal 2	Normal digital input
	DI3	Digital input terminal 3	Normal digital input
	DI4	Digital input terminal 4	Normal digital input/high frequency pulse input
	COM	Digital input common terminal	Digital input common terminal
Digital output	DO1	Digital output terminal 1	Normal digital output/high frequency pulse output
Power supply	10V	+10V power supply	Provide +10V power supply
	GND	+10V power ground	Reference ground for analog signal and +10V power supply
Others	RA/RC	Relay output	
	KEYBOARD	External keyboard	

5.5-22K Control Terminal Location and Function Description



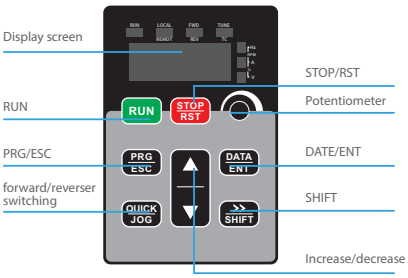
5.5KW-7.5KW

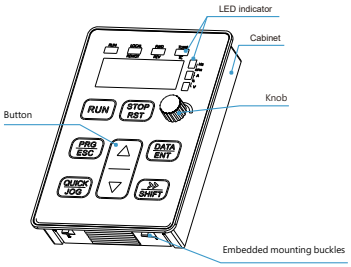


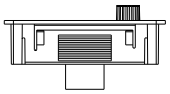
11KW-22KW

Terminal symbol	Terminal name and function description
R、S、T	Three-phase AC input terminal
PB、+	External braking resistor terminal
PE	Safety ground terminal
U、V、W	Three-phase AC output terminal
+、-	Busbar voltage

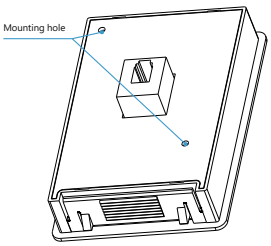
Keypad

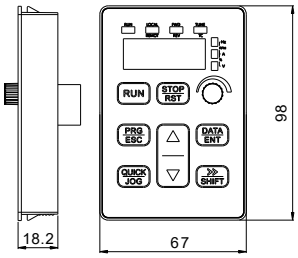






Display	Function Description
PRG/ESC	To enter or exit setting mode.
DATE/ENT	To confirm the selection/value in setting mode.
Increase/ decrease	To increase/decrease the setting value.
SHIFT	In the shutdown display interface and operation display interface, the parameters to be displayed can be selected circularly; when modifying the param-eters, the modification bit of the parameters can be selected.
RUN	In keyboard mode operation, used to run operation
STOP/RST	In the running state, pressing this key can be used to stop the running operation. When the fault alarm state is restricted by the function code P.04, all control modes can be used to reset the operation by this key.
Potentiometer	Adjust rate and frequency





Braking Resistor Selection Guide

MODEL	Braking Unit	Braking resistor at 100% of the barking tourque (Ω)	The consumped power of the barking resistor (KW) (10% braking)	The consumped power of the barking resistor (KW) (50% braking)	The consumped power of the barking resistor (KW) (80% braking)	Minimum baking resistor (Ω)
Astro 0.75G-S2	Built In	192	0.11	0.56	0.90	42
Astro 1.5G-S2		96	0.23	1.10	1.18	30
Astro 2.2G-S2		65	0.33	1.7	2.64	21
Astro 0.75G-T4		635	0.1	0.6	0.9	240
Astro 1.5G-T4		326	0.23	1.1	1.8	170
Astro 2.2G-T4		222	0.33	1.7	2.6	130
Astro 3.7G-T4		122	0.6	3	4.8	80
Astro 5.5G-T4		89	0.75	4.1	6.6	60
Astro 7.5G-T4		65	1.1	5.6	9	47
Astro 11G/15P-T4		44	1.7	8.3	13.2	31
Astro 15G/18.5P-T4		32	2	11	18	23
Astro 18.5G/22P-T4		27	3	14	22	19
Astro 22G/30P-T4		22	3	17	26	17