RW ENERGY

PRODUCT MANUAL

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RWV

RWV Series High Performance AC DRIVE

Speed tracking function, can be a good application of fan secondary start

Short - circuit, grounding and other protection

Can add master/slave control card,communication expansion card,PG card

Asynchronous motor, synchronous motor optional

Comply with IEC / CEI /GB/JB/DL standards

Provided customized manufacture

Whole solutions for design, assembly, test...

Accountable solution for safety and reliability

Wide range offering, easy business and convenient installation

Zhejiang Rockwill Energy Technology Co., Ltd. is a technology enterprise specializing in providing complete solutions for power automation system and related automation system supporting equipment.

The company has a long-term strategic cooperation with internationally renowned middle and high voltage electrical equipment R & D and manufacturing companies and research institutes, and has jointly developed a series of high-quality automation products,. The company has also married with the provincial intelligent high-voltage switch laboratory to jointly develop a new generation of intelligent synchronous switch measurement and control devices, electronic transformers, voltage sensor processing units, etc., and has achieved some fruitful technical achievements and accumulated a large number of industry professional and technical elites with excellent experience.Solid talent base, advanced production equipment, perfect quality system, strict testing means, is a strong guarantee for the company's product quality alone.

In addition to providing a rich choice of products, we can provide you with technical solution support services, you only need to tell us your needs, our technical staff will be tailored for you to design a complete set of product solutions

The company is renowned at home and abroad for providing high-quality products and services. In addition to the domestic market, the products are currently exported to South America, Central Asia, the Middle East, Central Europe, Southeast Asia, Africa and other places.We always adhere to the belief of growing together with customers, and strive to provide safer, more reliable, more advanced and more humane automation system solutions and equipment.

ROCKWILL®, China. Provide with best support.

If you have any question please consult below:

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ROCKWILL® Energy strives to bring our customers the latest technology and competitive pricing and best service for distribution automatic.

A Variable Frequency Drive (VFD) is a power control device widely used in the field of industrial automation. It integrates functions such as motor control, energy-saving regulation, communication, and monitoring, enabling precise speed control and operational status management of AC motors.The VFD adopts a modular design concept, offering high flexibility and programmability, which significantly reduces maintenance workload and spare parts requirements while meeting diverse application needs. As an ideal alternative to traditional motor control methods, the VFD provides notable advantages in improving energy efficiency, optimizing control accuracy, and extending equipment lifespan.

VFDs are widely applied in power systems, industrial production lines, HVAC (Heating, Ventilation, and Air Conditioning) systems, water pumps, fans, compressors, and other fields. In power systems, VFDs are used to regulate the operational status of generator sets, high- and low-voltage motors, and power distribution equipment. In industrial settings, they optimize the operational efficiency of production line equipment. In HVAC systems, VFDs achieve energy savings by adjusting the speed of fans and water pumps. Key functions of VFDs include precise speed control, soft start, overcurrent/overvoltage/overtemperature protection, data monitoring, and analysis. Additionally, VFDs support multiple communication protocols, enabling seamless integration with automation systems and enhancing the operational efficiency and management level of power systems.

Service environment

Ambient temperature:	-10°C - +40°C; When it is 40°C - 50°C, the output current decreases by 1% for every 1°C
Storing temperature:	-40°C - +70°C
Ambient humidity:	5% - 95%, no condensation
Rate of ambient temperature change:	<25℃/h
Altitude range:	0 - 2000m;Decrease by 1% for every 100m above 1000m

Start frequency	0.00Hz - 600.00Hz
Accel/Decel time	0.00s - 3600s
Carrier frequency	1.0KHz - 15.0KHz
Frequency command mod	Digital setting + Keypad Up/Down; Digital setting + terminal Up/Down; Communication setting; Analog setting: AI1/AI2/AB; Terminal pulse setting.
Start methods	Start from starting frequency; DC injection braking at start; Flying start.
Stop methods	Ramp to stop; Coast to stop; DC injection braking at ramp stop.
Dynamic brake capability	Braking unit triggered voltage: 650 - 750V; Service time: 0.0 - 100.0s; Brake units of RWV300G3 - 037 and below are optionally inbuilt.
DC braking capability	DC braking start frequency: 0.00 - 600.00Hz; DC braking current: constant torque 0.0 - 100%; DC braking time: 0.0 - 100s.
Input terminals	Eight switching input terminals, one high - speed pulse input terminal. Support dry node, active PIP, NP input mode; Two analog input terminals, one of which can only be used as a voltage input and the other is optional.
Output terminals	One high - speed pulse output(0 - 50kHz square wave output) and two analog outputs(voltage/current programmable) can output signals such as command frequency, output frequency, etc; one digital output; Two relay outputs.
Ercode input terminal	Support 5V/12V voltage grade. Support OC push - pull, differential signal inputs and such.

Other:

Efficiency	Installation	Protection grade	Cooling method
At rated power, power levels of 7.5kW and below: ⩾ 93%; 11kW to 45kW power level: ⩾ 95%;	Wall - mounted type(500kW and below); Cabinet type(560kW and 630kW)	IP20	Forced air cooling

Main Functions of Series High Performance AC DRIVE:

Automatic voltage regulation function: With automatic voltage regulation function, when the power grid voltage fluctuations, can automatically maintain the stability of the output voltage. This feature ensures consistent performance in the face of unstable power supplies, improving system reliability and efficiency.

Short-circuit protection function: When a short-circuit fault occurs on the output side of the inverter, the short-circuit protection function can quickly detect and cut off the output, protecting the inverter and the motor from the impact of short-circuit current.

Fault protection features: The fault protection features cover more than thirty different protection measures, including but not limited to over current protection, over voltage protection, under voltage protection, over temperature protection, phase loss protection, and overload protection. These comprehensive protection mechanisms ensure that equipment can be effectively protected against abnormal operating conditions.

Speed tracking function: With speed tracking function, it can be effectively applied to the secondary start-up process of the fan. This feature ensures a smoother and more efficient restart of the fan, improving system reliability and performance. By accurately tracking the speed, it is possible to optimize the control of the fan start-up process, reduce mechanical and electrical stress, and extend the life of the equipment.

High precision current limit control function: In the V/F control mode, the high precision current limit control makes the driver no overcurrent alarm whether it is fast acceleration and deceleration or gridlock. Reliable protection of the driver.

High precision torque limit control function: High precision torque limit control, so that the driver can output strong torque or soft torque according to the user's process control requirements, reliable protection of mechanical equipment.

Supports a variety of motor drives: It supports the drive of asynchronous motor and permanent magnet synchronous motor, and can accurately identify the parameters of these two types of motors. The system allows users to set different motor parameters according to their needs.

Energy saving function: Automatically adjust the running frequency and voltage of the motor according to the change of the load, so that the motor can run in the high efficiency zone under different loads, thus reducing the energy consumption of the motor.

Communication function: Support a variety of communication protocols, can communicate with the host computer control system or other equipment to achieve remote control, monitoring and data exchange, to facilitate the centralized control and management of automated production lines.

TI latest moto - control specific digital signal processors (DSP) with clock frequency reaching up to 150Hz are adopted.
Asynchronous motors and permanent magnet synchronous motors control are supported, with accurate automating.Two independent motor profiles are programmed, and the switch over of the two motors control can be realized by parameter setting or terminal input.
In V/f control mode, accurate current limited control function makes sure of no over - current fault occurred no matter the drives are running at acceleration/deceleration or rotor locked status, well protecting the drives.
In vector control mode, accurate torque limited control pledges powerful or moderate torque complying with application requirements, protecting machinery well.

In V/F separated control mode, output frequency and output voltage can be set respectively fit for applications, such as variable frequency power sources, torque motors, etc.

Control mode	Starting torque	Speed range	Speed accuracy	Torque response
V/F control	0.5Hz 180%	1:100	±0.5%	
Speed - sensorless control 1	0.5Hz 180%	1:100	±0.2%	<10ms
Speed - sensorless control 2	0.25Hz 180%	1:200	±0.2%	<10ms
Speed - senso control	0Hz 200%	1:1000	±0.02%	<5ms

Rectification stage:

Three - phase AC input: The three - phase alternating current provided by the power grid enters the frequency converter. The voltages and currents of these three phases are 120° out of phase with each other in time, providing a basis for subsequent power conversion.

Rectification process: The three - phase alternating current is converted into direct current using a rectifier circuit. The rectifier circuit usually consists of multiple diodes or thyristors. Diodes have unidirectional conductivity, allowing either the positive or negative half - cycle of the alternating current to pass. Through the combination of the rectifier bridge, the three - phase alternating voltage is converted into a pulsating direct voltage.

Filtering stage:

Smoothing the DC voltage: The DC voltage obtained from rectification has large pulsating components and needs to be smoothed by a filtering circuit. The filtering circuit generally consists of large - capacity capacitors and inductors. Capacitors can store electric charge, charging when the voltage is high and discharging when the voltage is low, thereby reducing voltage fluctuations. Inductors impede changes in current and cooperate with capacitors to further smooth the DC voltage, providing a stable DC power supply for the subsequent inverter stage.

Inversion stage:

IGBT switching control: The inverter circuit is the core part of the frequency converter and mainly consists of power switching devices such as Insulated Gate Bipolar Transistors (IGBTs). The control circuit controls the conduction and turn - off of these IGBTs according to certain algorithms and rules. For example, through Pulse Width Modulation (PWM) technology, the switching actions of the IGBTs are controlled at different frequencies and duty cycles.

Generating adjustable AC: Through the rapid conduction and turn - off of the IGBTs, the DC power supply is "chopped" into a series of pulses of different widths. These pulses can be equivalent to alternating voltages of different frequencies and amplitudes through appropriate combination and processing. By changing the frequency and width of the pulses, continuous adjustment of the frequency and amplitude of the output alternating voltage can be achieved, thereby driving the AC motor to run at different speeds.

Control stage:

Parameter setting and detection: Users can set various operating parameters on the control panel of the frequency converter according to actual needs, such as the target speed, acceleration time, and deceleration time. At the same time, sensors inside the frequency converter continuously monitor the operating status of the motor, including parameters such as current, voltage, speed, and temperature.

Feedback adjustment: The control circuit compares the detected actual operating parameters with the set values and adjusts the switching control signals of the IGBTs in the inverter circuit based on the comparison results.

Protection stage:

Fault monitoring: The inverter has a variety of built-in protection functions. Once abnormal conditions are found, the monitoring circuit continuously monitors the operating status of the inverter and the motor.

Protection action: When a fault occurs, the protection circuit quickly cuts off the output of the frequency converter and stops supplying power to the motor to prevent the fault from further expanding and protect the frequency converter and the motor from damage. At the same time, the frequency converter displays the corresponding fault code, facilitating maintenance personnel to quickly locate and troubleshoot the fault.

Power input:

Rated input voltage	Rated input current	Frequency	Allowable voltage range
3-phase 380VAC/400VAC/415VAC 440VAC/460VAC/480VAC	SEE the table "Model and technical parameters of RWV300 series"	50Hz/60Hz, tolerance ±5%	Voltage consecutive fluctuation ±10%, short fluctuation -15%~+10% ie. 323V~528V, Voltage out-of-balance rate:<3%, THD meets the standards of IEC 61800-2

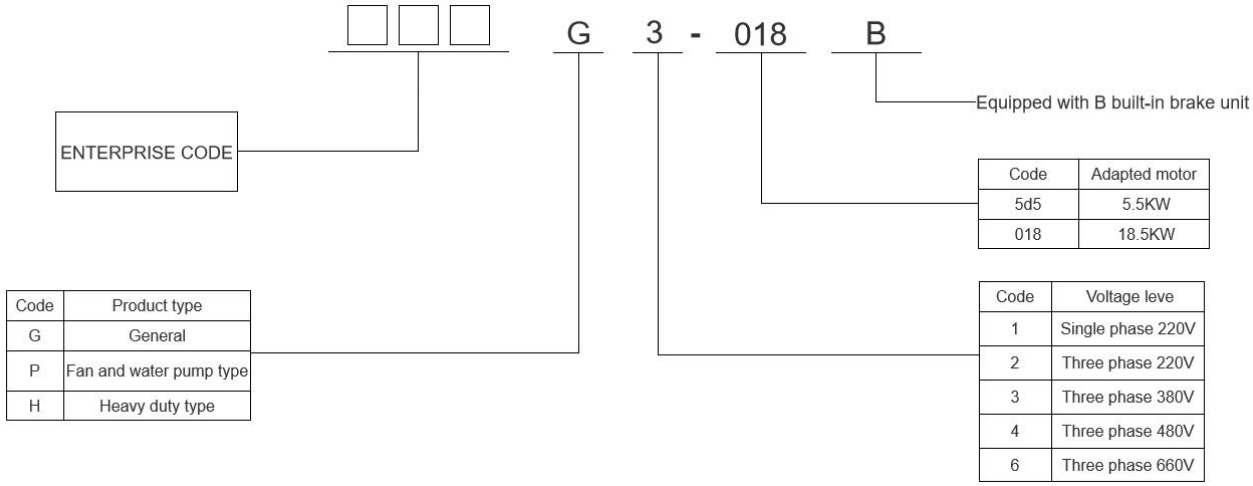
Power output:

Applicable motor	Rated current	Output voltage	Output frequency	Over load capability
See the table "Model and technical parameters of RWV300 ceriau.F"	See the table "Model and technical parameters of RWV300 series"	3-phase; 0 – rated input voltage, error less than ±3%	0.00Hz - 600Hz, Resolution 0.01Hz	150% 1min; 180% 10s; 200% 0.5s, once per 10min.

Control characteristics:

Control pattern	V/F control	Speed-sensor less control 1	Speed-sensor less control 2	Speed-sensor control position control
Starting torque	0.5Hz 180%	0.5Hz 180%	0.25Hz 180%	0Hz 200%
Speed range	1:100	1:100	1:200	1:100
Speed accuracy	±0.5%	±0.2%	±0.2%	±0.02%
Speed ripple	—	±0.3%	±0.3%	±0.1%
Torque control	NO	NO	Yes	Yes
Torque accuracy	—	—	±7.5%	±5%
Torque response	—	<10ms	<10ms	<5ms
Positioning accuracy	—	—	—	±1Line pulse±1

Product model description:



Code	Adapted motor
5d5	5.5KW
018	18.5KW

Code	Product type
G	General
P	Fan and water pump type
H	Heavy duty type

Code	Voltage leve
1	Single phase 220V
2	Three phase 220V
3	Three phase 380V
4	Three phase 480V
6	Three phase 660V

Single phase power supply 220V 50/60Hz,Output three-phase 380V				
Inverter model	Power capacity KVA	Input current (A)	Output current (A)	Adapt motor
RWV300 G5-0D75	1.5	10	2.5	0.75kW
RWV300 G5-1D5	3	14	3.7	1.5kW
RWV300 G5-2D2	4	21	5	2.2kW
RWV300 G5-004	5.9	35	9.5	4kW
RWV300 G5-5D5	8.9	44	14	5.5kW
RWV300 G5-7D5	11	65	18.5	7.5kW
RWV300 G5-011	17	90	25	11kW
RWV300 G5-015	21	120	32	15kW
RWV300 G5-018	24	150	38	18.5kW
RWV300 G5-022	30	170	45	22kW
RWV300 G5-030	40	226	60	30kW
RWV300 G5-037	57	270	75	37kW
RWV300 G5-045	69	330	92	45kW
RWV300 G5-055	85	420	115	55kW

Three phase power supply 380V 50/60Hz, Output three-phase 380V				
Inverter type	Power capacity kVA	Input current (A)	Output current (A)	Adaptive motor
RWV300 G3-0D75	1.5	3.4	2.5	0.75kW
RWV300 G3-1D5	3	5	3.7	1.5kW
RWV300 G3-2D2	4	5.8	5	2.2kW
RWV300 G3-004	5.9	13.5	9.5	4kW

Single phase power supply 220V 50/60Hz, Output single phase 220V				
Inverter model	Power capacity KVA	Input current (A)	Output current (A)	Adapt motor
RWV300 G1-0D75	1.5	10	4.5	0.75kW
RWV300 G1-1D5	3	14	7	1.5kW
RWV300 G1-2D2	4	21	10	2.2kW
RWV300 G1-004	5.9	35	16	4kW
RWV300 G1-5D5	8.9	44	20	5.5kW
RWV300 G1-7D5	17	65	30	7.5kW
RWV300 G1-011	21	90	42	11kW
RWV300 G1-015	30	120	55	15kW
RWV300 G1-018	40	150	70	18.5kW
RWV300 G1-022	57	170	80	22kW
RWV300 G1-030	69	226	110	30kW
RWV300 G1-037	85	270	130	37kW
RWV300 G1-045	114	330	160	45kW
RWV300 G1-055	134	420	200	55kW

Three phase power supply 220V 50/60Hz,Output three-phase 220V				
Inverter model	Power capacity KVA	Input current (A)	Output current (A)	Adapt motor
RWV300 G2-0D75	3	5	4.5	0.75kW
RWV300 G2-1D5	4	7.3	7	1.5kW
RWV300 G2-2D2	5.9	10.5	10	2.2kW
RWV300 G2-004	8.9	18.5	16	4kW
RWV300 G2-5D5	17	22	20	5.5kW
RWV300 G2-7D5	21	35	30	7.5kW
RWV300 G2-011	30	46.5	42	11kW
RWV300 G2-015	40	62	55	15kW
RWV300 G2-018	57	76	70	18.5kW
RWV300 G2-022	69	85	80	22kW
RWV300 G2-030	85	113	110	30kW
RWV300 G2-037	114	140	130	37kW
RWV300 G2-045	134	175	160	45kW
RWV300 G2-055	160	214	200	55kW
RWV300 G2-075	231	288	270	75kW
RWV300 G2-090	250	325	320	90kW

Three phase power supply 660V 50/60Hz,Output three-phase 660V				
Inverter model	Power capacity KVA	Input current (A)	Output current (A)	Adapt motor
RWV300 G6-0D75	1.5	2.5	2	0.75kW
RWV300 G6-1D5	3	3	2.5	1.5kW
RWV300 G6-2D2	4	5	4	2.2kW
RWV300 G6-004	5.9	8	6	4kW
RWV300 G6-5D5	8.9	11	9	5.5kW
RWV300 G6-7D5	11	14	11	7.5kW
RWV300 G6-011	17	18	16	11kW
RWV300 G6-015	21	25	20	15kW
RWV300 G6-018	24	30	25	18.5kW
RWV300 G6-022	30	35	28	22kW
RWV300 G6-030	40	40	35	30kW
RWV300 G6-037	57	47	45	37kW
RWV300 G6-045	69	52	52	45kW
RWV300 G6-055	85	65	63	55kW
RWV300 G6-075	114	85	86	75kW
RWV300 G6-090	134	95	98	90kW
RWV300 G6-110	160	118	121	110kW
RWV300 G6-132	192	145	150	132kW
RWV300 G6-160	231	165	175	160kW
RWV300 G6-185	231	190	198	185kW
RWV300 G6-200	250	210	218	200kW
RWV300 G6-220	280	230	240	220kW
RWV300 G6-250	355	255	270	250kW
RWV300 G6-280	396	286	320	280kW
RWV300 G6-315	445	334	350	315kW
RWV300 G6-350	500	360	380	350kW
RWV300 G6-400	565	411	430	400kW
RWV300 G6-450	635	445	465	450kW
RWV300 G6-500	706	518	540	500kW
RWV300 G6-560	791	578	600	560kW
RWV300 G6-630	890	655	680	630kW

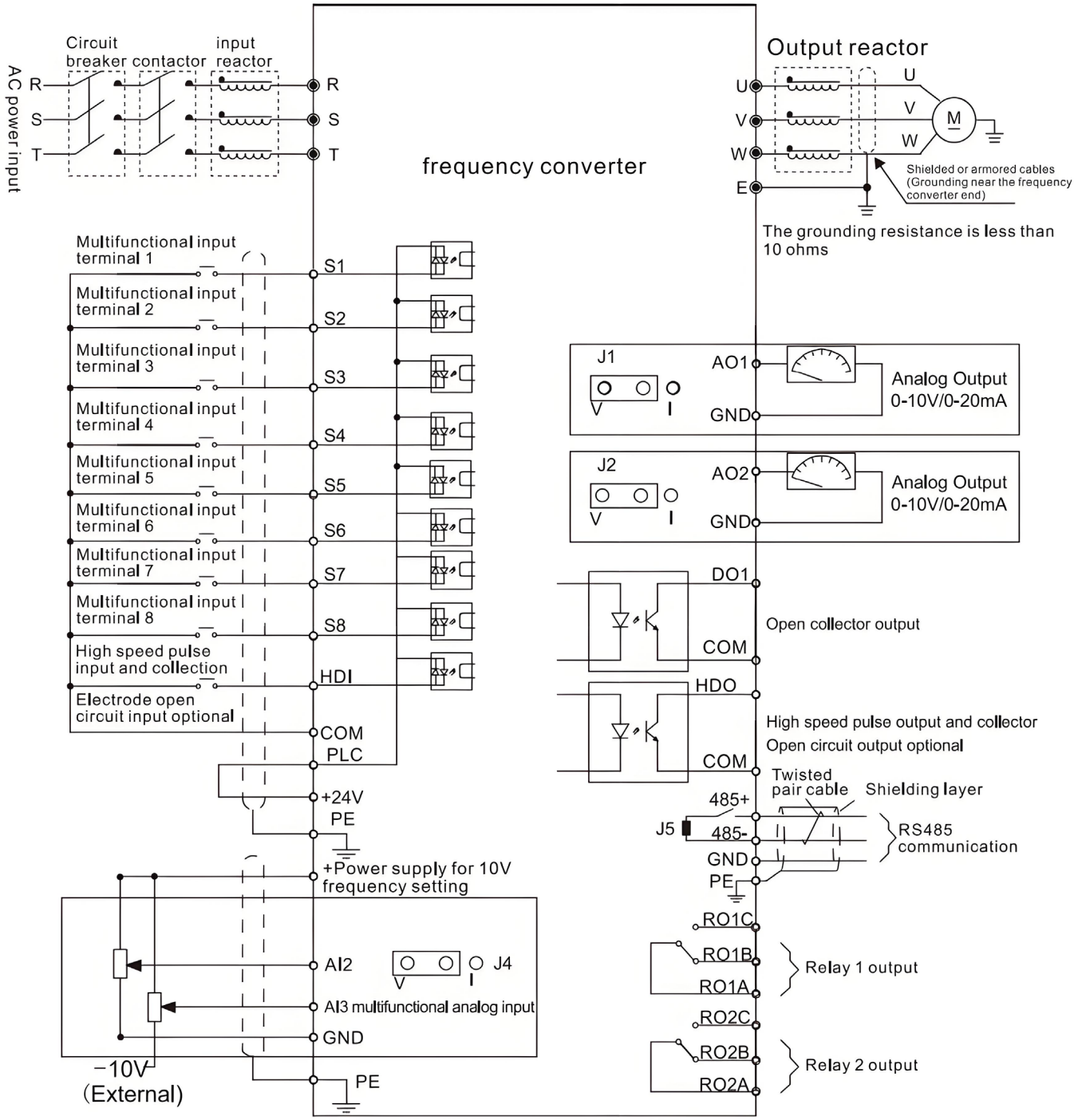
Category	Analog input	
Terminal	Terminal designation	Specification
+10V	Analog input reference voltage	Voltage: 10.3V±3% Maximum output current: 25mA, ad resistance of external potentiometer should be larger than 400Ω
GND	Analog ground	Isolated from COM interiorly
AI2	Ana log input 2	The voltage and current can be 0 - 10V/0 - 20mA, which can be switched by route switch J4. Input impedance: voltage input is 20kΩ, current input is 500kΩ Resolution: When 10V corresponds to 50Hz, the minimum resolution is 5mV Error ±1%, 25°C
AI3	Ana log input 3	-10V - 10V voltage Input impedance: 20kΩ at voltage input Resolution: When 10V corresponds to 50Hz, the minimum resolution is 5mV Error ±1%, 25°C

Category	Analog output	
Terminal	Terminal designation	Specification
AO1	Analog output 1	0mA - 20mA; impedance 200 - 500Ω, 0 - 10V; impedance ⩾10kΩ. 0mA - 20mA; input impedance 500Ω, maximum input current 25mA. Switch J1 on control board for jumping between 0 - 20mA and 0 - 10V. Factory default: 0 - 10V.
AO2	Analog output 2	0mA - 20mA; impedance 200 - 500Ω, 0 - 10V; impedance ⩾10kΩ. 0mA - 20mA; input impedance 500Ω, maximum input current 25mA. Switch J2 on control board for jumping between 0 - 20mA and 0 - 10V. Factory default 0 - 10V.
GND	Analog ground	Isolated from COM interiorly

Category	Terminal	Terminal designation	Specification	
Digital output	DO1	open collector output	voltage range:0 - 24V	Current range:0 - 50mA
	HDO	open collector out/Pulse out	Open collector output: same as DO1	Pulse output:0 - 50KHz
Relay output	RO1A/RO1B/RO1C RO2A/RO2B/RO2C	Two sets of relay outputs	RO1A common end, RO1B normally closed, RO1C normally open RO2A common end, RO2B normally closed, RO2C is always on	Contact capacity: 250VAC3A, 30VDC1A.

Category	Switching input	
Terminal	Terminal designation	Specification
+24V	+24V	24V±10%, isolated from GFNI D interiorly Maximum load 200mA
PLC	Digital input common terminal	Switch between high level and low level. Short - circuited with ±24V at delivery, low value of digital input valid, external power input.
COM	+24V ground	Isolated from GNID interiorly
S1 - S8	Digital input terminals 1 - 8	Input: 24VDC, 5mA Frequency range: 0 - 200Hz Voltage range: 10 - 30V
HDI	Digital input/Pulse input	Voltage range: 10 - 30V Digital input: same as S1 - S8 Pulse input: 0.1 - 50kHz;

Category	Terminal 485 interface	Keypad 485 interface
Terminal	Terminal designation	Specification
485+	Differential signal 485+	Rate: 1200/2400/4800/9600/19200/38400/57600bps
485-	Differential signal 485-	Maximum distance: 500m(use standard network cable)
GND	485 communication shielded ground	Isolated from COM interiorly



Field service operation and warranty issues:

ROCKWILL® can provide competent, well trained field service representatives to provide technical guidance and advisory assistance for the installation, overhaul, repair and maintenance of ROCKWILL® equipment, processes and systems.

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