RW ENERGY

PRODUCT MANUAL http://www.rw-relay.com

RWS

RWS Series Built - in bypass type motor soft starter

The built - in bypass contactor greatly improves the product performance.

Multiple starting control modes can meet various load requirements.

Motor protection functions reduce the probability of motor damage

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 bypass-type soft starter is a device specifically designed for the motor starting process, aiming to reduce start-up current and mechanical shock by controlling the voltage applied to the motor during startup. This type of soft starter gradually increases the voltage supplied to the motor, allowing it to smoothly accelerate to its rated speed without the large inrush currents and associated grid fluctuations that occur with direct-on-line starting.

One of the key features of a bypass-type soft starter is the integration of an internal bypass contactor. Once the motor reaches full speed, the soft-start phase ends, and the bypass contactor closes, directly connecting the motor to the power supply while bypassing the soft starter's power components.

From a technical perspective, bypass-type soft starters typically use thyristors (SCRs) as the primary control elements, adjusting their conduction angle to regulate the output voltage. Additionally, these devices often come equipped with various protection functions such as overload protection, phase loss protection, and undervoltage protection, further enhancing the safety and reliability of the motor.

By addressing many of the issues inherent in traditional starting methods—such as the high inrush currents and resulting grid instability—the bypass-type soft starter offers users a more stable and reliable motor starting experience. As technology advances, these soft starters continue to evolve towards smarter, more integrated designs, better meeting the diverse needs of different users.

This approach not only mitigates the risks associated with sudden surges but also contributes to the longevity of both motors and connected machinery, ensuring smoother operations across a wide range of industrial applications.

Service environment

Working temperature:	-10°C - +60°C
Storing temperature:	-40°C - +60°C
Humidity:	5% - 95% Relative humidity

Main Functions of Series Built-in bypass soft starter:

Starting Functions

Reduce Starting Current: The built-in bypass soft starter controls the conduction angle of the thyristor to gradually increase the voltage at the motor terminal from the initial value to the rated voltage, limiting the starting current to 2 - 5 times the rated current and reducing the impact on the power grid.

Smooth Starting: It enables the motor to start smoothly, avoiding excessive torque shock during direct starting. This reduces damage to mechanical equipment such as the motor, coupling, and drive belt, and extends the service life of the equipment. For example, when used in a belt conveyor, it can prevent the belt from being over - stretched due to sudden starting and reduce the risk of belt breakage.

Operating Functions

Energy Saving: After the motor reaches the rated speed, the built - in bypass contactor closes, short - circuiting the thyristor, and the motor is directly powered by the power grid. This reduces the power consumption of the thyristor during operation, improves the operating efficiency of the system, and achieves energy - saving purposes.

Stable Operation: It can adjust the operating parameters of the motor according to the load conditions, ensuring stable operation of the motor under different working conditions. For example, in fans and water pumps, the speed and power of the motor can be adjusted in real - time according to the actual air volume and water volume requirements.

Protection Functions

Overload Protection: It continuously monitors the motor current. When the motor current exceeds the set overload protection value, the soft starter will automatically take measures such as reducing the motor output power or stopping the motor to prevent damage to the motor due to long - term overload.

Phase - Loss Protection: It can detect whether there is a phase - loss in the three - phase power supply. Once a phase - loss is detected, it immediately stops the motor to avoid burning the motor windings due to phase - loss operation.

Over - Temperature Protection: Through the temperature sensor, it monitors the temperature of key components such as the thyristor. When the temperature exceeds the set safety value, it promptly takes measures such as heat dissipation or shutdown to protect the equipment.

Control Functions

Multiple Starting Modes: Usually, it has multiple starting modes, such as voltage ramp starting and current limiting starting. Users can select the appropriate starting mode according to the load characteristics and actual needs. For example, for equipment with heavy - load starting, the current limiting starting mode can be selected to ensure a smooth and reliable starting process.

The built-in bypass soft starter supports communication functions, enabling remote monitoring and control, which facilitates users' centralized management and operation.

More control

The soft starter adopts a new - generation soft - starting technology with adaptive control, achieving an unprecedented level of control over the motor's acceleration and deceleration curves.

The soft starter reads the motor's data during starting and stopping processes and then adjusts it to achieve the best results. Just select the mode that suits your load type.

Built-in bypass contactor

There is no need to install an external bypass contactor. The brand - new built-in bypass contactor has a performance 3 times higher, 2.6 times better heat dissipation, 25% enhanced safety, and 20% energy savings compared to ordinary AC contactors. Its service life can reach more than 100,000 times.

Cryptographic control

After debugging user parameters, you can use password lock to prevent others from changing parameters. The remote mobile APP function can be customized to control and monitor the operation of soft starting load remotely.

Multiple starting control methods are available

These various starting modes can meet all kinds of load requirements. Users can select the appropriate starting mode according to their own load conditions. Meanwhile, it simplifies the installation and operation of the motor starting system, thereby reducing the installation cost and shortening the installation time.

The built - in bypass soft starter mainly makes use of the electronic switching characteristics and voltage - regulating principle of thyristors. A thyristor is equivalent to an electronic switch whose conduction angle can be controlled. By changing the trigger angle (conduction angle) of the thyristor through the control circuit, the magnitude of the voltage applied to the motor can be adjusted. Since voltage is related to current, this enables control of the motor's starting current and torque, thus avoiding the large - current impact and mechanical stress during direct starting.

Operation Process

Startup Preparation: When the power supply of the soft starter is connected, its internal control circuit conducts a self-check to inspect the status of various components, such as thyristors, bypass contactors, and detection circuits. If the self-check is passed, it waits for the startup command. If a fault is detected, the soft starter will issue an alarm signal and may be locked and unable to start.

Starting Phase: Upon receiving the startup command, the control circuit gradually increases the conduction angle of the thyristors according to the preset starting mode (such as voltage ramp starting, current limiting starting, etc.). This causes the voltage across the motor to rise steadily from a relatively low value, and the starting current of the motor is also limited to a certain range (usually 2 - 5 times the rated current). The generated starting torque drives the motor to start rotating and accelerating. As the motor speed gradually increases, the current will change accordingly. The soft starter continuously monitors parameters such as current and adjusts the conduction angle of the thyristors based on the preset control strategy to ensure the smooth acceleration of the motor.

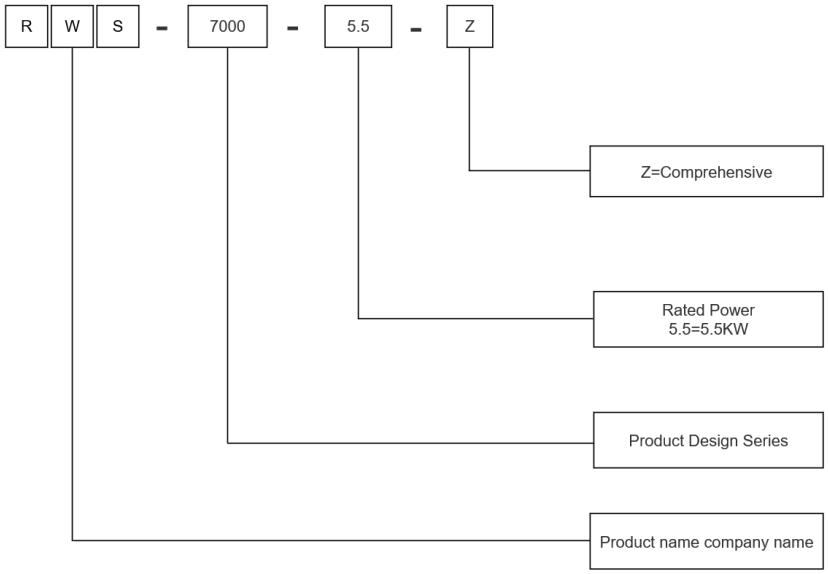
Bypass Switching: When the motor speed approaches the rated speed (generally reaching about 90% - 95% of the rated speed), the built-in bypass contactor closes under the action of the control circuit. After the bypass contactor closes, it short-circuits the thyristors, and the motor is directly connected to the power grid, which supplies the rated voltage for its normal

operation. The purpose of this is to avoid significant power losses caused by the long-term operation of thyristors and improve the system efficiency.

Operation Monitoring and Protection: During the motor's operation, the soft starter continuously monitors parameters such as the motor's current, voltage, and temperature. Once an abnormality is detected, such as the current exceeding the overload protection set value, abnormal voltage, or the temperature of thyristors or the motor being too high, the soft starter will take corresponding measures according to the preset protection strategy, such as issuing an alarm signal, reducing the output voltage, or directly cutting off the motor power to protect the motor and the soft starter itself from damage.

Shutdown phase: After receiving the shutdown command, if the soft starter has the soft - shutdown function, it will gradually reduce the conduction angle of the thyristors. This causes the voltage across the motor to gradually decrease, and the motor speed to decline smoothly, avoiding a large mechanical shock caused by sudden power failure.

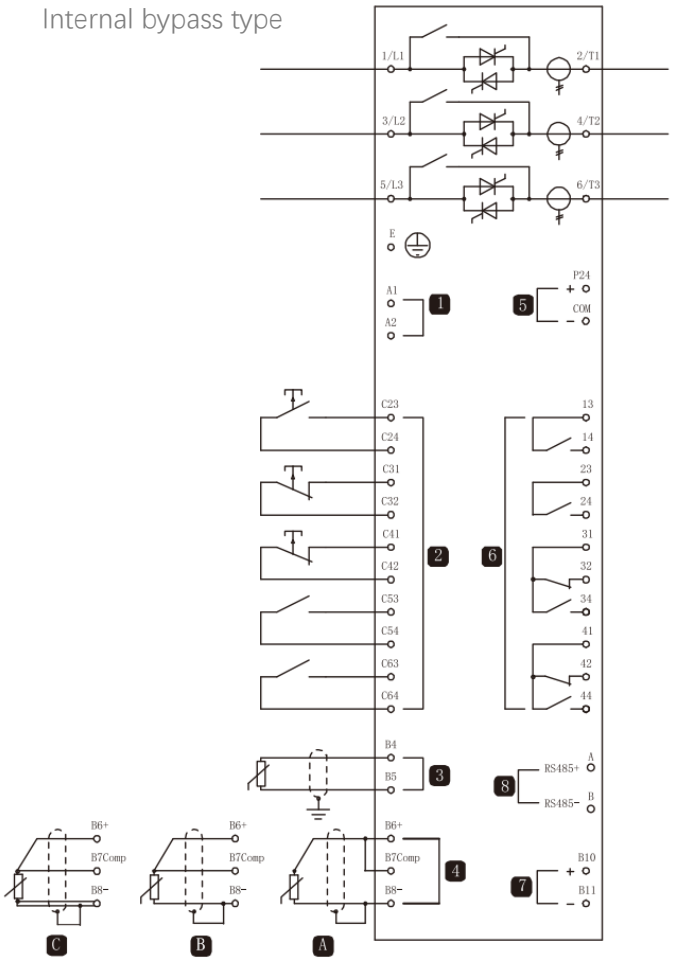
Product model description:



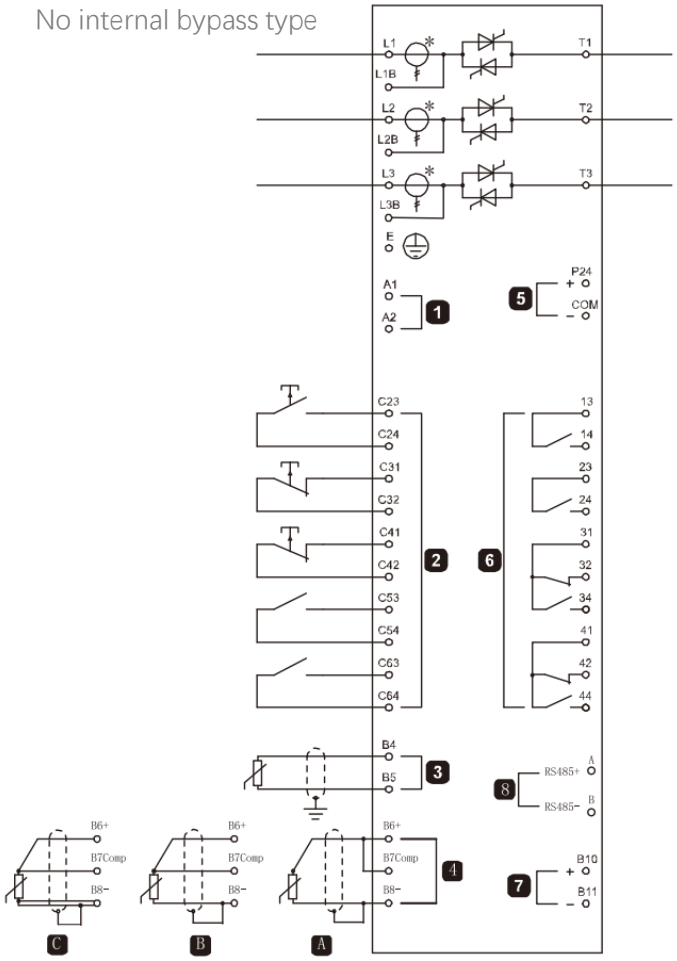
Parameter table:

Model	Star connection method	Rated current of delta connection method
RWS-7000-5.5-Z	11A	16A
RWS-7000-7.5-Z	15A	22A
RWS-7000-011-Z	23A	34A
RWS-7000-015-Z	30A	44A
RWS-7000-018-Z	37A	55A
RWS-7000-022-Z	45A	67A
RWS-7000-030-Z	60A	89A
RWS-7000-037-Z	75A	111A
RWS-7000-045-Z	90A	133A
RWS-7000-055-Z	110A	163A
RWS-7000-075-Z	150A	222A
RWS-7000-090-Z	180A	266A
RWS-7000-110-Z	220A	325A
RWS-7000-132-Z	255A	377A
RWS-7000-160-Z	320A	474A
RWS-7000-185-Z	370A	548A
RWS-7000-200-Z	400A	592A
RWS-7000-220-Z	425A	629A
RWS-7000-250-Z	500A	740A
RWS-7000-280-Z	560A	829A
RWS-7000-320-Z	630A	932A
RWS-7000-350-Z	700A	1036A
RWS-7000-400-Z	800A	1184A
RWS-7000-450-Z	900A	1332A
RWS-7000-500-Z	1000A	1480A
RWS-7000-630-Z	1200A	1776A

Internal bypass type



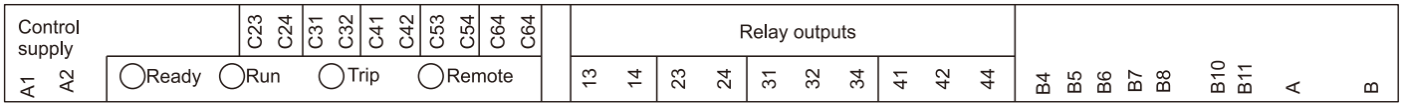
No internal bypass type

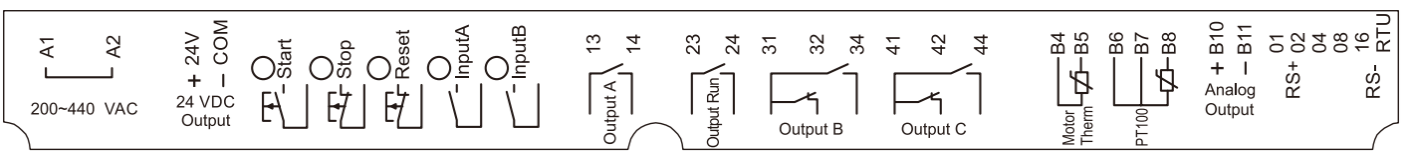


1	Control voltage
2	Remote control input
3	Motor thermistor input
4A	RTD/PT100 input -2 line
4B	RTD/PT100 input -3 line
4C	RTD/PT100 input -4 line
5	24VDC output
6	Relay power
7	Model output simulation
8	RS485 communication output

C23, C24	Start
C31, C32	stop
C41, C42	Reset
C53, C54	PLC input A
C63, C64	PLC input B
13, 14	Relay output A
23, 24	Carrying relay output
31, 32, 34	Relay output B
41, 42, 44	Relay output C

Control terminal diagram





Conventional
Current range ..... 23A - 1600A(rated)
Electrical connection..... triangular connection
Bypass ..... Integrated built-in or external

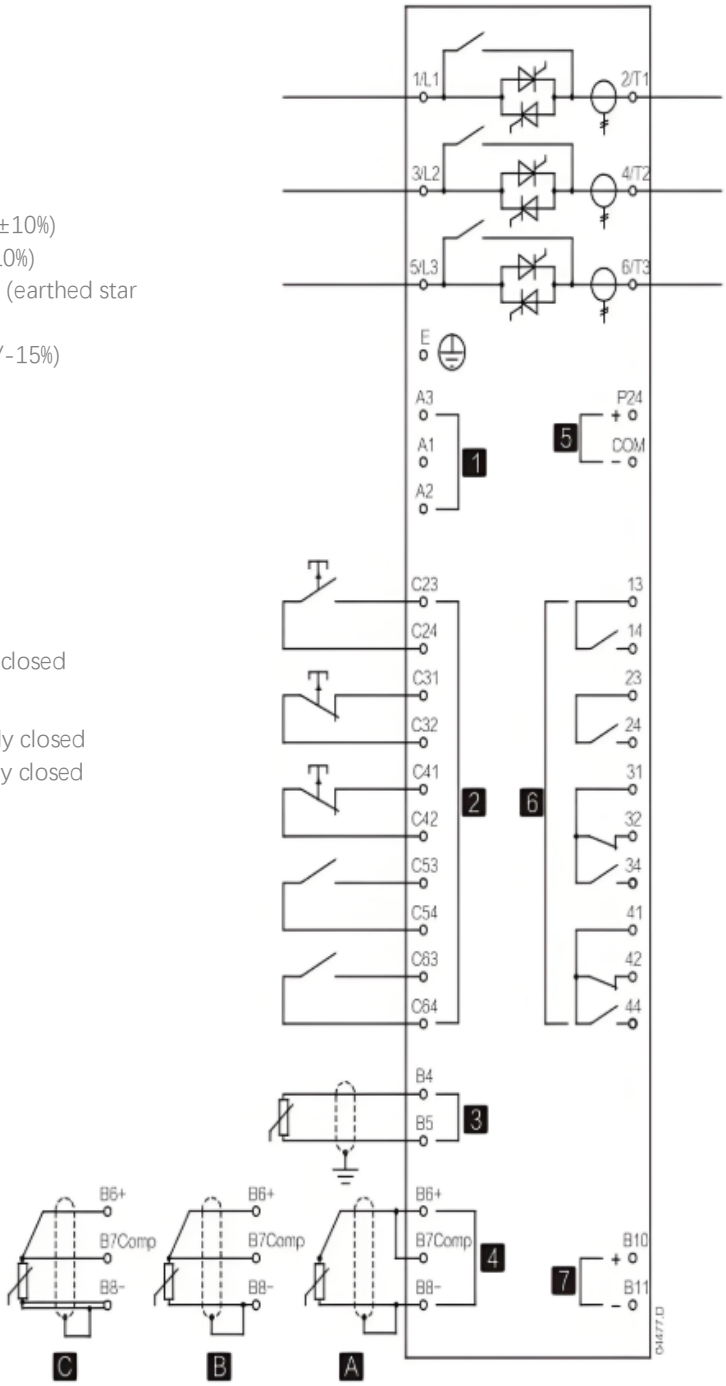
Power supply
Power supply voltage(L1,L2,L3)
SCKR1 - 7000 - xxxx - V4..... 200VAC - 440VAC (±10%)
SCKR1 - 7000 - xxxx - V7..... 380VAC - 690VAC (±10%)
SCKR1 - 7000 - xxxx - V7..... 380 ~ 690 VAC (±10%) (earthed star Supply system only)
Control voltage(A1,A2,A3) ..... 110 - 220VAC (+10%/-15%)
..... or230 - 440VAC (+10%/-15%)
..... 24 VAC/VDC (±20%)
Power frequency..... 45 - 66 Hz

Input
Input..... 24VDC,8 mA
Start(C23,C24) ..... Normally open
Stop(C31,C32)..... Normally close
Reset(C41,C42) ..... Normally closed or normally closed

Programmable input
InputA (C53,C54) ..... Normally closed or normally closed
InputB (C63,C64) ..... Normally closed or normally closed
Motor thermistor (B4,B5)
PT100 RTD (B6.B7.B8)

Output
Relay output..... 10A @ 250VACImpedance circuit
..... 5A @ 250VAC, AC15 pf0.3
Operating relay(23, 24) ..... Normally open

Programmable output
RelayA (13, 14)..... Normally open
RelayB (31, 32, 34)..... Normally open/closed
RelayC (41, 42, 44)..... Normally open/closed
Analog output(B10, B11)..... 0 - 20mA or 4 - 20mA
24VDC(P24. COM)..... 200mA

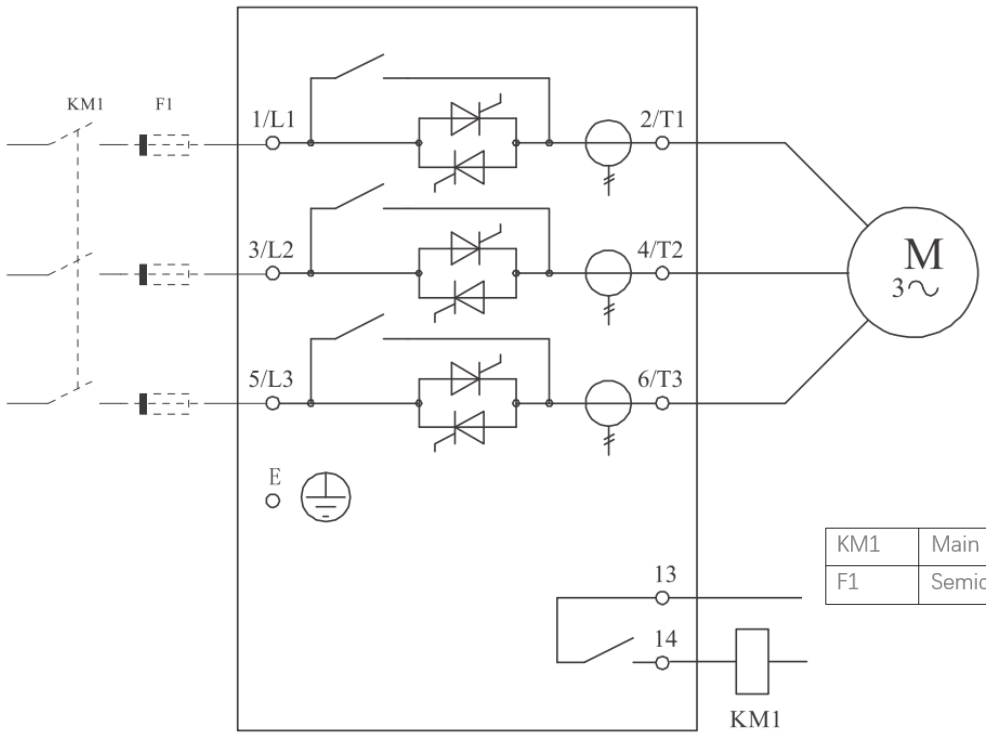


Only controllers with the suffix B have built-in bypass functions.
1: Control voltage (depending on model)
2: Remote control input port
3: Motor thermistor
4A: RTD/PT100 input terminal (2 lines)
4B: RTD/PT100 input terminal (3-line)
4C: RTD/PT100 input terminal (4-line)
5: 24 VDC output terminal
6: Relay output

Environment
Protection
SCKR1 - 7000 - 0023 ~ SCKR1 - 7000 - 0105..... IP20 & NEMA1
SCKR1 - 7000 - 0145 ~ SCKR1 - 7000 - 1600..... IP00
Working temperature ..... -10°C to 60°C
Storage temperature ..... -10°Cto60°C
Humidity..... 5%to95%Relative humidity

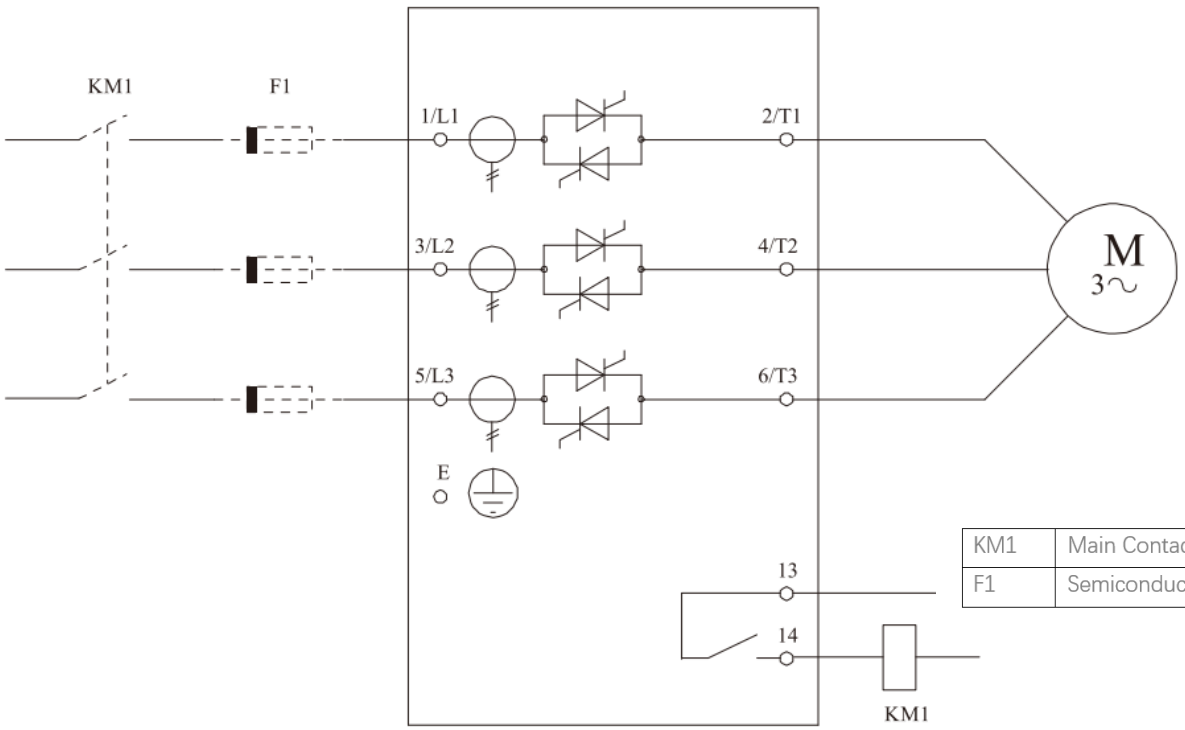
Motor connection diagram

Star connection with internal bypass



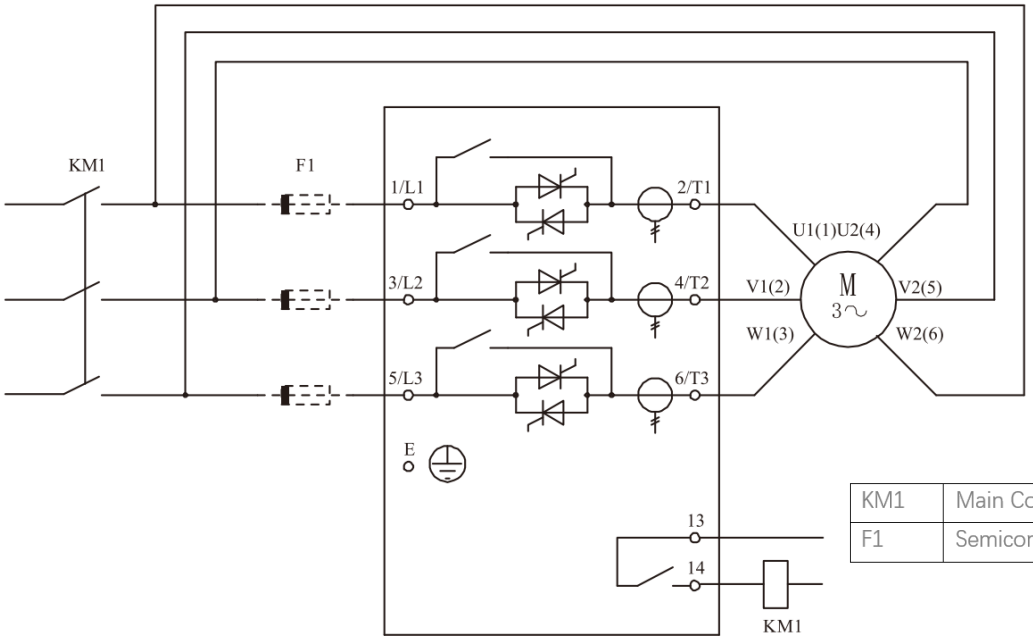
KM1	Main contactor (any selection)
F1	Semiconductor fuse (optional)

Star connection without bypass



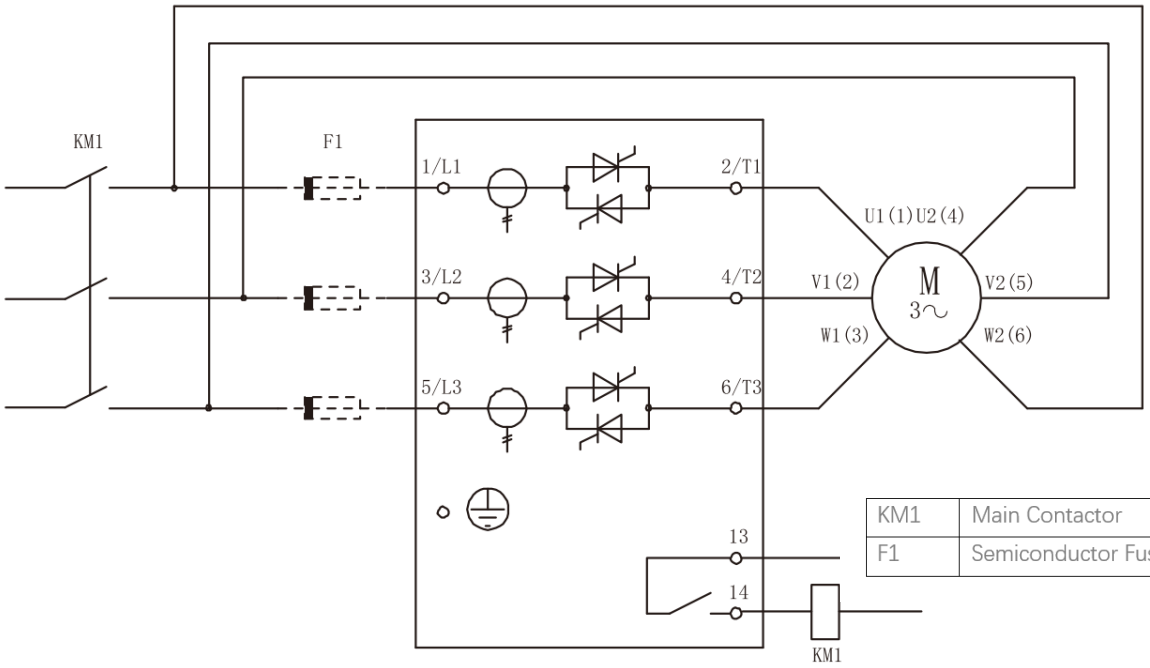
KM1	Main Contactor
F1	Semiconductor Fuse (optional)

Triangular connection with internal bypass



KM1	Main Contactor
F1	Semiconductor Fuse (optional)

Triangular connection without bypass



KM1	Main Contactor
F1	Semiconductor Fuse (optional)

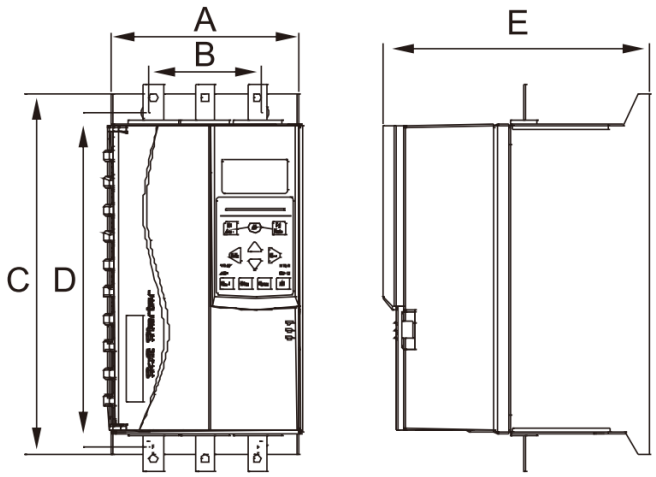


Fig 1 RWS-7000-5.5kW~55kW

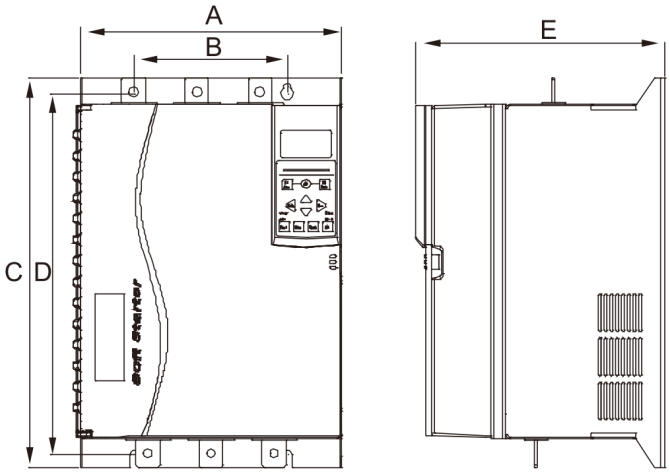


Fig 2 RWS-7000-75kW~110kW

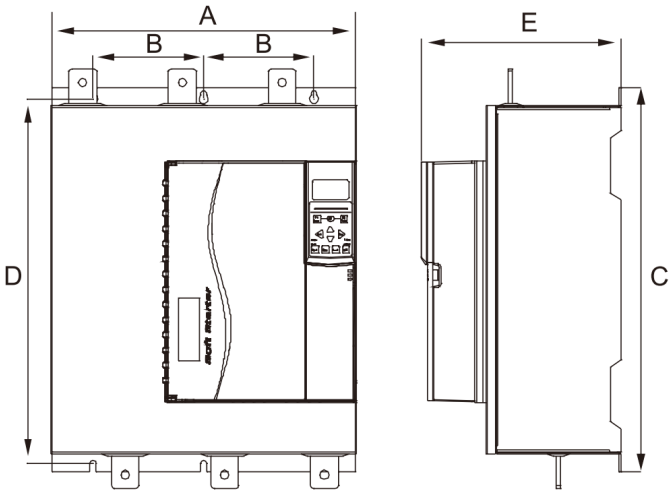


Fig 3 RWS-7000-132kW~400kW

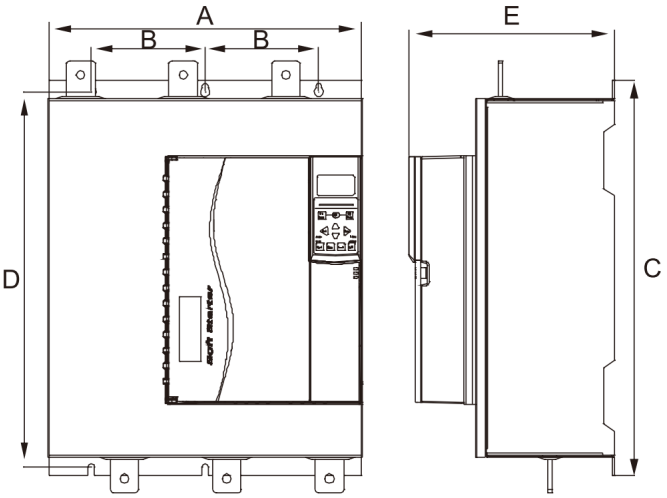


Fig 4 RWS-7000-450kW~800kW

Voltage	Rated Working Current	Rated Power	Display method	Number of parameters	Protection function type	Input Output Number of terminals	Overload capacity
380V	13A - 1600A	5.5kW - 800kW	Chinese (English) LCD	132 PCS	20 kinds	24 PCS	150%Ie, 35s
690V	13A - 1600A	5.5kW - 1200kW					

Specification model	Dimensions (mm)			Installation size (mm)			Outline
	A	C	E	B	D	d	
11kW - 55kW	152±0.3	292±0.3	217.5±1	92±0.3	275±0.3	M6	Fig1
75kW - 110kW	274±0.3	408±0.3	260±1	160±0.3	385±0.3	M8	Fig2
132kW - 400kW	455±2	556±0.3	290±1	160*2(320±0.3)	535±0.3	M8	Fig3
450kW - 800kW	615±2	823±0.3	397±1	200*2(400±0.3)	788±0.3	M12	Fig4

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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