

iSA3 SERIES

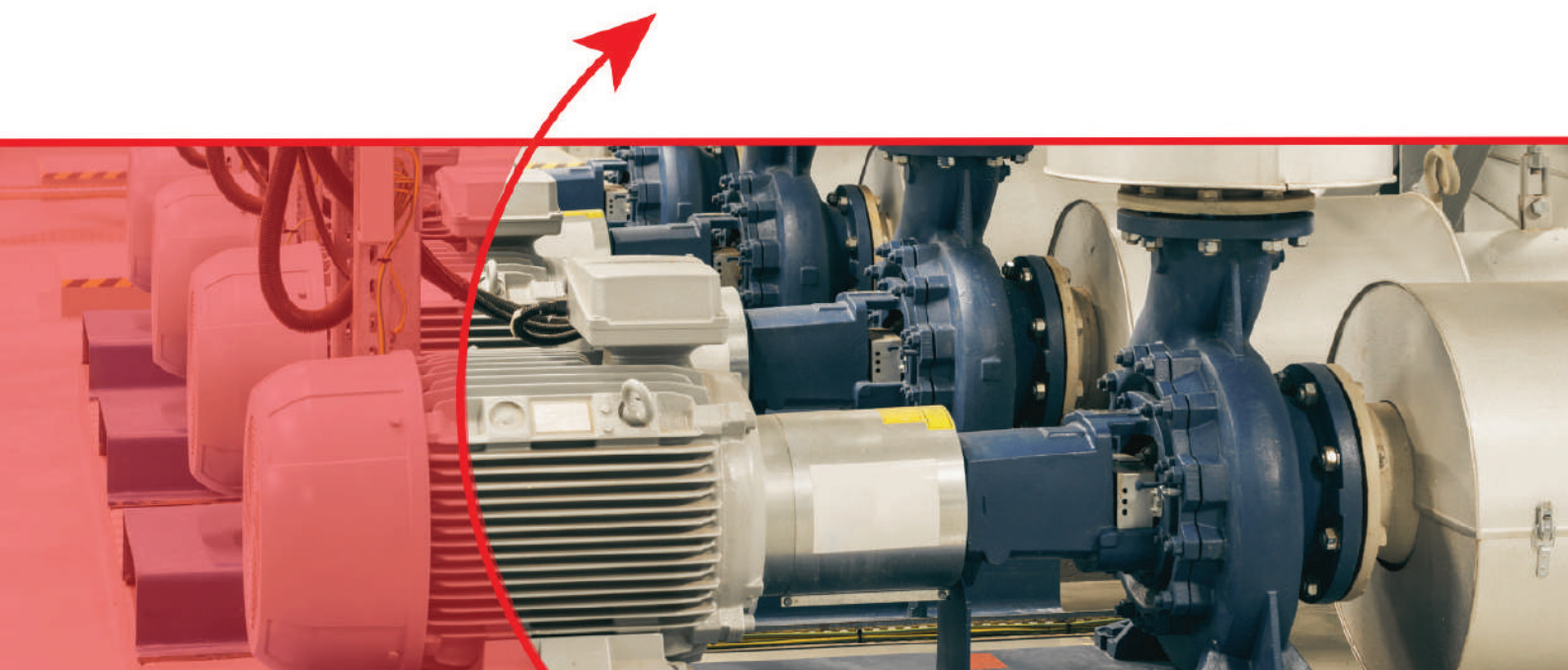
LOW VOLTAGE SOFTSTARTER

DESIGNED TO PERFORMANCE



INSTRUCTION MANUAL

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Product Features



- Start/stop slope and initial voltage set by 3 different built-in potentiometers.
- Bypass relay built-in, No need for extra contactor.
- Voltage slope with current limit mode.
- The output torque can be maintained during the stop process (Continuous torque control), prevents water hammering effect.
- External Δ or Internal Y Wiring mode.
- Real-time data of communication (A, B, C phase current, average current).
- Reading history fault records by communication (10 history log).
- The statistical data can be read by Modbus communication.
- Modbus Communication Interface.
- Start/stop Digital Input.
- Output relay (running relay, trip relay).
- Motor Protections:
 - Overcurrent Protection
 - Undercurrent Protection
 - Over Load Protection with classes 10A, 10, 20 and 30
 - Three phase current unbalance Protection
 - Max start time protection
 - Phase Missing/No voltage Protection
 - Phase Sequence Protection
 - SCR Overheating Protection

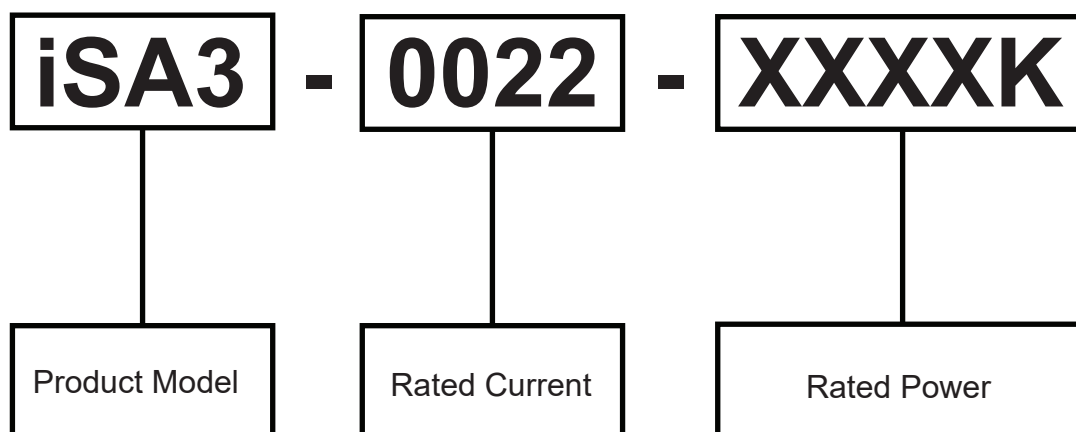
General Overview

iSA3 series soft starter is a full digital product. Suitable for squirrel-cage asynchronous motors:

Rated voltage: 400V Rated power: 1.1kW to 75KW

The iSA3 series soft starters provide smooth motor control during both acceleration and deceleration, enhancing efficiency and reducing mechanical stress. With 15 variants available to accommodate various motor power and current ratings, the iSA3 is equipped with comprehensive protection features, including overcurrent and overload protection, phase current imbalances, under voltage and phase loss detection, phase sequence monitoring, and SCR overheating prevention. This makes the iSA3 ideal for diverse applications requiring reliable motor performance and robust protection against common operational risks.

Product Descriptions



Model Descriptions

Model	Motor Power Rating 400V (kW)	Rated Current I _e A	Structure F	Weight KG
iSA3 – 0022–0011K	1.1	2.2	A	1
iSA3 – 0030–0015K	1.5	3	A	1
iSA3 – 0045–0022K	2.2	4.5	A	1
iSA3 – 0075–0037K	3.7	7.5	A	1
iSA3 – 0110–0055K	5.5	11	A	1
iSA3 – 0150–0075K	7.5	15	B	1.4
iSA3– 0220–0110K	11	22	B	1.4
iSA3 – 0300–0150K	15	30	C	2.4
iSA3 – 0370–0185K	18.5	37	C	2.4
iSA3 – 0450–0220K	22	45	C	2.4
iSA3 – 0600–0300K	30	60	C	2.4
iSA3 – 0750–0370K	37	75	C	2.4
iSA3 – 0900–0450K	45	90	D	5
iSA3 – 1100–0550K	55	110	D	5.2
iSA3 – 1500–0750K	75	150	D	5.2

Important Safety Instructions and Precautions



Caution

Users are reminded to exercise caution.



Warning

Risk of equipment damage if safety precautions are not followed.



Electrostatic Precautions

If not avoided could result in damaged to the equipment.



High Voltage Alert

Failure to observe this warning may cause equipment damage and pose risks of injury or death.



Electric Shock Risk

Warning: High voltage is present at the input and output terminals of the iSA3 series soft starter. The device may not function even when powered. Only qualified electricians should perform the installation. **Important:** Never work on the equipment while it is powered on. Electricians are responsible for ensuring proper earthing connections.

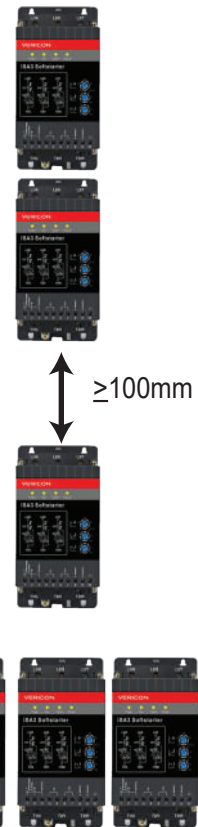


Power Factor Correction Notice

Do not connect the power factor correction capacitor to the output side of the iSA3 soft starter. Any compensation devices must be connected to the power supply side.

Mechanical Installation (Method of installation)

- We generally recommend installing the soft starter vertically, as this configuration promotes effective heat dissipation.
- When two or more soft starters are installed vertically in a stacked arrangement, there should be a minimum distance of 100 mm between them.
- When two or more soft starters are installed horizontally side by side, it is essential to maintain a minimum distance of 50 mm between each unit.



Installation Environment

Caution



1. Do not install the soft starter near the heat source.
2. Soft start must be reliably grounded and avoid dust or corrosive environment.
3. Working temperature under rating 0 °C to + 50 °C
4. Relative humidity is less than 95%

The rated loss power of the soft starter approximately about:

Power Dissipation $\approx 3 \times I_e$ (W)
 I_e - Motor Rated Current (A)
 Installed in a metal cabinet without ventilation
 Area (m²) > 0.12 x Power Dissipation

Wiring

Main circuit wiring for three-phase motor

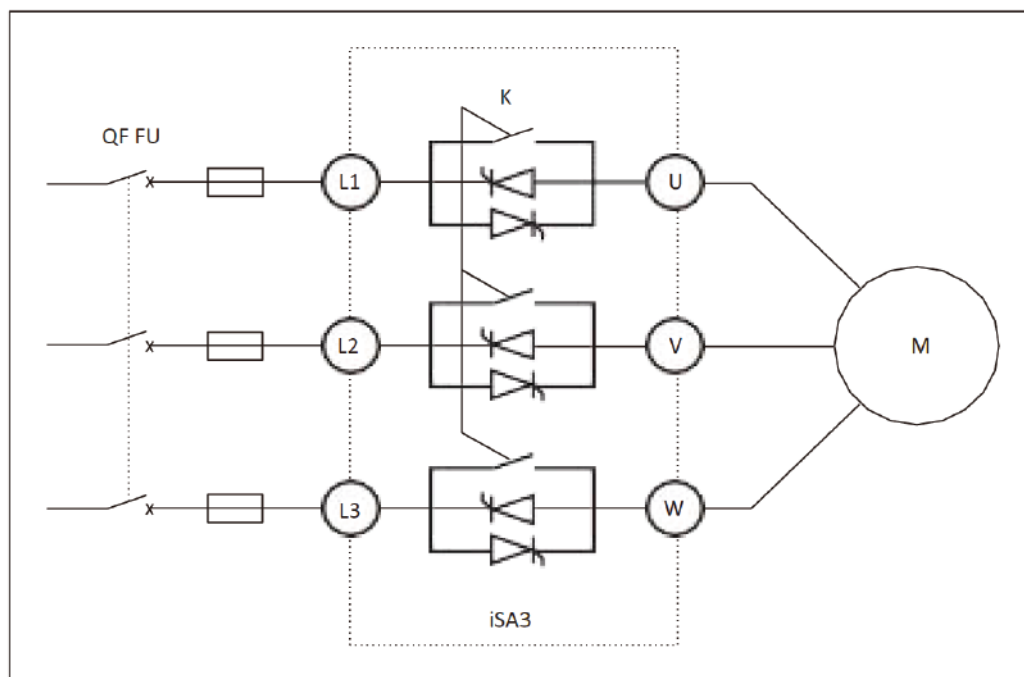


Diagram 1.1 iSA3 Main circuit wiring diagram

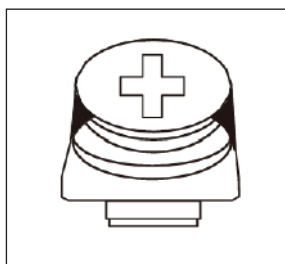


CAUTION

- QF Circuit breaker with a tripping device is recommended.
- K Built-in Bypass relay
- M Electric Motor
- Suggested that a circuit breaker with a tripping device is installed between input of the soft starter and the connection of the power source. The connection between the soft starter and the power source must be switch off before maintenance.
- Suggested to use flame retardant copper core PVC insulated wire to connect main circuit.

Wiring

Main circuit terminal



Main circuit terminal:

Recommended use: 6- 50mm² AWG: 10- 1/ 0

Recommended torque: 4N.m

Control Terminal

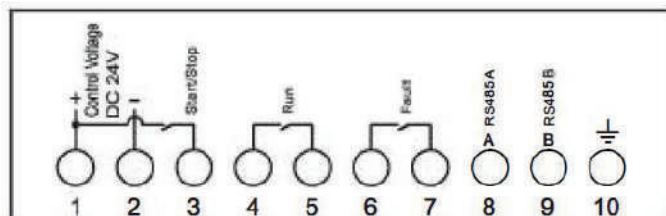


Diagram 2.1 Control terminal diagram

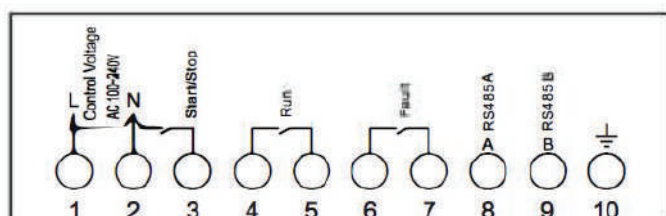


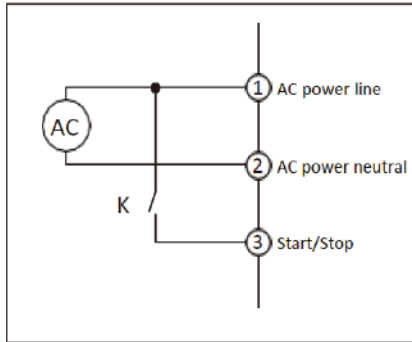
Diagram 2.2 Control terminal diagram

10 Input / Output Terminals

- ① Control power L or + input.
- ② Control power N or - input.
- ③ Start / Stop signal input. When terminal 3 is connected to terminal 1 the starter runs, When the terminal 3 and terminal 1 are disconnected, the stop softly until stop completely.
- ④ Running signal relay output. When the soft start is in start, bypass and soft stop state, relay operation is closed.
- ⑤ Running relay output common.
- ⑥ Fault relay output. When the soft start is in a fault state, the relay is closed.
- ⑦ Fault relay output common.
- ⑧ RS-485 bus A-LINE.
- ⑨ RS-485 bus B-LINE.
- ⑩ Earthing terminal.

Wiring

Control Power Supply And Control Input

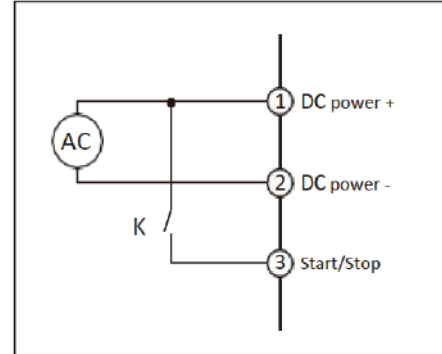


When using **100~240VAC** as a control power:

- ① Connect AC power line,
- ② Connect AC power neutral
- ③ Join the contact K between ① and ③,

Soft Starter runs when K is closed,
Soft Starter stops when K is disconnected;
If the control input cable too long or unseparated wiring with power supply, cause input signal with "induced voltage"

Please add a relay at the input, to avoid the "induced voltage" which leads to malfunction or damage of the soft starter.



When using **24VDC** as control power:

- ① Connect to DC+,
- ② Connect to DC-;
- ③ Join the contact K between ① and ③,

Soft Starter runs when K is closed,
Soft Starter stops when K is disconnected;
If the control input cable too long or unseparated wiring with power supply, cause input signal with "induced voltage"

Please add a relay at the input, to avoid the "induced voltage" which leads to malfunction or damage of the soft starter.

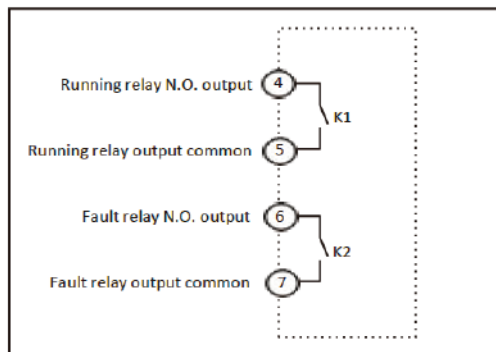


CAUTION

- The control power supply voltage must be matched the products, otherwise the input of the control voltage will exceed the range, which will lead to soft starter damage. When the control power supply is DC power, the positive and negative pole must be connected to the correct terminal.

Wiring

Relay Output



④ & ⑤ terminal for running relay output,

When iSA3 soft starter is on running (start / bypass / soft stop), K1 closes. ⑥ & ⑦ terminal is fault relay output,

When the iSA3 soft starter detects a fault, K2 closes. K1, K2 contact capacity 220VAC 5A.

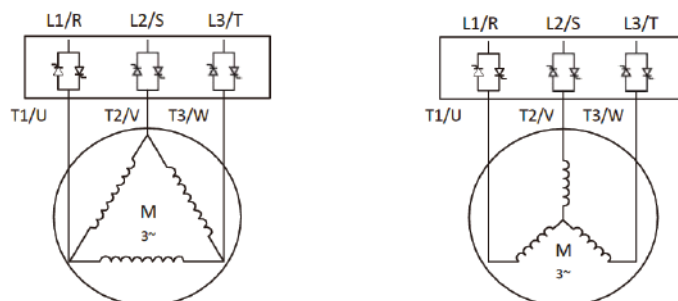


CAUTION

- In order to use the iSA3 soft starter safely, the fault relay K2 should be connected in the circuit of the control (release) of the circuit breaker between the power source and the iSA3 main power terminal. When the soft starter detects the fault, the K2 action can disconnect the power breaker at the same time.

Motor Connection And Terminals

Motor Connections



When using the external mode of iSA3, the iSA3 power module is connected between the power source and the motor.

Important: The motors with three terminals can only use the external wiring mode. The rated current of the soft starter in the external mode is selected according to the rated current of the motor.

Typical Wiring

iSA3 Soft Starter

Model	Motor Power Rating 400V (kW)	Rated Current I _e A	Structure F	Weight KG
iSA3 – 0022–0011K	1.1	2.2	A	1
iSA3 – 0030–0015K	1.5	3	A	1
iSA3 – 0045–0022K	2.2	4.5	A	1
iSA3 – 0075–0037K	3.7	7.5	A	1
iSA3 – 0110–0055K	5.5	11	A	1
iSA3 – 0150–0075K	7.5	15	B	1.4
iSA3– 0220–0110K	11	22	B	1.4
iSA3 – 0300–0150K	15	30	C	2.4
iSA3 – 0370–0185K	18.5	37	C	2.4
iSA3 – 0450–0220K	22	45	C	2.4
iSA3 – 0600–0300K	30	60	C	2.4
iSA3 – 0750–0370K	37	75	C	2.4
iSA3 – 0900–0450K	45	90	D	5
iSA3 – 1100–0550K	55	110	D	5.2
iSA3 – 1500–0750K	75	150	D	5.2

Typical Wiring

Fuse Table

Model	SCRI ² T(A ² S)	Fuse Value
iSA3 – 0022–0011K	150	10A
iSA3 – 0030–0015K	270	10A
iSA3 – 0045–0022K	610	16A
iSA3 – 0075–0037K	1700	25A
iSA3 – 0110–0055K	3630	32A
iSA3 – 0150–0075K	5000	40A
iSA3– 0220–0110K	7500	50A
iSA3 – 0300–0150K	10000	60A
iSA3 – 0370–0185K	11000	100A
iSA3 – 0450–0220K	12000	160A
iSA3 – 0600–0300K	15000	200A
iSA3 – 0750–0370K	18000	250A
iSA3 – 0900–0450K	40000	315A
iSA3 – 1100–0550K	60000	315A
iSA3 – 1500–0750K	100000	400A

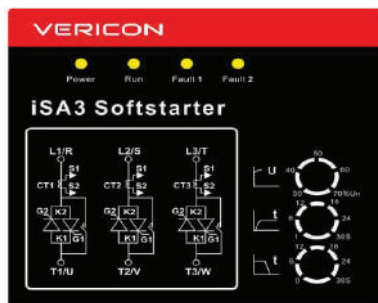


CAUTION

- Using semiconductor protection fuse can achieve 2nd standard and reduce the risk of power module damage caused by transient overload current
- 2nd standard: Under the condition of short circuit, the short circuit protection electric does not cause harm to the personal and installation equipment, and it can continue to be used.

Operation Interface Description

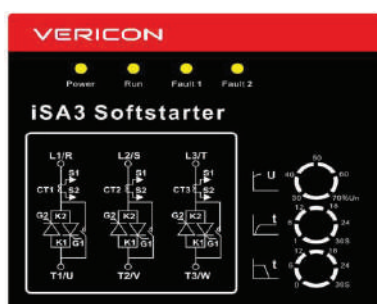
iSA3 Soft Starter Diagram



1. State display LED: Show the working state of the soft starter

	When the soft starter is power on, the power supply LED on.
Run (Yellow)	When soft starter (motor) is in soft start / soft stop state, running LED blink. When the soft starter (motor) stop, running LED off. When the soft starter (motor) is in bypass state, running LED on.
Fault 1 (Red)	When the soft starter is in fault state, fault LED blink or on. More details please check the page 18.
Fault 2 (Red)	

1. Potentiometer setting



Adjustable potentiometer

- Initial Voltage: Set Initial Voltage
- Start Time : Set acceleration time
- Stop Time : Set Deceleration time

Parameter Setting

The main starting / stopping parameters of iSA3 soft starter can be set by the panel potentiometer. Default parameters are preset at factory, users do not need to set them. Other parameters can be adjusted by RS485 communication e.g. bi-directional motor application. Phase sequence set to OFF.

Soft Starter Control And Application

Rated Main Voltage

The rated main voltage of iSA3 is 400VAC. For other voltage please consult factory.

Control Source Voltage

Code	Control Source Voltage
Standard	100~240VAC 50/60Hz
Optional	24VDC

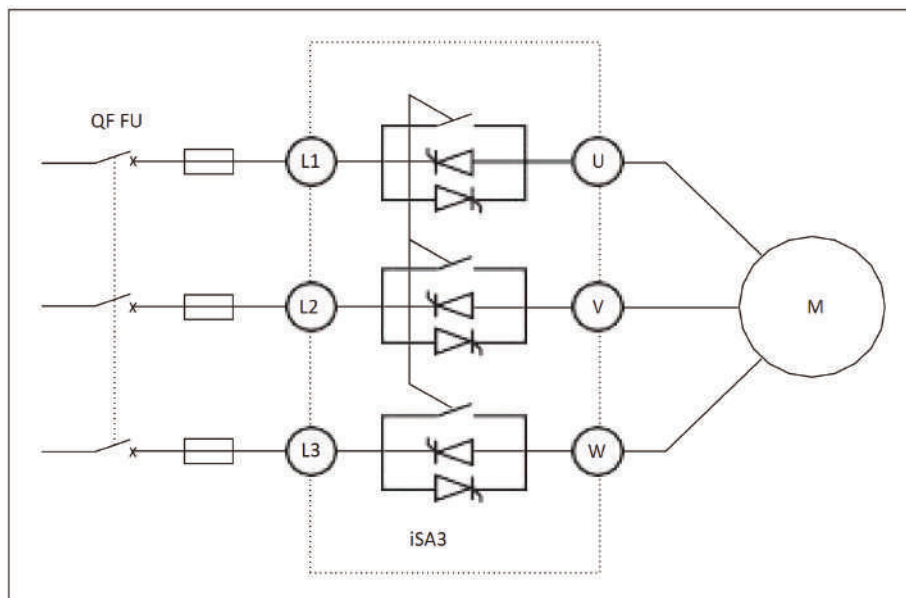


Diagram 3.1 internal control diagram

Options

Build In start/stop switch (Option 1)

The operation panel of soft starter can be equipped with start / stop switch, and users can use the switch to operate motor start / stop directly.

Model Selection

For example: Choose a 400V, 7.5KW soft starter with control source voltage of 230VAC

The type should be: iSA3-0150-0075K.

Model Specification

- **For normal loads**
 - The corresponding iSA3 soft starter models can be selected according to the rated current of motors marked on the motor nameplate, such as pumps, compressors, etc.
- **For heavy load (please consult VERICON Malaysia)**
 - iSA3 soft starter model of larger power size can be selected according to the rated current of motor nameplate, such as centrifuge, crushing machine, mixer, blender, etc.
- **Frequent start/stop (please consult VERICON Malaysia)**
 - For frequent starting/stopping loads. According to the rated current of the motor marked by the motor nameplate, choose a higher power size iSA3 soft starter.



CAUTION

When the ambient temperature is higher than 40 degrees, the current rating increases by 1 degree, and the current rating decreases by 0.8%.

- When altitude is above 1000m, decrease as below:

$$I_n = 100 - (1000/150)$$

- When the altitude is 2000m:

$$I_n = 100 - (2000 - 1000 / 150) = 93.3\%$$

The rated current capacity of soft starter should decrease to 93.3% of nominal current.

Parameter Description

Main parameter

Parameter	Setting Range	Default
FLC Full Load Current	0-150	Primary current of current transformer, factory setting.
FLA Full Load Current	0-150	Primary current of current transformer, according to rated current of soft starter factory setting.

Protection Parameters

Parameter	Setting Range	Default
Over Current protection Value	500-850%	500%. Factory setting
Over Current Trip Delay Time	0.1 ~ 1.0 sec	1 sec. Factory setting



CAUTION

iSA3 has two different levels of over current breaking protection.

- When the current is greater than 850% soft starter rated current (FLA), the soft starter will trip immediately. Fault relay (K2) tripped.
- When the output current is greater than the over current protection set value (the motor rated current FLA 500%-850%) the soft starter is delayed for a period of time ("over current action delay time" specified time) then trip, the fault relay (K2) tripped.

Parameter Description

Parameter	Setting Range	Default
Overload Protection	100 - 200%	110%. Factory setting
Overload Protection Class	0 - Class 10 A 1 - Class 10 2 - Class 20 3 - Class 30	0 - Class 10 A, Factory setting



CAUTION

Thermal protection of iSA3 motor:

It is recommended that users set overload protection to (level 10A),
When the setting less than "overload protection value", the soft starter detects overload protection.

Parameter	Setting Range	Default
Phase sequence protection	0 - OFF 1 - ON	1 - ON



CAUTION

More protections of iSA3:

- 1) Over temp protection. When the heat sink temperature is above 80 degrees, the soft start trip.
- 2) When the soft starter input terminal/output terminal missing phase, the soft start trip.
- 3) When the power module is short circuited, soft start tripped. 4) when the three-phase current of the soft starter is unbalanced (three-phase current difference > 20%FLA), soft starter trip.

Parameter Description

Start / Stop parameters

Parameter	Setting Range	Default
Starting time	1-30 Sec	Panel potentiometer setting



CAUTION

- The starting time is set through the panel or the communication

Parameter	Setting Range	Default
Stopping time	0-30 Sec	Panel potentiometer setting



CAUTION

- The stopping time is set through the panel or the communication.

Parameter	Setting Range	Default
Initial Volatage	30 - 70%	Panel potentiometer setting

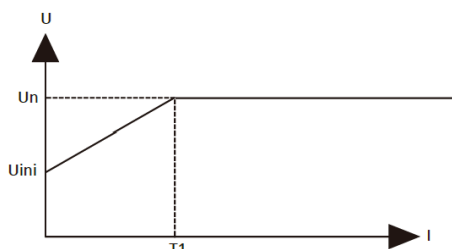


CAUTION

- The initial voltage is set via the panel or communication.
- When the initial turn Moment = initial voltage 2×TN (T N: rated torque)

Parameter Description

Voltage slope starting mode



U_n : Rated voltage

U_{ini} : Initial voltage $T1$: Acceleration time

At a predetermined acceleration time ($T1$), the output voltage of the soft starter rises from the voltage to the full voltage (rated voltage U_n).



CAUTION

The motor can't start (Locked-Rotor) if the voltage is too low. It is suggested that set initial voltage from high to low or use the Recommended setting.

Relay parameters

Parameter	Setting Range	Default
Bypass relay type	0 – Electric self-holding relay 1 – Magnet self-holding relay	Depending on the specific model. Factory setting



CAUTION

The type of bypass relay is not allowed to be changed !

Communication parameters

Parameter	Setting Range	Default
Slave machines address	1 – 127	Factory setting

Parameter	Setting Range	Default
Baud rate	0- 1200BPS 1- 2400BPS 2- 4800BPS 3- 9600BPS 4- 19200BPS	3 - 9600BPS Factory setting

Parameter	Setting Range	Default
Parity check	0-ECC 1-ODD 2-None	0-ECC



CAUTION

After setting up the communication parameters must restart the iSA3 soft starter. Incorrect settings cause communicate fault, it could cause cannot setting again. iSA3 cannot restore the default parameter, so please be careful when setting communication parameters

Troubleshooting

Fault list

Fault	Fault Reason	Not Working	Start/Stop Process	Bypass
Phase sequence trip	The sequence of three phase voltage is wrong	✗	✓	✓
Missing phase trip	Missing one phase or two-phase voltage in three phase voltage	✗	✓	✓
No voltage trip	NO voltage input	✗	✓	✓
Over current trip	Current value exceeding over current setting value	✓	✓	✓
Overload trip	Current value exceeds overloading set value	✗	✗	✓
Unbalanced current trip	The unbalanced three-phase current is larger than the unbalanced current setting value	✓	✓	✓
Over temp trip	The temperature of the heatsink is higher than the temperature setting value	✓	✓	✓
Under current trip	Current value lower than under current set value during bypass	✗	✗	✓
Max start time trip	The time of starting process exceeds the max start time value	✗	✓	✗

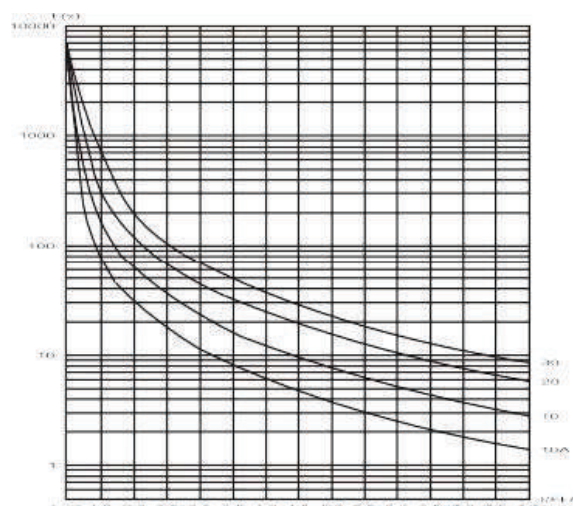
Note: ✗ -> Not Working ✓ -> Working

1. The frequency protection is built-in, iSA3 can work with 50/60HZ voltage.
2. The single-phase soft starter has no unbalanced current trip, but have no voltage trip

Electronic overload and tripping curve

A Class 30; B Class 20

C Class 10; D Class 10A



Troubleshooting

Fault Solutions

Fault	Fault 1	Fault 2	Fault Reason	Solution
Phase sequence trip	☐	○	The sequence of three phase voltage is wrong	Change the sequence of three phase
Missing phase trip/No voltage trip	○	☐	Missing one phase or two-phase voltage in three phase voltage /NO voltage input	The connection between the soft start and the main power supply is open
Over current trip	○	●	Current value exceeding over current setting value	Check whether the connection between soft start and motor is short circuited
Over load trip	●	○	Current value exceeds overloading set value	Check whether the load is too large or whether the selection of soft starter power is too small
Unbalanced current trip	●	☐	The unbalanced three-phase current is larger than the unbalanced current setting value	Check the winding of the motor and the connection between soft starter and motor
Over temp trip	☐	●	The temperature of the heatsink is higher than the temperature setting value	Check whether the connection between soft start and motor is short circuited. Check whether the load is too large or whether the selection of soft starter power is too small
Under current trip	●	●	Current value lower than under current set value during bypass	Check whether the load is too small like pump dry burning
Max start time trip	☐	☐	The time of starting process exceeds the max start time value	Check whether the parameters is reasonable, the load is too large or whether the selection of soft starter power is too small

☐ Blink; ● On; ○ OFF

Overload Time

$$\text{Overload trip time} = \frac{1375000}{I\%^2 - 110^2} \times \frac{T_x}{6}$$

Among:

I% is the ratio of the actual current to the rated current

Tolerance time of T * 500% overload current (X=5)

Minimum overload tolerance time

Overload Class	Minimum Overload Tolerance Time						
	X=8	X=7	X=6	X=5	X=4	X=3	X=2
10A	1.6	2	3	4	6	12	26
10	3	4	6	8	13	23	52
20	6	6	9	12	19	35	78
30	7	9	13	19	29	52	112

Parameter setting list

Parameter	Setting Range	Default
FLC Soft starter full load current	1-150A	Factory setting
FLA Motor full load current	1-150A	According to soft starter name plate
Over current protection value	500% – 850% FLA	500% FLA
Over current trip delay time	0. 5... 1Sec	1 Sec.
Overload protection value	100- 200 FLA	115% FLA
Overload protection Class	0 - Class 10A 1 - Class 10 2 - Class 20 3 - Class 30	0 - Class 10A
Phase sequence protection	0- OFF 1- ON	1- ON
Starting time	1- 30 Sec.	Panel potentiometer setting
Stopping time	0. 5... 10 Sec.	Panel potentiometer setting
Initial voltage	10... 50% FLA	Panel potentiometer setting

Parameter	Setting Range	Default
Bypass relay type	0-Electric self-holding relay 1-Magnet self-holding relay	Depending on the specific model
Slave machines address	1-127	1
Baud rate	0-1200BPS 1-2400BPS 2-4800BPS 3-9600BPS 4-19200BPS	3-9600BPS
Parity check	0 - ECC 1 - ODD 2 - None	0-ECC
Current limit value	00~500%FLA	350%FLA
Max start time	5~35Sec	30Sec

Common load and parameter setting

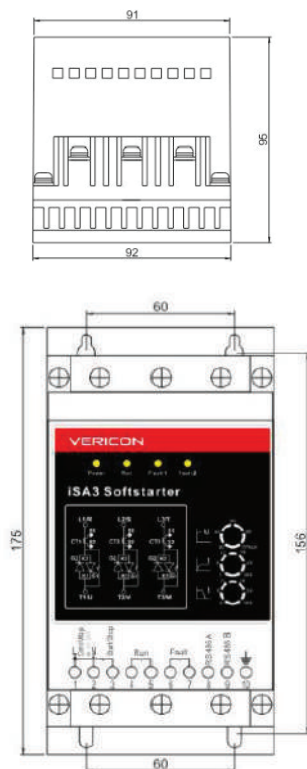
Ramp starting mode

Load	Start Time	Stop Time	Initial Voltage
Boat propeller	15	0	45%
Centrifugal fan	15	0	45%
Centrifugal pump	15	5	45%
Piston compressor	15	0	45%
Rotary converter	15	0	45%
Mixer	20	0	45%
Crusher	20	0	45%
Spiral air compressor	15	0	45%
No-load motor	15	0	45%
Band conveyor	15	0	45%
Hot water pump	15	5	45%
Air pump	15	0	45%

Mechanical Installation

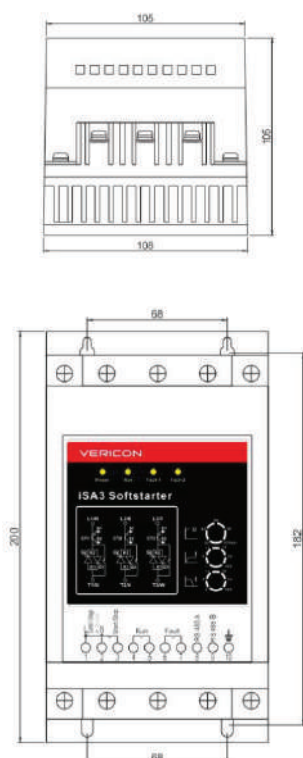
iSA3 1.5 ~ 11A

Model A



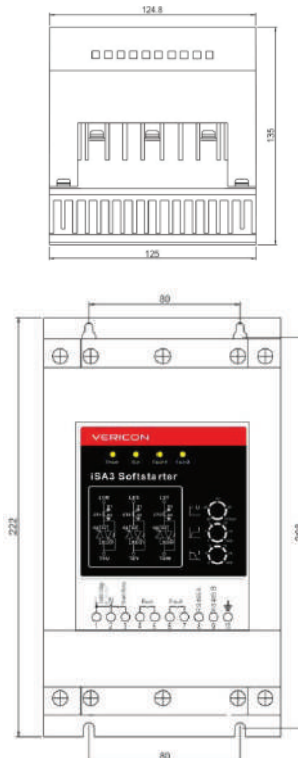
iSA3 15 ~ 22A

Model B



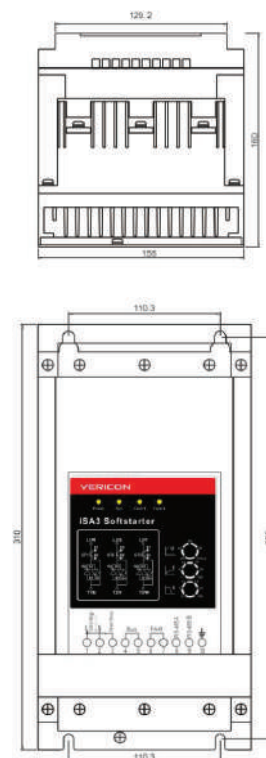
iSA3 30 ~ 75A

Model C



iSA3 90 ~ 150A

Model D



Model

Frame Size

Width

Height

Depth

Model

mm

mm

mm

iSA3 – 0022–0011K
iSA3 – 0030–0015K
iSA3 – 0045–0022K
iSA3 – 0075–0037K
iSA3 – 0110–0055K
iSA3 – 0150–0075K
iSA3– 0220–0110K
iSA3 – 0300–0150K
iSA3 – 0370–0185K
iSA3 – 0450–0220K
iSA3 – 0600–0300K
iSA3 – 0750–0370K
iSA3 – 0900–0450K
iSA3 – 1100–0550K
iSA3 – 1500–0750K

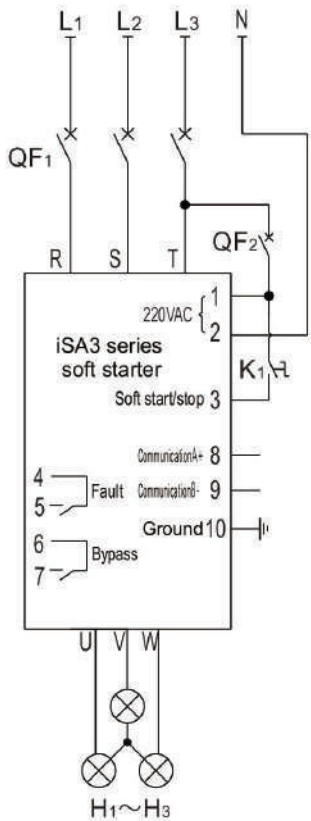
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Wiring Connection



Dear customer:

After receiving the products sent by our company, please do not install and run directly. First, it should make a simple test according to the wiring drawings of experimental methods and steps provided by our company. After ensuring the operation of the soft starter, the wiring of the cabinet and motor correct. Then the test of whole system can be carried out.

Test steps:

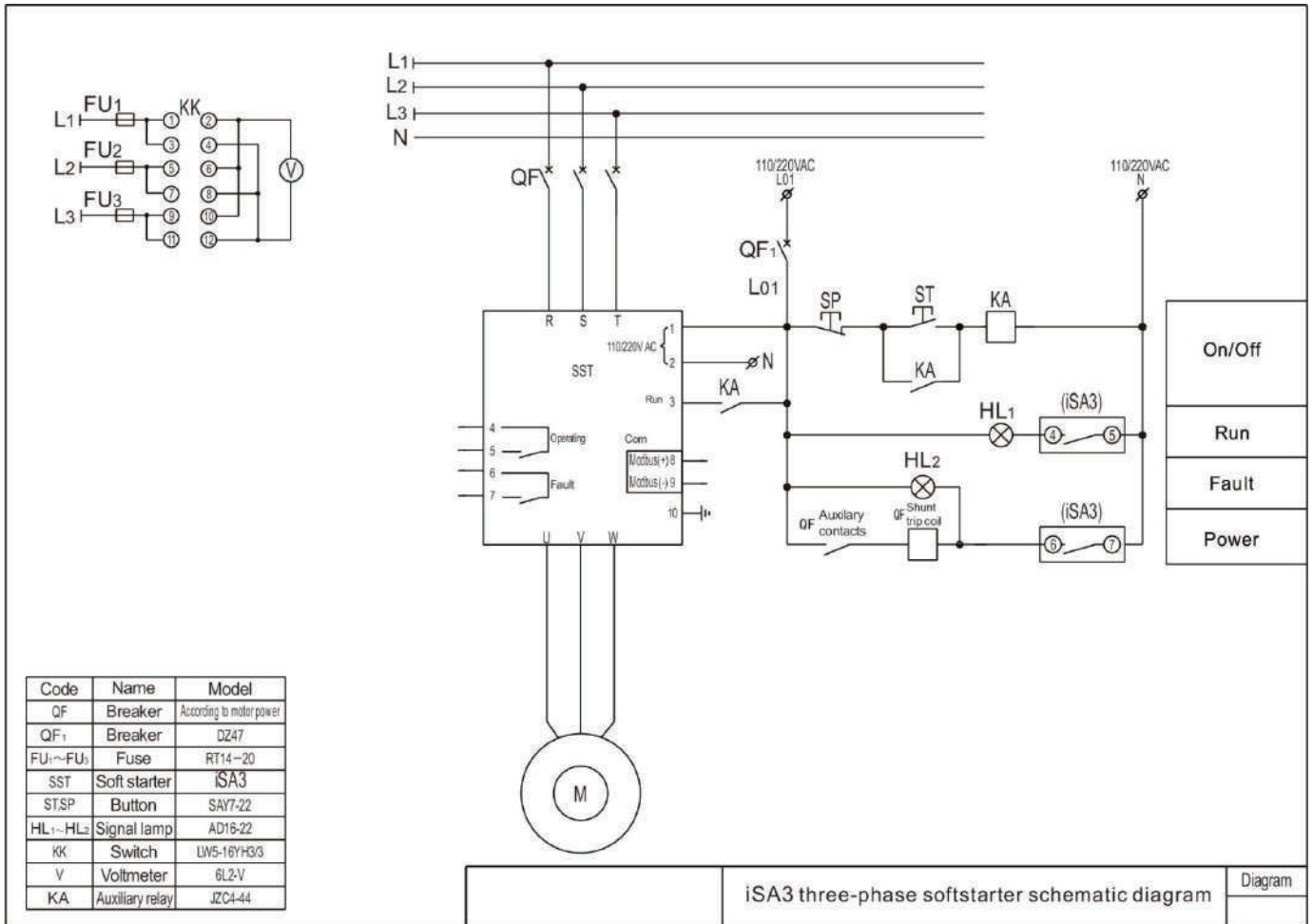
1. Connect 3 200W/220V lamps (H1~H3) with Y connection then connect to the output of the soft starter U, V and W, and also can test by connect the small motor.
2. Close the QF1, connect the 380V AC to R, S and T of the soft starter's input terminal
3. Close the QF2 to make the 220V control power connect to the control terminals 1 and 2 of the soft starter.
4. Soft start: closed knob switch K1 (connect terminal 1, 3), bulb slowly lighten up. After the bulb is bright up, the bypass KM closes the soft start process.
5. Soft stop: disconnect K1 (disconnect terminal 1, 3), bypass KM disconnect, bulb slowly extinguish, after bulb is completely off, soft stop process is completed.

*If the above experimental steps can not be carried out normally, we can preliminarily judge that the soft starter has been damaged. For more details, please contact the technical service department.

Basic parameter setting	
Overload Trip	10
Start	8~12S
Stop	2~4S
UINI	50%

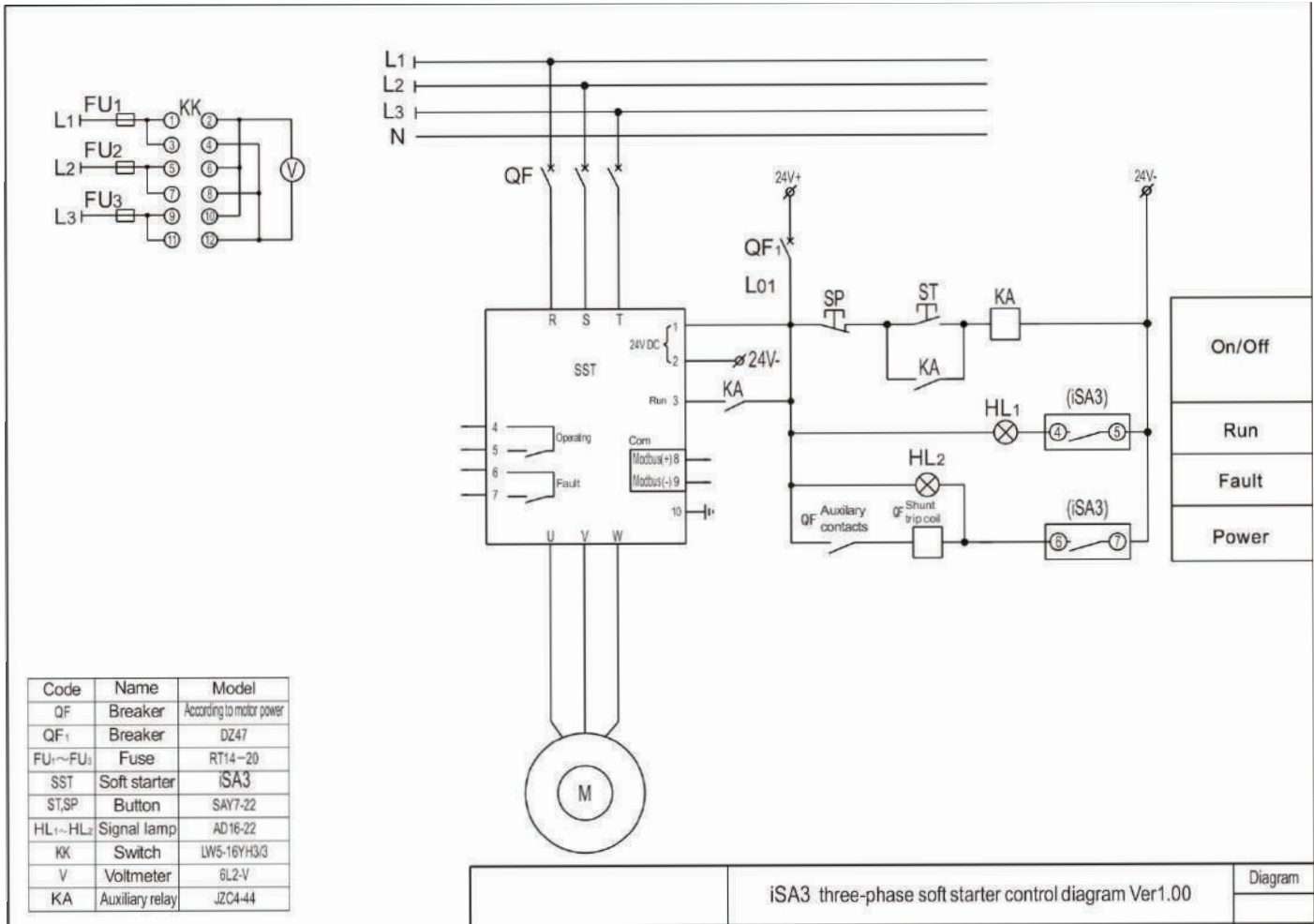
Wiring Connection

Control Voltage: 110 – 240VAC



Wiring Connection

Control Voltage: 110 – 240VAC



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