

Install & maintenance manual

EDR series Soft Starter



CATALOG

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Caution

Remind user caution information.



Warning

If not avoided, could result in damaged to the equipment.



Avoid electrostatic

Warning. It is forbidden to touch the PCB with the mark. Electrostatic charges could damage the components of soft starter.



High voltage warning

If not avoided, could result in damaged to the equipment and possible injury or death.

Safety & Warning

warning- Indicates a risk of electric shock.



High voltage are presents at the input and output terminals of ESR-S series soft starter, even not work when connect power supply. Only qualified electricians are allowed to install this products.



Do not carry out any work on the soft starter while the power is applied.

The installation electricians have the responsibility to ensure correct earthing connection. Do not connect the power factor correction capacitor to the output side of the ESR-S soft starter. If the static power factor compensation measures are to be taken, The related devices must be connected to the power supply side of the soft starter.

General

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

Rated voltage: 220V-480V;

Rated power: 0.37-5.5KW/220V 0.75-11KW/400V 1.1-15KW/480V

The device features a compact structure and is easy to install, Which can be installed horizontally side-by-side with other units. Saving space in control cabinets

The starter is designed for the following simple applications:

- Conveyor belt ●Pump ●Fan ●Compressor
- Automatic door ●Small crane ●Belt-driven equipment

Function

- Smooth motor acceleration and deceleration
- Torque limiter for asynchronous motors
- Improve the starting performance and prevent mechanical shock
- Built-in bypass to reduce the labor and material costs
- Boost function can be used to start heavy load under high mechanical friction
- Limit inrush current during motor startup
- Avoid excessive maintenance, and unplanned downtime

Description

The EDR series soft starter is equipped with

A Potentiometer ① to adjust acceleration time

A Potentiometer ② to adjust initial voltage

A Potentiometer ③ to adjust deceleration time

A Green LED ④ to indicate power on

A Yellow LED ⑤ to indicate full voltage

Control terminal (8 pin)

- 2 Input logic points, (6&5,6&4) for Run/Stop instruction

-1 Input logic point, (6&7) for activating Boost function

-1 Active output logic points(6&8) to indicate full voltage (24VDC 20mA)

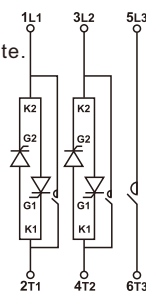
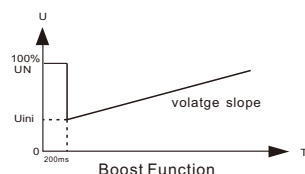
-1 Passive relay output(1&2) closed during soft starting/stopping and bypass

Two Phase are equipped with bypass relays

One Phase main circuit relay to ensure no voltage output in stopped state.

(improving operational safety)

*Optional Panel start/stop Switch

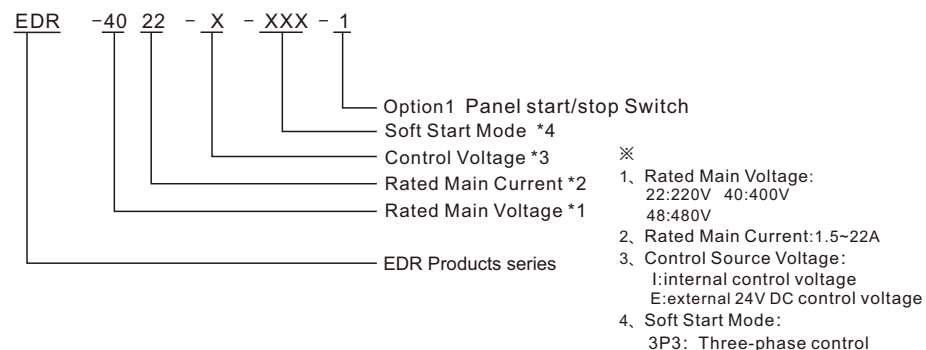


Model description

Technical parameters

- Rated Main Voltage: 220-480V AC 50/60Hz
- Control Voltage: 24VDC (external model)
None (Internal model)
- Rated Main Current: : 1.5A.....22A;
- Initial voltage: 30~80%
- Start slope: 1~10 Sec
- Stop slope: 1~10 Sec
- Overload: 3xle 7 Sec,
Valid for 50 % on time and 50 % off time.
- Times of start per hour:
<5, 5-10 (light load or no-load)
- Operation Environmental temperature: -10~+40°C;
- Store temperature: -25~+70°C;
- Maximum altitude: ≤1000m;
- Ingress Protection grade: IP20;

Model description



Rated main current

Table1 Internal control voltage model parameters

Model	Motor rated power	Current	Structure	Weight
	400V Pe/kW	Ie A	F	kg
EDR-XX 1T5-I-3P3	0.75	1.5	A	0.53
EDR-XX 2T2-I-3P3	1.1	2.2	A	0.53
EDR-XX 03-I-3P3	1.5	3	A	0.53
EDR-XX 4T5-I-3P3	2.2	4.5	A	0.53
EDR-XX 7T5-I-3P3	3.7	7.5	A	0.53
EDR-XX 11-I-3P3	5.5	11	A	0.53
EDR-XX 15-I-3P3	7.5	15	B	0.65
EDR-XX 22-I-3P3	11	22	B	0.65

※: 1T5 means 1.5A, 4T5 means 4.5A, 7T5 means 7.5A in rated current.

Fuse table & Selection

Rated Main Current

Table2 External 24VDC control voltage model parameters

Model	Motor rated power			Current	Structure	Weight
	220V Pe/kW	400V Pe/kW	480V Pe/kW	Ie A	F	kg
EDR - XX 1T5-E-3P3	0.37	0.75	1.1	1.5	A	0.4
EDR - XX 2T2-E-3P3	0.55	1.1	1.5	2.2	A	0.4
EDR - XX 03-E-3P3	0.75	1.5	2.2	3	A	0.4
EDR - XX 4T5-E-3P3	1.1	2.2	3.7	4.5	A	0.4
EDR - XX 7T5-E-3P3	1.5	3.7	5.5	7.5	A	0.4
EDR - XX 11-E-3P3	2.2	5.5	7.5	11	A	0.4
EDR - XX 15-E-3P3	3.7	7.5	11	15	B	0.52
EDR - XX 22-E-3P3	5.5	11	15	22	B	0.52

Fuse table



Model	SCR ¹ T(A ² S)	Fuse Value
EDR - XX 1T5-X-3P3	70	5A
EDR - XX 2T2-X-3P3	150	10A
EDR - XX 03-X-3P3	270	10A
EDR - XX 4T5-X-3P3	610	16A
EDR - XX 7T5-X-3P3	1700	25A
EDR - XX 11-X-3P3	3630	32A
EDR - XX 15-X-3P3	6750	32A
EDR - XX 22-X-3P3	14250	50A

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.

Model selection

For example : Choose a 400V, 7.5KW soft starter with internal control voltage

The type should be : EDR- 4015-I-3P3

If choose a 400V, 7.5KW soft starter with external control voltage DC24V

The type should be : EDR- 4015-E-3P3

Fuse table & Selection

Model selection specification

1) For ordinary loads

The corresponding EDR soft starter models can be selected according to the rated current of motors marked on the motor nameplate, such as pumps, compressors, etc.

2) For heavy loads

EDR 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

For frequent starting loads, according to the rated current of the motor marked by the motor nameplate, we choose a higher power size EDR soft starter .

◆ Caution :

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

2) When altitude is above 1000m, decrease as below:

$$I_n = 100 - \frac{x-1000}{150}$$

When the altitude is 2000m:

$$I_n = 100 - \frac{2000-1000}{150} = 93.3\%$$

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

Control circuit wiring

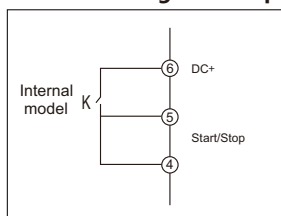
Control terminal diagram



8 input / output terminals:

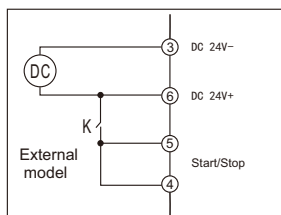
- ① Running signal relay output
When the soft start is in start, bypass and soft stop state, relay operation is closed
- ② Running signal relay output
- ③ Reserved with Internal model
DC24V- input with external model
- ④ Stop signal input-Soft stop when the terminal ④ and terminal ⑥ are disconnected
- ⑤ Start signal input-Soft start when the terminal ⑤ and terminal ⑥ are connected
- ⑥ Common terminal of ④/⑤/⑦. As DC24+ with external model
- ⑦ Boost input-Function is active when the terminal ⑦ and terminal ⑥ are connected
- ⑧ Full voltage signal output- Connect with terminal ⑥ after full voltage
(Active: Voltage 24VDC Current 20mA)

Control voltage and input



Internal model:

The point K is connected between terminal ④ ⑤&⑥.
Soft start when K is closed. Soft stop 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, so as to avoid the " induced voltage " which leads to malfunction or damage of the soft starter.



External mode:

Terminal ⑥ Connect with DC 24V+, ③ Connect with DC 24V-
The point K is connected between terminal ④ ⑤&⑥.
Soft start when K is closed. Soft stop 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, so as to avoid the " induced voltage " which leads to malfunction or damage of the soft starter.

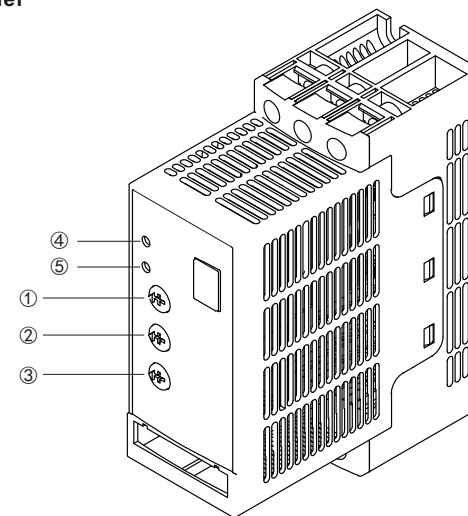
Caution



- 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.

Operation panel description

EDR Operation panel



1)Status indicator LED

④Power (Green)	Green LED on when soft starter energized
⑤Bypass (Yellow)	Yellow LED on when switching to bypass state

2)Potentiometer setting

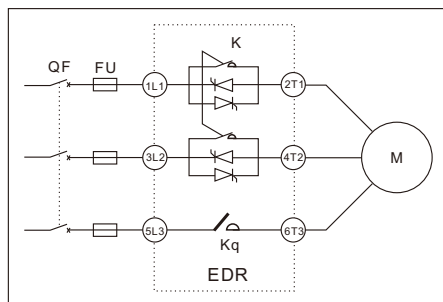
Adjustable potentiometer

- ① Start Slope - Set acceleration time
- ② Initial voltage - Set initial voltage
- ③ Stop Slope - Set deceleration time

Main circuit wiring

Wiring for three-phase motor

EDR- XXXX-X-3P3 Main circuit wiring diagram (3P3 soft starter)



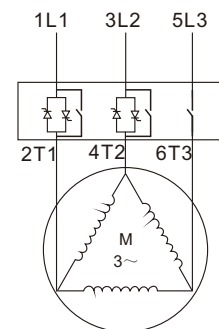
Caution



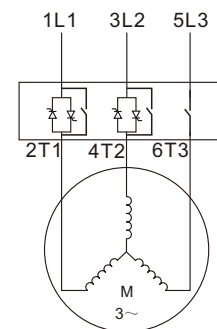
- QF Circuit breaker - A circuit breaker with a tripping device is recommended.
- FU Fuse recommended installation, selection of fuses based on SCR
More detail in the appendix on page 5.
- K Built-in bypass relay.
- M Motor.

Typical wiring

Delta connection



Star connection



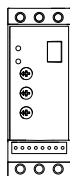
Parameter

EDR Parameter list

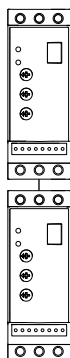
Parameter	Setting range	Note
Rated current	1.5-22A	User-defined
Rated voltage	220-480V(-E) 400V(-I)	User-defined
Control voltage mode	I-Internal control voltage E- External 24V DC control voltage	User-defined
Mounting type	DIN rail mounting	
IP grade	IP20	
Pollution degree	Degree 2	
Shock resistance	3 to 13 Hz: Peak-to-peak amplitude of 1.5 mm, 13 to 150 Hz: 1gn	
Impact resistance	15 gn for 11 ms	
Relative humidity	5~95%.	
Storage & Operation temperature	Storage: -25~ +70°C Operation: -10~ +40°C	The rated current derates by 2% for 1°C increased
Operation height	No derating under 1000m	Derating by 2. 2% for 100m increased
Vertical installation	Permanent angle deviation $\pm 10^\circ$	
Initial voltage	30~80%Ue	Panel setting
Start slope	1~10 Sec.	Panel setting
Stop slope	0~10 Sec	Panel setting
Frequency	50-5% 60+5%Hz	

Installation

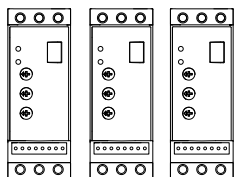
Mechanical installation (The method of installation)



Usually we suggest that the soft starter should be installed vertically, which is good for heat dissipation.



When two or more than two soft starters are installed vertically stacked, the distance between soft starters is no less than 100mm.



When two or more than two soft starters are installed horizontally side by side, the distance between soft starters is not less than 50mm.

Installation environment



Caution

- Do not install the soft starter near the heat source.
- Soft start must be reliably grounded, and avoid dust or corrosive environment.
- Working temperature under rating 0 °C to + 40 °C (32 °F to 104 °F)
- Relative humidity is less than 95%;

Installation environment

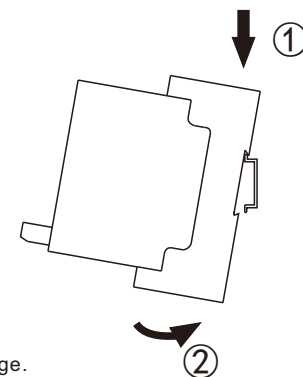
The rated loss power of the soft starter approximately about

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

Din-rail mounting

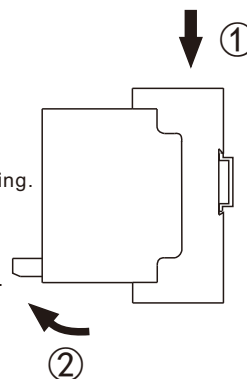
Din-rail installation

- 1.Position the soft starter over the mounting rail, ensuring they are parallel and aligned.
- 2.Gently press downward (follow arrow ①) until the starter's base engages with the rail's initial slot.
- 3.Rotate the soft starter (follow arrow ②) until you hear a "click" or feel it securely lock into place.
- 4.Lightly tug the starter to confirm it is stable and won't dislodge.



Din-rail removal

- 1.Press the top of the device downward (follow Arrow ①) to release the locking.
- Tip: If the latch is tight, gently wiggle the device to assist unlocking.
- 2.Hold the top of soft starter, then pull diagonally along Arrow ② (downward-left) to remove the device from its mounting position.

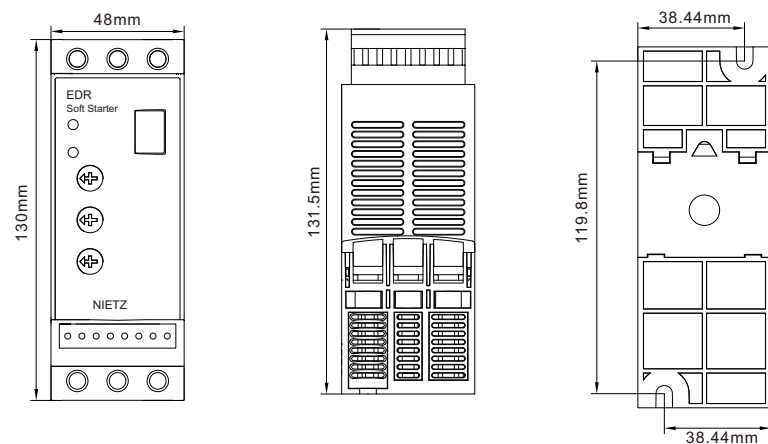


Notes

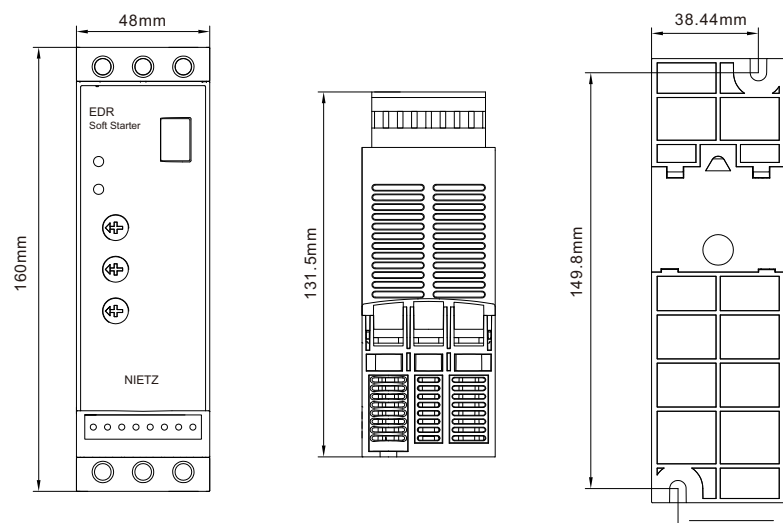
Ensure the device is disconnected from power and all before removal.
Avoid excessive force to prevent damage to the rail or locking mechanism.
Ensure the rail is mounted horizontally in the panel/enclosure, free of obstructions.

Dimensions

Frame A ESR 1.5A~11A



Frame B EDR 15A~22A



Appendix

Maximum connection capacity and fastening torque table

Model	EDR 1.5-11A	EDR 15-22A
Main circuit	φ4mm Screw clamp	φ4mm Screw clamp
Flexible wire (No terminal lugs)	1. 5-6mm ²	6-10mm ²
Flexible wire (With terminal lugs)	1-6mm ²	5-10mm ²
Hard wire	1-6mm ²	5-10mm ²
Tightening torque	0. 8N.m	1.9~2.5N.m
Control circuit	Screw terminal	Screw terminal
Flexible wire (No terminal lugs)	0. 5-2. 5mm ²	0. 5-2. 5mm ²
Flexible wire (With terminal lugs)	0. 5-2. 5mm ²	0. 5-2. 5mm ²
Hard wire	0. 5-2. 5mm ²	0. 5-2. 5mm ²
Tightening torque	0. 5N.m	0. 5N.m

Common load and parameter setting

1) Voltage slope

Load	Acceleration time	Deceleration time	Initial voltage
Boat propeller	10	0	30%
Centrifugal fan	10	0	30%
Centrifugal pump	10	5	30%
Piston compressor	10	0	50%
Hoist	10	0	60%
Rotary converter	10	0	30%
Mixer	10	0	60%
Crusher	10	0	50%
Spiral air compressor	10	0	40%
No-load motor	10	0	30%
Band conveyor	10	0	40%
Hot water pump	10	5	30%
Air pump	10	0	30%

Test Guidance(External model)

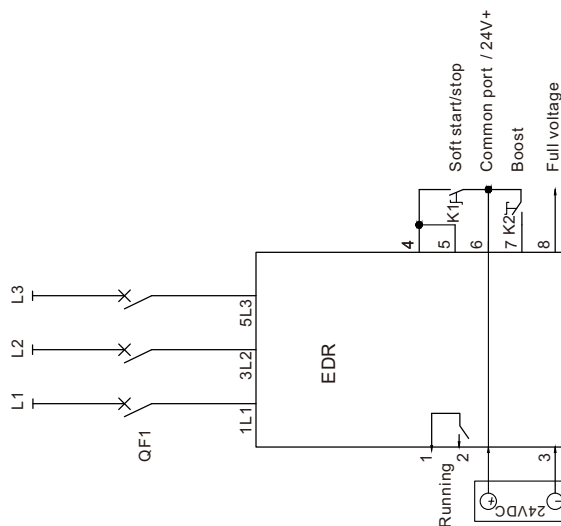
Dear Customer:

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 for external DC 24V model:

1. Connect three 200W/220V incandescent lamps (H1-H3) in a Y-configuration to the soft starter output terminals (U, V, W).
Alternative: A small motor may also be used for testing.
2. Close QF1 to apply 380V main power to the soft starter input terminals (L1, L2, L3). Connect the externally supplied DC24V to control terminals 6 (+) and 3 (-) with correct polarity.
3. The K2 rotary switch controls the Boost function:
Closed (ON): Enable Boost function.
Open (OFF): Disable Boost function.
4. Soft Start Process
Close the rotary switch K1: Lamps will illuminate gradually.
After full brightness is achieved, the internal bypass relay close, completing the soft start process.
Terminal 8 (24V+) activates, forming a full-voltage signal output with terminal 6 (24V+), which may drive a DC24V "full voltage" indicator.
5. Soft Stop Process
Open the rotary switch K1:
The internal bypass relay open, and lamps dim gradually.
After complete extinguishment, the main circuit relay opens, finalizing the soft stop.

If the above steps fail, the soft starter may be defective.
For detailed issues, contact the Technical Service Department.



Parameters setting		
Start slope	Start	5~10 S
Stop slope	Stop	2~4 S
Initial voltage	U _{ini}	50%

Test Guidance(Internal model)

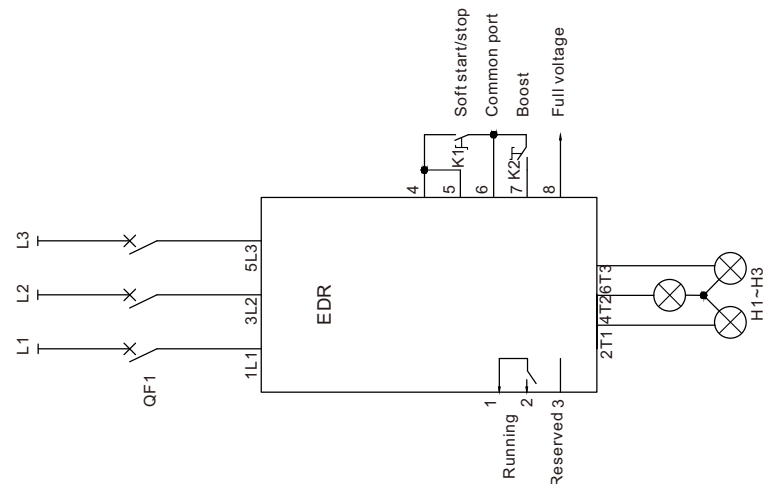
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Test steps for Internal model:

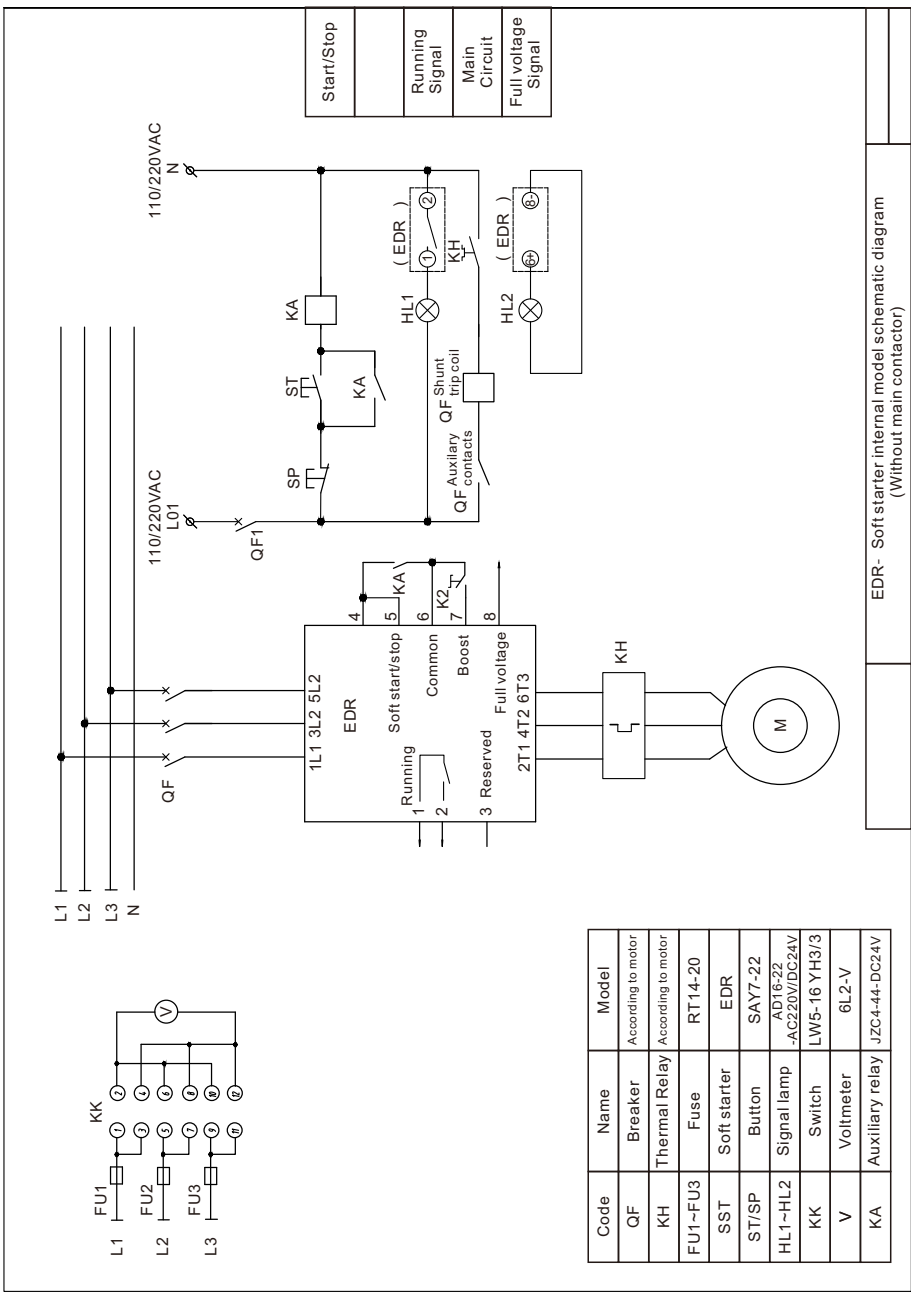
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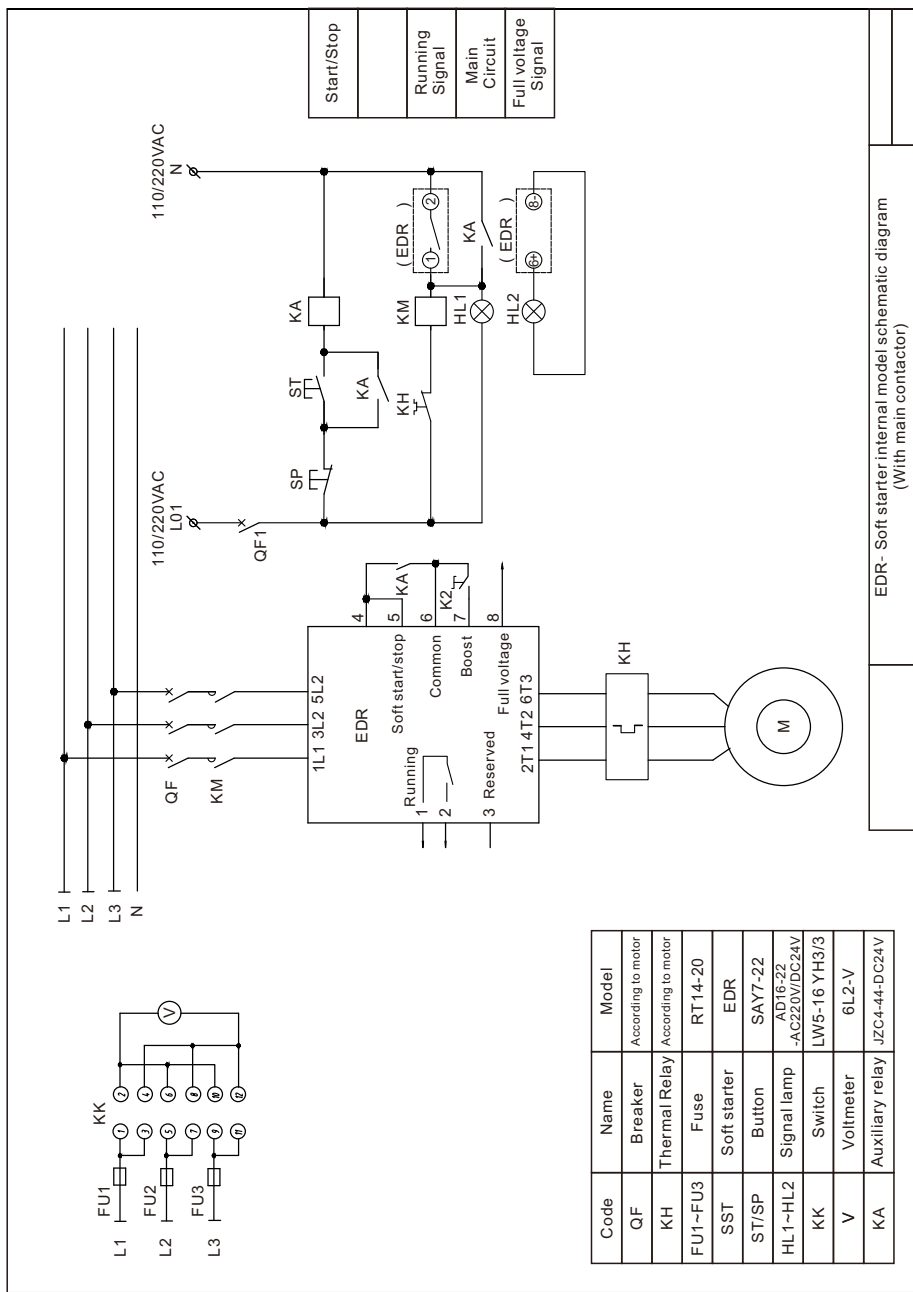


Parameters setting		
Start slope	Start	5~10 S
Stop slope	Stop	2~4 S
Initial voltage	U _{ini}	50%

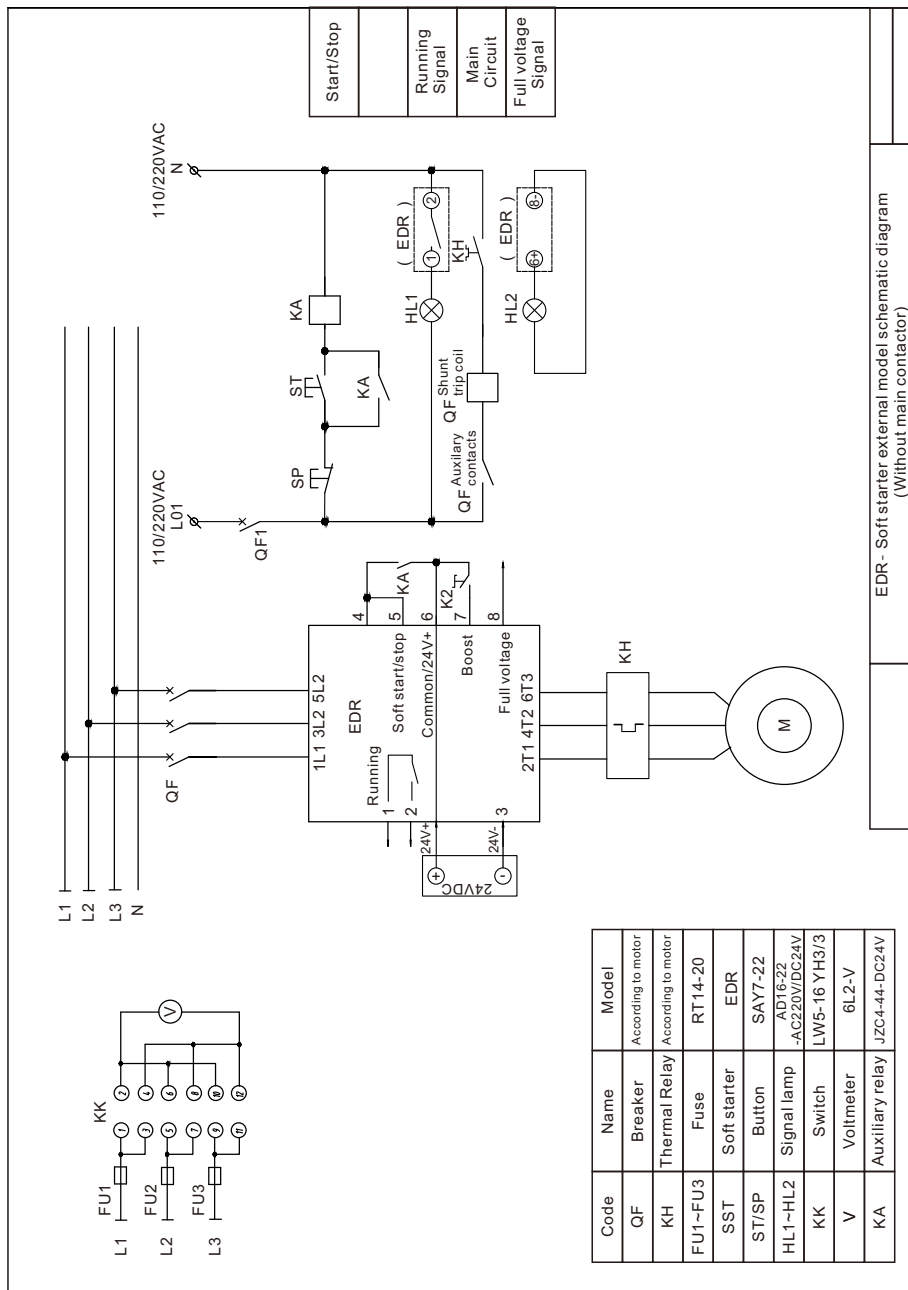
Typical wiring



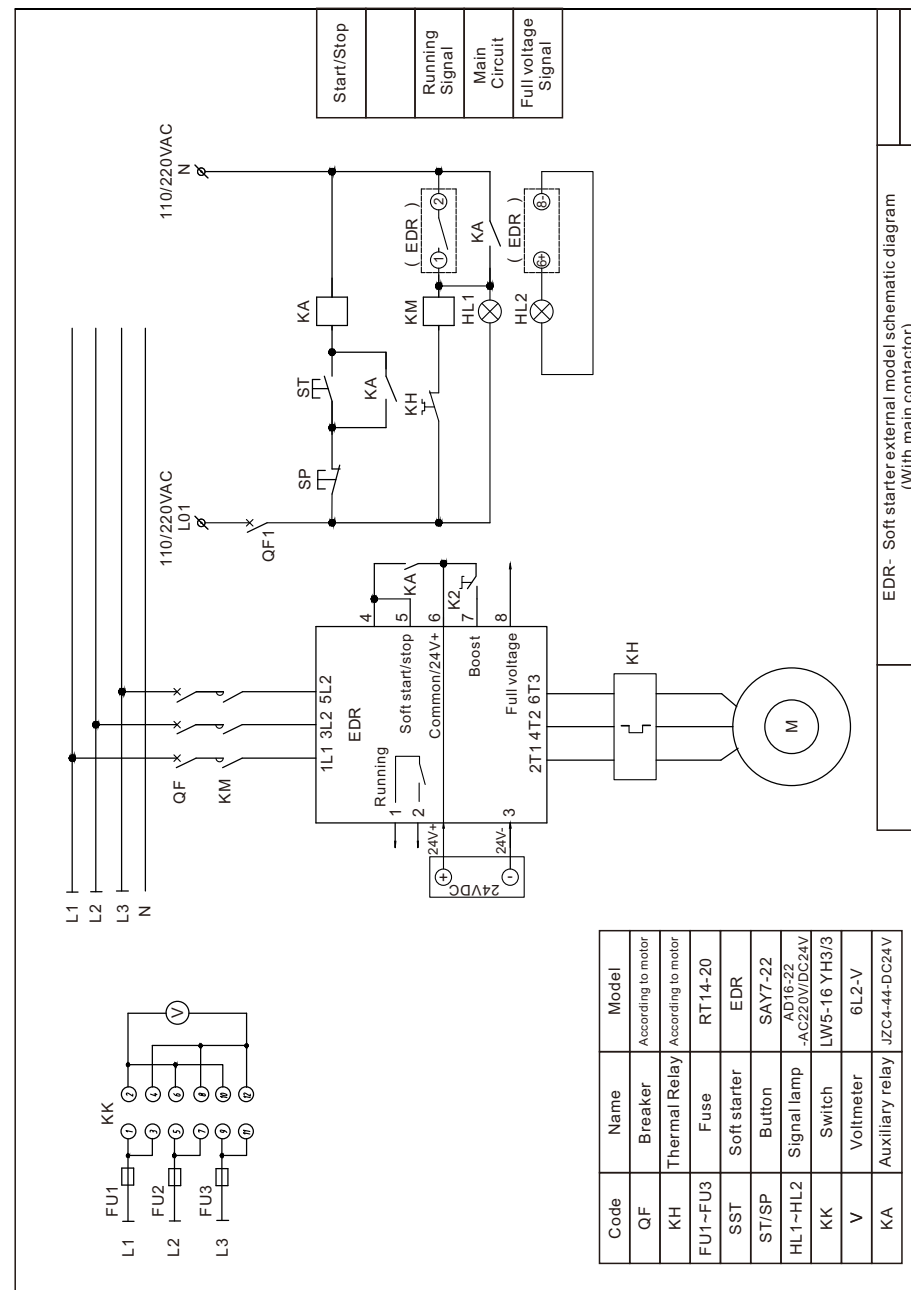
Typical wiring



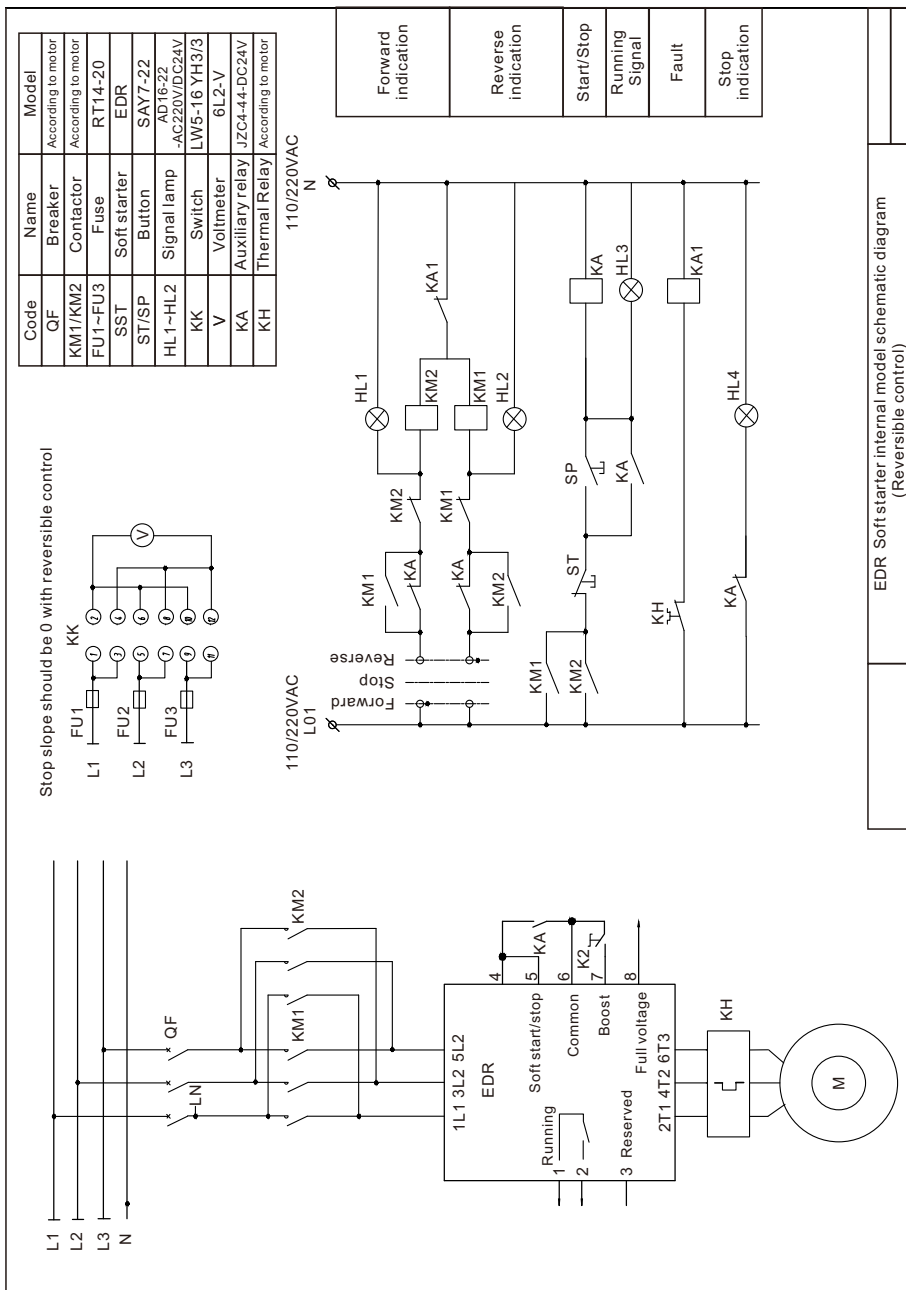
Typical wiring



Typical wiring



Typical wiring



Typical wiring

