AFK Fling-cut Switch

Installation instruction V1.5

Acrel Co., Ltd.

Declaration

The company reserves the right to modify the product specifications described in this manual without prior notice. Please contact your local agent for new specifications before ordering.

Contents

1 Product Overview

Low-voltage composite switch is a product used for switching capacitors in low-voltage reactive power compensation devices. Its basic working principle is to connect SCR and magnetic retention relay in parallel, which is controlled by internal microcontroller, and the SCR undertakes the over-zero casting at the moment of inputting and removing, and then the magnetic retention relay is turned on afterward. The composite switch has the advantages of no inrush current for over-zero switching and low power consumption for AC contactor operation.

Safety:

- The installation, maintenance and operation of this composite switch needs to be carried out by personnel with relevant specialized knowledge and skills.
- Make sure that the power supply system is a 0.4KV system and that the composite switch is not to be used in power supply systems higher than 0.4KV.
- Do not open the housing of the composite switch to prevent electric shock.

2 Functional Features

- SCR withstand voltage: SCR withstand voltage not less than 2000V, with over-voltage, over-current and current transient protection measures.
- Discharge technology: the capacitor can complete the discharge of the residual voltage within 2s.
- Software overcurrent detection technology: it can accurately find out the over-zero point, and does not issue an input command when harmonics are detected.

3 Model Description

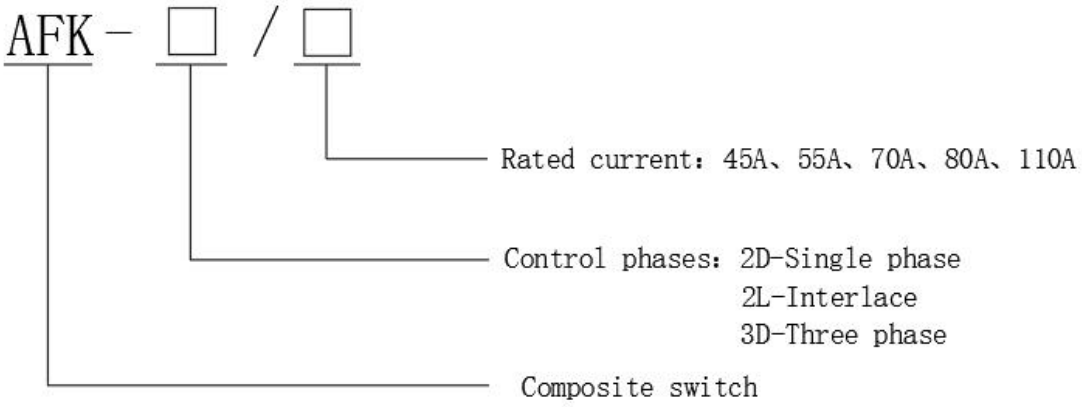


Table 1 Selection table

Compensation method	Rated current	Matching capacitor capacity (kvar)	Model No.
Co-complementary	45A	≤20	AFK-3D/45A
	55A	≤30	AFK-3D/55A
	70A	≤40	AFK-3D/70A
	80A	≤50	AFK-3D/80A
	110A	≤60	AFK-3D/110A
Divided Complementary	45A	≤20	AFK-2D/45A
	55A	≤30	AFK-2D/55A
	70A	≤40	AFK-2D/70A
	80A	≤50	AFK-2D/80A
	110A	≤60	AFK-2D/110A
Interphase	45A	≤20	AFK-2L/45A
	55A	≤30	AFK-2L/55A
	70A	≤40	AFK-2L/70A

Note: Composite switches are divided into two types: A and B. The size of B-type composite switch is different from that of A-type composite switch, and B-type size has a maximum rated current of 70A, while the other electrical

properties are the same, so you need to mark the size for selection, and if you don't, you will be defaulted to the size of A-type.

4 Main Specifications

4.1 Environmental conditions

Altitude: ≤2000m

Ambient Temperature: -25～70°C

Relative humidity: 40 °C, ≤90%

Atmospheric pressure: 79.5～106.0Kpa

No conductive dust and corrosive gases in the surrounding environment, and no flammable or explosive media.

4.2 Rated voltage

Three-phase type: AC380V ± 20%, 50Hz ± 10%

Split-phase type: AC220V ± 20%, 50Hz ± 10%

Working power supply: three-phase type: AC380V ± 20% 50Hz ± 10%

Split-phase: AC220V ± 20% 50Hz ± 10%

Harmonic distortion rate of power supply voltage: ≤ 5%

Control voltage: DC 5V-12V/10mA control signal can be accepted from the control output.

4.3 Basic parameters

Current specifications: 45A, 55A, 70A, 80A, 110A (B size maximum rated current 70A)

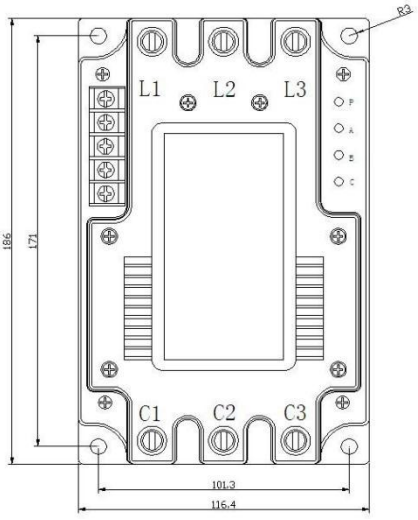
Power consumption: ≤3VA

Dynamic response time: after the control sends out the input or removal signal, complete the input or removal action within 1s.

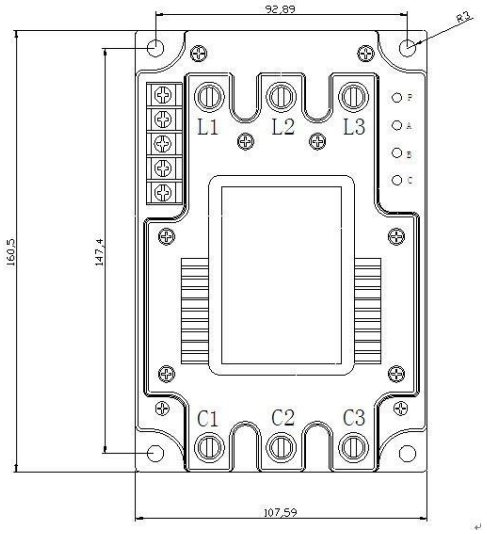
Repeat time: since the previous resection is completed, after a delay of 2s, you can once again put into action

Magnetic retention relay mechanical life: 10^6 times

5 Installation dimensions and wiring (unit: mm)



Type A Dimension Drawing



Type B Dimension Drawing

5.1 Common Complementary Terminal Block Diagram Definitions

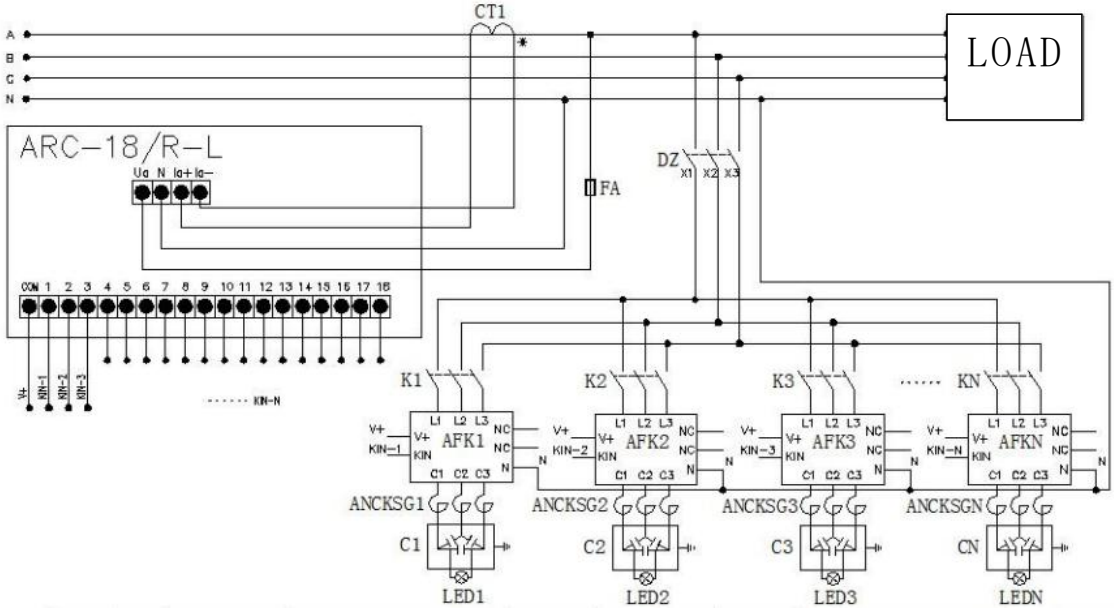
No.	△type definition	Description
1	N	Zero Line
2	V+	+12V common output
3	NC	none
4	NC	none
5	KIN	Input signal terminal

5.2 Subcomplementary Terminal Block Diagram Definitions

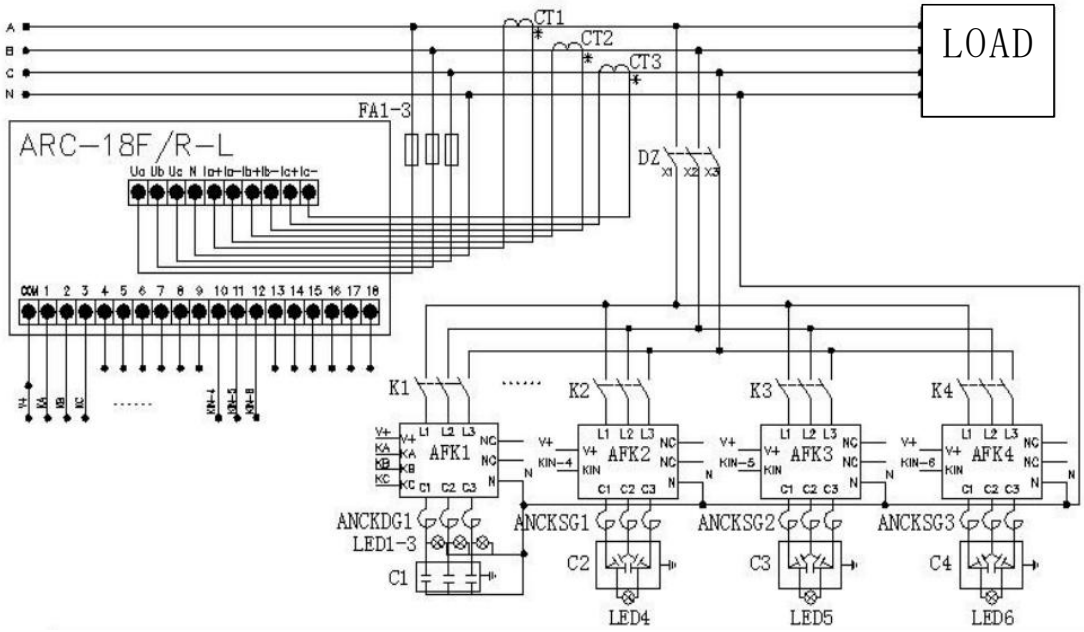
No.	△type definition	Description
1	N	Zero Line
2	V+	+12V common output
3	KA	Phase A input signal terminal
4	KB	Phase B input signal terminal
5	KC	Phase C input signal terminal

6 Typical application schematic

6.1 Three-phase common complement wiring diagram (with automatic power factor compensation controller)



6.2 Three-phase hybrid wiring diagram (with automatic power factor compensation controller)



7 Usage

7.1 Three-phase type:

Power indicator light P: After power on, the power indicator light is always on, it is normal working condition.

Status Indicator A, B, C: After suction closed, always on

After disconnecting, normally off

Fault alarm: flashing

7.2 Split-phase type:

Power indicator P: After power on, power indicator P is always on.

Status Indicator A, B, C: After suction closed, always on

After disconnection, normally off

Fault alarm: flashing

Special Note: The composite switch will not operate without access to the capacitor or dummy load!

If the user cannot access the capacitor for the action test when the capacitor cabinet is tested at the factory, it is recommended that: 6 incandescent light bulbs are used for this purpose, with every 2 in series, and then connected in a triangle as a dummy load. This will make the factory test.

8 Common Failures

8.1 Power indicator light: not lit, the compound switch does not operate, it may be an internal fault, please replace it.

8.2 Alarm light flashing: it may be the internal fault of compound switch, but it may also be the external fault, please check whether the fuse of the capacitor of the group is burnt out or not, whether the capacitor is faulty or not, etc.

8.3 No action: It may be the internal fault of the compound switch, but it may also be the external fault, please check whether the voltage of the control circuit is DC5-12V, whether the polarity of the control voltage is correct, whether the fuse of the capacitor in the group is burnt out, whether the capacitor has open-circuit fault, etc.

8.4 Refusal to operate: The composite switch is designed with a harmonic protection function and may refuse to operate when the harmonics of the power supply system seriously exceed the standard.

9 Ordering Notes

9.1 Please specify the model name, rated current, quantity and size of the product.

Example: Rated current 55A, need to connect 5 sets of 25kvar total complementary capacitors, B size, choose 5 sets of B size AFK-3D/55A composite switch.

Note: If the dimensions are not labeled, the A-size products will be shipped by default.

9.2 Delivery address and time.

9.3 Special requirements, please specify in advance.

1 Product Overview

Low-voltage synchronous switch is a new generation of low-voltage reactive power compensation device in the capacitor casting device, controlled by the internal single-chip computer, has the advantages of over-zero casting without inrush current, and also has the advantages of low power consumption of AC contactor operation, which can avoid the shortcomings of the thyristor operation heat and contactor removal with sparks.

Safety

- The installation, maintenance and operation of this synchronous switch need to be carried out by personnel with relevant professional knowledge and skills.
- Make sure that the power supply system is a 0.4 KV system, the synchronous switch must not be used in power supply systems higher than 0.4 KV.
- Do not open the housing of the synchronous switch to prevent electric shock.

2 Functional features

- Discharge technology: The capacitor can discharge the residual voltage within 2S.
- Software overcurrent detection technology: can accurately find out the over-zero point, and does not send out the input command when harmonics are detected.

3 Model description

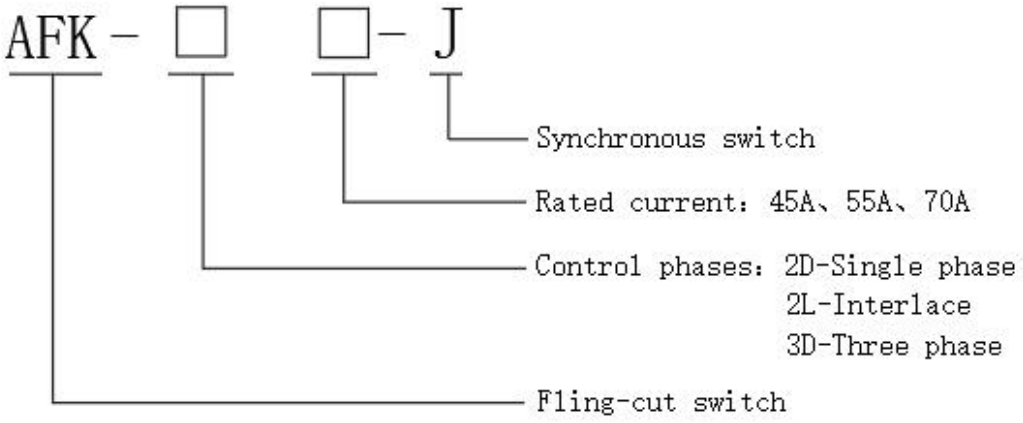


Table 1 Selection table+

Compensation method	Rated current	Matching capacitor capacity (kvar)	Model No.
Co-complementary	45A	≤20	AFK-3D/45A-J
	55A	≤30	AFK-3D/55A-J
	70A	≤40	AFK-3D/70A-J
Divided Complementary	45A	≤20	AFK-2D/45A-J
	55A	≤30	AFK-2D/55A-J
	70A	≤40	AFK-2D/70A-J
Interphase	45A	≤20	AFK-2L/45A-J
	55A	≤30	AFK-2L/55A-J
	70A	≤40	AFK-2L/70A-J

Note: Maximum rated current 70A

3.1 Environmental conditions

Altitude: ≤2000m

Ambient temperature: -25～55℃

Relative humidity: 40 ℃, 20 ~ 90%

Atmospheric pressure: 79.5～106.0Kpa

There is no conductive dust and corrosive gases in the surrounding environment, and there is no flammable or explosive medium.

3.2 Rated voltage

Three-phase type: AC380V±20%, 50Hz±10%

Split-phase: AC220V±20%, 50Hz±10%

Working power supply: three-phase type: AC380V ± 20% 50Hz ± 10%

Split-phase type: AC220V ± 20% 50Hz ± 10%

Harmonic distortion rate of power supply voltage: ≤ 5%

Control voltage: DC 5V-12V/10mA control signal can be accepted from control output.

3.3 Basic parameters

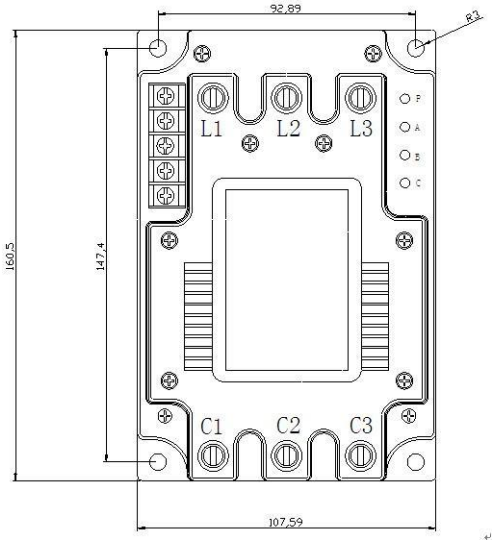
Current specification: 45A, 55A, 70A

Power consumption: ≤3VA

Dynamic response time: control issued after the input or removal signal, 1s to complete the input or removal action

Repeat casting and cutting time: since the previous resection is completed, after a delay of 2s, it can be put into action again Magnetic retention relay mechanical life: 10^6 times

4 Installation dimensions and wiring (unit: mm)



Dimension Drawing

4.1 Common Complementary Terminal Block Diagram Definitions :

No.	△type definition	Description
1	N	Zero Line
2	V+	+12V common output
3	NC	none
4	NC	none
5	KIN	Input signal terminal

4.2 Subcomplementary Terminal Block Diagram Definitions :

No.	△type definition	Description
1	N	Zero Line
2	V+	+12V common output
3	KA	Phase A input signal terminal
4	KB	Phase B input signal terminal
5	KC	Phase C input signal terminal

5 Ordering Notes

5.1 Please write down the product model name, rated current and quantity.

Example: Rated current 55A, need to connect 5 sets of 25kvar co-compensated capacitors, B-size, choose 5 sets of B-size AFK-3D/55A-J synchronous switch.

5.2 Supply address and time.

5.3For special requirements, please specify in advance.

1 Product Overview

AFK thyristor throw switch is an electronic switch without mechanical contacts, adopting over-zero throw, no over-voltage, arc and other phenomena in the throwing process, and the response time block can be frequently thrown.

Safety：

- The installation, maintenance and operation of this thyristor throw switch need to be carried out by personnel with relevant professional knowledge and skills.
- Make sure that the power supply system is a 0.4KV system and that the thyristor switch is not to be used in power supply systems higher than 0.4KV.
- Do not open the case of the thyristor throw switch at will to prevent electric shock.

2 Functional features

- Thyristor withstanding voltage: Thyristor withstanding voltage not less than 2000V, with over-voltage, over-current and current transient protection measures.
- No false triggering on power-up and power-down: the capacitor will not be mistakenly put into the capacitor on power-up, and the capacitor that has been put into the capacitor can be removed in time when power-down occurs.
- Over-zero casting: over-zero casting, small inrush current.

3 Model description

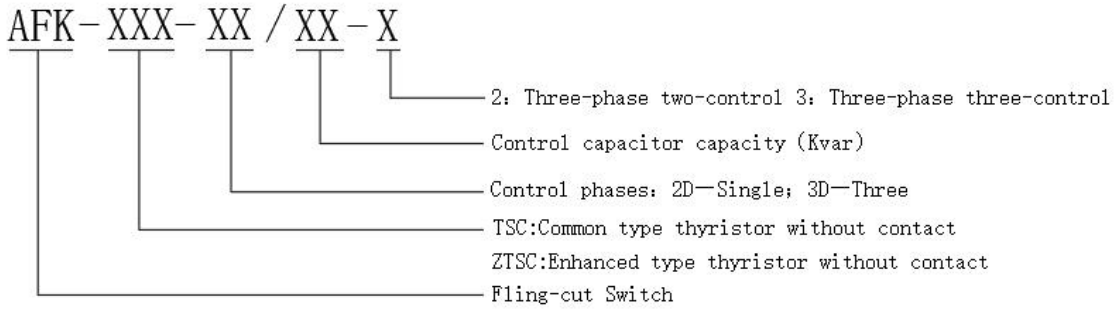


Table 1 Selection table

Compensation method		Matching capacitor capacity (kvar)	Model No.
Three-phase Common Complementary	Common Type	≤20	AFK-TSC-3D/20-2
		≤30	AFK-TSC-3D/30-2
		≤40	AFK-TSC-3D/40-2
		≤50	AFK-TSC-3D/50-2
		≤60	AFK-TSC-3D/60-2
		≤20	AFK-TSC-3D/20-3
		≤30	AFK-TSC-3D/30-3
		≤40	AFK-TSC-3D/40-3
		≤50	AFK-TSC-3D/50-3
		≤60	AFK-TSC-3D/60-3
	Enhanced Type	≤20	AFK-ZTSC-3D/20-2
		≤30	AFK-ZTSC-3D/30-2
		≤40	AFK-ZTSC-3D/40-2
		≤50	AFK-ZTSC-3D/50-2
		≤60	AFK-ZTSC-3D/60-2
Single-phase Subcompensation	Common Type	≤20	AFK-TSC-2D/20
		≤30	AFK-TSC-2D/30

		≤40	AFK-TSC-2D/40
		≤50	AFK-TSC-2D/50
	Enhanced Type	≤20	AFK-ZTSC-2D/20
		≤30	AFK-ZTSC-2D/30
		≤40	AFK-ZTSC-2D/40
		≤50	AFK-ZTSC-2D/50

4 Main Specifications

4.1 Environmental conditions

Altitude: ≤2000m

Ambient temperature: -10 ~ 50℃

Relative humidity: 40 ℃, 20 ~ 90%

Atmospheric pressure: 79.5 ~ 106.0Kpa

No conductive dust and corrosive gases in the surrounding environment, no flammable and explosive media

4.2 Rated voltage

Three-phase: AC380V ± 20%, 50Hz ± 10%

Split-phase: AC220V ± 20%, 50Hz ± 10%

Working power supply: AC380V/220V±20%, 50Hz±10%

Harmonic distortion rate of power supply voltage: ≤5%

Control voltage: DC 5V-12V, 10mA/road control signal can be accepted as control output.

4.3 Basic parameters

Capacity specification: three-phase common complementary ≤ 60kvar, single-phase sub-supplementary ≤ 50kvar

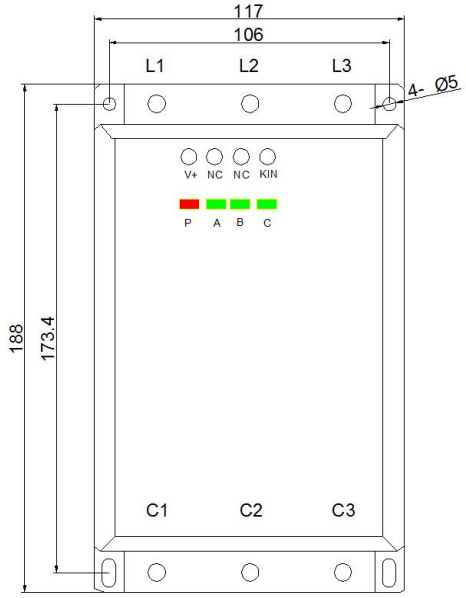
Local power consumption: ≤ 3VA

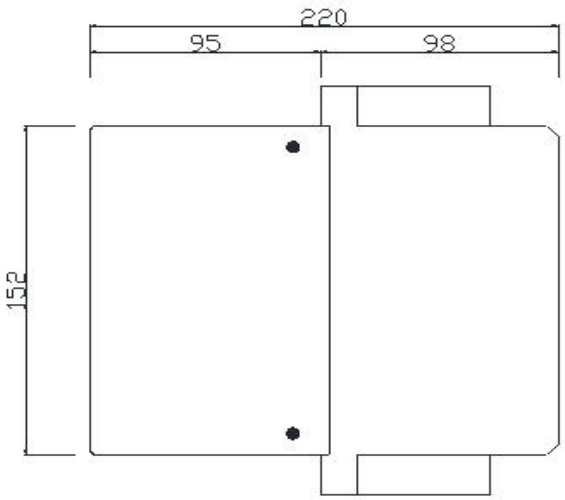
Dynamic response time: 10ms after the control sends out the input or removal signal, complete the input or removal action.

5 Installation dimensions and wiring (unit: mm)

Type C (upper and lower wiring)：

Overall dimensions: 188 × 117 × 220mm, mounting hole size: 173 × 106mm, radiator opening size: 118 × 155mm





5.1 Wiring Methods

Common complementary wiring method：

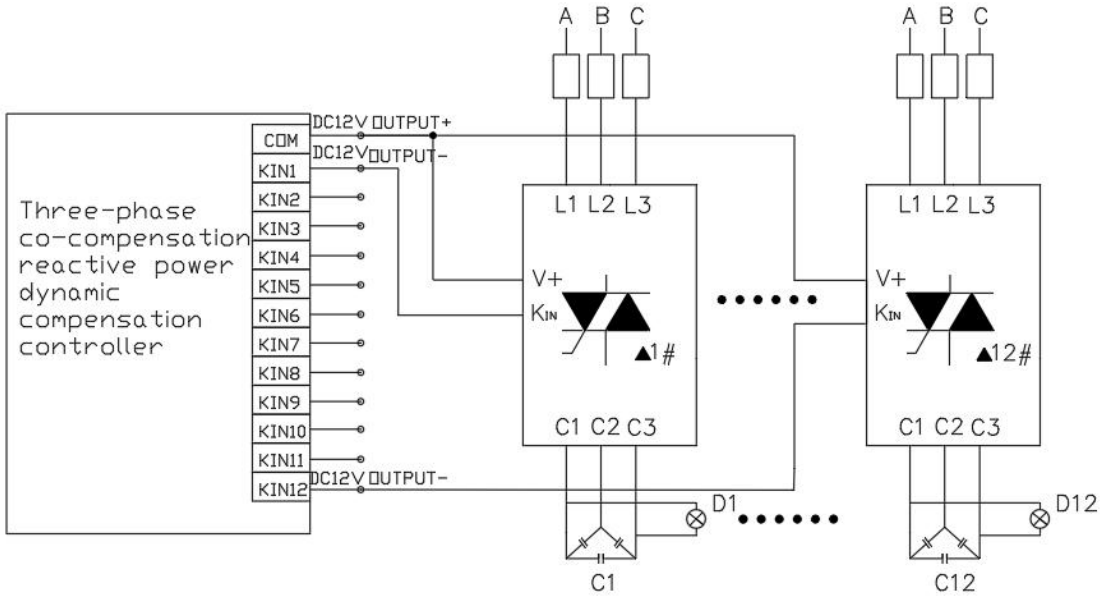
No.	Definition	Description
1	L1、L2、L3	Power supply access terminals

2	C1、C2、C3	Capacitor access terminal
3	V+	Control voltage positive terminal
4	NC	none
5	KIN	Negative control voltage

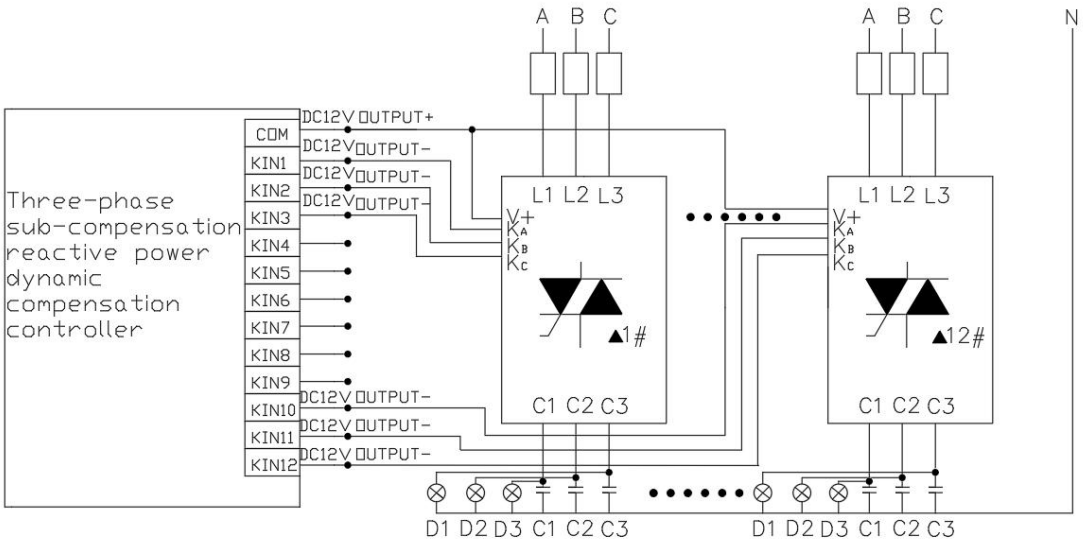
Sub-complementary wiring method：

No.	Definition	Description
1	L1、L2、L3	Power supply access terminals
2	C1、C2、C3	Capacitor access terminal
3	V+	Control voltage positive terminal
4	KA	Negative phase A control voltage
5	KB	Negative phase B control voltage
6	KC	Negative phase C control voltage

5.2 Three-phase common complementary wiring terminal diagram

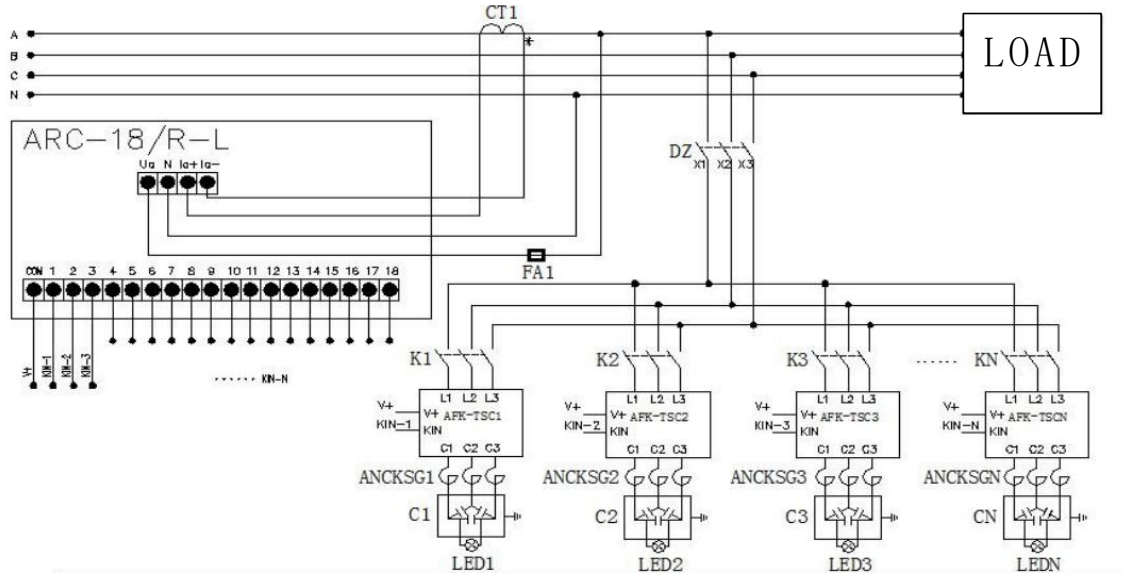


5.3 Three-phase sub-complementary terminal diagram

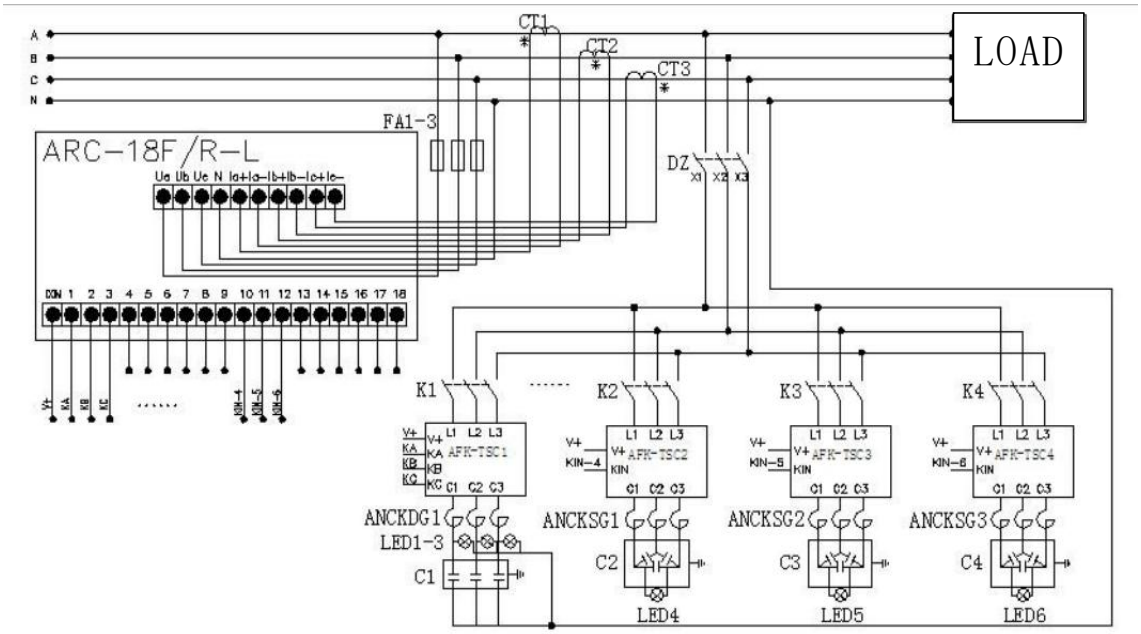


6 Typical application schematic

6.1 Three-phase common complement wiring diagram (with automatic power factor compensation controller)



6.2 Three-phase hybrid wiring diagram (with automatic power factor compensation controller)



7 Usage

Three-phase common complementary type:

Running indicator lamp: after power on, running lamp is always on, it is normal working condition.

Alarm indicator light: after running fault, the alarm light is always on.

Fan working indicator light: after fan working, fan indicator light is always on, after fan stopping, fan indicator light is always off.

Status indicator lamps A, B, C: after absorbing, it is always on, after disconnecting, it is always off.

Digital tube display: internal temperature of thyristor throw switch.

Split-phase sub-complementary type:

Running indicator light: after power on, running light is always on, it is normal working condition.

Fault alarm indicator light: after running fault, the alarm light is always on.

Fan working indicator light: after fan working, fan indicator light is always on, after fan stopping, fan indicator light is always off.

Status indicator lamps A, B, C: after suction is closed, the light is always on, after disconnection, the light is always off.

Digital tube display: internal temperature of thyristor throw switch.

Fan starts:

When the temperature is higher than 50 degrees, then start the fan operation.

When the temperature is lower than 40 degrees, then stop fan operation.

Over-temperature protection:

When the temperature is higher than 75 degrees, the loads that have been put in are removed and the thyristor is disconnected.

When the temperature is lower than 65 degrees, the thyristor is restored to operation.

Special Note: The thyristor throw switch will not operate without access to the capacitor or dummy load!

If the user cannot access the capacitor for the action test during the factory test of the capacitor bank, it is recommended that: 6 incandescent light bulbs are used for the test, every 2 in series, and then connected in a triangle as a dummy load. This can make the factory test.

8 Common Failures

1.Operation indicator light: not lit, thyristor throw switch does not operate, it may be an internal fault, please replace it.

2.Alarm light is on: it may be the internal fault of thyristor throw switch, but it may also be the external fault, please check whether the fuse of the capacitor of the group is burnt out or not, and whether the capacitor is faulty or not.

3.No action: It may be the internal fault of thyristor throw switch, but it may be the external fault, please check whether the control circuit voltage is DC5～12V, whether the polarity of the control voltage is correct, whether the fuse of the capacitor group is burnt out, whether the capacitor has open-circuit failure, etc.

4.Refusal to operate: This thyristor throw switch is designed with harmonic protection function, when the harmonics of the power supply system seriously exceeds the standard, it may refuse to operate.

9 Ordering notes

9.1 Write down the product model name, capacitor capacity and quantity.

Example: 5 sets of 25kvar three-phase capacitors, 5 sets of AFK-3D/30-3 thyristor throw switches.

9.2 Delivery address and time.

9.3 For special requirements, please specify in advance.

Record of Revision of the Instruction Manual：

T1.3→V1.4	Delete Thyristor Type A, Adjust Document Format	2022.4.25
V1.4→V1.5	Delete Synchronization Switch Type A	2022.7.21

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