



Power Factor Correction

(Capacitor, Capacitor Contactor Controller, Reactor)





About Himel

Himel is a multinational manufacturer and provider of electrical products successfully combining global expertise with local knowledge.

Founded by a Spanish entrepreneur in 1958, the company pioneered in exporting quality electrical enclosures, establishing Himel brand globally. Today, our global footprint and technology enable us to provide the best combination of affordable and reliable offers for Low Voltage Power distribution, Industry Automation and Home Electric to our long-term customers and partners in over 50 countries where we are present.

Himel. Reliable made affordable





Reactive Power Management

In electrical networks, reactive energy results in increased line currents for a given active energy transmitted to loads.

The main consequences are:

- Need for oversizing of transmission and distribution networks by utilities,
- Increased voltage drops and sags along the distribution lines,
- Additional power losses.

This results in increased electricity bills for industrial customers because of:

- Penalties applied by most utilities on reactive energy,
- Increased overall kVA demand,
- Increased energy consumption within the installations.

Reactive energy management aims to optimize your electrical installation by reducing energy consumption, and to improve power availability.

Power Factor Correction

Every electric machine needs active power (kW) and reactive power (kvar) to operate. The power rating of the installation in kVA is the combination of both: $(\text{kVA})^2 = (\text{kW})^2 + (\text{kvar})^2$.

The Power Factor has been defined as the ratio of active power (kW) to apparent power (kVA). $\text{Power Factor} = (\text{kW}) / (\text{kVA})$.

The objective of Reactive Energy management is improvement of Power Factor, or “Power Factor Correction”.

This is typically achieved by producing reactive energy close to the consuming loads, through connection of capacitor banks to the network.

Quality and Reliability

- Advanced impregnation technology ensures the stability of paraffin fill-in: reliable lifecycle.
- 100% testing in manufacturing plant.
- Design and engineering with the highest international standards.

Safety

- Explosion-proof equipment, and quick disconnection from power grid;
- No risk of oil leakage due to the application of microcrystalline wax as impregnation.

Efficiency and Productivity

- Product development including innovation in ergonomics and ease of installation and connection.
- Specially designed components to save time on installation and maintenance.

A Comprehensive Offer

Power Factor Correction capacitor with and without reactor form part of a comprehensive offer of products perfectly coordinated to meet low-voltage power distribution needs.



Reactive Power Management: Why?

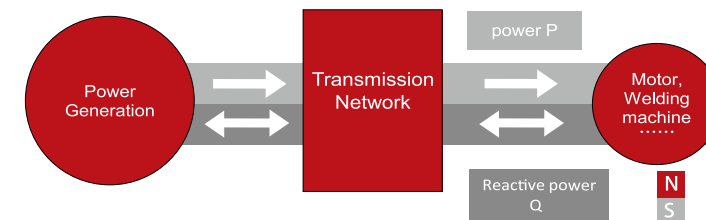
All AC electrical networks consume two types of power: active power (kW) and reactive power (kvar):

Use of these products in the electrical installation will result in:

- Improved continuity of service;
- Reduced power losses;
- Guarantee of scalability;
- efficient monitoring and management.
- The active power P (in kW) is the real power transmitted to loads such as motors, lamps, heaters, computers, etc. The electrical active power is transformed into mechanical power, heat or light.
- The reactive power Q (in kvar) is used only to power the magnetic circuits of machines, motors and transformers.

The apparent power S (in kVA) is the vector combination of active and reactive power.

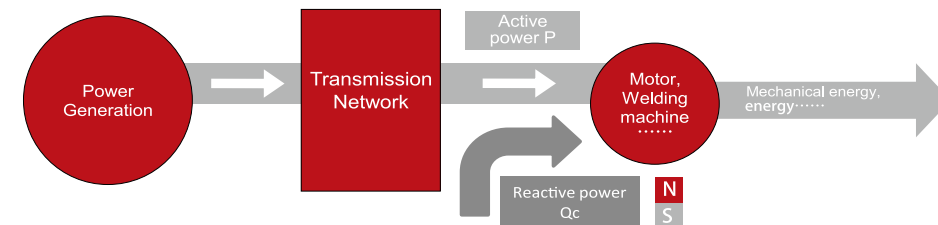
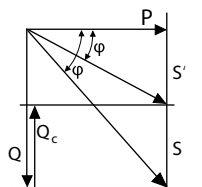
In an electrical circuit, the reactive energy is supplied in addition to the active energy.



For these reasons, there is a great advantage in generating reactive energy at the load level in order to prevent the unnecessary circulation of current in the network. This is what is known as “power factor correction”. This is obtained by the connection of capacitors, which produce reactive energy in opposition to the energy absorbed by loads such as motors.

The result is a reduced apparent power, and an improved power factor P/S' as illustrated in the diagram opposite.

The power generation and transmission networks are partially relieved, reducing power losses and making additional transmission capacity available.



Low-voltage Capacitor

The efficiency of power generation, transmission or conversion is improved when operated at near unity power factor. The least expensive way to achieve the same is by installing Capacitors. Capacitors must be able to withstand high voltage transients and power line variations without breakdown.

Characteristic

- Low loss of medium and temperature with long serving time to save eletricity bill.
- HIMEL Capacitors are made in accordance with Metallized Polypropelene technology with built-in SELF HEALING properties.
- Full specifications

HDCAP3 Series

Capacity: 1~30kvar
Voltage: 230V, 400V, 450V, 525V
Connection type: Three-phase
Voltage: 230V, 400V, 450V, 525V
Connection type: Three-phase

HBSM Series

Capacity: 0.5~60kvar
Voltage: 230V, 250V, 280V, 400V, 415V, 440V, 450V, 480V, 525V, 660V, 690V, 760V
Connection type: Single-phase, three-phase, three-phase four-wire
Housing type: D, M and Q



Detuned Reactors - Harmonic Blocking

Influence of Harmonics

The growing use of power electronic devices is causing an increasing level of harmonic distortion in the electrical systems, which frequently leads to problems with capacitor installations. This is the reason why energy suppliers and actual conditions require the usage of harmonic blocking reactors.

A detuned capacitor system works out the function of power factor correction while preventing any amplification of harmonic currents and voltages caused by resonance between the capacitor and inductive impedances of the electrical system.

Installation of a Detuned Harmonic Filters is recommended, which can restrain a low-pass resonant circuit (usually below the 5th) harmonics to flow into capacitors.



Application

Capacitors get easily affected and damaged by harmonic current, inrush current, and due to over voltage in the reactive power compensation system. Therefore, to avoid parallel resonance and the issue about amplified harmonic current, it is necessary to be in series reactor along with the capacitors. Reactors are applied to avoid excessive amplification of power grid harmonics and resonance resulting from the connection of capacitor banks to prolong the service time of capacitors.

Features

- Reactors adopt three-phase three-column type structure:
- The gap of the iron core adopts epoxy resin impregred glass cloth laminated sheet as the spacer. High-impact binder is applied (high-temperature tolerance) to ensure that gaps of reactors do not change and there is no noise during the operation.
 - Coils are tightly wound with enameled flat wires to ensure that coils of reactors do not vibrate during the operation(foil winding is used when current is more than 100A).
 - Advanced low-loss silicon steel sheet is used. Fast punching mode is applied to ensure that products have high efficiency and low loss.



Single-phase DType



Three-phase DType



Three-phase Four-wire DType



Three-phase MType



Three-phase Four-wire QType



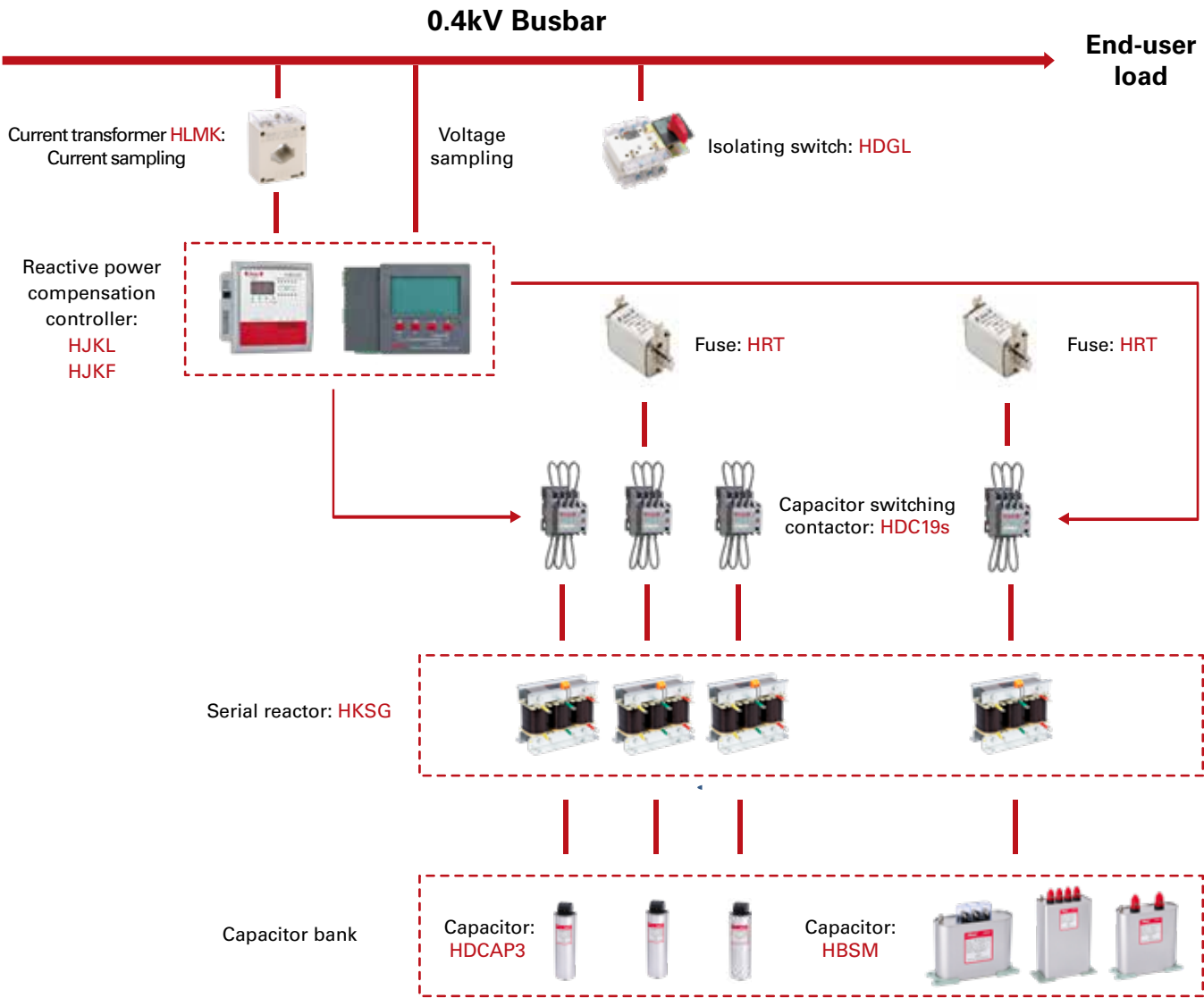
Three-phase Four-wire MType

POWER FACTOR CORRECTION

Power Factor Correction Solution

Standard: IEC60947-4-1, IEC60947-5-1

Reactive Power Compensation Solution



System solution for reactive power compensation cabinet.

POWER FACTOR CORRECTION



HDCAP3 Low-voltage Capacitor

NEW



HDCAP3

Rated Operating Voltage: AC 400V, 450V, 525V
Rated Capacity: 1~30kvar
Connection Type: Three-phase
Rated Frequency: 50Hz
Appearance: Cylinder
Inside Dipping Material: Polypropylene Metallized Film
Ambient Temperature: -25°C ~+50°C

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HBSM Low-voltage Capacitor

NEW



HBSM

Rated Operating Voltage: AC 230V,250V,280V,400V,415V, 440V,450V,480V,525V, 660V
Rated Capacity: 0.5~60kvar
Connection Type: Single-phase,three-phase, three-phase four-wire
Rated Frequency: 50Hz
Appearance: Box
Inside Dipping Material: Polypropylene Metallized Film
Ambient Temperature: -25°C ~+50°C

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HJKL Reactive Power Compensation Controllers



HJKL

Sampling voltage: AC 380V/220V±15%
Sampling current: n/5A (I≤5A)
Output loops: 4, 6, 8, 10, 12 loops

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HJKF Reactive Power Compensation Controller

NEW



HJKF

Rated operating voltage: AC400V (±15%)
Rated current: ≤5A
Output Loops: 12 loops
Four running output modes: circulate switching, coding switching, cut-on first and then cut-off, optimization switching
Frequency:50 / 60Hz

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HKSG Three-phase Serial Reactor

NEW



HKSG

Rated Operating Voltage: AC0.48kV, AC0.525kV
Detuning: 7% and 14%
Connection Type: Three-phase
Rated Frequency: 50Hz

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HDC19s Capacitor Switching Contactor



HDC19s

Rated Operating Voltage: 380/400V
Frame Current: 25A, 32A, 43A, 63A, 95A, 115A
Poles: 3P
Rated Frequency: 50Hz, 50/60Hz
Coil Voltage: 24V, 36V, 48V, 110V, 127V, 220/230V, 240V, 380/400V, 415V, 440V
Certificate: CE

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POWER FACTOR CORRECTION

HDCAP3 Low-voltage Capacitors

Standard: IEC60831



Range Presentation

Power Factor Correction capacitors with and without reactor form part of a comprehensive offer of products perfectly coordinated to meet low-voltage power distribution needs.

HDCAP3: Cylinder type

Features

- ◆ Low loss of medium and temperature with long serving time to save eletricity bill.
- ◆ Metallized Polypropylene technology with built-in SELF HEALING properties.
- ◆ Full specifications:
 - **HDCAP3**
 - Capacity:** 1-30kvar
 - Voltage:** 400V, 450V, 525V
 - Connection type:** Three-phase

Online Content



HDCAP3

Selection Code

HDCAP3 series

Range name	Rated voltage	Rated compensation capacity	Compensation method
HDCAP3	400	5	3
HDCAP3: Cylinder type	0400: 400V 0450: 450V 0525: 525V	005: 5kvar 705: 7.5kvar 010: 10kvar 025: 25kvar 030: 30kvar	3: Three-phase compensation

Technical Parameters	
Low-voltage Capacitor	HDCAP3
Rated Voltage(AC)	400V, 450V, 525V
Rated Capacity	1-30kvar
Capacity deviation (μF)	0~+10% of the rated capacity
Loss angle tangent (tan)	At the rated power-frequency voltage, 20°C tan δ≤0.2%
Connection Type	Three-phase
Rated Frequency	50Hz
Ambient Temperature	-25°C~+50°C
AC withstand voltage	Inter-electrode: 2.15Un/10s Between shell and phase: 3kV/10s
Allowable over-voltage (Un)	1.10 of rated voltage (not greater than 8h in 24h)
Allowable over-current (In)	1.43 of rated current
Altitude	≤2000m
Relative humidity	≤50% at 40°C ≤90% at 20°C
Appearance	Cylinder
Inside Dipping Material	Polypropylene metallized film
Self discharge characteristic	The residual voltage reduces to 50V or below from √ 2Un after 3 minutes in case of power failure
Standard	IEC60831

POWER FACTOR CORRECTION

HDCAP3 Lower-voltage capacitors selection guide

Standard: IEC60831

Commercial Reference	Description	Voltage (V)	Capacity kvar (50Hz)	Capacitance (uF)	Capacity kvar (60Hz)
HDCAP304000053	HDCAP3-400V-5kvar-3phase	400	5	99.47	6
HDCAP304007053	HDCAP3-400V-7.5kvar-3phase	400	7.5	149.21	9
HDCAP304000103	HDCAP3-400V-10kvar-3phase	400	10	198.95	12
HDCAP304000123	HDCAP3-400V-12kvar-3phase	400	12	238.74	14.4
HDCAP304000143	HDCAP3-400V-14kvar-3phase	400	14	278.53	16.8
HDCAP304000153	HDCAP3-400V-15kvar-3phase	400	15	298.42	18
HDCAP304000163	HDCAP3-400V-16kvar-3phase	400	13	258.63	15.6
HDCAP304000183	HDCAP3-400V-18kvar-3phase	400	18	358.11	21.6
HDCAP304000203	HDCAP3-400V-20kvar-3phase	400	20	397.90	24
HDCAP304000253	HDCAP3-400V-25kvar-3phase	400	25	497.37	30
HDCAP304000303	HDCAP3-400V-30kvar-3phase	400	30	596.85	36
HDCAP304500053	HDCAP3-450V-5kvar-3phase	450	5	78.60	6
HDCAP304507053	HDCAP3-450V-7.5kvar-3phase	450	7.5	117.90	9
HDCAP304500103	HDCAP3-450V-10kvar-3phase	450	10	157.19	12
HDCAP304500123	HDCAP3-450V-12kvar-3phase	450	12	188.63	14.4
HDCAP304500143	HDCAP3-450V-14kvar-3phase	450	14	220.07	16.8
HDCAP304500153	HDCAP3-450V-15kvar-3phase	450	15	235.79	18
HDCAP304500163	HDCAP3-450V-16kvar-3phase	450	16	251.51	19.2
HDCAP304500183	HDCAP3-450V-18kvar-3phase	450	18	282.95	21.6
HDCAP304500203	HDCAP3-450V-20kvar-3phase	450	20	314.39	24
HDCAP304500253	HDCAP3-450V-25kvar-3phase	450	25	392.99	30
HDCAP304500303	HDCAP3-450V-30kvar-3phase	450	30	471.58	36
HDCAP305250053	HDCAP3-525V-5kvar-3phase	525	5	57.74	6
HDCAP305257053	HDCAP3-525V-7.5kvar-3phase	525	7.5	86.62	9
HDCAP305250103	HDCAP3-525V-10kvar-3phase	525	10	115.49	12
HDCAP305250123	HDCAP3-525V-12kvar-3phase	525	12	138.59	14.4
HDCAP305250143	HDCAP3-525V-14kvar-3phase	525	14	161.69	16.8
HDCAP305250153	HDCAP3-525V-15kvar-3phase	525	15	173.23	18
HDCAP305250163	HDCAP3-525V-16kvar-3phase	525	16	184.78	19.2
HDCAP305250183	HDCAP3-525V-18kvar-3phase	525	18	207.88	21.6
HDCAP305250203	HDCAP3-525V-20kvar-3phase	525	20	230.98	24
HDCAP305250253	HDCAP3-525V-25kvar-3phase	525	25	288.72	30
HDCAP305250303	HDCAP3-525V-30kvar-3phase	525	30	346.47	36

HDCAP3 Lower-voltage capacitors selection guide

Standard: IEC60831

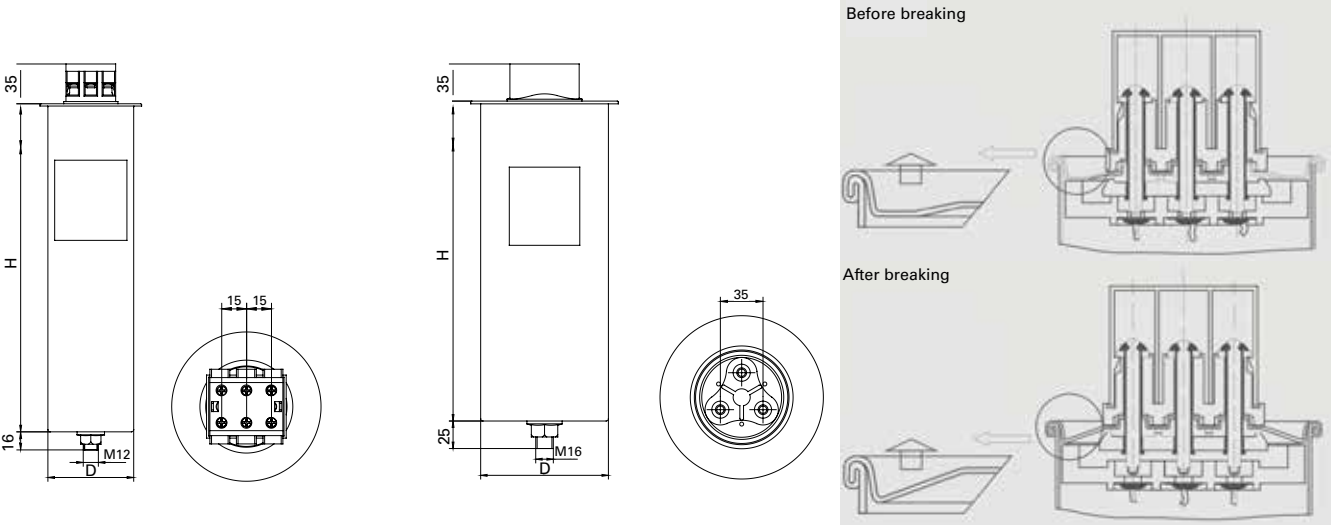
Coordination table between Capacitor and Contactor

Commercial Reference	Description	Voltage (V)	Capacity kvar (50Hz)	Matched HDC19s
HDCAP304000053	HDCAP3-400V-5kvar-3phase	400	5	HDC19s-25
HDCAP304007053	HDCAP3-400V-7.5kvar-3phase	400	7.5	HDC19s-25
HDCAP304000103	HDCAP3-400V-10kvar-3phase	400	10	HDC19s-25
HDCAP304000123	HDCAP3-400V-12kvar-3phase	400	12	HDC19s-32
HDCAP304000143	HDCAP3-400V-14kvar-3phase	400	14	HDC19s-32
HDCAP304000153	HDCAP3-400V-15kvar-3phase	400	15	HDC19s-43
HDCAP304000163	HDCAP3-400V-16kvar-3phase	400	13	HDC19s-32
HDCAP304000183	HDCAP3-400V-18kvar-3phase	400	18	HDC19s-43
HDCAP304000203	HDCAP3-400V-20kvar-3phase	400	20	HDC19s-63
HDCAP304000253	HDCAP3-400V-25kvar-3phase	400	25	HDC19s-63
HDCAP304000303	HDCAP3-400V-30kvar-3phase	400	30	HDC19s-95
HDCAP304500053	HDCAP3-450V-5kvar-3phase	450	5	HDC19s-25
HDCAP304507053	HDCAP3-450V-7.5kvar-3phase	450	7.5	HDC19s-25
HDCAP304500103	HDCAP3-450V-10kvar-3phase	450	10	HDC19s-32
HDCAP304500123	HDCAP3-450V-12kvar-3phase	450	12	HDC19s-25
HDCAP304500143	HDCAP3-450V-14kvar-3phase	450	14	HDC19s-32
HDCAP304500153	HDCAP3-450V-15kvar-3phase	450	15	HDC19s-32
HDCAP304500163	HDCAP3-450V-16kvar-3phase	450	16	HDC19s-32
HDCAP304500183	HDCAP3-450V-18kvar-3phase	450	18	HDC19s-43
HDCAP304500203	HDCAP3-450V-20kvar-3phase	450	20	HDC19s-43
HDCAP304500253	HDCAP3-450V-25kvar-3phase	450	25	HDC19s-63
HDCAP304500303	HDCAP3-450V-30kvar-3phase	450	30	HDC19s-63
HDCAP305250053	HDCAP3-525V-5kvar-3phase	525	5	HDC19s-25
HDCAP305257053	HDCAP3-525V-7.5kvar-3phase	525	7.5	HDC19s-25
HDCAP305250103	HDCAP3-525V-10kvar-3phase	525	10	HDC19s-25
HDCAP305250123	HDCAP3-525V-12kvar-3phase	525	12	HDC19s-25
HDCAP305250143	HDCAP3-525V-14kvar-3phase	525	14	HDC19s-25
HDCAP305250153	HDCAP3-525V-15kvar-3phase	525	15	HDC19s-25
HDCAP305250163	HDCAP3-525V-16kvar-3phase	525	16	HDC19s-32
HDCAP305250183	HDCAP3-525V-18kvar-3phase	525	18	HDC19s-32
HDCAP305250203	HDCAP3-525V-20kvar-3phase	525	20	HDC19s-43
HDCAP305250253	HDCAP3-525V-25kvar-3phase	525	25	HDC19s-43
HDCAP305250303	HDCAP3-525V-30kvar-3phase	525	30	HDC19s-63

HDCAP3 Lower-voltage capacitors Overall Dimension

Standard: IEC60831

Model	Rated Voltage (V)	Rated capacity (kvar)	Overall dimensions D*H (mm)	Mounting dimensions
HDCAP3-0.4-5-3	400	5	76*245	M12×16
HDCAP3-0.4-7.5-3	400	7.5	76*245	M12×16
HDCAP3-0.4-10-3	400	10	76*245	M12×16
HDCAP3-0.4-12-3	400	12	76*245	M12×16
HDCAP3-0.4-14-3	400	14	86*245	M12×16
HDCAP3-0.4-15-3	400	15	86*245	M12×16
HDCAP3-0.4-16-3	400	16	86*245	M12×16
HDCAP3-0.4-18-3	400	18	86*290	M12×16
HDCAP3-0.4-20-3	400	20	86*290	M12×16
HDCAP3-0.4-25-3	400	25	116*290	M16×25
HDCAP3-0.4-30-3	400	30	116*290	M16×25
HDCAP3-0.45-5-3	450	5	76*245	M12×16
HDCAP3-0.45-7.5-3	450	7.5	76*245	M12×16
HDCAP3-0.45-10-3	450	10	76*245	M12×16
HDCAP3-0.45-12-3	450	12	76*245	M12×16
HDCAP3-0.45-14-3	450	14	86*245	M12×16
HDCAP3-0.45-15-3	450	15	86*245	M12×16
HDCAP3-0.45-16-3	450	16	86*245	M12×16
HDCAP3-0.45-18-3	450	18	86*290	M12×16
HDCAP3-0.45-20-3	450	20	86*290	M12×16
HDCAP3-0.45-25-3	450	25	116*290	M16×25
HDCAP3-0.45-30-3	450	30	116*290	M16×25
HDCAP3-0.525-5-3	525	5	76*245	M12×16
HDCAP3-0.525-7.5-3	525	7.5	76*245	M12×16
HDCAP3-0.525-10-3	525	10	76*245	M12×16
HDCAP3-0.525-12-3	525	12	76*245	M12×16
HDCAP3-0.525-14-3	525	14	86*245	M12×16
HDCAP3-0.525-15-3	525	15	86*245	M12×16
HDCAP3-0.525-16-3	525	16	86*245	M12×16
HDCAP3-0.525-18-3	525	18	86*290	M12×16
HDCAP3-0.525-20-3	525	20	86*290	M12×16
HDCAP3-0.525-25-3	525	25	116*290	M16×25
HDCAP3-0.525-30-3	525	30	116*290	M16×25



HBSM Low-voltage Capacitors

Standard: IEC60831



Range Presentation

Power Factor Correction capacitors with and without reactor form part of a comprehensive offer of products perfectly coordinated to meet low-voltage power distribution needs.

HBSM: Box type

Features

- ◆ Low loss of medium and temperature with long serving time to save eletricity bill.
- ◆ Metallized Polypropylene technology with built-in SELF HEALING properties.
- ◆ Full specifications:
 - **HBSM: Capacity:** 0.5~60kvar
 - Voltage:** 230V, 250V, 280V, 400V, 415V, 440V, 450V, 480V, 525V, 660V, 690V, 760V
 - Connection type:** Single-phase, three-phase, three-phase four-wire
 - Housing type:** D, M and Q

Online Content



HBSM

HBSM series

Range name	With or without reactor	Rated voltage	Rated compensation capacity	Compensation method	Housing type
HBSM	0	04500	0150	3	D
HBSM: Box type	0: Without reactor	02300: 230V 02500: 250V 02800: 280V 04000: 400V 04150: 415V 04500: 450V 04800: 480V 05250: 525V 06900: 690V 07500: 750V 02303: 230√3V 02503: 250√3V 02803: 280√3V 04003: 400√3V	0005: 0.5kvar ... 0075: 7.5kvar ... 0100: 10kvar ... 0150: 15kvar ... 0200: 20kvar ... 0300: 30kvar ... 0400: 40kvar ... 0600: 60kvar	1: Single-phase compensation 3: Three-phase compensation 4: Three-phase four-wire compensation 3YN	D: D type M: M type Q: Q type
	1: With reactor				

Technical Parameters	
Low-voltage Capacitor	HBSM
Rated Voltage(AC)	230V, 250V, 280V, 400V, 415V, 440V, 450V, 480V, 525V, 660V
Rated Capacity	0.5-60kvar
Capacity deviation (μF)	0~+10% of the rated capacity
Loss angle tangent (tan)	At the rated power-frequency voltage, 20°C tan δ≤0.2%
Connection Type	Single-phase, three-phase, three-phase four-wire
Rated Frequency	50Hz
Ambient Temperature	-25°C ~+50°C
AC withstand voltage	Inter-electrode: 2.15Un/10s
	Between shell and phase: 3kV/10s
Allowable over-voltage (Un)	1.10 of rated voltage (not greater than 8h in 24h)
Allowable over-current (In)	1.43 of rated current
Altitude	≤2000m
Relative humidity	≤50% at 40°C
	≤90% at 20°C
Appearance	Box
Inside Dipping Material	Polypropylene metallized film
Self discharge characteristic	The residual voltage reduces to 50V or below from √ 2Un after 3 minutes in case of power failure
Standard	IEC60831

HBSM Lower-voltage capacitors selection guide

Standard: IEC60831

Commercial Reference	Description	Voltage (V)	Capacity kvar (50Hz)	Capacitance (uF)	Capacity kvar (60Hz)
HBSM00400001001D	HBSM-0-400V-10kvar-1phase-D	400	10	198.95	12
HBSM00400001501D	HBSM-0-400V-15kvar-1phase-D	400	15	298.42	18
HBSM00400002001D	HBSM-0-400V-20kvar-1phase-D	400	20	397.90	24
HBSM00400003001D	HBSM-0-400V-30kvar-1phase-D	400	30	596.85	36
HBSM00400005001Q	HBSM-0-400V-50kvar-1phase-Q	400	50	994.75	60
HBSM00400001003D	HBSM-0-400V-10kvar-3phase-D	400	10	198.95	12
HBSM00400001503D	HBSM-0-400V-15kvar-3phase-D	400	15	298.42	18
HBSM00400002003D	HBSM-0-400V-20kvar-3phase-D	400	20	397.90	24
HBSM00400002503D	HBSM-0-400V-25kvar-3phase-D	400	25	497.37	30
HBSM00400003003D	HBSM-0-400V-30kvar-3phase-D	400	30	596.85	36
HBSM00400003003M	HBSM-0-400V-30kvar-3phase-M	400	30	596.85	36
HBSM00400005003Q	HBSM-0-400V-50kvar-3phase-Q	400	50	994.75	60
HBSM00400006003Q	HBSM-0-400V-60kvar-3phase-Q	400	60	1193.70	72
HBSM00450001003D	HBSM-0-450V-10kvar-3phase-D	0.45	10	157.19	12
HBSM00450001503D	HBSM-0-450V-15kvar-3phase-D	0.45	15	235.79	18
HBSM00450002003D	HBSM-0-450V-20kvar-3phase-D	0.45	20	314.39	24
HBSM00450002503D	HBSM-0-450V-25kvar-3phase-D	0.45	25	392.99	30
HBSM00450003003D	HBSM-0-450V-30kvar-3phase-D	0.45	30	471.58	36
HBSM00450004003M	HBSM-0-450V-40kvar-3phase-M	0.45	40	628.78	48
HBSM00525001503D	HBSM-0-525V-15kvar-3phase-D	525	15	173.23	18
HBSM00525002003D	HBSM-0-525V-20kvar-3phase-D	525	20	230.98	24
HBSM00525003003M	HBSM-0-525V-30kvar-3phase-M	525	30	346.47	36
HBSM00525005003Q	HBSM-0-525V-50kvar-3phase-Q	525	50	577.45	60
HBSM00525006003Q	HBSM-0-525V-60kvar-3phase-Q	525	60	692.94	72

HBSM Lower-voltage capacitors selection guide

Standard: IEC60831

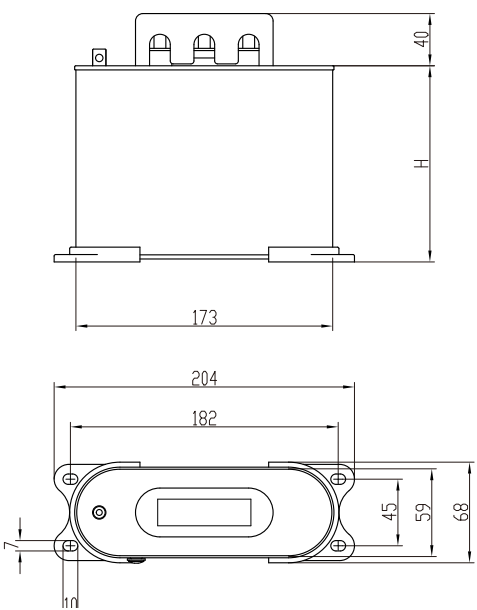
Coordination table between Capacitor and Contactor

Commercial Reference	Description	Voltage (V)	Capacity kvar (50Hz)	Matched HDC19s
HBSM00400001001D	HBSM-0-400V-10kvar-1phase-D	400	10	HDC19s-32
HBSM00400001501D	HBSM-0-400V-15kvar-1phase-D	400	15	HDC19s-43
HBSM00400002001D	HBSM-0-400V-20kvar-1phase-D	400	20	HDC19s-63
HBSM00400003001D	HBSM-0-400V-30kvar-1phase-D	400	30	HDC19s-95
HBSM00400005001Q	HBSM-0-400V-50kvar-1phase-Q	400	50	HDC19s-115
HBSM00400001003D	HBSM-0-400V-10kvar-3phase-D	400	10	HDC19s-32
HBSM00400001503D	HBSM-0-400V-15kvar-3phase-D	400	15	HDC19s-43
HBSM00400002003D	HBSM-0-400V-20kvar-3phase-D	400	20	HDC19s-63
HBSM00400002503D	HBSM-0-400V-25kvar-3phase-D	400	25	HDC19s-63
HBSM00400003003D	HBSM-0-400V-30kvar-3phase-D	400	30	HDC19s-95
HBSM00400003003M	HBSM-0-400V-30kvar-3phase-M	400	30	HDC19s-95
HBSM00400005003Q	HBSM-0-400V-50kvar-3phase-Q	400	50	HDC19s-115
HBSM00400006003Q	HBSM-0-400V-60kvar-3phase-Q	400	60	Not available in HIMEL
HBSM00450001003D	HBSM-0-450V-10kvar-3phase-D	0.45	10	HDC19s-25
HBSM00450001503D	HBSM-0-450V-15kvar-3phase-D	0.45	15	HDC19s-32
HBSM00450002003D	HBSM-0-450V-20kvar-3phase-D	0.45	20	HDC19s-43
HBSM00450002503D	HBSM-0-450V-25kvar-3phase-D	0.45	25	HDC19s-63
HBSM00450003003D	HBSM-0-450V-30kvar-3phase-D	0.45	30	HDC19s-63
HBSM00450004003M	HBSM-0-450V-40kvar-3phase-M	0.45	40	HDC19s-95
HBSM00525001503D	HBSM-0-525V-15kvar-3phase-D	525	15	HDC19s-25
HBSM00525002003D	HBSM-0-525V-20kvar-3phase-D	525	20	HDC19s-43
HBSM00525003003M	HBSM-0-525V-30kvar-3phase-M	525	30	HDC19s-63
HBSM00525005003Q	HBSM-0-525V-50kvar-3phase-Q	525	50	HDC19s-95
HBSM00525006003Q	HBSM-0-525V-60kvar-3phase-Q	525	60	HDC19s-115

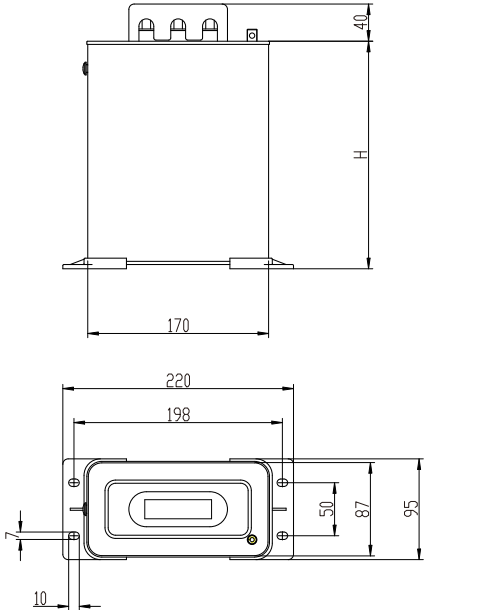
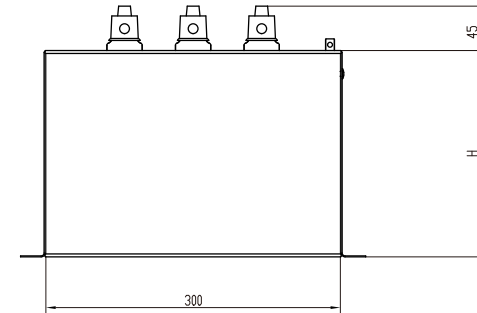
HBSM Lower-voltage capacitors Overall Dimension

Standard: IEC60831

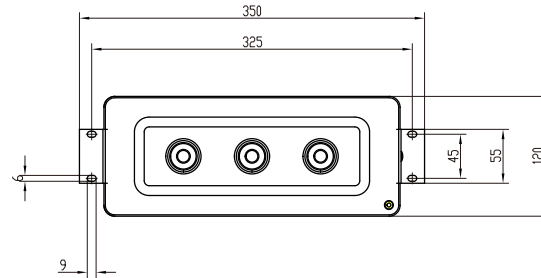
HBSM



	DType					Unit: mm
Housing code	D130	D185	D210	D245	D290	
Capacitor body length x width	173 x 59					
Capacitor body height (H)	130	185	210	245	290	
Max. height	170	225	250	285	330	
Mounting hole size	See Figure					



	DType		Unit: mm
Housing code	M210	M265	
Capacitor body length x width	170 x 87		
Capacitor body height (H)	210	265	
Max. height	250	305	
Mounting hole size	See Figure		



	DType		Unit: mm
Housing code	Q210	Q240	
Capacitor body length x width	300 x 120		
Capacitor body height (H)	210	240	
Max. height	255	285	
Mounting hole size	See Figure		

POWER FACTOR CORRECTION

HJKL Power Factor Correction Controllers

Standard: IEC60831



Range Presentation

HJKL is Himel range of reactive power compensation controllers, matching all kinds of capacitors in low-voltage system. It adopts MCU controlling to compute the phase difference between the fundamentals of current and voltage, enabling precise power factor measurement with quick response.

Features

- ◆ New control algorithm designed to reduce the number of switching operations and quickly attain the targeted power factor.
- ◆ Quick and simple mounting and wiring.
- ◆ Direct viewing of installation electrical information and capacitor condition.
- ◆ Direct reading and easy setup
- ◆ Alarm indication.

Online Content



HJKL

Selection Code

Range name	Sampling voltage	Output loops	Circuit type	Enclosure material
HJKL	2CM	4	DC	S
HJKL	2CM: 220V 5CQ: 380V	4: 4 loops 6: 6 loops 8: 8 loops 10: 10 loops 12: 12 loops	Default: AC circuit DC: DC 12V	S: Molded case

Technical Parameters		
Power Factor Correction Controllers	HJKL	
Category	Parameter value	Default Value
Sampling voltage	380V(HJKL5C)/ 220V(HJKL2C)±15%	
Sampling current	n/5A (Is≤5A)	
Frequency	50-60(Hz)	
Sensitivity	50mA	
Input threshold	lag 0.80-lead-0.82 adjustable step 0.01	0.95
Cut-off threshold	lead-0.80-lag0.82 adjustable step 0.01	-0.99
Loop setting	1-12 adjustable step 1	
Time setting	1s~120s adjustable step 1s	30s
Overvoltage setting	400~450V(HJKL5C)adjustable step 5V	430V
	235~260V(HJKL2C)adjustable step 5V	245V
Undervoltage protection	300V(HJKL5C) / 170V(HJKL2C)	
Undercurrent setting	0mA~500mA adjustable step 50mA	200mA (0 is for close)
COS display	Lead & Lag (0.00~0.99) resolution 0.01	
Working methods	Continuous working, circular switching	
Output loops	4, 6, 8, 10, 12 loops	
Capacity of output	Each group 5A, 220V resistive / 3A, 380V resistive	
IP grade	IP30 for cover	

POWER FACTOR CORRECTION

HJKL Power Factor Correction Controllers

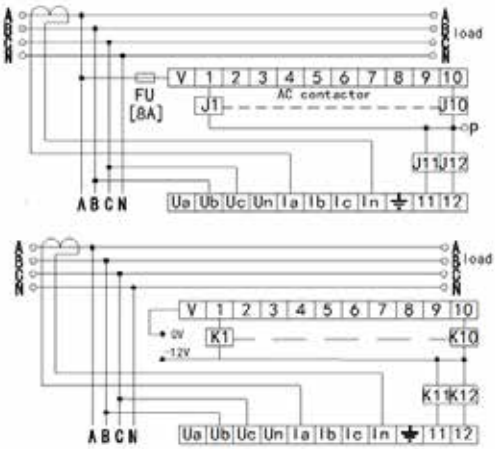
Standard: IEC60831



Wiring Diagram

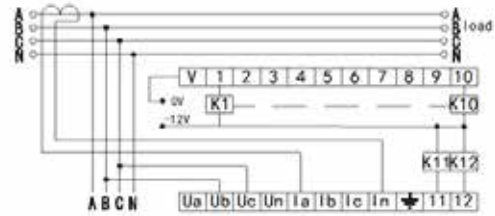
HJKL5C

HJKL5C
Ub, Uc: input of voltage signal
Ia, In: input of current signal
V: common terminal of control output
e.g. Contactor 380V: point P is connected to phase B or phase C;
e.g. Contactor 220V: point P is connected to phase N



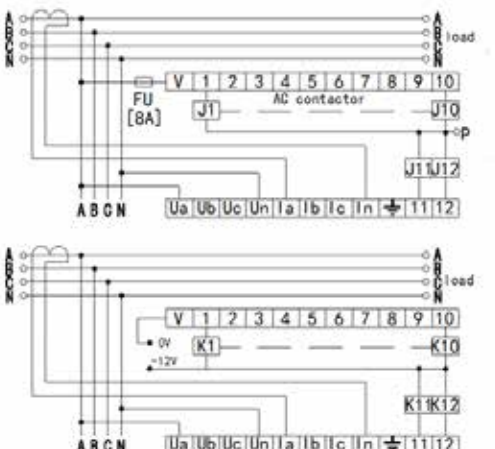
HJKL5C-DC

HJKL5C-DC
Ub, Uc: input of voltage signal
Ia, In: input of current signal
V, K(1-12): output of DC control signal
V: 0V
K(1-12): output -12V



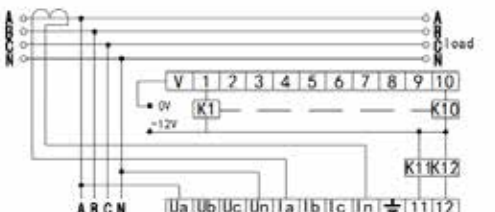
HJKL2C

HJKL2C
Ub, Uc: input of voltage signal
Ia, In: input of current signal
V: common terminal of control output
e.g. Contactor 380V: point P is connected to phase B or phase C;
e.g. Contactor 220V: point P is connected to phase N

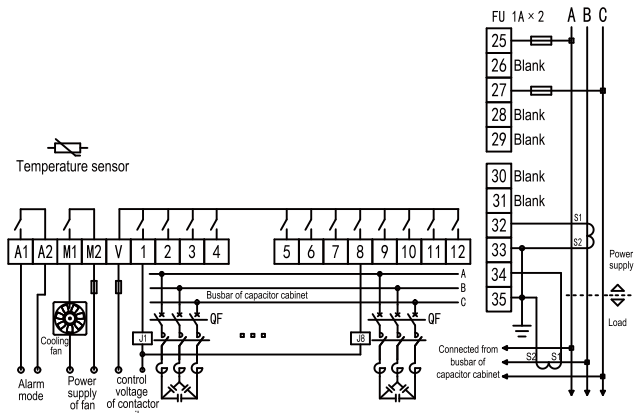


HJKL2C-DC

HJKL2C-DC
Ub, Uc: input of voltage signal
Ia, In: input of current signal
V, K(1-12): output of DC control signal
V: 0V
K(1-12): output -12V



HJKF5C



POWER FACTOR CORRECTION

HJKF Power Factor Correction Controllers

Standard: IEC60051



Range Presentation

HJKF is Hime range of the reactive power compensation controller. It is a special controller used for three-phase low-voltage power grid. Automatic generation of multiple alarm events, which can remind users through nodes or sounds. Temperature adjustment function is involved in all models, which can save 1 pcs temperature-control regulator in capacitor cabinet. Harmonics detecting and protection functions are included as well. All parameters are protected by password to avoid any unexpected modifications.

Features

- ◆ Elegant LCD display with rich contents
- ◆ Wiring identification by manual assistance is included for easy wiring
- ◆ Current dotted terminal identification is included for easy wiring switch
- ◆ Output code can be arbitrary coding, and it can be compatible with various capacity configurations
- ◆ Four running output modes: circulate switching, coding switching, cut-on first and then cut-off, optimization switching
- ◆ Temperature control node included is easy to adjust ambient temperature of the reactive power compensation cabinet
- ◆ Alarm node included is easy for users to temperature control, remote monitoring and fault protection
- ◆ Built-in buzzer alarm function, and alarm events can be optional which will be convenient for users on-site to find abnormal cases
- ◆ RS485 port is for communication type model which can be arbitrary wiring without differentiating A and B. It's easy for users to do wiring with master computers.

Selection Code

Range Name	Sampling Voltage	Output Loops	Function
HJKF5C	V	12	Z
HJKF5C	V: 400V	12: 12 loops	Default: without communication Z: Communication type

Technical Parameters	
Rated operating voltage	AC400V (±15%)
Frequency	50 / 60Hz
Rated current	≤5A
Sensitivity	≤50mA
Compensation method	Common three-phase compensation
Power loss	<5VA
Response time	1s~120s
Output capacity	220V/5A
Output loop number	12 loops
Hole size	113*113(mm)
Weight	<0.6kg

POWER FACTOR CORRECTION

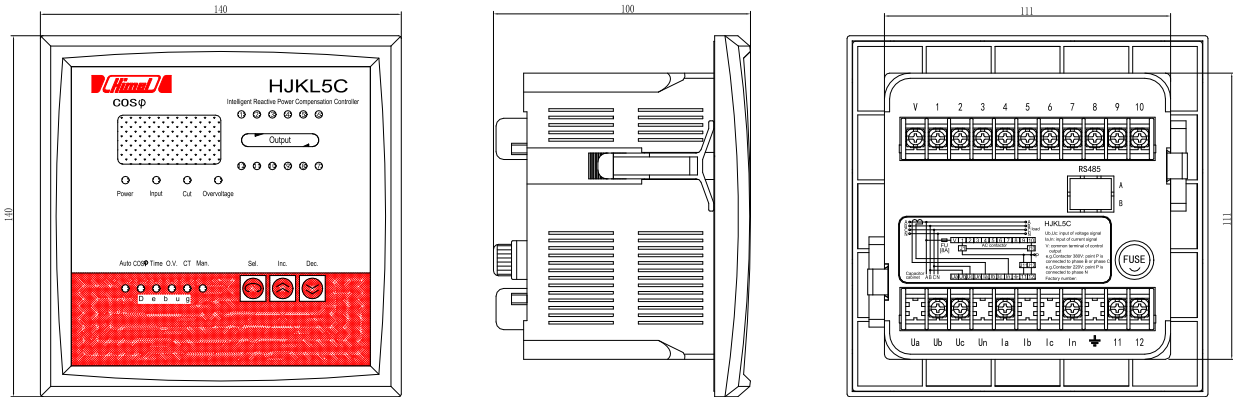
HJKF Power Factor Correction Controllers

Standard: IEC60051

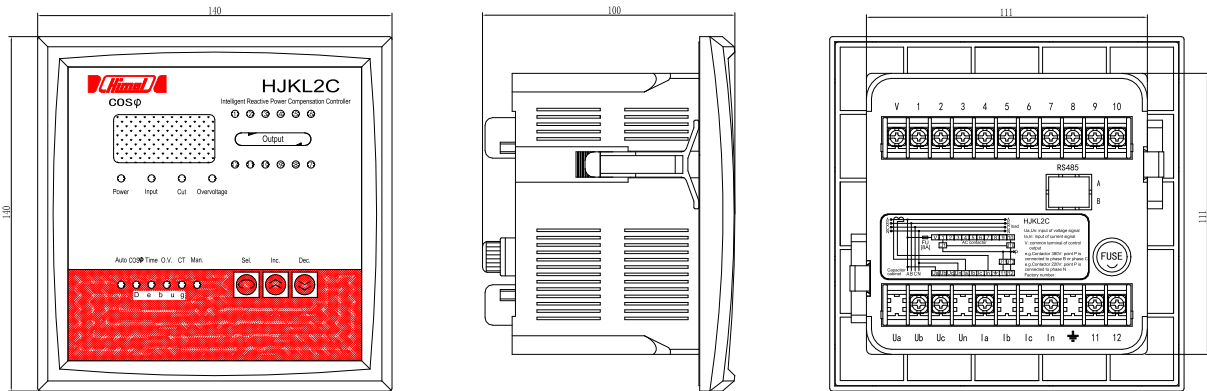


Dimensions

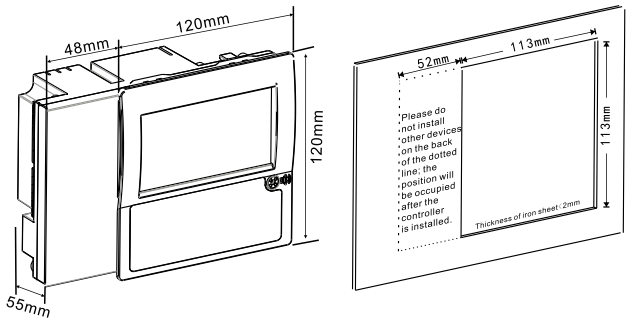
HJKL5C



HJKL2C



HJKF5C



POWER FACTOR CORRECTION

HKSG Detuned Reactors

Standard: IEC60289



Range Presentation

Capacitors get easily affected and damaged by harmonic current, inrush current, and due to over voltage in the reactive power compensation system. Therefore, to avoid parallel resonance and the issue about amplified harmonic current, reactors need to be added in series along with the capacitors. Reactors are applied to avoid excessive amplification of power grid harmonics and resonance resulting from the connection of capacitor banks to prolong the service time of capacitors.

Features

- Reactors adopt three-phase three-column type structure:
- ◆ High-impact binder is applied (high-temperature tolerance) and no noise during the operation
 - ◆ Coils are tightly wound with enameled flat wires to ensure that coils of reactors do not vibrate during the operation(foil winding is used when current is more than 100A).
 - ◆ High efficiency and low loss

Online Content



HKSG

Selection Code

Model	Winding Material	RatedCccapacity of the Reactor	Rated Voltage of the Capacitor	Reactance Ratio
HKSG	L	1P0	G048	H7
	Default: Copper windings L: Aluminum windings	P6: 0.6kvar P7: 0.7kvar 1P0: 1kvar ... 9P8: 9.8kvar	G048: 480V G052: 525V	H7: 7% H14: 14%"

Technical Parameters	
Basic Information	HKSG Series
Rated Operating Voltage(AC)	AC0.48kV, AC0.525kV (others can be customized)
Reactance Ratio	7% and 14% (others can be customized)
Phase	Three-phase
Rated Frequency	50Hz
Withstand voltage grade	3000V / min
Overload ability	≤1.35 times
Temperature rise limitation	Coil temperature rise≤85K Winding temperature rise≤95K
Reactor noise	< 50dB
Insulation class	> F
IP grade	IP00
Altitude	≤ 2000m
Ambient temperature	-25°C~+50°C
Standard	IEC 60289

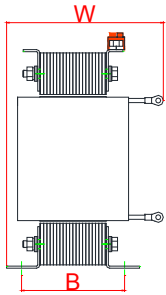
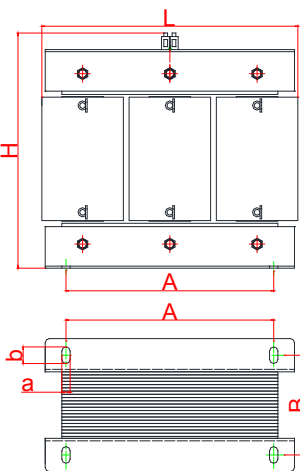
POWER FACTOR CORRECTION

HKSG Detuned Reactors

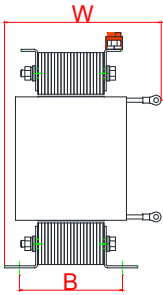
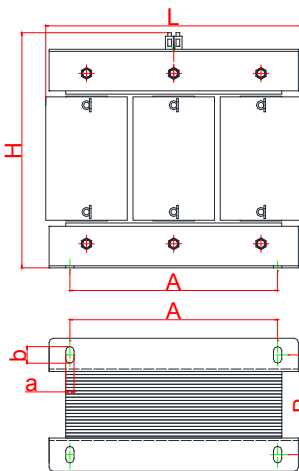
Standard: IEC60289

Dimension

No.	Product Parameter			Aluminum			Product outline	Copper			Product outline
	Reactor Model	Reactor capacity (kvar)	Capacitor capacity (kvar)	Dimension (mm)	Installation dimension (mm)	Hole dimension (mm)		Dimension (mm)	Installation dimension (mm)	Hole dimension (mm)	
				L*W*H	A*B	a*b		L*W*H	A*B	a*b	
1	HKSG-0.35/0.48-7%	0.35	5	160*115*170	130*75	17*φ7	D	160*115*170	130*75	17*φ7	D
2	HKSG-0.7/0.48-7%	0.7	10	160*120*170	130*82	17*φ7		200*110*195	170*72	17*φ7	
3	HKSG-0.84/0.48-7%	0.84	12	200*145*185	170*72	17*φ7		200*115*195	170*77	17*φ7	
4	HKSG-1.05/0.48-7%	1.05	15	200*150*185	170*77	17*φ7	Y	200*155*185	170*82	17*φ7	Y
5	HKSG-1.4/0.48-7%	1.4	20	200*165*185	170*87	17*φ7		200*165*185	170*92	17*φ7	
6	HKSG-1.75/0.48-7%	1.75	25	200*170*185	200*95	17*φ7		240*180*210	200*95	22*φ10	
7	HKSG-2.1/0.48-7%	2.1	30	240*180*210	200*95	22*φ10		240*185*230	200*100	22*φ10	
8	HKSG-2.45/0.48-7%	2.45	35	240*190*235	200*100	22*φ10		250*190*235	200*105	22*φ10	
9	HKSG-2.8/0.48-7%	2.8	40	240*190*235	200*100	22*φ10		250*195*235	200*110	22*φ10	
10	HKSG-3.15/0.48-7%	3.15	45	250*195*235	210*105	22*φ10		250*205*235	210*120	22*φ10	
11	HKSG-3.5/0.48-7%	3.5	50	250*200*235	210*110	22*φ10		250*205*255	210*120	22*φ10	
12	HKSG-4.2/0.48-7%	4.2	60	250*210*255	210*120	22*φ10		310*200*255	250*110	22*φ10	
13	HKSG-0.7/0.525-14%	0.7	5	200*110*190	170*72	17*φ7	D	200*110*190	170*72	17*φ7	D
14	HKSG-1.4/0.525-14%	1.4	10	200*125*190	170*87	17*φ7		200*125*190	170*87	17*φ7	
15	HKSG-1.68/0.525-14%	1.68	12	240*175*210	200*90	22*φ10		240*170*210	200*90	22*φ10	
16	HKSG-2.1/0.525-14%	2.1	15	240*185*210	200*100	22*φ10	Y	240*180*230	200*100	22*φ11	Y
17	HKSG-2.8/0.525-14%	2.8	20	240*185*230	200*100	22*φ10		240*190*230	200*110	22*φ10	
18	HKSG-3.5/0.525-14%	3.5	25	250*200*235	210*110	22*φ10		250*200*235	210*115	22*φ10	
19	HKSG-4.2/0.525-14%	4.2	30	250*200*255	210*110	22*φ10		250*205*255	210*120	22*φ10	
20	HKSG-4.9/0.525-14%	4.9	35	250*210*255	210*120	22*φ10		310*205*285	210*120	22*φ10	
21	HKSG-5.6/0.525-14%	5.6	40	310*200*285	250*110	22*φ10		310*205*285	250*120	22*φ10	
22	HKSG-6.39/0.525-14%	6.3	45	310*200*285	250*110	22*φ10		310*215*285	250*130	22*φ10	
23	HKSG-7.0/0.525-14%	7	50	310*215*285	250*120	22*φ10		310*225*285	250*140	22*φ10	
24	HKSG-8.4/0.525-14%	8.4	60	310*225*285	250*130	22*φ10		310*235*285	250*150	22*φ10	



Appearance D



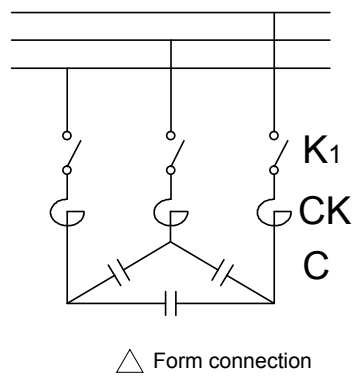
Appearance Y

POWER FACTOR CORRECTION

HKSG Detuned Reactors

Standard: IEC60289

Product Connection Method



Note:
the standard type of connection is Δ type connection (as shown in the figure above).
Other connection methods have to make separate comments when ordering.

Operating Environment and Working Conditions

Ensure the followings:

- ◆ No harmful gas, inflammable and explosive materials are around.
- ◆ Surrounding is well ventilated. For example: if it is installed in the cabinet, ventilation facilities should be added.
- ◆ There is no pollution, corrosive, and explosive medium in the atmosphere, which can seriously affects the insulation of reactors.
- ◆ No serious vibration and turbulence at the installation sites.
- ◆ The place is free from direct contact of rain and snow.

POWER FACTOR CORRECTION

HKSG Detuned Reactors

Standard: IEC60289

Guideline for Model Selection

With modern electronic technology and developed applications, the number of harmonics generating devices is gradually growing with high harmonic content. All other types of equipment, except the resistance heating devices and filament lamps, generate harmonics with different levels of harmonic content.

Harmonic Generating Devices:

The devices, which can generate harmonics include:

- ◆ Magnetic-core equipment (transformer, motor, reactor, electric welder, and inductive heating machine)
- ◆ Electric-control transmission equipment (variable frequency speed control, thyristor-type voltage regulation control, elevator or hoister)
- ◆ Electronic rectifier, inverter, electric arc furnace, furnace of calcium carbide, switching mode power supply, UPS, electronic office equipment (computers and printers),
- ◆ medical electronic equipment
- ◆ household appliances and many more.
- ◆ Converters, frequency conversion equipment, rolling mills, electric arc furnaces, and electric locomotive and saturated transformers with high ratings are the main sources of harmonics.

Sources Generating 3rd Harmonics:

The main sources for generating 3rd harmonics include:

- ◆ Electric arc furnace
- ◆ Electric locomotive
- ◆ Distribution system of shopping mall, business building, and residential building

Sources Generating 5th Harmonics:

The main sources for generating 5th harmonics include:

- ◆ Electric locomotive
- ◆ Distribution system of shopping mall, business building, and residential building
- ◆ Converter and frequency conversion equipment with high ratings

Sources Generating 7th Harmonics:

The main sources for generating 7th harmonics are converters and frequency conversion equipment with high ratings.

Where does our Reactor Fit :

Our reactors are mainly used to filter 3rd and 5th harmonics. Normally, reactance ratio is selected from the below list:

- ◆ 3rd harmonics is the main content: 14%
- ◆ 5th harmonics is the main content: 7%

Note: If a customer has requirements for other reactance ratio, we can also customize it.

POWER FACTOR CORRECTION

HDC19s Capacitor Switching Contactors

Standard: IEC60947-4-1, IEC60947-5-1



Range Presentation

HDC19s is Himel range of contactors dedicated for switching of capacitors. It is developed based on 3 series contactor with technology to reduce capacitor closing current impact on contactor contacts.

Features

- ◆ Current range covers from 25A to 115A
- ◆ Various auxiliary contact types can be selected for different applications
- ◆ Manufactured on automated production line for better reliability.

Online Content



HDC19s

Selection Code

Range name	Frame current	Auxiliary contact	Coil voltage	Frequency
HDC19s	25	11	M	5
HDC19s: Capacitor Switching Contactor	25: 25A 32: 32A 43: 43A 63: 63A 95: 95A 115: 115A	HDC19s-25~43A: 11: 1NO+1NC 20: 2NO+0NC 02: 0NO+2NC HDC19s-63~115A: 12: 1NO+2NC 21: 2NO+1NC	F: 110V S: 127V M: 220/230V U: 240V Q: 380/400V L: 415V X: 440V	5: 50Hz 7: 50/60Hz

Technical Parameters								
Capacitor Switching Contactors			HDC19s-25	HDC19s-32	HDC19s-43	HDC19s-63	HDC19s-95	HDC19s-115
Standard			IEC60947-4-1, IEC60947-5-1					
Certificate			CE					
Main circuit								
Rated operating voltage (Ue)		V	380/400					
Rated insulation voltage (Ui)		V	690					
Rated current of controlled capacitor	AC-6b 380V	A	17	23	29	43	63	87
Rated capacity of controlled capacitor (Qn: kvar)	Rated operating voltage of capacitor	AC-6b 220V	6	10	15	18	30	35
		AC-6b 380V	12	20	25	30	50	60
Rated conventional thermal current		A	25	32	43	63	95	125
Controlling capability of inrush current		A	≤35In			≤55In		
Mechanical endurance		10000 times	100					
Electrical endurance	AC-6b 380V	10000 times	15				12	
Operating frequency	AC-6b 380V	Times/h	300				120	
Coil								
Coil voltage (Us)		V	24,36,48,110,127,220/230,240,380/400,415,440					
Coil frequency		Hz	AC 50Hz & 50/60Hz					
Operating voltage		V	85%-110%Us					
Drop-out voltage		V	20%-75%Us					
Auxiliary Contact								
Auxiliary contact combination			11,20,02			12,21		
Rated conventional thermal current (Ith)		A	10					

Note: Parameters above are considered under three-phase system; for single-phase capacitor, please consult us.

POWER FACTOR CORRECTION

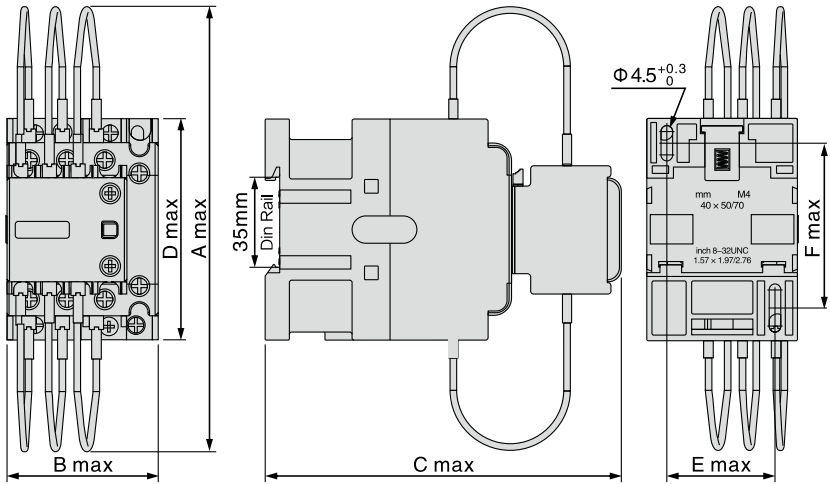
HDC19s Capacitor Switching Contactors

Standard: IEC60947-4-1, IEC60947-5-1

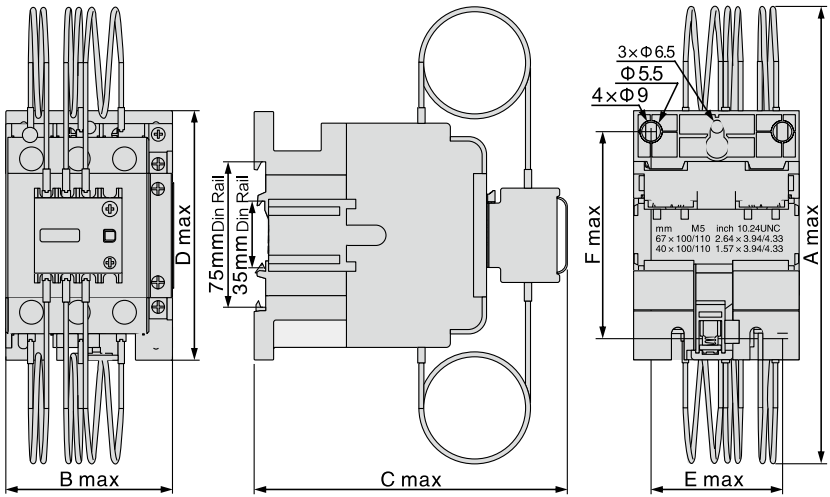


Dimension

HDC19s-25,32,43



HDC19s-63,95,115



Overall and installation Dimensions

Model	Overall size				Installation dimension	
	Amax	Bmax	Cmax	Dmax	Emax	Fmax
HDC19s-25	176	45.5	122	74.5	35	50/60
HDC19s-32	180	56.5	132	83	40	50/60
HDC19s-43	180	56.5	132	83	40	50/60
HDC19s-63	190	74.5	154	127.5	59	100/110
HDC19s-95	190	85.5	160	127.5	67	100/110
HDC19s-115	190	85.5	160	127.5	67	100/110

POWER FACTOR CORRECTION

HDC19s Capacitor Switching Contactors

Standard: IEC60947-4-1, IEC60947-5-1



Working Conditions

Ambient temperature: $-5^{\circ}\text{C} \sim +40^{\circ}\text{C}$, and the daily average temperature: $\leq 35^{\circ}\text{C}$

Altitude: ≤ 2000 m

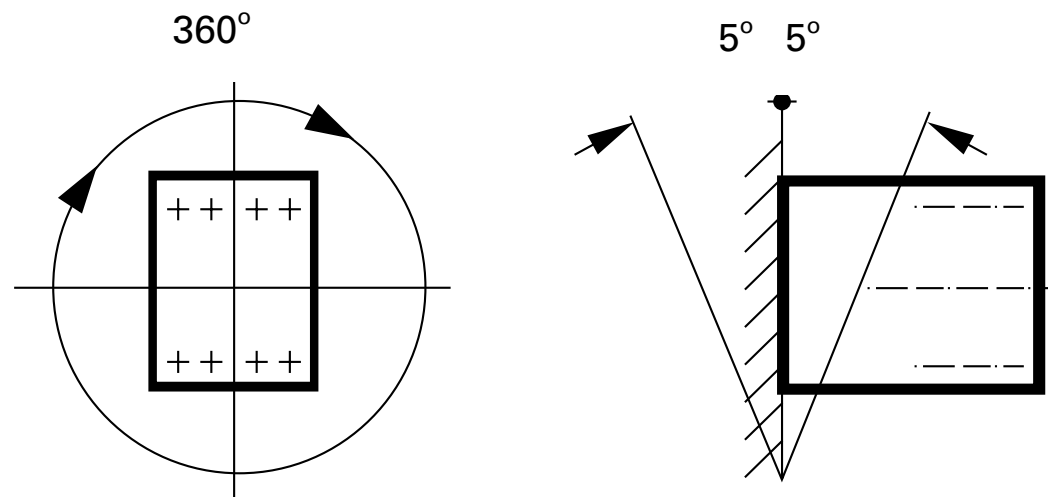
The atmospheric relative humidity does not exceed 50% when the highest ambient temperature is +40°C. It is allowed to have a relative higher humidity under lower temperature, e.g. up to 90% at +20°C. For occasional dew due to the temperature change, preventive measures shall be taken.

Pollution Level: 3

Installation Conditions

Installation Type: III

Installation position: should be installed in the absence of a significant shock and vibration point



Notes

[illegible]

[illegible]

