# Power Factor Correction

(Capacitor,Capacitor Contactor Controller,Reactor)

Himel

# 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: $(kVA)^2 = (kW)^2 + (kvar)^2$.

The Power Factor has been defined as the ratio of active power (kW) to apparent power (kVA). Power Factor = (kW) / (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 parraffin 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?

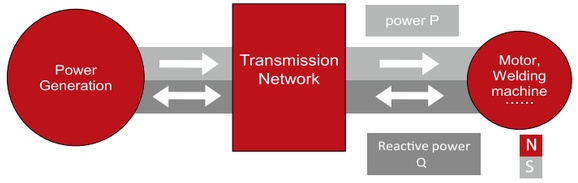
All AC electrical networks consume two types of power: active power (kW) and reactive power (kvar):

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.

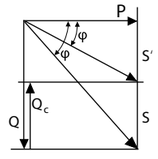
In an electrical circuit, the reactive energy is supplied in addition to the active energy.

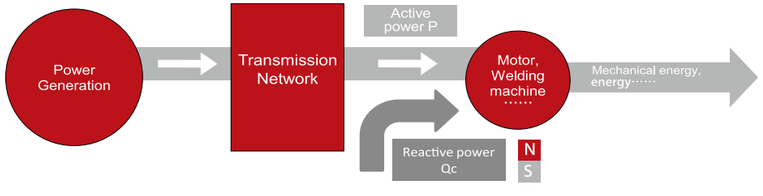



For these reasons, there is a great advantage in generating reactive energy at the load level in order to prevent the unnecessary circulation of current in the network. This is what is known as "power factor correction". This is obtained by the connection of capacitors, which produce reactive energy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

Single-phase DType

Three-phase DType

Three-phase Four-wire DType

Three-phase MType

Three-phase Four-wire QType

Three-phase Four-wire MType

# 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:

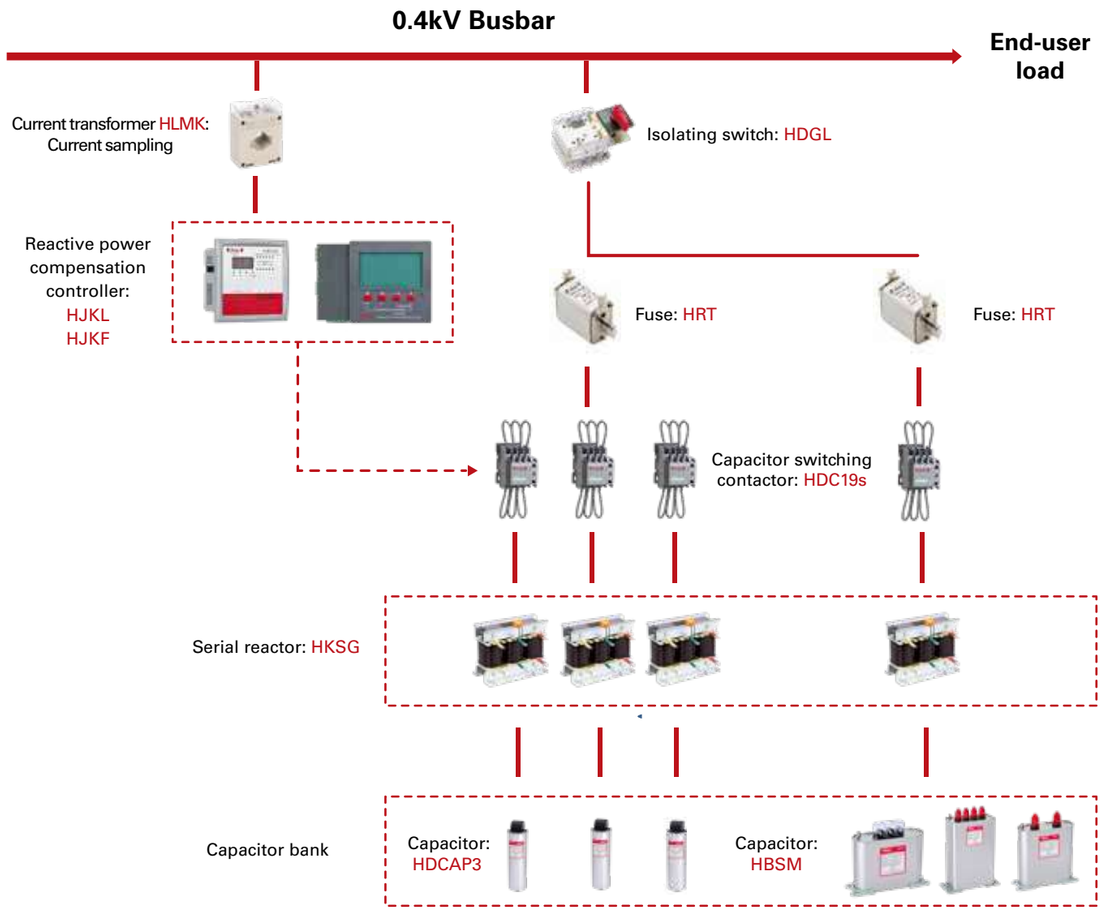
- The gap of the iron core adopts epoxy resin impreged glass cloth laminated sheet as the spacer. High-impact binder is applied (high-temperature tolerance) to ensure that gaps of reactors do not change and there is no noise during the operation.
- Coils are tightly wound with enameled flat wires to 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.

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

01

### HBSM Low-voltage Capacitor

HBSM

Rated Operating Voltage: AC 230V,250V,280V,400V,415V, 440V,450V,480V,525V, 660V,690V,750V
Rated Capacity: 0.5~60kvar
Connection Type: Single-phase,three-phase, three-phase four-wire
Rated Frequency: 50/60Hz
Appearance: Box
Inside Dipping Material: Polypropylene Metallized Film
Ambient Temperature: -25°C ~+50°C

02

### HJKL Reactive Power Compensation Controllers

HJKL

Sampling voltage: AC 380V/220V±15%
Sampling current: n/5A ( Is≤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,150A,170A
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 electricity 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<br>**0450:** 450V<br>**0525:** 525V | **005:** 5kvar<br>**705:** 7.5kvar<br>**010:** 10kvar<br>**025:** 25kvar<br>**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<br>≤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

# 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 electricity 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

**Single-Phase**

| Range Name | With or without reactor | Rated Voltage | Rated compensation capacity | Compensation method | Housing type |
|---|---|---|---|---|---|
| **HBSM** | **0** | **02500** | **0150** | **1** | **D** |
| **HBSM:** Box type | **0:** Without reactor | **02500:** 250V | **0020:** 2kvar<br>**0030:** 3kvar<br>**0040:** 4kvar<br>**0050:** 5kvar<br>**0080:** 8kvar<br>**0100:** 10kvar<br>**0120:** 12kvar<br>**0150:** 15kvar | **1:** Single-phase compensation | **D:** D type |
| | | | **0200:** 20kvar | | **M:** M type |

*For other voltages(230V, 280V, 400V, 415V, 450V, 480V, 525V), please consult local Himel office.

**Three-phase**

| 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 | **04000:** 400V<br>**04150:** 415V<br>**04500:** 450V<br>**05250:** 525V | **0005:** 0.5kvar<br>...<br>**0200:** 20kvar<br>...<br>**0320:** 32kvar | **3:** Three-phase compensation | **D:** D type |
| | | | **0300:** 30kvar<br>**0350:** 35kvar<br>**0400:** 40kvar | | **M:** M type |
| | | | **0400:** 40kvar<br>**0450:** 45kvar<br>**0500:** 50kvar<br>**0600:** 60kvar | | **Q:** Q type |

*For other voltages(230V, 250V, 440V, 480V, 690V, 750V), please consult local Himel office.

# HBSM Low-voltage Capacitors

Standard: IEC60831

**Three-phase four-wire**

| Range Name | With or without reactor | Rated Voltage | Rated compensation capacity | Compensation method | Housing type |
|---|---|---|---|---|---|
| **HBSM** | **0** | **02503** | **0150** | **4** | **D** |
| **HBSM:** Box type | **0:** Without reactor | **02303:** 230√3V<br>**02503:** 250√3V | **0030:** 3kvar<br>...<br>**0180:** 18kvar | **4:** Three-phase four-wire compensation 3YN | **D:** D type |
| | | | **0200:** 20kvar<br>**0240:** 24kvar | | **M:** M type |
| | | | **0250:** 25kvar<br>**0300:** 30kvar<br>**0400:** 40kvar<br>**0450:**45kvar | | **Q:** Q type |

*For other voltages(280√3V,400√3V),please consult local Himel office.

| Technical Parameters | | |
|---|---|---|
| **Low-voltage Capacitor** | | **HBSM** |
| Rated Voltage(AC) | Single-phase | 230V,250V,280V,400V,415V,450V,480V,525V |
| | Three-phase | 230V,250V,400V,415V,440V,450V,480V,525V |
| | Three-phase four-wire | 400V(230√3V),450V(250√3V),480V(280√3V),690V(400√3V) |
| 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 | | 50/60Hz |
| 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<br>≤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 |





# selection guide

Standard: IEC60831

## HDCAP3 50/60Hz Selection Guide

| Commercial Reference | Description | Ue (V) | 50Hz | | | 60Hz | | |
|---|---|---|---|---|---|---|---|---|
| | | | kvar | Ie (A) | Contact | kvar | Ie (A) | Contact |
| HDCAP304000053 | HDCAP3-400V-5kvar-3phase | 400 | 5 | 7.2 | HDC19s-25 | 6 | 8.7 | HDC19s-25 |
| HDCAP304007053 | HDCAP3-400V-7.5kvar-3phase | 400 | 7.5 | 10.8 | HDC19s-25 | 9 | 13 | HDC19s-25 |
| HDCAP304000103 | HDCAP3-400V-10kvar-3phase | 400 | 10 | 14.4 | HDC19s-25 | 12 | 17.3 | HDC19s-32 |
| HDCAP304000123 | HDCAP3-400V-12kvar-3phase | 400 | 12 | 17.3 | HDC19s-32 | 14.4 | 20.8 | HDC19s-32 |
| HDCAP304000143 | HDCAP3-400V-14kvar-3phase | 400 | 14 | 20.2 | HDC19s-32 | 16.8 | 24.2 | HDC19s-43 |
| HDCAP304000153 | HDCAP3-400V-15kvar-3phase | 400 | 15 | 21.7 | HDC19s-43 | 18 | 26 | HDC19s-43 |
| HDCAP304000163 | HDCAP3-400V-16kvar-3phase | 400 | 16 | 23.1 | HDC19s-43 | 19.2 | 27.7 | HDC19s-43 |
| HDCAP304000183 | HDCAP3-400V-18kvar-3phase | 400 | 18 | 26 | HDC19s-43 | 21.6 | 31.2 | HDC19s-63 |
| HDCAP304000203 | HDCAP3-400V-20kvar-3phase | 400 | 20 | 28.9 | HDC19s-63 | 24 | 34.6 | HDC19s-63 |
| HDCAP304000253 | HDCAP3-400V-25kvar-3phase | 400 | 25 | 36.1 | HDC19s-63 | 30 | 43.3 | HDC19s-95 |
| HDCAP304000303 | HDCAP3-400V-30kvar-3phase | 400 | 30 | 43.3 | HDC19s-95 | 36 | 52 | HDC19s-95 |
| HDCAP304500053 | HDCAP3-450V-5kvar-3phase | 450 | 5 | 6.4 | HDC19s-25 | 6 | 7.7 | HDC19s-25 |
| HDCAP304507053 | HDCAP3-450V-7.5kvar-3phase | 450 | 7.5 | 9.6 | HDC19s-25 | 9 | 11.5 | HDC19s-25 |
| HDCAP304500103 | HDCAP3-450V-10kvar-3phase | 450 | 10 | 12.8 | HDC19s-25 | 12 | 15.4 | HDC19s-25 |
| HDCAP304500123 | HDCAP3-450V-12kvar-3phase | 450 | 12 | 15.4 | HDC19s-25 | 14.4 | 18.5 | HDC19s-32 |
| HDCAP304500143 | HDCAP3-450V-14kvar-3phase | 450 | 14 | 18 | HDC19s-32 | 16.8 | 21.6 | HDC19s-43 |
| HDCAP304500153 | HDCAP3-450V-15kvar-3phase | 450 | 15 | 19.2 | HDC19s-32 | 18 | 23.1 | HDC19s-43 |
| HDCAP304500163 | HDCAP3-450V-16kvar-3phase | 450 | 16 | 20.5 | HDC19s-32 | 19.2 | 24.6 | HDC19s-43 |
| HDCAP304500183 | HDCAP3-450V-18kvar-3phase | 450 | 18 | 23.1 | HDC19s-43 | 21.6 | 27.7 | HDC19s-43 |
| HDCAP304500203 | HDCAP3-450V-20kvar-3phase | 450 | 20 | 25.7 | HDC19s-43 | 24 | 30.8 | HDC19s-63 |
| HDCAP304500253 | HDCAP3-450V-25kvar-3phase | 450 | 25 | 32.1 | HDC19s-63 | 30 | 38.5 | HDC19s-63 |
| HDCAP304500303 | HDCAP3-450V-30kvar-3phase | 450 | 30 | 38.5 | HDC19s-63 | 36 | 46.2 | HDC19s-95 |
| HDCAP305250053 | HDCAP3-525V-5kvar-3phase | 525 | 5 | 5.5 | HDC19s-25 | 6 | 6.6 | HDC19s-25 |
| HDCAP305257053 | HDCAP3-525V-7.5kvar-3phase | 525 | 7.5 | 8.2 | HDC19s-25 | 9 | 9.9 | HDC19s-25 |
| HDCAP305250103 | HDCAP3-525V-10kvar-3phase | 525 | 10 | 11 | HDC19s-25 | 12 | 13.2 | HDC19s-25 |
| HDCAP305250123 | HDCAP3-525V-12kvar-3phase | 525 | 12 | 13.2 | HDC19s-25 | 14.4 | 15.8 | HDC19s-25 |
| HDCAP305250143 | HDCAP3-525V-14kvar-3phase | 525 | 14 | 15.4 | HDC19s-25 | 16.8 | 18.5 | HDC19s-32 |
| HDCAP305250153 | HDCAP3-525V-15kvar-3phase | 525 | 15 | 16.5 | HDC19s-25 | 18 | 19.8 | HDC19s-32 |
| HDCAP305250163 | HDCAP3-525V-16kvar-3phase | 525 | 16 | 17.6 | HDC19s-32 | 19.2 | 21.1 | HDC19s-32 |
| HDCAP305250183 | HDCAP3-525V-18kvar-3phase | 525 | 18 | 19.8 | HDC19s-32 | 21.6 | 23.8 | HDC19s-43 |
| HDCAP305250203 | HDCAP3-525V-20kvar-3phase | 525 | 20 | 22 | HDC19s-43 | 24 | 26.4 | HDC19s-43 |
| HDCAP305250253 | HDCAP3-525V-25kvar-3phase | 525 | 25 | 27.5 | HDC19s-43 | 30 | 33 | HDC19s-63 |
| HDCAP305250303 | HDCAP3-525V-30kvar-3phase | 525 | 30 | 33 | HDC19s-63 | 36 | 39.6 | HDC19s-63 |

# selection guide

Standard: IEC60831

## HBSM 50/60Hz Selection Guide

### Single-phase , 250V

| Commercial Reference | Description Single-phase △ 250V | 50Hz | | | 60Hz | | |
|---|---|---|---|---|---|---|---|
| | | kvar | Ie (A) | Contact | kvar | Ie (A) | Contact |
| HBSM00250000201D | HBSM-0-250V-2kvar-1phase-D | 2 | 8 | HDC19s-25 | 2.4 | 9.6 | HDC19s-25 |
| HBSM00250000251D | HBSM-0-250V-2.5kvar-1phase-D | 2.5 | 10 | HDC19s-25 | 3 | 12 | HDC19s-25 |
| HBSM00250000301D | HBSM-0-250V-3kvar-1phase-D | 3 | 12 | HDC19s-25 | 3.6 | 14.4 | HDC19s-25 |
| HBSM00250000401D | HBSM-0-250V-4kvar-1phase-D | 4 | 16 | HDC19s-25 | 4.8 | 19.2 | HDC19s-32 |
| HBSM00250000501D | HBSM-0-250V-5kvar-1phase-D | 5 | 20 | HDC19s-32 | 6 | 24 | HDC19s-43 |
| HBSM00250000801D | HBSM-0-250V-8kvar-1phase-D | 8 | 32 | HDC19s-43 | 9.6 | 38.4 | HDC19s-63 |
| HBSM00250001001D | HBSM-0-250V-10kvar-1phase-D | 10 | 40 | HDC19s-63 | 12 | 48 | HDC19s-95 |
| HBSM00250001201D | HBSM-0-250V-12kvar-1phase-D | 12 | 48 | HDC19s-95 | 14.4 | 57.6 | HDC19s-95 |
| HBSM00250001501D | HBSM-0-250V-15kvar-1phase-D | 15 | 60 | HDC19s-95 | 18 | 72 | HDC19s-115 |
| HBSM00250002001M | HBSM-0-250V-20kvar-1phase-M | 20 | 80 | HDC19s-150 | 24 | 96 | HDC19s-150 |

### Three-phase, 400V

| Commercial Reference | Description Three-phase △ 400V | 50Hz | | | 60Hz | | |
|---|---|---|---|---|---|---|---|
| | | kvar | Ie (A) | Contact | kvar | Ie (A) | Contact |
| HBSM00400000103D | HBSM-0-400V-1kvar-3phase-D | 1 | 1.4 | HDC19s-25 | 1.2 | 1.7 | HDC19s-25 |
| HBSM00400000203D | HBSM-0-400V-2kvar-3phase-D | 2 | 2.9 | HDC19s-25 | 2.4 | 3.5 | HDC19s-25 |
| HBSM00400000303D | HBSM-0-400V-3kvar-3phase-D | 3 | 4.3 | HDC19s-25 | 3.6 | 5.2 | HDC19s-25 |
| HBSM00400000403D | HBSM-0-400V-4kvar-3phase-D | 4 | 5.8 | HDC19s-25 | 4.8 | 7 | HDC19s-25 |
| HBSM00400000503D | HBSM-0-400V-5kvar-3phase-D | 5 | 7.2 | HDC19s-25 | 6 | 8.7 | HDC19s-25 |
| HBSM00400000753D | HBSM-0-400V-7.5kvar-3phase-D | 7.5 | 10.8 | HDC19s-25 | 9 | 13 | HDC19s-25 |
| HBSM00400000803D | HBSM-0-400V-8kvar-3phase-D | 8 | 11.5 | HDC19s-25 | 9.6 | 13.8 | HDC19s-25 |
| HBSM00400001003D | HBSM-0-400V-10kvar-3phase-D | 10 | 14.4 | HDC19s-25 | 12 | 17.3 | HDC19s-32 |
| HBSM00400001203D | HBSM-0-400V-12kvar-3phase-D | 12 | 17.3 | HDC19s-32 | 14.4 | 20.8 | HDC19s-32 |
| HBSM00400001403D | HBSM-0-400V-14kvar-3phase-D | 14 | 20.2 | HDC19s-32 | 16.8 | 24.2 | HDC19s-43 |
| HBSM00400001503D | HBSM-0-400V-15kvar-3phase-D | 15 | 21.7 | HDC19s-43 | 18 | 26 | HDC19s-43 |
| HBSM00400001603D | HBSM-0-400V-16kvar-3phase-D | 16 | 23.1 | HDC19s-43 | 19.2 | 27.7 | HDC19s-43 |
| HBSM00400001803D | HBSM-0-400V-18kvar-3phase-D | 18 | 26 | HDC19s-43 | 21.6 | 31.2 | HDC19s-63 |
| HBSM00400002003D | HBSM-0-400V-20kvar-3phase-D | 20 | 28.9 | HDC19s-63 | 24 | 34.6 | HDC19s-63 |
| HBSM00400002403D | HBSM-0-400V-24kvar-3phase-D | 24 | 34.6 | HDC19s-63 | 28.8 | 41.5 | HDC19s-63 |
| HBSM00400002503D | HBSM-0-400V-25kvar-3phase-D | 25 | 36.1 | HDC19s-63 | 30 | 43.3 | HDC19s-95 |
| HBSM00400002803D | HBSM-0-400V-28kvar-3phase-D | 28 | 40.4 | HDC19s-63 | 33.6 | 48.5 | HDC19s-95 |
| HBSM00400003003D | HBSM-0-400V-30kvar-3phase-D | 30 | 43.3 | HDC19s-95 | 36 | 52 | HDC19s-95 |
| HBSM00400003003M | HBSM-0-400V-30kvar-3phase-M | 30 | 43.3 | HDC19s-95 | 36 | 52 | HDC19s-95 |
| HBSM00400003503M | HBSM-0-400V-35kvar-3phase-M | 35 | 50.5 | HDC19s-95 | 42 | 60.6 | HDC19s-95 |
| HBSM00400004003M | HBSM-0-400V-40kvar-3phase-M | 40 | 57.7 | HDC19s-95 | 48 | 69.3 | HDC19s-115 |
| HBSM00400004503Q | HBSM-0-400V-45kvar-3phase-Q | 45 | 65 | HDC19s-115 | 54 | 78 | HDC19s-150 |
| HBSM00400005003Q | HBSM-0-400V-50kvar-3phase-Q | 50 | 72.2 | HDC19s-115 | 60 | 86.6 | HDC19s-150 |
| HBSM00400006003Q | HBSM-0-400V-60kvar-3phase-Q | 60 | 86.6 | HDC19s-150 | 72 | 103.9 | HDC19s-170 |





# selection guide

Standard: IEC60831

### Three-phase, 415V

| Commercial Reference | Description Three-phase △ 415V | 50Hz | | | 60Hz | | |
|---|---|---|---|---|---|---|---|
| | | kvar | Ie (A) | Contact | kvar | Ie (A) | Contact |
| HBSM00415000303D | HBSM-0-415V-3kvar-3phase-D | 3 | 4.2 | HDC19s-25 | 3.6 | 5 | HDC19s-25 |
| HBSM00415000503D | HBSM-0-415V-5kvar-3phase-D | 5 | 7 | HDC19s-25 | 6 | 8.4 | HDC19s-25 |
| HBSM00415000753D | HBSM-0-415V-7.5kvar-3phase-D | 7.5 | 10.4 | HDC19s-25 | 9 | 12.5 | HDC19s-25 |
| HBSM00415000803D | HBSM-0-415V-8kvar-3phase-D | 8 | 11.1 | HDC19s-25 | 9.6 | 13.3 | HDC19s-25 |
| HBSM00415001003D | HBSM-0-415V-10kvar-3phase-D | 10 | 13.9 | HDC19s-25 | 12 | 16.7 | HDC19s-32 |
| HBSM00415001203D | HBSM-0-415V-12kvar-3phase-D | 12 | 16.7 | HDC19s-32 | 14.4 | 20 | HDC19s-32 |
| HBSM00415001403D | HBSM-0-415V-14kvar-3phase-D | 14 | 19.5 | HDC19s-32 | 16.8 | 23.4 | HDC19s-43 |
| HBSM00415001503D | HBSM-0-415V-15kvar-3phase-D | 15 | 20.9 | HDC19s-32 | 18 | 25.1 | HDC19s-43 |
| HBSM00415001603D | HBSM-0-415V-16kvar-3phase-D | 16 | 22.3 | HDC19s-43 | 19.2 | 26.8 | HDC19s-43 |
| HBSM00415002003D | HBSM-0-415V-20kvar-3phase-D | 20 | 27.8 | HDC19s-43 | 24 | 33.4 | HDC19s-63 |
| HBSM00415002503D | HBSM-0-415V-25kvar-3phase-D | 25 | 34.8 | HDC19s-63 | 30 | 41.7 | HDC19s-63 |
| HBSM00415003003D | HBSM-0-415V-30kvar-3phase-D | 30 | 41.7 | HDC19s-63 | 36 | 50.1 | HDC19s-95 |
| HBSM00415003503M | HBSM-0-415V-35kvar-3phase-M | 35 | 48.7 | HDC19s-95 | 42 | 58.4 | HDC19s-95 |
| HBSM00415004003M | HBSM-0-415V-40kvar-3phase-M | 40 | 55.6 | HDC19s-95 | 48 | 66.8 | HDC19s-115 |
| HBSM00415004503Q | HBSM-0-415V-45kvar-3phase-Q | 45 | 62.6 | HDC19s-95 | 54 | 75.1 | HDC19s-115 |
| HBSM00415005003Q | HBSM-0-415V-50kvar-3phase-Q | 50 | 69.6 | HDC19s-115 | 60 | 83.5 | HDC19s-150 |
| HBSM00415006003Q | HBSM-0-415V-60kvar-3phase-Q | 60 | 83.5 | HDC19s-150 | 72 | 100.2 | HDC19s-170 |

### Three-phase, 450V

| Commercial Reference | Description Three-phase △ 450V | 50Hz | | | 60Hz | | |
|---|---|---|---|---|---|---|---|
| | | kvar | Ie (A) | Contact | kvar | Ie (A) | Contact |
| HBSM00450000103D | HBSM-0-450V-1kvar-3phase-D | 1 | 1.3 | HDC19s-25 | 1.2 | 1.6 | HDC19s-25 |
| HBSM00450000203D | HBSM-0-450V-2kvar-3phase-D | 2 | 2.6 | HDC19s-25 | 2.4 | 3.1 | HDC19s-25 |
| HBSM00450000303D | HBSM-0-450V-3kvar-3phase-D | 3 | 3.8 | HDC19s-25 | 3.6 | 4.6 | HDC19s-25 |
| HBSM00450000403D | HBSM-0-450V-4kvar-3phase-D | 4 | 5.1 | HDC19s-25 | 4.8 | 6.1 | HDC19s-25 |
| HBSM00450000503D | HBSM-0-450V-5kvar-3phase-D | 5 | 6.4 | HDC19s-25 | 6 | 7.7 | HDC19s-25 |
| HBSM00450000753D | HBSM-0-450V-7.5kvar-3phase-D | 7.5 | 9.6 | HDC19s-25 | 9 | 11.5 | HDC19s-25 |
| HBSM00450000803D | HBSM-0-450V-8kvar-3phase-D | 8 | 10.3 | HDC19s-25 | 9.6 | 12.4 | HDC19s-25 |
| HBSM00450001003D | HBSM-0-450V-10kvar-3phase-D | 10 | 12.8 | HDC19s-25 | 12 | 15.4 | HDC19s-25 |
| HBSM00450001203D | HBSM-0-450V-12kvar-3phase-D | 12 | 15.4 | HDC19s-25 | 14.4 | 18.5 | HDC19s-32 |
| HBSM00450001403D | HBSM-0-450V-14kvar-3phase-D | 14 | 18 | HDC19s-32 | 16.8 | 21.6 | HDC19s-43 |
| HBSM00450001503D | HBSM-0-450V-15kvar-3phase-D | 15 | 19.2 | HDC19s-32 | 18 | 23.1 | HDC19s-43 |
| HBSM00450001603D | HBSM-0-450V-16kvar-3phase-D | 16 | 20.5 | HDC19s-32 | 19.2 | 24.6 | HDC19s-43 |
| HBSM00450001803D | HBSM-0-450V-18kvar-3phase-D | 18 | 23.1 | HDC19s-43 | 21.6 | 27.7 | HDC19s-43 |
| HBSM00450002003D | HBSM-0-450V-20kvar-3phase-D | 20 | 25.7 | HDC19s-43 | 24 | 30.8 | HDC19s-63 |
| HBSM00450002203D | HBSM-0-450V-22kvar-3phase-D | 22 | 28.2 | HDC19s-43 | 26.4 | 33.8 | HDC19s-63 |
| HBSM00450002403D | HBSM-0-450V-24kvar-3phase-D | 24 | 30.8 | HDC19s-63 | 28.8 | 37 | HDC19s-63 |
| HBSM00450002503D | HBSM-0-450V-25kvar-3phase-D | 25 | 32.1 | HDC19s-63 | 30 | 38.5 | HDC19s-63 |
| HBSM00450002803D | HBSM-0-450V-28kvar-3phase-D | 28 | 35.9 | HDC19s-63 | 33.6 | 43.1 | HDC19s-95 |
| HBSM00450003003D | HBSM-0-450V-30kvar-3phase-D | 30 | 38.5 | HDC19s-63 | 36 | 46.2 | HDC19s-95 |
| HBSM00450003003M | HBSM-0-450V-30kvar-3phase-M | 30 | 38.5 | HDC19s-63 | 36 | 46.2 | HDC19s-95 |
| HBSM00450003203D | HBSM-0-450V-32kvar-3phase-D | 32 | 41.1 | HDC19s-63 | 38.4 | 49.3 | HDC19s-95 |
| HBSM00450003503M | HBSM-0-450V-35kvar-3phase-M | 35 | 44.9 | HDC19s-95 | 42 | 53.9 | HDC19s-95 |
| HBSM00450004003M | HBSM-0-450V-40kvar-3phase-M | 40 | 51.3 | HDC19s-95 | 48 | 61.6 | HDC19s-95 |
| HBSM00450004503Q | HBSM-0-450V-45kvar-3phase-Q | 45 | 57.7 | HDC19s-95 | 54 | 69.3 | HDC19s-115 |
| HBSM00450005003Q | HBSM-0-450V-50kvar-3phase-Q | 50 | 64.2 | HDC19s-115 | 60 | 77 | HDC19s-150 |
| HBSM00450006003Q | HBSM-0-450V-60kvar-3phase-Q | 60 | 77 | HDC19s-150 | 72 | 92.4 | HDC19s-150 |

# selection guide

Standard: IEC60831

## HBSM 50/60Hz Selection Guide

**Three-phase, 525V**

| Commercial Reference | Description Three-phase △ 525V | 50Hz | | | 60Hz | | |
|---|---|---|---|---|---|---|---|
| | | kvar | Ie (A) | Contact | kvar | Ie (A) | Contact |
| HBSM00525000303D | HBSM-0-525V-3kvar-3phase-D | 3 | 3.3 | HDC19s-25 | 3.6 | 4 | HDC19s-25 |
| HBSM00525000503D | HBSM-0-525V-5kvar-3phase-D | 5 | 5.5 | HDC19s-25 | 6 | 6.6 | HDC19s-25 |
| HBSM00525001003D | HBSM-0-525V-10kvar-3phase-D | 10 | 11 | HDC19s-25 | 12 | 13.2 | HDC19s-25 |
| HBSM00525001203D | HBSM-0-525V-12kvar-3phase-D | 12 | 13.2 | HDC19s-25 | 14.4 | 15.8 | HDC19s-25 |
| HBSM00525001503D | HBSM-0-525V-15kvar-3phase-D | 15 | 16.5 | HDC19s-25 | 18 | 19.8 | HDC19s-32 |
| HBSM00525001603D | HBSM-0-525V-16kvar-3phase-D | 16 | 17.6 | HDC19s-32 | 19.2 | 21.1 | HDC19s-32 |
| HBSM00525001803D | HBSM-0-525V-18kvar-3phase-D | 18 | 19.8 | HDC19s-32 | 21.6 | 23.8 | HDC19s-43 |
| HBSM00525002003D | HBSM-0-525V-20kvar-3phase-D | 20 | 22 | HDC19s-43 | 24 | 26.4 | HDC19s-43 |
| HBSM00525002503D | HBSM-0-525V-25kvar-3phase-D | 25 | 27.5 | HDC19s-43 | 30 | 33 | HDC19s-63 |
| HBSM00525003003M | HBSM-0-525V-30kvar-3phase-M | 30 | 33 | HDC19s-63 | 36 | 39.6 | HDC19s-63 |
| HBSM00525003503M | HBSM-0-525V-35kvar-3phase-M | 35 | 38.5 | HDC19s-63 | 42 | 46.2 | HDC19s-95 |
| HBSM00525004003M | HBSM-0-525V-40kvar-3phase-M | 40 | 44 | HDC19s-95 | 48 | 52.8 | HDC19s-95 |
| HBSM00525004003Q | HBSM-0-525V-40kvar-3phase-Q | 40 | 44 | HDC19s-95 | 48 | 52.8 | HDC19s-95 |
| HBSM00525005003Q | HBSM-0-525V-50kvar-3phase-Q | 50 | 55 | HDC19s-95 | 60 | 66 | HDC19s-115 |
| HBSM00525006003Q | HBSM-0-525V-60kvar-3phase-Q | 60 | 66 | HDC19s-115 | 72 | 79.2 | HDC19s-150 |



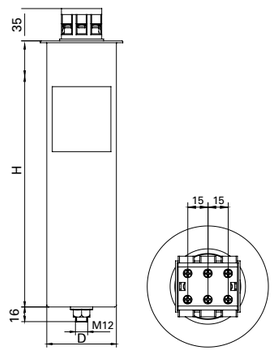


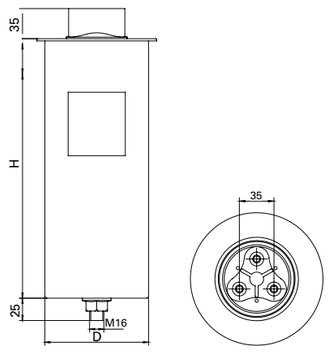
# Overall Dimension

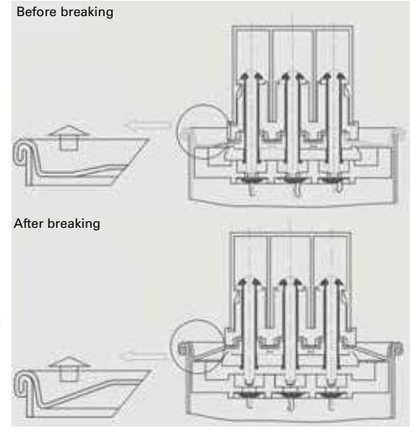
Standard: IEC60831

## HDCAP3 Overall Dimension

| Model | Overall dimensions D*H(mm) | Mounting dimensions | Capacitance (μF) |
|---|---|---|---|
| HDCAP3-0.4-5-3 | 76*245 | M12×16 | 99.47 |
| HDCAP3-0.4-7.5-3 | 76*245 | M12×16 | 149.21 |
| HDCAP3-0.4-10-3 | 76*245 | M12×16 | 198.95 |
| HDCAP3-0.4-12-3 | 76*245 | M12×16 | 238.74 |
| HDCAP3-0.4-14-3 | 86*245 | M12×16 | 278.53 |
| HDCAP3-0.4-15-3 | 86*245 | M12×16 | 298.42 |
| HDCAP3-0.4-16-3 | 86*245 | M12×16 | 318.31 |
| HDCAP3-0.4-18-3 | 86*290 | M12×16 | 358.11 |
| HDCAP3-0.4-20-3 | 86*290 | M12×16 | 397.9 |
| HDCAP3-0.4-25-3 | 116*290 | M16×25 | 497.37 |
| HDCAP3-0.4-30-3 | 116*290 | M16×25 | 596.85 |
| HDCAP3-0.45-5-3 | 76*245 | M12×16 | 78.6 |
| HDCAP3-0.45-7.5-3 | 76*245 | M12×16 | 117.9 |
| HDCAP3-0.45-10-3 | 76*245 | M12×16 | 157.19 |
| HDCAP3-0.45-12-3 | 76*245 | M12×16 | 188.63 |
| HDCAP3-0.45-14-3 | 86*245 | M12×16 | 220.07 |
| HDCAP3-0.45-15-3 | 86*245 | M12×16 | 235.79 |
| HDCAP3-0.45-16-3 | 86*245 | M12×16 | 251.51 |
| HDCAP3-0.45-18-3 | 86*290 | M12×16 | 282.95 |
| HDCAP3-0.45-20-3 | 86*290 | M12×16 | 314.39 |
| HDCAP3-0.45-25-3 | 116*290 | M16×25 | 392.99 |
| HDCAP3-0.45-30-3 | 116*290 | M16×25 | 471.58 |
| HDCAP3-0.525-5-3 | 76*245 | M12×16 | 57.74 |
| HDCAP3-0.525-7.5-3 | 76*245 | M12×16 | 86.62 |
| HDCAP3-0.525-10-3 | 76*245 | M12×16 | 115.49 |
| HDCAP3-0.525-12-3 | 76*245 | M12×16 | 138.59 |
| HDCAP3-0.525-14-3 | 86*245 | M12×16 | 161.69 |
| HDCAP3-0.525-15-3 | 86*245 | M12×16 | 173.23 |
| HDCAP3-0.525-16-3 | 86*245 | M12×16 | 184.78 |
| HDCAP3-0.525-18-3 | 86*290 | M12×16 | 207.88 |
| HDCAP3-0.525-20-3 | 86*290 | M12×16 | 230.98 |
| HDCAP3-0.525-25-3 | 116*290 | M16×25 | 288.72 |
| HDCAP3-0.525-30-3 | 116*290 | M16×25 | 346.47 |



# Overall Dimension

Standard: IEC60831

## HBSM Overall Dimension

• Single-phase dimension（250V）

| Commercial Reference | Shell Code | Capacitance (μF) |
|---|---|---|
| HBSM00250000201D | D130 | 101.86 |
| HBSM00250000251D | D130 | 127.33 |
| HBSM00250000301D | D130 | 152.79 |
| HBSM00250000401D | D130 | 203.72 |
| HBSM00250000501D | D130 | 254.65 |

| Commercial Reference | Shell Code | Capacitance (μF) |
|---|---|---|
| HBSM00250000801D | D210 | 407.44 |
| HBSM00250001001D | D210 | 509.3 |
| HBSM00250001201D | D210 | 611.15 |
| HBSM00250001501D | D290 | 763.94 |
| HBSM00250002001M | M265 | 1018.59 |

• Three-phase dimension（400V）

| Commercial Reference | Shell Code | Capacitance (μF) |
|---|---|---|
| HBSM00400000103D | D130 | 19.89 |
| HBSM00400000203D | D130 | 39.79 |
| HBSM00400000303D | D130 | 59.68 |
| HBSM00400000403D | D130 | 79.58 |
| HBSM00400000503D | D130 | 99.47 |
| HBSM00400000753D | D130 | 149.21 |
| HBSM00400000803D | D130 | 159.15 |
| HBSM00400001003D | D130 | 198.95 |
| HBSM00400001203D | D185 | 238.73 |
| HBSM00400001403D | D185 | 278.52 |
| HBSM00400001503D | D185 | 298.42 |
| HBSM00400001603D | D185 | 318.31 |

| Commercial Reference | Shell Code | Capacitance (μF) |
|---|---|---|
| HBSM00400001803D | D210 | 358.1 |
| HBSM00400002003D | D210 | 398 |
| HBSM00400002403D | D245 | 477.46 |
| HBSM00400002503D | D245 | 497.37 |
| HBSM00400002803D | D290 | 557.04 |
| HBSM00400003003D | D290 | 596.85 |
| HBSM00400003003M | M210 | 596.85 |
| HBSM00400003503M | M265 | 696.3 |
| HBSM00400004003M | M265 | 795.77 |
| HBSM00400004503Q | Q210 | 895.25 |
| HBSM00400005003Q | Q210 | 994.75 |
| HBSM00400006003Q | Q240 | 1193.7 |

•Three-phase dimension（415V）

| Commercial Reference | Shell Code | Capacitance (μF) |
|---|---|---|
| HBSM00415000303D | D130 | 55.45 |
| HBSM00415000503D | D130 | 92.41 |
| HBSM00415000753D | D130 | 138.62 |
| HBSM00415000803D | D130 | 147.86 |
| HBSM00415001003D | D130 | 184.82 |
| HBSM00415001203D | D185 | 221.79 |
| HBSM00415001403D | D185 | 258.75 |
| HBSM00415001503D | D185 | 277.23 |
| HBSM00415001603D | D185 | 295.72 |

| Commercial Reference | Shell Code | Capacitance (μF) |
|---|---|---|
| HBSM00415002003D | D210 | 369.64 |
| HBSM00415002503D | D245 | 462.06 |
| HBSM00415003003D | D290 | 554.47 |
| HBSM00415003503M | M265 | 646.88 |
| HBSM00415004003M | M265 | 739.29 |
| HBSM00415004503Q | Q210 | 831.7 |
| HBSM00415005003Q | Q210 | 924.11 |
| HBSM00415006003Q | Q210 | 1108.94 |
| | | |

•Three-phase dimension（450V）

| Commercial Reference | Shell Code | Capacitance (μF) |
|---|---|---|
| HBSM00450000103D | D130 | 15.72 |
| HBSM00450000203D | D130 | 31.44 |
| HBSM00450000303D | D130 | 47.16 |
| HBSM00450000403D | D130 | 62.88 |
| HBSM00450000503D | D130 | 78.6 |
| HBSM00450000753D | D130 | 117.89 |
| HBSM00450000803D | D130 | 125.75 |
| HBSM00450001003D | D130 | 157.19 |
| HBSM00450001203D | D185 | 188.63 |
| HBSM00450001403D | D185 | 220.07 |

| Commercial Reference | Shell Code | Capacitance (μF) |
|---|---|---|
| HBSM00450002803D | D290 | 440.13 |
| HBSM00450003003D | D290 | 471.58 |
| HBSM00450003003M | M210 | 471.58 |
| HBSM00450003203D | D290 | 503.01 |
| HBSM00450003503M | M265 | 550.17 |
| HBSM00450004003M | M265 | 628.78 |
| HBSM00450004503Q | Q210 | 707.36 |
| HBSM00450005003Q | Q210 | 785.95 |
| HBSM00450006003Q | Q240 | 943.14 |
| | | |





# Overall Dimension

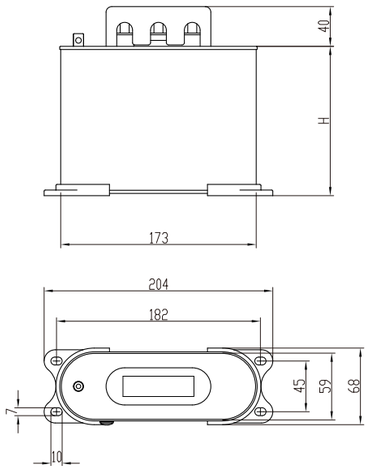
Standard: IEC60831

•Three-phase dimension（415V）

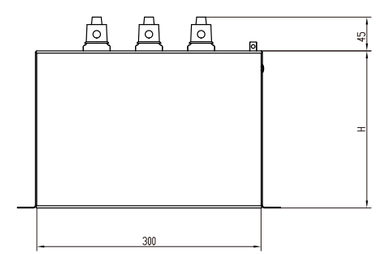
| Commercial Reference | Shell Code | Capacitance (μF) |
|---|---|---|
| HBSM00415000303D | D130 | 55.45 |
| HBSM00415000503D | D130 | 92.41 |
| HBSM00415000753D | D130 | 138.62 |
| HBSM00415000803D | D130 | 147.86 |
| HBSM00415001003D | D130 | 184.82 |
| HBSM00415001203D | D185 | 221.79 |
| HBSM00415001403D | D185 | 258.75 |
| HBSM00415001503D | D185 | 277.23 |
| HBSM00415001603D | D185 | 295.72 |

| Commercial Reference | Shell Code | Capacitance (μF) |
|---|---|---|
| HBSM00415002003D | D210 | 369.64 |
| HBSM00415002503D | D245 | 462.06 |
| HBSM00415003003D | D290 | 554.47 |
| HBSM00415003503M | M265 | 646.88 |
| HBSM00415004003M | M265 | 739.29 |
| HBSM00415004503Q | Q210 | 831.7 |
| HBSM00415005003Q | Q210 | 924.11 |
| HBSM00415006003Q | Q210 | 1108.94 |
| | | |

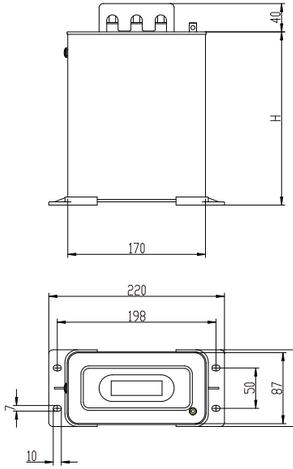
## HBSM



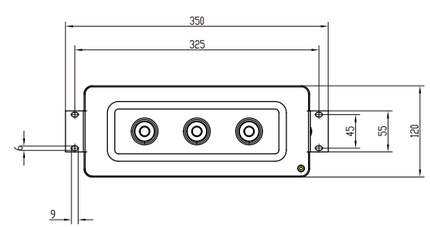

| | D Type | | | | Unit: mm |
|---|---|---|---|---|---|
| Housing code | D130 | D185 | D210 | D245 | D290 |
| Capacitor body height (H) | 130 | 185 | 210 | 245 | 290 |




| | Q Type | Unit: mm |
|---|---|---|
| Housing code | Q210 | Q240 |
| Capacitor body height (H) | 210 | 240 |




| | M Type | Unit: mm |
|---|---|---|
| Housing code | M210 | M265 |
| Capacitor body height (H) | 210 | 265 |



# 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<br>**5CQ:** 380V | **4:** 4 loops<br>**6:** 6 loops<br>**8:** 8 loops<br>**10:** 10 loops<br>**12:** 12 loops | **Default:** AC circuit<br>**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) |
| COSΦdisplay | 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 | |





# 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:** wiithout communication<br>**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 |

# Wiring Diagram

Standard: IEC60831

## Wiring Diagram

### HJKL5C

HJKL5C

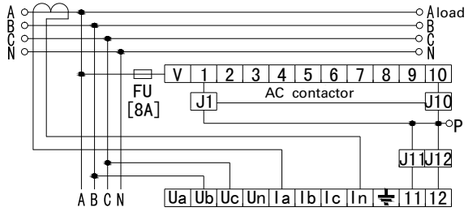
Ub, Uc: input of voltage signal

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

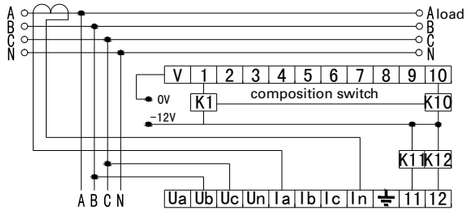
Ub, Uc: input of voltage signal

Ia, In: input of current signal

V, K(1-12): output of DC control signal

V: 0V

K(1-12): output -12V




### HJKL2C

HJKL2C

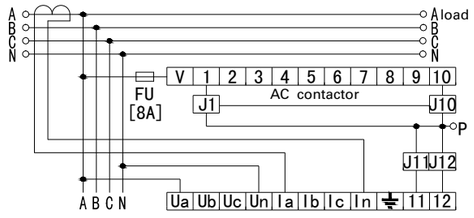
Ub, Uc: input of voltage signal

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

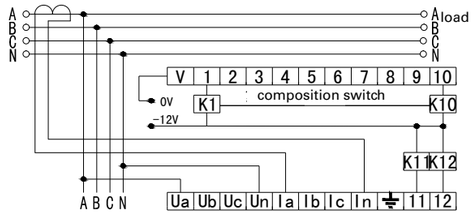
Ub, Uc: input of voltage signal

Ia, In: input of current signal

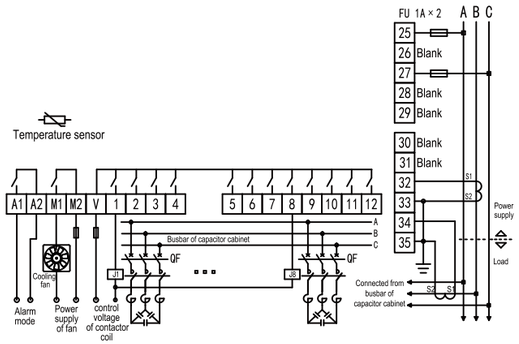
V, K(1-12): output of DC control signal

V: 0V

K(1-12): output -12V




### HJKF5C





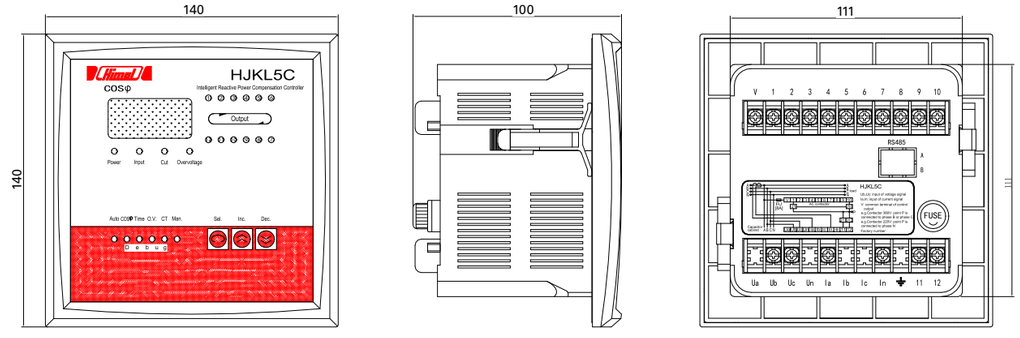



# Dimensions

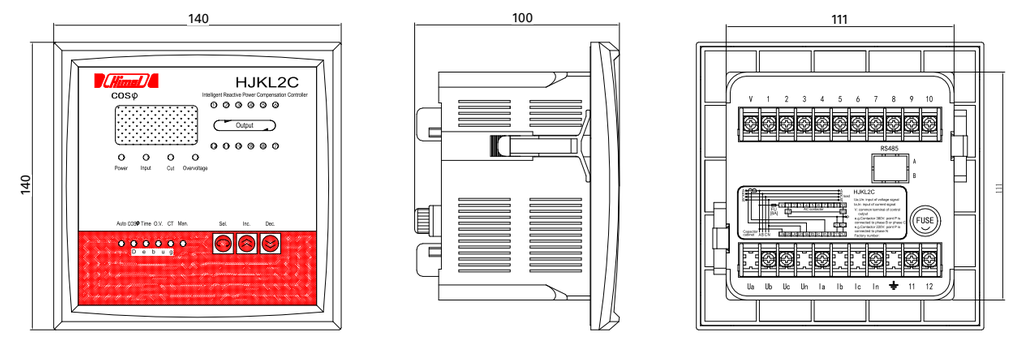
Standard: IEC60051

## Dimensions

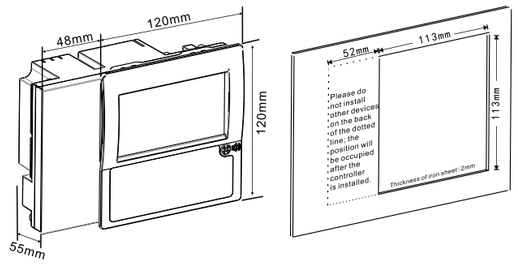
### HJKL5C




### HJKL2C




### HJKF5C



# 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 | Rated Capacity of the Reactor | Rated Voltage of the Capacitor | Reactance Ratio |
|---|---|---|---|---|
| **HKSG** | **L** | **1P0** | **G048** | **H7** |
| | **Default:** Copper windings<br>**L:** Aluminum windings | **P6:** 0.6kvar<br>**P7:** 0.7kvar<br>**1P0:** 1kvar<br>...<br>**9P8:** 9.8kvar | **G048:** 480V<br>**G052:** 525V | **H7:** 7%<br>**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<br>Winding temperature rise≤95K |
| Reactor noise | ＜ 50dB |
| Insulation class | ＞ F |
| IP grade | IP00 |
| Altitude | ≤ 2000m |
| Ambient temperature | -25°C~+50°C |
| Standard | IEC 60289 |



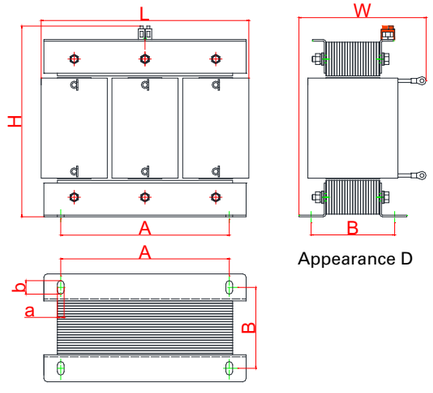
POWER FACTOR CORRECTION

# HKSG Detuned Reactors

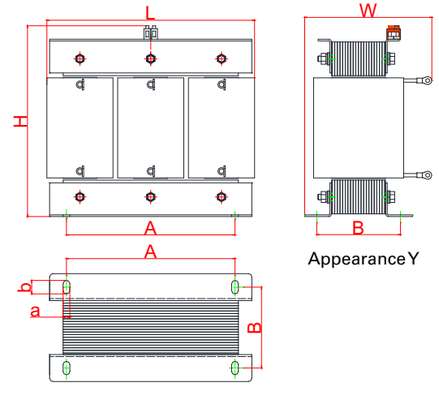
Standard: IEC60289

## 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 | |
| 2 | HKSG-0.7/0.48-7% | 0.7 | 10 | 160*120*170 | 130*82 | 17*φ7 | | 200*110*195 | 170*72 | 17*φ7 | D |
| 3 | HKSG-0.84/0.48-7% | 0.84 | 12 | 200*145*185 | 170*72 | 17*φ7 | Y | 200*115*195 | 170*77 | 17*φ7 | |
| 4 | HKSG-1.05/0.48-7% | 1.05 | 15 | 200*150*185 | 170*77 | 17*φ7 | | 200*155*185 | 170*82 | 17*φ7 | |
| 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 | Y |
| 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 | |
| 14 | HKSG-1.4/0.525-14% | 1.4 | 10 | 200*125*190 | 170*87 | 17*φ7 | | 200*125*190 | 170*87 | 17*φ7 | D |
| 15 | HKSG-1.68/0.525-14% | 1.68 | 12 | 240*175*210 | 200*90 | 22*φ10 | Y | 240*170*210 | 200*90 | 22*φ10 | |
| 16 | HKSG-2.1/0.525-14% | 2.1 | 15 | 240*185*210 | 200*100 | 22*φ10 | | 240*180*230 | 200*100 | 22*φ11 | |
| 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 | Y |
| 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

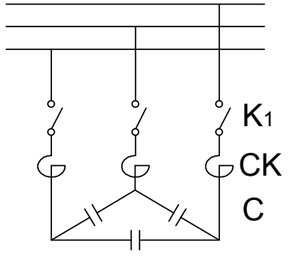



Appearance Y

# HKSG Detuned Reactors

Standard: IEC60289

## Product Connection Method




△ Form connection

Note:

the standard type of connection is △ 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 satured 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.

# HDC19s Capacitor Switching Contactors

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

CE

## 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 170A
- 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<br>**32:** 32A<br>**43:** 43A<br>**63:** 63A<br>**95:** 95A<br>**115:** 115A<br>***150:** 150A<br>***170:** 170A | **HDC19s-25~43A:**<br>**11:** 1NO+1NC<br>**20:** 2NO+0NC<br>**02:** 0NO+2NC<br><br>**HDC19s-63~115A:**<br>**12:** 1NO+2NC<br>**21:** 2NO+1NC<br><br>**HDC19s-150~170A:**<br>**32:** 3NO+2NC | **F:** 110V<br>**S:** 127V<br>**M:** 220/230V<br>**U:** 240V<br>**Q:** 380/400V<br>**L:** 415V<br>**X:** 440V | **5:** 50Hz<br>**7:** 50/60Hz |

Note:"*" pruducts are not yet on the market, please consult local Himel office if necessary.

**Technical Parameters**

| Capacitor Switching Contactors | | | HDC19s-25 | HDC19s-32 | HDC19s-43 | HDC19s-63 | HDC19s-95 | HDC19s-115 | HDC19s-150 | HDC19s-170 |
|---|---|---|---|---|---|---|---|---|---|---|
| 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 | 115 | 130 |
| Rated capacity of controlled capacitor (Qn: kvar) | Rated operating voltage of capacitor | AC-6b 220V | 6 | 10 | 15 | 18 | 30 | 35 | 46 | 52 |
| | | AC-6b 380V | 12 | 20 | 25 | 30 | 50 | 60 | 80 | 90 |
| Rated conventional thermal current | | A | 25 | 32 | 43 | 63 | 95 | 125 | 200 | 200 |
| Controlling capability of inrush current | | A | ≤35In | | | ≤55In | | | ≤60In | |
| 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 | | | 32 | |
| 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

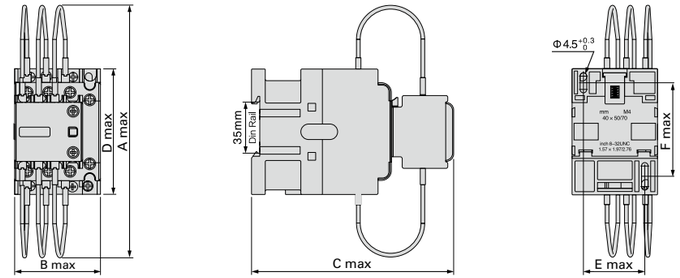
# HDC19s Capacitor Switching Contactors

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

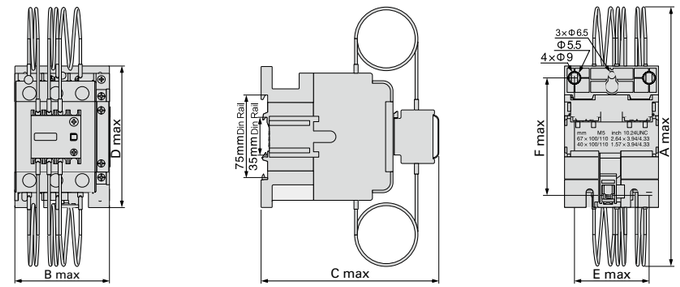
CE

## Dimension

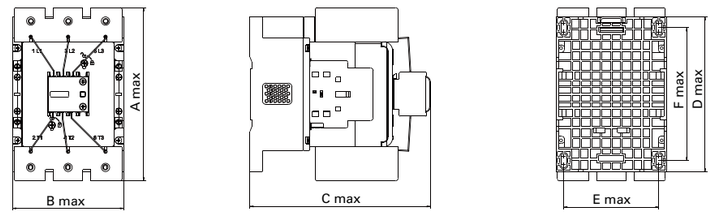
**HDC19s-25,32,43**




**HDC19s-63,95,115**




**HDC19s-150,170**




## Overall and Installation Dimensions

| Model | 104.5Overall size | | | | Installation dimension | |
|---|---|---|---|---|---|---|
| | A max | B max | C max | D max | E max | F max |
| 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 |
| HDC19s-150 | 188.5 | 120.5 | 196 | 170 | 104.5 | 136.5/151.5 |
| HDC19s-170 | 188.5 | 120.5 | 196 | 170 | 104.5 | 136.5/151.5 |

# HDC19s Capacitor Switching Contactors

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

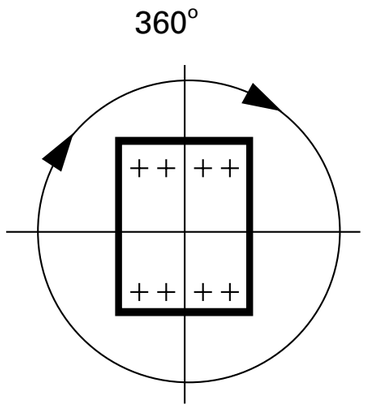
CE

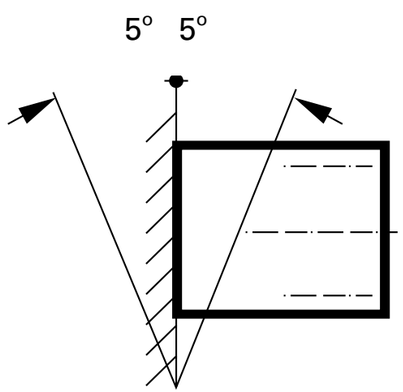
## Working Conditions

Ambient temperature:-5°C ~ +40°C, and the daily average temperature: ⩽ 35°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

**Himel**
www.himel.com

**Oct 2021**