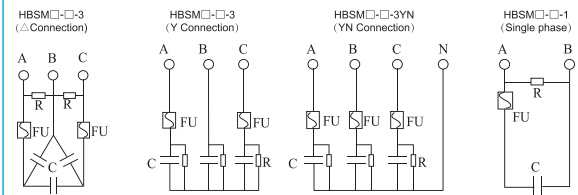


●Wiring diagram



Commissioning and operation

- (1) Check whether the technical parameters specified on the nameplate meet the use requirements.
- (2) Fully consider the factors such as voltage rise caused by the operation of the capacitor before installation to prevent a long-term operation of the capacitor under the over-voltage.
- (3) Before installing the capacitor, check the voltage waveform and network characteristics, and take the corresponding measures (such as the connection of the low-voltage filter reactor in series) to limit the influence on the harmonic sources (such as a large rectifier, an inverter, a frequency converter, and an intermediate frequency furnace) according to the severity of the harmonic wave.
- (4) When the capacitor and motor are connected together in parallel, it is recommended to select the capacitor according to the condition of the capacitor current of less than 90% of the non-load current of the motor.
- (5) The soft copper wire is used as much as possible for connection of the capacitor line terminal and grounding terminal for good contact. It is recommended that the capacitor wiring terminal is checked regularly by user to prevent poor contact resulting in accidental damage to the capacitor.
- (6) The following protection measures are taken for capacitor used in the capacitor box:
 - ① Transient overcurrent protection: Even HDC19s series is used to switch the capacitor contactor, or a XD1 current limiting reactor is provided at the front of the capacitor.
 - ② Steady over-voltage protection: Generally, there is an over-voltage protector on the reactive compensation controller.
 - ③ Steady over-current protection: A heat relay or a miniature circuit breaker is provided on the capacitor for over-current protection.

Maintenance and service

- Perform the regular maintenance to remove dust deposited on the capacitor timely.
- Do not open the capacitor to replace the parts inside without permission, and contact the customer center timely or stop the machine in case of the failure of the capacitor.

Common faults and solutions

No.	Fault	Cause	Solution
1	When the new capacitor works in the power grid, found that the measured capacitor current is much smaller than the rated current specified on the nameplate, with the same faults also found on other capacitors.	Under the premise with the same rated capacity, because the capacitor having the higher voltage grade is connected in the 380V power grid, the actual compensation current is smaller than the rated current.	This is a normal phenomenon. The normal capacitor can be judged according to the measured capacitance of the capacitor.
2	When the capacitor puts into operation, the current is close to the rated current, and then decreased after working for a long time.	The reduced capacitance will result in decrease of the current. The reduction of the capacitance is mainly caused by improper use.	Check the line and power environment for treatment; replace the capacitor by a new one if the capacitance is attenuated more than half.
3	Leaded from the joint of the crimping edge of the capacitor	Crimping edge is not welded connected.	Seal the leakage point in a soldering way.
4	Found oil trace at the root of the wiring terminal for unused capacitor.	There is remaining oil on the connection between the root of the terminal and the cover, because it is not removed in factory; however, this situation does not affect the product quality and use.	Wipe the oil off with a cloth.
5	The external wiring terminal threaded rod of the capacitor is heated and even is black in use.	The wiring nut is loose or the installation nut is not tightened firmly.	Tighten the wiring nut, and replace nuts, flat gaskets and spring washer if necessary.
6	The fuse often breaks (often trip when a miniature circuit breaker is used); the thermal relay trips; the contactor's contact fuses together; the contactor resistance of the series current limiting resistance is broken.	The system harmonic content is large, or the harmonic wave is magnified, or resonance occurs.	A filter is provided to eliminate harmonic wave or a reactor is connected in series in the capacitor circuit to inhibit harmonic wave.
7	There is a continuous electromagnetic force vibration sound inside the capacitor in use. Sometimes a sound can be heard, and sometimes no sound can be heard.	There is a harmonic current passing through the capacitor.	The harmonic current can be accepted if within the allowable range of the capacitor; measures must be taken if the harmonic current is too large (see Item 6)
8	Current increased in one circuit of the capacitor.	Either a power frequency resonance or a harmonic wave is magnified, or a resonance occurs.	See Item 6
9	The grid voltage does not exceed the rated voltage of the capacitor, but the circuit current of the capacitor much exceeds the rated current.	There is a harmonic current in the system.	See Item 6
10	The temperature of the lower covers of two terminals in the three-phase capacitor in use is higher than that of other part.	Because there is a reactance coil in the capacitor, the power of the reactance coil is large with high temperature. Where the temperature is high is where the coil is placed.	The capacitor with a large capacity cannot be equipped with a current suppressing coil. Measures are taken outside the capacitor to limit rush current.

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HBSM

low voltage capacitor

User Manual

In line with standards: IEC 60831-1

Please carefully read this Use Manual before installing and use this product, and keep this Manual for further reference.



Safety Notice

Please read this Manual carefully before installation, operation, run, maintenance and inspection, and install and use this manual according to this Manual.

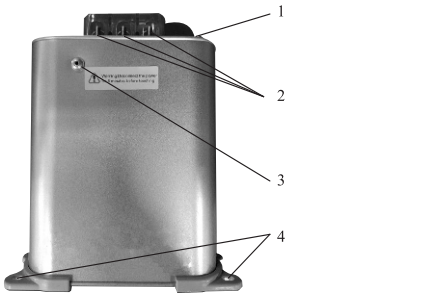
⚠ Danger:

- Do not operate the capacitor with wet hands.
- Do not touch the live part during operation.
- Cut off the power supply during maintenance and service.

⚠ Attention:

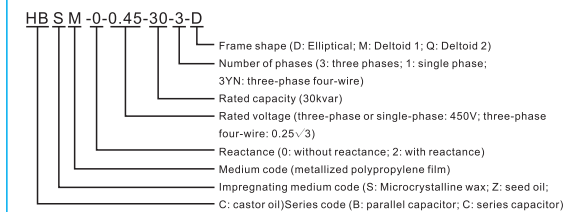
- Installation, maintenance and service must be performed by the professionals.
- Remove the capacitor from the power grid timely if found that the capacitor housing is swelled seriously.
- The time interval between the removal of the capacitor and the reuse shall be greater than 3 minutes (self-discharge time), or a very high transition over-voltage may occur, resulting in damage to the capacitor.
- Check that the product operating voltage, rated current, frequency and use purpose meet the requirements before use.
- Turn on the control circuit for non-load operation test, and then connect to the load after checking no abnormality.
- Tighten the terminals regularly.
- Prevent impurities from falling into the product.
- Please use spare parts provided by our company.
- Stop the machine immediately and contact the supplier if found any damage or abnormal sound during unpacking.
- Please dispose the product waste for any scrapped product.

●Description of HBSM



1 – Grounding terminal 2 – Wiring terminal 3 – Limit wax filling hole 4 – Mounting seat

●Naming rules



●Main technical parameters

Rated voltage (U_n)	230V~760V
Rated capacity (Q_n)	1~60kvar
Capacity deviation (μF)	Rated capacity 0~+10%
Loss angle tangent angle ($\tan \delta$)	Under the power frequency rated voltage, 20℃: $\tan \delta \leq 0.0015$
Voltage withstand (U_t)	Inter-pole 2.15 U_n 2s
	Pole-to-case Higher value taken among 2 U_n , +2kV or 3kV; last 2s after increased by 20%
Allowable over-voltage	1.10 U_n (not exceed 8h in 24h)
Allowable over-current	1.43 I_n
Self-discharge characteristic	The residual voltage decreases to 50V and below from $\sqrt{2} U_n$ within 3 minutes after power failure

Normal use, installation and transport conditions

●Normal use and installation conditions

- (1) The ambient air temperature is ranged -25℃ to +50℃ in use.
- (2) The altitude at the installation site does not exceed 2000m.
- (3) The atmospheric relative humidity does not exceed 50% when the highest ambient temperature is +40℃, and a higher relative humidity can be obtained at the low temperature, for example 90% at 20℃; the protection measures shall be taken for condensation due to temperature changes.
- (4) The product shall be installed vertically, with the title angle of not more than 10° at each direction.
- (5) The installation site shall be free from direct sunlight, not affected by rain or snow, with excessive dust and severe vibration avoided; the mutual distance should be greater than 30mm; the effective measures are taken in summer with high temperature to ensure good ventilation and cooling.

●Normal storage and transport conditions

- (1) Temperature: -25℃~+55℃; up to +70℃ in a short time (not more than 24h).
- (2) Please handle the product during transport, and do not invert it to avoid strong impact.

External and installation dimensions (mm)

For example: External dimensions of some products

No.	Model	H(mm)	Figure	Remarks
1	HBSM-0-0.45-10-3-D	130	Fig. 1	D type
2	HBSM-0-0.45-15-3-D	185	Fig. 1	D type
3	HBSM-0-0.45-20-3-D	210	Fig. 1	D type
4	HBSM-0-0.45-25-3-D	245	Fig. 1	D type
5	HBSM-0-0.45-30-3-D	290	Fig. 1	D type
6	HBSM-0-0.45-30-3-M	210	Fig. 3	M type
7	HBSM-0-0.45-40-3-M	265	Fig. 3	M type
8	HBSM-0-0.45-50-3-Q	210	Fig. 4	Q type
9	HBSM-0-0.45-60-3-Q	240	Fig. 4	Q type
10	HBSM-0-0.25√3-5-3YN-D	130	Fig. 1*	D type
11	HBSM-0-0.25√3-10-3YN-D	210	Fig. 1*	D type
12	HBSM-0-0.25√3-15-3YN-D	290	Fig. 1*	D type
13	HBSM-0-0.25√3-20-3YN-M	265	Fig. 3*	M type
14	HBSM-0-0.25√3-30-3YN-Q	210	Fig. 4*	Q type
15	HBSM-0-0.25√3-45-3YN-Q	240	Fig. 4*	Q type

Remarks: 1. The external installation dimensions of the single-phase product are same with that of the three-phase product having the same specifications (for example: the dimensions of HBSM-0-0.45-30-3-D are same with that of HBSM-0-0.45-30-1-D).
2. Product marked with "N" is three-phase four wire split phase compensation product, and the terminal marked with "N" is connected to the neutral point.
3. For more specifications, see the Selection Guide or visit the company website (www.delixi-electric.com).

●External installation dimensions diagram

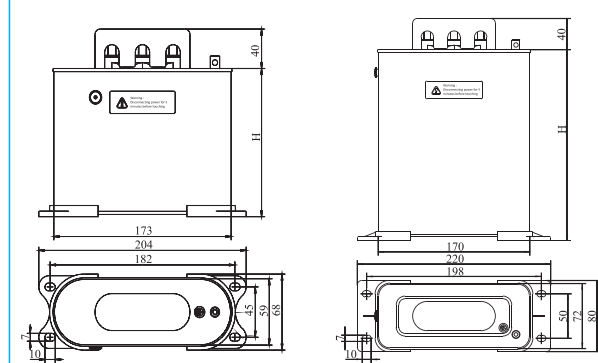


Fig. 1 (D type)

Fig. 2 (I type)

Fig. 3 (M type)

Fig. 4 (Q type)