

DS Decontactors (Plugs & Sockets)

Bhartia Cutler-Hammer's DS Decontactors Plugs & Sockets are manufactured in collaboration with Marechal France, who have been world leaders and pioneers in the field for the last three decades. Marechal products are manufactured in nine countries across the globe and are available in over 70 different countries, with approvals from electrical authorities such as LCIE, KEMA, UL, CSA etc.

Bhartia Cutler-Hammer's DS Decontactors are plug & socket outlets with an integral switching device, available in ratings 16A, 32A, 63A and 125 at 500V. The DS Decontactor conforms to IEC : 309-1.

It is a French masterpiece with revolutionary concept of design to make and break its rated current. This design has overcome inherent disadvantages of conventional plug & socket rendering them extremely safe, reliable and long lasting. The unrivaled design features are:

- Integral Switching Device, which eliminates cumbersome interlocked switch socket outlets
- Silver-tipped, spring-loaded butt-end contacts, self-aligning, self-wiping, assuring pre-determined constant pressure, low contact resistance and temperature rise way below requirements of IEC : 309-1
- A safety lid cover for socket.
- Safety Disc/Socket Shutter provides a dead front. Live contacts are shrouded & inaccessible so that no one can wedge a wire in the socket outlet to draw power without a plug.
- Central earth pin contact makes first, breaks last.
- Mechanical interlocking on plug insertion.
- Vibration proof termination-a unique patented tightening device using a split terminal body and elastic outer ring allows for flowage and compression of conductor to be compensated for, preventing screws from loosening.
- An interior keying system with 24 non-interchangeable different positions, prevents equipment being used on incorrect supply voltage.
- Weather-proof construction conforming to IP:657.

Reliability & Economy

One of the most important design features of the BCH DS Decontactors is the achievement of lowest practical voltage drop across the connectors.

A low voltage drop means, minimum watt loss, less heating, less deterioration, less oxidation and hence less problems. The lower the heat loss, the greater the reliability of the Connector. To achieve this aim, BCH incorporates in their design :

- (a) Silver butt type contacts to provide:
 - (i) Low contact resistance.
 - (ii) Stable resistance over the years.
 - (iii) Minimum deterioration with use.
 - (iv) No mismatch between new and old connectors.
- (b) Copper instead of brass is used for current carrying component parts and terminals.
- (c) Unique self-adjusting, temperature expansion, pressure type 'Elastic' terminals.
- (d) Wide terminal screws made from brass/stainless steel.

Contacts

In butt type contacts, manufacturing tolerances and wear can be kept to a minimum. This is one of the most important factors in maintaining a low voltage drop with new and existing connectors.

Comparison of Contact Resistance

STATE OF SURFACE METALS	RESISTANCE IN MICRO OHMS			
	CLEAN	AS%OFBRASS	TARNISHED	AS%OFBRASS
Silver	5.9	1.6	25.5	1.8
Silver-Nickel				
85-15	23.1	6.2	60.6	4.3
Gold	31.3	8.4	31.3	2.2
Copper	28.3	7.6	400.0	28.4
Brass	372.1	100.0	1407.3	100.0

Butt type contacts used have following advantages over conventional pin and sleeve type contacts.

Pin & Sleeve Type Contacts

1. The insertion force is at right angle to the direction of contact pressure which leads to inadequate contact pressure. The contact pressure must be adequate to prevent excessive temperature rise but must permit the insertion and withdrawal of the plug with ease. Because of design limitations, considerable friction is encountered resulting in continuous wear after each operation and making the plug a poor fit. This causes reduction in contact pressure and excessive temperature rise.

If the resilience of the material used for pins is inadequate, the plug will lose its spring action in due course, resulting in reduction of contact pressure and eventual failure of the plug. Besides, the manufacturing tolerance on the contacts can cause the efficiency of the fit to vary considerable i.e. either the plug is too tight or too loose. This will result in excessive temperature rise of the device.

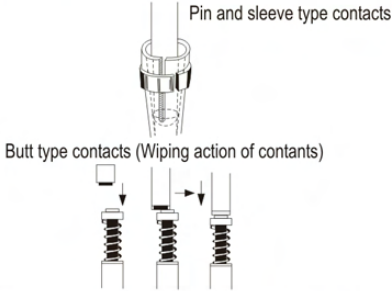
2. The applied force is generally achieved by integral resilience of a slit-on-plug or slit-on-contact-tube or by a flat cylindrical spring mounted on the contact tube.

This spring works under extension and hence cannot be precisely rated. The applied force is unknown and also cannot be maintained at a minimum given value.

3. The material is either brass or copper which is prone to oxidation. The oxides are nonconductive and result in high contact resistance and excessive temperature rise. Once oxidation starts, it gets accelerated on passage of current.

Butt Type Contacts

1. The inserting force is parallel to the direction of the contact pressure and this problem does not rise. Contact pressure is consistent and constant throughout the life of the device.
2. In butt type spring-loaded contact, the spring works by compression. It provides a well defined force for a given compression of the spring.



3. Silver nickel used in DS Decontactors has a far lower contact resistance. Further, silver oxide has a negative coefficient of resistance i.e. its contact resistance will decrease with temperature rise on passage of current. These contacts are most suitable for working at higher ambient temperature.

Self-Aligning and Self-Wiping

Contacts of DC Decontactors are self-cleaning and self-wiping. When the plug is inserted; it does not make contact with socket contacts at the first instant. The plug is to be twisted and pushed forward. This action cleans the contacts and ensures positive and uniform contact surfaces.

Safety

- Live contacts are not accessible whether the plug is inserted or fully withdrawn.
- The plug cannot be withdrawn from the decontactor socket outlet while power is applied to the plug.
- Decontactors can safely break ten times their nominal rating without damage.
- Cord extension decontactors (connectors) have the live contacts effectively protected isolated and inaccessible.
- The earth contact is in the center position and makes first and breaks last.
- A unique keying and safety-shutter system and an asymmetrical pin layout make it impossible to insert plug incorrectly.

DS Decontactors provide additional safety because of the following features:

(i) Lid

The socket has a protective cover which is held closed when the plug is not inserted and retained by a latch. The opening of the lid is automatic on pressing the latch button.

(ii) Latch

This is spring-loaded and serves two purposes:

- (a) to retain the lid in the closed position.
- (b) to retain the plug in the ON position or fully engaged position.

(iii) Safety Disc/Socket Shutter

The dead front feature: Live contacts are shrouded and inaccessible when no plug is fitted. There is a safety disc in the socket assembly which has contact access holes by the disc is so placed that contacts are inaccessible in the unconnected position. The plug is to be twisted clockwise in the socket housing. This rotates the safety disc along with the plug, aligning holes in the disc with live contacts.

The socket shutter can be set in different positions to suit the required socket output supply circuit as follows:

This table is applicable to plug and sockets with interiors set to the same keying position. Thus, the shutter discriminates between contact configurations, preventing, for example, single phase input to a 3 phase appliance.

(iv) Interior Keying System

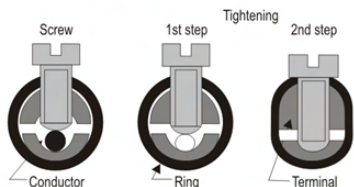
The interior moulding of plug and socket can be placed in any one of 24 positions within its housing and no two positions are interchangeable. Due to asymmetrical contact spacing, only plugs and sockets which have been set in similar keyed position will engage. This prevents plugs being used on the incorrect voltage, frequency or type of supply (i.e. AC/DC, three phase/single phase.)

Materials

The interior insulators are made of high grade nylon reinforced with glassfibre. This material is wear-resistant and possesses considerable resistance to arc tracking. The components in the arcing zone near the contacts are made from Thermo-set Polyester, which is flame retardant. The housing is cast in aluminium. The handle is made of neoprene rubber. The contact spring is made from high quality spring steel. The braid is of copper, silver-plated, providing an electrical path between butt contacts and terminals

Terminals

The terminals are specially designed to clamp stranded or solid conductor with sufficient pressure to withstand vibration and arduous conditions. These terminals enable the flowage and compression of conductors to be compensated for by applying a constant force which is produced by the elliptical deformation of an elastic ring on the conductors, as shown



Degree of Protection

ENCLOSURE CATEGORIES				
SOCKET	CHARACTERISTIC NUMERAL			
	FIRST	SECOND	THIRD	
Lid Closed	IP	5	4	7
Plug inserted	IP	6	5	7

The above versions are available in combinations of voltage/contact configuration given below:

SOCKET SHUTTER LOCATION				PRODUCT			
VOLTAGE	CONTACT CONFIG-URATION	POSITION CODE		DS1 16A	DS3 32A	DS6 63A	DS9 125A
415/240V AC	3P+N+E	7A1		A	A	A	A

P-Phase, N-Neutral, E-Earth, All AC Voltage refer to 50 Hz, A-Available

Note

1. The socket shutter can also be set in 21 different non-interchangeable positions other than shown above. Details on request.
2. The position of the mark on socket-retaining ring & plug housing represents interior key position e.g. the plug of position one will go in socket of position one only.
3. A dual voltage of 415/240V, 50Hz, AC represents 3 phase supply of 415V and neutral voltage of 240V, 50Hz. This means that a single phase plug of 240V AC is allowed to engage into a socket of 415 / 240V 3 phase socket.
4. Fused Junction Box with socket-outlet, in weather-proof enclosure for loop-in/loop-out facility is available for all versions. Details on request.

Product Specification

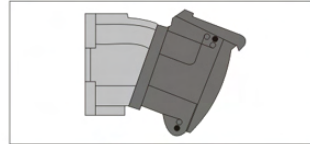
STANDARD TYPE	IEC : 309-1			
	DS1	DS3	DS6	DS9
Insulation Voltage (Ui)	600V	600V	600V	600V
Thermal Rating (Ith)	30A	50A	90A	150A
Rated Current (Ie)	16A	32A	63A	125A
Making & Breaking Current at 0.6p.f. (as per IEC : 309-1)	1.25xIe	1.25xIe	1.25xIe	1.25xIe
Breaking capacity at 0.6 p.f				
380/440V AC	30A	50A	90A	125A
500V AC	25A	40A	75A	125A
600V AC	20A	30A	60A	100A
300V DC	16A	25A	50A	100A
Utilization Category as per IEC : 408 & IEC : 158-1				
AC20	30A	50A	90A	150A
AC21	16A	32A	63A	125A
AC22	10A	16A	32A	50A
AC23	3.5A	5.5A	9A	16A
AC3	2HP	3HP	5HP	10HP
Thermal Time constant in Minutes	15	20	30	42
Millivolt drop at Rated Current	25	25	30	30
Terminal Capacity (mm ²)				
i) Rigid Conductor	6	10	25	70
ii) For all conductors use Dowell Lugs				
a) Cable Size (Max)	10	16	50	120
b) Dowell Lugs Cat. No.	WPC-20	WPC-2	WPC-26	WPC-34
Conduit Entry on Wall Box as per IS : 1653-1964	25.4x 1.588P	31.8x 1.588P	31.8x 1.588P	
IP Category	IP 65	IP 65	IP 65	IP 65

Ordering Information

DESCRIPTION	SOCKET SHUTTER LOCATION						
	VOLT. CONTACTS	POSITION	DS1 16A	DS3 32A	DS6 63A	DS9 125A	
Panel Mounting Socket	415/240V AC	3P+N+E	7A1	DS1B7A1	DS3B7A1	DS6B7A1	DS9B7A1
Plug	415/240V	3P+N+E	7A1	DS1A7A1	DS1A7A1	DS3A7A1	DS9A7A1

- * Other 21 different position in voltage/position available, refer to Central marketing.
- * Fuse junction Box in weather-proof enclosure for Loop in/Loop out in all versions, refer to Central Marketing for details.

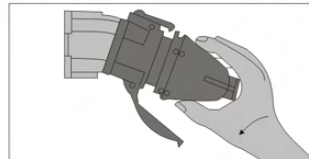
EASY TO USE



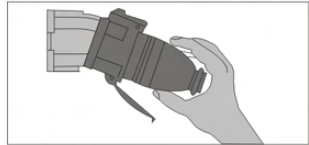
Protected Outlet



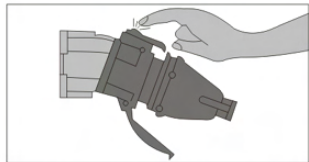
Depress Latch to Free Cover



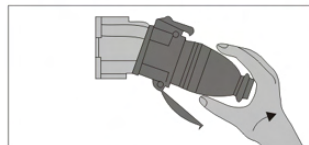
To Insert, Push in Plug, then Twist



Push and Secure with latch



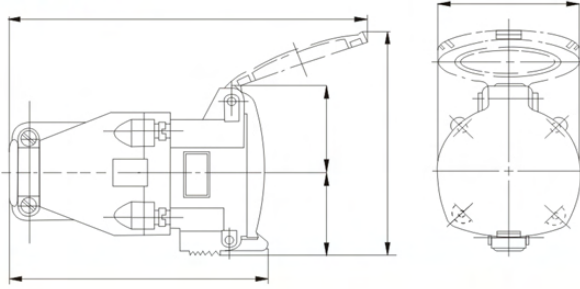
To Disconnect, Push latch



Twist and Remove

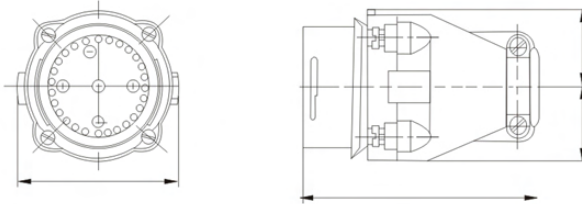
Dimensions (mm)

Panel Mounting Socket



PRODUCT	DIMENSIONS							
	A	B	C	D	E	F	G	H
DS-1/16A	130.0	120.0	85.0	5.0	52.0	45.0	48.0	68.0
DS-3/32A	145.0	142.0	92.0	5.5	59.0	51.0	55.0	80.0
DS-6/63A	177.5	166.0	107.0	5.5	65.0	58.0	66.0	95.0
DS-9/125A	225.0	193.0	142.0	5.5	72.0	67.0	81.3	112.0

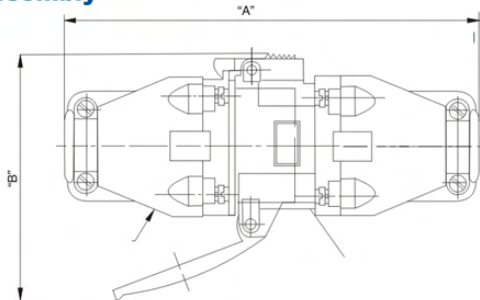
Plug



PRODUCT	DIMENSIONS			
	A	B	C	D
DS-1/16A	74.0	116.0	33.0	38.0
DS-3/32A	86.0	136.0	38.5	43.5
DS-6/63A	101.0	152.0	46.5	50.5
DS-9/125A	123.0	200.0	65.0	60.0

General Arrangement

Plug & Socket Assembly



DIMENSIONS	PRODUCT			
	DS-1/16A	DS-3/32A	DS-6/63A	DS-9/125A
A	120.0	142.0	166.0	193.0
B	155.0	178.0	210.0	280.0