

SWITCH DISCONNECTORS



PV switch disconnecter LS DC

The construction of the switch ensures reliable switching up to 1500V.
 The construction of the contacts and the material selection guarantee that no oxidation (small switching frequency develops, and is thus prevented inadmissible heating-up).
 The switch disconnecter has 2, 4 or 4+2 contacts, by serial / paralel wiring of the contacts the contact rating will be increased.
 The switching speed at the manually operated handle does not have an effect on the switching attitude of the contacts.

General characteristics

Rated voltage	≤ 1500V d.c.
Rated current	≤ 58A
Standards	IEC 60364-7-712
Application	For interrupting the DC/AC inverter from the solar panels

PV switch disconnecter for photovoltaic systems

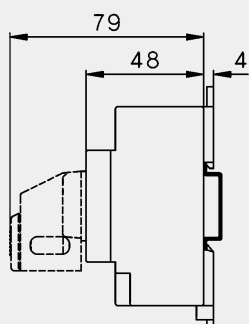
Code	Type		Weight [g]	Packaging [pcs]
004660060	LS16 SMA A2	2-pole	150	1
004660061	LS25 SMA A2			
004660062	LS32 SMA A2			
004660063	LS16 SMA A4			
004660064	LS25 SMA A4	4-pole		
004660065	LS32 SMA A4			
004660066	LS32 SMA A4+2	4+2 pole	430	
004660067*	LSV-B1	-	6,6	100

Switch disconnectors "LS.." are switch gears for interrupting DC/AC-inverter from the solar-panels.

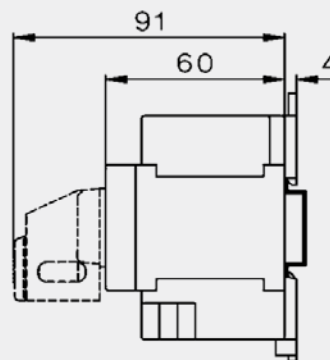
Photovoltaic-installations have to be equipped with DC-isolators according to IEC 60364-7-712.

*Insulated Jumper

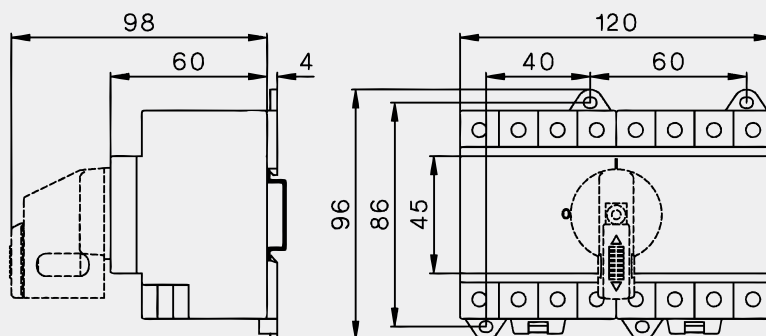
LS32 SMA A4+2 has already installed jumpers for series and parallel connection.



LS16, 25, 32 2p



LS16, 25, 32 4p



LS32 A4+2

		LS16 [A]		LS25 [A]		LS32 [A]		
		DC21B	DC22B	DC21B	DC22B	DC21B	DC22B	
	2 pole in series A2	500V DC	16	7	25	8	32	9
		600V DC	16	5,5	25	6	32	6,5
		800V DC	16	2	20	2,5	21	3
		1000V DC	9	1	11	1,5	13	2
		1200V DC	6	-	8	-	10	-
		1500V DC	3	-	4	-	5	-
	4 poles in series A4	500V DC	16	16	25	25	32	32
		600V DC	16	16	25	25	32	27,5
		800V DC	16	11,5	25	12	32	12,5
		1000V DC	16	8	25	9	32	10
		1200V DC	16	-	25	-	32	-
		1500V DC	16	-	20	-	23	-
	4 poles in series + 2 poles parallel A4+2	500V DC		-		-	58	-
		600V DC		-		-	58	-
		800V DC		-		-	58	-
		1000V DC		-		-	58	-
		1200V DC		-		-	50	-
		1500V DC		-		-	23	-
Rated conditional short-circuit current		kA _{eff}		5				
Max. fuse size gL (gG)		A		40		63		80
Mechanical life		x10 ³		10				
Rated short-time withstand current (1s) I _{cw}	A2, A4, A6, A8	A		800		900		1000
	A2+2, A3+2, A4+2	A		1300		1500		1700
Short circuit making capacity I _{cm}	A2, A4, A6, A8	A		800		900		1000
	A2+2, A3+2, A4+2	A		1300		1500		1700
Maximum cable cross sections including jumper LSV-B1	solid or stranded	mm ²		4 - 16				
	flexible	mm ²		4 - 10				
	flexible (+ multicore cable end)	mm ²		4 - 10				
	Size of terminal screw			M4 Pz2				
Maximum cable cross sections 2 cables per clamp without jumper LSV-B1 / LSV-B2	Tightening torque	Nm		1,7 - 1,8				
	solid or stranded	mm ²		16+(1,5-2,5) / 10+(1,5-6) / 6+(1,5-10) / 4+(1,5-10)				
	flexible & flexible + multicore cable end	mm ²		16+(1,5-2,5) / 10+(1,5-4) / 6+(1,5-6)				
	stranded	AWG		8+(16-12) / 10+(16-10) / 12+(16-8) 14+(16-8)				
	solid	AWG		10+(16-12) / 12+(16-10) 14+(16-10)				
Maximum ambient temperature	Operation	open	°C		-40 ... +65			
		closed	°C		-40 ... +45			
	Storage	°C		-50 ... +90				
Power loss per switch at I _{e max}	A2	(A)/W		(16) / 1		(25) / 2,3		(32) / 3,7
	A4	(A)/W		(16) / 2		(25) / 4,6		(32) / 7,4
	A6	(A)/W		(16) / 3		(25) / 6,9		(32) / 11,1
	A8	(A)/W		(16) / 4		(25) / 9,2		(32) / 14,8
	A2+2	(A)/W		(29) / 1,5		(45) / 3,7		(58) / 6
	A3+2	(A)/W		(29) / 2,3		(45) / 5,6		(58) / 9
	A4+2	(A)/W		(29) / 3		(45) / 7,4		(58) / 12
Contact resistance per pole		mΩ		1,75				

Because of very high breaking point capacity, switch disconnectors "LS.." are suitable for many different operating conditions.



PV switch disconnect LBS DC

→ Mounting system provides better cooling

→ Handle position indicate true position of switch.

→ Due to perforated protection covers it is possible to measure contacts temperature without removing covers.



→ Indicator provides contacts position.



→ Possible to lock handle with 3 locks.



→ Package includes connection screws.

Switch disconnectors

LBS DC are manually operated multipolar load break switches. Making and breaking capacity under load conditions up to 1500 VDC. These extremely durable switches have been tested and approved for use in the most demanding applications. They have been designed and tested for all types of applications: earthing, floating or bipolar.

- Thanks to a reduced number of bridging bars, you can limit your costs and save mounting time
 - A 2 pole switch has reduced warming and can be placed in a smaller enclosure
 - can be directly connected to up to four independent PV panel strings (4 pole switch)
 - tested to critical currents and at 10kA short circuit during 50 ms without specific protection
- High quality materials glass fibre reinforced polyester frame provide:
- high mechanical strength,
 - stability to temperature variations (RTI of 130 °C)
 - high dielectric strength (high CTI / tested as per standard ASTM D 2303)

General characteristics

Rated voltage	1500 VDC (500 VDC/pole) IEC 60947-3
Rated current	≤ 400A
Standards	IEC 60947-3, IEC 60364-7-712
Application	For interrupting DC circuits (PV, battery storage systems, etc.)

1 PV circuit 1000 V DC

Type	Code No.	Nr. Of poles	Description	Current [A] / pole	Weight [g]	Packaging [pcs]
LBS 100 2P DC1000	004661853	2	500 V DC / pole	100	1850	1
LBS 160 2P DC1000	004661854	2		160	1870	1
LBS 250 2P DC1000	004661855	2		250	1850	1
LBS 400 4P DC1000	004661856	4	250 V DC / pole	400	2360	1
LBS 500 4P DC1000	004661857	4		500	2404	1

Connect poles in series for 1000VDC, or in parallel for higher nominal current (2x at 2 pole and 4x at 4 pole)



Switch disconnectors

1 PV circuit 1500 V DC

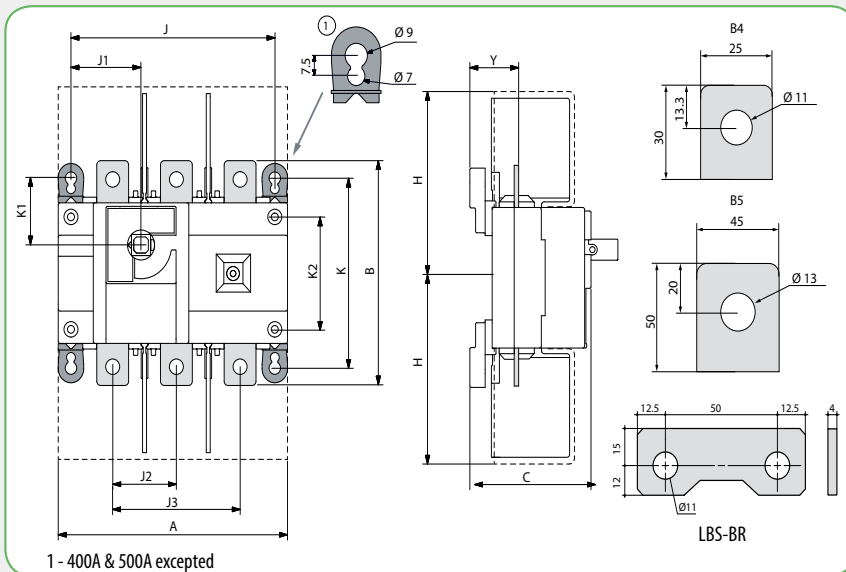
Type	Code No.	Nr. Of poles	Description	Current [A] / pole	Weight [g]	Packaging [pcs]
LBS 275 3P DC1500	004661858	3	500 V DC / pole	275	6270	1
LBS 400 3P DC1500	004661859	3		400	6270	1


Technical data (according to IEC 60947-3):

Type	LBS 100 DC					LBS 160 DC				
Rated current, I_n	100 A					160 A				
Thermal current at 40 °C	100 A					160 A				
Thermal current at 50 °C	100 A					160 A				
Thermal current at 60 °C	100 A					160 A				
Rated insulation voltage, U_n	1000 V DC					1000 V DC				
Rated impulse withstand voltage, U_{imp}	12kV					12kV				
Number of circuits	Rated insulation voltage	Utilisation category	$I_{c'}$ (A)	Number of poles in series per circuit	Number of poles of the device	Frame size	$I_{c'}$ (A)	Number of poles in series per circuit	Number of poles of the device	Frame size
1	1000V DC	DC-21B	100	1P+ ; 1P-	2	B4	160	1P+ ; 1P-	2	B4
Rated short-term withstand current 0,3s (rms)	10 kA					10 kA				
Rated short-term withstand current 1s (rms)	5 kA					5 kA				
Rated short-circuit making capacity I_{om} (50ms)	10 kA					10 kA				
Connection										
Nominal Cu cable section	35 mm ²					70 mm ²				
Nominal Cu busbar width	32 mm					32 mm				
Max Cu rigid cable cross-section	35 mm ²					70 mm ²				
Max Cu busbar width	32 mm					32 mm				
Tightening torque min	20 Nm					20 Nm				
Tightening torque max	26 Nm					26 Nm				
Durability (number of operating cycles)	10000									
Operating effort	10 Nm									
Weight of a 2 pole device	1,8 kg									
Power dissipation per poles of the PV switch (W/P) @ 40°C	0,8					2				

Technical data (according to IEC 60947-3):

Type	LBS 250 DC		LBS 275 DC							
Rated current, I_n	250 A		275 A							
Thermal current at 40 °C	250 A		275 A							
Thermal current at 50 °C	250 A		275 A							
Thermal current at 60 °C	250 A		275 A							
Rated insulation voltage, U_n	1000 V DC		1500 V DC							
Rated impulse withstand voltage, U_{imp}	12kV		12kV							
Number of circuits	Rated insulation voltage	Utilisation category	I_e , (A)	Number of poles in series per circuit	Number of poles of the device	Frame size	I_e , (A)	Number of poles in series per circuit	Number of poles of the device	Frame size
1	1000V DC	DC-21B	250	1P+; 1P-	2	B4	275	1P+; 1P-	3	B5
1	1500V DC		-	-	-	-		2P+; 1P-	3	
Rated short-term withstand current 0,3s (rms)		10 kA		10 kA						
Rated short-term withstand current 1s (rms)		5 kA		5 kA						
Rated short-circuit making capacity I_{cm} (50ms)		10 kA		10 kA						
Connection										
Nominal Cu cable section		120 mm ²		185 mm ²						
Nominal Cu busbar width		32 mm		32 mm						
Max Cu rigid cable cross-section		120 mm ²		185 mm ²						
Max Cu busbar width		32 mm		32 mm						
Tightening torque min		20 Nm		20 Nm						
Tightening torque max		26 Nm		26 Nm						
Durability (number of operating cycles)		10000		10000						
Operating effort		10 Nm		10 Nm						
Weight of a 2 pole device		1,8 kg		-						
Weight of a 3 pole device		-		6 kg						
Power dissipation per poles of the PV switch (W/P) @ 40°C		4,7		5,5						



Frame size	Nr. Of poles	Dimensions (mm)											
		A	B	C	H	J	J1	J2	J3	K	K1	K2	Y
B4	2	180	160	95	132,5	160	55	-	100	135	48	80	38,5
B4	4	230	170	79	132,5	210	105	50	-	-	-	80	22,5
B5	3	230	260	126,5	203	210	75	65	-	195	67,5	80	51,5

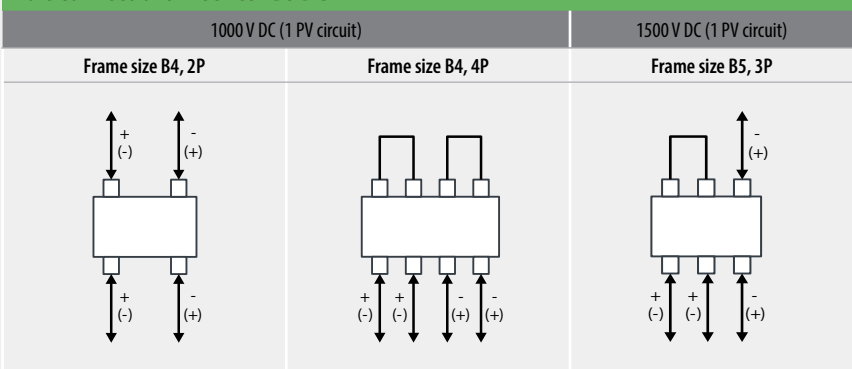


Technical data (according to IEC 60947-3):

Type	LBS 400 DC		LBS 500 DC							
Rated current, I_n	400 A		500 A							
Thermal current at 40 °C	400 A		500 A							
Thermal current at 50 °C	400 A		500 A							
Thermal current at 60 °C	400 A		475 A							
Rated insulation voltage, U_n	1000 V DC/1500 V DC*		1000 V DC							
Rated impulse withstand voltage, U_{imp}	12kV		12kV							
Number of circuits	Rated insulation voltage	Utilisation category	I_e (A)	Number of poles in series per circuit	Number of poles of the device	Frame size	I_e (A)	Number of poles in series per circuit	Number of poles of the device	Frame size
1	1000V DC	DC-21B	400	2P+ ; 2P-	4	B4	500	2P+ ; 2P-	4	B4
	1500V DC*			2P+ ; 1P-	3	B5	-	-	-	-
Rated short-term withstand current 0,3s (rms)				-				10 kA		
Rated short-term withstand current 1s (rms)				10 kA				5 kA		
Rated short-circuit making capacity I_{cm} (50ms)				10 kA				10 kA		
Connection										
Nominal Cu cable section				240 mm ²				2x150 mm ²		
Nominal Cu busbar width				32 mm				32 mm		
Max Cu rigid cable cross-section				240 mm ²				2x150 mm ²		
Max Cu busbar width				32 mm				32 mm		
Tightening torque min				20 Nm				20 Nm		
Tightening torque max				26 Nm				26 Nm		
Durability (number of operating cycles)				5000						
Operating effort				10 Nm						
Weight of a 3 pole device				3,8 kg				-		
Weight of a 4 pole device				2,3 kg				3,8 kg		
Power dissipation per poles of the PV switch (W/P) @ 40°C				20@DC1000/8@DC1500				30		

* 1500 V DC rated insulation voltage only for switch 004661859

Pole connections in series LBS DC



LBS AC1000 load break switches (IEC 69047-3)

Heavy duty applications up to 1000 VAC - AC 22

Advantages

- Improved performance
 - The rapid opening and closing, combined with the arcing chambers, ensure improved breaking performance.
 - Harsh service categories AC-22 under 1000 VAC.
- Robustness
 - Double breaking per pole (proven sliding system) offering durability and high short-circuit current withstand.
 - Made of glass fiber reinforced polyester for maximum thermal and mechanical resistance.
- Safe operation
 - The position indicator is directly on the bar housing the moveable contacts, ensuring it can be seen in all circumstances.
- Ease of installation
 - Connection facilitated by the design of the external terminals:
 - good centre-to-centre distance (up to 65 mm),
 - copper connection up to 240 mm²,
 - large range of accessories to facilitate integration and operation.

Applications

LBS AC1000 load break switches can be used in applications with non standard voltage levels. There are many PV inverters today on the market with higher output voltages (up to 800V AC).
 Can be also used in applications with harsh operating conditions such as: paper mills or the metallurgy, chemical, petrochemical or mining industries.
 LBS AC is designed for all heavy duty applications up to 1000 VAC - AC 22. It offers a total adaptability to any environment thanks to a wide variety of accessories.

LBS AC1000 load break switches (IEC 69047-3)						
Type	Code No.	Nr. Of poles	Ie [A]	Weight [g]	Packaging [pcs]	
LBS 200 3P AC1000	004661923	3	275	1850	1/1	
LBS 400 3P AC1000	004661924	3	400	4550	1/1	

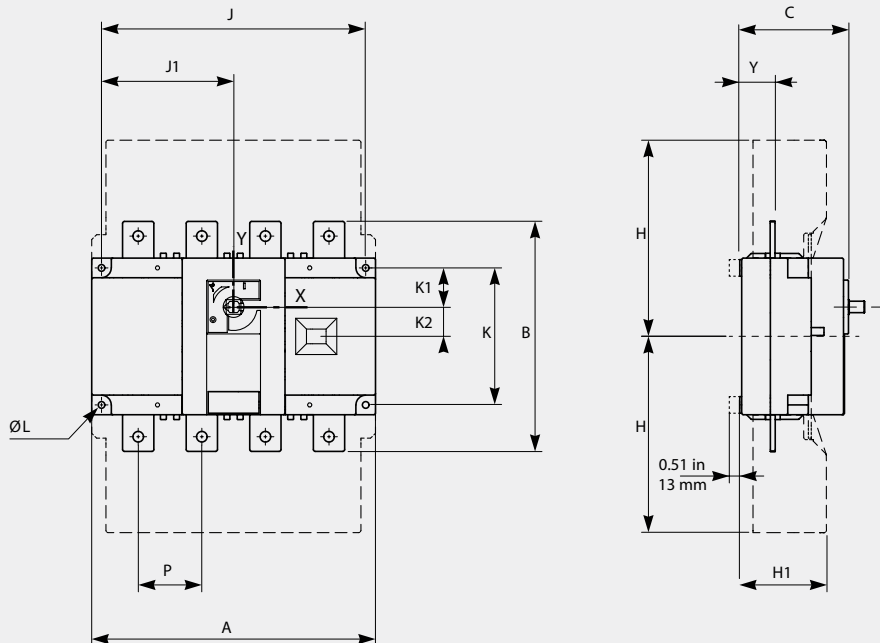


LBS 200 3P AC1000



LBS 400 3P AC1000

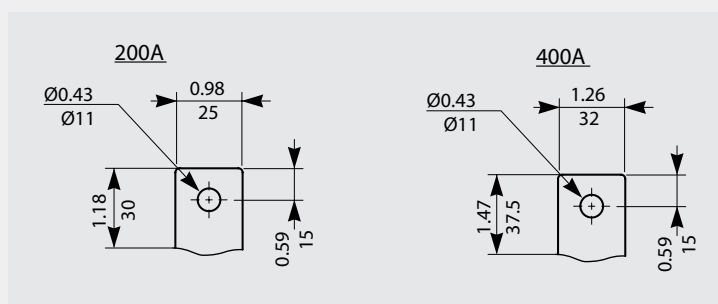
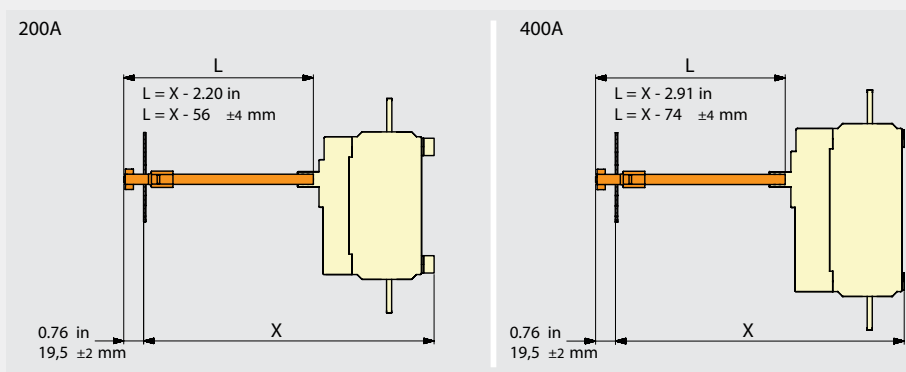
Switch disconnectors



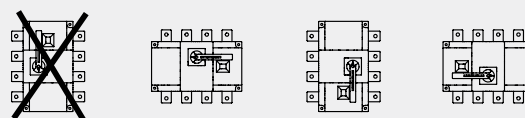
	A		B		C		H		H1		J		J1		K		K1		K2		Ø L		P		Y	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
LBS 200 3P AC1000	7.08	180	6.30	160	3.09	78.5	5.70	145	2.20	56	6.30	160	2.16	55	3.15	80	0.78	20	0.78	20	0.21	5.5	1.96	50	0.86	22
LBS 400 3P AC1000	9.05	230	9.25	235	4.37	111	7.91	201	3.36	85.5	8.26	210	2.95	75	5.51	140	1.57	40	1.18	30	0.27	7	2.56	65	1.41	36


Technical data (according to IEC 60947-3):

Type		LBS 200 3P AC1000	LBS 400 3P AC1000	
Conventional free air thermal current I_{th} at 40 °C		200 A	400 A	
Rated insulation voltage, U_n		1000 V		
Rated impulse withstand voltage, U_{imp}		12 kV		
Rated operational current I_c according to IEC 60947-3	Rated operational voltage U_e	A/B		
	500 V a.c.	AC-20 A / AC-20 B	200 A/200 A	400 A/400 A
	500 V a.c.	AC-21 A / AC-21 B	200 A/200 A	400 A/400 A
	500 V a.c.	AC-22 A / AC-22 B	200 A/200 A	400 A/400 A
	500 V a.c.	AC-23 A / AC-23 B	200 A/200 A	400 A/400 A
	690 V a.c.	AC-20 A / AC-20 B	200 A/200 A	400 A/400 A
	690 V a.c.	AC-21 A / AC-21 B	200 A/200 A	400 A/400 A
	690 V a.c.	AC-22 A / AC-22 B	200 A/200 A	400 A/400 A
	690 V a.c.	AC-23 A / AC-23 B	200 A/200 A	400 A/400 A
1000 V a.c.	AC-22 A / AC-22 B	200 A/200 A	400 A/400 A	
Frequency		50 / 60 Hz		
Rated short-time withstand current I_{cw} 0,3s at 690 V a.c. (rms)		15 kA		
Rated short-time withstand current I_{cw} 1s at 690 V a.c. (rms)		8 kA	11 kA	
Rated short-circuit making capacity I_{cm} at 690 V a.c. (peak)		22 kA		
Conditional short-circuit current at 690 V a.c. (rms)		50 kA		
Associated gG fuse rating		200 A	400 A	



Mounting orientation



Accessories for LBS DC and LBS AC1000 switches

Direct handle for direct operation LBS

Type	Code No.	Description	For use with	Weight [g]	Packaging [pcs]
LBS-DH630/B	004661481	Direct handle black	LBS100-500DC (1000V, 1500V), LBS 200 3P	100	1/25
LBS-DH630/R	004661861	Direct handle red	AC1000, LBS 400 3P AC1000	100	1/80



Door interlocked handle IP65

Type	Code No.	Description	For use with	Weight [g]	Packaging [pcs]
LBS-EH630/G .../400/G FLBS	004661483	Door handle Black	LBS100-500DC (1000V, 1500V), LBS 200 3P	250	1/20
LBS-EH630/YR	004661486	Door handle Red	AC1000, LBS 400 3P AC1000	250	1/20



*shaft not included

Shaft for door interlocked handle

Type	Code No.	Description	For use with	Weight [g]	Packaging [pcs]
LBS-S200/630 (CO) .../400 FLBS	004661490	Shaft 200mm	LBS100-500DC	160	1/25
LBS-S320/630 (CO) .../400 FLBS	004661493	Shaft 320mm	(1000V, 1500V), LBS 200 3P	250	1/50
LBS-S500/630 (CO) .../400 FLBS	004661496	Shaft 500mm	AC1000, LBS 400 3P AC1000	390	1/10



Terminal screen

Type	Code No.	Description	For use with	Weight [g]	Packaging [pcs]
LBS-TS250 2P DC	004661862	Terminal screen, 2P	LBS ... 2P	40	1/30
LBS-TS500 4P DC	004661863	Terminal screen, 4P	LBS ... 4P	50	1/20
LBS-TS500 3P DC	004661865	Terminal screen, 3P	LBS ... 3P	60	1/100

1 reference includes 1pc for top or bottom contacts, to protect all, 2 references shall be ordered



Terminal shrouds

Type	Code No.	Description	For use with	Weight [g]	Packaging [pcs]
LBS-TS250 3P (CO)	004661501	Terminal shrouds, 3P	LBS 200 3P AC1000	121	1/10
LBS-TS630 3P (CO)	004661502		LBS 400 3P AC1000	242	1/5

One reference includes 3 pcs (3pole) for top or bottom contacts, to protect all 2 references shall be ordered



Bridging bars

Type	Code No.	Description	For use with	Weight [g]	Packaging [pcs]
LBS-BR500 1P DC	004661864	Bridging bars, 1pole	LBS ... DC 1000	60	1/100
LBS-BR400 1P DC	004661866		LBS ... DC 1500	210	1/50

1 reference includes connection for 1 pole



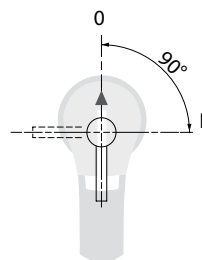
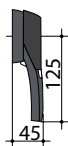
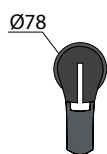
Auxiliary contact

Type	Code No.	Description	For use with	Weight [g]	Packaging [pcs]
LBS-PS11	004661499	Auxiliary contact (CO)	LBS ... DC1000, DC1500, LBS 200 3P AC1000, LBS 400 3P AC1000	26	1/30



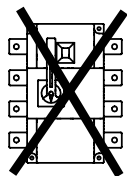
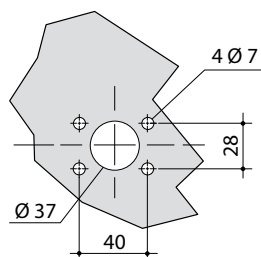


Handle type LBS-EH630



Direct front operation

Door drilling



Mounting position LBS DC

