



INOSYS LBS

Load Break Switches for DC & PV applications

from 160 to 800 A, up to 1500 VDC incorporating tripping function

Load break switches



INOSYS LBS
2-poles with tripping function



INOSYS LBS
2-poles without tripping function

The solution for

- > Disconnection within PV installation
- > Battery protection
- > Rapid shutdown for firefighter safety
- > Isolation of DC processes

Strong points

- > High-performance switching in a compact frame
- > Safe & reliable operation
- > Tripping function
- > Easy to install
- > Modular solution
- > Visible contact indication

Conformity to standards

- > IEC 60947-3
- > UL 98B



Compatible with requirements:

- > IEC 60364-7-712
- > NEC art. 690



Function

INOSYS LBS are load break switches which are available with integrated tripping function. They can be operated manually using the handle or remotely (via tripping coils) to disconnect part or all of the electrical installation.

They make and break under load conditions, provide safety isolation for any low voltage circuits up to 1500 VDC and are suitable for emergency switching.

Advantages

High-performance switching in a compact frame

INOSYS LBS switches integrate a patented technology that offers high switching capacity of 500 and 750 VDC per pole with optimum arc containment and significant power loss reduction - all within a compact device.

Safe & reliable operation

- Reliable position indication through visible contacts.
- ON, OFF and TRIP positions are stable: resistant to voltage fluctuations.
- The trip position provides complete disconnection and isolation.
- The opening and closing of the switch is fully independent from the speed of operation, ensuring safe operation under all conditions.
- High temperature withstand: no derating up to 55 °C (131° F).

Tripping function: flexible and robust

- Fully immune to external perturbation: no nuisance tripping.
- Shunt-trip or undervoltage release from 24 to 220 VDC and from 24 to 230 VAC.
- Wide operating temperature range: -25 to +70 °C (-15 to +160 °F).
- Fast disconnection (<50 ms) for rapid firefighter shutdown, compliant with installation standards.

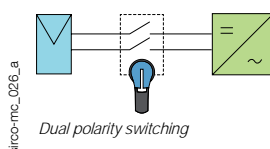
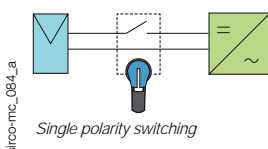
Easy to install

- Wiring: as the switch is non-polarised all types of wiring and connections are possible.
- Easy access without tools to integrate auxiliary contacts and tripping coil (both located within the switch footprint).

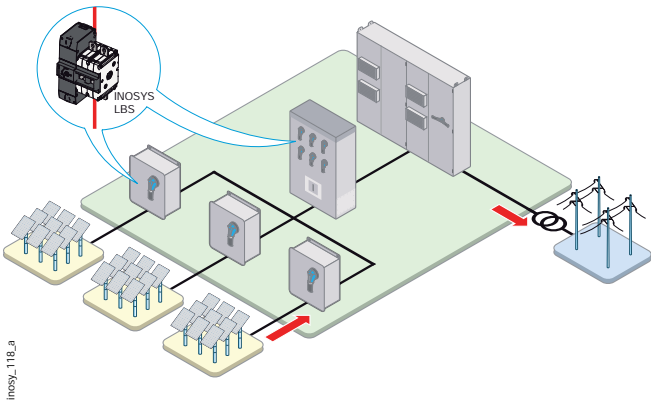
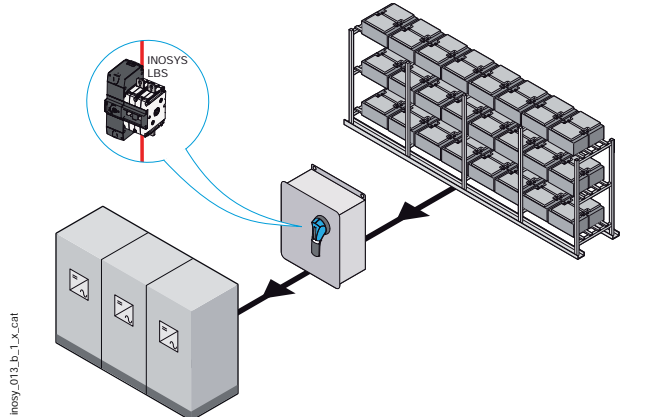
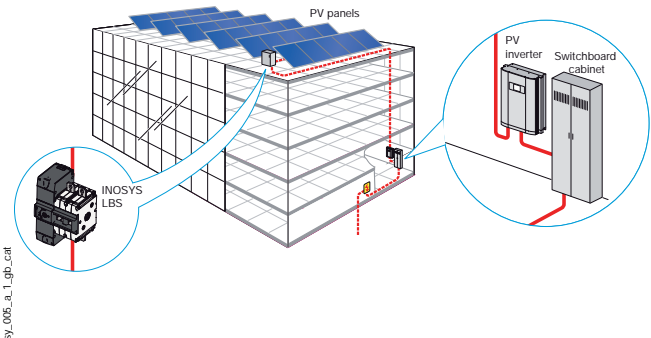
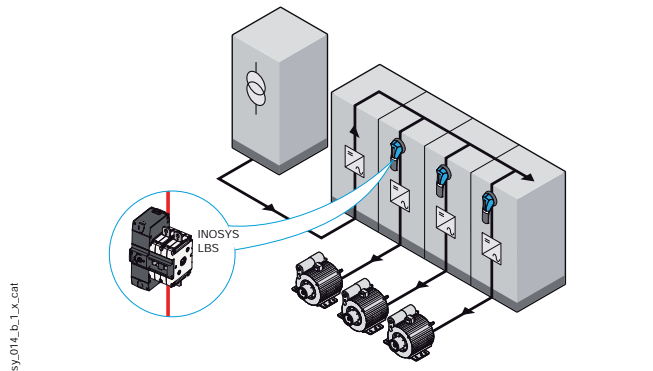
Modular solution for a flexible configuration

- Single or dual polarity switching



The same switch can be used for installation with either grounded or floating networks by choosing the wiring configuration.



Typical applications: local and remote safe disconnection for DC and PV applications

<p>PV installation: Combiner box, Recombiner box or Inverter</p>  <p>inosy_118_a</p>	<p>Battery protection</p>  <p>inosy_013_b_1_x_cat</p>
<p>Rapid shutdown for firefighter safety (compliant with installation standards, incl. NEC 2014)</p>  <p>inosy_005_a_1_gb_cat</p>	<p>Isolation of DC processes</p>  <p>inosy_014_b_1_x_cat</p>

The SOCOMEC solutions

<p>SIRCO PV Manual operation PV switches</p>  <p>up to 3200 A at 1000 VDC up to 2000 A at 1500 VDC up to 4 circuits</p> <p>sirco-pv_059 - 060 - 061_a</p>	<p>INOSYS LBS Up to 1500 VDC with visible contact indication - with or without tripping function</p>  <p>up to 800 A at 1000 VDC up to 400 A at 1500 VDC</p> <p>inosy_120_a - inosy_082_a</p>
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Overview



References

INOSYS LBS with tripping function

1000 VDC - 1 circuit

Rating (A)	Frame size	No. of poles per circuit	Switch body ⁽¹⁾	External operation	Tripping coil	Aux. Contact	Bridging Bar ⁽²⁾
160 A	F2	2 P (1 P+, 1 P-)	84P0 2016	Shaft 320 mm 1400 1032 S2 type handle Black IP65 742F 2118	Shunt trip coil 24 V AC/DC 8499 7002	NO/NC 8499 0001	-
250 A	F2		84P0 2025		48 V AC/DC 8499 7004		
315 A	F2		84P0 2031		230 V AC/DC 8499 7023		
400 A	F3		84P0 2040	Shaft 320 mm 1400 1032 S2L type handle Black IP65 74AF 2118	Undervoltage releases 48 VAC 8499 8104		
630 A	F3		84P0 2063		230 VAC 8499 8123		
800 A	F3		84P0 2080		24 VDC 8499 8202		
					48 VDC 8499 8204		

(1) The switches are supplied without accessories.

(2) Please consult us

1500 VDC - 1 circuit

Rating (A)	Frame size	No. of poles per circuit	Switch body ⁽¹⁾	External operation	Tripping coil	Aux. Contact	Bridging Bar ⁽²⁾
160 A	F2	3 P (2 P+, 1 P-)	84P0 3016	Shaft 320mm 1400 1032 S2 type handle Black IP65 742F 2118	Shunt trip coil	NO/NC 8499 0001	8409 0016
250 A	F2		84P0 3025		24 V AC/DC 8499 7002		
315 A	F2		84P0 3031		48 V AC/DC 8499 7004		
400 A	F3	2 P (1 P+, 1 P-)	84P0 2041	Shaft 320mm 1400 1032 S2L type handle Black IP65 74AF 2118	230 V AC/DC 8499 7023		-
630 A	F3		84P0 2064		Undervoltage releases 48 VAC 8499 8104		
					230 VAC 8499 8123		
					24 VDC 8499 8202		
					48 VDC 8499 8204		

(1) The switches are supplied without accessories.

(2) For isolated networks.

INOSYS LBS

Load Break Switches for DC & PV applications

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References (continued)

INOSYS LBS without tripping function

1000 VDC - 1 circuit

Rating (A)	Frame size	No. of poles per circuit	Switch body ⁽¹⁾	External operation	Aux. Contact	Bridging Bar ⁽²⁾
160 A	F2	2 P (1 P+, 1 P-)	86P0 2016	Shaft 320mm 1400 1032 S2 type handle Black IP65 742F 2111	NO/NC 8499 0001	-
250 A	F2	2 P (1 P+, 1 P-)	86P0 2025			
315 A	F2	2 P (1 P+, 1 P-)	86P0 2031			
400 A	F3	2 P (1 P+, 1 P-)	86P0 2040	Shaft 320mm 1400 1032 S2L type handle Black IP65 14AF 2111		

(1) The switches are supplied without accessories.

(2) Please consult us

1500 VDC - 1 circuit

Rating (A)	Frame size	No. of poles per circuit	Switch body ⁽¹⁾	External operation	Aux. Contact	Bridging Bar ⁽²⁾
160 A	F2	3 P (2 P+, 1 P-)	86P0 3016	Shaft 320mm 1400 1032 S2 type handle Black IP65 742F 2111	NO/NC 8499 0001	8409 0016
250 A	F2	2 P (1 P+, 1 P-)	86P0 2026 ⁽⁴⁾			-
		3 P (2 P+, 1 P-)	86P1 1026 ⁽³⁾ ⁽⁴⁾			
315 A	F2	3 P (2 P+, 1 P-)	86P0 3025	8409 0016		
400 A	F3	2 P (1 P+, 1 P-)	86P0 2041	Shaft 320mm 1400 1032 S2L type handle Black IP65 14AF 2111	-	
			86P1 1041 ⁽³⁾			
630 A	F3		86P0 2064			
			86P1 1064 ⁽³⁾			

(1) The switches are supplied without accessories.

(2) For isolated networks.

(3) Centered mechanism.

(4) Available end of 2018.

Accessories

Direct operation handle

For LBS with tripping function

Frame size	Handle type	Handle colour	Reference
F2 - F3	E3	Black	8499 5032



E2 type handle

access_400_a_1_cat

For LBS without tripping function

Frame size	Handle type	Handle colour	Reference
F2	E2	Black	8499 5022
F2	E2	Red	8499 5023
F3	E3	Black	8499 5032

Door interlocked external operation handle

Use

Door interlocked external operation handles include an escutcheon and are padlockable. External handles must be utilised with an extension shaft.

Note: We recommend to use IP55 for inside applications and IP65 for outside applications.

Example of application

As the handle is interlocked in the "ON" position the operator must safely disconnect and isolate the circuit prior to accessing the panel for maintenance procedures.

Opening the door when the switch is in the "ON" position can only be done by defeating the interlocking function with the use of a dedicated tool (authorised persons only). The interlocking function is restored when the door is re-closed.



S2 type handle

access_150_a_1_cat.eps

For LBS with tripping function

Frame size	Handle type	Handle colour	Degree of protection	Front operation
				Reference
F2	S2	Black	IP55	7421 2118
F2	S2	Black	IP65	742F 2118
F2	S2	Red	IP65	742G 2118
F3	S2L ⁽¹⁾	Black	IP55	74A1 2118
F3	S2L ⁽¹⁾	Black	IP65	74AF 2118
F3	S2L ⁽¹⁾	Red	IP65	74AG 2118

⁽¹⁾ S2L handles have an extended grip; please refer to the dimensions section.

For LBS without tripping function

Frame size	Handle type	Handle colour	Degree of protection	Front operation	Lateral operation
				Reference	Reference
F2	S2	Black	IP55	7421 2111	
F2	S2	Black	IP65	742F 2111	14YA 2111
F2	S2	Red	IP65	742G 2111	14YB 2111
F3	S2L ⁽¹⁾	Black	IP55	14A1 2111	
F3	S2L ⁽¹⁾	Black	IP65	14AF 2111	14AA 2111
F3	S2L ⁽¹⁾	Red	IP65	14AG 2111	14AB 2111

⁽¹⁾ S2L handles have an extended grip; please refer to the dimensions section.

Accessories (continued)

Shaft for external handle

Frame size	Handle type	Length (mm)	Reference
F2 - F3	S2, S2L	200	1400 1020
F2 - F3	S2, S2L	320	1400 1032
F2 - F3	S2, S2L	400	1400 1040

Other lengths: please consult us.



Shaft for S2 and S2L type handle

access_401_a_1_cat

Shaft guide for external handle

Use

To guide the shaft extension into the external handle.

This accessory enables the handle to engage the extension shaft with a misalignment of up to 15 mm / 0.59 in.

Recommend for a shaft length over 320 mm / 12.6 in.

Description	Reference
Shaft guide	1429 0000



access_280_a_2_cat

Alternative S-type handle cover colours

Use

For S2 and S2L type single grip handles.

Handle colour	Handle type	To be ordered in multiples of	Reference
Light grey	S2, S2L	50	1401 0001
Dark grey	S2, S2L	50	1401 0011

Other colours: please consult us.



access_199_a_1_cat

Auxiliary contact

Use

The same auxiliary contact can be used to provide position and tripping information. The function of the auxiliary contact depends on where it is mounted on the mechanism.

Characteristics

Changeover type: NO/NC, IP2X with front operation (cover tap screwed). 10 000 operations. Maximum 3 per switch.

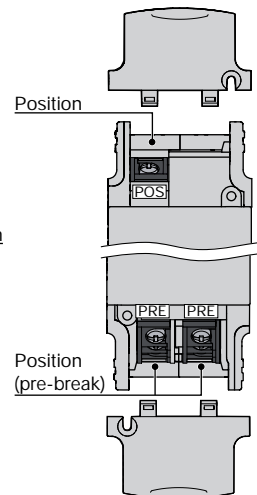
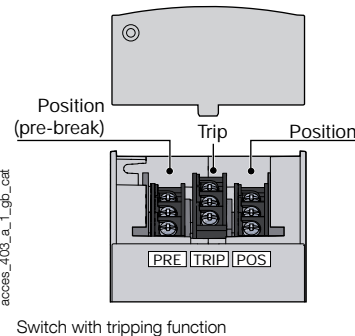
Frame size	Connection type	Type	Reference
F2 - F3	Screw	NO/NC standard	8499 0001
F2 - F3	Screw	NO/NC low level	8499 0002
F2 - F3	Screw	NC > 600 V	8499 0003



access_402_a_1_cat

Characteristics

Auxiliary contact type	Min. current (A)	I _{th} (A)	Operating current I _e (A)				
			24 VDC DC-14	48 VDC DC-14	230 VAC AC-15	440 VAC AC-15	690 VAC AC-15
Standard	12.5 mA / 24 V	16	1	0.2	4	4	-
Low level	1 mA / 4 V	16	1	0.2	2	1	-
> 600 V	10 mA / 24 V	16	1	0.2	4	4	0.5



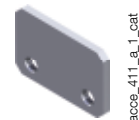
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Bridging bar for poles in series

Use

The bridging bars enable the poles to be connected in series, allowing the following configurations for 1500 VDC in 3 poles.

Connection diagrams, see "Pole connection in series" page 150.



Frame size	Rating (A)	Quantity to be ordered for 1500 VDC configuration	Reference
F2	160 ... 315	1 ⁽¹⁾	8409 0016 ⁽²⁾

(1) For insulated network (switching of both polarities + and -).
(2) Kit comprises 2 identical bridging bars.

Tripping coil

Use

Allows remote activation of the switch's tripping mechanism. Shunt trip and undervoltage release coils are available.

Connection: 1.5 mm², push in type.
Maximum one tripping coil per switch.
Safe and easy coil replacement by using standard tools.



Shunt trip coil

Shunt trip coil

Frame size	Voltage (V)	Reference
F2 - F3	24 V AC/DC	8499 7002
F2 - F3	48 V AC/DC	8499 7004
F2 - F3	110 - 127 VAC ; 110 - 125 VDC	8499 7011
F2 - F3	230 V AC/DC	8499 7023

Other voltage ratings available, please consult us.

Undervoltage release

Frame size	Voltage (V)	Reference
F2 - F3	48 VAC	8499 8104
F2 - F3	110 - 120 VAC	8499 8111
F2 - F3	230 - 240 VAC	8499 8123
F2 - F3	24 VDC	8499 8202
F2 - F3	48 VDC	8499 8204

Other voltage ratings available, please consult us.

Characteristics

Shunt trip coils

AC type (±10%)	24 VAC	48 VAC	110 VAC	230 VAC
Inrush consumption (A); <10ms	6.85	2.95	1.25	0.73
DC type (-5% ... +20%)	24 VDC	48 VDC	110 VDC	230 VDC
Inrush consumption (A), <10ms	7.6	3.28	1.39	0.78

Max supply time 2 s.

Example to avoid permanent supply includes connection of auxiliary contact connected in series with shunt trip coil, or coil supply voltage to be taken from the load side, or electronic limitation of the duration of the supply voltage/current.
For DC shunt trip coil rated above 70 VDC, external relay shall be used to disconnect the coil.

Undervoltage release

AC type	24 VAC	48 VAC	110 VAC	230 VAC
Max permanent consumption (VA), at 110% U _n	-	1.8	1.4	1.5
DC type	24 VDC	48 VDC	110 VDC	230 VDC
Max permanent consumption (VA), at 110% U _n	1.6	1.4	-	-

Holding: up to 85% x U_n

Release: < 35 to 70% x U_n

Inter-phase barrier

Use

Provides safety isolation between the terminals, essential for use at 1000 and 1500 VDC or between 2 circuits.

Frame size	Type	Pack (unit)	Reference
F2 - F3	Short	2	8499 2202
F2 - F3	Short	3	8499 2203
F2 - F3	Long	2	8499 2212
F2 - F3	Long	3	8499 2213



Accessories (continued)

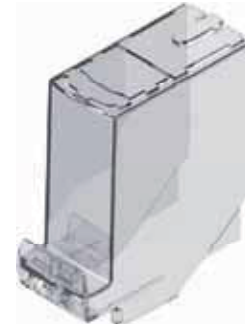
Terminal shroud

Use

For top or bottom protection against direct contact with terminals or connection parts; provides IP4 protection and phase separation. 1 P type to cover 1 pole connection.

Advantages

Perforations for thermographic inspection / voltage check without the need to remove the shrouds. Terminal shrouds can be fixed in place with a holding insert. Includes break-off tabs for precise adaptation to cables or insulated bars.



access_407_a_1_cat

Frame size	Pack (unit)	No. of poles	Position	Reference
F2	3	1 P	Top or bottom	8499 4213 ⁽¹⁾
F2	4	1 P	Top or bottom	8499 4214 ⁽¹⁾
F3	3	1 P	Top or bottom	8499 4313 ⁽¹⁾
F3	4	1 P	Top or bottom	8499 4314 ⁽¹⁾

⁽¹⁾ Compatible with the holding insert which can be fitted to lock the shrouds in place.

Terminal screen

Use

Provides top and bottom protection against direct contact with terminals or connection parts.

Advantages

Perforations for thermographic inspection. Mounting requires holding inserts (supplied with the terminal screens).



access_408_a_1_cat

Frame size	No. of poles	Position	Reference ⁽¹⁾
F2	2 P	Top and bottom	8499 3222
F2	3 P	Top and bottom	8499 3232
F3	2 P	Top and bottom	8499 3322

⁽¹⁾ Each reference comprises 2 terminal screens for top and bottom protection.

Holding insert

Use

Used to secure terminal shrouds / inter-phase barriers on the switch.

Frame size	Pack (unit)	Reference
F2 - F3	10	8499 6220
F2 - F3	100	8499 6221

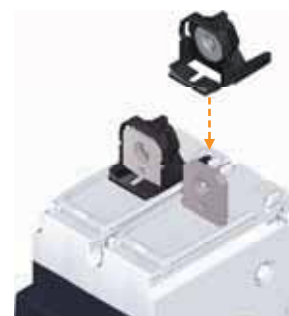


access_409_a_1_cat

Captive nut

Use

This accessory enables simple one-sided connection to the power terminals. It can be mounted on either side of the terminal for front or rear connection.



Frame size	Pack (unit)	Reference
F2	12	8499 6120
F2	120	8499 6121
F3	12	8499 6130
F3	120	8499 6131

acce_399_a_1_cat

Voltage tap

Use

Allows connection of voltage sensing or power cables, with fast-on connection.



Frame size	Pack (unit)	Reference
F2	12	8499 9012
F3	12	8499 9013

acce_412_a_1_cat

Characteristics

Characteristics according to IEC 60947-3

Rated current I_n			160 A	250 A	315 A	400 A	630 A	800 A
Frame size			F2	F2	F2	F3	F3	F3
Thermal current at 40°C (A)			160	250	315	400	630	800
Thermal current at 50°C (A)			160	250	315	400	630	760
Thermal current at 60°C (A)			160	250	315	400	570	685
Rated insulation voltage U_i (V)			1500	1500	1500	1500	1500	1500
Rated impulse withstand voltage U_{imp} (kV)			12	12	12	12	12	12
Number of circuits	Rated voltage	Utilisation category	I_e (A)	I_e (A)	I_e (A)	I_e (A)	I_e (A)	I_e (A)
1 circuit	1000 VDC ⁽¹⁾	DC-21 B	160	250	315	400	630	800
1 circuit	1500 VDC ⁽²⁾	DC-21 B	160	250	315	400	630	800
Short-circuit capacity at 1000 & 1500 VDC (without protection)								
Rated short-time withstand current I_{cw} 1s (kA eff.)			5	5	5	8	8	8
Rated short-circuit making capacity I_{cm} (kA peak) - 60 ms			10	10	10	10	10	10
Connection								
Recommended Cu rigid cable cross-section (mm ²) ⁽⁴⁾			70	120	185	240	2 x 185	2 x 240
Recommended Cu busbar width (mm) ⁽⁴⁾			20	20	20	25	25	25
Mechanical characteristics								
Durability (number of operating cycles)			10000	10000	10000	8000 / 6000 ⁽⁵⁾	8000 / 6000 ⁽⁵⁾	8000 / 6000 ⁽⁵⁾
Number of tripping operations			1000	1000	1000	1000	1000	1000

(1) 2 poles in series.

(2) 3 poles in series.

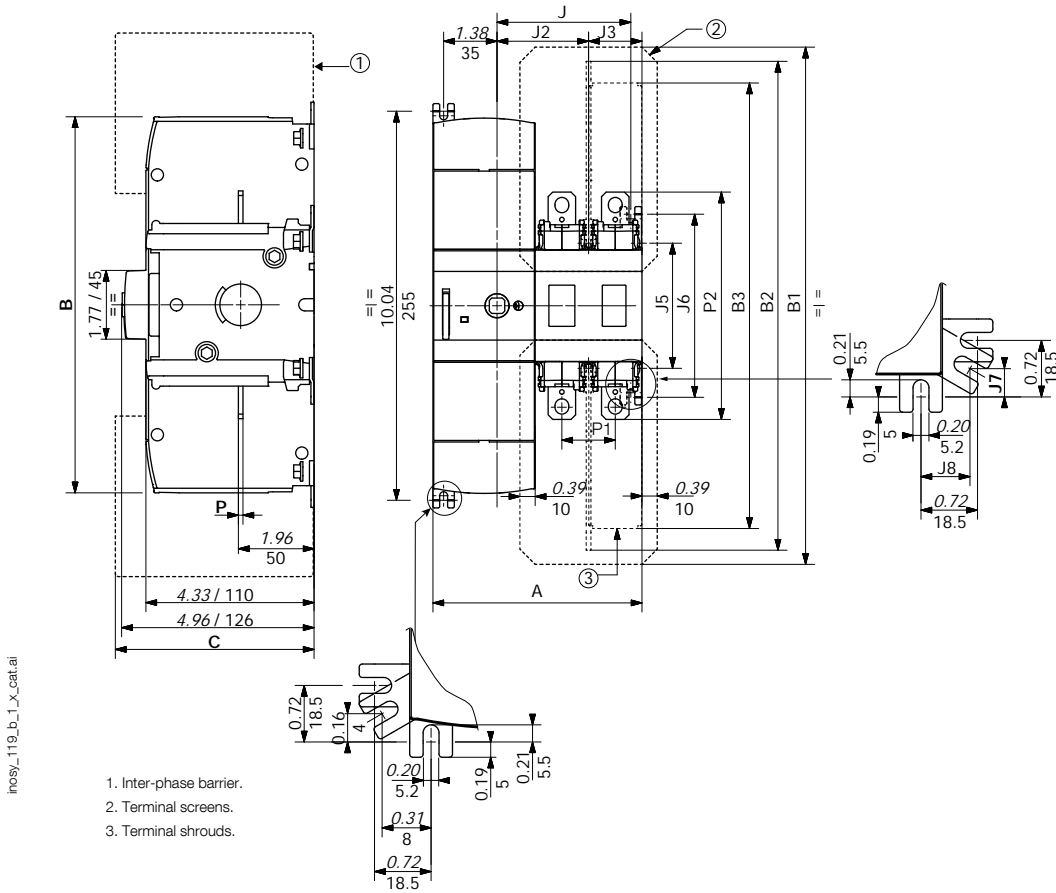
(3) Cu busbar.

(4) For aluminium connection, please consult us.

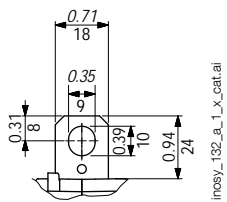
(5) 8000 for LBS without tripping function and 6000 for LBS with tripping function.

Dimensions (in/mm)

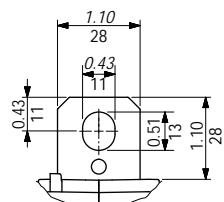
INOSYS LBS with tripping function



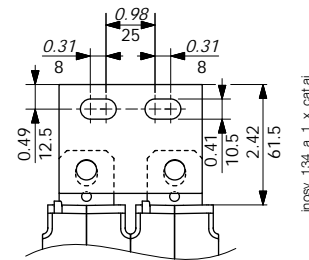
Connection terminal F2



Connection terminal F3



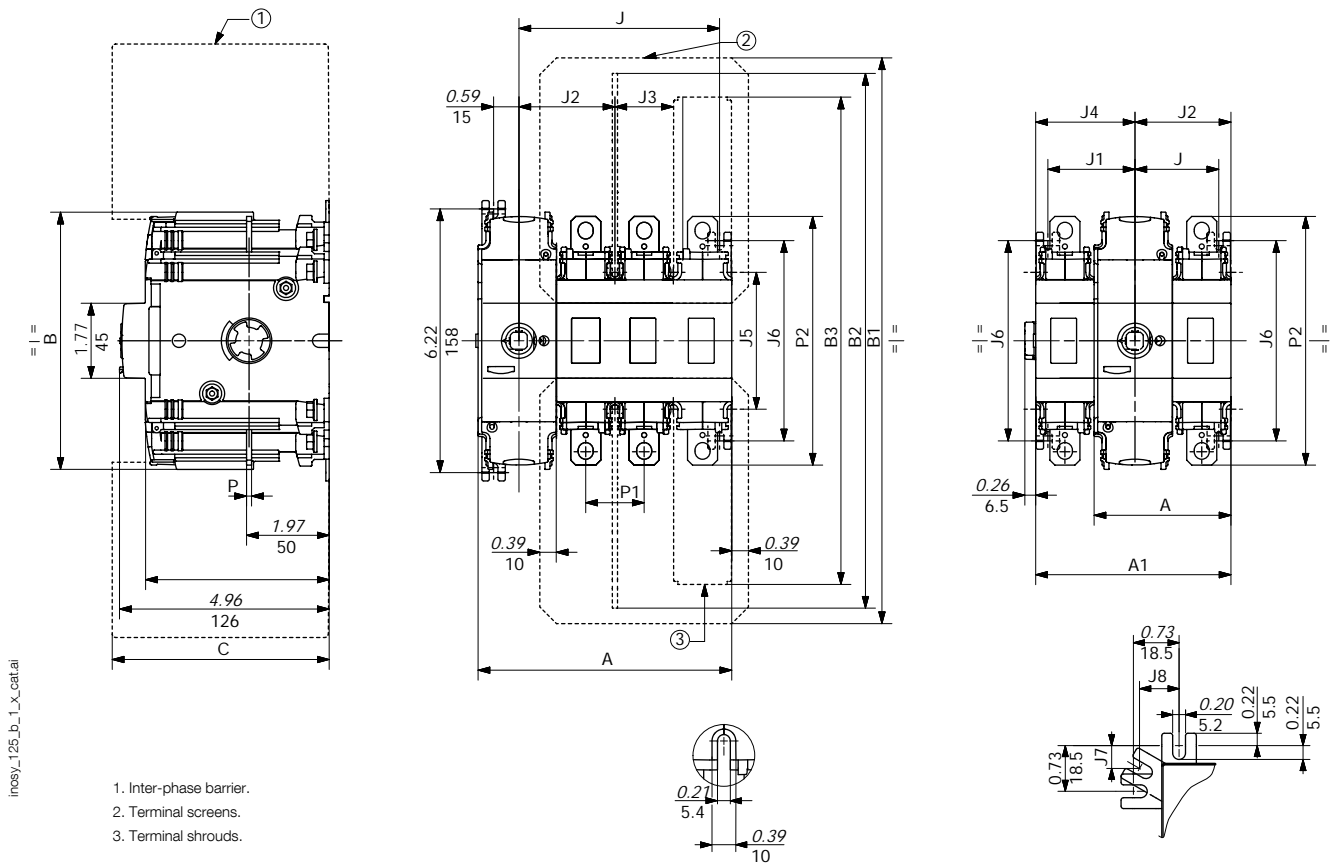
Parallel bridging F3



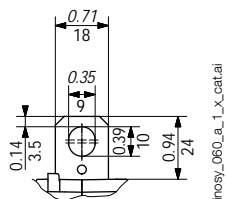
Rating (A)	Frame size	Units	A	
			2 P	3 P
160 ... 315	F2	in	5.39	6.77
		mm	137	172
400 ... 800	F3	in	6.18	-
		mm	157	-

Rating (A)	Frame size	Units	B2															
			B	B1	short	long	B3	C	J2	J3	J4	J5	J6	J7	J8	P	P1	P2
160 ... 315	F2	in	9.69	13.35	7.85	12.61	11.64	4.33	2.36	1.38	3.03	3.23	4.72	0.39	0.58	0.12	1.38	5.87
		mm	246	339	199	320	296	110	60	35	77	82	120	10	15	3	35	149
400 ... 800	F3	in	9.69	16.28	9.35	14.11	14.12	4.33	2.76	1.77	3.43	4.72	6.22	0.16	0.33	0.20	1.77	7.87
		mm	246	414	237	358	359	110	70	45	87	120	158	4	8	5	45	200

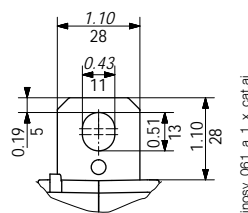
INOSYS LBS without tripping function



Connection terminal F2



Connection terminal F3



Rating (A)	Frame size	Units	A		A1	J	J1	J	
			2 P	3 P	1+1 P	1+1 P	1+1 P	2 P	3 P
160 ... 315	F2	in	4.60	5.98	4.60	1.97	2.05	3.35	4.72
		mm	117	152	117	50.5	52.5	85.5	120.5
400	F3	in	4.60	-	4.60	2.36	2.44	4.13	-
		mm	117	-	117	60.5	62.5	105.5	-

Rating (A)	Frame size	Units	B2															
			B	B1	short	long	B3	C	J2	J3	J4	J5	J6	J7	J8	P	P1	P2
160 ... 315	F2	in	5.90	13.35	7.85	12.61	11.64	4.33	2.26	1.38	2.34	3.23	4.72	0.39	0.58	0.12	1.38	5.87
		mm	154	339	199	320	296	110	57.5	35	59.5	82	120	10	15	3	35	149
400	F3	in	5.90	16.28	9.35	14.11	14.12	4.33	2.64	1.77	2.72	4.72	6.22	0.16	0.33	0.2	1.77	7.87
		mm	154	414	237	358	359	110	67.5	45	69.5	120	158	4	8	5	45	200

Dimensions for external handles (in/mm)

F2 frame size

Handle type	Front operation Direction of operation	Door drilling
S2 type with trip 		
S2 type 		

poign_057_a_1_us_cat.eps

poign_013_a_1_us_cat.eps

F3 frame size

Handle type	Front operation Direction of operation	Door drilling
S2L type with trip 		
S2L type 		

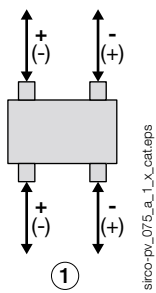
poign_068_a_1_us_cat.eps

poign_069_a_1_us_cat.eps

Pole connections in series

1 PV circuit - 1000 VDC

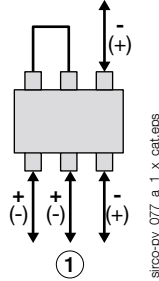
F2-F3 - 2 P



1. Circuit 1

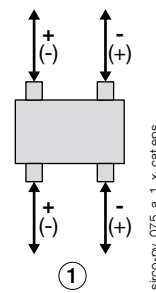
1 PV circuit - 1500 VDC

F2 - 3 P



1 PV circuit - 1500 VDC

F3 - 2 P

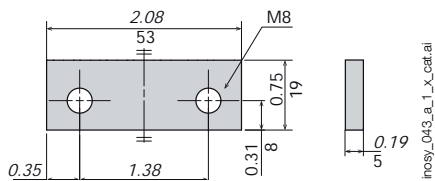


Bridging bars (in/mm)

F2

8409 0016 ⁽¹⁾

(1) Kit comprises 2 identical bars.



Mounting orientation

F2 - F3

All mounting orientations are possible. Derating may apply - please consult us.

