

INOSYS LBS UL 98B

Load Break Switches for DC & PV applications
from 100 to 600 A, up to 1500 VDC



INOSYS LBS
1 + 1 poles



INOSYS LBS
2 poles

Function

INOSYS LBS are load break switches which are available in manual operation. They can be operated using the handle to disconnect all or part of electrical installation.

They make and break under all load conditions, provide safety isolation for any low voltage circuits up to 1500 VDC and are suitable for emergency switching. They are available for DC-PV2 utilization category.

Advantages

High-performance switching in a compact frame

INOSYS LBS switches integrate a patented technology that offers high switching capacity. The 500 and 750 VDC per pole provides 1500 VDC in 2 poles only with optimum arc containment and significant power loss reduction - all within a compact device.

Safe & reliable operation

- Reliable position indication through visible contacts.
- 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 131° F (55 °C), functional from -40 to +122 °F (-40 to +50 °C).

Designed for harsh environments

- Vibration testing (from 13.2 to 100 Hz at 0.7 g).
- Shock testing (15 g during three cycles).
- Humid temperature testing (2 cycles, 131 °F/55 °C with 95% humidity level).
- Salt mist testing (3 cycles with humidity storage, 104 °F/40 °C, 93% humidity after each cycle).

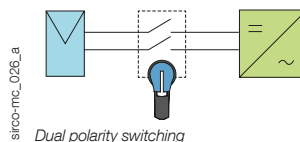
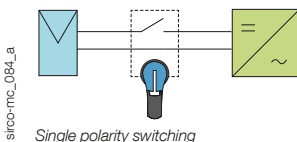
Easy to install

- Wiring: as the switch is non-polarized all types of wiring and connections are possible.
- Easy access without tools to integrate auxiliary contacts (located within the switch footprint).
- Mechanism can be centered or left aligned (in the factory) to accommodate installation requirements.

Modular solution for 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.



The solution for

- > Combiner box
- > Recombiner box
- > Solar Inverter
- > Energy Storage Inverter
- > Battery Energy Storage Systems
- > DC Drives

Strong points

- > High-performance switching in a compact design
- > Easy integration
- > Reinforced safety with visible contact indication
- > Efficient with low power-loss

Compliance with standards

- > IEC 60947-3, DC-21B & DC-PV2



- > UL98B File E346418



- > KEMA-KEUR



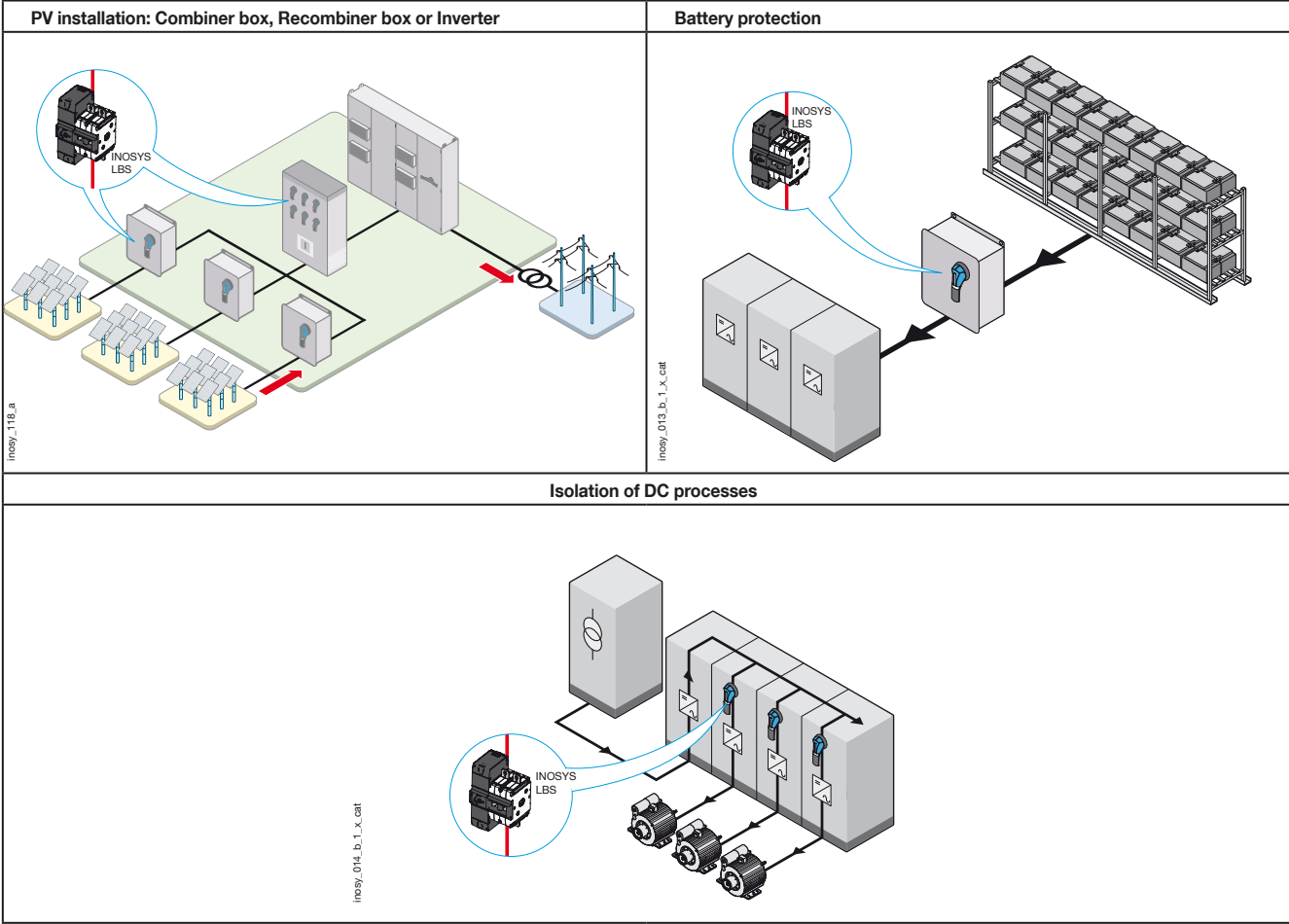
- > CCC



Compatible with requirements

- > IEC 60364-7-712
- > NEC art. 690
- > AS/NZS 5033

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



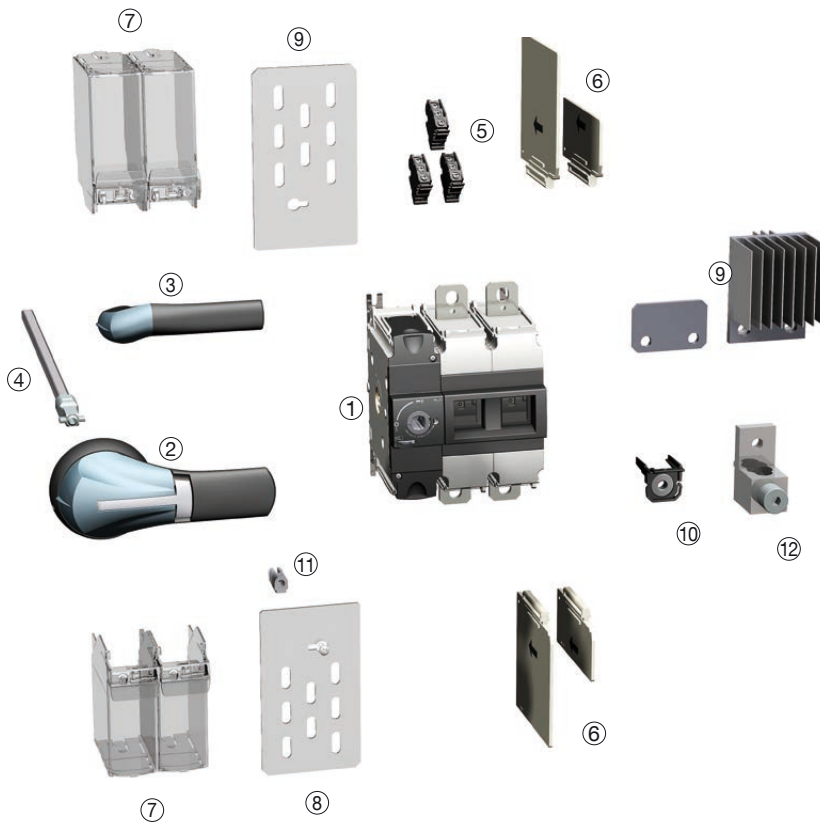
The SOCOMEC solutions

<p>SIRCO PV Manual operation PV switches</p>	<p>INOSYS LBS Up to 1500 VDC with visible contact indication</p>
 <p>up to 2000 A at 1000 VDC up to 4 circuits</p> <p><small>sirco-pv_059 - 060 - 061_a</small></p>	 <p>up to 500 A at 1000 VDC up to 600 A at 1500 VDC</p> <p><small>inosy_156</small></p>

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Overview



1. INOSYS LBS 400 A - 1500 V DC
2. External operation handle
3. Direct operation handle
4. Shaft for external operation
5. Auxiliary contact
6. Inter-phase barriers
7. Terminal shrouds
8. Terminal screen
9. Bridging bar to arrange the poles in series
10. Captive nut
11. Mounting insert
12. Cage terminals

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References

INOSYS LBS

1000 VDC - 1 circuit

Rating (A)	Frame size	No. of poles per circuit	Switch body ⁽¹⁾	External operation	Aux. Contact	Bridging Bar ⁽²⁾
100 A	F2	2 P	87P0 2010	Shaft 12.6 inches 320 mm 1400 1032	NO/NC 8499 0001	8409 0016
250 A	F2	2 P	87P0 2025	S2 type handle Black 3R, 12 - 4, 4X 742D 2111		
400 A	F3	2 P	87P0 2040	Shaft 12.6 inches 320 mm 1400 1032		8409 0040
500 A	F3	2 P	87P0 2050	S2L type handle Black 3R, 12 - 4, 4X 14AD 2111		8409 0041

(1) The switches are supplied without accessories.

(2) For grounded network, single polarity switching.

1500 VDC - 1 circuit

Rating (A)	Frame size	No. of poles per circuit	Switch body ⁽¹⁾	External operation	Aux. Contact	Bridging Bar ⁽²⁾
100 A	F2	2 P (1 P+, 1 P-)	87P0 2011	Shaft 12.6 inches 320 mm 1400 1032	NO/NC 8499 0001	8409 0016
			87P1 1011 ⁽³⁾			8409 0024
200 A	F2	2 P (1 P+, 1 P-)	87P0 2021	S2 type handle Black 3R, 12 - 4, 4X 742D 2111	NO/NC 8499 0001	8409 0016
			87P1 1021 ⁽³⁾			8409 0024
250 A	F2	2 P (1 P+, 1 P-)	87P0 2026	S2 type handle Black 3R, 12 - 4, 4X 742D 2111	NO/NC 8499 0001	8409 0016
			87P1 1026 ⁽³⁾			8409 0024
		3 P (2 P+, 1 P-)	87P0 3025			2x 8409 0025
400 A	F3	2 P (1 P+, 1 P-)	87P0 2041	Shaft 12.6 inches 320 mm 1400 1032	NO/NC 8499 0001	8409 0040
			87P1 1041 ⁽³⁾			8409 0039
500 A	F3	2 P (1 P+, 1 P-)	87P0 2051	S2L type handle Black 3R, 12 - 4, 4X 14AD 2111	NO/NC 8499 0001	8409 0039
			87P1 1051 ⁽³⁾			8409 0041
600 A	F3	2 P (1 P+, 1 P-)	87P0 2061		NO/NC 8499 0001	8409 0063
			87P1 1061 ⁽³⁾			Consult us

1500 VDC - 2 circuits

Rating (A)	Frame size	No. of poles per circuit	Switch body ⁽¹⁾	External operation	Aux. Contact	Bridging Bar ⁽²⁾
400 A	F3	2 P (1P+, 1P-)	87P2 2041 ⁽³⁾	Shaft 12.6 inches 320 mm 1400 1032	NO/NC 8499 0001	8409 0041 8409 0063 ⁽⁴⁾
500 A			87P2 2051 ⁽³⁾	S2L type handle Black 3R, 12 - 4, 4X 14AD 2111		8409 0063
600 A			87P2 2061 ⁽³⁾			

(1) The switches are supplied without accessories.

(2) For isolated networks.

(3) Centered mechanism.

(4) In side mounting.

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Accessories

Door interlocked external operation handle

Use

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

Example

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 (authorized personnel only). The interlocking function is restored when the door is re-closed.



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S2 type handle

Frame size	Handle type	Handle colour	Degree of protection	Front operation	Lateral operation
				Reference	Reference ⁽²⁾
F2	S2	Black	3R,12	742F 2111	
F2	S2	Black	4,4X	742D 2111	142J 6111
F2	S2	Red	4,4X	742E 2111	
F3	S2L ⁽¹⁾	Black	3R,12	14AF 2111	
F3	S2L ⁽¹⁾	Black	4,4X	14AD 2111	14AJ 2111
F3	S2L ⁽¹⁾	Red	4,4X	14AE 2111	

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

(2) only compatible with left mechanism version.

Direct operation handle available, consult us.

Shaft for external handle

Frame size	Handle type	Length (in/mm)	Reference
F2 - F3	S2, S2L	7.87/200	1400 1020
F2 - F3	S2, S2L	12.6/320	1400 1032
F2 - F3	S2, S2L	15.75/400	1400 1040

Other lengths: please consult us.



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Shaft for S2 and S2L type handle

Auxiliary contact

Use

Provide information about the position and pre-break depending on installation location.

Characteristics

Switching type: NO/NC,
 IP2X with front control (screw cap).
 10 000 operations.
 Max. 3 per switch.

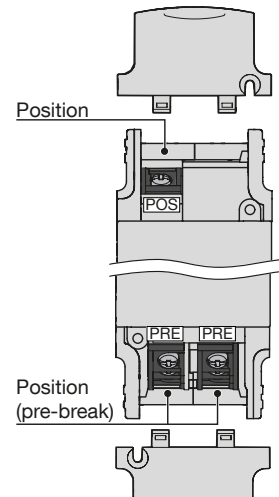
Frame size	Connection type	Type	Reference
F2 - F3	Screws	Standard NO/NC	8499 0001
F2 - F3	Screws	Low level NO/NC	8499 0002

Characteristics

Type of auxiliary contact	Min. current (A)	I _{th} (A)	Operating current I _e (A)			
			24 VDC	48 VDC	230 VAC	440 VAC
			DC-14	DC-14	AC-15	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



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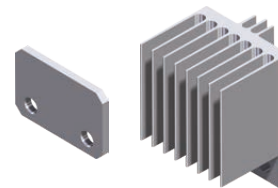
Accessories (continued)

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.

Connection diagrams, see "Pole series connection" pages.



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1000 VDC - 1 circuit

Frame size	Rating (A)	No. of poles	Quantity to be ordered	Reference
F2	100	2 P	1	8409 0016
F2	250	2 P	1	8409 0016
F3	400	2 P	1	8409 0040
F3	500	2 P	1	8409 0041
F3	600	2 P	1	8409 0063

1500 VDC - 1 circuit

Frame Size	Rating (A)	No. of poles	Quantity to be ordered	Reference
F2	100	3 P	2	8409 0016
F2	100 ... 250	2 P	1	8409 0024 ⁽¹⁾
F2	250	3 P	2	8409 0025
F3	400 ... 600	2 P	1	8409 0039 ⁽¹⁾
F3	400	2 P	1	8409 0040
F3	500 ... 600	2 P	1	8409 0041 8409 0063

1500 VDC - 2 circuits

Frame Size	Rating (A)	No. of poles	Quantity to be ordered	Reference
F3	400	2 P	2	8409 0041 8409 0063
F3	500 ... 600	2 P	2	8409 0063

(1) Centered mechanism.

Terminal screen

Use

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

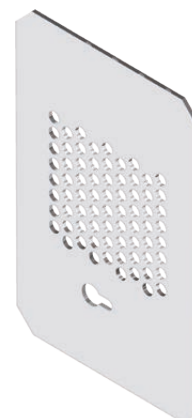
Advantages

Small holes in the screen to allow for thermographic inspection. Mounting requires holding inserts (supplied with the terminal screens).

Frame size	No. of poles	Position	Reference ⁽¹⁾⁽²⁾
F2	2 P	Top and bottom	8499 3222
F2	3 P	Top and bottom	8499 3232
F3	2 P	Top and bottom	8499 3722

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

(2) When used with interphase barriers, please consult us.



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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



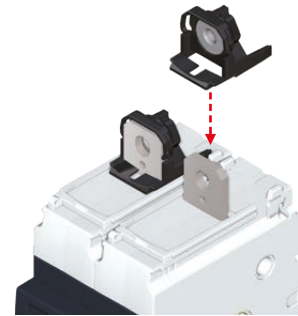
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Captive nut

Use

This accessory enables simple one-handed 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



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Voltage tap

Use

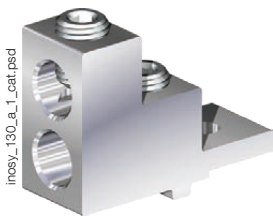
Allows connection of voltage sensing or power cables, with fast-on connection.

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

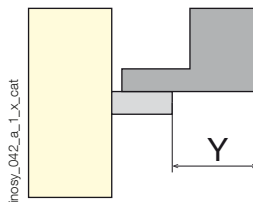


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Terminal lugs



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Frame size	Number and size (min. - max.) of cables	Type of cable	Openings per lug	Quantity per reference	Dimension "Y" (mm/in)	Type	Reference ⁽¹⁾
F2	2 conductors (#12 - 2/0)	Cu / Al	2	2	32,5 / 1.29	IHI 2S2-0-TP-STK-34-49-HEX	3954 2023 ⁽¹⁾
F2		Cu / Al		3			3954 3023 ⁽¹⁾
F2		Cu / Al		4			3954 4023 ⁽¹⁾
F3	2 conductors (#2 - 600 KCMIL)	Cu / Al	2	2	69,7 / 2.74	CMC PV2-600	3954 2060 ⁽¹⁾
F3		Cu / Al		3			3954 3060 ⁽¹⁾
F3		Cu / Al		4			3954 4060 ⁽¹⁾

⁽¹⁾ Captive nut 84996xxx is mandatory.

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Characteristics

Characteristics according to UL 98B

Rated current I _n	100 A	200 A	250 A	400 A	500 A	600 A
Frame size	F2	F2	F2	F3	F3	F3
Number of poles(s) in series per polarity - 1000VDC	2 P	2 P	2 P	2 P	2 P	2 P
Number of poles(s) in series per polarity - 1500VDC	2 P / 3 P	2 P / 3 P	2 P / 3 P	2 P	2 P	2 P
Number of pole(s) of the device - 1000VDC	2 P	2 P	2 P	2 P	2 P	2 P
Number of pole(s) of the device - 1500VDC	2 P / 3 P	2 P / 3 P	2 P / 3 P	2 P	2 P	2 P
Short-circuit capacity at 1000 & 1500VDC (with protection)						
Prospective short-circuit current (kA rms DC)	10 ⁽¹⁾	10 ⁽¹⁾	10 ⁽¹⁾	10 ⁽¹⁾	10 ⁽¹⁾	10 ⁽¹⁾
Mechanical characteristics						
Durability (number of operating cycles)	8000	8000	8000	8000 ⁽²⁾	8000 ⁽²⁾	8000 ⁽²⁾
Power loss/pole (W/Pole)	2	5.1	11.2	13	21.6	29.3

(1) Without fuse during 50 ms.

(2) 8,000 for LBS.

Characteristics according to IEC 60947-3

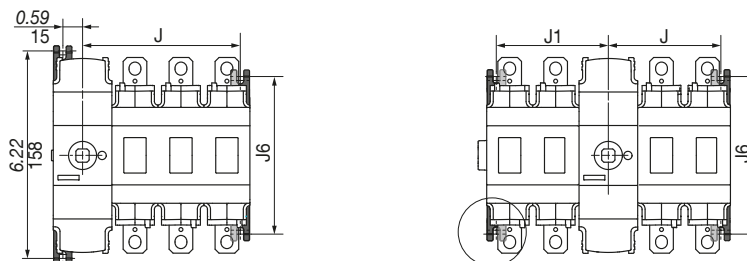
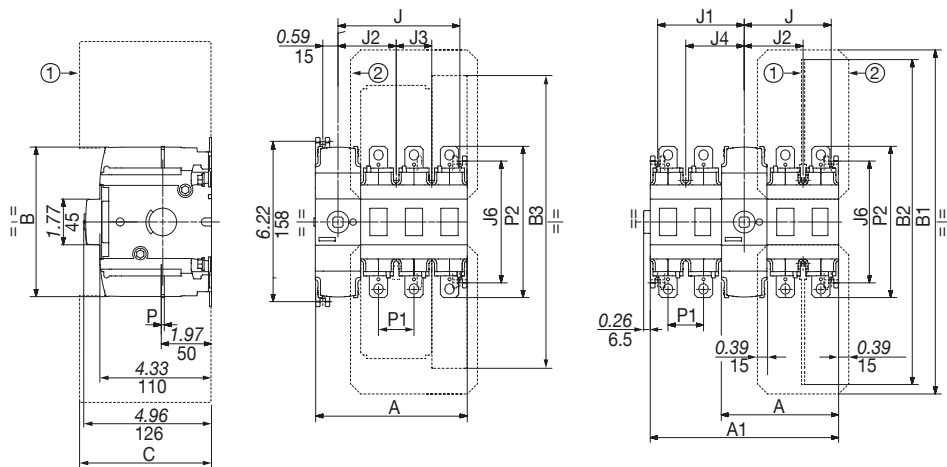
Rated current I _n	160 A	250 A	315 A	400 A	500 A	630 A
Frame size	F2	F2	F2	F3	F3	F3
Thermal current at 40 °C (A)	160	250	315	400	500	630
Thermal current at 50 °C (A)	160	250	315	400	500	630
Thermal current at 60 °C (A)	160	250	315	400	500	630
Rated insulation voltage U _i (V)	1500	1500	1500	1500	1500	1500
Rated impulse withstand voltage U _{imp} (kV)	12	12	12	12	12	12
Number of circuits	Nominal voltage	Utilisation category	I_e (A)	I_e (A)	I_e (A)	I_e (A)
1 circuit	1000 VDC ⁽¹⁾	DC-21 B	160	250	315	400
1 circuit	1500 VDC ⁽²⁾	DC-21 B	160	250	315	400
Number of circuits	Nominal voltage	Utilisation category	I_e (A)	I_e (A)	I_e (A)	I_e (A)
1 circuit	1000 VDC ⁽¹⁾	PV2	-	-	-	-
1 circuit	1500 VDC ⁽²⁾	PV2	160	250	315	400
2 circuits	1500 VDC ⁽²⁾	PV2	-	-	-	400
Short-circuit operation at 1000 VDC and 1500 VDC (unprotected)						
Current rated as short-time withstand I _{cw} 1s (kA rms)	5	5	5	8	8	8
Rated short-circuit breaking capacity I _{cm} (peak kA) – 60 ms	10	10	10	10	10	10
Connection						
Recommended Cu rigid cable cross-section ⁽³⁾	70	120	185	240	2 x 150	2 x 185
Recommended width of copper bars (mm) ⁽³⁾	20	20	20	25	25	25
Mechanical characteristics						
Durability (number of operating cycles)	8000	8000	8000	8000	8000	8000
Power dissipation per pole (W/pole)	4.5	11.2	13	13	21.6	30.2

(1) 2 poles in series.

(2) 2 or 3 poles in series.

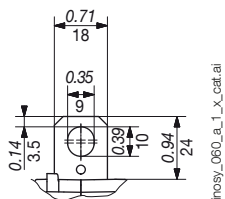
(3) For aluminium connections, please contact us.

INOSYS LBS

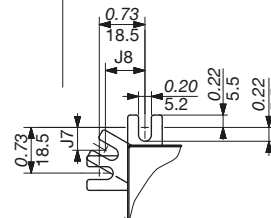
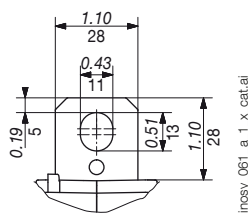


- 1. Inter-phase barrier.
- 2. Terminal screens..

Connection terminal F2



Connection terminal F3



Rating (A)	Frame size	Units	A		A1	J	J1	J	
			2 P	3 P	1+1 P / 2+2 P	1+1 P / 2+2 P	1+1 P / 2+2 P	2 P	3 P
100 ... 250	F2	in	4.60	5.98	4.60 / 7.36	1.97 / 3.37	2.05 / 3.44	3.35	4.72
		mm	117	152	117 / 187	50.5 / 85.5	52.5 / 87.5	85.5	120.5
400 ... 600	F3	in	5.40	7.17	5.40 / 8.94	2.36 / 4.15	2.44 / 4.23	4.13	-
		mm	137	182	137 / 227	60.5 / 105.5	62.5 / 107.5	105.5	-

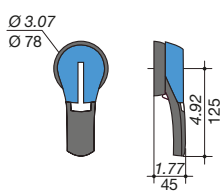
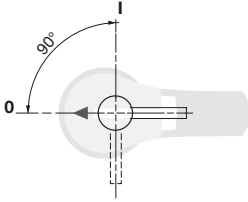
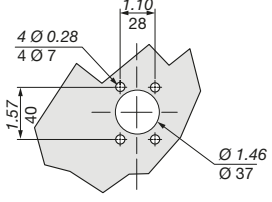
Rating (A)	Frame size	Units	B	B1	B2			B3	C		J2	J3	J4	J6	P1	P2
			IEC short	IEC long	UL	IEC	UL									
100 ... 250	F2	in	5.90	13.35	7.85	12.61	10.31	11.64	4.33	4.33	2.26	1.38	2.34	4.72	1.38	5.87
		mm	154	339	199	320	262	296	110	110	57.5	35	59.5	120	35	149
400 ... 600	F3	in	5.90	16.28	9.35	14.11	15.5	14.12	4.33	5.31	2.64	1.77	2.72	6.22	1.77	7.87
		mm	154	414	237	358	394	359	110	135	67.5	45	69.5	158	45	200

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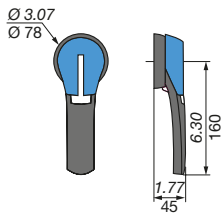
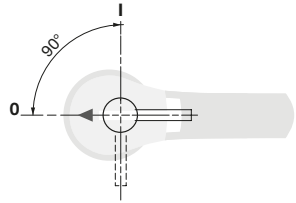
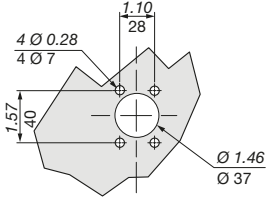
Dimensions for external handles (in/mm)

F2 frame size

Handle type	Front operation Direction of operation	Door drilling
S2 type 		

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F3 frame size

Handle type	Front operation Direction of operation	Door drilling
S2L type 		

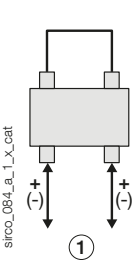
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Wiring configuration

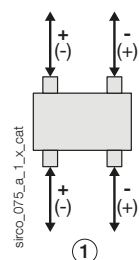
1 circuit - 1000 & 1500 VDC

F2-F3 - 2 P

Grounded network



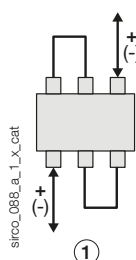
Floating network



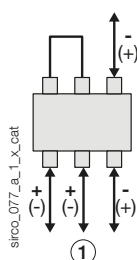
1 circuit - 1500 VDC

F2 - 3 P

Grounded network



Floating network

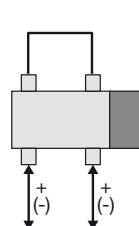


1. Circuit 1
2. Circuit 2

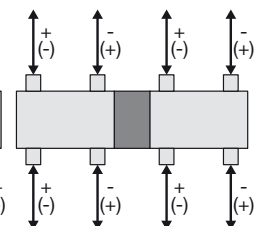
2 circuits - 1500 VDC

F3 - 2 P

Grounded network



Floating network

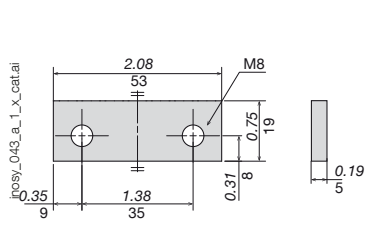


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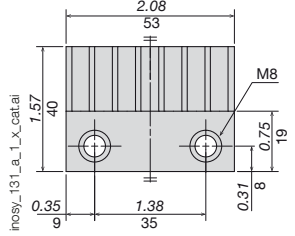
Bridging bars (in/mm)

F2

8409 0016 ⁽¹⁾
 (1) Kit comprises 2 identical bars.

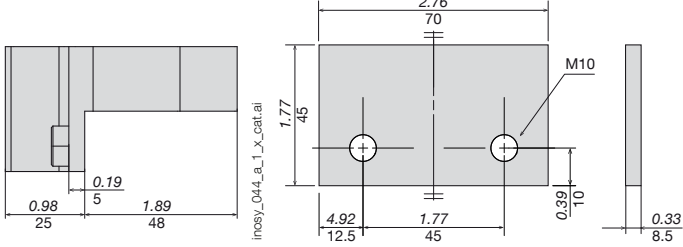


8409 0025



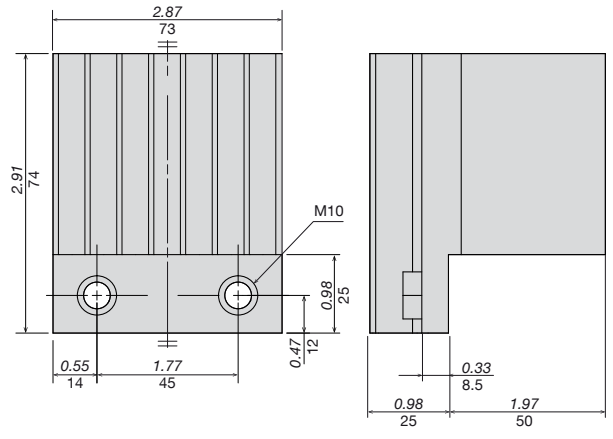
F3

8409 0040 ⁽¹⁾
 (1) Kit comprises 2 identical bars.

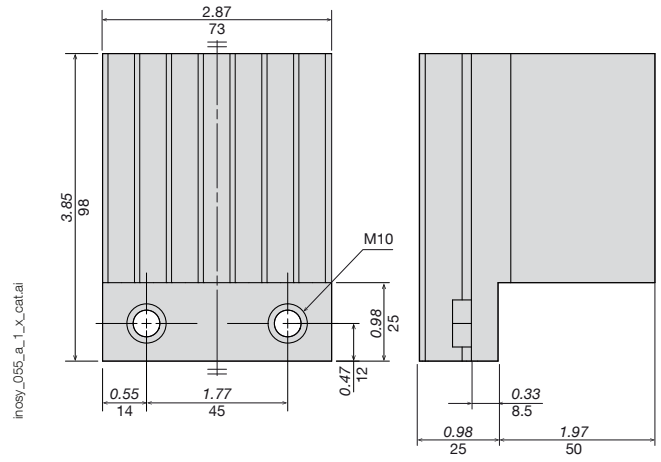


F3

8409 0041



8409 0063



Mounting orientation

F2 - F3

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

