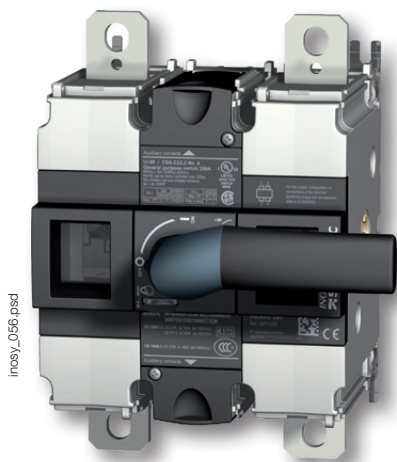


INOSYS *LBS* UL 98B

Load Break Switches for DC & PV applications
from 100 to 1200 A, up to 1500 VDC



The solution for

- > Industry

Strong points

- > High performance power switching in a compact frame
- > Safe & reliable operation
- > Designed for harsh environments
- > Easy to install
- > Modular solution for flexible configuration

Conformity to standards

- > UL 98B
Guide WHVA
File E346418



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



- > CCC



Function

INOSYS LBS is a range of load break switches that can be manually controlled. These switches can be operated manually using the handle to disconnect all or part of the electrical installation. They ensure on-load opening / closing and safe disconnection of any direct current low voltage electrical circuit up to 1500 VDC. They can also be used for emergency power switching applications. They are available for DC-PV2 utilization category.

Advantages

High-performance switching in a compact frame

INOSYS LBS load break switches incorporate patented technology that provides a breaking capacity of 750 VDC per pole, providing 1500 VDC in just 2 poles, and significantly limiting power dissipation. All in an exceptionally compact device.

Safe & reliable operation

- Direct position indication on the bar and visible contact with containment of the electrical arc.
- 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 centred or left aligned (in the factory) to accommodate installation requirements.

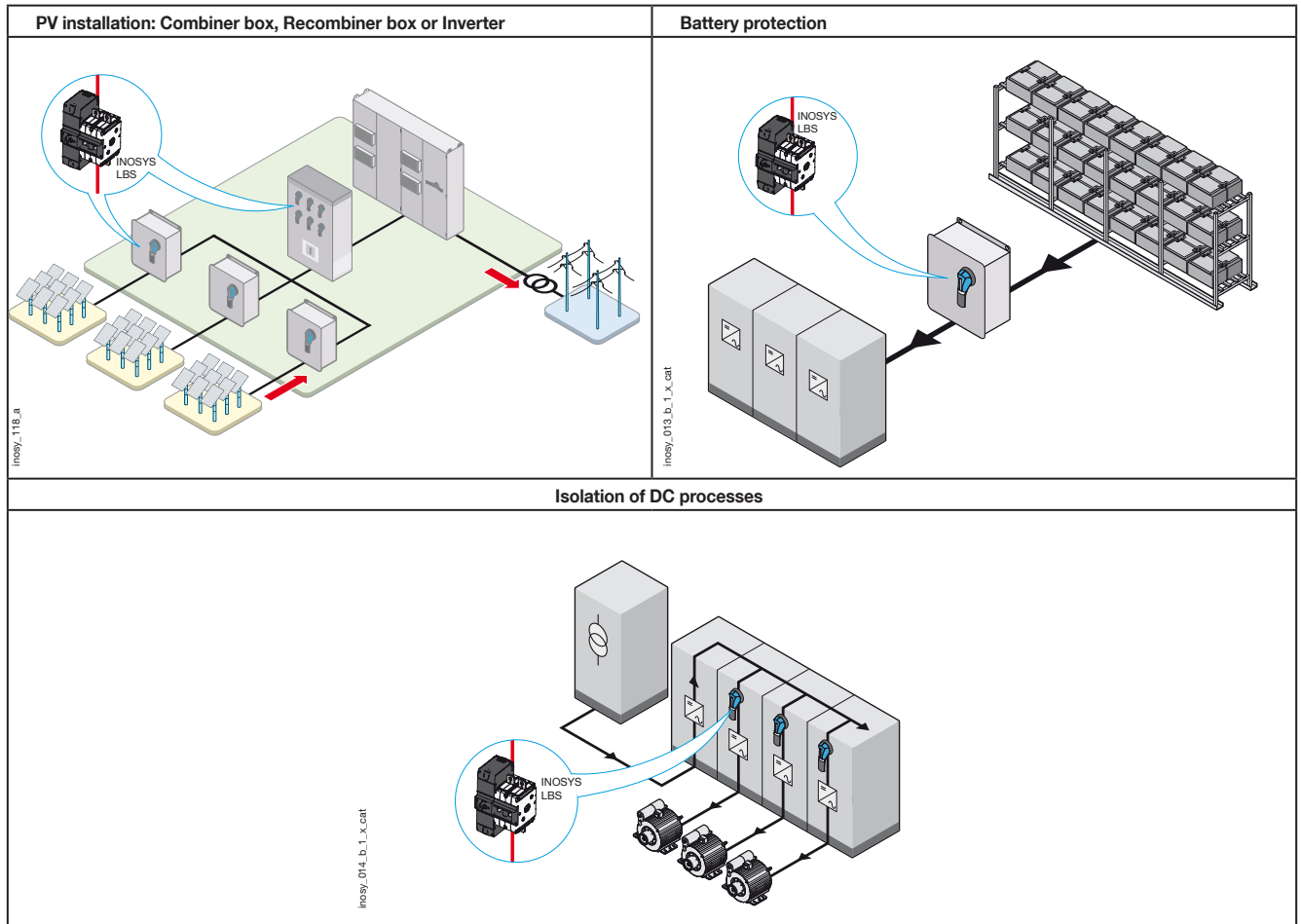
Modular solution for flexible configuration

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

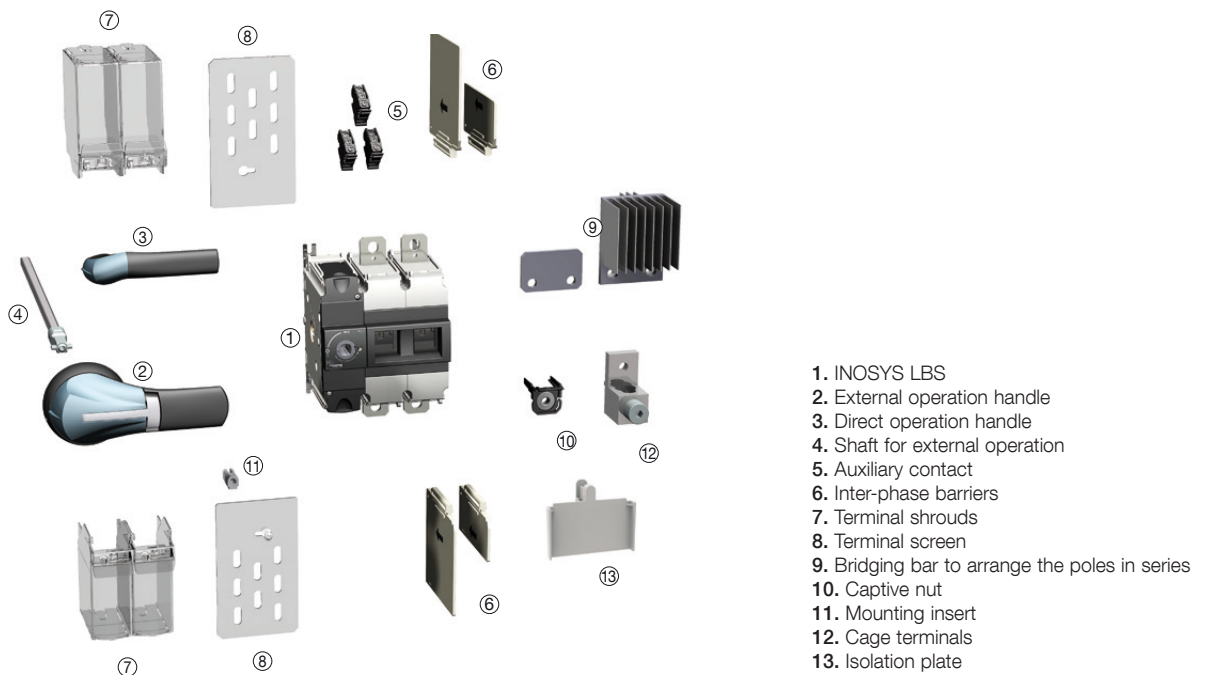
General characteristics

- Range from 100A to 1200A.
- Up to 1500 VDC.
- High-performance switching in a compact design.
- Easy integration.
- Reinforced safety with visible contact indication.
- Efficient with low power-loss.

Typical applications: local safe disconnection for DC and PV applications



Overview



inosy_189_a

INOSYS LBS UL 98B

Load Break Switches for DC & PV applications
from 100 to 1200 A, up to 1500 VDC

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	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		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 2042	Shaft 12.6 inches 320 mm 1400 1032		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
			87P1 1051 ⁽³⁾	8409 0041		
600 A	F3	2 P (1 P+, 1 P-)	87P0 2061	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.

1500 VDC - high rating

Rating (A)	Frame size	No. of poles per circuit	Switch body ⁽¹⁾	External operation	Aux. Contact	Bridging bar
800 A	F3	4P (2P // 2P)	87P2 2081	Shaft 12.6 in / 320 mm 1400 1032	NO/NC 8499 0001	8409 1600
1000 A			87P2 2100	S2L type Handle Black 3R, 12 - 4, 4X 14AD 2111		
1200 A			8792 2120			

(1) The switches are supplied without accessories.

Accessories

Direct operation handle

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



E3 handle

access_400_a_1_cat

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.



S2 type handle

access_150_eps

Frame size	Handle type	Handle colour	Degree of protection	Front operation Reference	Lateral operation 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.

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.



Shaft for S2 and S2L type handle

access_401_a_1_cat

Accessories (continued)

Isolation plate

Use

This isolation plate ensure safety for the customer.

Characteristics

Products above 800A are supplied from factory with isolation plates. For replacement purposes, quantity to order should be 2 kits.

Description	Quantity to order	Reference
Isolation plate	2	8499 1000 ⁽¹⁾

(1) Kit includes 2 identical isolation plates



access_589_eps

Auxiliary contact

Use

The function of the auxillary 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.

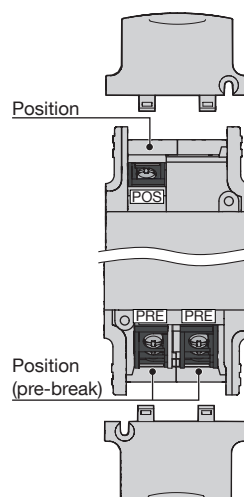
Frame size	Connection type	Type	Reference
F2 - F3	Screw	NO/NC standard	8499 0001
F2 - F3	Screw	NO/NC standard	8499 0002
F2 - F3	Screw	NC > 600 V	8499 0002

Characteristics

Auxiliary contact type	Min. current (A)	I _{th} (A)	Electrical characteristics per UL 60947-5-1
Standard	12.5 mA / 24 V	10	A300 - R300 - Q150
Low level	1 mA / 4 V	10	A300 - R300 - Q150
> 600 V	10 mA / 24 V	10	A600



access_402_a_1_cat



access_465_a_1_gpb_cat

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.

1000 VDC - 1 circuit

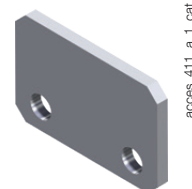
Frame size	Rating (A)	No. of poles	Quantity to be ordered	Reference
F2	100	2 P	1	8409 0016
F2	250	2 P	1	8409 0016
F3	400	2 P	1	8409 0040
F3	500	2 P	1	8409 0041
F3	600	2 P	1	8409 0063

1500 VDC - 1 circuit

Frame Size	Rating (A)	No. of poles	Quantity to be ordered	Reference
F2	100	3 P	2	8409 0016
F2	250	3 P	2	8409 0025
F3	400	2 P	1	8409 0040
F3	500 ... 600	2 P	1	8409 0041 8409 0063
F3	800 ... 1200	2P	1	8409 1600

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



access_411_a_1_cat

Terminal screen

Use

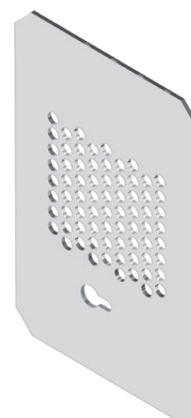
Provides top and bottom protection against direct contact with terminals or connection parts.

Advantages

Perforations for thermal checks.
Assembly requires mounting inserts (provided with terminal screens).

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 3722

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



access_408_a_1_cat

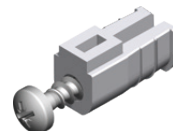
Accessories (continued)

Holding insert

Use

Used to secure terminal screens on the switch.

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



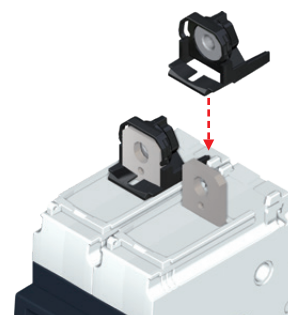
acce_409_a_1_cat

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



acce_399_a_1_cat

Voltage tap

Use

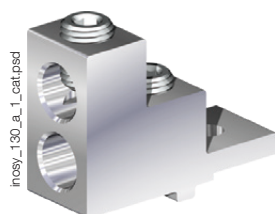
Allows connection of voltage sensing or power cables, with fast-on connection.

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

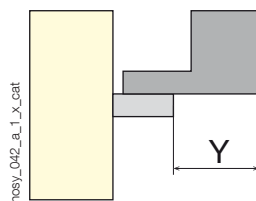


acce_412_a_1_cat

Terminal lugs



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inosy_042_a_1_x_cat

Frame size	Number and size (min. - max.) of cables	Type of cable	Openings per lug	Quantity per reference	Dimension "Y" (mm/in)	Reference ⁽¹⁾
F3	2 conductors (#2 - 600 KCMIL)	Cu / Al	2	2	69,7 / 2.74	3954 2060 ⁽¹⁾
F3		Cu / Al		3		3954 3060 ⁽¹⁾
F3		Cu / Al		4		3954 4060 ⁽¹⁾

⁽¹⁾ Captive nut 8499 6xxx is mandatory.

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	8000	8000
Power loss/pole (W/Pole)	2	5.1	11.2	13	21.6	29.3

(1) Without fuse during 50 ms.

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
Thermal current at 70°C (A)			160	250	315	400	480	580
Thermal current at 80°C (A)			140	220	280	360	430	520
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)	I _e (A)	I _e (A)
1 circuit	1000 VDC ⁽¹⁾	DC-21 B	160	250	315	400	500	630
1 circuit	1500 VDC ⁽²⁾	DC-21 B	160	250	315	400	500	630
Number of circuits	Nominal 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⁾	PV2	-	-	-	-	-	-
1 circuit	1500 VDC ⁽²⁾	PV2	160	250	315	400	500	630
2 circuits	1500 VDC ⁽²⁾	PV2	-	-	-	400	500	630
Short-circuit operation at 1000 VDC and 1500 VDC (unprotected)								
Current rated as short-time withstand I _{cw} 1s (kA rms)			10	10	10	10	10	10
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.

Characteristics (continued)

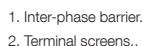
Characteristics according to UL 98B

Rated current I _n		800	1000	1200
		(A)	(A)	(A)
Short circuit capacity (UL)				
Prospective short-circuit current (kA rms DC) (kA rms)	UL 98B	10	10	10
Mechanical characteristics				
Durability (number of operating cycles)		8000	8000	8000
Power dissipation per pole (W/pole)		14	21	31

Characteristics according to IEC 60947-3

Rated current I _n		800	1000	1250
		(A)	(A)	(A)
Rated insulation voltage U _i (V)		1500	1500	1500
Rated impulse voltage U _{imp} (kV)		12	12	12
Frame Size		F3	F3	F3
Rated voltage	Ambient temperature (°C)	63	63	63
1500 VDC	40	800	1000	1250
1500 VDC	50	800	1000	1250
1500 VDC	60	720	900	1120
1500 VDC	70	650	810	1010
1500 VDC	80	580	730	910
Rated voltage	Utilisation category	63	63	63
1500 VDC	DC-21 B	800	1000	1250
1500 VDC	PV1	800	1000	1250
1500 VDC	PV2	800	1000	
Short circuit capacity				
"Rated short time withstand current I _{cs} 1s (kA rms)"	IEC 60947-3	20	20	20
"Rated short-circuit making capacity I _{cm} (kA peak)"	IEC 60947-3	20	20	20
Connection				
Rigid Cu cable cross-section (mm ²)		4 x 400	4 x 400	4 x 600
Maximum Cu busbar width (mm)		10 x 100	10 x 100	-
Tightening torque min (Nm)		35	35	35
Tightening torque max (Nm)		42	42	42

INOSYS LBS



Technical drawing of a boat hull cross-section. The drawing shows the hull shape with various dimensions in inches (top) and millimeters (bottom). The dimensions are: 0.71 (18 mm) for the top width, 0.35 (9 mm) for the width of the central opening, 0.14 (3.5 mm) for the height of the bow, 0.39 (10 mm) for the height of the stern, and 0.94 (24 mm) for the total height. The central opening is labeled with a circle and a cross, and the bow is labeled with a circle and a cross.

Technical drawing of a mechanical part with the following dimensions:

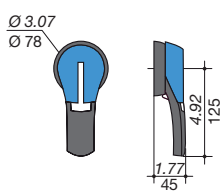
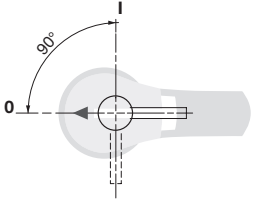
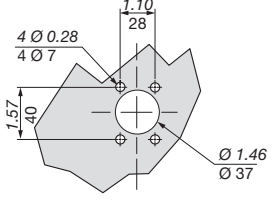
- Top width: 1.10
- Top width: 28
- Inner width: 0.43
- Inner width: 11
- Left side height: 0.19
- Left side height: 5
- Right side height: 0.51
- Right side height: 13
- Right side height: 28

			A		A1	J	J1	J	
									
Rating (A)	Frame size	Units	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 ... 1200	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 ... 1200	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

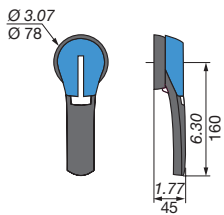
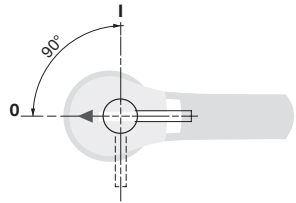
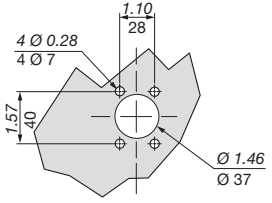
Dimensions for external handles (in/mm)

F2 frame size

Handle type	Front operation Direction of operation	Door drilling
S2 type 		

polgn_013_b_1_us_cat.eps

F3 frame size

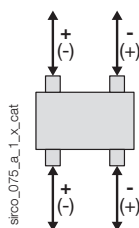
Handle type	Front operation Direction of operation	Door drilling
S2L type 		

polgn_069_b_1_us_cat.eps

Wiring configuration

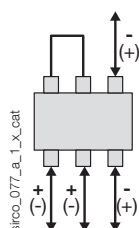
1 circuit - 1000 VDC

F2-F3 - 2 P

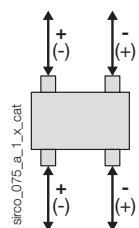


1 circuit - 1500 VDC

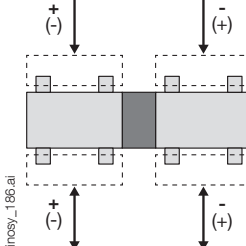
F2 - 3P



F2-F3 - 2P

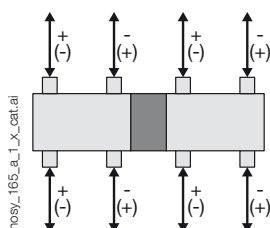


F3 - 2 P // 2P



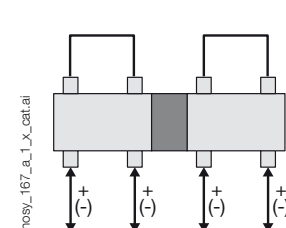
2 circuits - 1500 VDC

F3 - 2 P



1 circuit - 1500 VDC per polarity

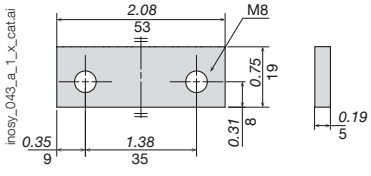
F3 - 2P+2P



Bridging bars (in/mm)

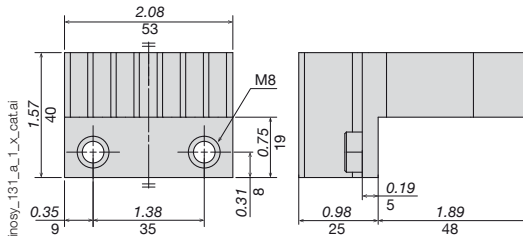
F2

8409 0016⁽¹⁾



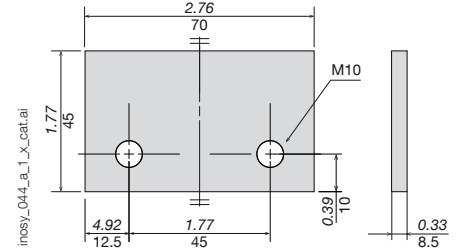
⁽¹⁾ Kit comprises 2 identical bars.

8409 0025



F3

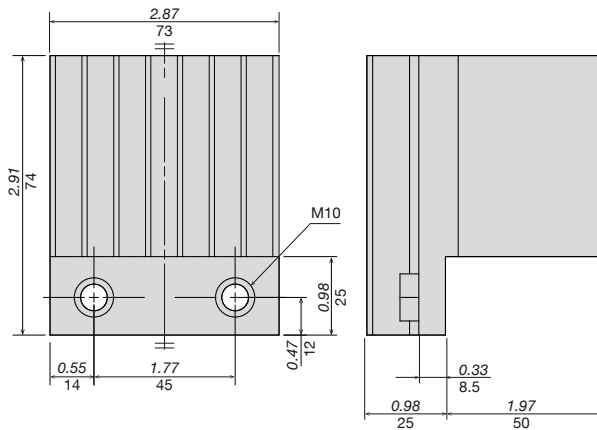
8409 0040⁽¹⁾



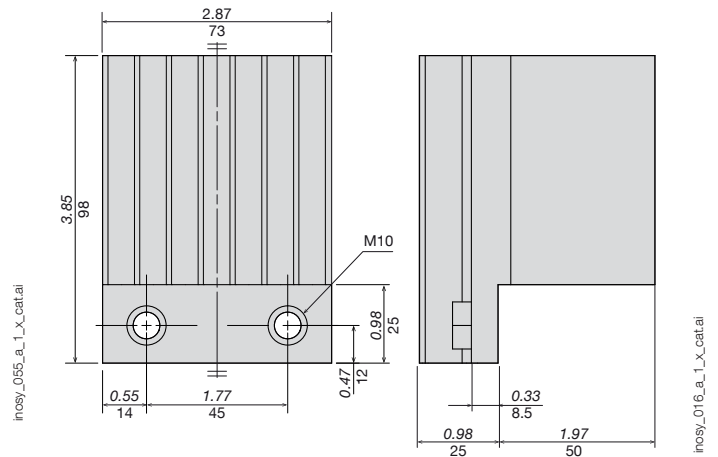
⁽¹⁾ Kit comprises 2 identical bars.

F3

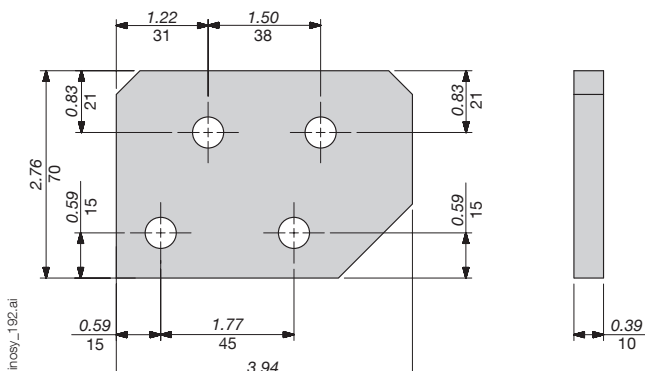
8409 0041



8409 0063



8409 1600



Mounting orientation

F2 - F3

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

