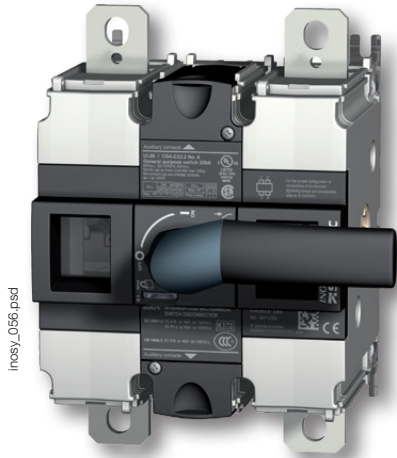


# INOSYS LBS DC

Load Break Switches for DC and PV applications  
from 160 to 1600 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

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



- > UL98B



- > 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 power 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 55 °C, functional from -40 to +70 °C.

### 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 160A to 1600A.
- Up to 1500 VDC.
- High-performance switching in a compact design.
- Easy integration.
- Reinforced safety with visible contact indication.
- Efficient with low power-loss.

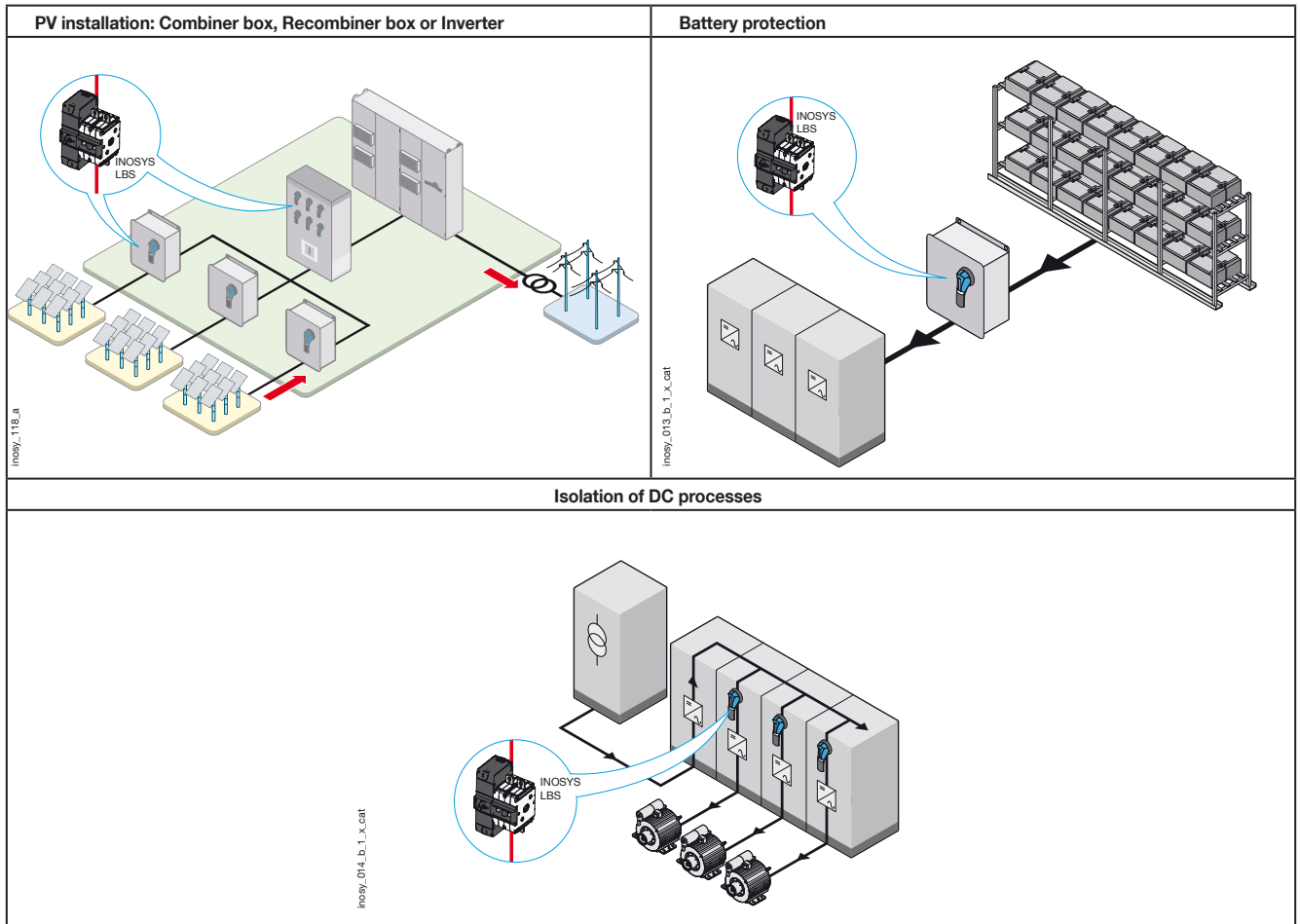
### Designed for harsh environments

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

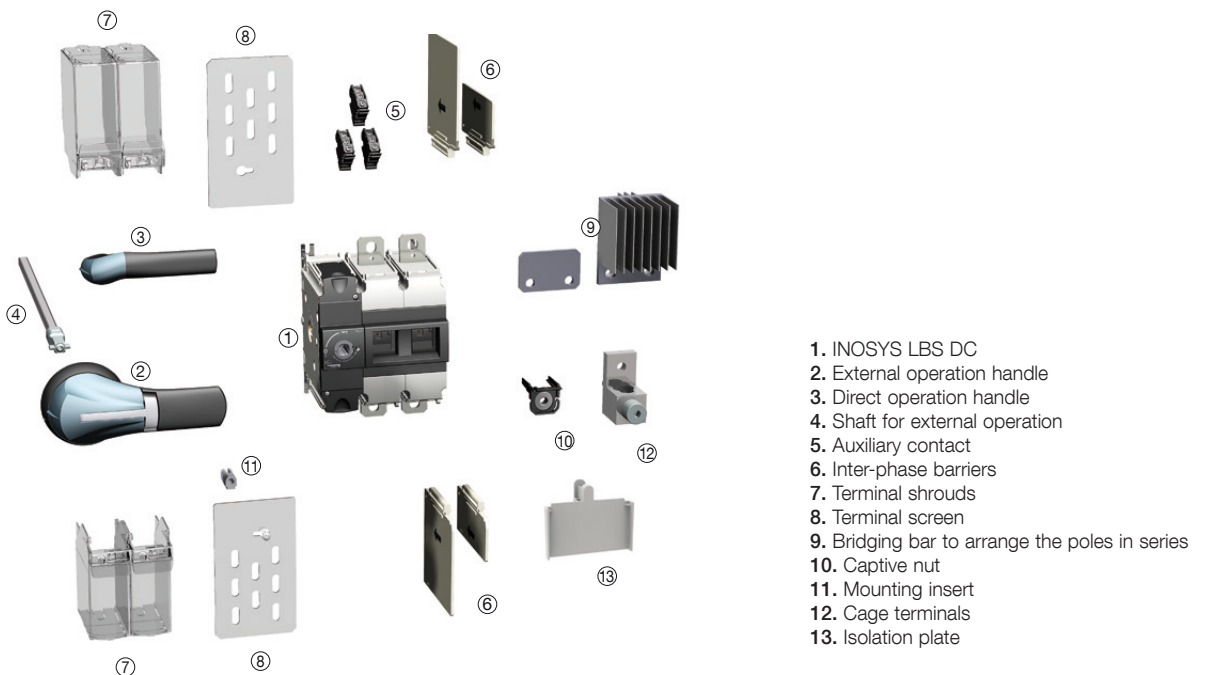
### Easy to install

- 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.

Typical applications: local safe disconnection for DC and PV applications



Overview



# INOSYS LBS DC

Load Break Switches for DC and PV applications

160 to 1600 A, up to 1500 VDC

## References

### INOSYS LBS

#### 1000 VDC - 1 circuit

Rating (A)	Frame size	No. of poles per circuit	Switch body <sup>(1)</sup>	External operation	Aux. Contact
160 A	F2	2 P (1 P+, 1 P-)	86P0 2016	Shaft 320 mm 1400 1032  Handle type S2 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 320 mm 1400 1032  Handle type S2L Black IP65 14AF 2111	

(1) The switches are supplied without accessories.

#### 1500 VDC - 1 circuit

Rating (A)	Frame size	No. of poles per circuit	Switch body <sup>(1)</sup>	External operation	Aux. Contact
160 A	F2	2 P (1 P+, 1 P-)	86P0 2017	Shaft 320 mm 1400 1032  Handle type S2 Black IP 65 742F 2111	NO/NC 8499 0001
			86P1 1017 <sup>(2)</sup>		
		3 P (2 P+, 1 P-)	86P0 3016		
250 A	F2	2 P (1 P+, 1 P-)	86P0 2026		
			86P1 1026 <sup>(2)</sup>		
		3 P (2 P+, 1 P-)	86P0 3025		
315 A	F2	2 P (1 P+, 1 P-)	86P0 2032		
			86P1 1032 <sup>(2)</sup>		
		3 P (2 P+, 1 P-)	86P0 3031		
400 A	F3	2 P (1 P+, 1 P-)	86P0 2041	Shaft 320 mm 1400 1032  Handle type S2L Black IP 65 14AF 2111	
			86P1 1041 <sup>(2)</sup>		
630 A	F3	2 P (1 P+, 1 P-)	86P0 2064		
			86P1 1064 <sup>(2)</sup>		

(1) The switches are supplied without accessories.

(2) Centred mechanism.

**1500 VDC - 2 circuits**

Rating (A)	Frame size	No. of poles per circuit	Switch body <sup>(1)</sup>	External operation	Aux. Contact
400 A	F3	2 P (1 P+, 1 P-)	86P2 2041 <sup>(2)</sup>	Shaft 320 mm 1400 <b>1032</b>	NO/NC 8499 <b>0001</b>
630 A			86P2 2064 <sup>(2)</sup>	Handle type S2L Black IP 65 14AF <b>2111</b>	

*(1) The switches are supplied without accessories.*

*(2) Centred mechanism.*

**1500 VDC - high rating**

Rating (A)	Frame size	No. of poles per circuit	Switch body <sup>(1)</sup>	External operation	Aux. Contact
800 A	F3	4P (2P // 2P)	86P2 2081	Shaft 320 mm 1400 <b>1032</b>  Handle type S2L Black IP 65 14AF <b>2111</b>	NO/NC 8499 <b>0001</b>
1000 A			86P2 2100		
1250 A			86P2 2125		
1400 A			86P2 2140		
1600 A			86P2 2160		

*(1) The switches are supplied without accessories.*

### Accessories

#### Direct operation handle

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



E2 handle

access\_400\_a\_1\_cat

#### External operation handle

##### Use

The external control handles include a breastplate and can be padlocked. External handles should be used with a shaft extension.

##### Example of use:

When the handle is locked in the "ON" position, the operator must make sure to disconnect and isolate the circuit before accessing the board and carrying out maintenance work.

You can open the door when the switch is in the "ON" position by bypassing the lock function with a specially designed tool (authorised persons only). The lock is automatically re-applied when the door is closed.



Handle type S2

access\_150\_eps

Frame size	Handle type	Handle colour	Protection degree	Front operation Reference	Side operation Reference <sup>(2)</sup>
F2	S2	Black	IP65	742F <b>2111</b>	14YA <b>2111</b>
F2	S2	Red	IP65	14AE <b>2111</b>	
F3	S2L <sup>(1)</sup>	Black	IP65	14AF <b>2111</b>	14AA <b>2111</b>
F3	S2L <sup>(1)</sup>	Red	IP65	14AE <b>2111</b>	

<sup>(1)</sup> S2L handles have an extended socket; please see the section on dimensions.

<sup>(2)</sup> Only compatible with left mechanism version.

#### Shaft for external handle

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

Other lengths: please consult us.



Shaft for S2 and S2L type handle

access\_401\_a\_1\_cat

#### 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 <b>1000</b> <sup>(1)</sup>

<sup>(1)</sup> Kit includes 2 identical isolation plates



access\_569\_eps

## 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.

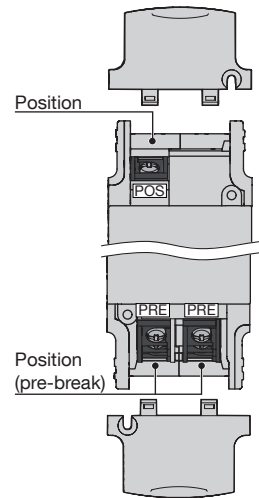
Frame size	Connection type	Type	Reference
F2 - F3	Screws	Standard NO/NC	8499 0001
F2 - F3	Screws	Low level NO/NC	8499 0002

### Characteristics

Type of auxiliary contact	Min. current (A)	I <sub>th</sub> (A)	Operating current I <sub>e</sub> (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



access\_402\_a\_1\_cat



access\_465\_a\_1\_gb\_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.

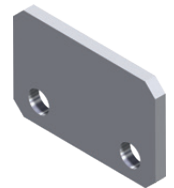
### 1500 VDC - 1 circuit

Frame Size	Rating (A)	No. of poles	Quantity to be ordered	Reference
F2	160 ... 315	3 P	2	8409 0025
F3	1600	4P / 2P	2	8409 1600

### 1500 VDC – 1 circuit with full voltage switching per polarity

Frame Size	Rating (A)	No. of poles	Quantity to be ordered	Reference
F3	400	4P / 2P	2	8409 0040 <sup>(1)</sup>
F3	500	4P / 2P	2	8409 0041
F3	630	4P / 2P	2	84090063

(1) Centered mechanism.



access\_411\_a\_1\_cat

### Accessories (continued)

#### Terminal screen

##### Use

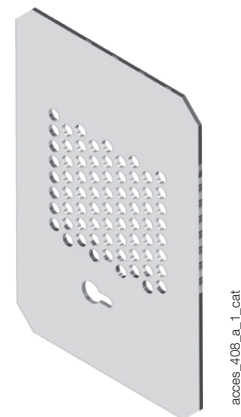
Provides top and bottom protection against direct contact with terminals or connection parts.

##### Advantages

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

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

<sup>(1)</sup> Each reference comprises 2 terminal screens for top and bottom protection.

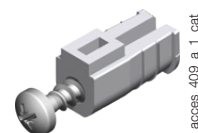


#### Holding insert

##### Use

Used to secure terminal on the switch.

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

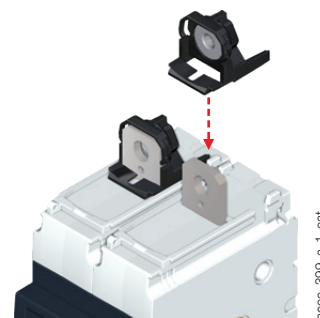


#### Captive nut

##### 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



#### 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



## Characteristics

### Characteristics according to IEC 60947-3

Rated current $I_n$			160 A	250 A	315 A	400 A	500 A	630 A
<b>Frame size</b>			<b>F2</b>	<b>F2</b>	<b>F2</b>	<b>F3</b>	<b>F3</b>	<b>F3</b>
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 <sup>(1)</sup>	DC-21 B	160	250	315	400	500	630
1 circuit	1500 VDC <sup>(2)</sup>	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 <sup>(1)</sup>	PV2	-	-	-	-	-	-
1 circuit	1500 VDC <sup>(2)</sup>	PV2	160	250	315	400	500	630
2 circuits	1500 VDC <sup>(2)</sup>	PV2	-	-	-	400	500	630
<b>Short-circuit operation at 1000 VDC and 1500 VDC (unprotected)</b>								
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
<b>Connection</b>								
Recommended Cu rigid cable cross-section <sup>(3)</sup>			70	120	185	240	2 x 150	2 x 185
Recommended width of copper bars (mm) <sup>(3)</sup>			20	20	20	25	25	25
<b>Mechanical characteristics</b>								
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.

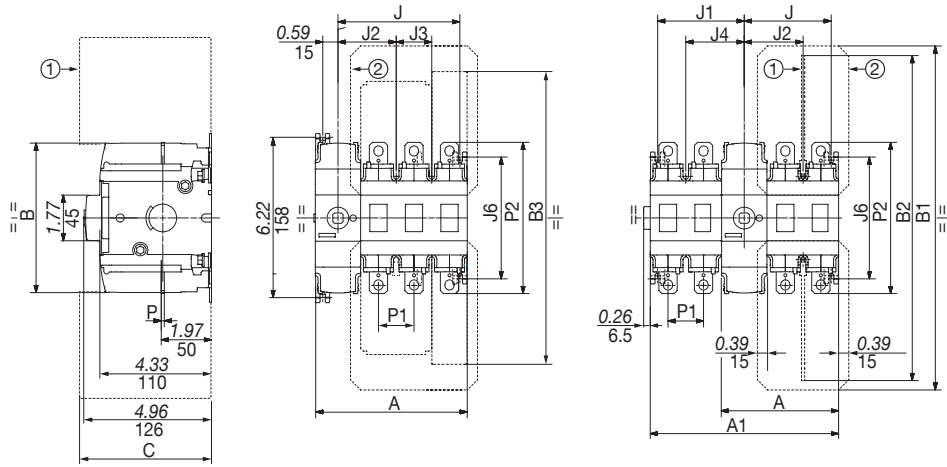


## Characteristics (continued)

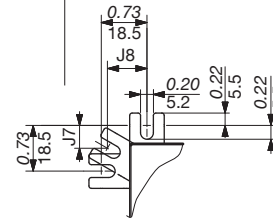
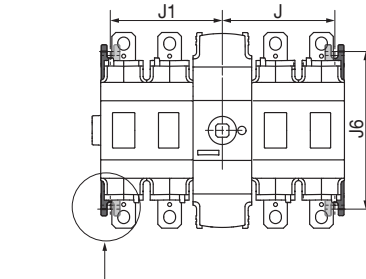
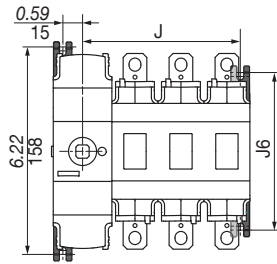
### Characteristics according to IEC 60947-3

Rated current I <sub>n</sub>		800	1000	1250	1400	1600
		(A)	(A)	(A)	(A)	(A)
Rated insulation voltage U <sub>i</sub> (V)		1500	1500	1500	1500	1500
Rated impulse voltage U <sub>imp</sub> (kV)		12	12	12	12	12
Frame Size		F3	F3	F3	F3	F3
Rated voltage	Ambient temperature (°C)	(A)	(A)	(A)	(A)	(A)
1500 VDC	40	800	1000	1250	1400	1600
1500 VDC	50	800	1000	1250	1400	1480
1500 VDC	60	720	900	1120	1260	1330
1500 VDC	70	650	810	1010	1130	1200
1500 VDC	80	580	730	910	1020	1080
Rated voltage	Utilization category	(A)	(A)	(A)	(A)	(A)
1500 VDC	DC-21 B	800	1000	1250	1400	1600
1500 VDC	PV1	800	1000	1250		
1500 VDC	PV2	800	1000			
Short circuit capacity						
Rated short time withstand current I <sub>cs</sub> (kA rms)	IEC 60947-3	20	20	20	20	20
Rated short-circuit making capacity I <sub>cm</sub> (kA peak)	IEC 60947-3	20	20	20	20	20
Connection						
Recommended width of copper bars (mm)		2 x 5 x 50	2 x 5 x 60	2 x 5 x 80	2 x 5 x 100	2 x 5 x 100
Tightening torque min (Nm)		35	35	35	35	35
Tightening torque max (Nm)		42	42	42	42	42
Mechanical characteristics						
Durability (number of operating cycles)		8000	8000	8000	8000	8000
Power dissipation per pole (W/pole)		12	18	28	35	46

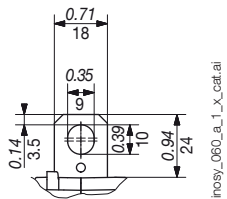
## INOSYS LBS DC



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

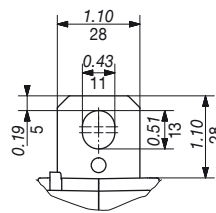


Connection terminal F2



inosy\_060\_a\_1\_x\_cat.ai

Connection terminal F3



inosy\_061\_a\_1\_x\_cat.ai

inosy\_166\_a\_1\_x\_cat.ai

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	mm	117	152	117 / 187	50.5 / 85.5	52.5 / 87.5	85.5	120.5
400 ... 1600	F3	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	IEC	IEC	IEC	IEC	IEC	IEC	IEC	IEC	IEC	IEC
100 ... 250	F2	mm	154	339	199	320	296	110	57,5	35	59,5	120	35	149
400 ... 1600	F3	mm	154	414	237	358	359	110	67.5	45	69.5	158	45	200

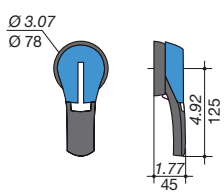
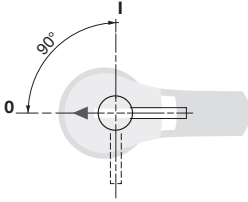
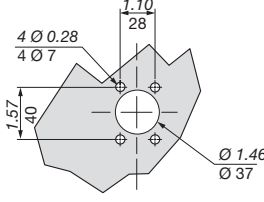
# INOSYS LBS DC

Load Break Switches for DC and PV applications

160 to 1600 A, up to 1500 VDC

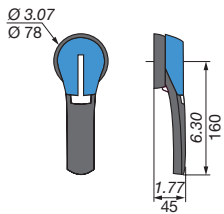
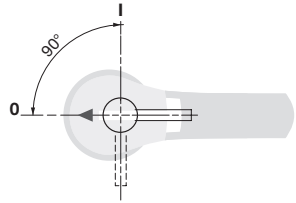
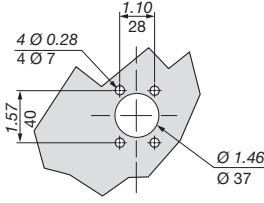
## Dimensions for external handles (in/mm)

### F2 frame size

Handle type	Front operation Direction of operation	Door drilling
<b>S2 type</b>  		

polgn\_013\_b\_1\_us\_cat.eps

### F3 frame size

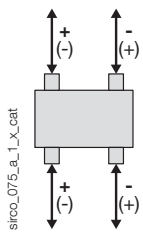
Handle type	Front operation Direction of operation	Door drilling
<b>S2L type</b>  		

polgn\_069\_b\_1\_us\_cat.eps

## Wiring configuration

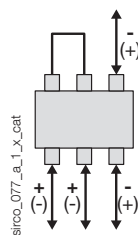
### 1 circuit - 1000 VDC

#### F2-F3 - 2 P

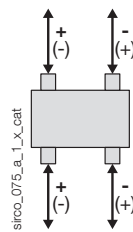


### 1 circuit - 1500 VDC

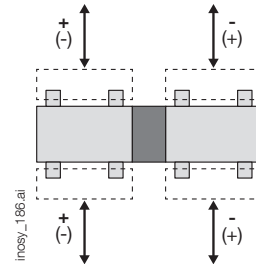
#### F2 - 3P



#### F2-F3 - 2P

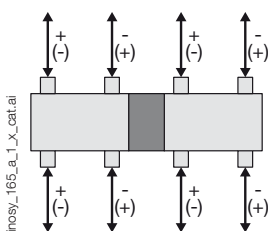


#### F3 - 2 P // 2P



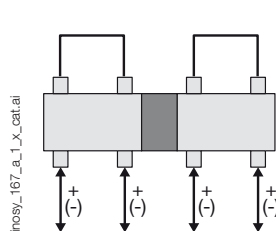
### 2 circuits - 1500 VDC

#### F3 - 2 P



### 1 circuit - 1500 VDC per polarity

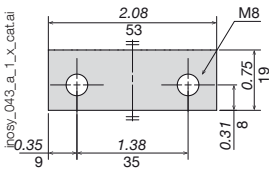
#### F3 - 2P+2P



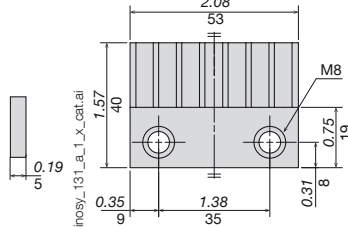
## Bridging bars (in/mm)

### F2

8409 0016<sup>(1)</sup>

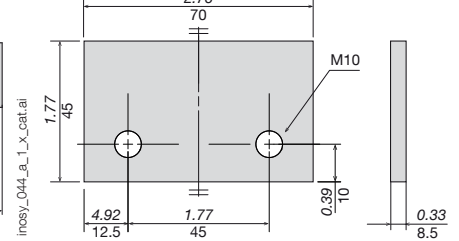


8409 0025



### F3

8409 0040<sup>(1)</sup>

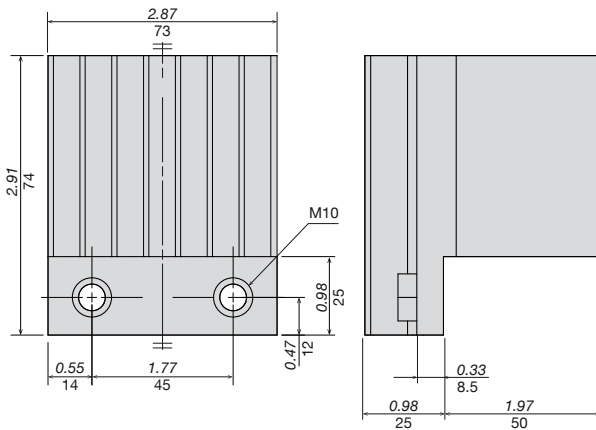


(1) Kit comprises 2 identical bars.

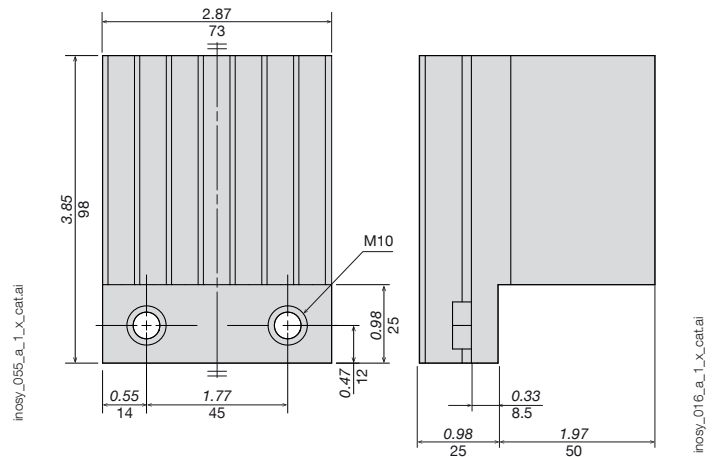
(1) Kit comprises 2 identical bars.

### F3

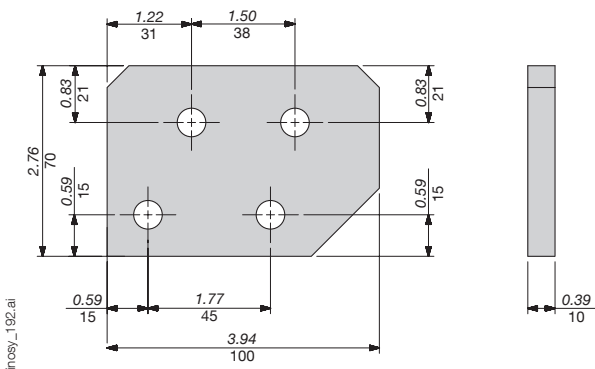
8409 0041



8409 0063



8409 1600



## Mounting orientation

### F2 - F3

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

