

# FP ESS

## Fuses for energy storage systems

from 160 to 3000 A, up to 1500 VDC



gamma\_910.psd

### The solution for

- Energy
- Infrastructure & Transport
- Industry

### Strong points

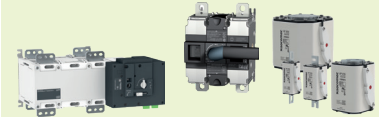
- Premium performance for Energy Storage
- A range for a multitude of designs
- Certified coordination

### Conformity to standards

- UL248-13
- CSA C22.2 NO. 248.1-11
- IEC 60269-1 /-4

### For optimised protection

- Combine INOSYS, SIRCOMOT DC ESS Load Break Switches and FP ESS fuses to achieve a level of protection and safety above market standards



## Function

FP ESS fuses are designed specifically for DC networks with high voltage and short circuit levels. They perfectly meet the requirements of energy storage applications and ensure optimal protection of battery racks and battery connection panel (BCP) against short circuits and overloads.

## Advantages

### Premium performance for energy storage

FP ESS fuses have been specially developed to meet the requirements of Energy Storage applications:

- they are sized for installations with potential short-circuit currents of up to 250 kA and continuous voltages of up to 1500 VDC,
- these fuses offer increased reliability, ensuring consistent performance over time. Their silver-based composition protects them from premature ageing, making them perfectly suited to the cyclic operations characteristic of energy storage application.

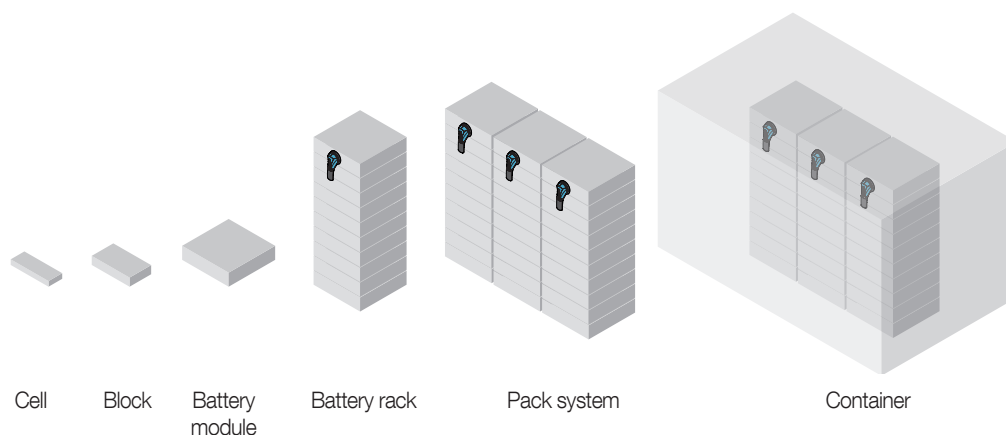
### A range for a multitude of designs

The FP ESS fuse range covers requirements from 160 to 3000 A, several mounting types and complies with UL, CSA and IEC standards. Combined with the advice of our experts, manufacturers are guaranteed to find the most suitable technical solution by limiting the energy transmitted to the Energy Storage system as much as possible in the event of a fault.

### Certified coordination

Combining load break switches with FP ESS fuses enables us to surpass industry standards for protection and safety. Socomec conducts rigorous real-world testing on this combination to push the boundaries of performance and safety even further.

## The building blocks of an energy storage system



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### Rack construction

#### Cells: serial connection to increase ampacity

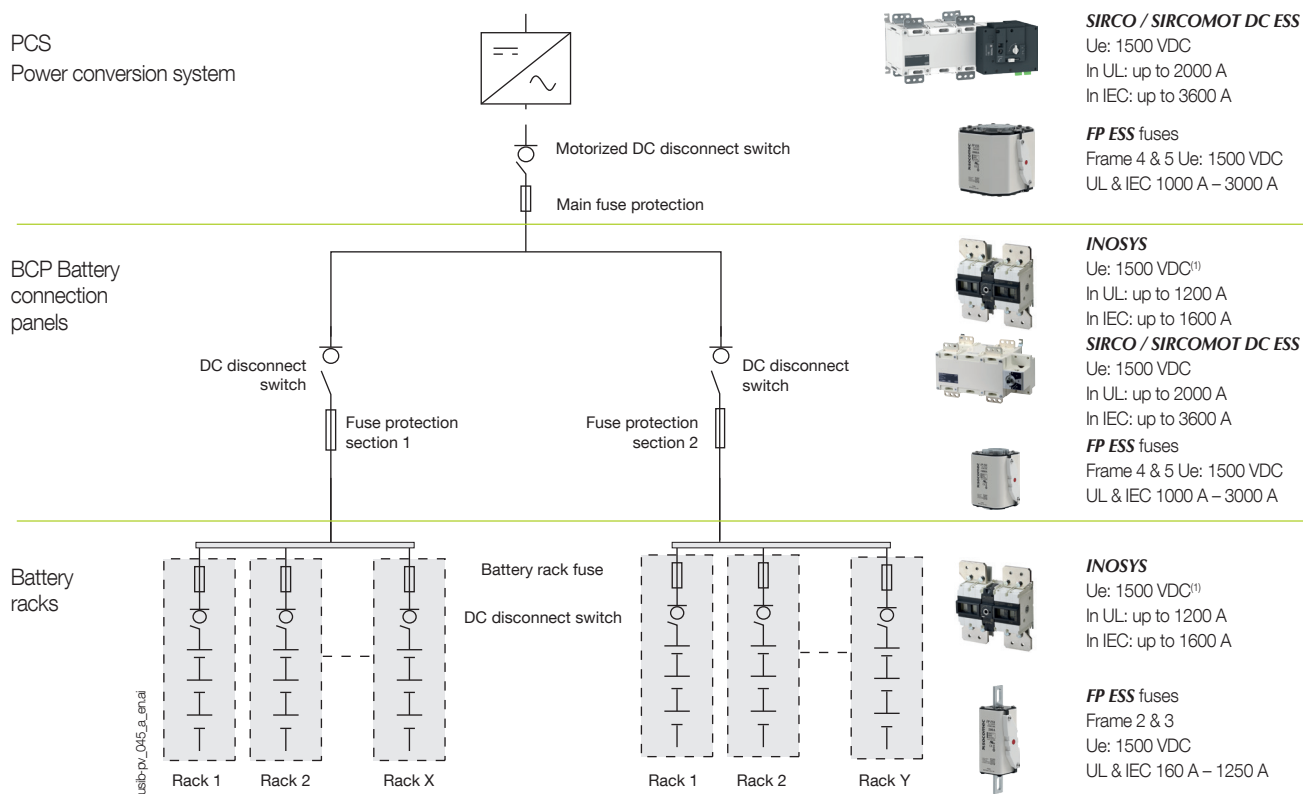
- Cells are connected in serial to create blocks.
- Blocks are connected together into the battery module.
- Battery rack contains several battery modules and includes switch and fuse protection.

### System construction

#### Modules: parallel connection to reach a higher voltage

- Modules are connected together in parallel to reach a higher voltage (1000 VDC to 1500 VDC).
- Battery systems, pack system and containers are connected in parallel to increase ampacity.

## Typical energy storage architecture



(1) 2000 VDC available for IEC, consult us.

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## References

Frame 2

Rating (A)	Reference			Rated voltage (VDC)	Breaking capacity (kA)	I <sup>2</sup> t (A.s <sup>2</sup> )		Power loss (W)			Standard Package Quantity
	DIN	Bolted	Flush			Pre-arcing	Total	100% rated	80% rated	60% rated	
160	61S1 2016	61S2 2016	61S3 2016	1500	250	4850	12150	81	52	29	8
200	61S1 2020	61S2 2020	61S3 2020	1500	250	12900	32508	90	58	32	8
250	61S1 2025	61S2 2025	61S3 2025	1500	250	20667	52702	113	72	41	8
280	61S1 2028	61S2 2028	61S3 2028	1500	250	24704	63737	125	80	45	8
315	61S1 2032	61S2 2032	61S3 2032	1500	250	34406	89799	134	86	48	8
350	61S1 2035	61S2 2035	61S3 2035	1500	250	45240	119433	143	92	51	8
400	61S1 2040	61S2 2040	61S3 2040	1500	250	64361	171844	159	102	57	8
450	61S1 2045	61S2 2045	61S3 2045	1500	250	85836	231757	169	108	61	8
500	61S1 3050	61S2 3050	61S3 3050	1500	250	109226	298187	183	117	66	8
550	61S1 3055	61S2 3055	61S3 3055	1500	250	134094	370099	204	131	73	8
630	61S1 2063	61S2 2063	61S3 2063	1500	250	194817	543539	213	136	77	8
700	61S1 2070	61S2 2070	61S3 2070	1500	250	263007	741680	236	152	85	8
800	61S1 2080	61S2 2080	61S3 2080	1500	250	389471	1109993	253	162	91	8

Frame 3

Rating (A)	Reference			Rated voltage (VDC)	Breaking capacity (kA)	I <sup>2</sup> t (A.s <sup>2</sup> )		Power loss (W)			Standard Package Quantity
	DIN	Bolted	Flush			Pre-arcing	Total	100% rated	80% rated	60% rated	
315	61S1 3032	61S2 3032	61S3 2032	1500	250	21132	76076	130	83	47	6
350	61S1 3035	61S2 3035	61S3 2035	1500	250	29035	103654	141	90	51	6
400	61S1 3040	61S2 3040	61S3 2040	1500	250	38277	134736	163	104	59	6
450	61S1 3045	61S2 3045	61S3 2045	1500	250	54477	189034	178	114	64	6
500	61S1 3050	61S2 3050	61S3 3050	1500	250	73708	254293	194	124	70	6
550	61S1 3055	61S2 3055	61S3 3055	1500	250	92243	310858	211	135	76	6
630	61S1 3063	61S2 3063	61S3 2063	1500	250	130404	429029	236	151	85	6
700	61S1 3070	61S2 3070	61S3 3070	1500	250	180048	582330	257	164	92	6
800	61S1 3080	61S2 3080	61S3 2080	1500	250	280849	876249	268	172	96	6
900	61S1 3090	61S2 3090	61S3 3090	1500	250	404951	1222952	288	184	104	6
1000	61S1 3100	61S2 3100	61S3 2063	1500	250	543539	1589259	338	216	122	6
1100	61S1 3110	61S2 3110	61S3 3110	1500	250	747801	2108800	348	222	125	6
1200	61S1 3120	61S2 3120	61S3 2080	1500	250	1109993	2751692	359	230	129	6

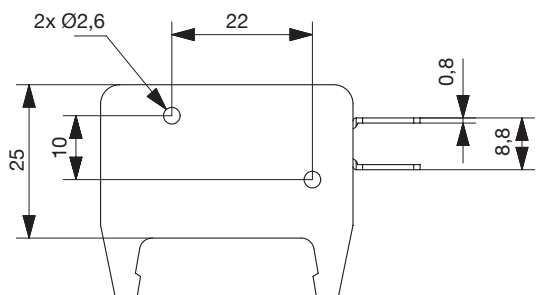
Frame 4

Rating (A)	Reference		Rated voltage (VDC)	Breaking capacity (kA)	I <sup>2</sup> t (A.s <sup>2</sup> )		Power loss (W)			Standard Package Quantity
	Flush				Pre-arcing	Total	100% rated	80% rated	60% rated	
630	61S3 4063		1500	250	16700	990000	185	118	67	2
700	61S3 4070		1500	250	189000	1270000	196	125	71	2
800	61S3 4080		1500	250	280000	1910000	205	131	74	2
900	61S3 4090		1500	250	436500	2890000	209	134	75	2
1000	61S3 4100		1500	250	644163	4190000	213	136	77	2
1100	61S3 4110		1500	250	796700	4879000	238	152	86	2
1250	61S3 4125		1500	250	1113846	7240000	248	159	89	2
1500	61S3 4150		1500	250	1870000	12140000	296	189	107	2
1600	61S3 4160		1500	250	2278000	14580000	294	188	106	2
1800	61S3 4180		1500	250	3154589	20470000	325	208	117	2

## Frame 5

Calibre (A)	Reference Flush	Rated voltage (VDC)	Breaking capacity (kA)	I <sup>2</sup> t (A.s <sup>2</sup> )		Power loss (W)			Standard Package Quantity
				Pre-arcing	Total	100% rated	80% rated	60% rated	
1250	61S3 5125	1500	250	2374000	4287000	270	173	97	1
1350	61S3 5135	1500	250	3265000	6823000	290	186	104	1
1500	61S3 5150	1500	250	4986000	8912000	300	192	108	1
1800	61S3 5180	1500	250	5897000	11300000	330	211	119	1
2000	61S3 5200	1500	250	7850000	13400000	380	243	137	1
2200	61S3 5220	1500	250	9875000	17300000	430	275	155	1
2500	61S3 5250	1500	250	11540000	22890000	440	282	158	1
2800	61S3 5280	1500	250	15400000	28765000	460	294	166	1
3000	61S3 5300	1500	250	2189000	38970000	600	384	216	1

## Accessoires



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Reference	Contact	Electrical performances
61S0001	1NO + 1NC	250 VDC 2 A

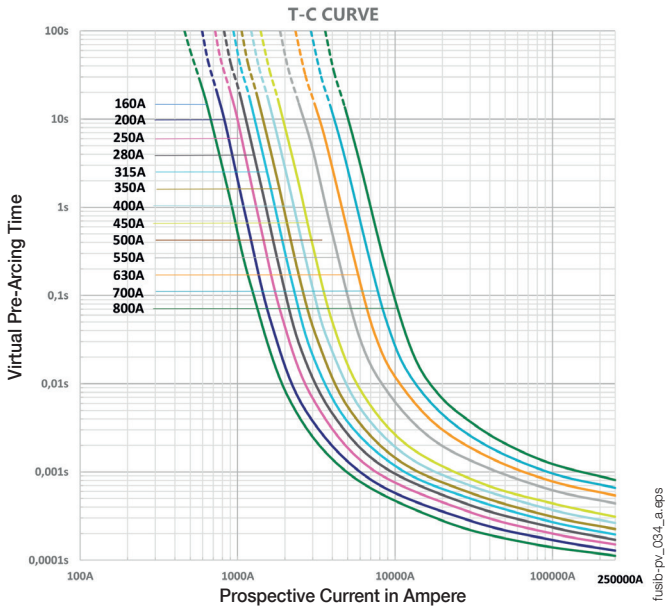
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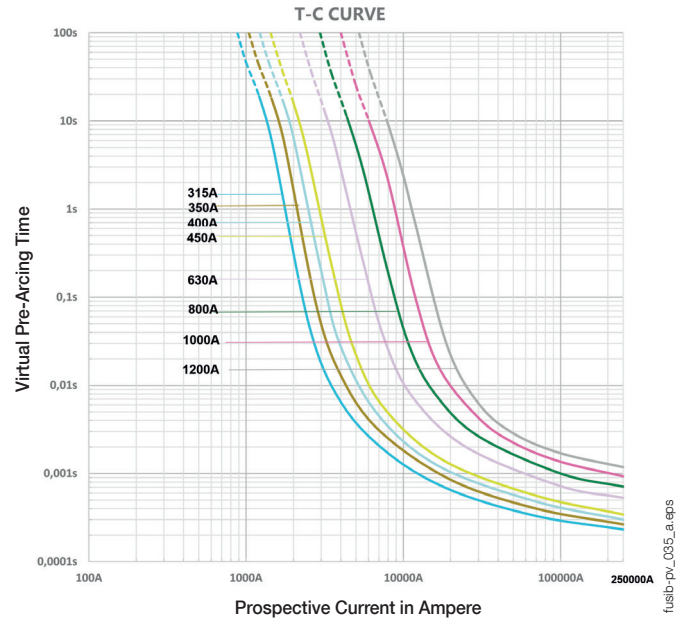
## Features

### Time/current operation

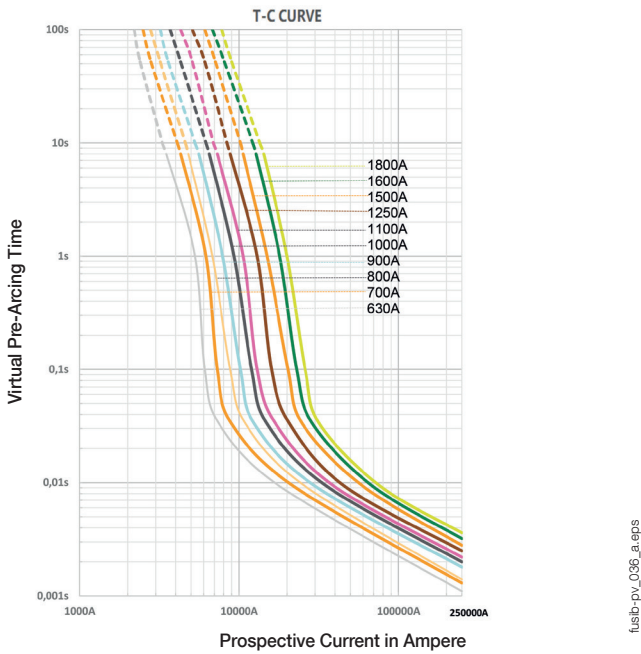
Frame 2



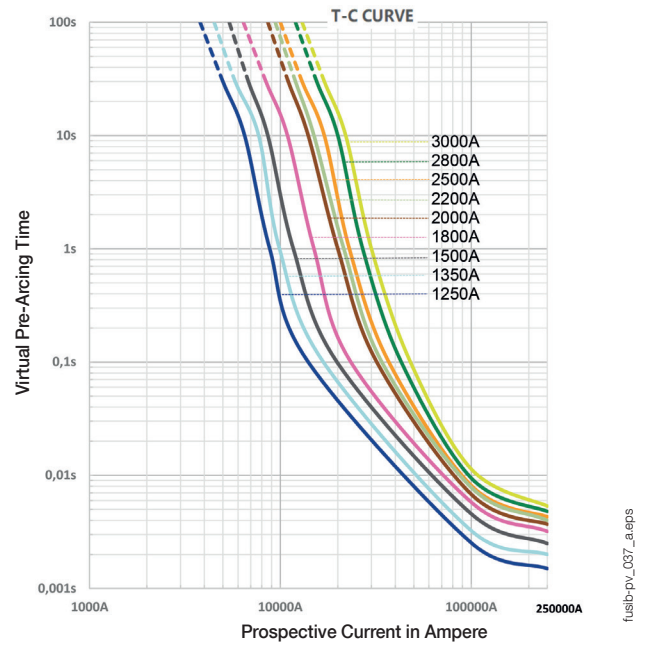
Frame 3



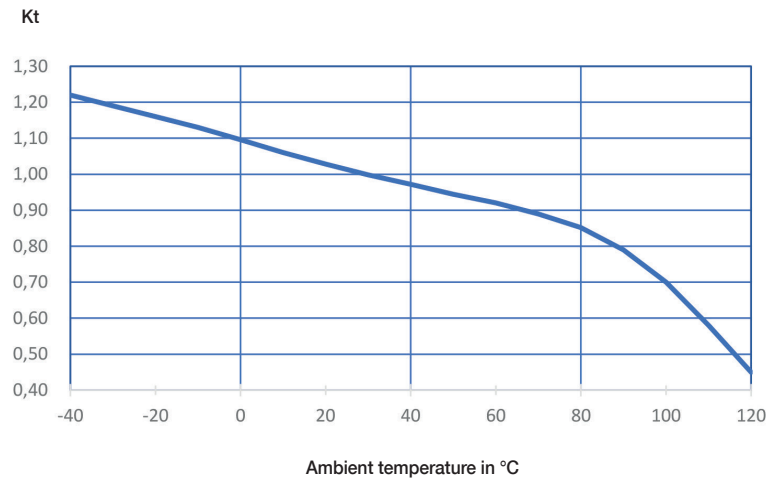
Frame 4



Frame 5



## Temperature correction curve



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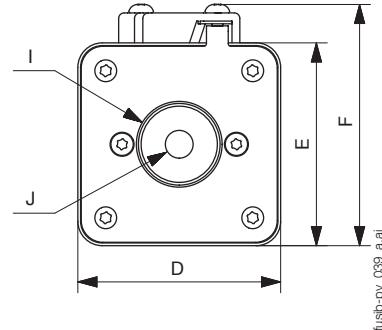
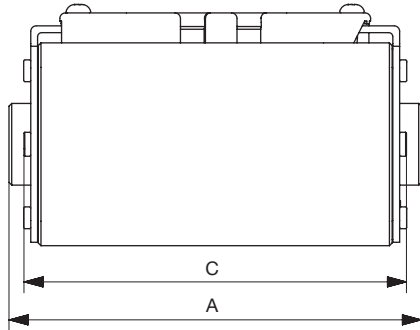
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## Dimensions (in/mm)

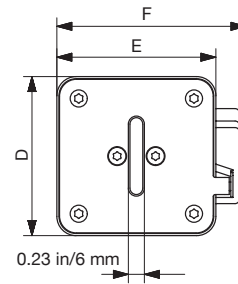
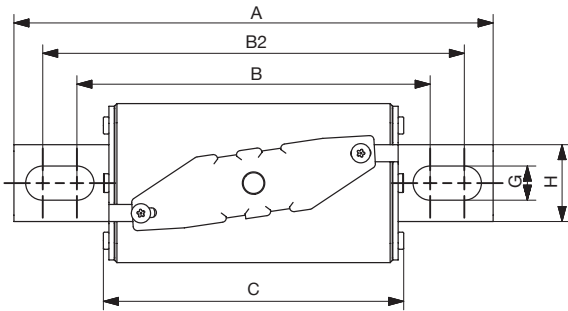
### Flush mount



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	A		C		D		E		F		I		J
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	Bolt
Frame 2	5,96	152	5,50	140	2,33	59,2	2,33	59,2	3,03	77	0,94	24	M10
Frame 3	5,96	152	5,50	140	2,93	74,5	2,93	74,5	3,62	92	1,18	30	M12

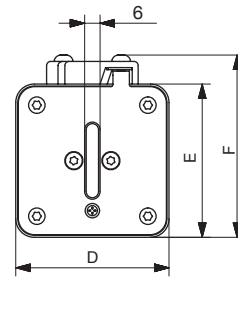
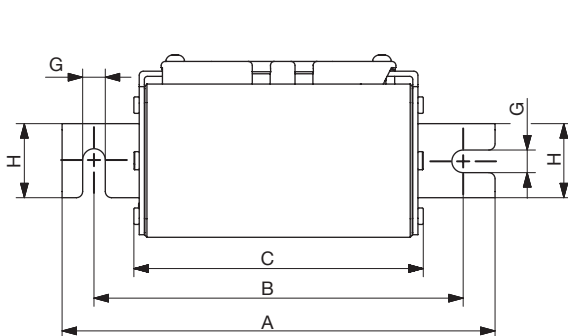
### Bolted mount



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	A		B		B2		C		D		E		F		G		H	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
Frame 2	8,76	222,5	6,59	168	7,78	198	5,50	140	2,33	59,2	2,33	59,2	3,03	77	0,55	14	1,10	28
Frame 3	8,84	224,5	6,52	166	7,78	198	5,54	141	2,93	74,5	2,93	74,5	3,62	92	0,63	16	1,42	36

### DIN mount

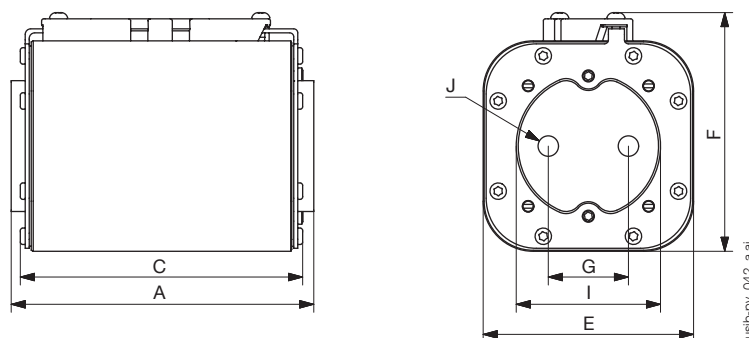


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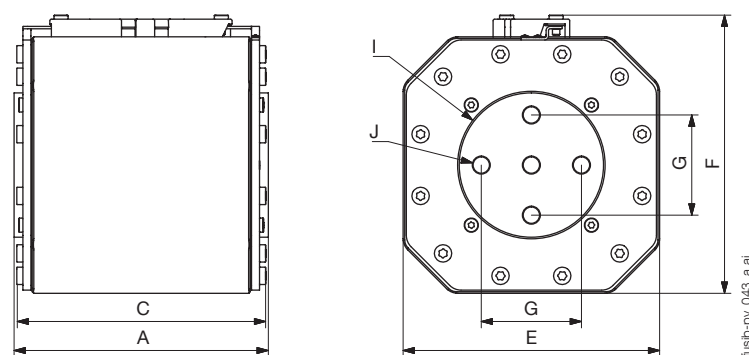
	A		B		C		D		E		F		G		H	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
Frame 2	8,29	211	7,07	180	5,50	140	2,33	59,2	2,33	59,2	3,03	77	0,43	11	1,10	28
Frame 3	8,29	211	7,07	180	5,54	141	2,93	74,5	2,93	74,5	3,62	92	0,43	11	1,42	36

## Dimensions (in/mm)

### Flush mount

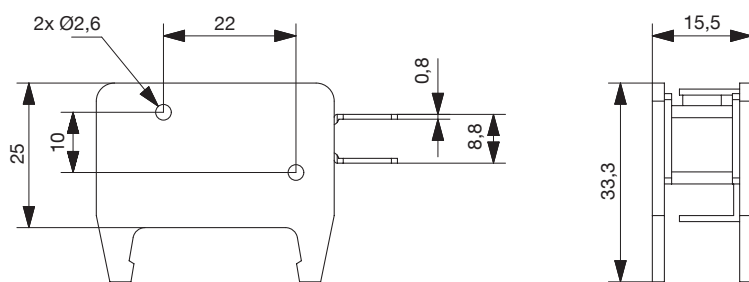


	A		C		E		F		G		I		J
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	Bolt
Frame 4	5,98	152	5,55	141	59,20	105	4,76	121	1,57	40	2,76	70	M10



	A		C		E		F		G		I		J
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	Bolt
Frame 5	6,26	159	6,10	155	50,20	158	6,22	158	2,46	62,5	3,54	90	M12

## Accessories



Electrical performances	Contact	Reference
250 VDC 2 A	1NO + 1NC	61S0 0001