



Fire rated switch disconnectors

Gawe
low voltage electrical manufacturer



Fire rated switch disconnectors



Ventilation and smoke extraction systems aim to help safe working conditions on building evacuation and fire rescue operations, diminishing roof temperatures and delaying lateral fire expansion in order to permit an effective fight against fire expansion.

Standard EN- 12101-3:2015 applies to **Smoke and heat control systems** detailing on part 3 specifications for powered smoke and heat exhaust fans. In order to guarantee installation safety under emergency conditions all ventilation system components must comply with this standard requirements, carrying test

sequences according to details specified on the standard.

Gawe Electro engineering team has developed a product for these stringent conditions and passed laboratory testing during a 200min. period. These tests endorse product qualifying under class **F300, F400 and F600** according to Table 8 on standard EN 12101-3:2015.

Applications

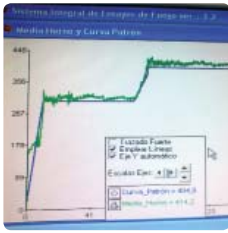
- Car Parks and tunnels
- Warehouse and industries
- Workshops, industrial and public buildings



Tests



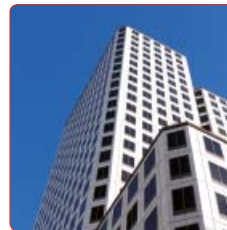
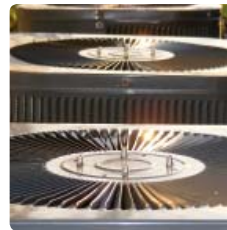
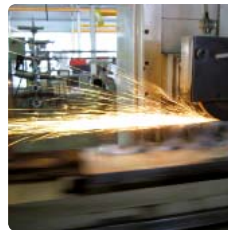
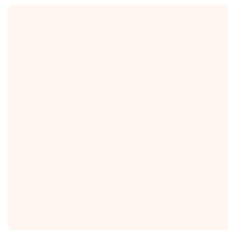
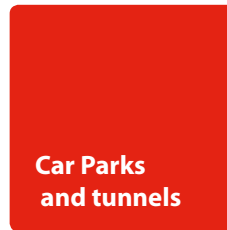
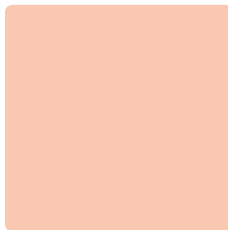
The development of products rated to provide fire resistance in order to guarantee electrical functional integrity under extreme circumstances, does require the employment of **specialist laboratories** capable to reproduce, on a controlled manner, similar conditions to those that take place when a fire occurs.



The recognized* AFITI laboratory has facilities that allow constant pressure and temperature monitoring on the testing area thus ensuring that the **temperature curve** is replicated as established by the standard.

**ENAC Spanish recognized part of ILAC Cooperation Scheme*

Application



Design and innovation



A rapidly changing environment with increasing **standard requirements** on design and installation characteristics, motivates a technical team used to work on product **solutions**.

The employment of innovative engineering techniques, use of **advanced engineering tools**, and operation with the latest manufacturing process, guarantee an excellent final outcome.

Certification

Test Certificate
Nº CB650/12-7

Applicant: GAVE ELECTRO, S.L.
C/ Alfred Nobel de 16
08430 La Roca del Valles (BARCELONA)

Building Element: Switch disconnector
Manufacturer: Gave Electro, S.L.

Reference:	AB55625F3	AL55625F3
	AB55225F3	AL55225F3
	AB55641F3	AL55641F3
	AB55241F3	AL55241F3

Test: Test protocol based on EN 12101-3:2002 "Smoke and heat control systems. Part 3: Specifications for powered smoke and heat exhaust ventilators".
SIP-46-12
Test report in 8056/12-3 issued by AFITI LICOF on 22nd Oct 2012.

Fire Resistance Classification: **F300**

Argenda del Rey, 22nd of October of 2012

Signat: Agnès Garcia Calabrera
Technical Director
Fire Resistance Laboratory
Technique of LICOF

Test Certificate
Nº CB650/12-8

Applicant: GAVE ELECTRO, S.L.
C/ Alfred Nobel de 16
08430 La Roca del Valles (BARCELONA)

Building Element: Switch disconnector
Manufacturer: Gave Electro, S.L.

Reference:	AB55241F4	AL55241F4
	AB55221F4	AL55221F4
	AB55641F4	AL55641F4
	AB55621F4	AL55621F4
	AB55661F4	AL55661F4
	AB55261F4	AL55261F4

Test: Test protocol based on EN 12101-3:2002 "Smoke and heat control systems. Part 3: Specifications for powered smoke and heat exhaust ventilators".
SIP-46-12
Test report in 8056/12-8 issued by AFITI LICOF on 22nd Oct 2012.

Fire Resistance Classification: **F400 | I20**

Argenda del Rey, 22nd of October of 2012

Signat: Agnès Garcia Calabrera
Technical Director
Fire Resistance Laboratory
Technique of LICOF

Test Certificate
Nº CB834/13-3

Applicant: GAVE ELECTRO, S.L.
C/ Alfred Nobel de 16
08430 La Roca del Valles (BARCELONA)

Building Element: Switch disconnector
Manufacturer: Gave Electro, S.L.

Reference:	AB55661F4	AL55661F4
	AB55261F4	AL55261F4
	AB55671F4	AL55671F4
	AB55271F4	AL55271F4
	AB55691F4	AL55691F4
	AB55291F4	AL55291F4

Test: Test protocol based on EN 12101-3:2002 "Smoke and heat control systems. Part 3: Specifications for powered smoke and heat exhaust ventilators".
SIP-46-13
Test report in 8056/13 issued by AFITI LICOF on 19th Feb 2013.

Fire Resistance Classification: **F400 | I20**

Argenda del Rey, 19th of February of 2013

Signat: Agnès Garcia Calabrera
Technical Director
Fire Resistance Laboratory
Technique of LICOF

Test Certificate
Nº CB834/13-2

Applicant: GAVE ELECTRO, S.L.
C/ Alfred Nobel de 16
08430 La Roca del Valles (BARCELONA)

Building Element: Switch disconnector
Manufacturer: Gave Electro, S.L.

Reference:	AB55661F6	AL55661F6
	AB55261F6	AL55261F6
	AB55671F6	AL55671F6
	AB55271F6	AL55271F6
	AB55691F6	AL55691F6
	AB55291F6	AL55291F6

Test: Test protocol based on EN 12101-3:2002 "Smoke and heat control systems. Part 3: Specifications for powered smoke and heat exhaust ventilators".
SIP-46-13
Test report in 8056/13 issued by AFITI LICOF on 19th Feb 2013.

Fire Resistance Classification: **F600**

Argenda del Rey, 19th of February of 2013

Signat: Agnès Garcia Calabrera
Technical Director
Fire Resistance Laboratory
Technique of LICOF

SIMPLIFIED REPORT

Sponsor: Gave Electro S.L.
C/ Alfred Nobel, 16 Pol. Ind. de Valloriol
08430 La Roca del Valles

Product concerned: High temperature switches

References:
AB556A1F4 / AL556A1F4 AB552A1F4 / AL552A1F4
AB556B1F4 / AL556B1F4 AB552B1F4 / AL552B1F4
AB556C1F4 / AL556C1F4 AB552C1F4 / AL552C1F4

Objective:
Assessment of the fire performance of high temperature switches fire tested at 400°C/2h according to heating conditions given in EN 12101-3:2005 "Smoke and heat control systems. Part 3: Specification for powered smoke and heat exhaust ventilators (Fans)".
More details in test report Nº 16/13432-2300 of 2nd March 2017 and assessment report Nº 17-13432-442, of 6th March 2017.

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Applus[®] Laboratories

Defensor: 13 of June of 2017
Fan range: FProtoc
Range report: 14/8809-998
Date of range report: 28 of July of 2014
Test sponsor: GAVE ELECTRO S.L.
C/ Alfred Nobel, 16 Pol. Ind. Valloriol
08430 La Roca del Valles, Barcelona (Spain)

Applus LGA TECHNOLOGICAL CENTER, S.A. has carried out the range report to the following switch disconnectors models: **FProtoc**

According to range report 14/8809-998 based on the following tests carried out at 400°C/2hours:

- 12/6351-180 M1
- 12/4372-1138
- 12/4372-1465

CONCLUSION
After performing the tests according to the UNE EN 12101-3:2005 and UNE EN 12101-3:2002/AC:2006 "Smoke and heat control systems - part 3: Specification for powered smoke and heat exhaust ventilators" on fans equipped with "FProtoc" switch disconnectors supplied by GAVE ELECTRO, it can be considered that:

"FProtoc" switch disconnectors by GAVE ELECTRO are suitable for 400°C/2hours performance assembled in F400 smoke extraction fans.

Maximum intensity tested at 400°C: 84.4 A

Generic references provided by the petitioner:
 • ABxxx21F4 (equivalent to "FProtoc F400 25A")
 • ABxxx41F4 (equivalent to "FProtoc F400 60A")
 • ABxxx61F4 (equivalent to "FProtoc F400 83A")

The results obtained are valid in accordance to standard EN 12101-3:2005. The different test reports that make up the range have been evaluated and checked on 13 of June of 2017 in accordance to standard EN 12101-3:2005, satisfying the sample selection requirements, the test requirements and the performance test criteria.

Gum Viver
Fire Safety Engineer
Fire Safety Engineering Department
Applus - LGA Technological Center, S.A.

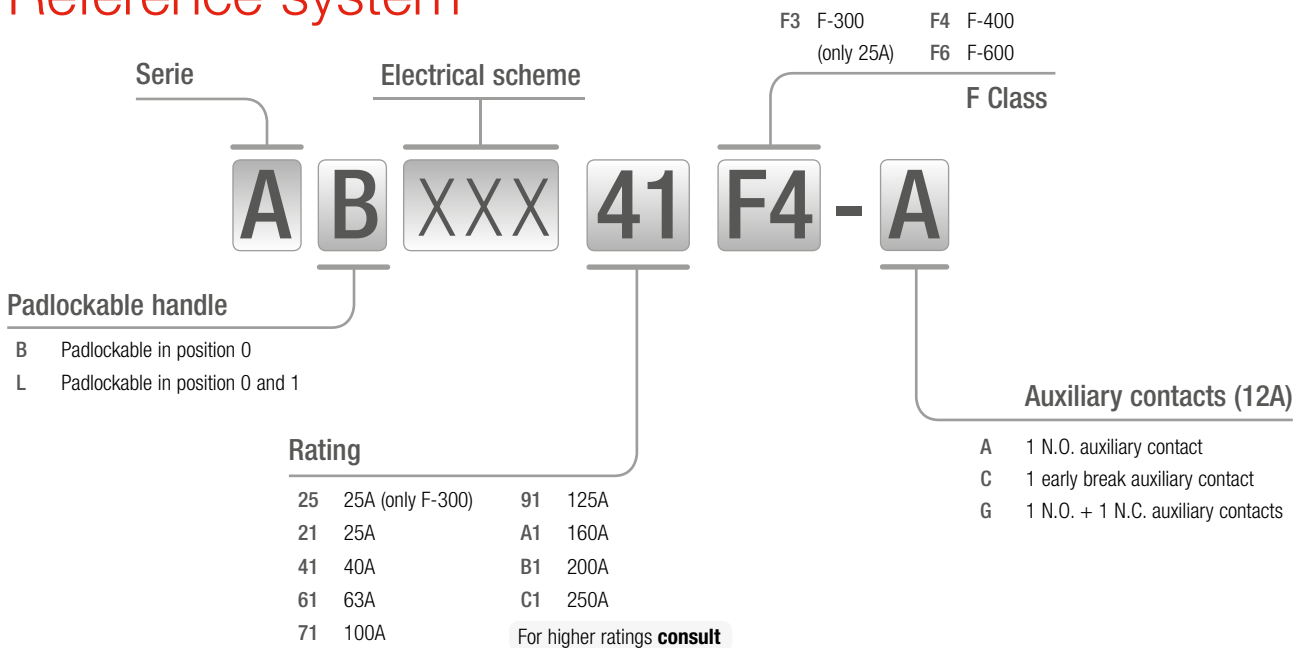
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Temperature classification

Switch disconnectors testing must be conducted according to procedures established in standard EN 12101-3:2015 annex C. Fire rating categories are based on temperature and minimum time resistance according to EN 13501-4.

	Temperature (°C)	Minimum functioning period (minutes)
■ F300	300	60
■ F400	400	120
■ F600	600	60

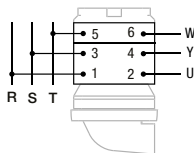
Reference system



Electrical schemes

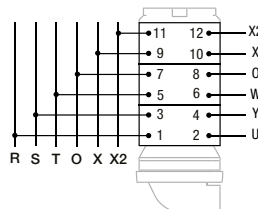
552 Switch 3P

5	6	X
3	4	X
1	2	X
0 1		



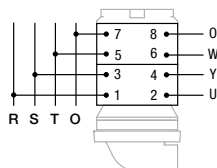
556 Switch 6P

11	12	X
9	10	X
7	8	X
5	6	X
3	4	X
1	2	X
0 1		



553 Switch 4P

7	8	X
5	6	X
3	4	X
1	2	X
0 1		



Auxiliary contacts

Type A

11	12	
9	10	X
7	8	
5	6	X
3	4	X
1	2	X
0 1		

Type C

11	12	
9	10	X
7	8	
5	6	X-X
3	4	X-X
1	2	X-X
0 1		

Type G

11	12	X
9	10	X
7	8	
5	6	X
3	4	X
1	2	X
0 1		

Auxiliary contacts are 25A Size D1.
Auxiliary contacts identification number change based on the number of switch cells.

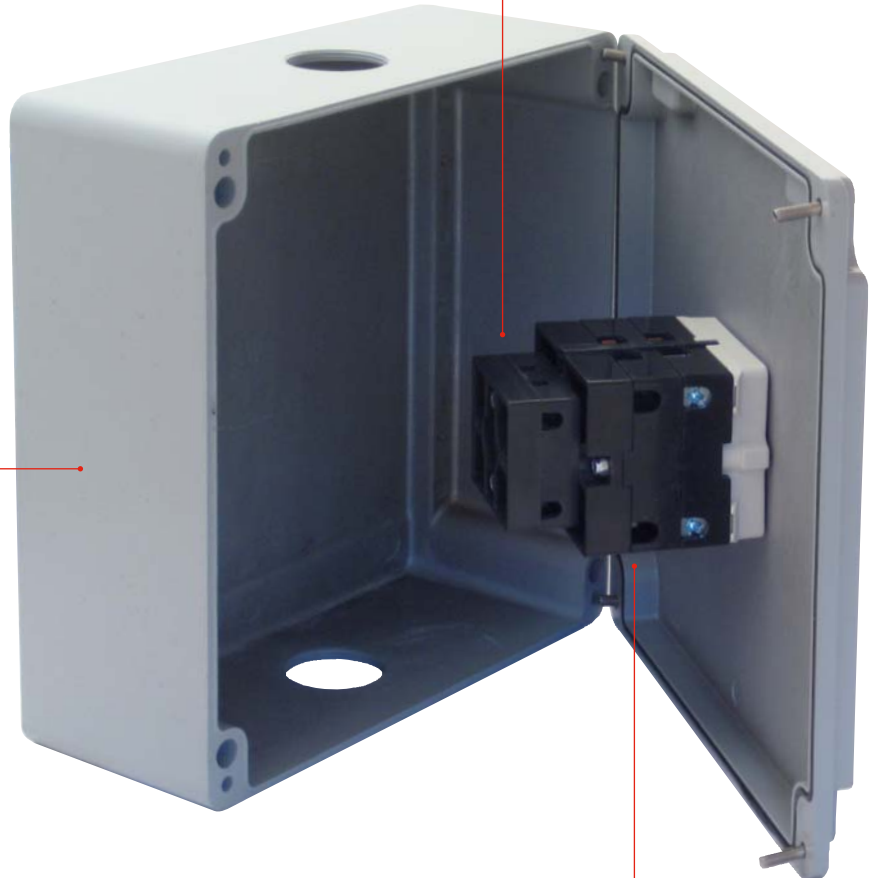
General characteristics

Stringent requirements according to standards EN 12101-3 have originated a highly demanding research task aiming to reach optimal resistance to high temperature operation



Enclosure

The enclosure has direct contact with the heating source and acts as a firewall diminishing direct heat into the switch.



Advanced materials

High performance polymers mixed with additives succeed to obtain high temperature switches able to resist erosion while offering stable dimensions under high temperature conditions (controlled CTE) while keeping component lubricity and mechanical performance.

- F300 switch can be identified by its Light brown exterior colour. Employed materials offer excellent characteristics to temperature changes.
- The switch body on the F400 and F600 present a larger size containing specific mechanical elements on materials resistant to high temperatures.
- We recognise F400 switches by its external black colour whereas class F600 switches are identifies by its white colour.



IP65 protection

Sealing injected on the enclosure lid ensuring an IP65 degree of protection according to EN 60529.



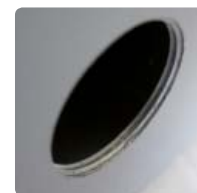
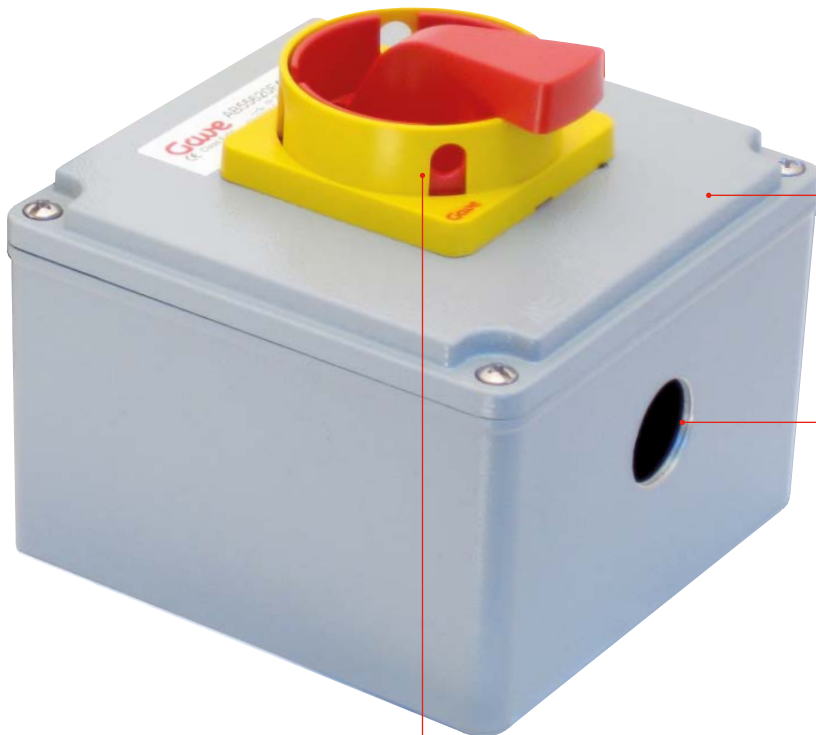
Auxiliary contacts

Maximum reliability, contact cams operated with the same shaft of main contacts. Construction with the same materials as main contacts avoids temperature related unbalance.



Surface finish

Enclosure coated with epoxy polyester powder grey colour (RAL 7032 aluminium -7035 steel) semi-gloss textured made by electrostatic projection and high temperature oven dry. This treatment provides excellent protection against chemical agents.



Cabling

Connection is made through two threaded metric entries placed one on the enclosure top face and the other on the bottom face.



Handle

Safety/emergency handle with padlockable facility (up to 4 padlocks) on the disconnect position in order to guarantee safety during maintenance operations. Optionally padlockable in all positions.

Fire rated F300 / F400



The range of F300 and F400 switch disconnectors share the aluminium enclosures that offer a high IP and IK rating. The F300 range is limited to 40A and the F400 is limited to 125A when using aluminium enclosures. F400 higher ratings (160-250A) use lightweight sheet

steel enclosures for easy handling and installation. All the range follows a surface treatment consisting of an epoxy polyester powder coating by electrostatic projection and high temperature oven drying that provides excellent protection against chemical agents.

Technical characteristics

			25A (F3)	25A (F4)	40A	63A	100A	125A	160A	200A	250A	
Thermal rating		Ith A	25	32	40	70	100	125	160	200	250	
Flexible wire		mm ²	2,5-6	2,5-16	2,5-16	6-50	6-50	6-50	70	95	120	
Connection screws			M4	M5	M5	M8	M8	M8	M8	M8	M8	
Screw torque		Nm	1,6	2	2	3,5	3,5	3,5	12	12	12	
Terminals												
Rated conditional short-circuit current Icc (r.m.s.) Max. Fuse size gG/aM	415V	A	25/25	25/25	40/32	63/63	100/100	125/100	160**	200*	250*	
		kA	6	6	6	8	8	8/6	8	8	8	
	500V	A	25/25	25/25	40/32	63/63	100/100	125/100	160*	200*	250*	
		kA	6	6	6	8	8	8/6	8	8	8	
Impulse voltage		Uimp KV	4	4	4	4	4	4	4	4	4	
Insulating voltage		Ui V~	690	690	690	690	690	690	690	690	690	
Operating rating		Ie A	25	25	40	63	100	125	160	200	250	
AC 22	kW	3 x 230V	7,5	7,5	11	18,5	30	37	37	45	55	
		Motor load VA kW	3 x 415V	15	15	22	37	55	55	75	90	110
		0,45 <cosφ <0,65 kW	3 x 500V	18,5	18,5	22	45	55	75	90	110	132
AC 23	kW	3 x 230V	5,5	5,5	11	15	18,5	18,5	30	38	-	
		Motor load VA kW	3 x 415V	7,5	11	18,5	22	30	37	52	65	-
		0,45 <cosφ <0,65 kW	3 x 500V	15	15	22	30	37	45	65	80	-

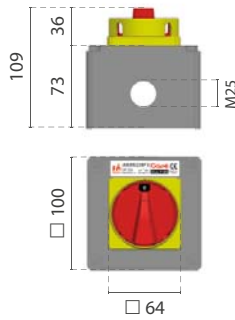
** aR Fuse

F300 Classification

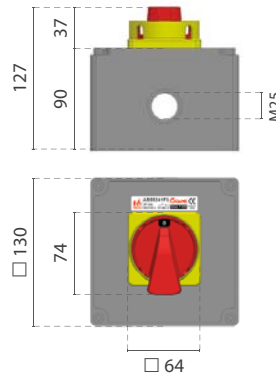
F300 switches are based on advanced polyether polymers that are widely used on the motor and aeronautic industry due to its high temperature resistance combined with excellent wear, chemical and hydrolytic behaviour.

Dimensions

Box size 1AL



Box size 2AL



Standard references



F-300 Class

3 Poles

Reference	Enclosure size	Cable entries	Rating
AB55225F3	1AL	2xM25	25 A
AB55241F3	2AL	2xM25	40 A

6 Poles

Reference	Enclosure size	Cable entries	Rating
AB55625F3	1AL	2xM25	25 A
AB55641F3	2AL	2xM25	40 A

Enclosures and auxiliary contacts

Reference	Rating	Poles	Auxiliary contacts		
			Without Aux.	1 aux. cell	2 aux. cells
AB55225F3-□	25A	3	1AL	1AL	1AL
AB55241F3-□	40A	3	2AL	2AL	2AL
AB55625F3-□	25A	6	1AL	1AL	2AL
AB55641F3-□	40A	6	2AL	2AL	2AL

F400 Classification

The stringent requirements on class F400 under fire conditions require the use of special composite materials that must combine good resistance to extreme temperatures while maintaining electrical characteristics requirements under IEC 947-3 when operating on normal conditions.

To guarantee insulation characteristics we need the use of an specific contact block dedicated to F400 classified switches. Mechanical components also must be modified in order to pass product testing sequence which requires a minimum functioning period of 120 minutes.

Standard references



F-400 Class

3 Poles

Reference	Enclosure size	Cable Entries*	Rating	Handle
AB55221F4	2AL	2xM25	25 A	
AB55241F4	3AL	2xM32	40 A	
AB55261F4	4AL	2xM40	63 A	
AB55271F4	4AL		100 A	
AB55291F4	4AL	230x140mm	125 A	
AB552A1F4	E3F		160 A	
AB552B1F4	E3F		200 A	
AB552C1F4	E4F	300x140mm	250 A	

4 Poles

Reference	Enclosure size	Cable Entries*	Rating	Handle
AB55321F4	2AL	2xM25	25 A	
AB55341F4	3AL	2xM32	40 A	
AB55361F4	4AL	2xM40	63 A	
AB55371F4	4AL		100 A	
AB55391F4	4AL	230x140mm	125 A	
AB553A1F4	E3F		160 A	
AB553B1F4	E3F		200 A	
AB553C1F4	E4F	300x140mm	250 A	

6 Poles

Reference	Enclosure size	Cable Entries*	Rating	Handle
AB55621F4	2AL	4xM25	25 A	
AB55641F4	3AL	4xM32	40 A	
AB55661F4	4AL	4xM40	63 A	
AB55671F4	4AL		100 A	
AB55691F4	4AL	300x140mm	125 A	
AB556A1F4	E4F		160 A	
AB556B1F4	E4F		200 A	
AB556C1F4	E4F	300x140mm	250 A	

* Threaded holes 1,5mm pitch

Enclosures and auxiliary contacts

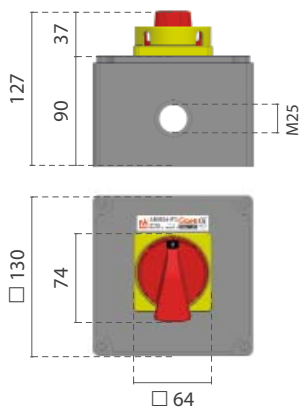


Reference	Rating	Poles	Without Aux.	Aux +1 cell	Aux +2 cell
AB55x21F4-□	25A	3 or 4	2AL	2AL	1AC
AB55x41F4-□	40A	3 or 4	3AL	3AL	1AC
AB55x61F4-□	63A	3 or 4	4AL	4AL	2AC
AB55x71F4-□	100A	3 or 4	4AL	4AL	2AC
AB55x91F4-□	125A	3 or 4	4AL	4AL	2AC
AB55xA1F4-□	160A	3 or 4	E3F	E3F	E4F
AB55xB1F4-□	200A	3 or 4	E3F	E3F	E4F
AB55xC1F4-□	250A	3 or 4	E4F	E4F	E4F

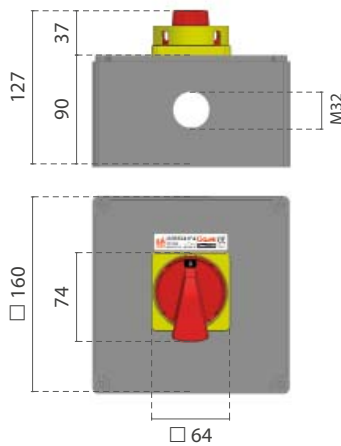
Reference	Rating	Poles	Without Aux.	Aux +1 cell	Aux +2 cell
AB55621F4-□	25A	6	2AL	1AC	2AC
AB55641F4-□	40A	6	3AL	1AC	2AC
AB55661F4-□	63A	6	4AL	2AC	2AC
AB55671F4-□	100A	6	4AL	2AC	2AC
AB55691F4-□	125A	6	4AL	2AC	2AC
AB556A1F4-□	160A	6	E4F	E4F	E4F
AB556B1F4-□	200A	6	E4F	E4F	E4F
AB556C1F4-□	250A	6	E4F	E4F	E4F

Dimensions

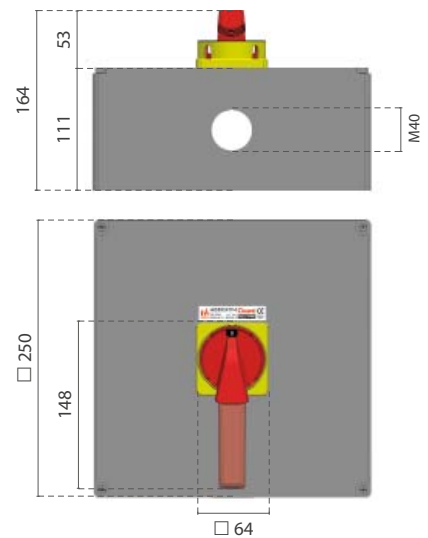
Box size 2AL



Box size 3AL

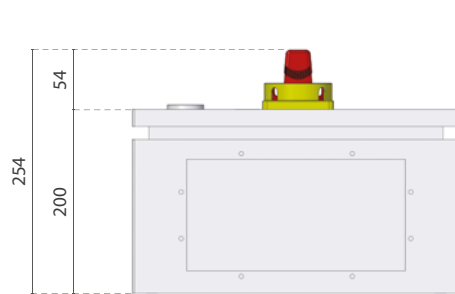


Box size 4AL

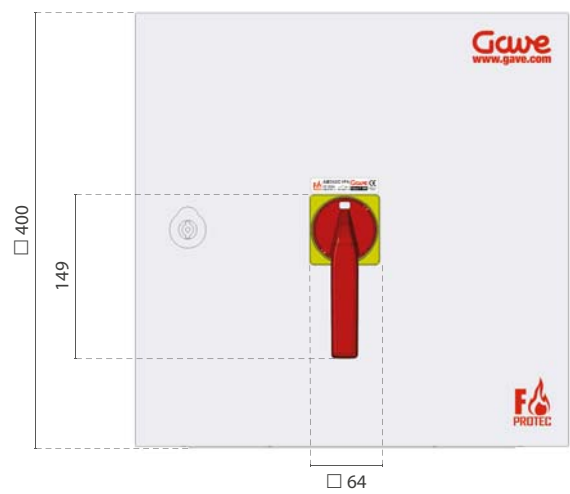
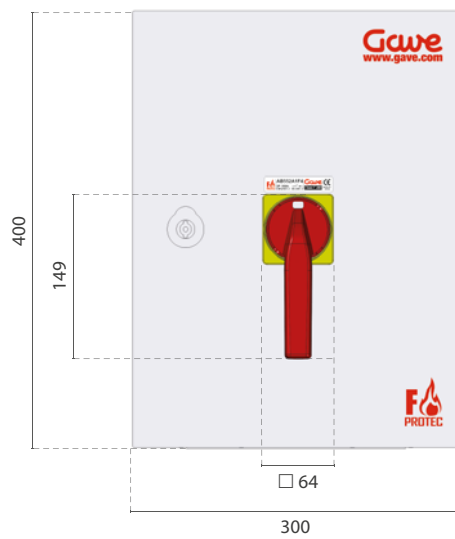
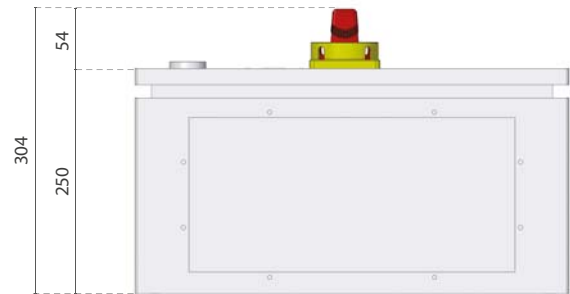


Dimensions

Box size E3F



Box size E4F



Safety interlock

High rating F400 switches (160-250A) are base mounted designs using sheet steel enclosures that grant easy cabling operations. They are equipped with a door interlock system that prevents access to live parts when in operation.





Fire rated F600

Constructing F600 switch disconnectors does require the use of very special materials able to overcome the extreme conditions under this category. The enclosure is on cold-laminated steel resistant to 600°C temperature.

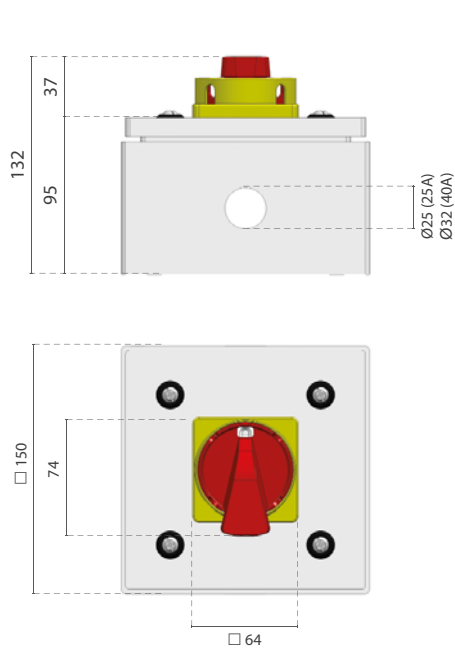
Developing a particular mechanical block for high temperature has also improved switch behaviour when shortcircuit occurs while keeping the electrical characteristics when operating under normal conditions.

Technical characteristics

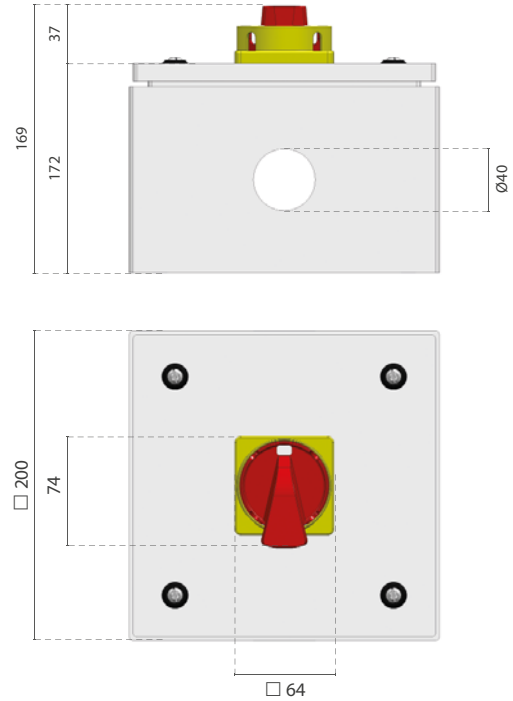
			25A	40A	63A	100A	125A
Thermal rating		Ith A	32	40	70	100	125
Flexible wire		mm ²	2,5-6	2,5-16	6-50	6-50	6-50
Connection screws			M5	M5	M8	M8	M8
Screw torque		Nm	2	2	3,5	3,5	3,5
Terminals							
Rated conditional short-circuit current Icc (r.m.s.)	415V	A	25/25	40/32	63/63	100/100	125/100
		kA	6	6	8	8	8
Max. Fuze size gG/aM	500V	A	25/25	40/32	63/63	100/100	125/100
		kA	6	6	8	8	8/6
Impulse voltage		Uimp KV	4	4	4	4	4
Insulating voltage		Vi V~	690	690	690	690	690
Operating rating		Ie A	25	40	63	100	125
AC 22	kW	3 x 230V	7,5	11	22	30	37
	Motor load VA kW	3 x 415V	15	22	30	55	55
	0,45 <cosØ <0,65 kW	3 x 500V	18,5	22	37	55	75
AC 23	kW	3 x 230V	5,5	11	15	18,5	18,5
	Motor load VA kW	3 x 415V	7,5	18,5	22	30	37
	0,45 <cosØ <0,65 kW	3 x 500V	11	22	30	37	45

Dimensions

Box size 1AC



Box size 2AC

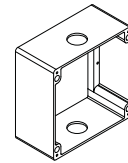


Standard references



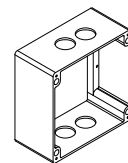
3 Poles

Reference	Poles	Enclosure size	Cable entries	Rating
AB55221F6	3P	1AC	2xM25	25 A
AB55241F6	3P	1AC	2xM32	40 A
AB55261F6	3P	2AC	2xM40	63 A
AB55271F6	3P	2AC		100 A
AB55291F6	3P	2AC		125 A



6 Poles

Reference	Poles	Enclosure size	Cable entries	Rating
AB55621F6	6P	2AC	4xM25	25 A
AB55641F6	6P	2AC	4xM32	40 A
AB55661F6	6P	2AC	4xM40	63 A
AB55671F6	6P	2AC		100 A
AB55691F6	6P	2AC		125 A



Special requests

The large variety of installations that require this type of products often demand special product versions to particular needs.

When requiring adaptations such as auxiliary contacts, particular angle positions, specific enclosure surface treatments or colours, cable glands, fixing elements, ... we have at your

disposition a technical office specialised on this type of specific demands.



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