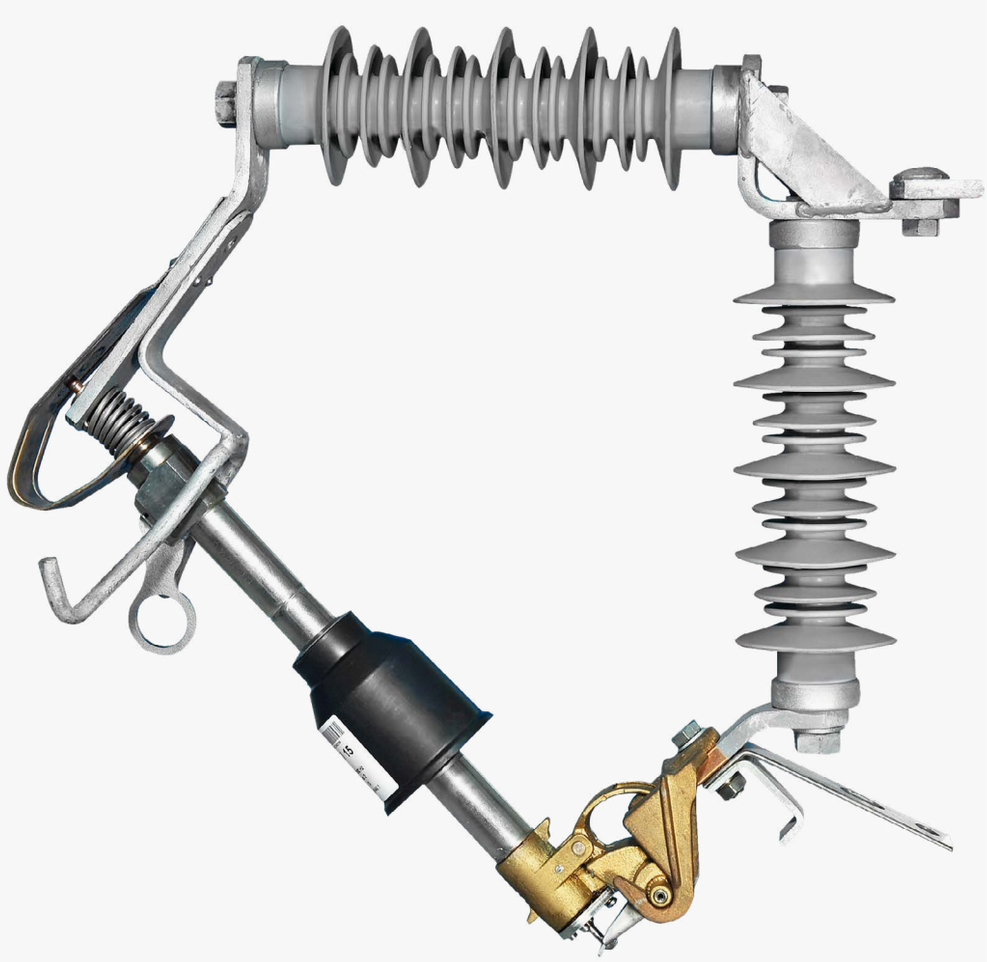
ENG

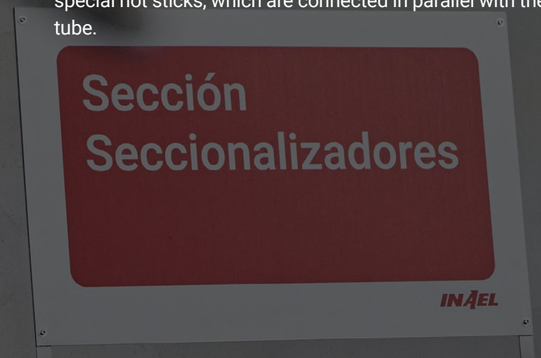


Expulsion fuses and automatic sectionalising

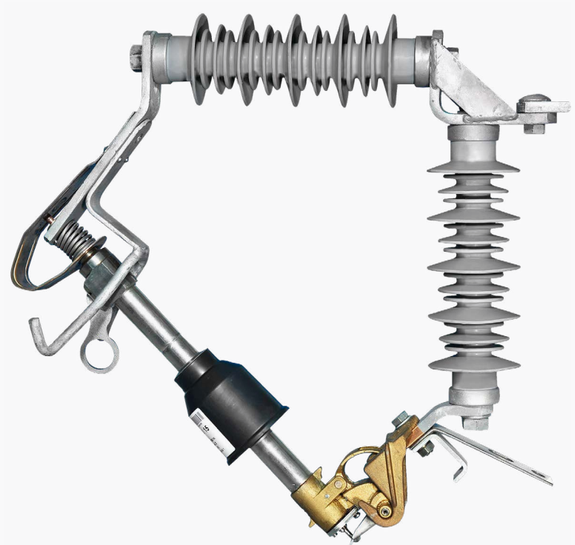
About the product

Inael expulsion cut-out fuses are unipolar devices for vertical mounting, specially designed to be used outdoors, providing broad protection to overhead distribution systems, with voltages ranging from 6 kV to 36 kV.

All cut-outs are equipped with hooks for load opening using special hot sticks, which are connected in parallel with the fuse tube.



Likewise, the devices have an ingenious construction system that guides the fuse holder during closing, so that it is done with great safety, regardless of the operator's position.
Inael single expulsion cut-outs are fully interchangeable with the analogs of this system, which, like ours, comply with RU 6406 B.



Expulsion fuses and automatic sectionalising

Our cut-out fuses have been tested with satisfactory results at CESI (Milan), as well as at LCOE and LABEIN.

- **CER-96/017516** Breaking capacity according to IEC 282-2:1970 and Amendment 1 of 1978 for 24 kV fuses from 6.3 A to 100 A.
- **CER-96/017304** Breaking capacity according to IEC 282-2:1970 and Amendment 1 of 1978 for 24 kV fuses from 6.3 A to 50 A.
- **CER-96/017507** Breaking capacity according to IEC 282-2:1970 and Amendment 1 of 1978 for 24 kV fuses from 63 A to 100 A.
- **CER-96/017565** Breaking capacity according to IEC 282-2:1970 and Amendment 1 of 1978 for 36 kV fuses from 6.3 A to 50 A.
- **AT-96/021528** the solid layer method.
- **LAB-95/023096** Pollution withstand test with salt fog.
- **GPS-A0/026646** Breaking capacity according to IEC 60282-2:1997 for 24 kV polymeric fuses from 6.3 A to 100 A.

- **AT-A1/016245** Enclosure test: tracking and erosion test according to IEC 61009:1992 for 24 kV polymeric fuses.
- **AT-A1/016247** Enclosure test: tracking and erosion test according to IEC 61009:1992 for 36 kV polymeric fuses.
- **AT-A1/027140** Dielectric tests according to IEC 60282-2:1995 for 24 kV polymeric fuses.
- **AT-A1/030760** Dielectric tests according to IEC 60282-2:1995 for 36 kV polymeric fuses.
- **AT-A1/025012** Design tests: tests on interfaces and metallic fittings according to IEC 61109:1992-03 for 24 kV polymeric fuses.
- **AT-A1/025013** Design tests: tests on interfaces and metallic fittings according to IEC 61109:1992-03 for 36 kV polymeric fuses.

General Information

Single expulsion cut-out fuses can be used as disconnectors, simply by replacing the fuse holder with a disconnect blade, made of copper alloy, which can permanently carry a current of 200 A. The cut-outs can operate with SEIN automatic sectionalizers or any other with standardized dimensions.

Electrical characteristics											
Type	Code	Ur kV	Rated Current			Breaking capacity Effective kA - kA rms		Withstand voltages			
								50 Hz 1 min.		Impulse 1.2/50us	
			Base A	Fuse holder A	Blade	Symmetrical	Asymmetri-cal	To ground	Disconnection	To ground	Disconnection
A-1000	34151000	15	200	100	200	8	12	35	45	95	115
A-1200	3A241000	24	200	100	200	8	12	50	60	125	145
A-1200-V/24	3AV241000										
A-1200-P/24	2AP241000										
A-1200-VP/24	3AVP2400										
A-1200/36	3A361000	36	200	100	200	8	12	70	80	170	195
A-1200/36/GL	3A3610GL										
A-1200-V/36	3AV361000										
A-1200-VP/36	3AVP3600										

Protections

For the preparation of the recommended fuse tables for the protection of transformers and capacitors, we have based them on technical studies and practical usage cases; the recommended types are valid when the ambient temperature at the place of use is between -10 °C and 40 °C. For different environmental conditions, please consult us.

Capacitor protection

Electrical characteristics												
Power kVA	Rated Current											
	6-7.2		10-12		15-17.5		20-24		25-28		30-36	
10	1	2	0.6	2	0.38	2	0.3	2				
15	1.5	4	0.9	2	0.57	2	0.46	2	0.35	2		
20	2	4	1.15	2	0.77	2	0.57	2	0.57	2	0.4	2
25	2.4	6	1.44	2	0.96	2	0.72	2	0.57	2	0.5	2
50	4.8	10	2.9	6	1.92	4	1.4	4	1.15	2	1	2
75	7.2	16	4.3	10	2.9	6	2	4	1.73	4	1.4	4
100	9.6	16	5.8	10	3.8	6	2.9	4	2.3	4	1.9	4
125	12	20	7.2	16	4.8	10	3.6	6	2.9	6	2.4	6
160	15.4	25	9.2	16	6	10	4.6	10	3.7	6	3.1	6

Capacitor current A Rated fuse current A

Transformer protection

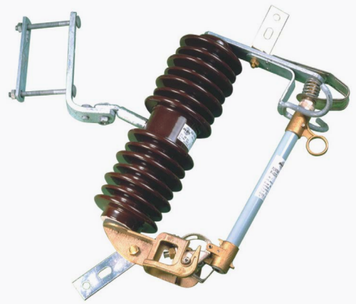
Electrical characteristics												
Power kVA	Rated Voltage kV											
	6-7.2		10-12		15-17.5		20-24		25-28		30-36	
10	1	2	0.6	2	0.38	2	0.3	2				
15	1.5	4	0.9	2	0.57	2	0.46	2	0.35	2		
20	2	4	1.15	2	0.77	2	0.57	2	0.57	2	0.4	2
25	2.4	6	1.44	2	0.96	2	0.72	2	0.57	2	0.5	2
50	4.8	10	2.9	6	1.92	4	1.4	4	1.15	2	1	2
75	7.2	16	4.3	10	2.9	6	2	4	1.73	4	1.4	4
100	9.6	16	5.8	10	3.8	6	2.9	4	2.3	4	1.9	4
125	12	20	7.2	16	4.8	10	3.6	6	2.9	6	2.4	6
160	15.4	25	9.2	16	6	10	4.6	10	3.7	6	3.1	6
200	19.2	32	11.5	20	7.7	16	5.8	10	4.6	10	3.8	6
250	24	40	14.4	25	9.3	16	7.2	16	5.7	10	4.8	10
315	30	50	18.2	32	12	20	9	16	7.3	16	6	10
400	39	63	23	40	15.4	25	11.5	20	9.2	20	7.7	16
500	48	100	29	50	19.2	32	14.4	25	11.5	20	9.6	16
630			36.4	63	24.2	40	18.2	32	14.5	25	12	20
800			46.2	80	3038	63	23	40	18.5	32	15.4	25
1000			57.8	100	38.5	63	29	50	23	40	19.2	20
1250					48	80	36	63	29	50	24	40

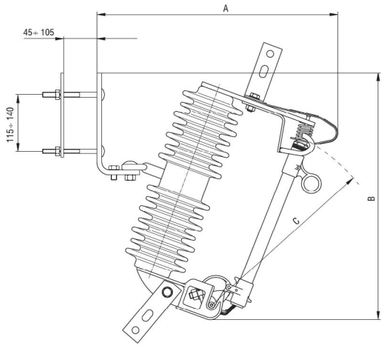
Capacitor current A Rated fuse current A

Capacitor protection

A-1200

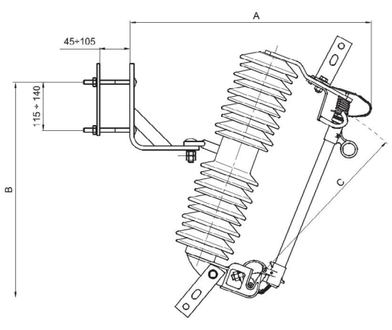
The A-1000 and A-1200 models are single-insulator expulsion fuses suitable for use in 15 kV and 24 kV distribution systems.





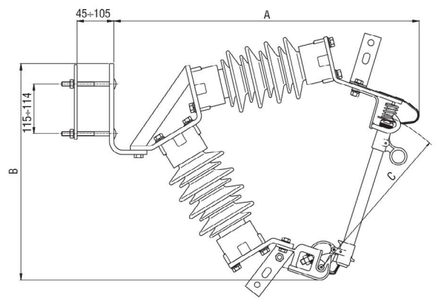
A-1200/36/GL

The A-1200/36/GL model is an expulsion fuse with a porcelain insulator with a large creepage distance.



Ceramic cutouts with double insulator

A-1200V/24

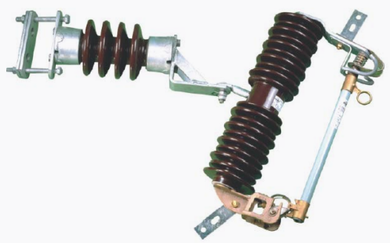


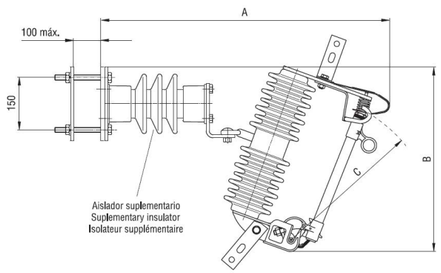
Dimensions

Type	Code	Ur kV	Creepage distance mm.	Dimensions mm.			Weight kg.
				A	B	C	
AC-1200 I	3A4151000	15	300	420	450	275	9.4
AC-1200	3A241000	24	180	507	495	380	13.8
A-1200/36	3A301000	36	744	600	570	468	14.8
A-1200/36/GL	3A3610GL	36	860	600	570	468	15.1

Ceramic cutouts with supplemented insulator

A-1200 I





Dimensions

Type	Code	Ur kV	Creepage distance mm.	Dimensions mm.			Weight kg.
				A	B	C	
AC-1200 I	3A241000C1	24	480+380=860	861	480	380	C4-125
AC-1200 III	3A241000C3	24	480+625=1105	871	480	380	IN-24 III
A-1200/36 I	3A610CA	36	740+380=1120	895	535	468	C4-125
A-1200/36 III	3A361000C3	36	740+628=1365	905	535	468	IN-24 III
AC-1200/36/ GL I	3A3610GL	36	860+380=1240	895	535	468	C4-125
AC-1200/36/ GL III	3A3610GLC3	36	860+625=1485	905	535	468	IN-24 III

Polymeric cutouts of single expulsion

A-1200-P/24

Polymeric insulators composed of an epoxy core with fiberglass and a silicone sheath.

Vandal-resistant insulators.

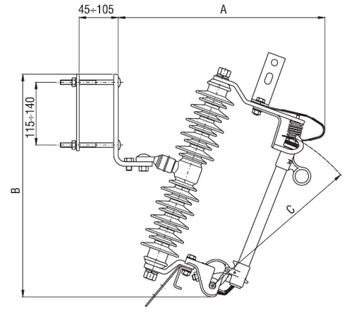
Hydrophobic insulators.

Insulators without environmental contraindications in their use.

Inclined fin system with two different diameters, with a wide protected creepage distance.

Total interchangeability with ceramic models.

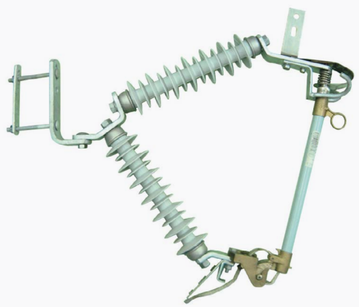
They accept SEIN (Single-phase), SIT (Three-phase) sectionalizers from Inael or any other type with standardized dimensions.

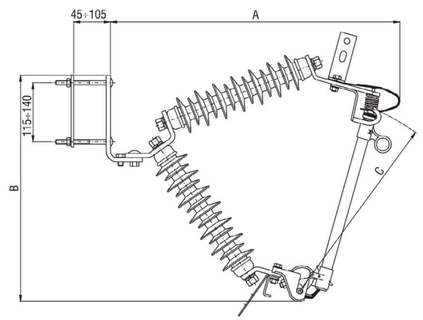


Dimensions

Type	Code	Ur kV	Creepage distance mm.	Dimensions mm.			Weight kg.
				A	B	C	
A-1200-P/24	3AP241000	24	575	465	500	380	8
A-1000-VP	3AVP1500	15	360	252	390	275	7,8
A-1200-VP/24	3AVP2400	24	755	615	490	380	8,4
A-1200-VP/36	3AVP3600	36	826	690	540	468	9

A-1200-VP/36





Fuse links

Our fuse links are made up of: Tube, which on its inner part has a special coating for better arc extinction. Fuse element of pure silver.

Connection braid, made of tinned copper and with sufficient cross-section to avoid excessive consumption. The fuse links presented in this catalog can be used in all expulsion fuses that comply with current standards. For domestic manufacturing, links with M6x1 thread are used. For export, they are manufactured with 1/4” UNF 28-thread.

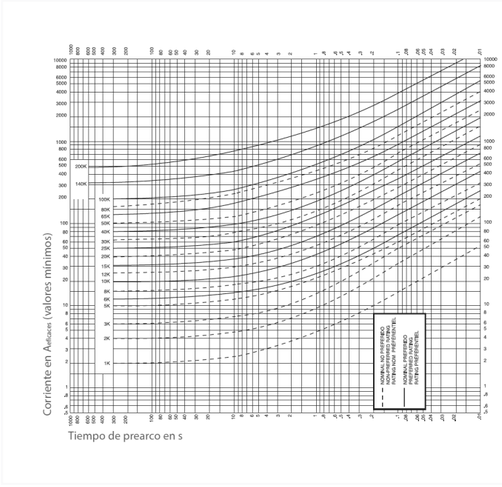
Dimensions			
Assigned Current A	Dimensions mm.		
	A min.	Bmm.0/C	0 E/
≤50	584	12.5	8
>50		-	11

Type K and type T links

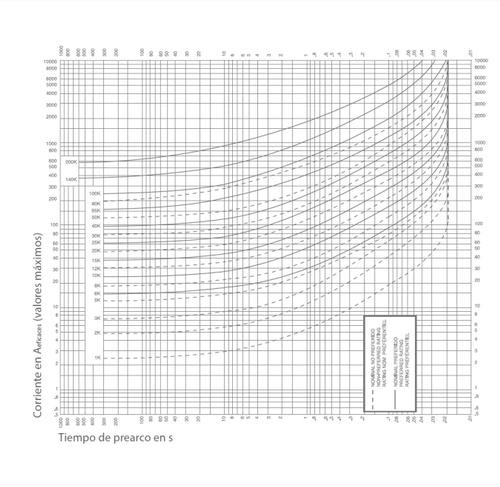
Dimensions				
Type K	Code	Assigned Current A	TYPE T	Code
EK-002	1C220200	2	ET-002	1C220200T
EK-003	1C220300	3	ET-003	1C220300T
EK-004	1C220400	4	ET-004	1C220400T
EK-006	1C221000	6	ET-006	1C220600T
EK-010	1C221000	10	ET-010	1C221000T
EK-016	1C221600	16	ET-016	1C221600T
EK-020	1C222000	20	ET-020	1C222000T
EK-025	1C222500	25	ET-025	1C222500T
EK-032	1C223200	31,5	ET-032	1C223200T
EK-040	1C224000	40	ET-040	1C224000T
EK-050	1C285000	50	ET-050	1C285000T
EK-063	1C286300	63	ET-063	1C286300T
EK-080	1C288000	80	ET-080	1C288000T
EK-100	1C28110	100	ET-100	1C28110T

Melting curves

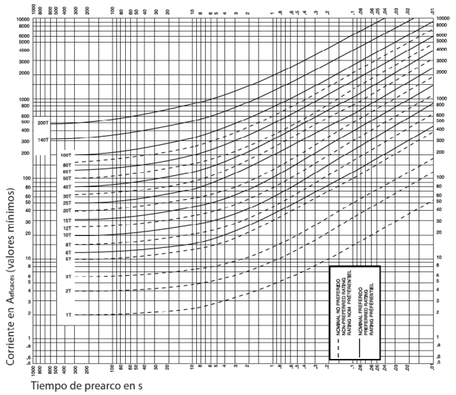
Type K (minimum values)



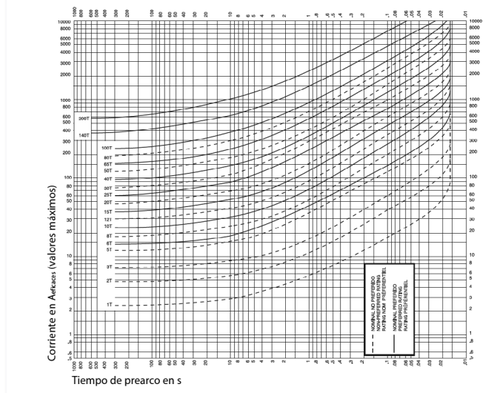
Type K (maximum values)



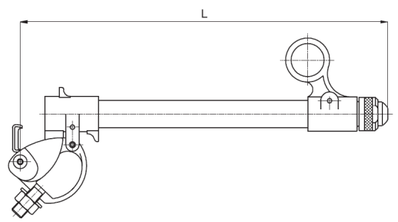
Type T (minimum values)

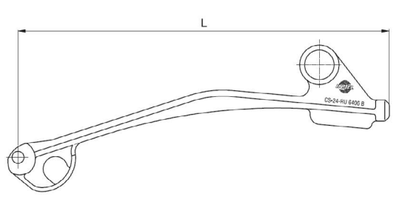


Type T (maximum values)



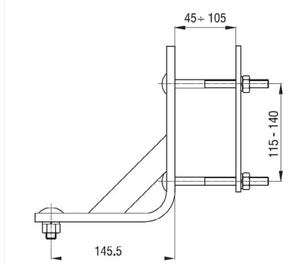
Fuse holders and disconnecting knife switch



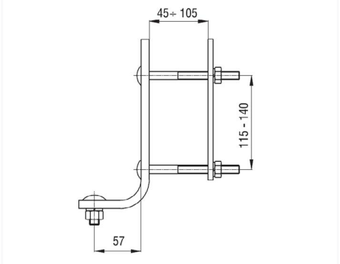


Type	Code	Ur kV	Max. Continuous Current A	L mm.	WEIGHT kg.
Fuse holders	3F151000	15	100	275	0.09
	3F241000	24	100	380	1.04

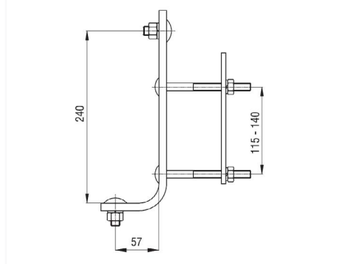
Mounting hardware



Ref.: IN-J90L LONG MOUNTING



Ref.: IN-J90C SHORT MOUNTING



Ref.: IN-J90CA FOR CUT-OUT AND SURGE ARRESTERS

Automatic sectionalizers SEIN, SIT AND SITI

The INAEL automatic sectionalizers represent a radical revolution in the field of protection for branches and feeders in overhead distribution lines. They are fully self-powered devices, designed for use together with automatic circuit breakers.

Recent statistical studies show that approximately 90% of the operations of expulsion fuses in overhead line branches occur in response to transient faults, such as lightning storms, contact with tree branches, etc. It is also known that the labor cost for each replacement of a blown fuse can be similar to the cost of a new Cut-Out.

The INAEL automatic sectionalizers provide an economical solution to this problem, ensuring effective isolation of a branch in the case of a permanent local fault, while remaining inert to transient currents, which, as mentioned, occur in approximately 90% of cases.

Definitions

- **THRESHOLD CURRENT** This is the maximum current value, above which it is considered to be a fault current and the logic circuit of the sectionalizer is activated. It is a preset value in the sectionalizer, which must be chosen according to the load to be protected and is available in standard values of 12 A, 25 A, 40 A, 63 A, 100 A, and 140 A for the SEIN and SIT models. In the SITI model, the fault occurs when the increase in current over a period of time A/s exceeds the preset value.
- **RESPONSE TIME** This is the reaction time of the logic circuit to the pickup current, specifically, the time that passes from the start of the fault current to the recognition of such current by the logic circuit, and it is less than 50 ms.
- **RECOVERY TIME** This is the time it takes for the logic circuit, once activated, to return to its initial inert state, “forgetting” the incident that activated it. In our sectionalizers, it is around 30 seconds minimum.
- **SAFETY CURRENT** This is the current threshold above which the logic circuit of the sectionalizer inhibits its opening and the cycle count. It is set at 300 mA, which must flow through the sectionalizer for at least 0.15 seconds (dead line time).
- **TRIP COUNT** This is the number of times the logic circuit of the sectionalizer must “see” the fault current, that is, a current higher than the threshold current, before deciding that it is a permanent fault and preparing to open. Its standard value is 2 (second cycle), but it can be programmed, upon request, for the first and third cycle.
- **COMMUNICATION CODE (Only SIT and SITI Three-phase)** In the three-phase models, communication between the 3 sectionalizers is carried out via radio using a communication code. To avoid interference between sets of sectionalizers that are less than 10 meters apart, they must be configured with a different communication code. Up to 8 different communication codes are available. SEIN (Single-phase)

Operation

The logic circuit on the printed circuit board, located inside the sectionalizer, is powered by a small current transformer mounted on the conductor tube. Under normal conditions, the printed circuit board remains inert.

However, if the current in the line increases above a certain predetermined value, which is the threshold current in the SEIN and SIT models, the logic circuit is activated. For the SITI model, an increase in current over a period of time A/s greater than the preset value is required.

The reaction time of the logic circuit to this pickup current is called response time and is less than 50 milliseconds. The upstream automatic circuit breaker will open at that moment, thus temporarily eliminating the line fault. The logic circuit memorizes the incident for at least 30 seconds, corresponding to the so-called regeneration time. When the upstream automatic circuit breaker closes, between 3 and 10 seconds after opening, if the fault current has disappeared, then the automatic sectionalizer will forget the incident after the regeneration time has passed and will return to its initial state.

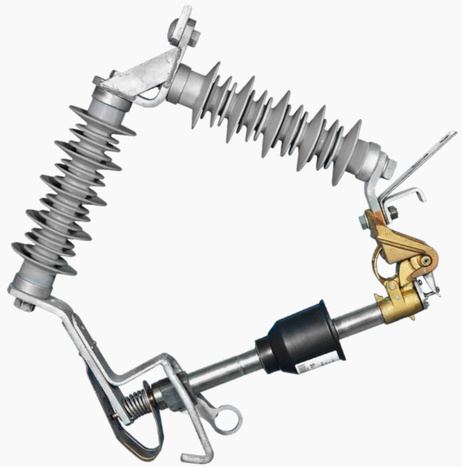
However, if after the automatic circuit breaker closes, the fault condition persists, the logic circuit will decide that we are facing a permanent fault, and will prepare to open, but will not do so until the upstream automatic circuit breaker has opened for the second time, and the current in the line has remained below 300 mA, which is the safety current, for a period of at least 0.15 seconds. In this way, the sectionalizer operates during the time in which the automatic circuit breaker keeps the line open, and does so smoothly and silently, without arcs, emission of ionized gas, or erosion of the contacts.

The trip count is a parameter that indicates the number of times the logic circuit must “see” the fault current before preparing to open. The SEIN (Single-phase) or SIT/SITI (Three-phase) automatic sectionalizers are supplied by default as 2nd cycle, that is, the fault current must pass twice, as in the operating sequence described in the previous paragraph, before the sectionalizer opens. However, on request, they can be supplied as 1st and 3rd cycle.

Voltage kV	15/17.5		20/24		30/36	
Max. service current (SEIN AND SIT) - A	8	15	25	38	60	90
Incremental Current Threshold SITI - A/s	30/0.3		50/0.4		100/0.5	
Max. value of fault current for:						
1 second - kA	8					
10 seconds - kA	3					
Crest value of fault current for:						
1 second - kA	20					
10 seconds - kA	7.5					
Type of response - ms	<50					
Dead line verification time - ms	<150					
Approximate reset time - s	30					
Max. operating time - s	<0.1					
Safety current during 0.15s - mA	<300					
Trip count**	1, 2* or 3					
Different communication codes (only SIT and SITI)	8					
For installation in Cut-out (INAEL or similar)	A-1000		A-1200		A-1200-36	

* If not otherwise indicated, the device is supplied with two counts.

** Values indicated in orders and nameplates.



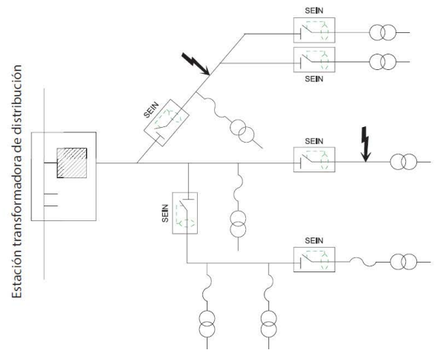
Application

The sectionalizers must be used together with an automatic circuit breaker, located upstream, with the capacity for repeated reclosing; at a minimum, this number must be equal to the number of cycles preset for the sectionalizer. The time during which this automatic circuit breaker keeps the line open must be appreciably less than the minimum 30 seconds, which is the regeneration time of the sectionalizer.

Note that the recommended threshold current is one or two times the value of the normal full load current, and should never be higher than the minimum trip current of the main circuit breaker. After the operation of the sectionalizers, it is not necessary to change or replace any part, since to restore service it is enough to manually reset the device, reinstall it in the base, and close the circuit.

Application

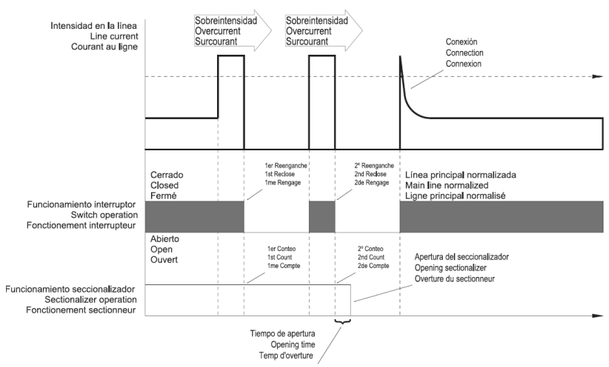
- IEC 62271-102 Sectionalizers
- IEC 60255-21 Vibrations
- IEC 60068-2 Climatic
- IEC 61000 Electromagnetic Compatibility



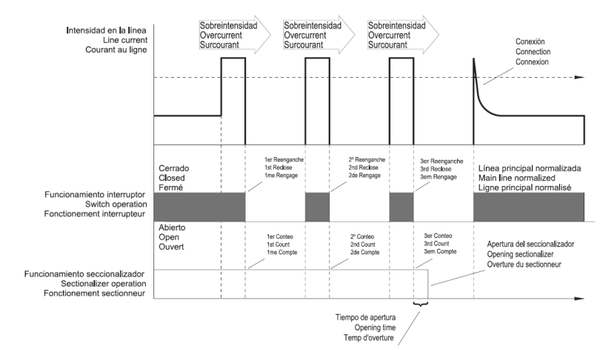
Legend

- Interruptor de cabecera de línea o reconectador.
- Seccionalizador.
- Cortacircuito fusible de expulsión.
- Transformador.
- Falta

Behavior in case of permanent fault (2 counts)

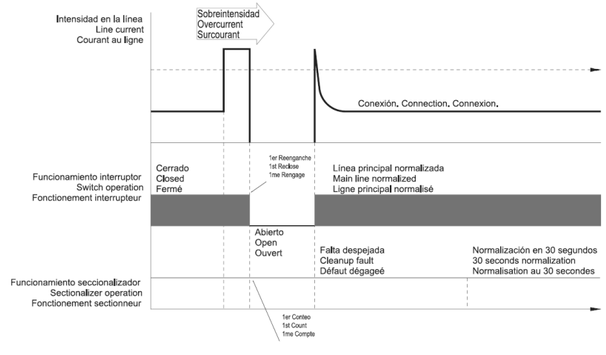


Behavior in case of permanent fault (3 counts)



Inael Electrical Systems Expulsion fuses and automatic sectionalising

Behavior in case of 1 transient fault (2 counts)



GENERAL TERMS OF SALE

ALL PRICES, CODES AND REFERENCES INDICATED IN THIS PRICE LIST ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE

GENERAL TERMS
All sales made by the Seller are expressly subject to the total acceptance by the Buyer of the terms and conditions specified below and to the waiver of the Buyer's general purchase conditions, acceptance and waiver that will be considered as made in every order placed by the Buyer.

OBJECTIVE AND SCOPE OF OFFERS
The applicable prices are those appearing in the Seller's price list in force on the date of the order. The prices and conditions for specific offers will refer exclusively to the products offered, with a validity of one month, unless otherwise stipulated. Acceptance of an offer must be formalized with a purchase order to the Seller. This will be considered definitively accepted after the express and unconditional acceptance of the order by the Seller. Any modifications and/or variations in the scope, deadlines, or other terms of the contract that may be proposed by either party must always be notified in writing and accepted in the same way.

PAYMENT TERMS
Unless otherwise agreed, all our sales are insured by an insurance company and will be made with a maximum payment term of 60 days from invoice date, in accordance with the provisions of Law 15/2010, of July 5, amending Law 3/2004, of December 29, which establishes measures to combat late payment in commercial transactions, without in any case exceeding the maximum terms established therein. For orders under €300, payment will be in advance.

In the case of international sales, when payment is made by documentary credit, the buyer must obtain the seller's acceptance of the terms of the letter of credit and of the confirming bank before its issuance. Due to the management of costs borne by the seller, a minimum invoice amount of €150 will be applied to all sales.

TRANSPORT AND INSURANCE
For shipments within the Peninsula, consignments exceeding a net amount of €2000 will be shipped carriage paid; for any other destination, the goods will be delivered under EXW Toledo conditions. For carriage paid shipments, no transport claims will be accepted after 48 hours from delivery. In the case of urgent shipments requested by the customer, such goods will always be shipped carriage forward. Goods always travel at the buyer's risk, who, in case of damage or delay, must file the relevant claim with the transport companies or agents within no more than 48 hours.

TOOLING AND PACKAGING
The tooling built for the manufacture of special products will be at the customer's expense, remaining deposited at INAEL and used exclusively for those orders for which they were manufactured. They may only be used for third parties with the express authorization of the customer, and will be at INAEL's disposal five years after their last use. The delivery of the tooling must be expressly agreed upon with the order. All materials shipped from INAEL to customers are in standard packaging suitable for road transport; any other type of specific packaging requested by the buyer will be at the customer's expense.

MANUFACTURING
In the event of force majeure of any kind, including that caused by an evident lack of raw materials, manufacturing difficulties, strike, communication breakdown, or catastrophe, INAEL is automatically released from all commitments made, reserving the right to cancel pending manufacturing orders without prior notice.

DELIVERY TIMES
Delivery times are approximate, unless expressly accepted by the Seller as firm delivery times. Delivery times will begin to count from the latest of the following dates:

- Date of unconditional acceptance of the order by INAEL
- The receipt by INAEL of the information from the customer necessary for the execution of the order
- The receipt by INAEL of the advance payment that the customer undertakes to pay, in accordance with the terms of the sales contract
- In the case of payment by Letter of Credit, on the date when a documentary credit acceptable to INAEL is notified and, if applicable, confirmed by INAEL.

If the prior conditions have not been fulfilled within 6 months from the existence of the contract, it will be null and void, and the client waives any claim for damages arising from it. In the event that the client requests a postponement of the delivery date, INAEL may invoice upon making the products available on the agreed date, without prejudice to passing on to the client any storage costs that may be incurred.

GENERAL TERMS OF SALE

OWNERSHIP OF THE GOODS AND RETENTION OF TITLE
INAEL will retain ownership of the goods until full payment of the invoice sale price, even if a bill of exchange exists. The client is authorized to transform the goods, although this authorization will automatically cease if the client does not strictly comply with the established conditions.

RETURN OF MATERIALS
Returns are not accepted without the express involvement and consent of INAEL, and under no circumstances for special materials. If a return is accepted, all transport, inspection, repair, or verification costs for reconditioning will be borne exclusively by the sender. No returns of any type of material will be accepted after one year from the delivery date.

TESTING
Our products are always tested and checked before being shipped to our clients. If desired, routine tests can be carried out in the presence of the clients at our factory, provided that prior notice is given in the order proposal to arrange a date. If any other type of tests, third-party inspections, or other actions are required, these will be quoted and approved by INAEL and will always be at the client's expense.

WARRANTY
We guarantee the products of our manufacture for one year from the date of departure from the factory, against any material defect or manufacturing fault, undertaking during this period to repair or replace at our expense and in our factory, as quickly as possible, any part recognized as defective, without compensation for either party, and accepting no responsibility for direct or indirect damages that may arise.

To ensure our warranty is not affected, it is essential to comply with the instructions in our assembly and maintenance manuals. Likewise, notification or repair of our products without our involvement or consent will automatically void our warranty on them.

The repair of the product or any part of it, its change or replacement during the warranty period, will in no case result in an extension of the product's warranty period.

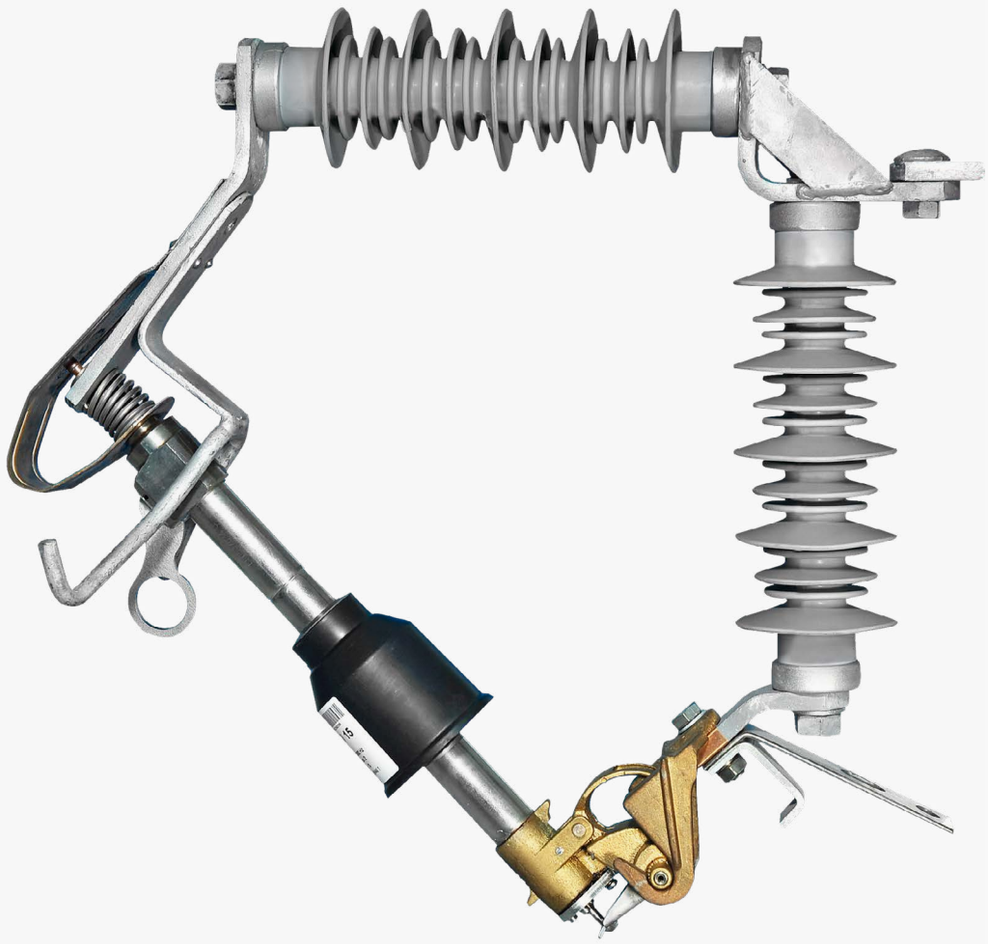
ENVIRONMENTAL REGULATIONS
It is the responsibility of the holder of the waste to collect and dispose of it or to ensure that it is collected and disposed of. For professional electrical and electronic equipment affected by European Directives 2002/96/EC of January 27, 2003 and 2006/66/EC of September 6, 2006, as well as the current regulations implementing them, the organizational and financial responsibility for the collection and processing of waste generated by this equipment marketed after August 13, 2005 has been transferred to the direct purchaser, who accepts it. The direct purchaser undertakes to assume responsibility for collecting and disposing of the generated waste, as well as for its processing and recycling. Failure by the purchaser to comply with these obligations may result in the application of criminal penalties in each member state of the European Union. INAEL hereby guarantees that the substances, whether alone or contained in products incorporated for the relevant production process, have been used in accordance with the provisions relating to registration, authorization, and restriction.

As of January 1, 2024, the tax on equipment with fluorinated gases comes into effect, approved by Law 14/2022 of July 8, amending Law 19/2013 of December 9. In particular, this tax applies to equipment with SF6 that is delivered and installed in Spain after that date.

In this offer, said tax is calculated based on the scope and normal installation conditions of the project. If the scope and/or installation conditions of the project are modified, the tax will need to be recalculated. This tax is transferable throughout the supply chain. Furthermore, the tax is not exempt from VAT.

In the particular case that the equipment is to be exported, you may consult with the Tax Authorities on how to process the refund of the amount of said tax.

JURISDICTION
In the event of disputes, the Judges and Courts of Toledo shall have jurisdiction, to which both parties expressly submit, waiving their own jurisdiction.



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