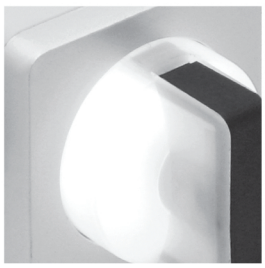
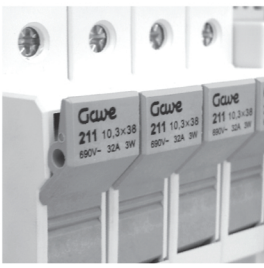
Gave



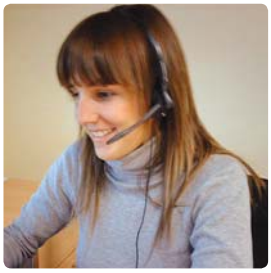


General catalogue

Gave
low voltage electrical material

General catalogue

Company



Introduction

Since 1944 Gave product range has continuously developed in close cooperation with product users.

All these years experience have built up recognised capabilities on product design, development and manufacturing, specifically on the fields of low voltage control, breaking and protection.

Our worldwide presence with distributors in more than 40 countries guarantees qualified technical support always close to our customers.

Today Gave means experience and competence on specialist electro-technical products. A large range of products including cam operated switches, automatic transfer switches, motorized changeover switches, control relays and fuse protection.

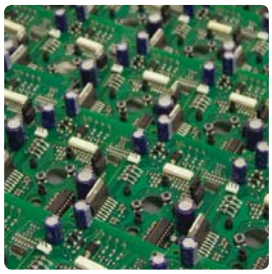
«Natural partner for trade and industry»

«Advanced system on supply chain management»

An integrated logistic system runs on line on production, stock and shipments. Supply chain management with real added value by integrating suppliers on the different steps of product development and production.

«Working today on tomorrow solutions»

Our future is based on strong technical capabilites on product design and development realizing original solutions to customer specific demands focused on the fields of electrical control, breaking and protection.



Innovation

«Know-how and technology benefitting your competitiveness»

Innovation means for us systematic operation with technical capabilities melting with customer experiences into new product developments. From an idea a qualified technical team will sort out a product through all developing stages; design, prototyping, laboratory extensive type testing and production execution.

Permanent surveillance on normative and technological environment ensure a performant product integrating latest technologies while assuring maximum safety and reliability. The result shows on an innovative product offering real added value to the customer. Market recognition is cause of satisfaction to all persons contributing with their daily effort on future developments.

«Ideas mean progress»

Quality

«Heart to safety and reliability»

Our extensive offer has always been distinguished by quality. Products are designed for easy installation and safe operation. Components and raw material are sourced from a group of selected suppliers able to guarantee constants high quality. Modern manufacturing process achieve outstanding levels of precission on products.

Through all manufacturing processes are practiced quality tests required by standards plus additional tests determined by a panel of engineers and technical qualified personnel. Quality assurance is undertaken by an auditing process controlling accurancy on the system operation, this guaranteeing product reliability.

Cam switches

Cam operated switches

A5 cam operated switches have been designed to operate as switch-disconnectors, main switches, load break switches, changeover switches, motor control switches,…

According to Standards

- IEC 60947-3
- UL 508

General characteristics

- Permits any electrical diagrams and makes the number of possible diagrams limitless.
- Abrupt breaking mechanism with 30, 45, 60 o 90° positions, according to diagram and requirements.
- Contact decks made of self-extinguishing polyester reinforced with glass fiber.
- Silver alloy low resistance contacts with high arcing and welding characteristics.
- Connection with protected cable clamps until 125A.
- Electrolytic treatment against oxidation of their ferrous components.
- High number of mechanical operations.
- According to RoHS standard.

General characteristics

Internal and external links

Simple "click" front plate fixing

Front plate designed for easy fixing by simple push-in on the mounting plate

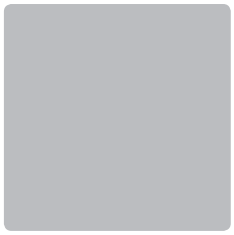
Factory assembled links. Insulated external links protect against direct contact on live parts

Metalic shaft

Optimal mechanical effort transmission on the operating cams based on the use of strong metalic shaft. V shape position indication

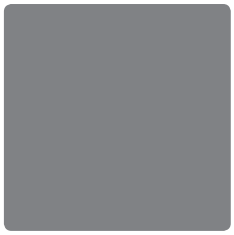
Marking

Product marked with permanent ink indicating reference and electrical characteristics



Insert bolts

Bolts inserted on the breaking mechanism making simple switch mounting, saving time and avoiding loose components



Clamp-yoke connection

Contact surfaces grooved for optimal grip and conductivity

Protection degree IP20

Terminals protected against solid objects up to 12,5mm according to IEC 60529

Plus/Minus Z screws

Reliability and maximum tihtening torque using Z bits

Reference system

Cam switches technology is typically defined by its large production flexibility permitting special solutions to multiple specific requirements that we find in the industrial world. These requirements are characterised by a variety of electrical schemes, large number of mounting possibilities and an assortment of accessories. Referencing tailor made solutions is determined by production units and will generate a constructive file permitting livelong tracking and future duplicates. Most common products can be ordered by standardised references as detailed on the following reference system description.

Serie

Rating

0 12 A	3 32 A	7 100 A	A 160 A
1 16 A	4 40 A	9 125 A	B 200 A
2 25 A	6 63 A		C 250 A

A - 552 2 1 0 0

Handle

- \- standar (switches only)
- A reverse colour to standard (switches only)
- B padlock locking (red / yellow)
- C padlock locking (grey / black)
- I front plate and screw handle in black
- N black colour in front plate and handle
- H lockout handle (red / yellow)
- J lockout handle (grey / black)

Electrical scheme

Mounting type

- 0 panel mounting
- 2 key lockable handle
- 3 key interlock
- 5 light indication
- 6 with undervoltage release
- 7 IP65 plastic enclosed switch
- 8 aluminium enclosed switch

Front plate type

- 0 standard
- \- without plate and handle

Size

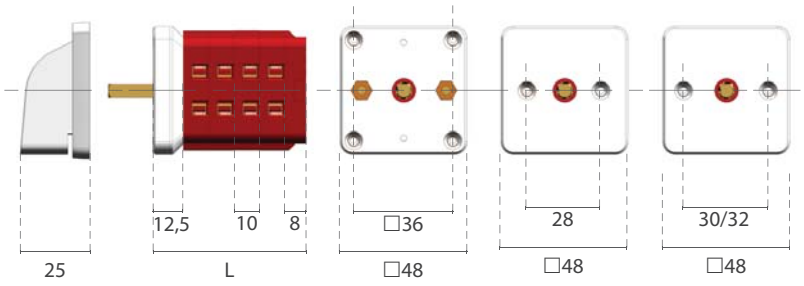
- 0 fixing 36 x 36
- 1 fixing 48 x 48
- 5 size 0 with front plate and handle size 1

Technical data

			size 0			size 1							
			12A	16A	25A	25A	32A	40A	63A	100A	125A	160A	200A	250A
thermal rating		Ith A	16	20	30	32	40	50	70	100	125	160	200	250
max. fuse protection (gG-aM)		In A	20	25	25	32	40	50	80	125	125	200	200	250
impulse voltage		Uimp KV	4	4	4	4	4	4	4	4	4	4	4	4
conditional shortcircuit current		Icc KA	6	6	6	6	6	6	8	8	8	-	-	-
operating voltage		Ue V~	690	690	690	690	690	690	690	690	690	690	690	690
insulating voltage		V~	690	690	690	690	690	690	690	690	690	690	690	690
insulating voltage		V…	400	400	400	600	600	600	600	600	600	600	600	600
operational rating		Ie A	12	16	25	25	32	40	63	100	125	160	200	250
wire section														
stranded		mm2	2,5 - 6	2,5 - 6	2,5 - 6	10 - 25	10 - 25	10 - 25	16 - 50	16 - 50	16 - 50	70	95	120
flexible		mm2	2,5 - 6	2,5 - 6	2,5 - 6	10 - 16	10 - 16	10 - 16	16 - 50	16 - 50	16 - 50	70	95	120
		AWG	10	10	10	6	6	6	6 - 1	6 - 1	6 - 1	00	000	250 kcmil
torque		Nm	1,6	1,6	1,6	2	2	2	3,5	3,5	3,5	6	6	6
connection screws			M4	M4	M4	M5	M5	M5	M8	M8	M8	M8	M8	M8
terminal														
AC 21	kW	3 x 230V	3	5,5	7,5	11	11	15	22	37	37	45	55	75
	dummy kW	3 x 400V	7,5	11	15	18,5	18,5	22	37	55	75	90	110	132
	cosØ >0,95 kW	3 x 500V	11	15	18,5	22	22	30	45	75	90	110	132	160
AC 22	kW	3 x 230V	2,2	4	7,5	7,5	7,5	11	22	30	30	37	45	55
	mixed load kW	3 x 400V	5,5	7,5	11	15	15	22	30	45	55	75	90	110
	0,65 <cosØ <0,95 kW	3 x 500V	7,5	11	15	18,5	18,5	22	37	55	75	90	110	132
AC 23	kW	3 x 230V	2,2	3	4	4,5	5,5	7,5	15	18,5	18,5	30	38	-
	motor load VA kW	3 x 400V	4	5,5	7,5	10	11	18,5	22	30	37	52	65	-
	0,45 <cosØ <0,65 kW	3 x 500V	5,5	7,5	11	12	15	22	30	37	45	65	80	-
AC 11	VA	3 x 110V	600	1000	1400	2000	2000	-	-	-	-	-	-	-
	circuit loads VA	3 x 230V	1200	2000	2800	4000	4000	-	-	-	-	-	-	-
	magnetic VA	3 x 430V	2000	3500	4800	7000	7000	-	-	-	-	-	-	-
UL 508 manual motor controller	1-phase 110-120V	hp	1	1,5	2	1,5	2	2	5	10	10	-	-	-
	1-phase 220-240V	hp	1,5	2	3	3	3	5	10	15	15	-	-	-
	3-phase 220-240V	hp	1	2	2	5	7,5	7,5	15	25	25	-	-	-
	3-phase 380-415V	hp	2	2	3	7,5	10	10	25	30	30	-	-	-
	3-phase 440-480V	hp	3	3	5	10	10	15	30	40	40	-	-	-
	3-phase 550-600V	hp	3	5	7	10	15	20	32	50	50	-	-	-

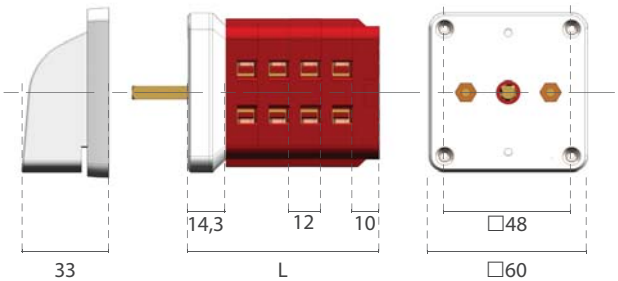
Dimensions standard connection

12A - 16A - 25A



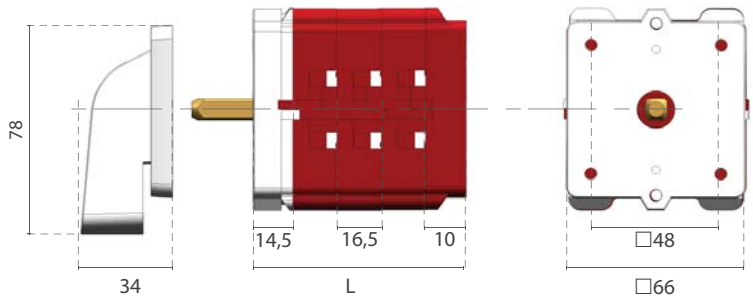
cells	1	2	3	4	5	6	7	8	9	10	11	12
length (L)	30,5	40,5	50,5	60,5	70,5	80,5	90,5	100,5	110,5	120,5	130,5	140,5

32A - 40A



cells	1	2	3	4	5	6	7	8	9	10	11	12
length (L)	36,3	48,3	60,3	72,3	84,3	96,3	108,3	120,3	132,3	144,3	156,3	168,3

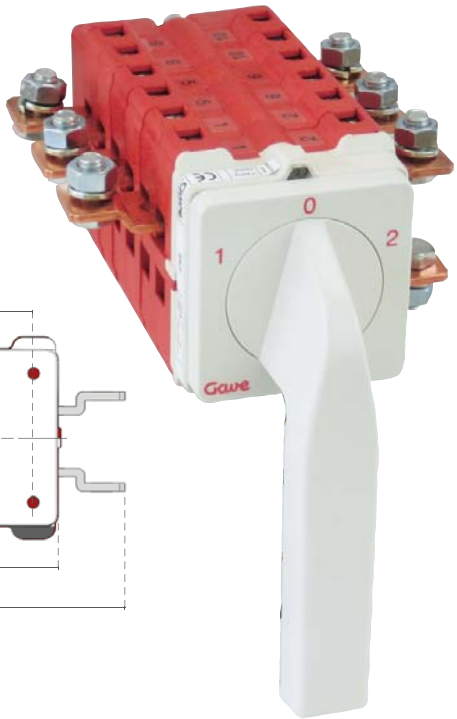
63A - 100A - 125A

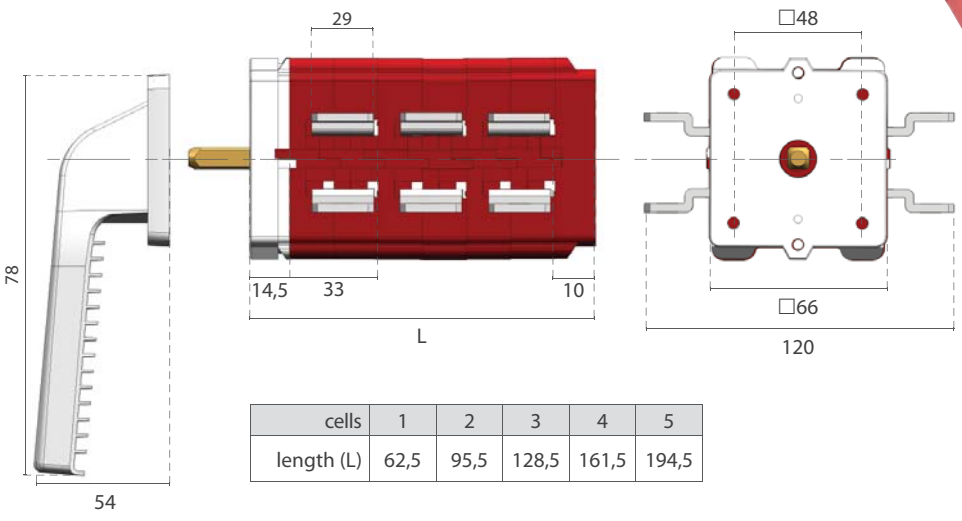


cells	1	2	3	4	5	6	7	8	9	10
length (L)	46,0	62,5	79,0	95,5	112,0	128,5	145,0	161,5	178,0	194,5

* lever handle on 100-125A switches

160A - 200A - 250A

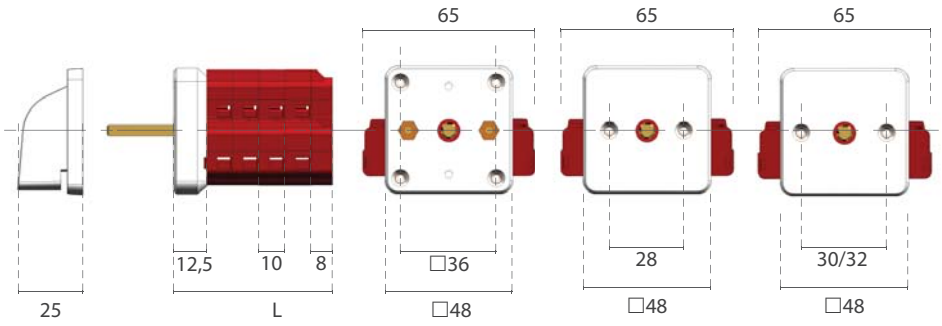




cells	1	2	3	4	5
length (L)	62,5	95,5	128,5	161,5	194,5

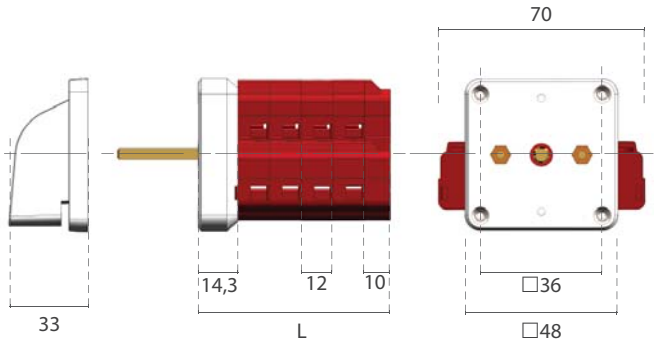
Dimensions lateral connection

12A - 16A - 25A



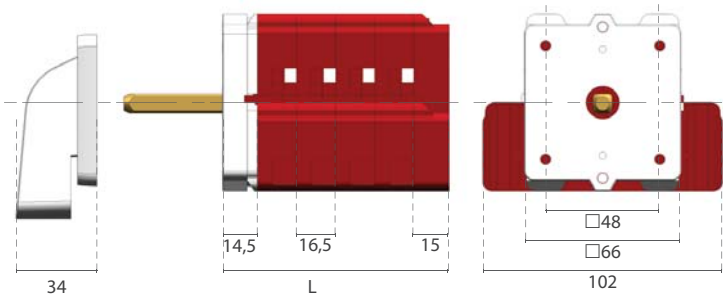
cells	1	2	3	4	5	6	7	8	9	10	11	12
length (L)	30,5	40,5	50,5	60,5	70,5	80,5	90,5	100,5	110,5	120,5	130,5	140,5

32A - 40A



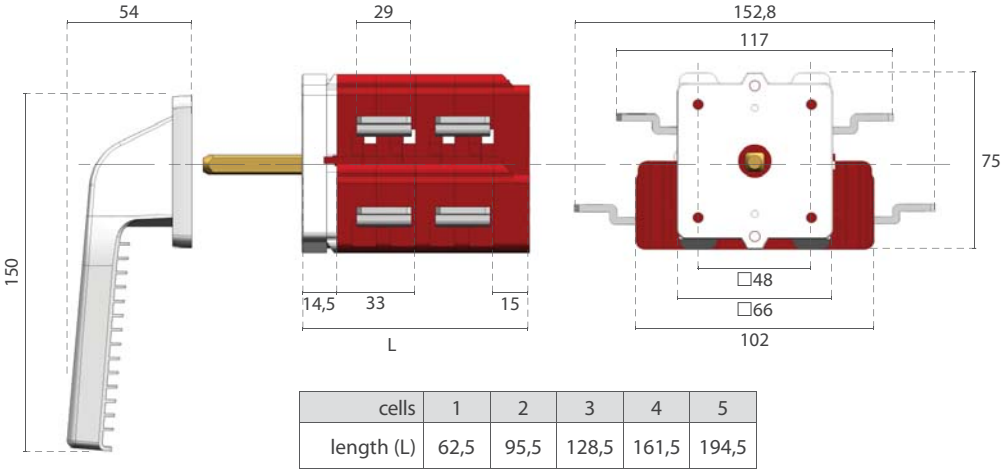
cells	1	2	3	4	5	6	7	8	9	10	11	12
length (L)	36,3	48,3	60,3	72,3	84,3	96,3	108,3	120,3	132,3	144,3	156,3	168,3

63A - 100A - 125A



cells	1	2	3	4	5	6	7	8	9	10
length (L)	46,0	62,5	79,0	95,5	112,0	128,5	145,0	161,5	178,0	194,5

160A - 200A - 250A



cells	1	2	3	4	5
length (L)	62,5	95,5	128,5	161,5	194,5

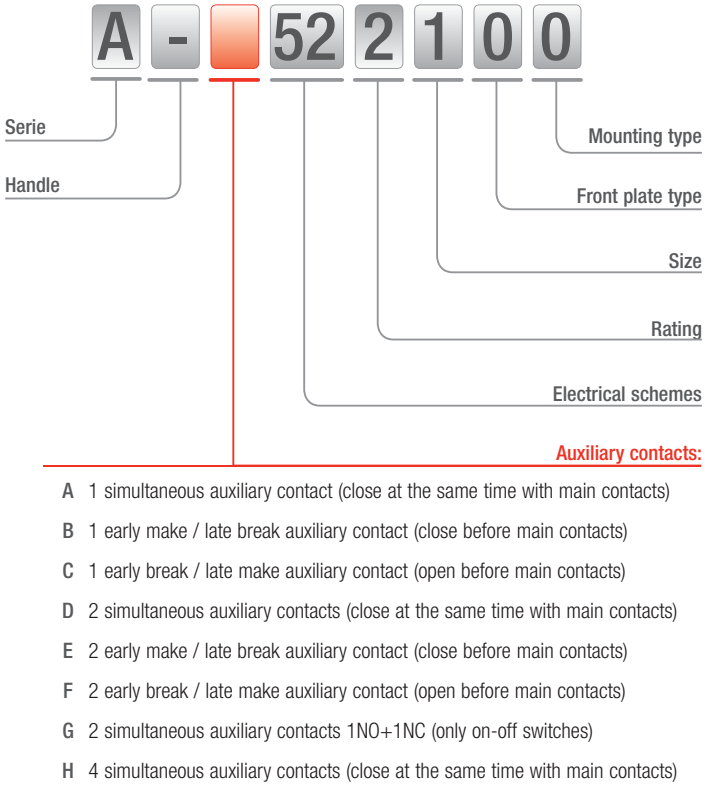
Auxiliary contacts

General characteristics

- On 55x, 56x and 57x electrical references
- Auxiliary contact 12A
- Mounted on independent cells

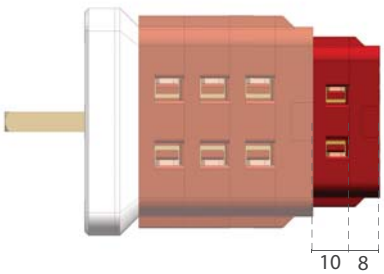
Reference system

The first digit on the electrical scheme is exchanged by a letter indicating the auxiliary contact type.

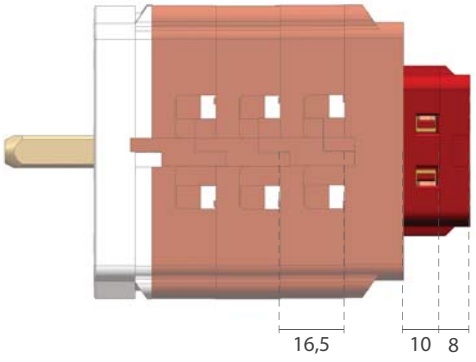


Dimensions

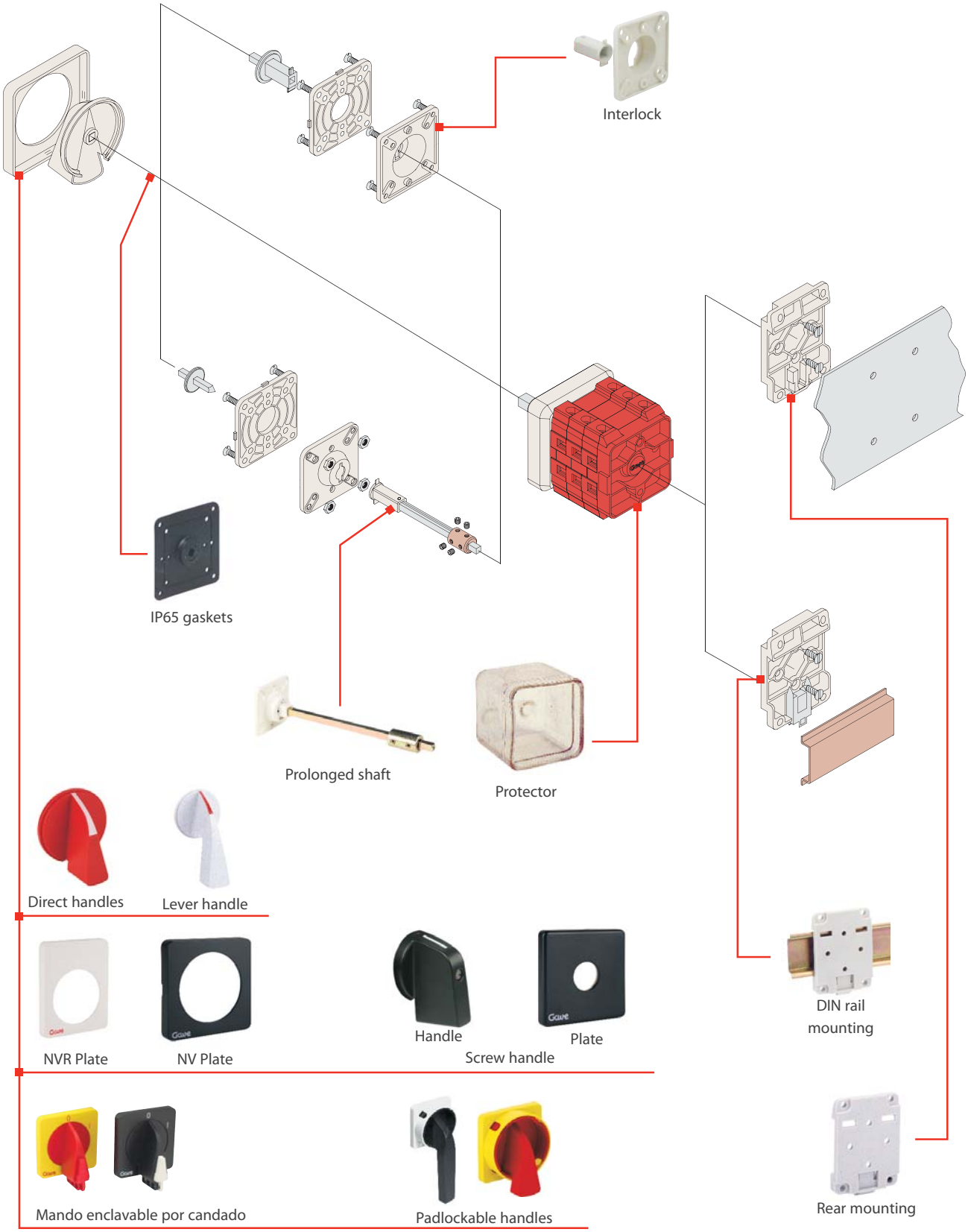
Size 1



Size 2



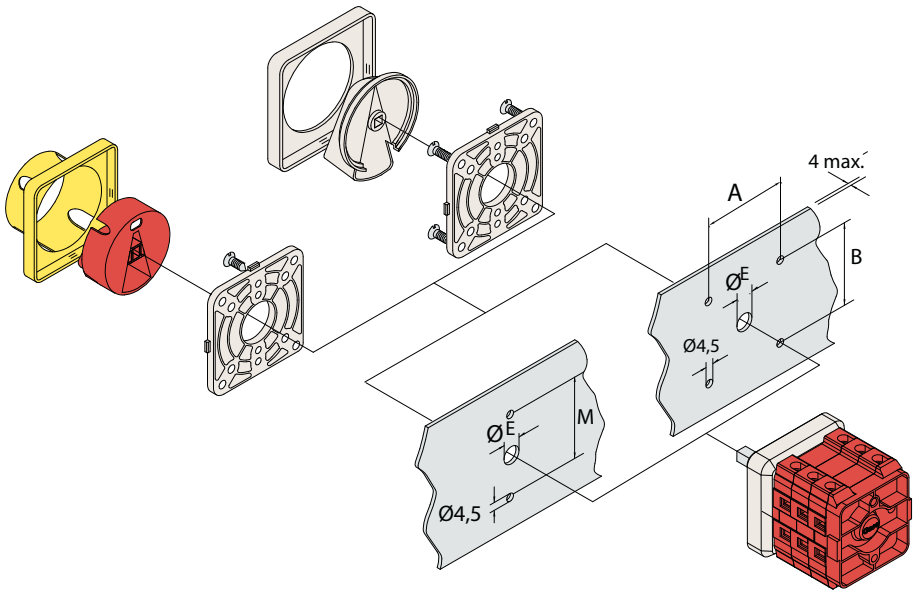
Mounting possibilities



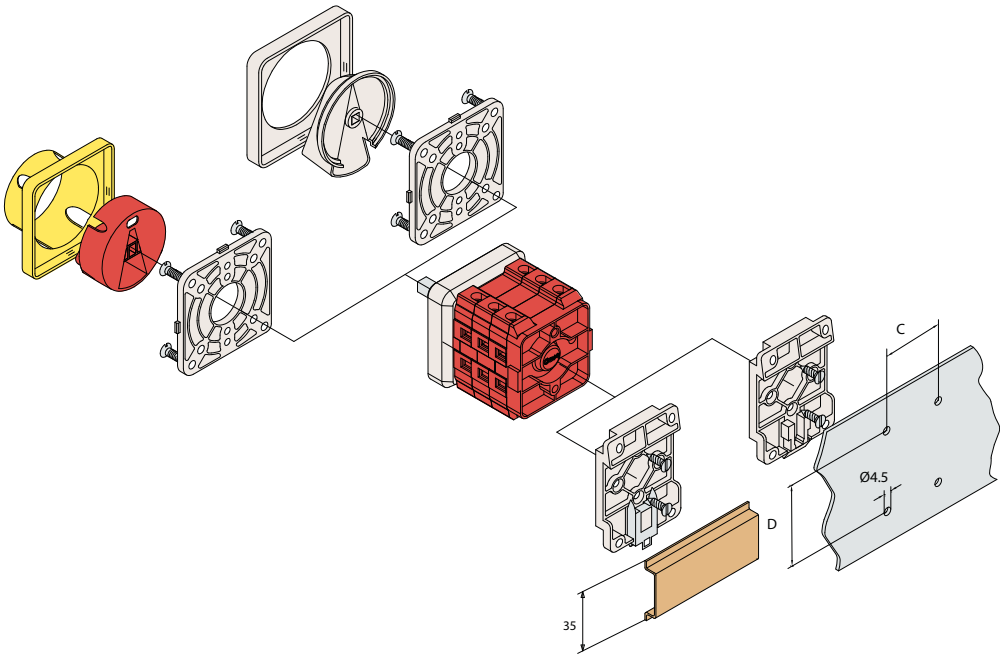
Mounting schemes

Direct mounting

frontal mounting

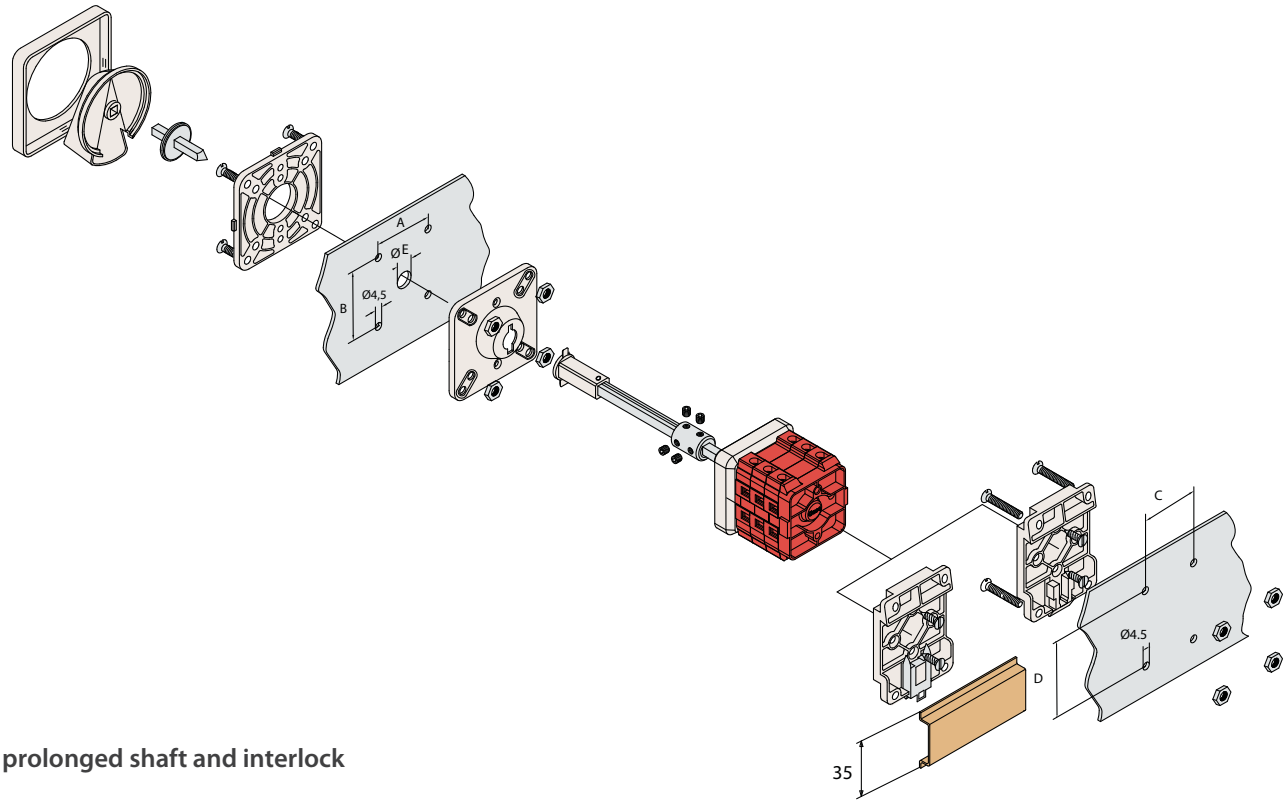


DIN rail or rear mounting

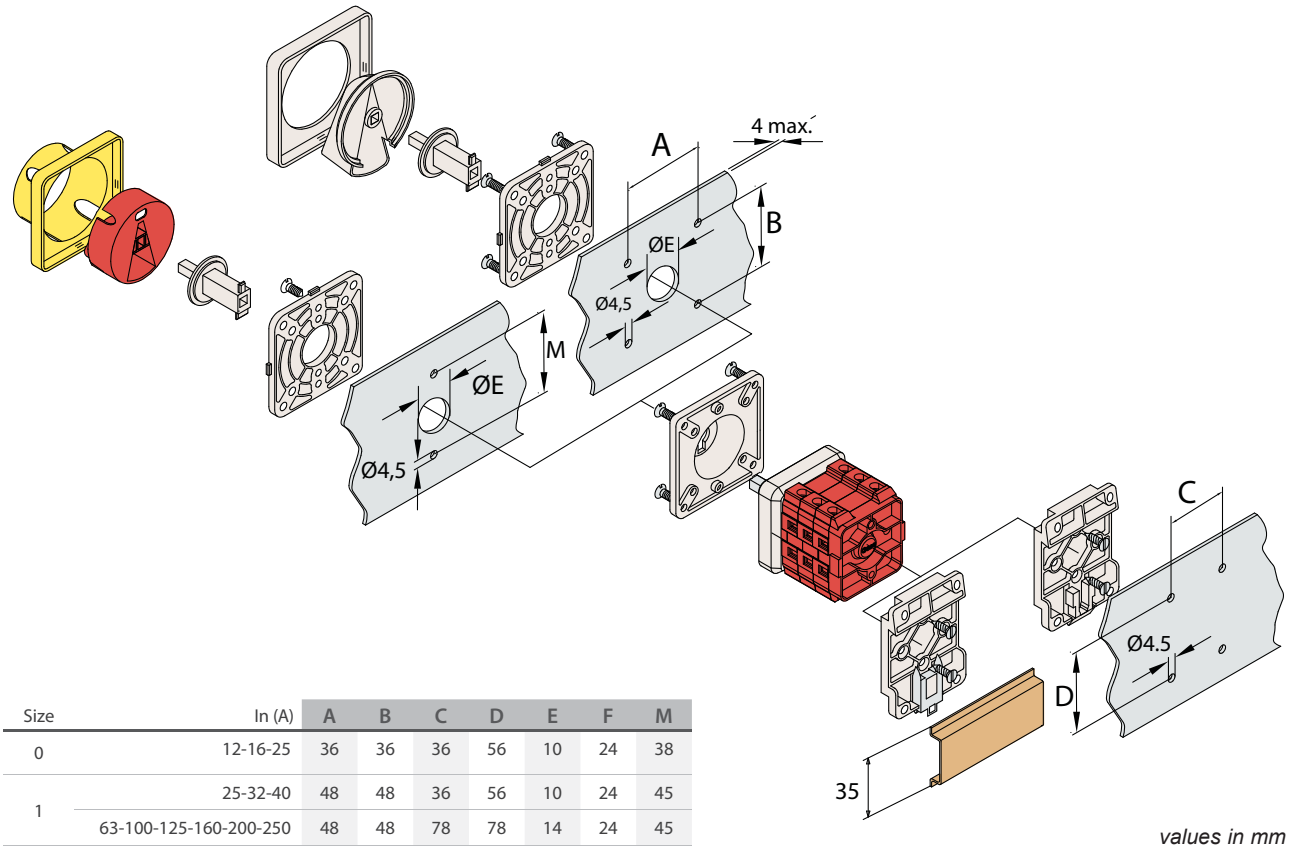


Interlock mounting

interlock



prolonged shaft and interlock



Size	In (A)	A	B	C	D	E	F	M
0	12-16-25	36	36	36	56	10	24	38
1	25-32-40	48	48	36	56	10	24	45
	63-100-125-160-200-250	48	48	78	78	14	24	45

values in mm

Special mountings

Mechanical red/green flag indicator

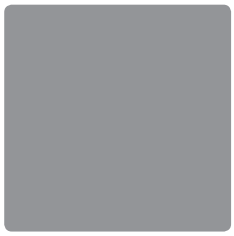
Characteristics	availability		
	size 0	size 1	size 5
central red/green flag indicates latest executed operation. Mounting from origin		●	●

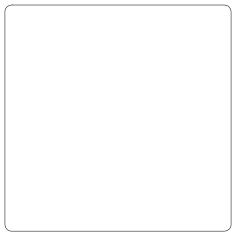
Voltage selector lock

Characteristics	availability		
	size 0	size 1	size 5
front plate and handle with screw insert lock that allows operation from position 0 to 220 or 380		● (up to 40A)	●

Push and turn

Characteristics	availability		
	size 0	size 1	size 5
to operate the switch into a specific position is required to push the handle and turn	●	●	





Key operating padlock

Characteristics	availability		
	size 0	size 1	size 5
standard key removable and lockable up to four different positions. Mounting from origin	●	● (up to 40A)	●
security KABA key removable and lockable only in on position. Mounting from origin		● (up to 40A)	●

Light indication

Characteristics	availability		
	size 0	size 1	size 5
frontplate with red pilot light at 380V. Mounting from origin	●	● (up to 40A)	●

Unidirectional

Characteristics	availability		
	size 0	size 1	size 5
allows to operate in a single direction	●	●	

Special mountings

Key interlock

Characteristics	availability		
	size 0	size 1	size 5
key removable and lockable in all positions		●	●

Switch lock mounting

Characteristics	availability		
	size 0	size 1	size 5
one position in main switch locks operation on secondary switch		● (up to 40A)	●

Tandem operation

Characteristics	availability		
	size 0	size 1	size 5
switches above 24 contacts		● (up to 40A)	●

Push button interlock

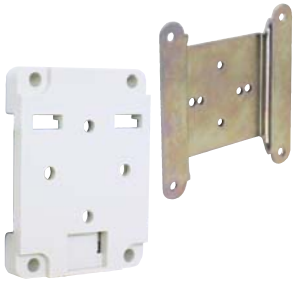
Characteristics	availability		
	size 0	size 1	size 5
push button releases cam switch handle always with DIN rail		● (up to 40A)	●

Mounting and installation accessories and options

length L non standard

Special shafts

Characteristics	availability		
	size 0	size 1	size 5
Custom made shaft length Specific material construction	●	● (up to 40A)	●



Base mounting plates

References	availability		
	size 0	size 1	size 5
AK0000003	●	● (up to 40A)	●
AK0000006		● (63-250A)	

DIN rail mounting plates

References	availability		
	size 0	size 1	size 5
AK0100007	●	● (up to 40A)	●

Prolonged shaft

References	Length	availability		
		size 0	size 1	size 5
AK0800003	200 mm	●	● (up to 40A)	●
AK0800006	200 mm		● (63-250A)	

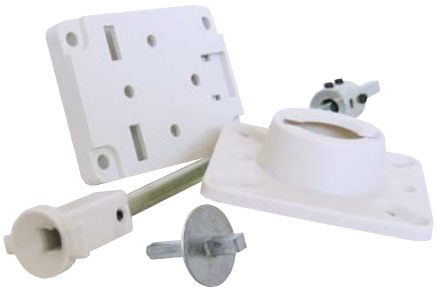
Allen screws

Characteristics	availability		
	size 0	size 1	size 5
Allen screws for improved access		● (63-250A)	

Gold contacts

Characteristics	availability		
	size 0	size 1	size 5
gold plated contacts for low voltages	●		

Clutches



Devices that permit back plate or DIN rail switch mounting while keeping with external handle operation. The handle unit detaches from the rotary shaft when opening the panel door. Compatible with direct handle and padlockable handle.
The assembly kits are supplied with rear mounting plate or DIN rail mounting plate.
The kit without interlock permits panel door opening in all positions.
The kit with interlock increases assembly safety permitting panel door opening uniquely on 0 disconnect position. It is specially adequate on main switch or safety switch functions.

Kit without interlock

References	Shaft	Mounting plate	availability		
			size 0	size 1	size 5
AK0230003	-	rear	●	● (up to 40A)	●
AK0230006	-	rear		● (63-200A)	
AK1630003	200 mm	rear	●	● (up to 40A)	●
AK1630006	200 mm	rear		● (63-200A)	
AK0240003	-	DIN rail	●	● (up to 40A)	●
AK0240006	-	DIN rail		● (63-200A)	
AK1640003	200 mm	DIN rail	●	● (up to 40A)	●
AK1640006	200 mm	DIN rail		● (63-200A)	

Kit with interlock

References	Shaft	Mounting plate	availability		
			size 0	size 1	size 5
AK0330003	-	rear	●	● (up to 40A)	●
AK0330006	-	rear		● (63-200A)	
AK1730003	200 mm	rear	●	● (up to 40A)	●
AK1730006	200 mm	rear		● (63-200A)	
AK0340003	-	DIN rail	●	● (up to 40A)	●
AK0340006	-	DIN rail		● (63-200A)	
AK1740003	200 mm	DIN rail	●	● (up to 40A)	●
AK1740006	200 mm	DIN rail		● (63-200A)	

See mounting schemes at page 22-23

Handles and sets

Handles

References	Colour	availability		
		size 0	size 1	size 5
AK1000010	grey	●		
AK1000020	red	●		
AK1000040	black	●		
AK1000011	grey		●	
AK1000021	red		●	
AK1000041	black		●	
AK1000016	grey		● (63-100A)	
AK1000026	red		● (63-100A)	
AK1000046	black		● (63-100A)	

Screw handles

References	Colour	availability		
		size 0	size 1	size 5
AK1010040	black	●		
AK1010041	black		● (up to 40A)	
AK1010046	black		● (63-100A)	

Lever handles

References	Colour	availability		
		size 0	size 1	size 5
AK1000010	grey		● (up to 40A)	
AK1000020	red		● (up to 40A)	
AK1000016	grey		● (63-200A)	
AK1000026	red		● (63-200A)	
AK1000046	black		● (63-200A)	

see page 24

Front plate and handle set
Voltage selector lock

References	availability		
	size 0	size 1	size 5
AK2700010		● (up to 40A)	
AK2700046		● (63-100A)	

Front plate and handle set
Padlockable handle

References	Colour	Mando	availability		
			size 0	size 1	size 5
AK1200523	red/yellow	Short	●	● (up to 40A)	●
AK1200526	red/yellow	Long		● (63-125A)	
AK1200528	red/yellow	Lever		● (160-200A)	
AK1200143	black/grey	Short	●	● (up to 40A)	●
AK1200146	black/grey	Long		● (63-125A)	
AK1200148	black/grey	Lever		● (160-200A)	

Front plate and handle set
Lockout handle

References	Colour	availability		
		size 0	size 1	size 5
AK1300523	red/yellow	●		
AK1300143	black/grey	●		

Plates and inscriptions

NV plates (without inscriptions)

References	Colour	availability		
		size 0	size 1	size 5
AK1800100	grey	●		
AK1800200	red	●		
AK1800400	black	●		
AK1830400	black and screw fixing	●		
AK1800104	grey		●	●
AK1800204	red		●	●
AK1800404	black		●	●
AK1830404	black and screw fixing		●	●

NVR plates (without inscriptions)

References	Colour	availability		
		size 0	size 1	size 5
AK1900100	grey	●		
AK1900200	red	●		
AK1900104	grey		●	●
AK1900204	red		●	●

Protection accessories

Protectors

References	Cells	availability		
		size 0	size 1	size 5
AK0601000	1 and 2 cells	●		
AK0602000	3 to 5 cells	●		
AK0603000	6 to 8 cells	●		
AK0601001	1 and 2 cells		●	●
AK0602001	3 to 5 cells		●	●
AK0603001	6 to 8 cells		●	●

IP65 gaskets

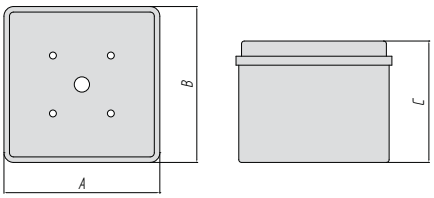
References	availability		
	size 0	size 1	size 5
AK2240003	●	● (up to 40A)	●
AK2240006		● (63-250A)	●

Terminal shrouds

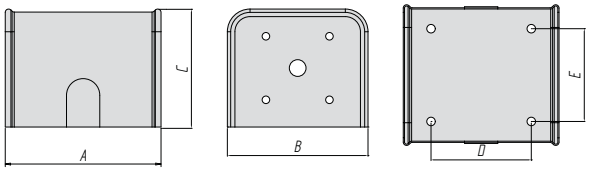
References	Cells	availability		
		size 0	size 1	size 5
AK0702009	2 cells		● (160-250A)	
AK0703009	3 cells		● (160-250A)	
AK0704009	4 cells		● (160-250A)	

Enclosures

IP55 Plastic enclosure

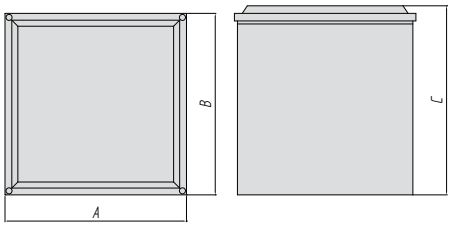


References	Cells	dimensions			availability		
		A	B	C	size 0	size 1	size 5
AK1401000	1 to 6 cells	113	113	88	●		
AK1401001	1 to 4 cells	113	113	88		● (up to 40A)	●



IP40 Metal enclosure

References	Cells	dimensions					availability		
		A	B	C	D	E	size 0	size 1	size 5
AK0901000	1 to 6 cells	103	93	82	80	67	●		
AK0902001	1 to 4 cells	103	93	82	80	67		● (up to 40A)	●
AK0903001	5 to 10 cells	103	93	62	80	67		● (up to 40A)	●
AK0904001	7 to 12 cells	103	93	62	80	67		● (up to 40A)	●



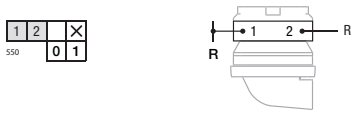
IP65 Aluminium enclosure

References	Cells	dimensions			availability		
		A	B	C	size 0	size 1	size 5
AK1501000	1 and 2 cells	110	110	50		● (up to 40A)	●
AK1501000	1 to 3 cells	110	110	50			●
AK1501001	3 to 8 cells	110	110	120		● (up to 40A)	●
AK1501001	4 to 10 cells	110	110	120			●
AK1502006	1 to 5 cells	200	300	105		● (63-125A)	

Standard electrical schemes

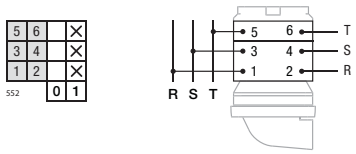
Switches

550 — 1 pole 1 cell

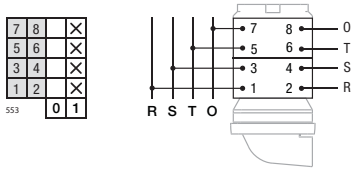


551 — 2 poles 1 cell

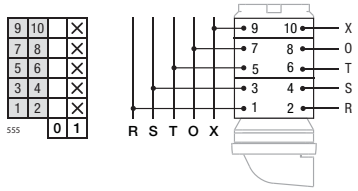
552 — 3 poles 2 cells



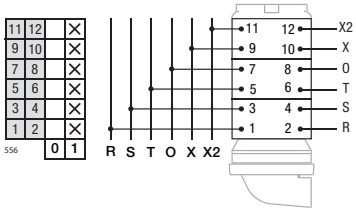
553 — 4 poles 2 cells



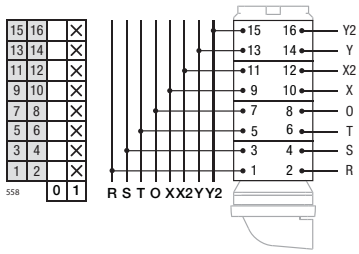
555 — 5 poles 3 cells



556 — 6 poles 3 cells

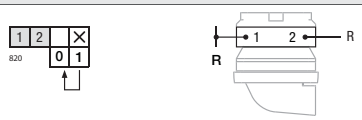


558 — 8 poles 4 cells

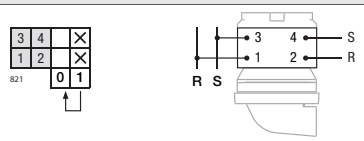


Switches spring return to off

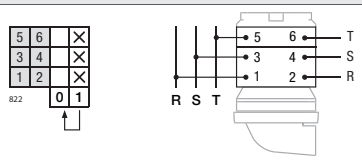
820 — 1 poles 1 cell



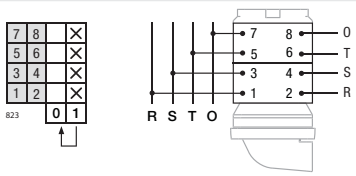
821 — 2 poles 1 cell



822 — 3 poles 2 cells

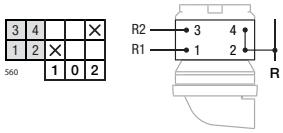


823 — 4 poles 2 cells

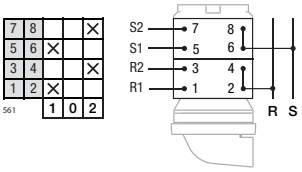


Changeover switches with off position

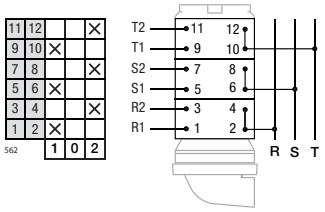
560 — 1 pole, 1 cell



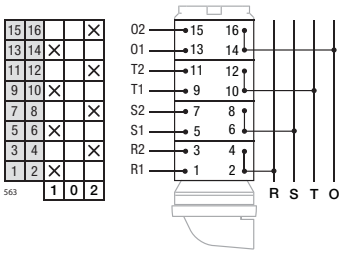
561 — 2 poles, 2 cells



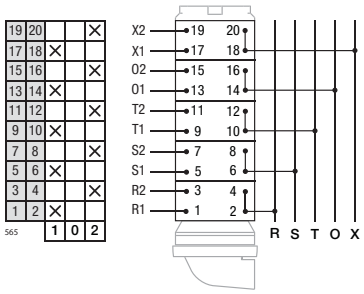
562 — 3 poles, 3 cells



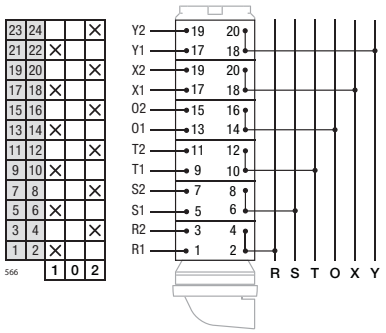
563 — 4 poles, 4 cells



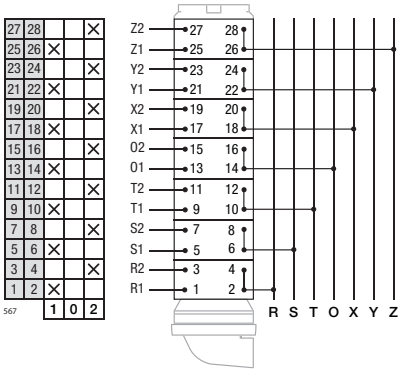
565 — 5 poles, 5 cells



566 — 6 poles, 6 cells



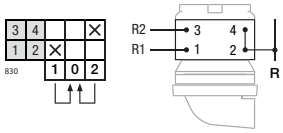
567 — 7 poles, 7 cells



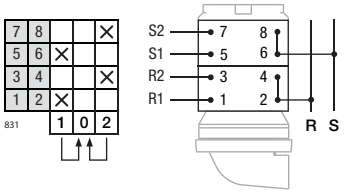
Standard electrical schemes

Changeover switches spring return to off

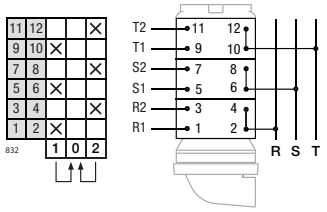
830 — 1 pole 1 cell



831 — 2 poles 2 cells

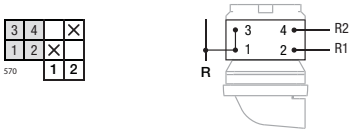


832 — 3 poles 3 cells

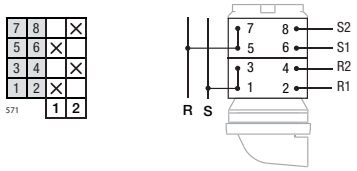


Changeover switches without off position

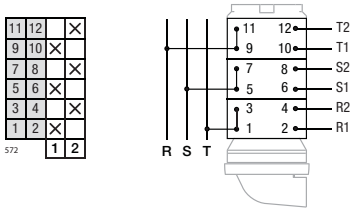
570 — 1 pole 1 cell



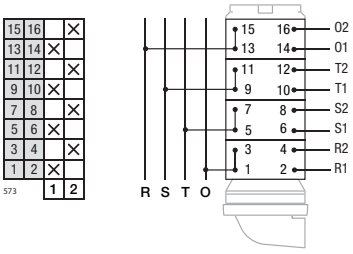
571 — 2 poles 2 cells



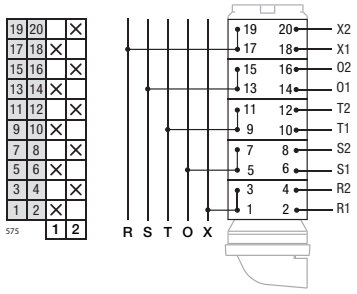
572 — 3 poles 3 cells



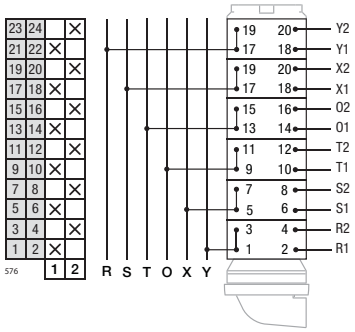
573 — 4 pole 4 cells



575 — 5 poles 5 cells

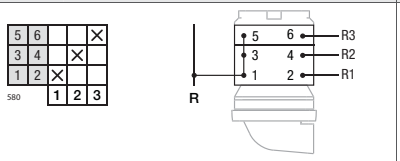


576 — 6 poles 6 cells

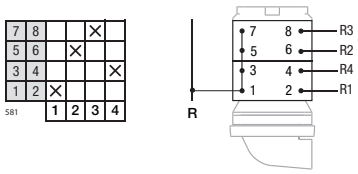


Step switches without off position
SINGLE POLE

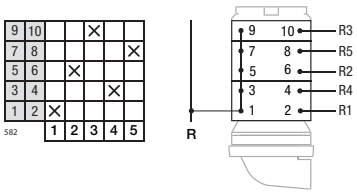
580 — 3 positions, 2 cells



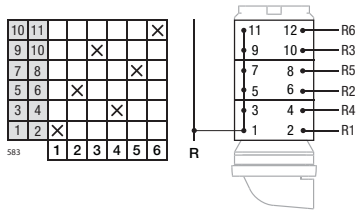
581 — 4 positions, 2 cells



582 — 5 positions, 3 cells

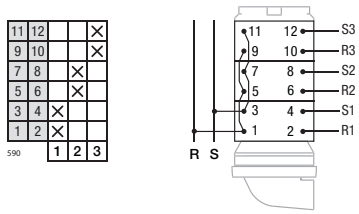


583 — 6 positions, 3 cells

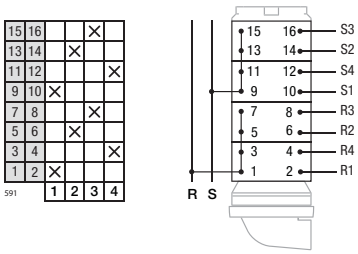


DOUBLE POLE

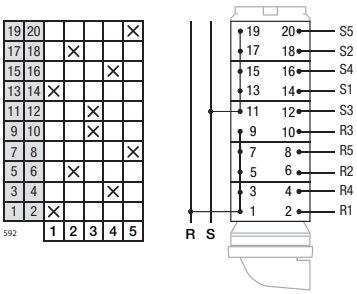
590 — 3 positions, 3 cells



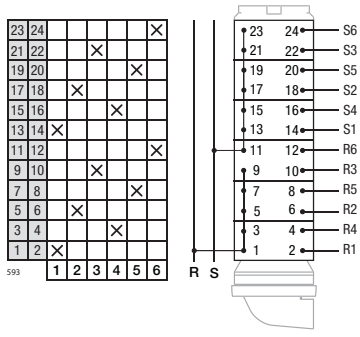
591 — 4 positions, 4 cells



592 — 5 positions, 5 cells



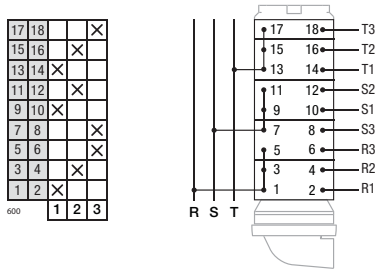
593 — 6 positions, 6 cells



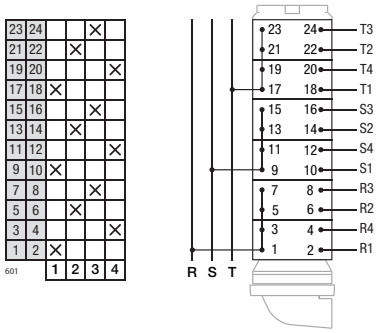
Standard electrical schemes

Step switches without off position
TRIPLE POLE

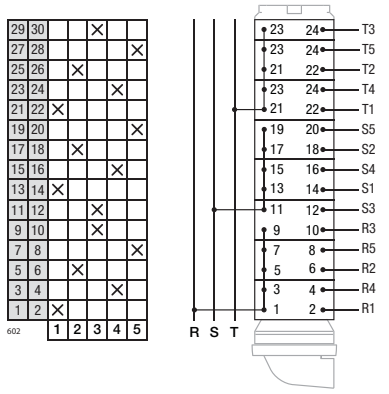
600 — 3 positions, 5 cells



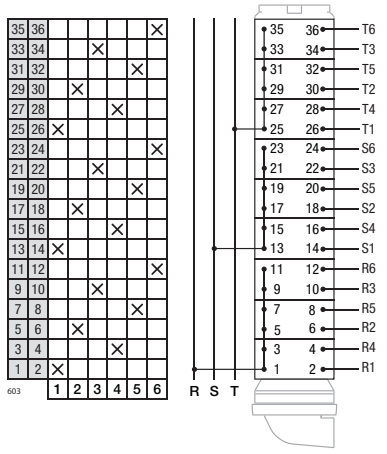
601 — 4 positions, 6 cells



602 — 5 positions, 8 cells

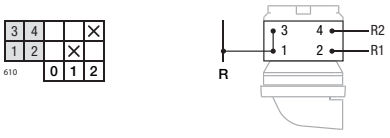


603 — 6 positions, 9 cells

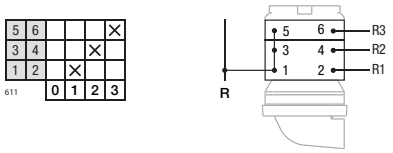


Step switches with off position
SINGLE POLE

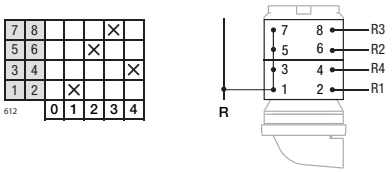
610 — 2 positions, 1 cell



611 — 3 positions, 2 cells

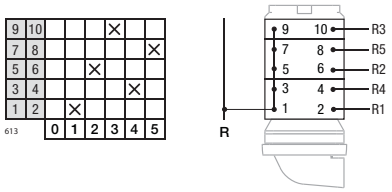


612 — 4 positions, 2 cells

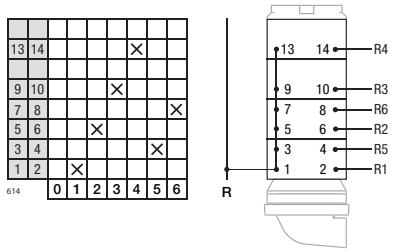


Step switches with off position
SINGLE POLE

613 — 5 positions, 3 cells

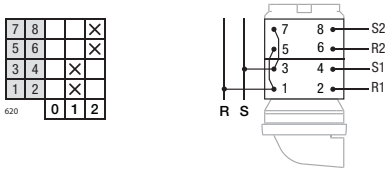


614 — 6 positions, 4 cells

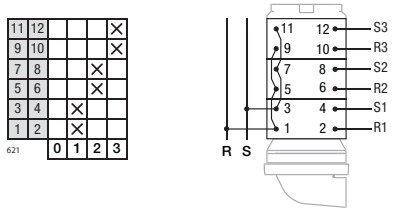


DOUBLE POLE

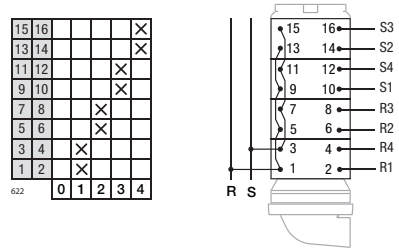
620 — 2 positions, 2 cells



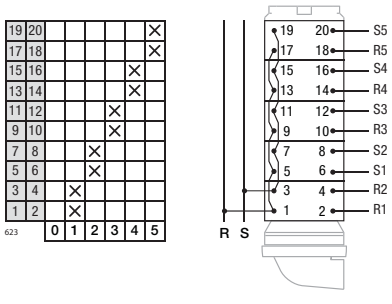
621 — 3 positions, 3 cells



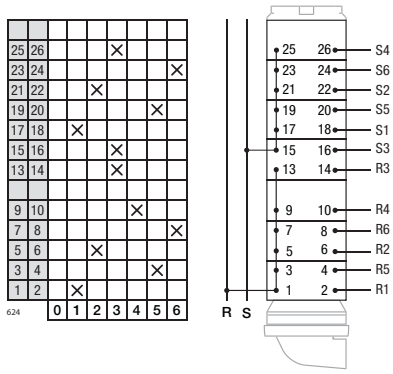
622 — 4 positions, 4 cells



623 — 5 positions, 5 cells



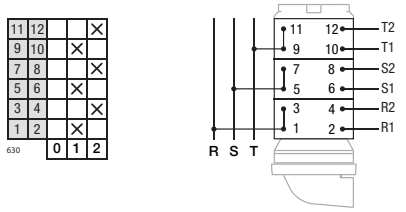
624 — 6 positions, 7 cells



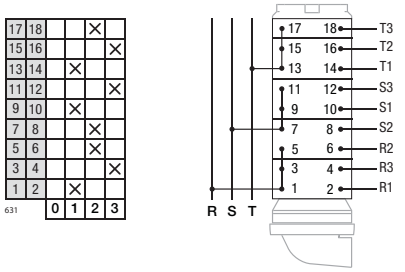
Standard electrical schemes

Step switches with off position
TRIPLE POLE

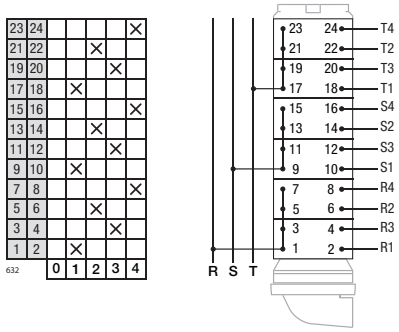
630 — 2 positions, 3 cells



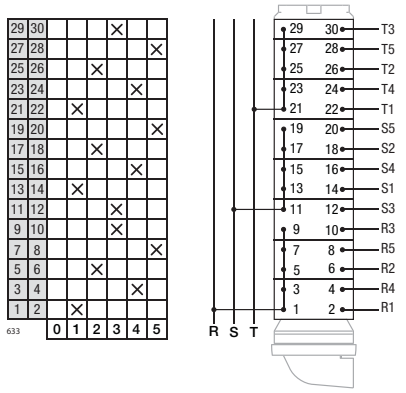
631 — 3 positions, 5 cells



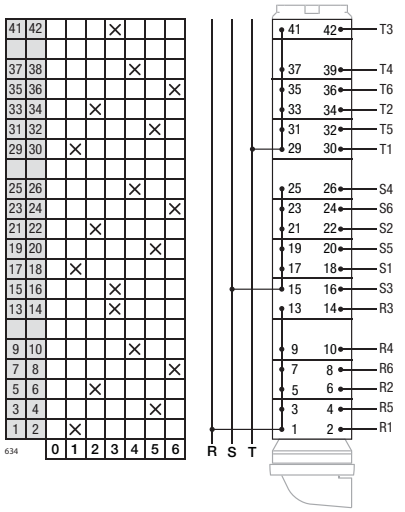
632 — 4 positions, 6 cells



633 — 5 positions, 8 cells

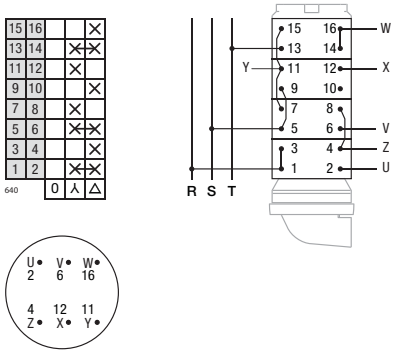


634 — 6 positions, 11 cells

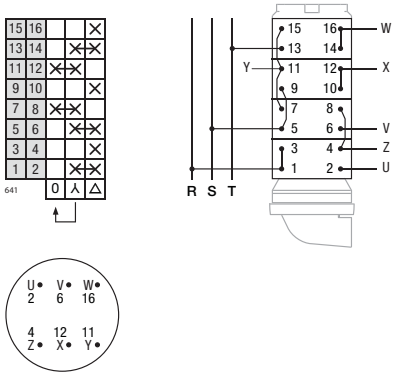


Star-delta changeover switches

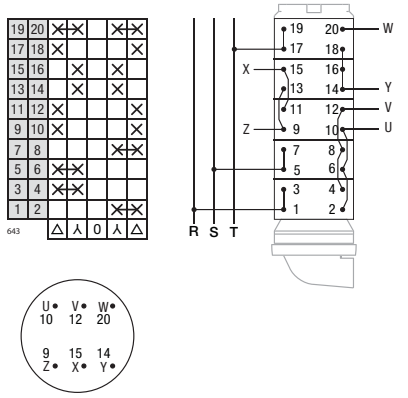
640 — 3 positions, 4 cells



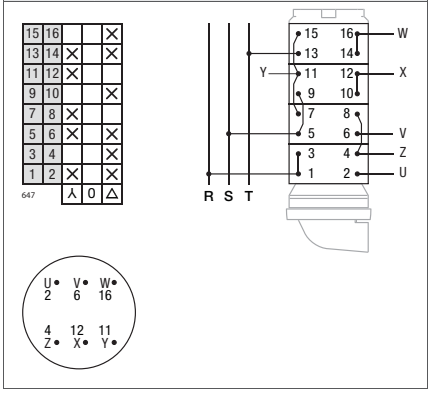
641 — 3 positions, 4 cells



643 — 5 positions, 5 cells

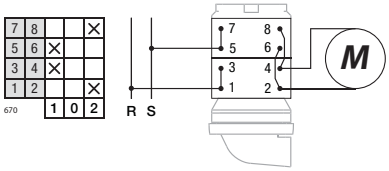


647 — 3 positions, 4 cells

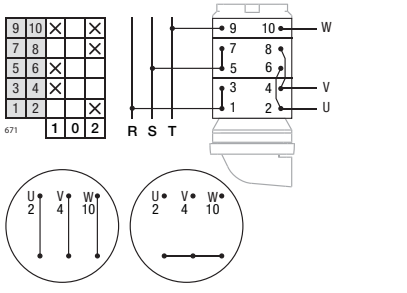


Reversing switches

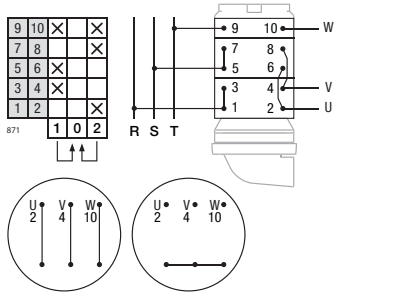
670 — 2 poles, 2 cells



671 — 3 poles, 3 cells



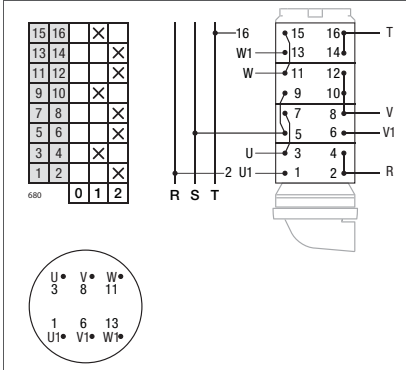
871 — 3 poles, 3 cells



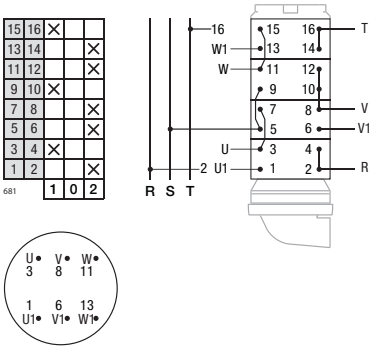
Standard electrical schemes

Pole changing switches for 2 speeds

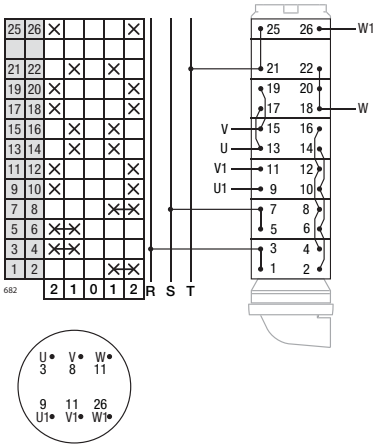
680 — 3 positions, 4 cells



681 — 3 positions, 4 cells

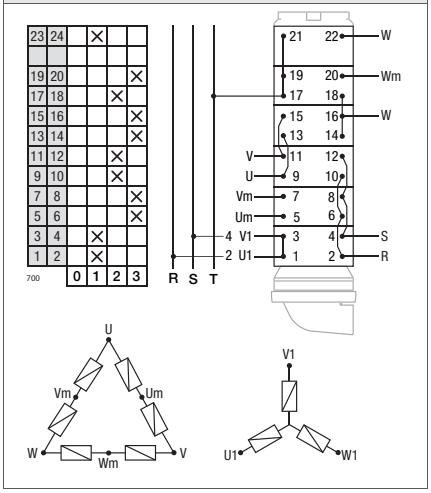


682 — 3 positions, 7 cells



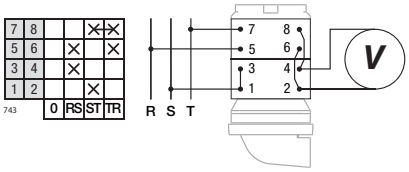
Pole changing switches for 3 speeds

700 — 4 positions, 6 cells

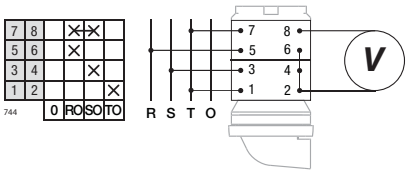


Voltmeter changeover switches

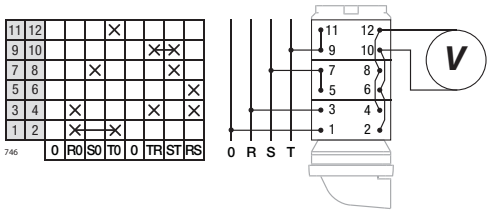
743 — 3 phases 2 cells



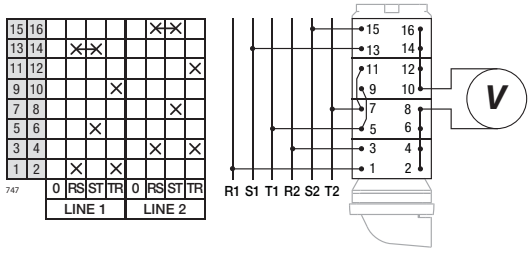
744 — 3 phases + N 2 cells



746 — 3 phases + N 4 cells



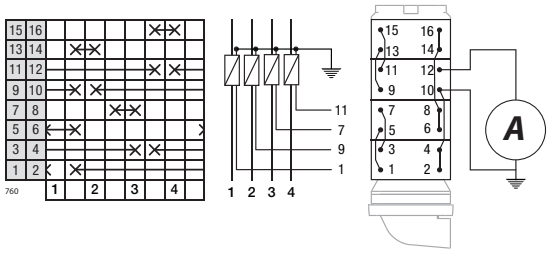
747 — 3 phases 4 cells



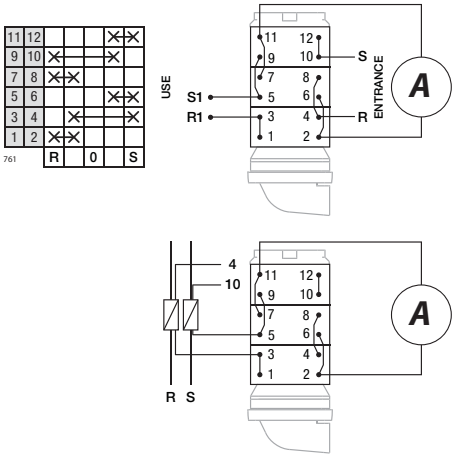
Standard electrical schemes

Ammeter changeover switches

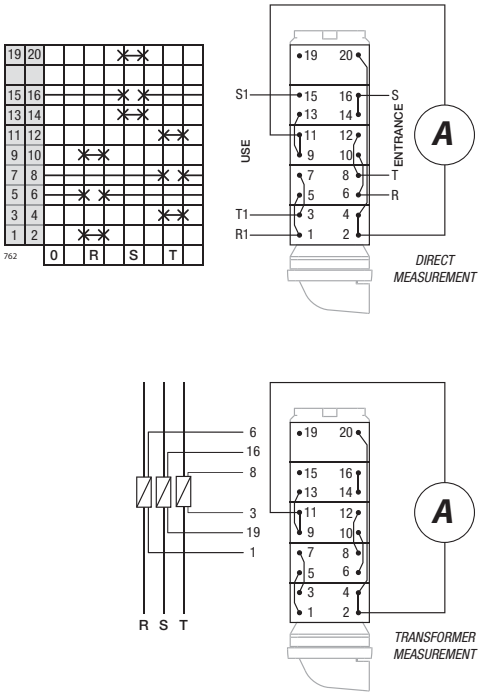
760 4 phases 4 cells



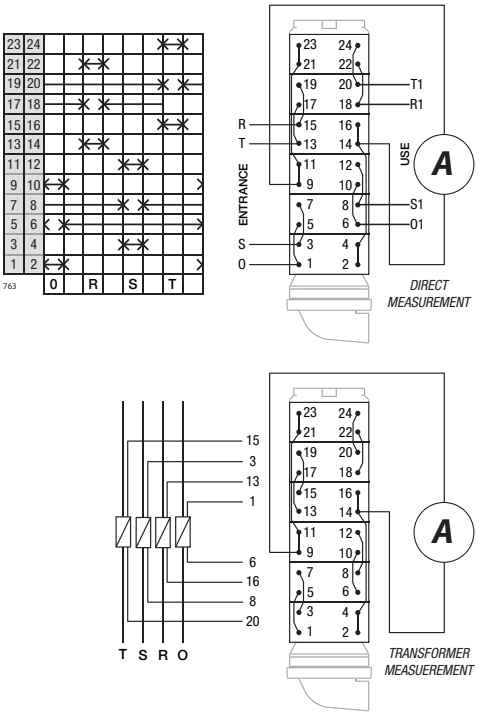
761 2 phases 3 cells



762 3 phases 5 cells

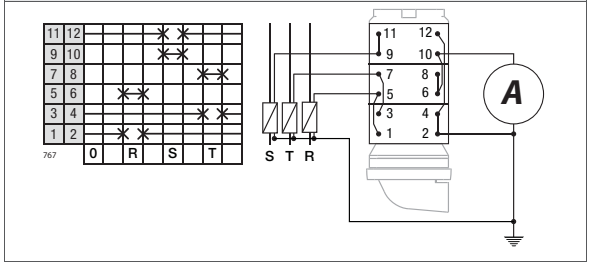


763 3 phases+ N 6 cells



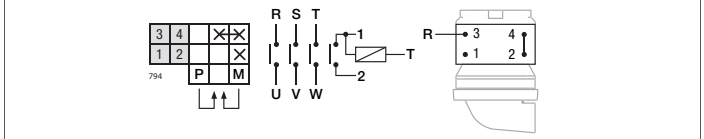
Ammeter changeover switches

767 3 phases 3 cells

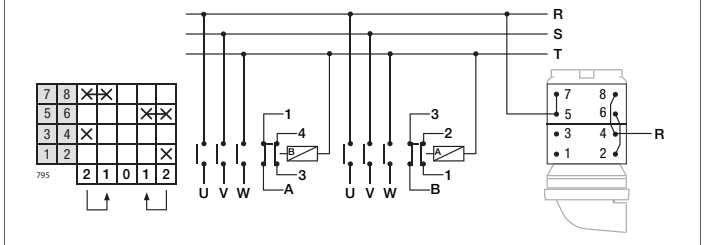


Manipulator changeover switches

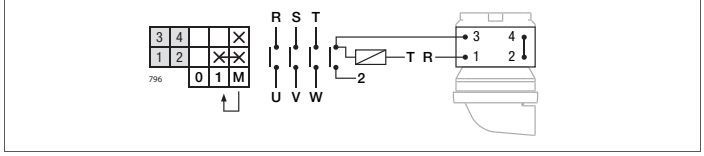
794 load-break 1 cell



795 selector 2 cells



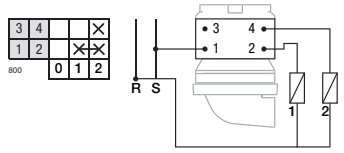
796 0-1 load 1 cell



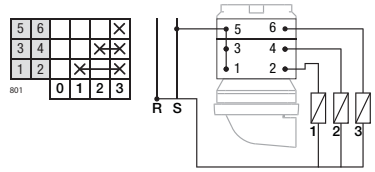
Standard electrical schemes

Group changeover switches

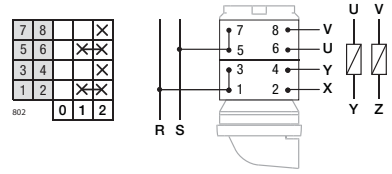
800 two selectors 1 cell



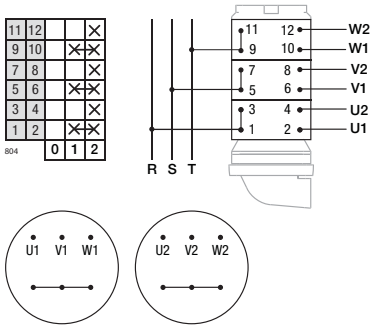
801 three selectors 2 cells



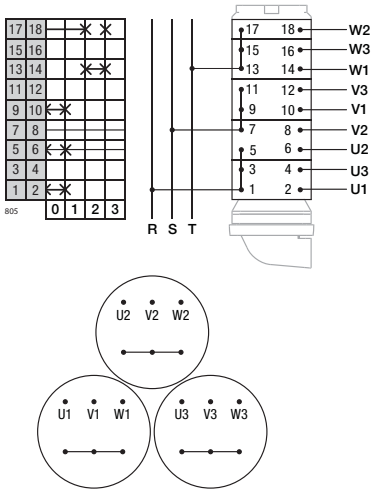
802 two selectors 2 cells



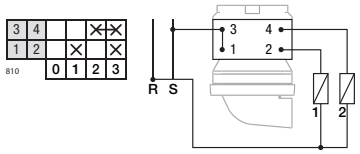
804 two selectors 3 cells



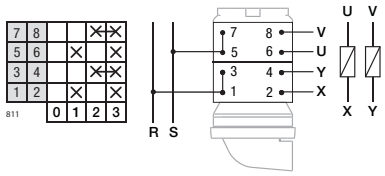
805 three selectors 5 cells



810 two selectors 1 cell

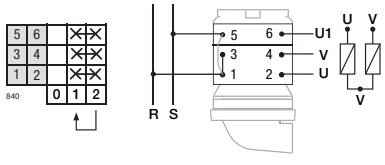


811 two selectors 2 cells



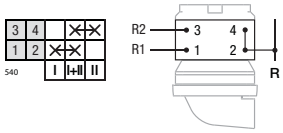
Circuit breaker for motor starting

840 2 poles 2 cells

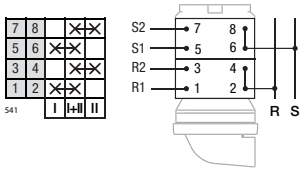


Overlapping changeover switches

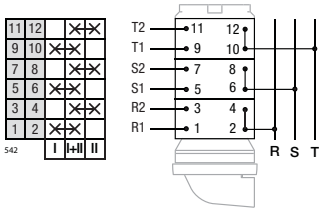
540 — 1 pole, 1 cell



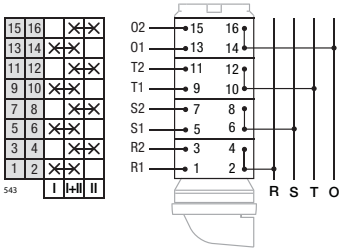
541 — 2 poles, 2 cells



542 — 3 poles, 3 cells

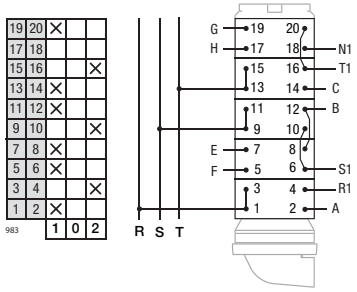


543 — 4 poles, 4 cells

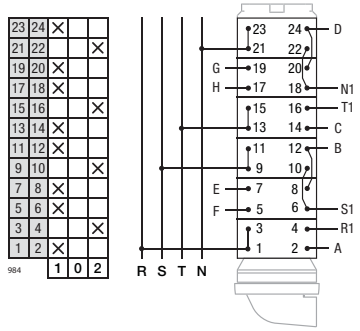


By-Pass changeover switches

983 — 4 poles, 4 cells



984 — 4 poles, 6 cells



Special diagrams

Photocopy and complete the following form to request special diagrams.

Gave

Reference _____ **Number of units** _____

Customer _____

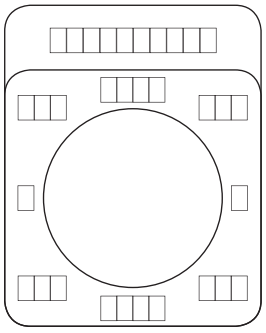
Plate inscription	Outside connections: 1 3 · 2 4	5 7 · 6 8	9 11 · 10 12	13 15 · 14 16	17 19 · 18 20	21 23 · 22 24	25 27 · 26 28	29 31 · 30 32	33 35 · 34 36	37 39 · 38 40	41 43 · 42 44	45 47 · 46 48
	Inside connections											

Legend

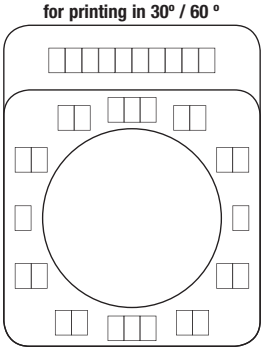
Inside connections
- × close contact
- close contact in different positions with no interruption
- return form the last position to the previous on

Outside connections
- bridge

maximum number of characters for printing in 45º / 90 º



maximum number of characters for printing in 30º / 60 º



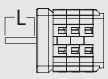
Operation rating Ie (A)

Size 0	*Size 1*		
☐ 12	☐ 25	☐ 125	
☐ 16	☐ 32	☐ 160	
☐ 25	☐ 40	☐ 200	
	☐ 63	☐ 250	
	☐ 100		

Prolonged shaft

☐ Special long shaft

Length (L): _____ mm



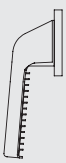
Comments

Handle type

short

☐ Black ☐ Red ☐ Grey

Lever



☐ Black ☐ Red ☐ Grey

NOTE: Contacts order and switching angle might change due to constructional reasons.

Main switches with undervoltage release

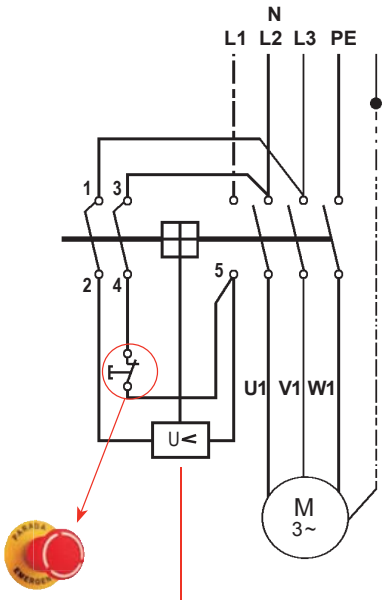
Undervoltage release switches have as a main function to guarantee user safety avoiding risks associated to power failure. They are multipole manually operated switch disconnectors that after power failure jump back to "stop" position and prevent machine automatic restarting at recovery voltage, requiring manual operation for machine restart.

According to

- IEC 60947-3
- IEC 60204-7
- UL508

General characteristics

- Triple pole main switch disconnectors with undervoltage release.
- Maximum padlock diammeter 9mm.
- Complete range from 25 up to 63A.
- 230 and 400V coil releases.
- Protection degree IP54.
- Red/Yellow padlockable handle..

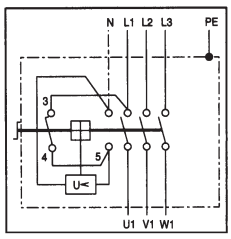


Energising	= 85%
De-energising	35...75%
Continuous operation	100%

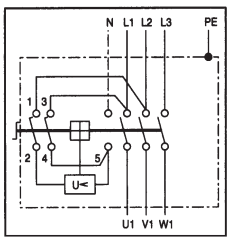
«Safety on machinery electrical equipment standard IEC/EN 60204-1 requires on section 7.5 Protection against automatic restart after power failure and reappearance voltage.»

Connection diagram

230 V



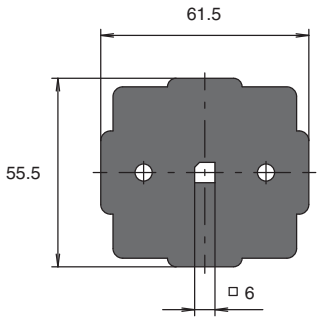
400 V

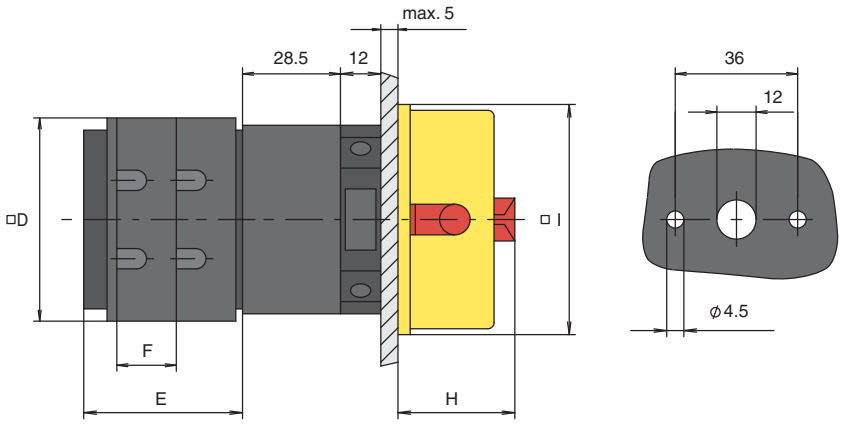


Technical data

description		values		
operational rating	I_e	25	40	63
connection screws		M 3,5	M 4	M 5
wire section				
stranded	mm^2	1 - 4	1 - 6	1,5 - 10
flexible	mm^2	1 - 2,5	1 - 4	1,5 - 6
impulse voltage	U_{imp} KV	6	6	6
AC23	kW 3 x 400V	7,5	11	18,5
AC3	kW 3 x 400V	11	15	22
conditional shortcircuit current	I_{cc} kA	6	6	6

Dimensions





	D	E	F	H	I
25A	49	36	12,5	32	66
40A	62	38	12,5	32	66
63A	72	47	17,5	32	66

Discrepancy switches

«*An advanced solution introducing new technological advantages on discrepancy applications*»

Discrepancy switches are used to control, monitor position of disconnector switches and circuit breakers, and signal any discrepancy on their operation. They are also used to send short impulses to remote controlled solenoids, meters,..

Discrepancy switches use latest developments on Led technology increasing signal reliability and remarkable for being maintenance free. Specific electronics permit multivoltage connection limiting the number of references required and simplifying panel designs and product logistics.

According to standards

- IEC 60947-3
- EN 60947-3
- IEC 61000

General characteristics

Combining electronic and electromechanic technology on this product has achieved a solution that distinguishes by its well achieved integration and its simple installation and operation.

- High luminosity low consumption multiled technology (100.000 hours live expectancy)
- Multivoltage 24-240VAC - 24-150VDC
- Vibration proof
- Polarity free easy connection by plug-in terminal blocks
- Encapsulated electronics. Maximum protection and safety.
- Simple mounting. Insert bolts on frontal breaking mechanism.
- Easy "push & click" front plate mounting

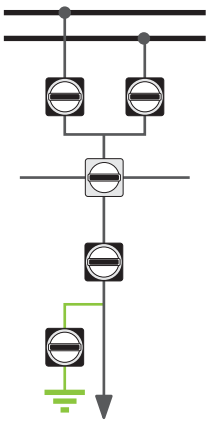
Applications

Rail transport industry

Medium voltage energy distribution

Mimic diagram

The association between discrepancy switch and disconnector/circuit breaker is directly identyfied on the mimic diagram by the front plate shape.

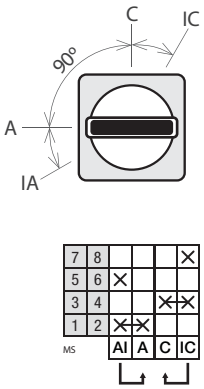


control discrepancy mimic diagram exemple

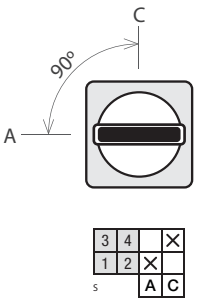
Operation

Control discrepancy

Discrepancy control switches have two fixed positions for pre-selection contacts at 90º and two additional impulse positions with 30º spring return.

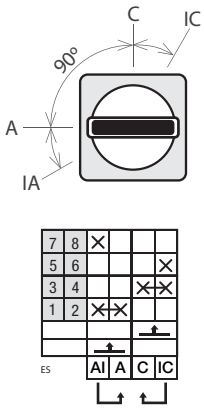


Discrepancy



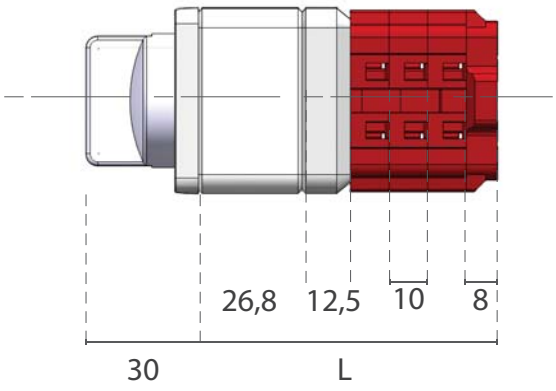
Push-turn control discrepancy

ES push-turn discrepancy control switches have two fixed positions for pre-selection contacts at 90º and two additional push-turn impulse positions with 30º spring return.

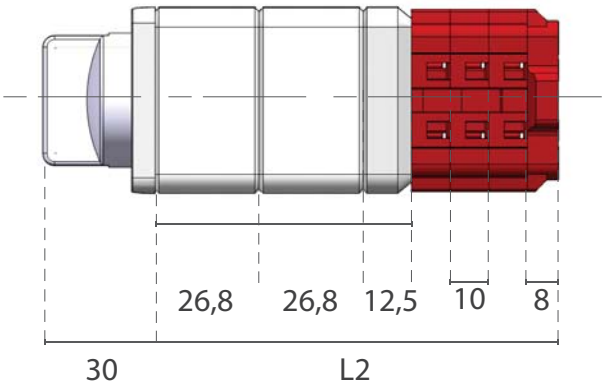


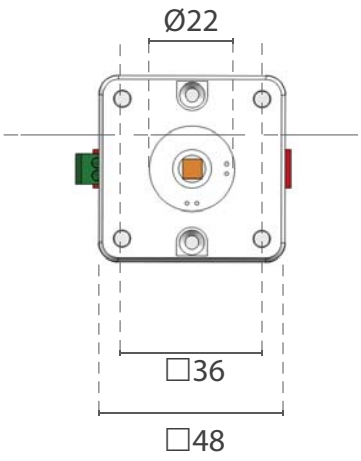
Dimensions and mounting

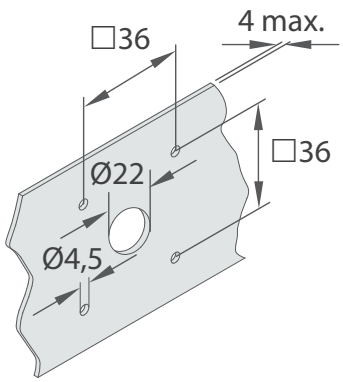
Control and discrepancy switches



Push-turn control discrepancy switches



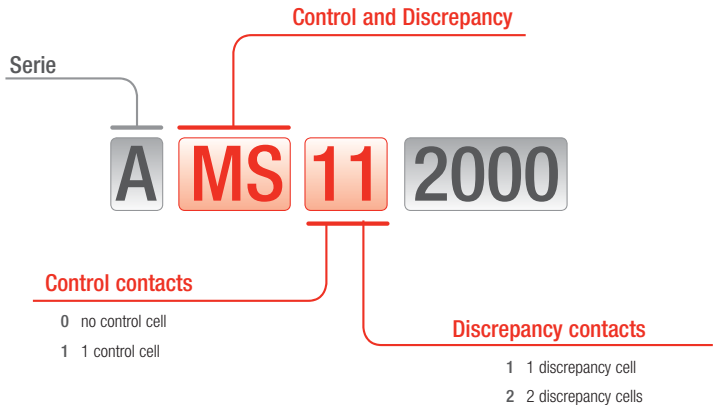


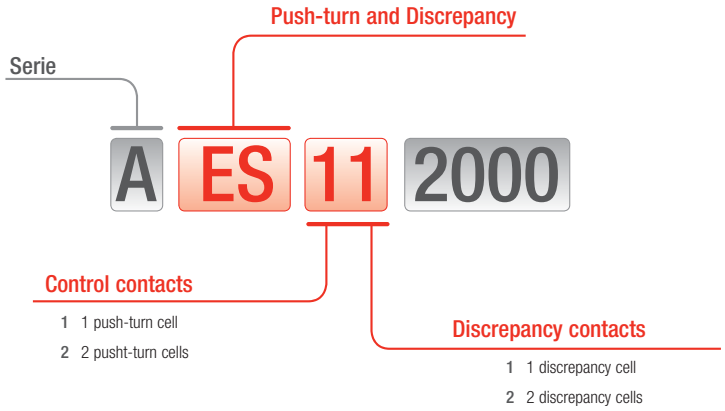


cells	1	2	3	4
L	57,3	67,3	77,3	87,3
L2	84,1	94,1	104,1	114,1

in mm.

References

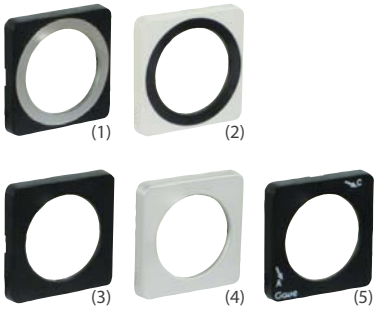




Switches

References	Type	In
AES112000	push-turn control and discrepancy	25 A
AES122000	push-turn control and discrepancy	25 A
AMS112000	control and discrepancy	25 A
AMS122000	control and discrepancy	25 A
AMS012000	discrepancy	25 A
AMS022000	discrepancy	25 A

Switches supplied without plate



Accesories

References	Description
AP326904-	black front plate with silver circle (picture 1)
AP327906-	grey front plate with black circle (picture 2)
AP325904-	square black front plate (picture 3)
AP325906-	square front plate silver (picture 4)
AP3289040	black front plate with inscription (picture 5)

Changeover and switch disconnectors

Enclosed safety switches

The enclosed safety switches are enclosed multipole switches with manual handle.

Designed to be used as:

- main switches for direct machine operation
- auxiliary switches for maintenance operations in vacuum machines, air installations...

According to standards

- IEC 60947-3
- EN 60947-3

General characteristics

- IP65 protection
- Safety padlockable handle (up to 4 padlocks)
- Interlock operation when switch is not in OFF position
- Earth terminal
- Quick base mounted click fixing
- Easy wiring before or after fixing
- Easy break knockouts
- Possibility to include up to 4 auxiliary 12A contacts
- Large wiring space on high rating switches.

General characteristics

from 16A to 63A

- Compact and original presentation.
- Protection degree IP65.
- Wall mounting.

Easy opening knockouts

Padlockable handle

- Red/Yellow.
- Up to 4 padlocks.

Interlock in position I

Safety

Earthing terminal

Large wiring space

Lateral access to terminals

from 100A to 200A
(Sheet steel enclosures)

Protection degree IP65

Metal hinges with quick release pin and polyurethane joint

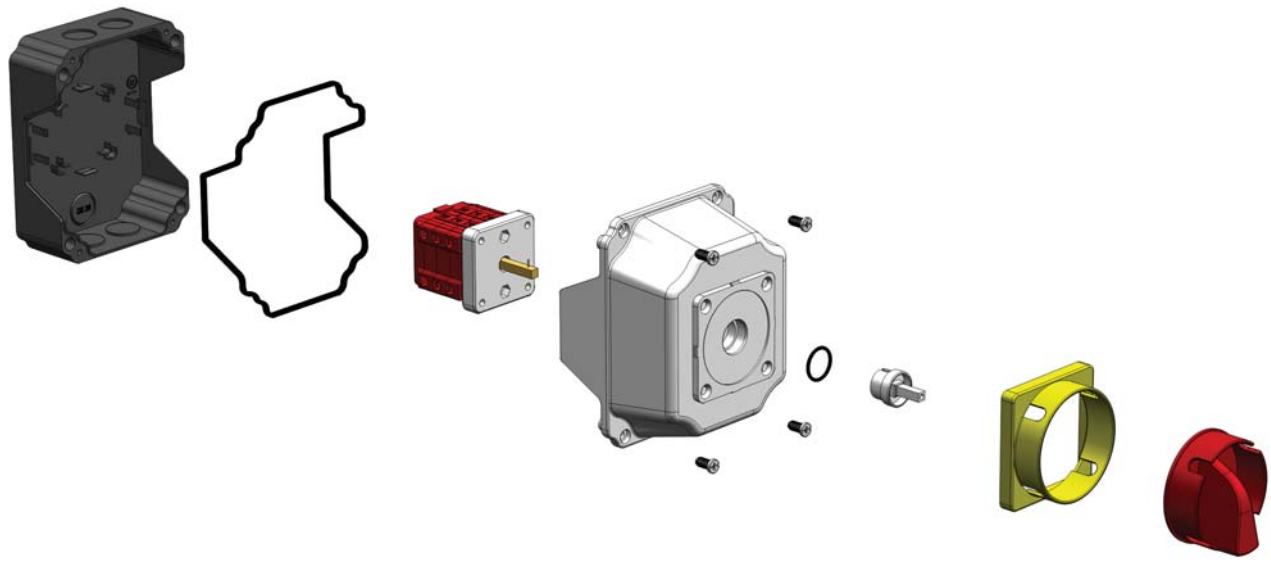
Cable gland plate

Embedded plate with neoprene seal leveled with the base.

Resistance

Designed to meet industrial environment requirements with mechanical risks and powder exposure .

Mounting scheme



Reference system

Serie

A B 552 2 1 0 7

Handle

- B padlock locking (red / yellow)
- C padlock locking (grey / black)
- I front plate and screw handle

Electrical schemes

Rating

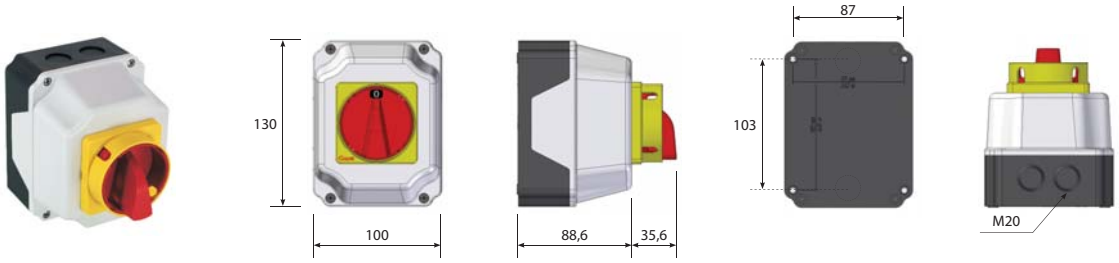
1 16 A	4 40 A	9 125 A	A 160 A
2 25 A	6 63 A		B 200 A
3 32 A	7 100 A		C 250 A

Mounting

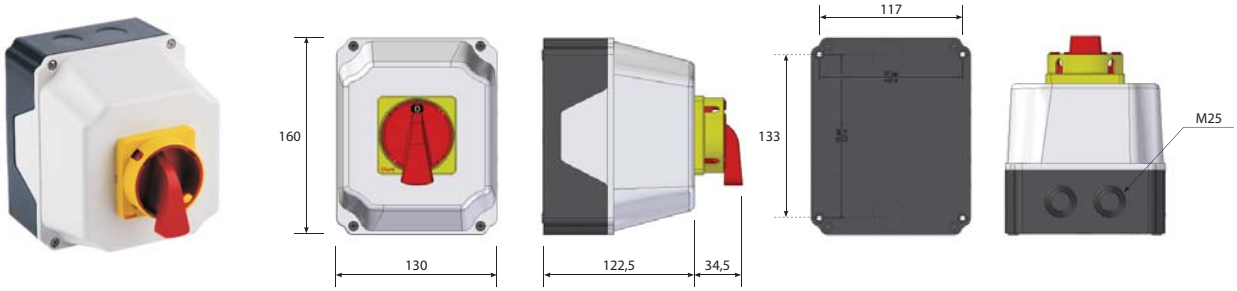
7 IP65 enclosure

Dimensions

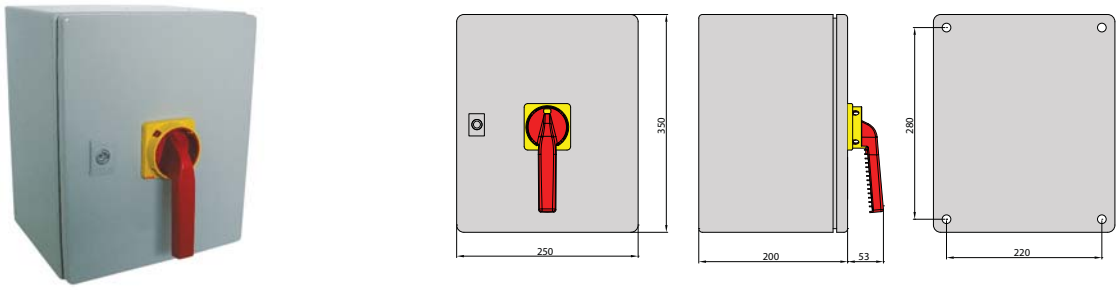
16A - 25A - 32A



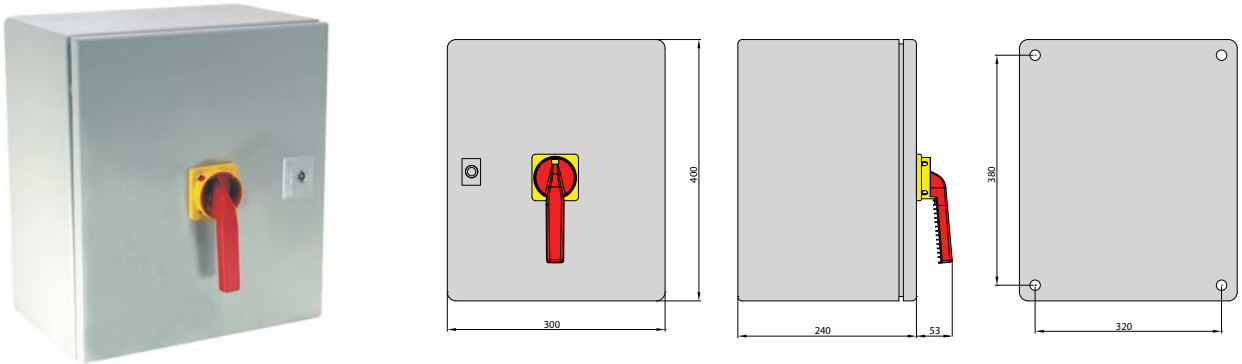
40A - 63A



100A - 125A



160A - 250A



Technical data

		16A	25A	32A	40A	63A	100A	125A	160A	200A	250A
thermal rating Ithe (inside)	A	20	25	40	40	70	100	125	160	200	250
max. fuse protection (gG-aM)	In (A)	25	25	40	50	80	125	125	200	200	250
stranded wire	mm^2	2,5-6	2,5-6	10-25	10-25	16-50	16-50	16-50	70	95	120
flexible wire	mm^2	2,5-6	2,5-6	10-16	10-16	16-50	16-50	16-50	70	95	120
tightening torque	Nm	1,6	1,6	2	2	3,5	3,5	3,5	6	6	6
operating voltage Ue	V~	690	690	690	690	690	690	690	690	690	690
operational rating Ie	A	16	25	32	40	63	100	125	160	200	250

Maximum cells number

Size	Aux. contacts	A				
Without auxiliary contacts						
Size 0	-	12-16-25A	5	8	10	-
Size 1	-	25A	4	7	8	-
	-	32A	4	7	8	-
	-	40A	2	7	8	-
Size 1	-	63A	-	4	6	8
	-	80A-125A	-	-	6	8
	-	160-250A	-	-	3	4
With auxiliary contacts						
Size 1	1 cell aux	25-32-40A	2	5	7	-
	2 cells aux	25-32-40A	1	4	6	-
	3 cells aux	25-32-40A	1	3	5	-
Size 1	1 cell aux	63A	-	3	5	7
	2 cells aux	63A	-	2	4	6
	3 cells aux	63A	-	2	3	6
Size 1	1 cell aux	80A-125A	-	-	5	7
	2 cells aux	80A-125A	-	-	4	6
	3 cells aux	80A-125A	-	-	3	6
Size 1	1 cell aux	160-250A	-	-	2	3
	2 cells aux	160-250A	-	-	2	3
	3 cells aux	160-250A	-	-	1	3

High temperature (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 spreading in order to permit an effective fight against fire expansion.

Standard EN- 1201-2003 applies to Smoke and heat control systems detailing on part 3 specifications for powered smoke and heat exhaust ventilators. In order to guarantee installation safety under emergency conditions all ventilation system components must comply with this standard requirements and carry test sequences according to details specified on the standard.

Gave engineering team has developed a product for these stringent conditions and passed laboratory testing at 300º during a period of 120min. Testing results largely overpass class F200 and F300 as detailed on Table 2 paragraph 6.1.3 standard EN 12101-3.

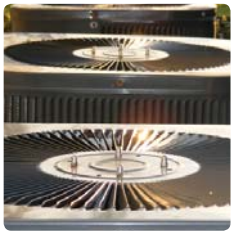
Application



« Gave engineering department has developed a specific product to cope with this particular requirement »

Parkings





Warehouse and industries

Workshops and factory builidngs

General characteristics

Stringent requirements according to standards EN 12101-3 have launched a strongly demanding research task aiming to achieve a product with optimal resistance to high temperature operation

Advanced materials

This switch has required exploring technical materials able to offer a controlled coefficient of technical expansion (CTE) combined with excellent mechanical resistance and dimensional stability under high temperature conditions. High performance polymers mixed with additives succeed to obtain high temperature switches able to resist erosion while offering stable dimensions and maintaining sufficient component lubricity.

Surface finish

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

Enclosure

The enclosure has direct contact with the heating source and acts as a firewall diminishing direct heat into the switch. To this effect we employ a special thickness die-cast aluminium enclosure.

Cabling

Connection is made through two M20 threaded entries placed on the bottom face.

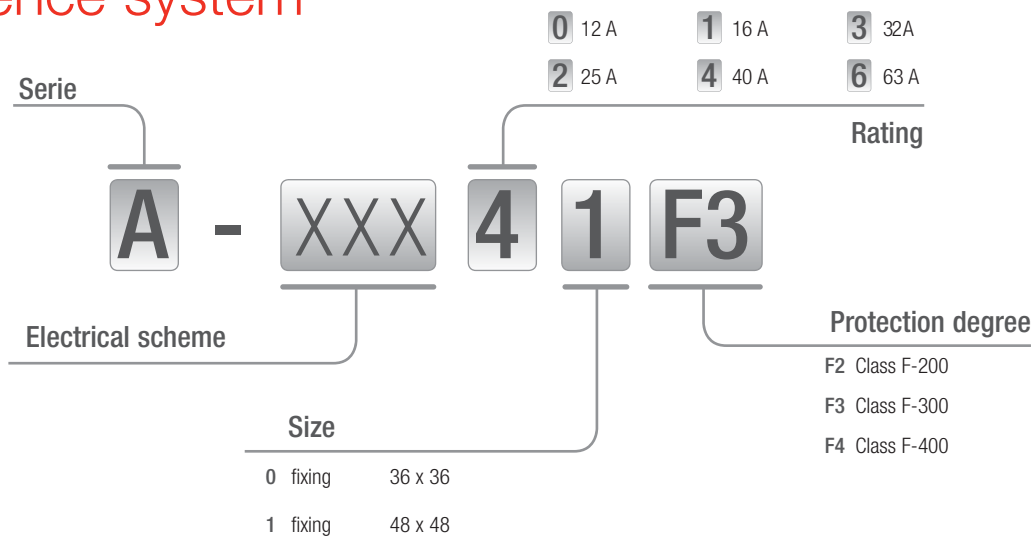
IP65 protection

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

Handle

Switch handle is die cast aluminium manufactured maintaining high characteristics on the full unit and offering the possibility to padlock the unit on the Off position for maintenance purposes.

Reference system

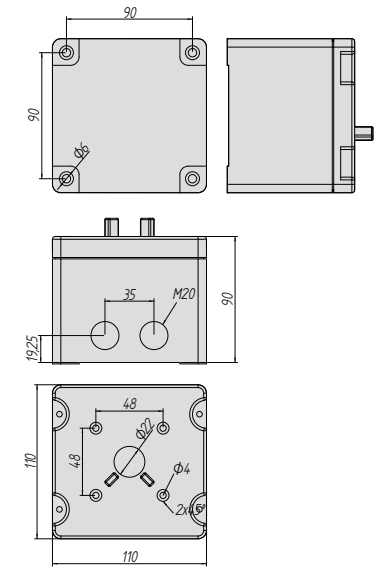


Technical characteristics

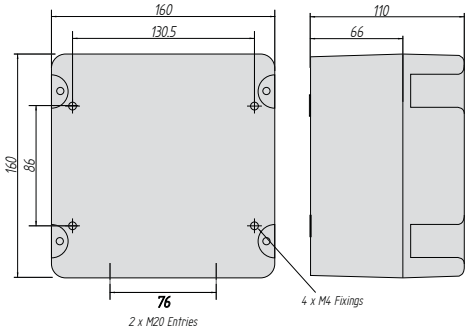
			size 0			size 1	
			12A	16A	25A	32A	40A
thermal rating		Ith A	16	20	30	40	50
max. fuse protection (gG-aM)		In (A)	20	25	25	40	40
connectiong screws			M4	M4	M4	M5	M5
stranded wire		mm2	2,5 - 6	2,5 - 6	2,5 - 6	10 - 25	10 - 25
flexible wire		mm2	2,5 - 6	2,5 - 6	2,5 - 6	10 - 16	10 - 16
impulse voltage		Uimp KV	4	4	4	4	4
conditional shortcircuit current		Icc KA	6	6	6	6	6
operating voltage		Ue V~	690	690	690	690	690
insulating voltage		V~	690	690	690	690	690
insulating voltage		V...	400	400	400	600	600
operating rating		Ie A	12	16	25	32	40
wire section		AWG	10	10	10	6	6
screw torque		Nm	1,6	1,6	1,6	1,8	1,8
AC 21	kW	3 x 230V	3	5,5	7,5	11	15
	dummy kW	3 x 400V	7,5	11	15	18,5	22
	cosØ >0,95 kW	3 x 500V	11	15	18,5	22	30
AC 22	kW	3 x 230V	2,2	4	7,5	7,5	11
	mixed load kW	3 x 400V	5,5	7,5	11	15	22
	0,65 <cosØ <0,95 kW	3 x 500V	7,5	11	15	18,5	22
AC 23	kW	3 x 230V	2,2	3	4	5,5	7,5
	motor load VA kW	3 x 400V	4	5,5	7,5	11	18,5
	0,45 <cosØ <0,65 kW	3 x 500V	5,5	7,5	11	15	22

Dimensions

Size 0



Size 1



Modular switches serie M5

M5 series is a comprehensive offer of manually operated modular switch disconnectors.
They have been designed to operate as load break main switches, safety switches or emergency switches.

According to standards

- IEC 60947-3
- EN 60947-3

Special characteristics

M5 - 25-40-63A

- Fully visualised breaking.
- Contact point technology.

M5 - 125-160A

- Visible double breaking.
- Fully visualised breaking.

General characteristics

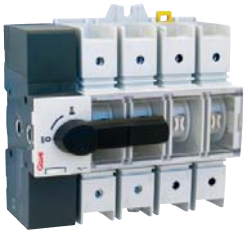
- Double break per phase.
- DIN rail fixing, panel or modular panel with 45mm front cut out.
- IP20 device and accesories.

Technical data

			25A	40A	63A	125A	160A
thermal rating		Ith A	25	40	63	125	160
max. fuse protection (gG-aM)		In (A)	40	40	80	125	160
impulse voltage		Uimp KV	8	8	8	8	8
rated short-time withstand current 0.3s		Icw A	2,5	2,5	3	7	7
rated short-circuit making capacity		Icc KA	6	6	9	12	12
rated operating voltage		Ue V~	690	690	690	690	690
rated isolation voltage		Ui V	800	800	800	800	800
rated operational currents							
AC 21	A	415V	25	40	63	125	160
	A	500V	25	40	63	125	160
	A	690V	25	40	63	125	160
AC 22	A	415V	25	40	63	125	160
	A	500V	25	40	63	125	125 (AC 22 A) 160 (AC 22 B)
	A	690V	25	32 (AC 22 A) 40 (AC 22 B)	40 (AC 22 A) 63 (AC 22 B)	80 (AC 22 A) 100 (AC 22 B)	100 (AC 22 A) 160 (AC 22 B)
AC 23	A	415V	25	40	63	125	125 (AC 23 A) 160 (AC 23 B)
	A	500V	25	25	63	100	100
	A	690V	25	25	40	80	80
cable section (min-max)		mm2	1,5 - 6	1,5 - 6	2,5 - 35	10 - 70	10 - 70
tightening torque		Nm	2,5	2,5	4	4	4

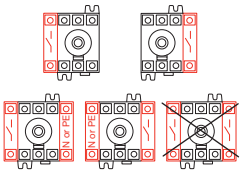
References



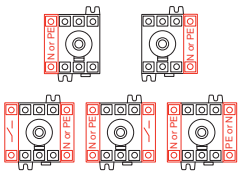
Poles	3 P	3 P	3 P	4P
25 A	MN55221-0			
40 A		MN55241-0		
63 A		MN55262-0		
125 A			MV55293-0	MV55393-0
160 A			MV552B3-0	MV553B3-0

Additional Poles

Fourth Pole

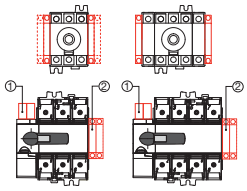
References	Rating	Size
MN3002100	25 A	1
MN3004100	40 A	1
MN3006200	63 A	2

Other poles

References	Type	Rating	Size
MN300PE01	Ground	25-40 A	1
MN300PE02	Ground	63 A	2
MN300NP01	Neutral	25-40 A	1
MN300NP02	Neutral	63 A	2

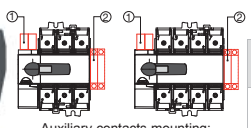
Auxiliary contacts

Auxiliary contacts mounting:
1. Max. 2 auxiliary contacts
2. Max. 4 auxiliary contacts

Type M

References	Rating	
MN3100000	25-160 A	

Auxiliary contacts mounting:
1. Max. 2 auxiliary contacts
2. Max. 4 auxiliary contacts

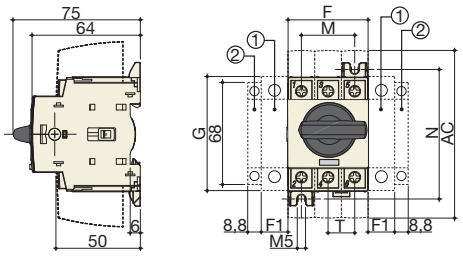
Type U

References	Description	
39990701	Auxiliary contact type U NC	
39990702	Auxiliary contact type U NA	

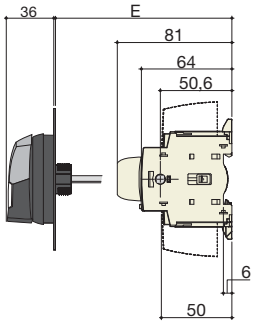
Dimensions

25 to 63 A

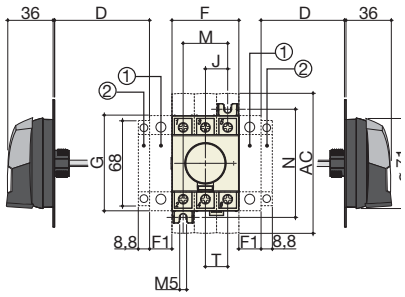
Direct front operation



External front operation



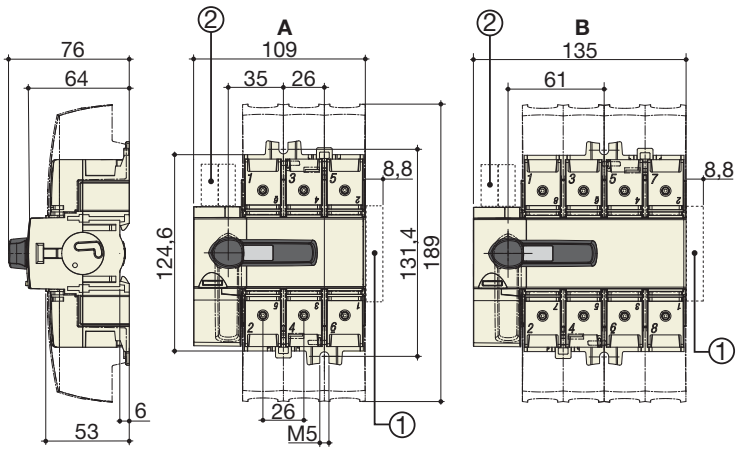
External side operation



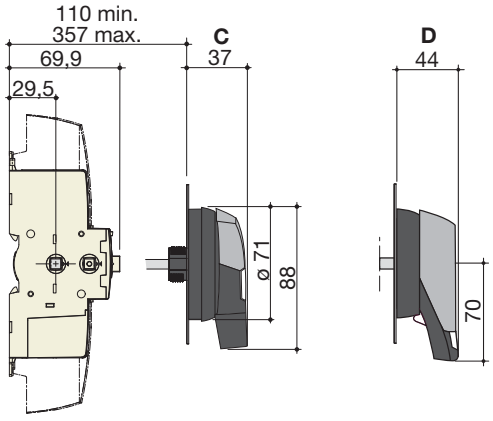
	Overall dimensions				Terminal shrouds	Switch body				Switch mounting		Connecting terminals
Size	D min	D max	E min	E max	AC	F	F1	G	J	M	N	T
16-40 A	30	235	100	372	110	45	15	68	15	30	75	15
63-80 A	30	235	100	372	110	52,5	17,5	76	17,5	35	85	17,5

125 to 160 A

Direct front operation



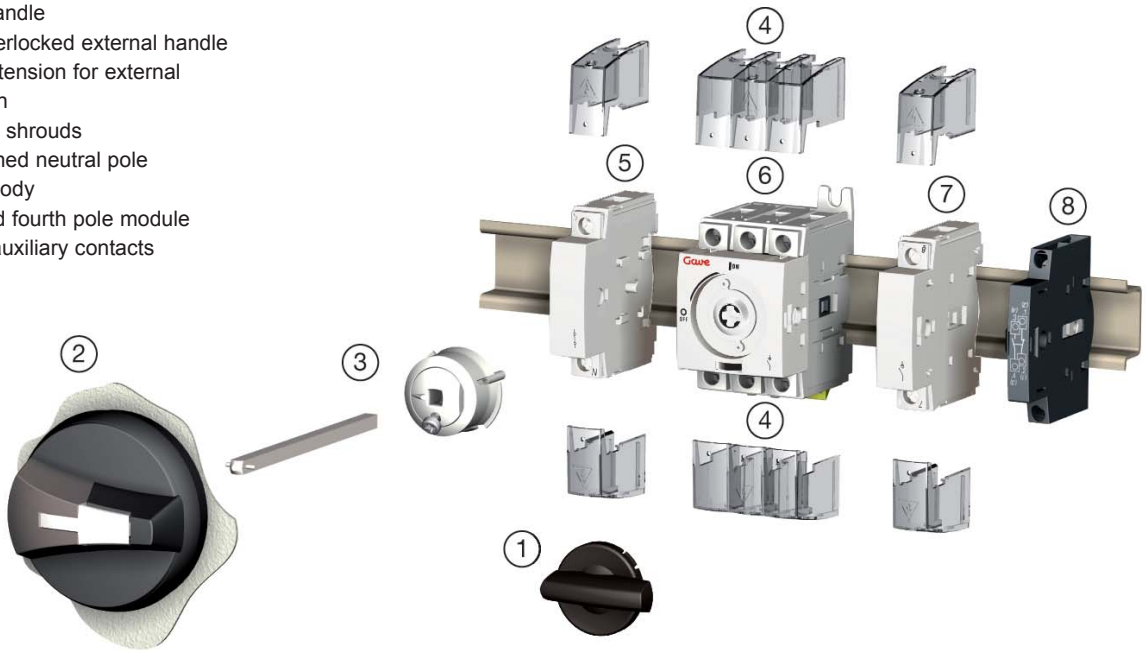
External front operation



Accesories

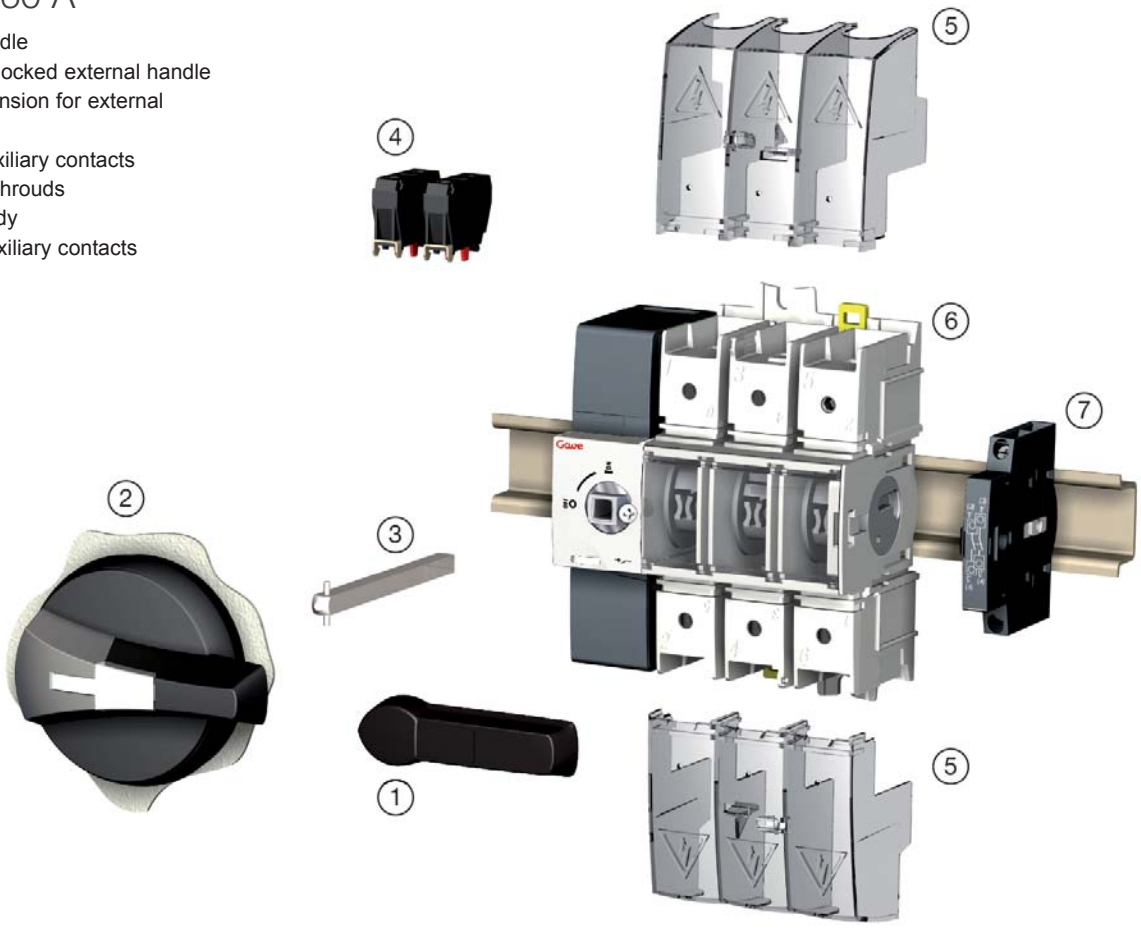
25 to 63 A

1. Direct handle
2. Door interlocked external handle
3. Shaft extension for external operation
4. Terminal shrouds
5. Unswitched neutral pole
6. Switch body
7. Switched fourth pole module
8. M type auxiliary contacts



125 to 160 A

1. Direct handle
2. Door interlocked external handle
3. Shaft extension for external operation
4. U type auxiliary contacts
5. Terminal shrouds
6. Switch body
7. M type auxiliary contacts



Direct operation handle

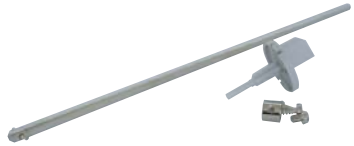
References		Rating
MK1000N40		25-40-63 A
MK1000N42		125-160 A

Interlocked external handle

References	Colour	Handle
MK1200N40	black/grey	25-40-63 A
MK1200N42	black/grey	125-160 A
MK1200N20	red/yellow	25-40-63 A
MK1200N22	red/yellow	125-160 A

Terminal shrouds

References	Rating	Poles
MN0700101	25-40 A	1 pole
MN0700103	25-40 A	3 poles
MN0700201	63 A	1 pole
MN0700203	63 A	3 poles
MN0700303	125-160 A	3 poles
MN0700304	125-160 A	4 poles



Prolonged shafts

References	Rating	Lenght
MK0805150	25-40-63 A	150 mm
MK0806150	125-160 A	150 mm
MK0805200	25-40-63 A	200 mm
MK0806200	125-160 A	200 mm
MK0805320	25-40-63 A	300 mm
MK0806320	125-160 A	300 mm

LD Changeover Switches

The **LD Changeover** product range are on load changeover switches equipped with front manual operation.
They provide transfer of sources or changeover of two on load low voltage circuits as well as safety disconnect isolation.

General characteristics

- Easy and quick DIN rail mounting.
- Compact integrated size.
- Integrated internal common link.
- Protected cable clamp connection IP20 (63 to 125A).
- Terminals with screen protection cover (160 to 250A).
- Auxiliary contacts directly shaft operated.
- Range of accesories.
- Electrical scheme flexibility.

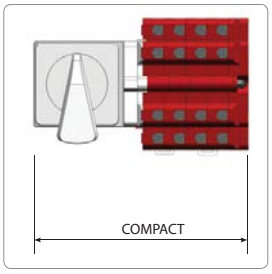
According to standards

- IEC 60947-1
- IEC 60947-3

General characteristics

Integrated link
Common link internally integrated saving installation time and avoiding misconnection.

IP20 Protection
Complete range offers IP20 protection. Protected cable clamps on 63-125A and screen protection cover on 160-250A.



Compact Size
Integrating two circuits on each cell permits an extra compact size. Up to 40% space saving to conventional switches.

Auxiliary Contacts
Power contacts and auxiliary signalling contacts are all directly operated on the same shaft. No risk of erroneous indication.

Installation
Designed to mount directly on DIN rail.

Easy connection
Easy to wire with two levels of connection that prove specially smart on maintenance operations.

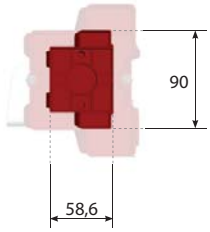
Technical data

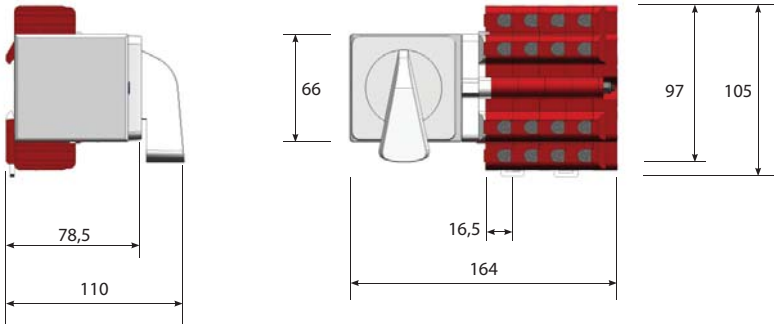
		63A	100A	125A	160A	200A	250A
thermal rating	Ith A	70	100	125	160	200	250
max. fuse protection (gG-aM)	In (A)	80	125	125	200	200	250
impulse voltage	Uimp KV	4	4	4	4	4	4
conditional shortcircuit current	Icc KA	8	8	8	-	-	-
operating voltage	Ue V~	690	690	690	690	690	690
insulating voltage	V~	690	690	690	690	690	690
insulating voltage	V…	600	600	600	600	600	600
operational rating	Ie A	63	100	125	160	200	250
wire section							
stranded	mm2	16-50	16-50	16-50	70	95	120
flexible	mm2	16-50	16-50	16-50	70	95	120
	AWG	6-1	6-1	6-1	00	000	250 kcmil
tightening torque	Nm	3,5	3,5	3,5	6	6	6
connection screws		M8	M8	M8	M8	M8	M8
terminal							
AC 21 kW	3 x 230V	22	37	37	45	55	75
dummy kW	3 x 400V	37	55	75	90	110	132
cosØ >0,95 kW	3 x 500V	45	75	90	110	132	160
AC 22 kW	3 x 230V	22	30	30	37	45	55
mixed load kW	3 x 400V	30	45	55	75	90	110
0,65 <cosØ <0,95 kW	3 x 500V	37	55	75	90	110	132
AC 23 kW	3 x 230V	15	18,5	18,5	30	38	-
motor load kW	3 x 400V	22	30	37	52	65	-
0,45 <cosØ <0,65 kW	3 x 500V	30	37	45	65	80	-

Dimensions

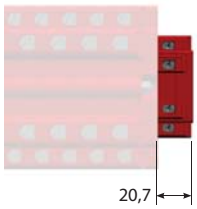
Auxiliary contacts

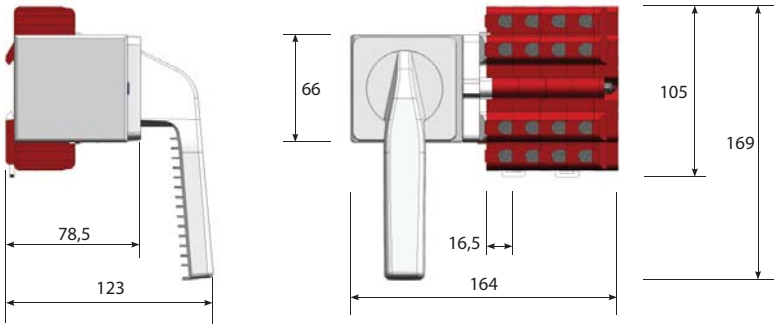
63A



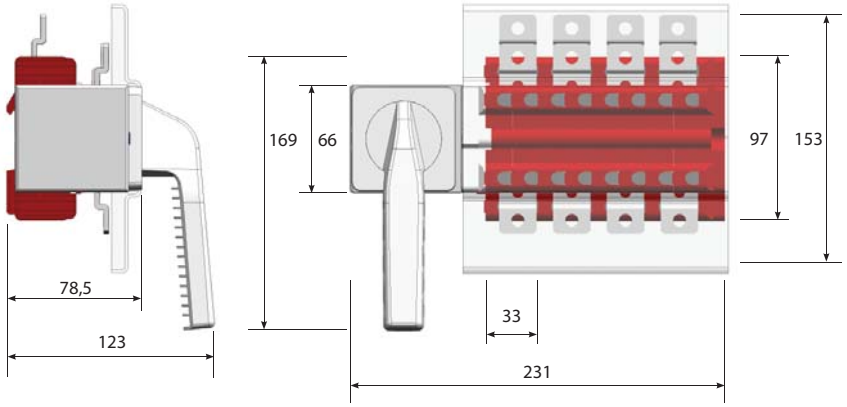


100A-125A





160A-200A-250A

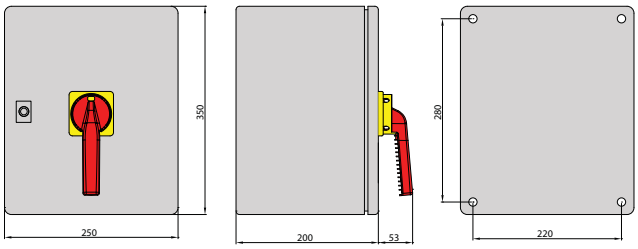


Enclosed changeover switches

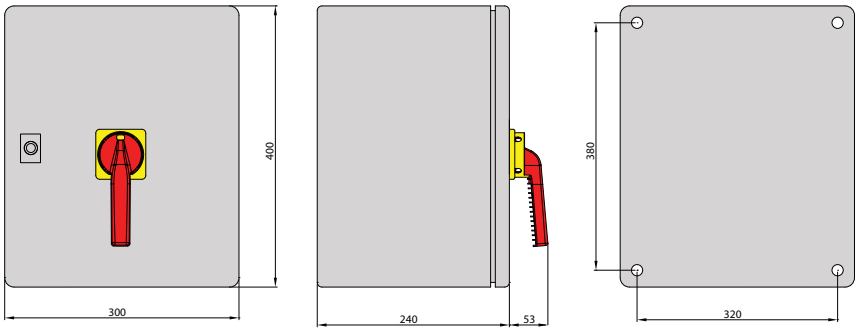
- Bespoke for industrial environments with mechanical risk and dust hazard.
- Protection degree: IP65 / IK10.
- Polyester-epoxy powder coating colour grey 7032 textured.
- Locking system 3mm double-bar key.
- Metal hinges with quick release pins.
- Bottom removable gland plate with neoprene joint finished to match the enclosure.
- Two earthing points M6 x 15.

Dimensions

63A - 125A

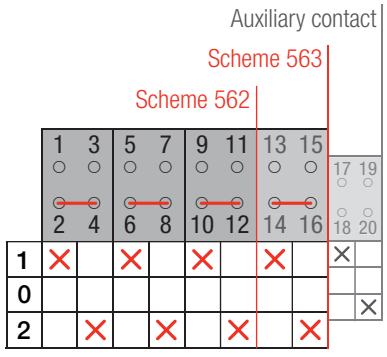


160A - 250A

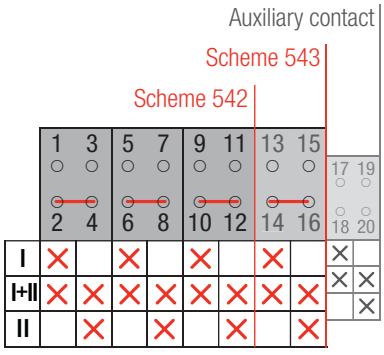


Electrical Schemes

56x
Changeover 1-0-2

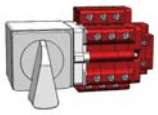
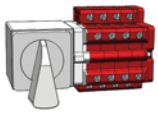
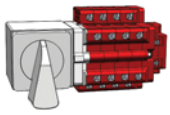


54x
Changeover with overlapping I - I+II - II

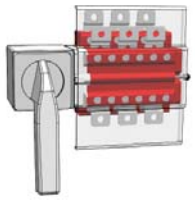
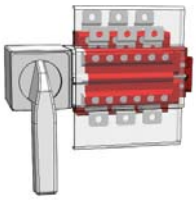
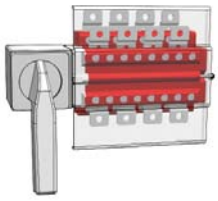
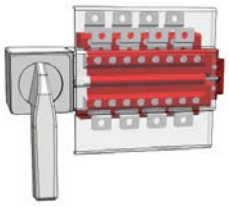


Electrical Scheme Flexibility
Technology based on cells offers great flexibility on electrical schemes.
Possibility to build up on demand switches on typical applications such as by-pass, or motor switches,...

References

Poles	3 P	3 P + CA	4 P	4 P + CA
Changeover switches 1-0-2				
63 A	LD5626100	LDA626100	LD5636100	LDA636100
100 A	LD5627100	LDA627100	LD5637100	LDA637100
125 A	LD5629100	LDA629100	LD5639100	LDA639100
Changeover switches with overlapping I - I+II - II				
63 A	LD5426100	LDA426100	LD5436100	LDA436100
100 A	LD5427100	LDA427100	LD5437100	LDA437100
125 A	LD5429100	LDA429100	LD5439100	LDA439100

Poles	3 P	3 P + CA	4 P	4 P + CA
Changevoer switches 1-0-2				
160 A	LD562A100	LDA62A100	LD563A100	LDA63A100
200 A	LD562B100	LDA62B100	LD563B100	LDA63B100
250 A	LD562C100	LDA62C100	LD563C100	LDA63C100
Changeover switches with overlapping I - I+II - II				
160 A	LD542A100	LDA42A100	LD543A100	LDA43A100
200 A	LD542B100	LDA42B100	LD543B100	LDA43B100
250 A	LD542C100	LDA42C100	LD543C100	LDA43C100

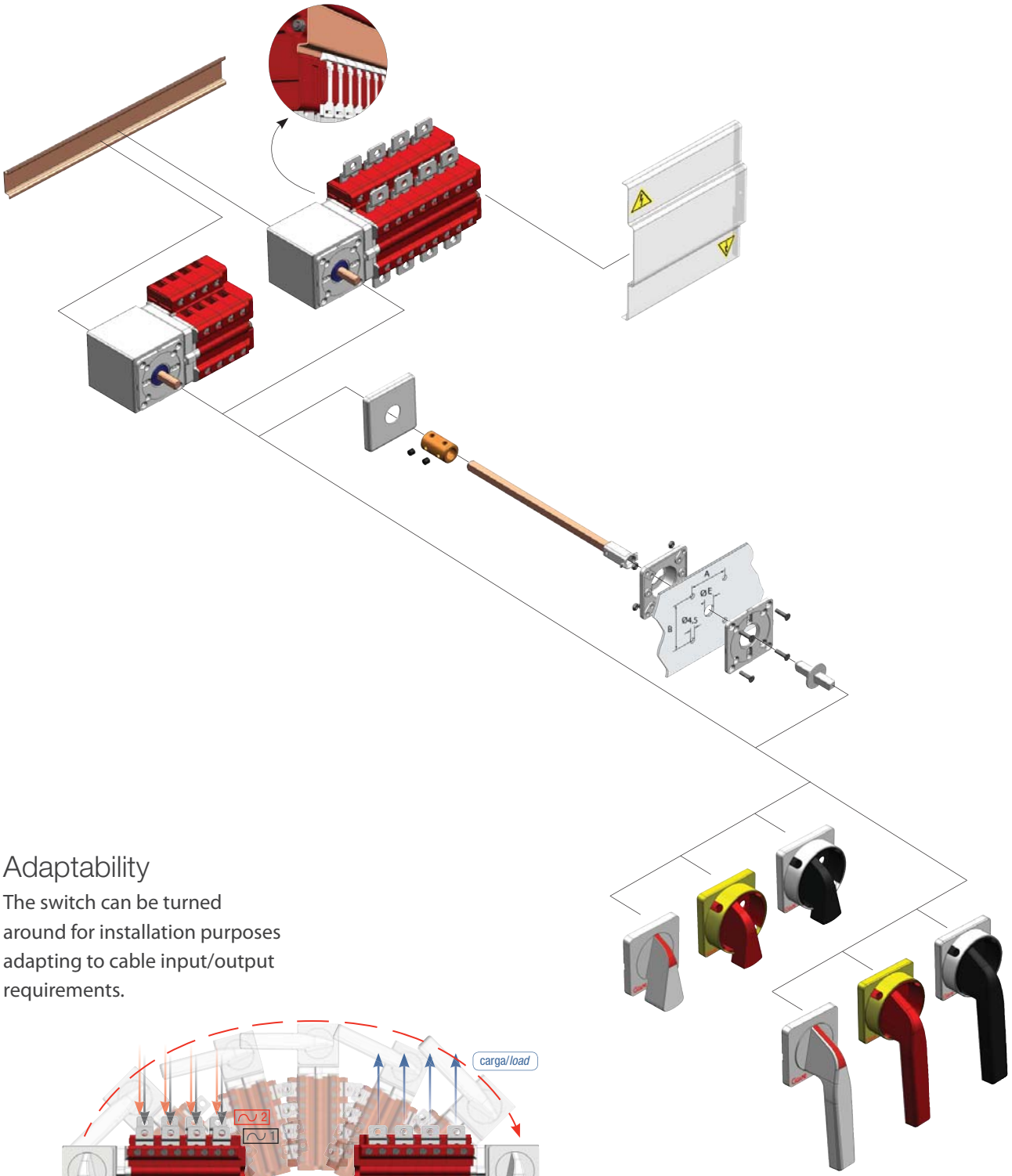
Enclosed 1-0-2 Changeover switches





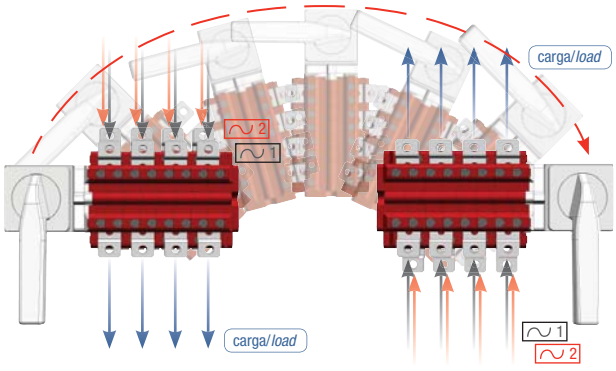

Poles	Scheme	63 A	100 A	125 A	160 A	200 A	250 A
3 P + CA	562	LDA426107	LDA427107	LDA429107	LDA42A107	LDA42B107	LDA42C107
4 P + CA	563	LDA436107	LDA437107	LDA439107	LDA43A107	LDA43B107	LDA43C107

Mounting Scheme



Adaptability

The switch can be turned around for installation purposes adapting to cable input/output requirements.



Accessories

● standard ● optional

Rating	compatibility table								
									
63 A	●	●	●	●	●	●	●	●	
100 A		●			●	●	●	●	
125 A		●			●	●	●	●	
160 A		●			●	●	●	●	●
200 A		●			●	●	●	●	●
250 A		●			●	●	●	●	●

Padlockable Handles

References	Colour	Handle
AK1200526	red/yellow	Short
AK1200528	red/yellow	Lever
AK1200146	black/grey	Short
AK1200148	black/grey	Lever

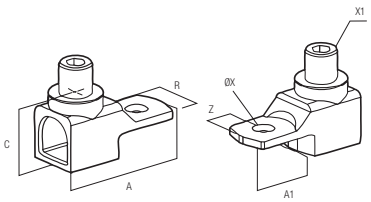
IP65 gasket

References	Description
AK2240006	IP65 gasket protection 8mm.

Mounting kits

References	Description	
LK0800006	Shaft 200 mm	
LK1720006	External handle with interlock	

Cage terminals



References	Rating	A	A1	C	R	ØX	X1	Z	Poles
5400 3016	160	47,5	22,5	25	20	8,5	M12	10	3P
5400 4016	160	47,5	22,5	25	20	8,5	M12	10	4P
5400 3025	200-250	62	31,5	31,5	25	10,5	M16	15	3P
5400 4025	200-250	62	31,5	31,5	25	10,5	M16	15	4P

Motorised changeover and automatic transfer switches

«Smart solution on your remote operated changeover applications combining performant switching technology with functional installation requirements»

Y SERIES
Motorised switches

Gave Y Series motorised changeover switches have been designed to perform distant changeover operations.
They secure electromechanical reliability in all sort of applications: transfer supply-generator with or without break, main switch, reverse switch, by-pass,...
Modern industrial and service companies require standby power systems in order to avoid high costs related to supply breakdowns. An increasing number of countries are approving new legislation involving backup power sources on business and administration installations open to public service. Therefore an increasing number of installations demand source changeover products covering this function.
Motorised changeover switches are an ideal response to the practical requirements of remote changeover operations.

Product overview

Standard Type

Easy connection with sources input on top and load output on bottom.

40-63A AC22

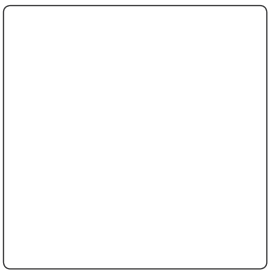
63-100-125A

160-200-250A

Compact Type

Space limited installations can use compact type motorised changeover switches that offer up to 45% width reduction.

63-100-125A



Industrial and commercial low voltage distribution systems install motorised changeover switches that additional to remote changeover operation also offer local operation adding safety on the installation on emergency circumstances or maintenance conditions.

Applications

- Automatic transfer supplies
- System automation
- IT power supply systems
- Light control
- Emergency supplies
- Motor reversing
- Ventilation and heating systems

Y SERIES
Motorised switches

Gave Y series motorised changeover switches have been designed to perform remote changeover operations.

According to standards

- IEC 60947-3
- IEC 61000

General characteristics

- Switch element:
  - Load break switch at 90º
  - Silver alloy contacts
  - Easy terminal accessibility
  - Connection on protected cable clamps
  - Body cells on self-extinguishing GRP
- Driving element:
  - Mechanical operation runned by electric motor
  - Motor operation electronically controlled.
- Control element:
  - Electronic control by magnetic recognition.
  - High capacity microprocessor.
- Complete set:
  - Integrated auxiliary contacts, shaft linked to the changeover unit.
  - Internal common link integrated in contact chamber.
  - One input signal available for each changeover switch mechanical position.
  - Digital display allows reading out changeover position.
  - Signal connection on protected terminal block.
  - Power supplies 12, 24 and 48V DC, and 80 to 220V AC.
  - Compact dimensions
  - Rear panel fixing
  - Endurance: > 10.000 on load operations and 50.000 mechanical operations.
  - Manual operation overrides automatic operation

➜ Changeover switching

Performant switching technology providing safety isolation, elevated electrical endurance and high make/break capacity. Built-in internal link integrates two circuits.

➜ Installation

Easy cable connection on base mounted product. No installation difficulties as common link, mechanical and electrical interlock are internally built-in. Saving time and start-up problems.

➜ Control

Your equipment is run by electronic control that commands motorised operations and informs on operation mode and position status. Program based switching priorities are established in case of multiple orders.

➜ Safety

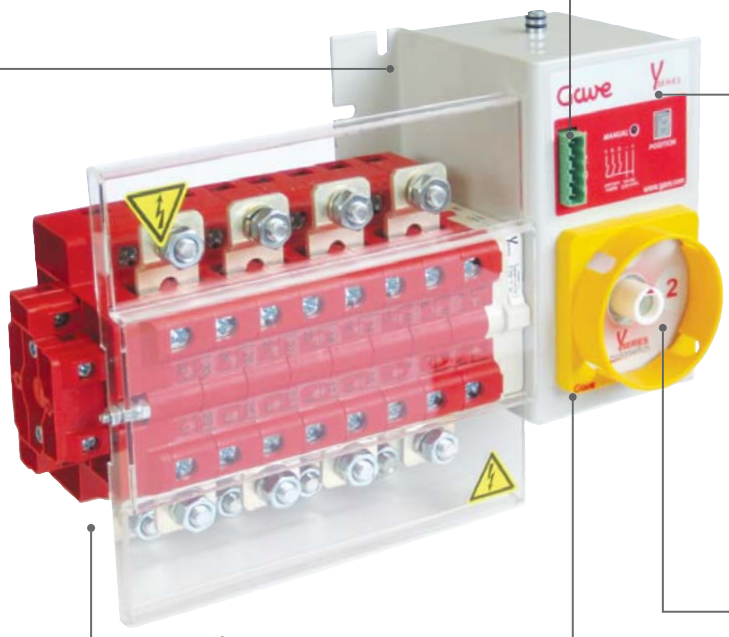
Local operation guarantees safe disconnection under all circumstances.

Characteristics

Control terminals
Simple push-in terminals controlling the switch.

Compact motor block.
Enabled security against unstable supplies.

Operations counter
3 shaft pushes and blinking digit will indicate number of operations.



Visual indication
Digital position readout. Manual operation red LED lights on.

Auxiliary contacts
Operated with the same shaft as power contacts.

Manual operation
Possibility to perform manual backup operation.

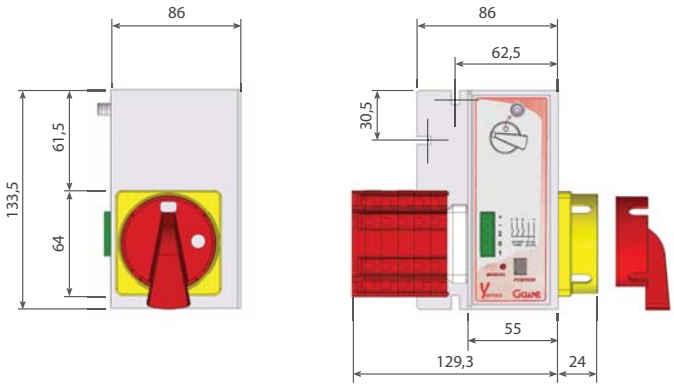
Padlockable handle
Up to 4 padlocks on maintenance conditions.

Protection Screen
Suppllied from origin on cable lug connection units.

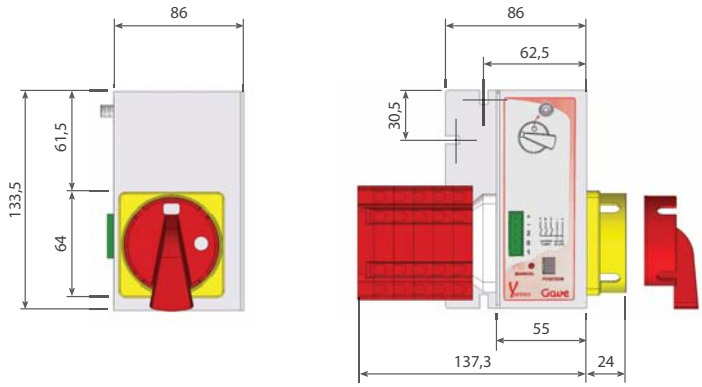
Dimensions

Changeover switches

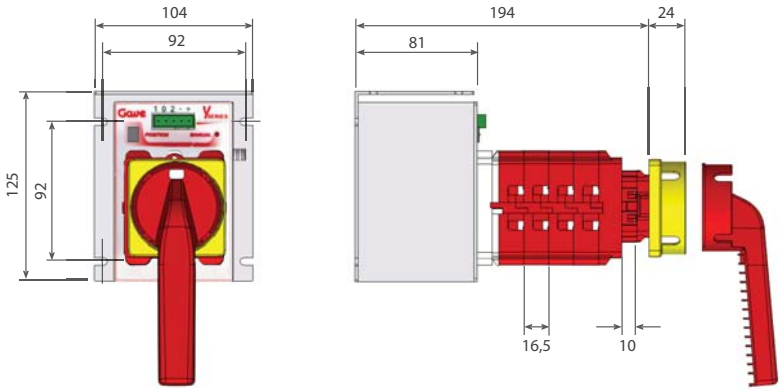
25A



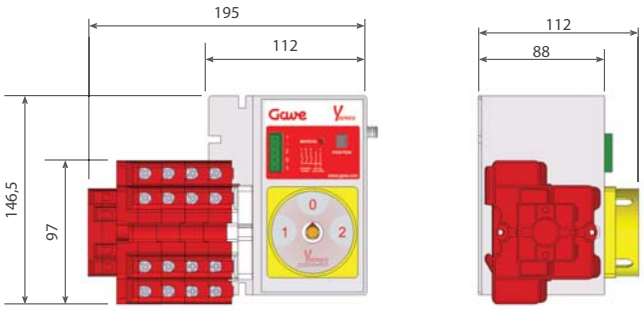
32A - 40A - 63A AC22



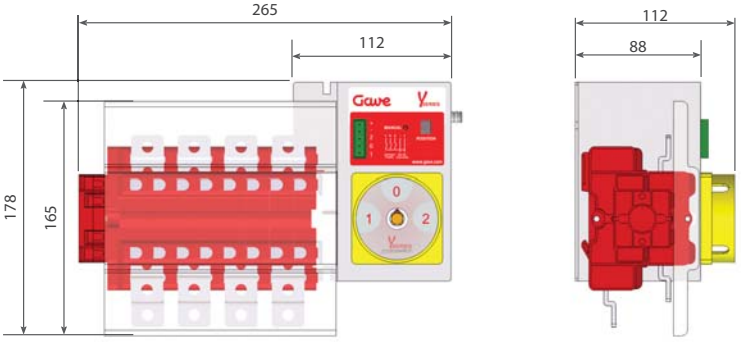
63A - 100A - 125A



63A - 100A - 125A

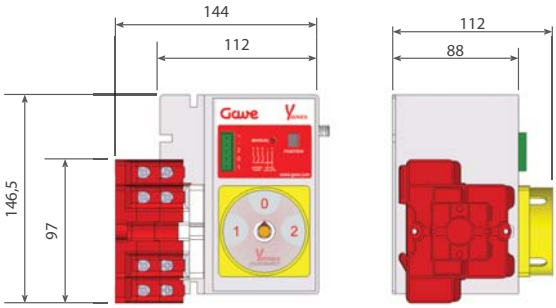


160A - 200A - 250A

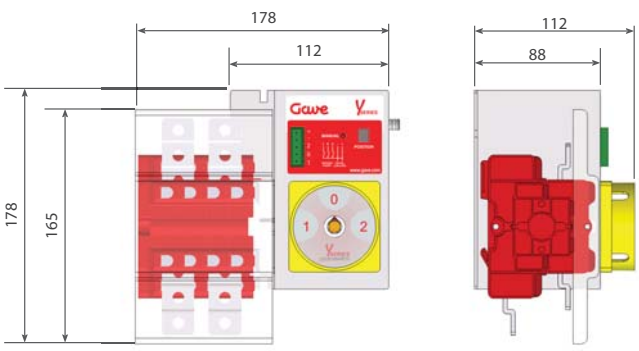


Switches

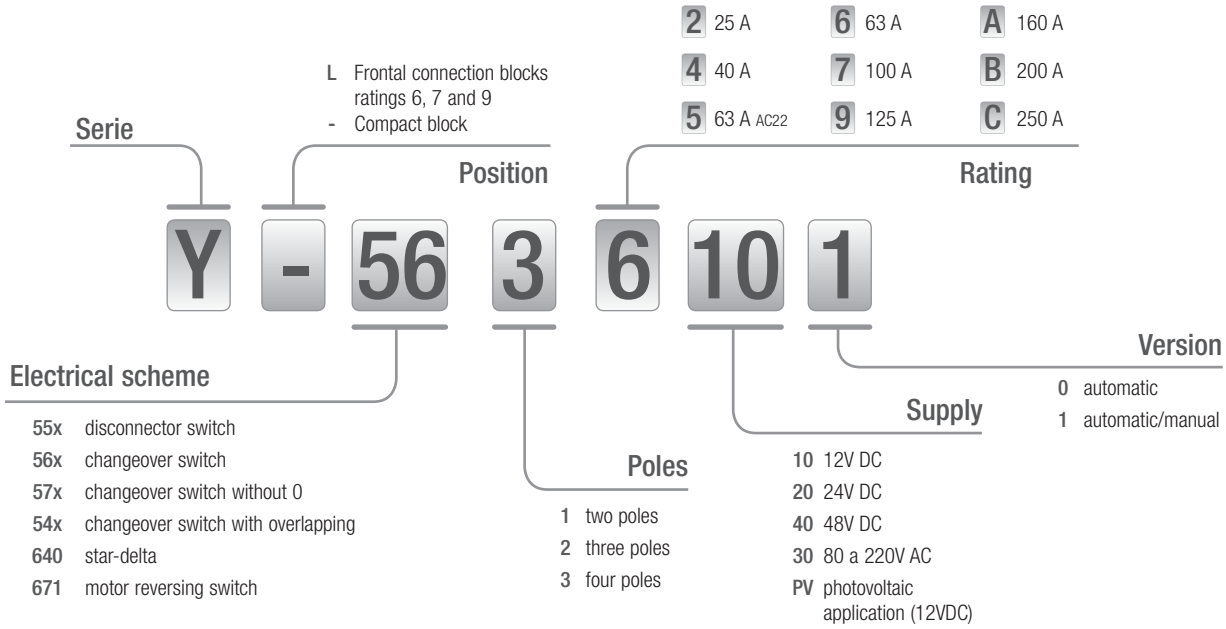
63A - 100A - 125A



160A - 200A - 250A



Reference system



Technical data

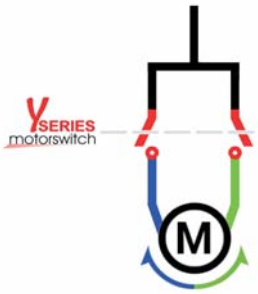
			25A	32A	40A	63A AC22	63A	100A	125A	160A	200A	250A
rated voltage/frequency		V/Hz	690V to 50 Hz									
thermal rating		Ith (A)	30	40	50	70	70	100	125	160	200	250
operational rating		Ie (A)	25	32	40	63	63	100	125	160	200	250
AC-21	400V AC	kW	17	22	28	44	44	69	87	111	139	173
AC-22	400V AC	kW	-	15	22	35	-	-	-	-	-	-
AC-23	400V AC	kW	7,5	11	18,5	-	37	45	55	60	75	90
peak consumption		A	2	2	2	2	2,5	2,5	2,5	2,5	2,5	2,5
nominal consumption		mA	40	40	40	40	40	40	40	40	40	40
weight		gr	1.000	1.200	1.200	1.200	2.250	2.250	2.250	2.850	2.850	2.850
supply voltage		V DC	12V +15%									
wire section												
stranded		mm2	2,5-6	10-25	10-25	10-25	16-50	16-50	16-50	70	95	120
flexible		mm2	2,5-6	10-25	10-25	10-25	16-50	16-50	16-50	70	95	120
tightening torque		Nm	1,6	2	2	3,5	3,5	3,5	3,5	6	6	6
connection screws			M5	M5	M5	M8	M8	M8	M8	M8	M8	M8
terminal												

References

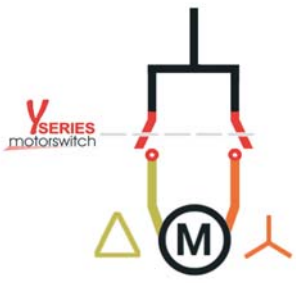
	3 pole		4 pole		3 pole		4 pole	
	12V DC	230V AC	12V DC	230V AC	12V DC	230V AC	12V DC	230V AC
								
Changeover switches 1-0-2					Switches 0-1			
40A	Y-5624101	Y-5624301	Y-5624101	Y-5624301	Y-5524101	Y-5524301	Y-5534101	Y-5534301
63A AC22	Y-5625101	Y-5625301	Y-5625101	Y-5625301	Y-5525101	Y-5525301	Y-5535101	Y-5535301
								
63A	Y-5626101	Y-5626301	Y-5626101	Y-5626301				
100	Y-5627101	Y-5627301	Y-5627101	Y-5627301				
125	Y-5629101	Y-5629301	Y-5629101	Y-5629301				
								
63A	YL5626101	YL5626301	YL5626101	YL5626301	YL5526101	YL5526301	YL5536101	YL5536301
100	YL5627101	YL5627301	YL5627101	YL5627301	YL5527101	YL5527301	YL5537101	YL5537301
125	YL5629101	Y-5629301	YL5629101	YL5629301	YL5529101	YL5529301	YL5539101	YL5539301
								
160A	YL562A101	YL562A301	YL562A101	YL562A301	YL552A101	YL552A301	YL553A101	YL553A301
200A	YL562B101	YL562B301	YL562B101	YL562B301	YL552B101	YL552B301	YL553B101	YL553B301
250A	YL562C101	YL562C301	YL562C101	YL562C301	YL552C101	YL552C301	YL553C101	YL553C301

Special Applications

Cam technology provides great flexibility on special applications, we can add load break cells while keeping with an extremely compact unit. By-pass 3+6 or 4+8, motor starting, motor reversing are typical applications that can be conducted with motorised switches that will allways offer local manual operation when remote operation overriding is necessary.



Motor reversing



Motor starting

«A comprehensive range of power transfer units integrating on load motorised changeover and user friendly control logic reassuring your electrical needs.»

Y SERIES
Automatic transfer switch (ATS)

Gave Yseries motorised changeover switches have been designed to perform distant changeover operations.

They secure electromechanical reliability in all sort of applications: transfer supply-generator with or without break, main switch, reverse switch, by-pass,...

Strong competition has made industries, commercial and service companies increasingly dependent on power supply. Preventing consequences of power failure has become a critical element for customer service and business profitability.
Generator and auxiliary power supply systems have become common place on modern installations from small business to large scale facilities.

A comprehensive range of Automatic Transfer Switches has been developed by Gave based on his extensive experience on the field. Design has been done considering installation requirements and user real needs.

Product overview

Enclosed Automatic Transfer Switch Units

ATS + Measuring
25-400A

ATS
25-3200A

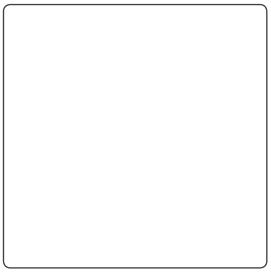
ATS + Emergency
25-3200A

Automatic Transfers Open Type

Open Type
25-250A

Special products

Special ATS



External large synoptic provides user friendly constant indication on system status. Large cable entrance is an installer requirement. Easy configuration is specially adequate for users on residential and commercial applications. The system is designed to offer easy access on local manual emergency/ maintenance operations.

Applications

- Residential transfers
- Commercial buildings
- Sport arenas
- Theatres and auditoriums
- IT power supply systems
- Emergency systems
- Ventilationa and heating systems

ATS
Automatic Transfer Switches

Gave Y Series motorised changeover switches have been designed to perform remote changeover operations.

According to standards

- IEC 60947-3
- IEC 61000

General characteristics

- Motorised changeover
  - 2 And 4 pole changeovers.
  - Ratings from 25A to 3200A.
  - Local manual emergency operation.
  - Clutch mechanism detaches manual switching operation from motorised mechanism (Y Series 40 to 250A).
  - Local padlockable handle for maintenance operations.
  - Mechanical and electrical 0 position equipped from origin.
- Control element:
  - Phase presence and sequence control.
  - Voltage monitoring thresholds adjustable.
  - Control elements fuse protected.
  - Control electronics protected against surge overvoltage (optional on basic models).
  - Operating cycles timer programmable.
  - High peformance power supply protected against output shortcircuit.
  - Changeover power relays with 3 pos. Manual button for test operations.
  - Auxiliary contacts for external signalling and genset command.

System reference

002	25 A	010	100 A	040	400 A	160	1600 A
003	32 A	012	125 A	063	630 A	200	2000 A
004	40 A	016	160 A	080	800 A	250	2500 A
005	63 A AC22	020	200 A	100	1000 A	320	3200 A
006	63 A	025	250 A	125	1250 A		

Serie

CA Enclosed automatic transfer switch
PL Open automatic transfer switch

Rating

CA 0 1 2 006 P

Model

1 control logic
2 control logic + synoptic mains/genset
4 control logic + synoptic&measuring mains/genset
E emergency

Poles

2 two poles
4 four poles

Version

P Surge protector device*
☐ No SPD protection

* included in measuring and emergency models

Y SERIES

- Complete set:
  - Components integrated on metal steel enclosure IP55 with embedded cable entry plate with neoprene seal.
  - Foamed-in polyurethane gasket guarantees watertightness for years.
  - Fixing brackets, fastened with screws from the outside, can be placed horizontally or vertically.
  - Epoxy polyester texturised powder coating colour grey RAL-7035.
  - Solid door fixed with two or three hinges.
  - 3mm standard double bar lock. Wide variety of lock transformations available.
  - Ventilation and thermal solutions available.
  - Terminal connection with flexible cable up to 35mm^2 on transfers ratings up to 125A.
  - Cable lug connection from 160A up to 250A.
  - Busbar connection on 400A and above ratings.

Functionality
Simple "Plug&Play" transfer. Extensive range covering multiple function possibilities such as signalling, measuring, emergency,...

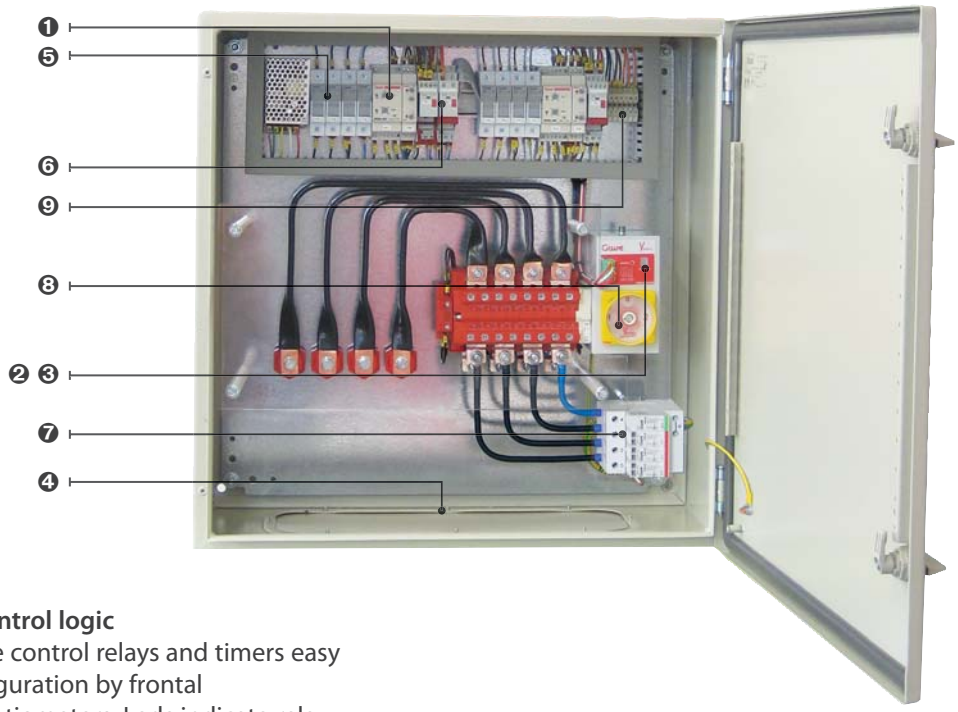
Installation
Wall mounting panels with large cable entries and straightforward terminal connection.

Switching
Well established changeover switching technology with excellent electrical and mechanical endurance charateristics.

Control
User friendly logic control easy to program by adjusting analogic rotary selectors. Signalling leds inform about relays status.

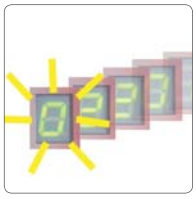
Reliability
Local operation guarantees safe disconnection and transfer operation under all circumstances.

Characteristics



❶ Control logic
Phase control relays and timers easy configuration by frontal potentiometers. Leds indicate relay status.

❷ Changeover information
Quick readout on switch position and operation mode.



❸ Operation counter
Three pushes on shaft and display blinks 5 numbers indicating number of operations.

❹ Embedded bottom plate.
Removable entry plate provides large accessibility.

❺ Fuse protection
Control logic fuse protected.

❻ Miniauture power relays
Space saving power relays with mechanical indication and test button.

❼ Overvoltage surge protector.
Control logic protected against lightning disturbances.

❽ Manual operation
Integrated handle for local backup operation. Padlockable for safety maintenance.

❾ Auxiliary contacts.
External signalling and genset command.

¿Do you need expert support?

We are assisting a large number of specific demands covering multiple varieties on automatic transfer needs ranging from simple adaptions to complex system design.

¿Do you have special needs?

SP/TPN transfers
Changeover between two power supplies one single phase (two poles)and the other three phases (three or four poles)

Transfers with measuring
Automatic transfers with built in measuring function with external or internal display and possibility to integrate communication elements.

Transfers with specific supplies
Automatic transfers with specific power supplies for control logic including direct voltage and battery systems

Transfers with controllers
Automatic transfers with specific controllers integrating specific functions as genset start, control, monitoring,..

Hazardous environments
Automatic transfers with particular requirements for hazardous environments. Increased IP protection, aluminium enclosures, unit thermal management,..

Transfers with Measuring and communication
Automatic transfer integrating communication on the output measuring functionality (RS485 JBUS/ MODBUS; RS485 PROFIBUS/DP; Ethernet)

Transfers with UPS By-Pass
UPS auxiliar supply load pass and insulation by using an integrated by-pass 4+8 pole load switch

ATS with isolation By-Pass
Top and bottom ATS function isolation guaranteeing line continuity through a by-pass system. This operation is performed with a single manual handle operation providing ATS safe disconnection during maintenance operations. Single line and double line possibilities. Double line permits manual changeover supply selection during ATS isolation.

ATS with measuring and signalling
System diagram

❶ Initial status. Mains supply OK.

❷ Phase control relay RF1 detects failure on Mains supply.

❸ Volt free output contact changes status commanding Generator start.

❹ Phase control relay RF2 detects Genset output is OK.

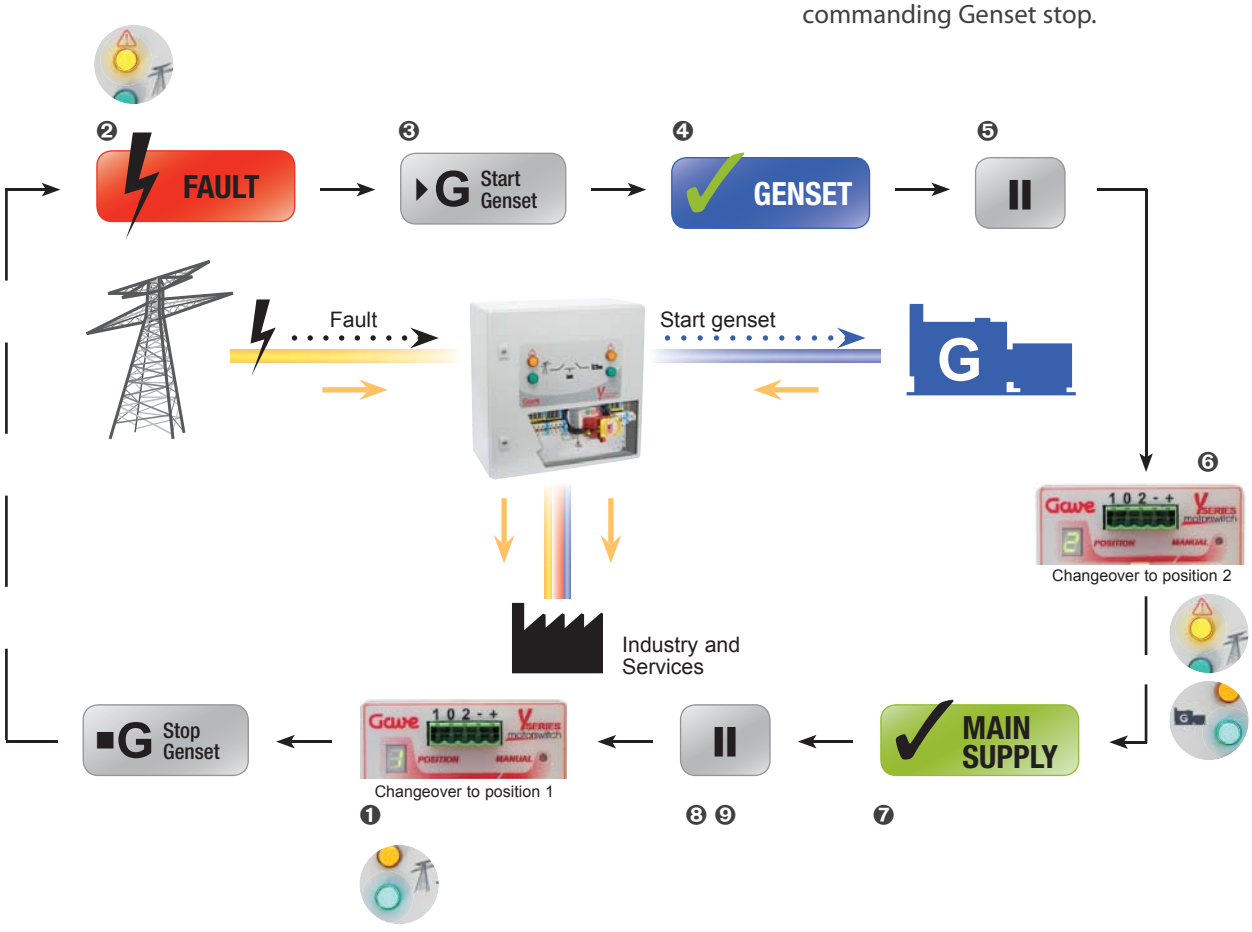
❺ Timer TM1 delays transfer to Genset.

❻ Transfer to Genset is operated.

❼ Failure on Mains supply is over.

❽ Timer TM2 counts return time before retransfer.

❾ Retransfer is operated and output contact returns to initial status commanding Genset stop.



ATS with signalling

Specific characteristics and applications

Automatic transfers 02 are the best choice on those applications where we need constant indication on supply status. A user friendly large size synoptic using easy to understand symbols and high luminosity led pilot lights guarantee that source condition is under control.

- Local emergency/ maintenance manual operation
- User friendly configuartion
- Easy cable access "plug&play"
- Operation counter
- Control logic lightning overvoltage protected (optional)

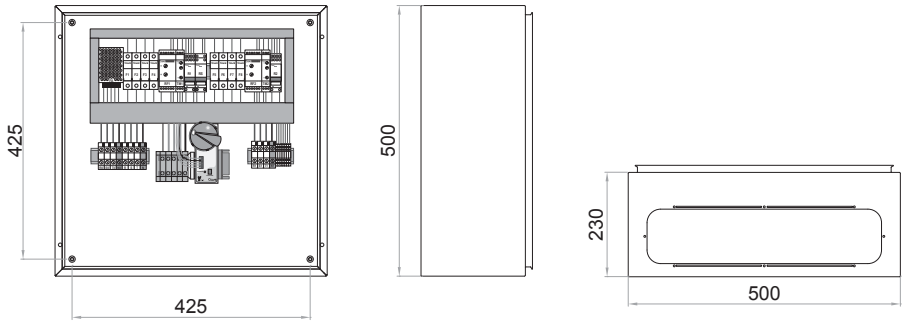
up to 40 A

Description	A	2 poles	4 poles	Logic overvoltage protected	
				2 poles	4 poles
ATS synoptic	40	CA022004	CA024004	CA022004P	CA024004P

from 63 to 125 A

Description	A	2 poles	4 poles	Logic overvoltage protected	
				2 poles	4 poles
ATS synoptic	63	CA022006	CA024006	CA022006P	CA024006P
ATS synoptic	100	CA022010	CA024010	CA022010P	CA024010P
ATS synoptic	125	CA022012	CA024012	CA022012P	CA024012P

Dimensions

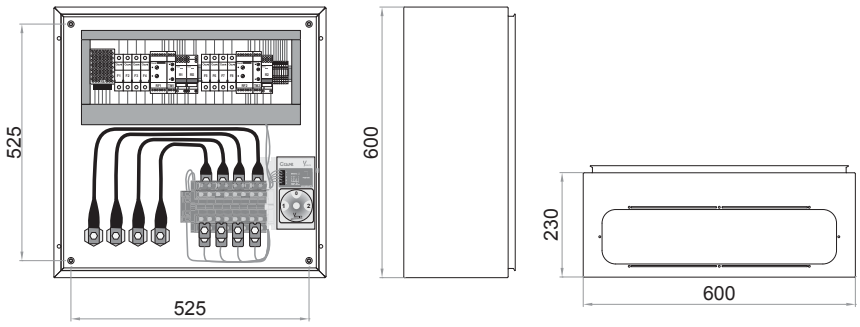


ATS with signalling

from 160 to 250 A

Description	A	4 poles	4 poles logic overvoltage protected
ATS synoptic	160	CA024016	CA024016P
ATS synoptic	200	CA024020	CA024020P
ATS synoptic	250	CA024025	CA024025P

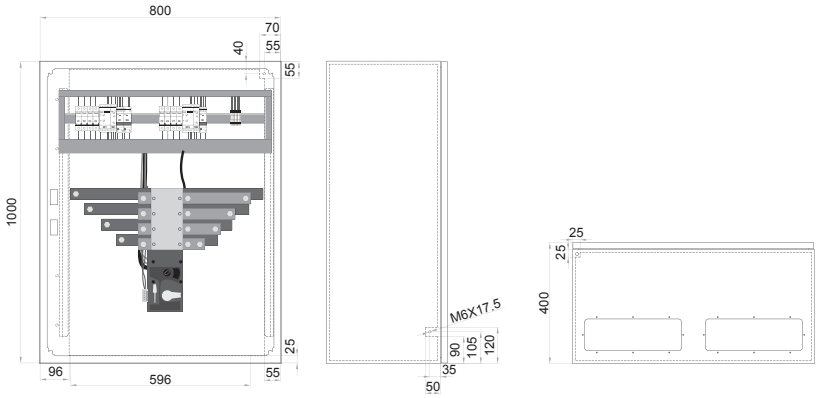
Dimensions



from 400 to 630 A

Description	A	4 poles logic overvoltage protected
ATS synoptic	400	CA024040P
ATS synoptic	630	CA024063P

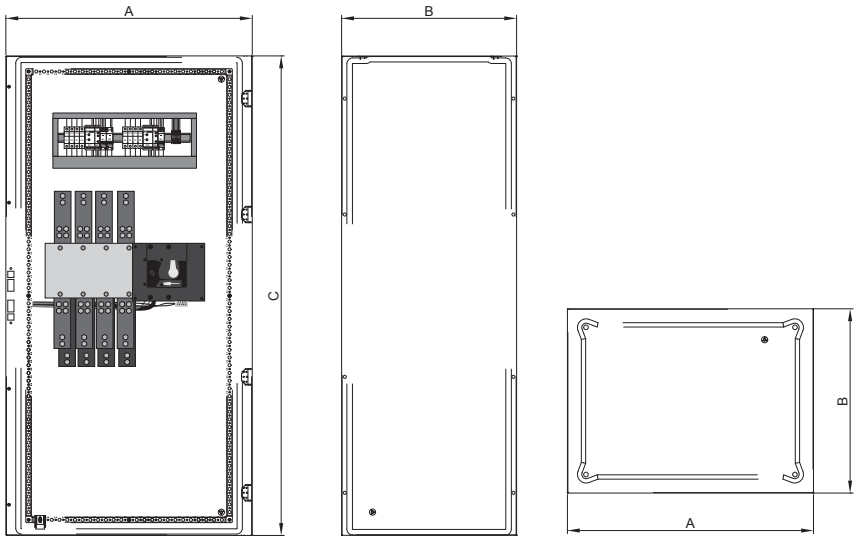
Dimensions



from 800 to 3200 A

Description		A	4 poles logic overvoltage protected
ATS synoptic	1700 x 800 x 600	800	CA024080P
ATS synoptic	1700 x 800 x 600	1000	CA024100P
ATS synoptic	1700 x 800 x 600	1250	CA024125P
ATS synoptic	1700 x 800 x 600	1600	CA024160P
ATS synoptic	1700 x 800 x 800	2000	CA024215P
ATS synoptic	1700 x 800 x 800	2500	CA024250P
ATS synoptic	1700 x 800 x 800	3200	CA024320P

Dimensions



In (A)	A	B	C
800-1600 A	800	600	1700
2000-3200 A	800	800	1700

ATS with measuring

Specific characteristics and applications

Automatic transfer switches integrating measuring functionality are specially adequate on those installations where electricity distribution needs to be monitored and energy management wants to be implemented independently from the supply source.

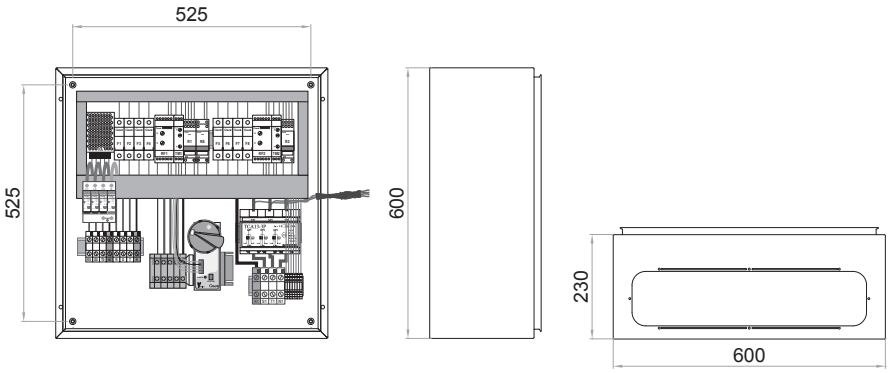
- Multimeasure on transfer output
- High accuracy 0,2% (TRMS measurement)
- Initial display current ratings
- Backlit high luminosity LCD display with easy readout
- User friendly synoptic panel informs on transfer status
- Control logic and measurement protected against lightning overvoltage

1. Backlit LCD display.
2. Direct access button for currents (instantaneous and max. values), current THD and set up wiring correction.
3. Direct access button for voltages and frequencies.
4. Direct access button for active, reactive and apparent power (instantaneous and max. values) and power factor.
5. Direct access button for energies.

up to 40 A

Description	A	2 poles	4 poles
ATS + Measuring	40	CA042004	CA044004

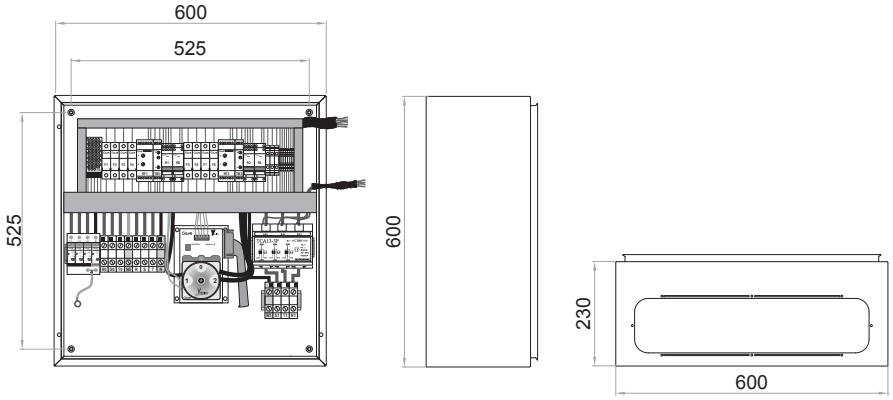
Dimensions



from 63 to 125 A

Description	A	2 poles	4 poles
ATS + Measuring	63	CA042006	CA044006
ATS + Measuring	100	CA042010	CA044010
ATS + Measuring	125	CA042012	CA044012

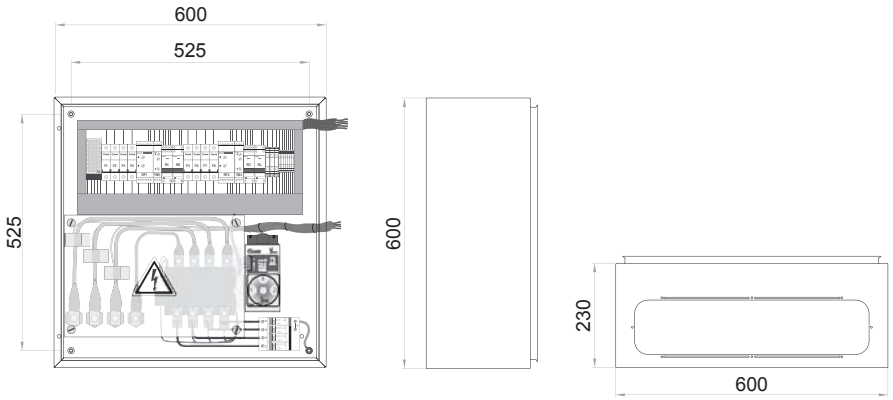
Dimensions



from 160A to 250 A

Description	A	4 poles logic protected
ATS + Measuring	160	CA044016
ATS + Measuring	200	CA044020
ATS + Measuring	250	CA044025

Dimensions

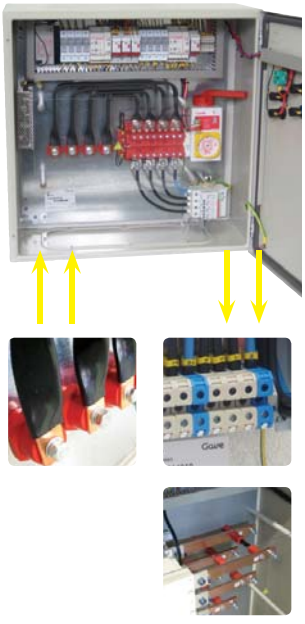


ATS with emergency function from 25 to 3200A

Automatic transfers with emergency function are specially adequate on industry and public buildings where a quick access to emergency supply stop is required. An internal battery system guarantees transfer system supply autonomy assuring automatic operation and effective emergency external stop.

Main characteristics

Plug and play solution



- Plug and play.
- Direct connection to terminal cable lugs or busbar.
- Mains - Genset inputs and Load output plus auxiliary contacts.

Emergency stop

- Emergency stop latching mushroom with trigger action according to EN 418
- Motorised changeover supply continuity secured with battery system.
- Synoptic signalling secured with battery supply.
- Built-in battery charger.

Signalling

Identify

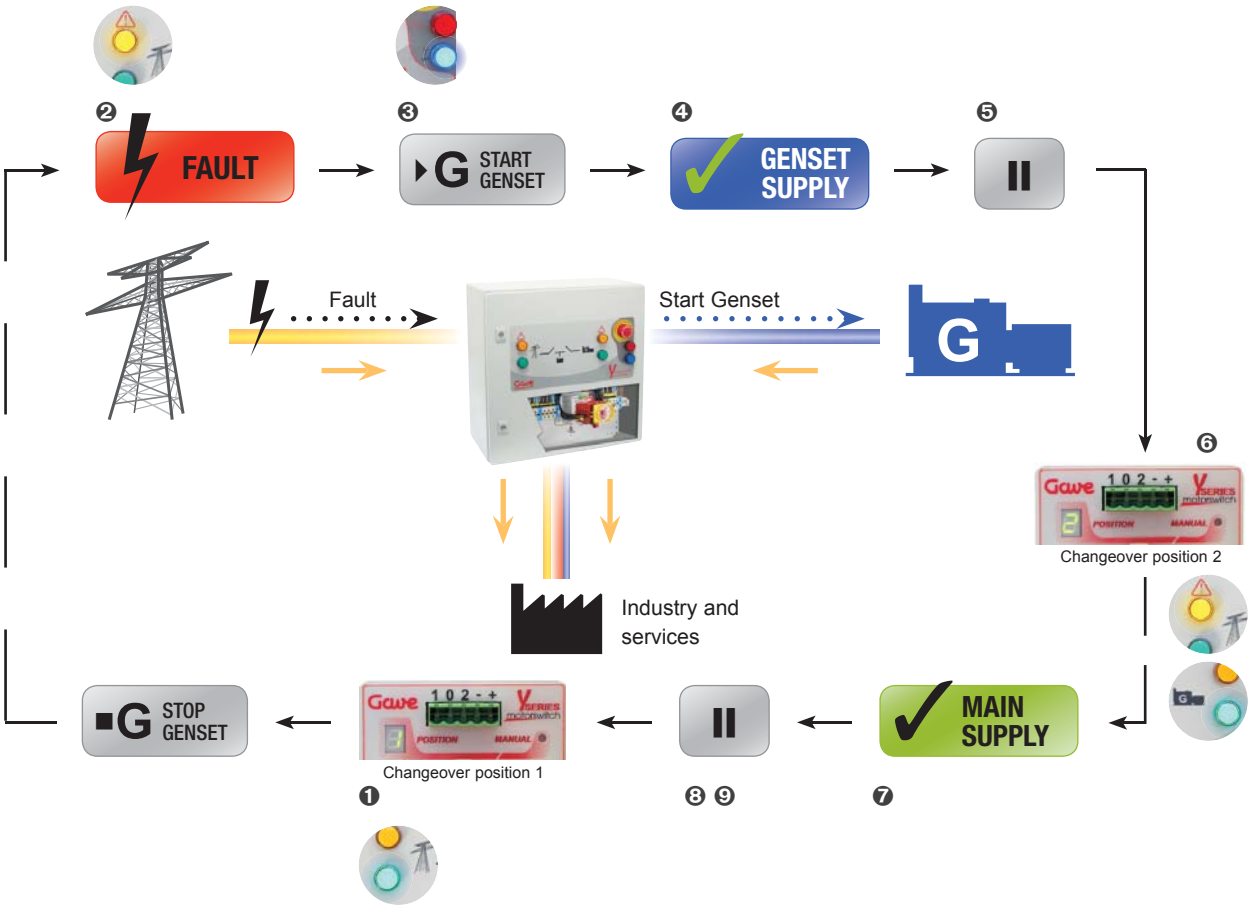
- Instruction sheet attached with unit.
- Easy wiring recognition
- Product label with tracking system.

Control

- RF02I: Phase control relay
- TM01: Timer
- 211: Fuse-holder disconnectors
- VCBC: Power Supply +battery charger
- PST440: Surge protector device Imax 40kA

System diagram

❶ Initial status. Mains supply OK.
❷ Phase control relay RF1 detects failure on Mains supply. Yellow pilot lights on.
❸ Volt free output contact changes status commanding Generator start. Changeover switches to position 0. Blue pilot lights on.
❹ Phase control relay RF2 detects Genset output is OK.
❺ Timer TM1 delays transfer to Genset.
❻ Transfer to Genset is operated. Position 0 blue pilot lights off. Genset green pilot lights on.
❼ Failure on Mains supply is over.
❽ Timer TM2 counts return time before retransfer.
❾ Retransfer is operated and output contact returns to intial status commnanding Genset stop.



Emergency stop

❶ Emergency stop. Push latching mushroom with trigger action according to EN 418. Changeover switchs to position 0 with priority from its current position or logic. Blue pilot lights on indicating changeover switch on position 0 and red pilot lights on indicating emergency stop.
❷ Turn mushroom to release. Automatic transfer command return to logic control.

ATS with emergency function

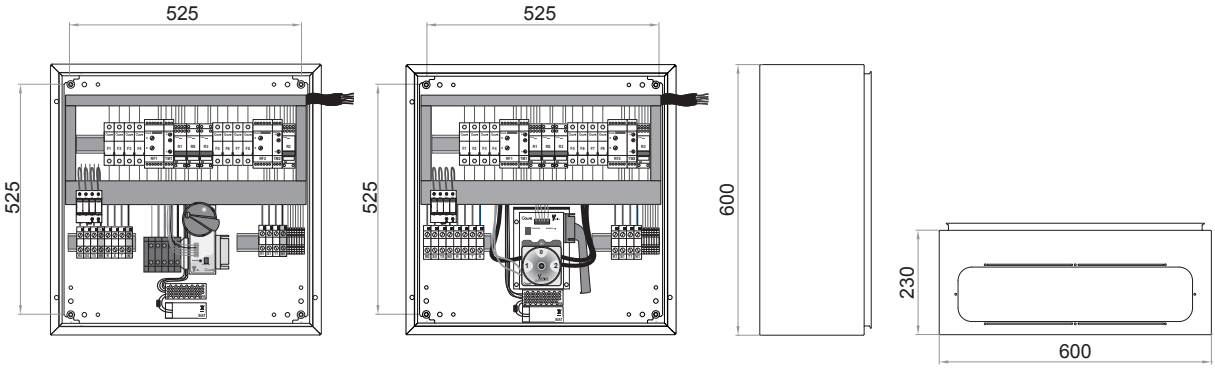
up to 40 A

Description	A	2 poles	4 poles
ATS + emergency	40	CA0E2004	CA0E4004

from 63 to 125 A

Description	A	2 poles	4 poles
ATS + emergency	63	CA0E2006	CA0E4006
ATS + emergency	100	CA0E2010	CA0E4010
ATS + emergency	125	CA0E2012	CA0E4012

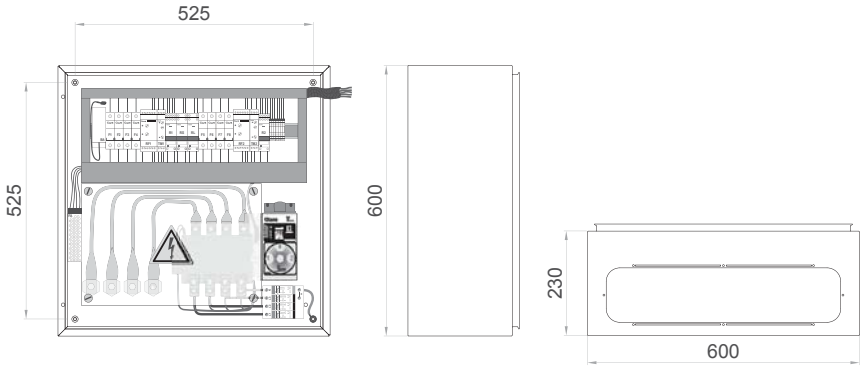
Dimensions



from 160 to 250 A

Description	A	4 poles
ATS + emergency	160	CA0E4016
ATS + emergency	200	CA0E4020
ATS + emergency	250	CA0E4025

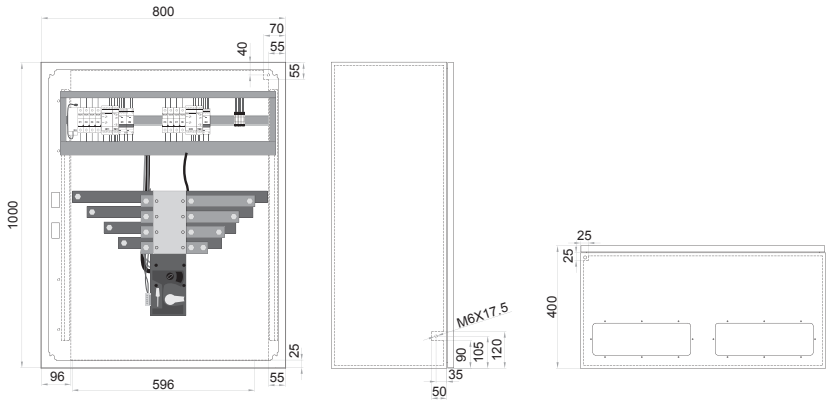
Dimensions



from 400 to 630 A

Description	A	4 poles
ATS + emergency	400	CA0E4040
ATS + emergency	630	CA0E4063

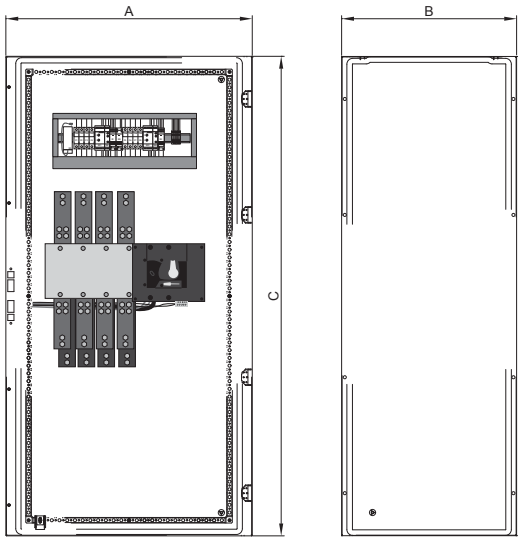
Dimensions



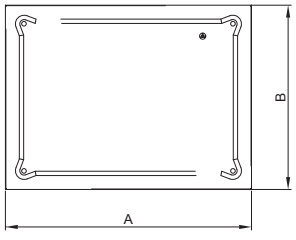
from 400 to 630 A

Description	dimensions	A	4 poles
ATS + emergency	1700 x 800 x 600	800	CA0E4080
ATS + emergency	1700 x 800 x 600	1000	CA0E4100
ATS + emergency	1700 x 800 x 600	1250	CA0E4125
ATS + emergency	1700 x 800 x 600	1600	CA0E4160
ATS + emergency	1700 x 800 x 800	2000	CA0E4120
ATS + emergency	1700 x 800 x 800	2500	CA0E4250
ATS + emergency	1700 x 800 x 800	3200	CA0E4320

Dimensions



In (A)	A	B	C
800-1600 A	800	600	1700
2000-3200 A	800	800	1700



«When ATS function on switchgear designs need to combine user friendly logics while keeping with integration flexibility an open type range of transfers is available»

ATS open type

ATS Open type adapt to your installation needs.

Switchgear system engineers integrate their automatic transfers into their system designs. Commercial and residential installation might often be operated by non specialist personnel, particularly when local manual stand-by or emergency operation is required. In such a case a simple user friendly transfer should be considered as an ideal solution.

A range of open type transfer switches is available with three different sizes ranging from 40A up to 250A. Control logic is based on easy to configurate potentiometers. Led indication on control relays and transfer timers will permit an easy readout on the transfer status.

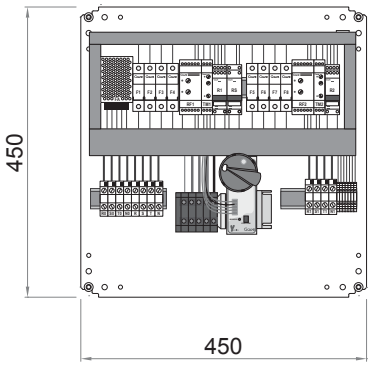
up to 40 A

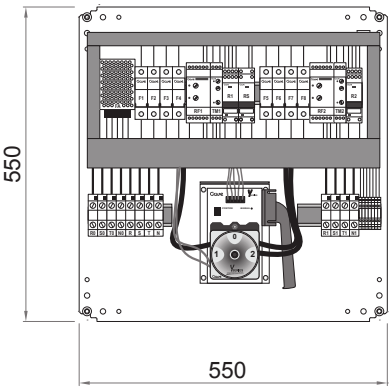
Description	A	2 poles	4 poles
Basic ATS Open Type	40	PL012004	PL014004

from 63 to 125 A

Description	A	2 poles	4 poles
Basic ATS Open Type	63	PL012006	PL014006
Basic ATS Open Type	100	PL012010	PL014010
Basic ATS Open Type	125	PL012012	PL014012

Dimensions

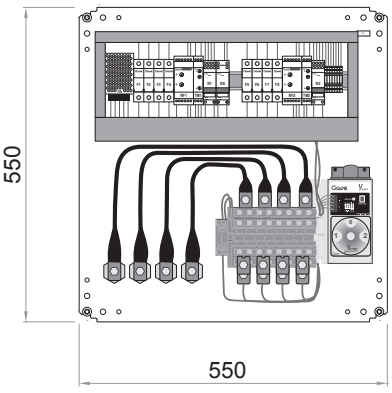




from 160 to 250 A

Description	A	4 poles
Basic ATS Open Type	160	PL014016
Basic ATS Open Type	200	PL014020
Basic ATS Open Type	250	PL014025

Dimensions



Control relays
and protection

Control relays

Modern industry is characterised by automated continuous production process that must be under control in order to avoid high costs associated to irregular operation and unexpected stops. Employing control relays on industrial installations will permit monitoring network supply and prevent potential breakdowns. Machinery maintenance will be supported by anticipatory protection.

General characteristics

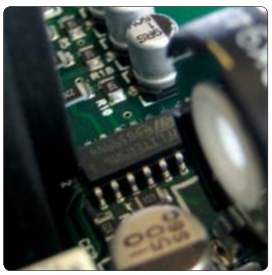
Direct setting
Frontal direct setting and reading of measurement thresholds and time delays

On product information
Wiring and relay characteristics on side Product easy recognition with reference on face.

Specific transformer
Oversized transformer stands supply variations and filters disturbances

Firmware

Large flexibility on control specific requirements by integrating programable non-volatile memory. Customised products to particular market and OEM needs.



Phase Control

Aimed to protect motors where phase sequence is specially relevant (lifts, cranes, escalators,..) or phase failure can be specially damaging.

References
RF011 RF01 RF01A

Current and temperature monitoring

Monitoring currents and temperature on mechanical loads such as motors, pumps and resistors increase protection on applications such as pumping, ventilation, lifts and conveyors.

References
RC RTM

Voltage Monitoring

Industrial process requiring additional protection and preventive action install complex voltage monitoring relays that additional to phase failure and sequence protection offer voltage control within established threshold and adjustable timings. We find it in automation systems, refrigeration, network transfers.

References
RF02 RF02N RF-UT
RF03 RF03N

Applications

- Motors
- Moving equipment (cranes, lifts, escalators,conveyors)
- Refrigaration
- Extraction fans
- Pumps
- Automatic transfer supplies
- System automation

→ Monitor

Control relays are measurement units that continuously monitor electrical values within established parameters.

→ Control

Output relays operate with positive logic, contacts are closed on normal conditions and will open when control electronics detect network faults.

→ Protection

Your equipment is protected against network faults and all associated damages.

→ Signalling

Operating set, working status and failure conditions are informed through rotary selectors and signalling led located on the front face.

RF011

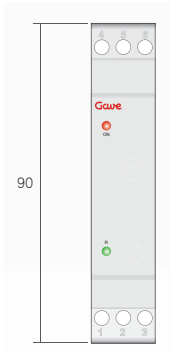
Phase Failure and Phase Sequence Relay

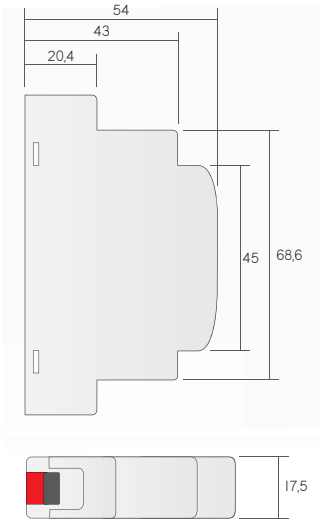
Voltage monitoring relay for three phase supply.
Protects against Phase Failure (loss) and Phase Sequence.

Characteristics

- Mounting on symmetrical DIN rail
- Connects when detecting: 3 phases
  correct phase sequence RST presence
- Trips when detecting: phase failure
  incorrect phase sequence
- Phase failure is considered when nominal voltage is < 85% rated
- Output changeover relay 5A / 250V AC cos φ = 1
- Operating temperature: -10º to + 60ºC

Dimensions

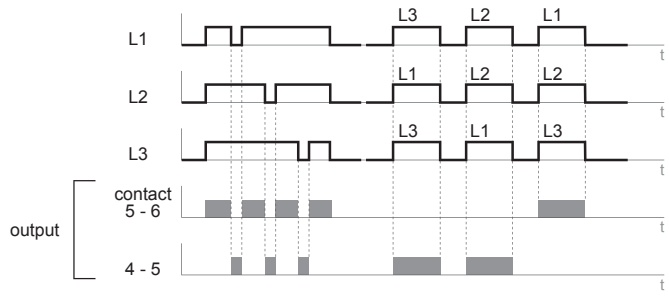




References

References	Width (modules)	Reset time	Voltage
RF011	17,5mm (1)	0,1 sec.	208-480V AC

Diagram



Signalling

ON (red)	R (green)	Status
⊗	●	supply
●	●	incorrect phase sequence
⊗	☼	phase failure

● ON ⊗ OFF ☼ BLINK

RF01

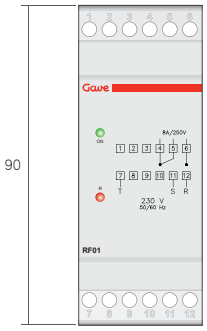
Phase Failure and Phase Sequence Relay

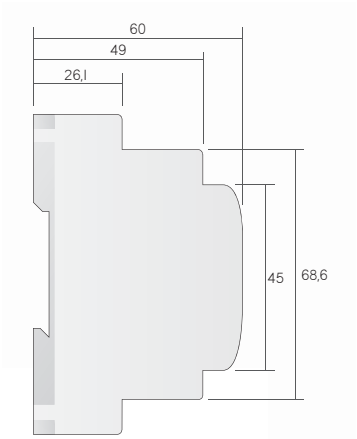
Voltage monitoring relay for three phase supply.
Protects against Phase Failure (loss) and Phase Sequence.

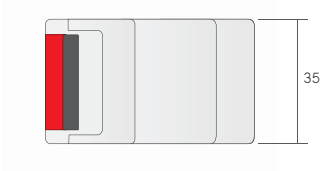
Characteristics

- Mounting on symmetrical DIN rail
- Connects when detecting: 3 phases presence
  correct phase sequence RST presence
- Trips when detecting: voltage drop > 25%
  incorrect phase sequence
- Phase failure is considered when nominal voltage is < 75% rated
- Output changeover relay 8A / 250V AC cos φ = 1
- Operating temperature: -10º to + 60ºC

Dimensions



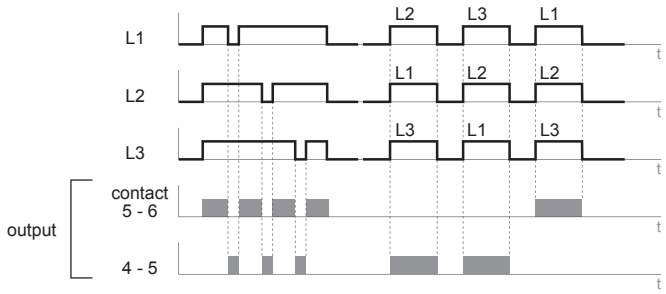




References

References	Width (modules)	Reset time	Voltage
RF01-230	35mm (2)	0,1 sec.	230 V
RF01-400	35mm (2)	0,1 sec.	400 V

Diagram



Signalling

R (red)	ON (green)	Status
⊗	●	supply
●	●	incorrect phase sequence
⊗	⊗	phase failure

● ON ⊗ OFF ☼ BLINK

RF01A

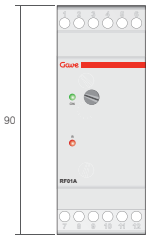
Adjustable Phase Failure and Phase Sequence Relay

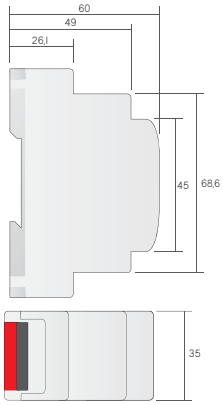
Electronic relay for three phase supply monitoring and protecting against disturbances on the main supply.
Protection against Phase Failure (loss) and Phase Sequence.
Undervoltage adjustable.

Characteristics

- Mounting on symmetrical DIN rail
- Adjustable phase failure tripping
- Connects when detecting: 3 phases
  correct phase sequence RST presence
- Trips when detecting: voltage drop under the preset voltage
  incorrect phase sequence
- Detection of phase failure under preset value
  RF01A-230: adjustable from 150V to 250V
  RF01A-400: adjustable from 300V to 440V
- Output changeover relay 8A / 250V AC cos φ = 1
- Operating temperature: -10º to + 60ºC

Dimensions

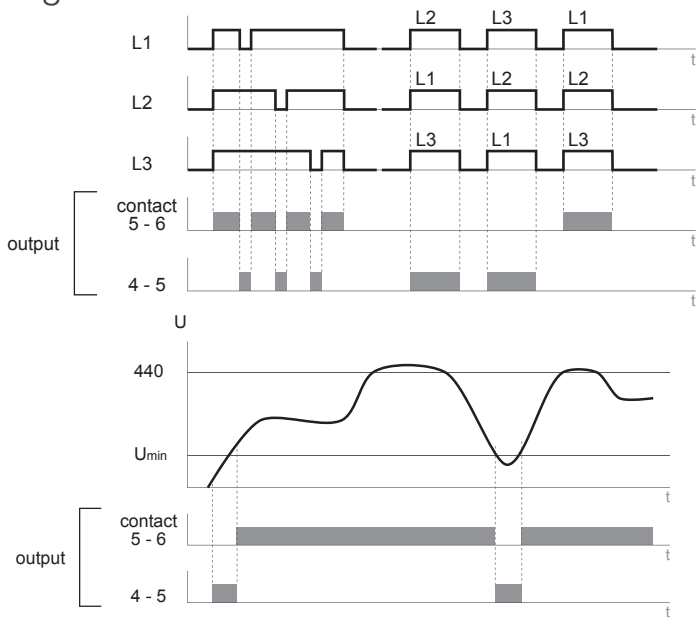




References

References	Width (modules)	Reset time	Voltage
RF01A-230	35mm (2)	0,1 sec.	230 V
RF01A-400	35mm (2)	0,1 sec.	400 V

Diagram



Signalling

R (red)	ON (green)	Status
⊗	●	supply
●	●	incorrect phase sequence
⊗	⊗	phase failure

● ON ⊗ OFF ☼ BLINK

RF-UT

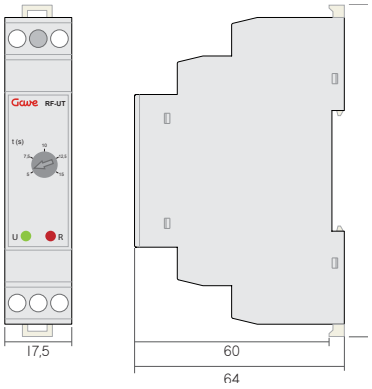
Fixed Undervoltage Relay

Electronic relay for single phase or three phase supply voltage control and protecting against disturbance on the main supply.
Protection against undevoltage at a fixed voltage. Restart time delay to protect motors against abrupt restarts.

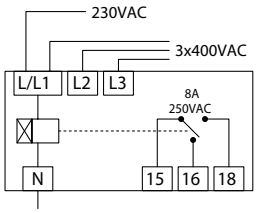
Characteristics

- Compact size width 1 module (17,5 mm)
- 1 output changeover contact
- Breaking capacity: 8A / 250V AC cos φ =1
- Mounting on symmetrical DIN rail
- Energising after time delay when supply voltage >75% Un
- Restart time delay adjustable 5 -15 min

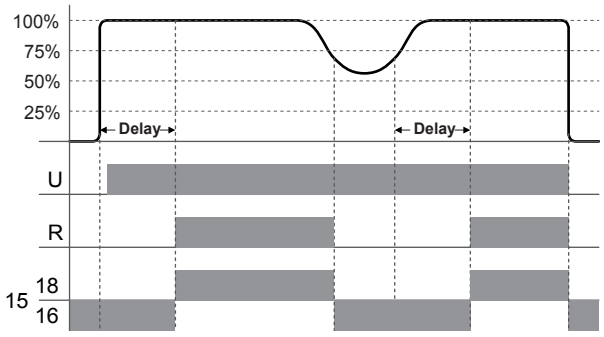
Dimensions



Connection



Diagram



Signalling

R (red)	U (green)	Status
⊗	●	supply
●	●	relay contact closed

● ON ⊗ OFF ☼ BLINK

References

References	Width (modules)	Reset time	Voltage
RF-UT	17,5mm (1)	5-15 min	230 VAC
RF-UT3	17,5mm (1)	5-15 min	3 x 400VAC

RF02

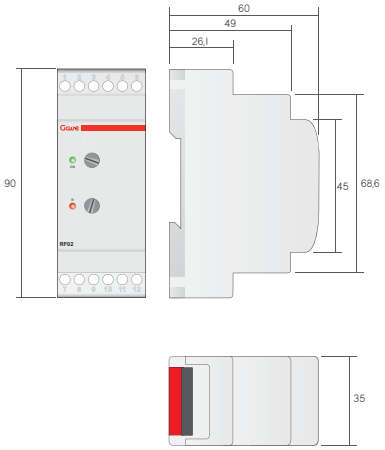
Phase Failure, Sequence and Voltage monitoring Relay

Electronic relay for three phase supply monitoring and protecting against disturbances on the main supply.
Protection against Phase Failure (loss), Phase Sequence and Over/under voltage.

Characteristics

- Mounting on symmetrical DIN rail
- Connects when detecting: 3 phases within the set voltage
  correct phase sequence RST presence
- Trips when detecting: phase failure, incorrect phase sequence, voltage variations
- Adjustable threshold (5 to 20%) for voltage variations (from 0,1 to 10 seconds)
- Output changeover relay 8A / 250V AC cos φ = 1
- Operating temperature: -10º to + 60ºC

Dimensions



References

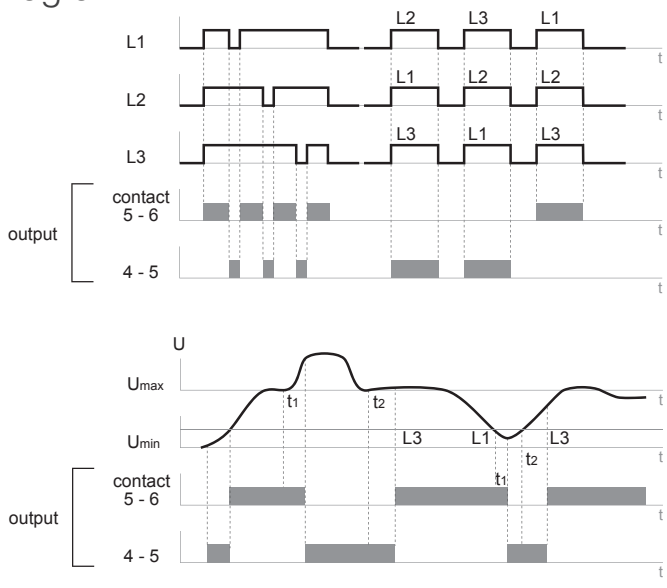
References	Width (modules)	Reset time	Voltage
RF02-230	35mm (2)	3min continuous input voltage within threshold	230 V
RF02-400	35mm (2)		400 V
RF02I-230	35mm (2)	0,1sec.	230 V
RF02I-400	35mm (2)		400 V

Signalling

R (red)	ON (green)	Status
⊗	●	supply
●	●	incorrect phase sequence
☼	●	voltage out of threshold
☼	☼	timing to reset from voltage variation
⊗	⊗	phase failure
⊗	☼	timing to reset from phase failure

● ON ⊗ OFF ☼ BLINK

Diagram



RF02N

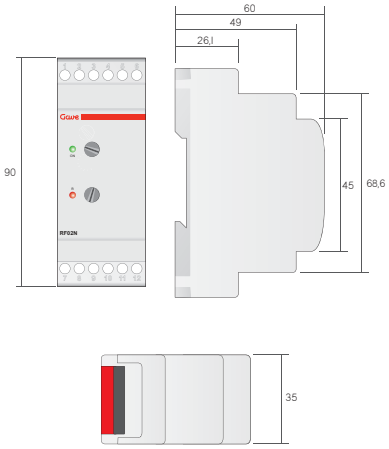
Phase Sequence, Phase + Neutral Failure and Voltage monitoring Relay

Detects an incorrect phase sequence. Detects a failure on any phase.
Detects phase voltage variation

Characteristics

- Mounting on symmetrical DIN rail
- Connects when detecting: 3 phases
  phase sequence RST+N is correct
- Trips when detecting either a phase failure, phase/neutral voltage variations (adjustable threshold ±5 to ±20 %) or an incorrect phase sequence.
- Tripping time, for voltage variations, adjustable from: 0,1 to 10 seconds.
- Tripping time for an incorrect phase sequence or phase failure: 0,1 sec.
- Output: change over relay
- Operating temperature: -10ºC to +60ºC

Dimensions



Signalling

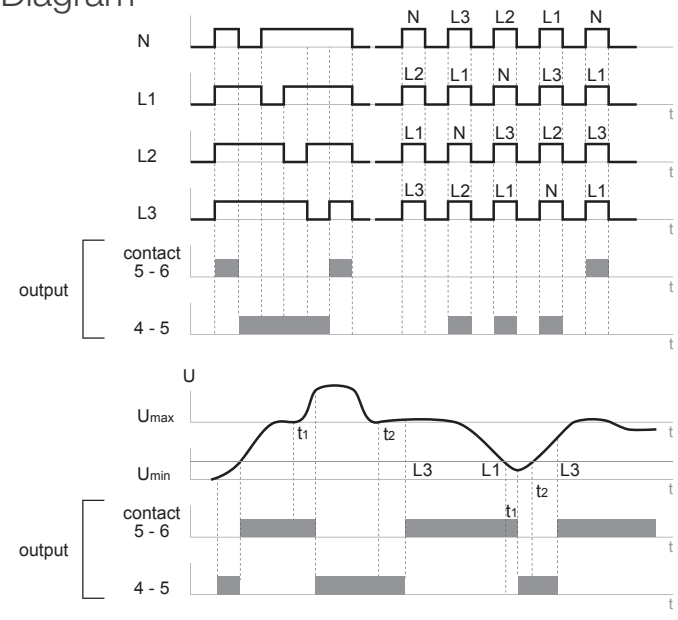
R (red)	ON (green)	Status
⊗	●	supply
●	●	incorrect phase sequence
☼	●	voltage out of threshold
☼	☼	timing to reset from voltage variation
⊗	⊗	phase failure
⊗	☼	timing to reset from phase failure

● ON ⊗ OFF ☼ BLINK

References

References	Width (modules)	Reset time	Voltage
RF02N-230	35mm (2)	3min continuous input voltage within threshold	230 V
RF02N-400	35mm (2)		400 V
RF02NI-230	35mm (2)	0,1sec.	230 V
RF02NI-400	35mm (2)		400 V

Diagram



RF03

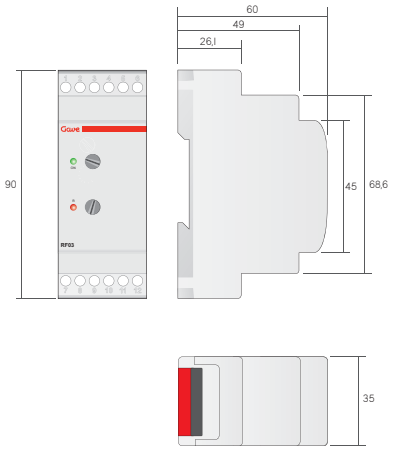
Phase Failure, Sequence and Unbalance Relay

Electronic relay for three phase supply monitoring and protecting against disturbances on the main supply.
Protection against Phase Failure (loss), Phase Sequence and Phase Unbalance.

Characteristics

- Mounting on symmetrical DIN rail
- Connects when detecting: 3 phases within the set voltage
  correct phase sequence RST presence
- Trips when detecting: phase failure, incorrect phase sequence, phase unbalance
- Tripping time delay adjustable against short time voltage variations
- Phase unbalance adjustable threshold (5 to 15%)
- Output changeover relay 8A / 250V AC cos φ = 1
- Operating temperature: -10º to + 60ºC

Dimensions



References

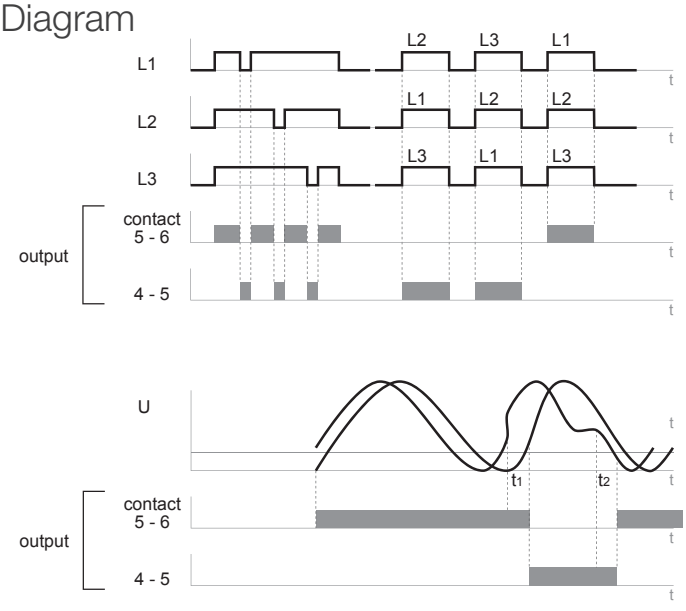
References	Width (modules)	Reset time	Voltage
RF03-400	35mm (2)	3min continuous input voltage within threshold	400 V
RF03I-400	35mm (2)	0,1sec.	400 V

Signalling

R (red)	ON (green)	Status
⊗	●	supply
●	●	incorrect phase sequence
☼	●	voltage out of threshold
☼	☼	timing to reset from voltage variation
⊗	⊗	phase failure
⊗	☼	timing to reset from phase failure

● ON ⊗ OFF ☼ BLINK

Diagram



RF03N

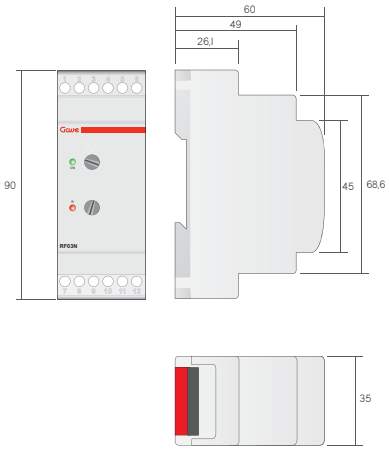
Phase Failure, Sequence and Unbalance Relay

Detects an incorrect phase sequence
Detects a failure on any phase
Detects phase unbalance

Characteristics

- Connects when detecting: 3 phases
  phase sequence RST+N is correct
- Trips when detecting phase failure, a phase unbalance (adjustable threshold 5 to 15 %) or an incorrect phase sequence
- Tripping time, for voltage variations, adjustable from: 0,1 to 10 seconds.
- Tripping time for an incorrect phase sequence or phase failure: 0,1 sec.
- Output: change over relay
- Working temperature: -10ºC to +60ºC
- Phase failure is considered when voltage is lower than 160V between phase and neutral.

Dimensions



Signalling

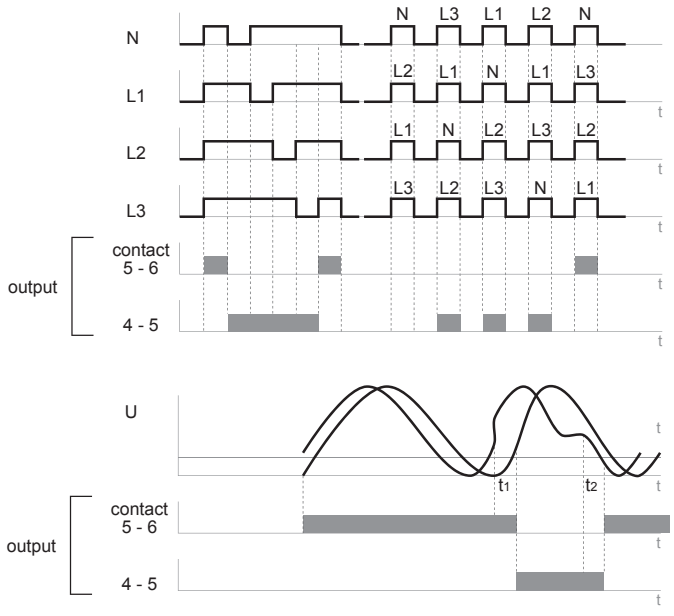
R (red)	ON (green)	Status
⊗	●	supply
●	●	incorrect phase sequence
☼	●	voltage out of threshold
☼	☼	timing to reset from voltage variation
⊗	⊗	phase failure
⊗	☼	timing to reset from phase failure

● ON ⊗ OFF ☼ BLINK

References

References	Width (modules)	Reset time	Voltage
RF03N-400	35mm (2)	3min continuous input voltage within threshold	400 V
RF03NI-400	35mm (2)	0,1sec.	400 V

Diagram



RC

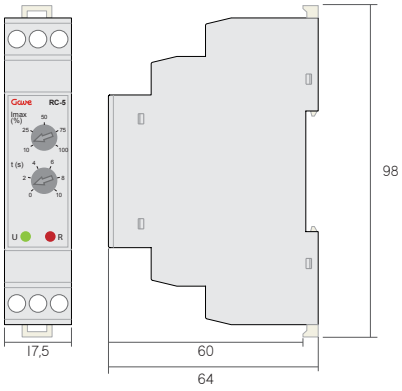
Over Current Relay

Over current Electronic control relay using external sensor in order to monitor electrical and mechanical loads such as motors.

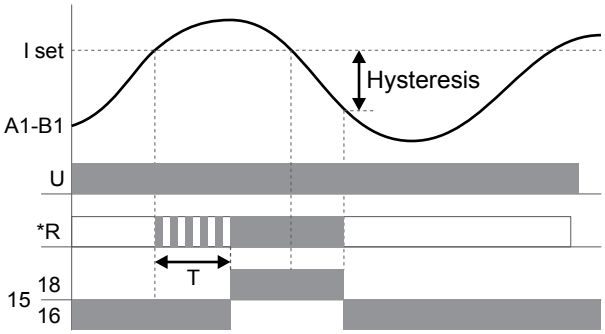
Characteristics

- Current control relay sensing from current transformer
- Current range 5-100% In
- Compact size width 1 module (17,5 mm)
- Consumption: 2,5VA
- Output contacts switching capacity: 8A / 250V AC cos φ =1
- Mounting on simmetrical DIN rail
- Usable for DC current and AC current autorecognized
- Supply is not galvanically separated from measured current, it must be in the same phase
- Adjustable tripping time delay from 0,1 to 10 sec.
- Multivoltage
- Current range 0.25-5 (RC-5) / 0.8-16 (RC-16)

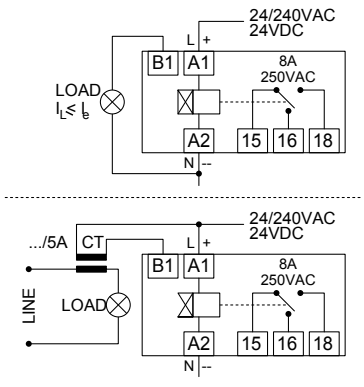
Dimensions



Diagram



Connection



References

References	Width (modules)	Current range	Voltage
RC-5	17,5mm (1)	0,25-5A	24VDC / 24-240VAC
RC-16	17,5mm (1)	0,8-16A	24VDC / 24-240VAC

Signalling

R	U	Status
⊗	●	voltage presence
●	●	tripping voltage relay connected
●	●	tripping voltage relay disconnected

● ON ⊗ OFF ☼ BLINK

RTM

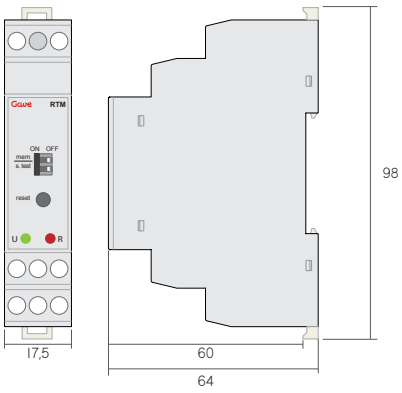
Motor Temperature Relay

Electronic control relay providing thermal protection using external PTC sensor to monitor motor overheating due to overload condition. Relay monitors probe short circuit and line break (wire broken).

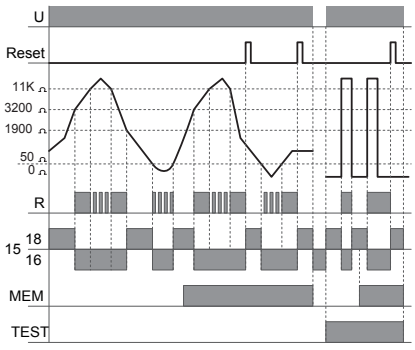
Characteristics

- Compact size width 1 module (17,5 mm)
- Consumption: 2,5VA
- Output contacts breaking capacity: 8A / 250V AC cos φ =1
- Mounting on simmetrical DIN rail
- Sensor PTC according to DIN 44081 total resistence R1+R2+RN <1.5 kΩ
- Tripping resistence 3.2kΩ +-10%
- Reset resistence 1.9kΩ +-10%
- Manual or automatic reset
- 3 operating modes: normal, memory, and test

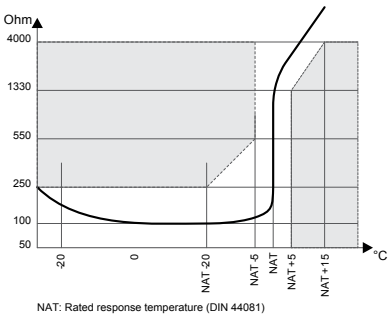
Dimensions



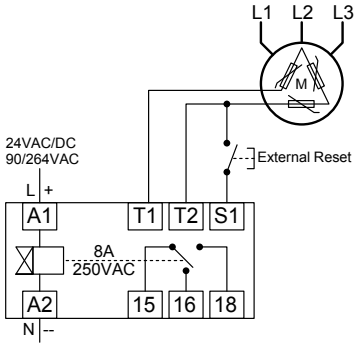
Diagram



PTC resistive curve



Connection



References

References	Width (modules)	Voltage
RTM	17,5mm (1)	230 V
RTM-24	17,5mm (1)	24VAC/DC

Signalling

R	U	Status
⊗	●	voltage presence
●	●	relay contact closed

● ON ⊗ OFF ☼ BLINK

Pump control relays

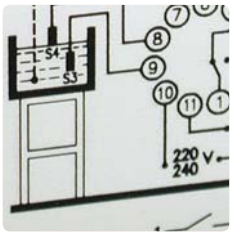
Managing water and conductive liquids are an essential part of modern societies illustrated in water plants, factory production processes, agriculture irrigation, pools,..
Pumps are the core of liquid flow systems and they require efficient control in order to avoid service continuity problems and expensive costs associated to system breakdowns such as pump dry running.

General characteristics

Sensitivity
Frontal direct setting of sensitivity adjustment. Two sensitivities on double level controllers.

Indication LEDs
Indicates relay operational status.

On product information
Relay characteristics, and wiring diagram direct reading on product...



Reinforced electronics
Harsh EMC testing and varistor protection against overvoltage disturbances.

Modularity
All range offers is modular (45mm cutout) including plug-in types.

Level control relays

Conductive liquids are monitored by level control relays that operate based on the principle of liquid resistivity. Sensitivity adjustment permits adapting the circuit to each specific liquid characteristics. Control relays prove more reliable than float switches which demonstrate faulty with vibration, condensation, or polluted environments.
Level controllers will command the pump on filling and draining operations.

References
HN1P HN2P HN12 HN12A HN22

Alternating relays

Liquid systems with multiple pumps use alternating relays in order to balance motor start-ups, diminish maintenance operations on stand-by pumps and optimising load capacity and load sharing on the system. The system does benefit from longer live and increases productivity.

References
AR01 AR02 AR03

Applications

- Pumping systems
- Water plants
- Sewage plants
- Irrigation
- Industrial liquid systems
- Pools

Monitor

Level controllers can adjust sensitivity measurement to specific liquid conditions and monitor filling/draining on wells and tanks. Double types offer optimum coordination between two different reservoirs.

Safety

Transformer insulation between measuring circuit and command circuit guarantees safety.

Protection

Your equipment is protected against idle functioning and live is enlarged by balancing loads. Varistor protection on the electronic circuit prevents damages on the control due to lightning effects.

Signalling

Sensitivity adjusment, relay status and power supply are indicated through rotary selectors and signalling leds located on the front face.

HN12

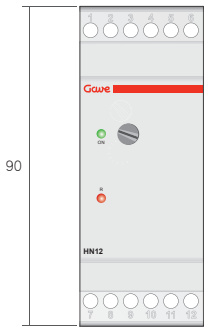
Single Level Control Relay

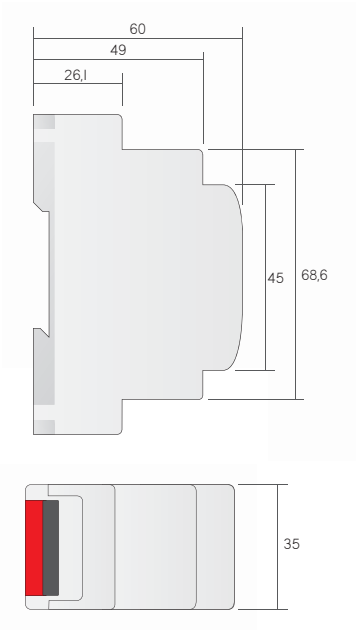
Electronic modular relay for automatic control of conductive liquids in a single tank.
Adjustable sensitivity, either well or tank.
Monitoring filling (up) or empting (down).

Characteristics

- Mounting on symmetrical DIN rail
- Output changeover relay 8A / 240V AC cos φ = 1
- Protection up to 2500V peak (1,2-50 µs) in voltage supply and probes against lightning disturbances on the supply
- Operating temperature: -10º to + 60ºC

Dimensions

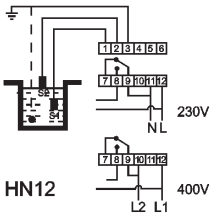


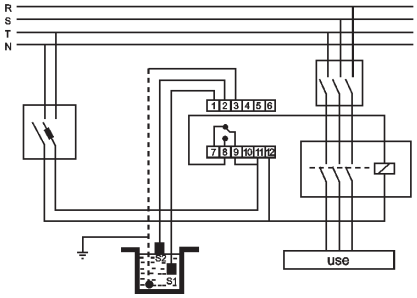


References

References	Width (modules)	Voltage supply	Function
HN12	35mm (2)	230V-400V AC	well or tank
HN12-24AC	35mm (2)	24V AC	
HN12-12DC	35mm (2)	12V AC	

Diagram





Signalling

R (red)	ON (green)	Status
⊗	●	supply
●	●	output

● ON ⊗ OFF ☼ BLINK

HN22

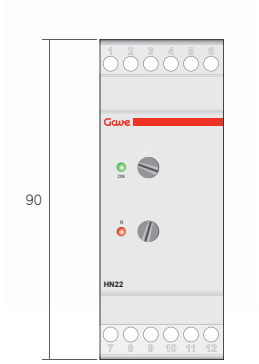
Double Level Control Relay

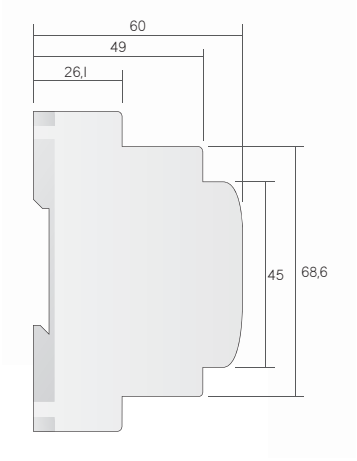
Electronic modular relay for automatic control of conductive liquids in two different tanks.
Two independent adjustable sensitivities, for well and tank.
Monitoring filling (up) or empting (down).
Both functions combined for monitoring the pumping out of a well and filling of a tank.

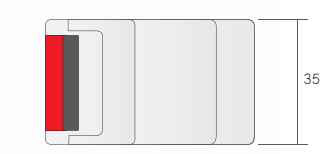
Characteristics

- Mounting on symmetrical DIN rail
- Output changeover relay 8A / 240V AC cos φ = 1
- Protection up to 2500V peak (1,2-50 µs) in voltage supply and probes against lightning disturbances on the supply
- Operating temperature: -10º to + 60ºC

Dimensions



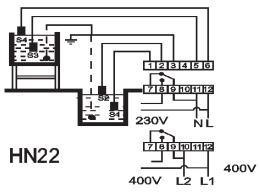


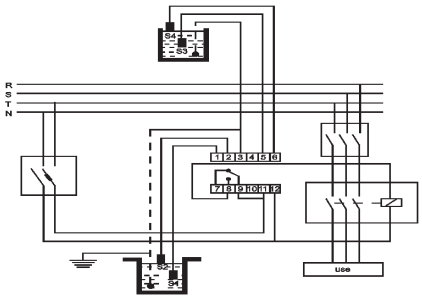


References

References	Width (modules)	Voltage supply	Function
HN22	35mm (2)	230V-400V AC	well and tank
HN22-24AC	35mm (2)	24V AC	

Diagram





Signalling

R (red)	ON (green)	Status
⊗	●	supply
●	●	output

● ON ⊗ OFF ☼ BLINK

HN12A

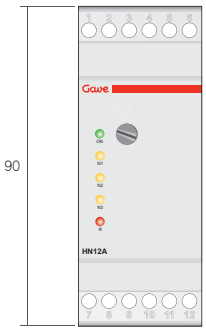
Single Level Control Relay with 3 intermediate levels

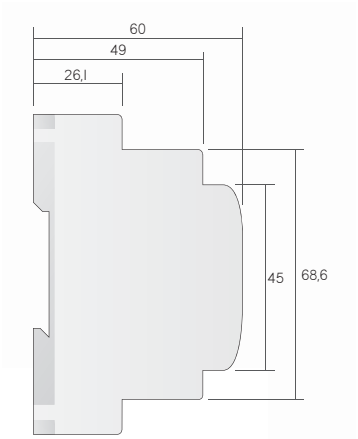
Electronic modular relay for automatic control of conductive liquids in a single tank.
Adjustable sensitivity, either well or tank.
Monitoring filling (up) or empting (down).

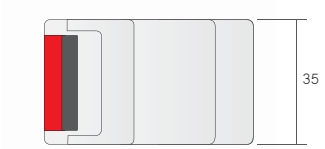
Characteristics

- Mounting on symmetrical DIN rail
- Output changeover relay 8A / 240V AC cos φ = 1
- Protection up to 2500V peak (1,2-50 µs) in voltage supply and probes against lightning disturbances on the supply
- Operating temperature: -10º to + 60ºC

Dimensions



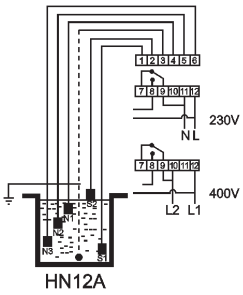


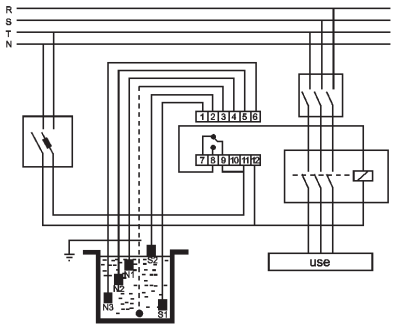


References

References	Width (modules)	Voltage supply	Function
HN12A	35mm (2)	230V-400V AC	well or tank

Diagram





Signalling

level

R (red)	ON (green)	Status
⊗	●	supply
●	●	output

● ON ⊗ OFF ☼ BLINK

HN1P

Single Level Control Relay

Electronic modular relay for automatic control of conductive liquids in a single tank.
Adjustable sensitivity, either well or tank.
Monitoring of filling (up) or empting (down).

Characteristics

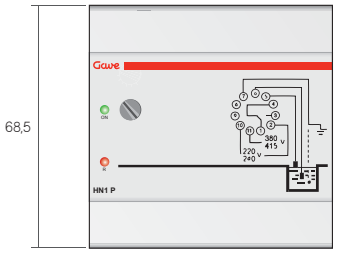
- Plug-in base mounting (11 pin)
- Mounting options: on symmetrical DIN rail
  panel mounting with one screw DIN 963, M4
  panel mounting with two screws and two nuts, M3
- Protection up to 2500V peak (1,2-50 µs) in voltage supply and probes against lightning disturbances on the supply
- Output changeover relay 8A / 240V AC cos φ = 1
- Operating temperature: -10º to + 60ºC

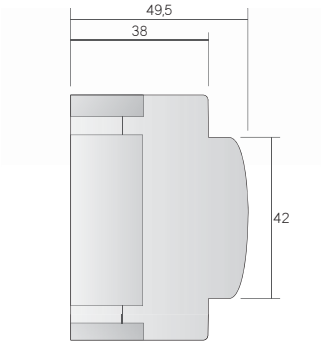
included

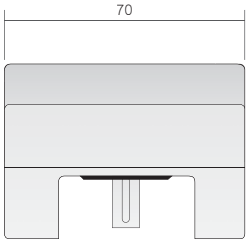
1x 

2x 

Dimensions





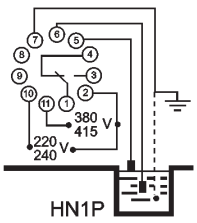


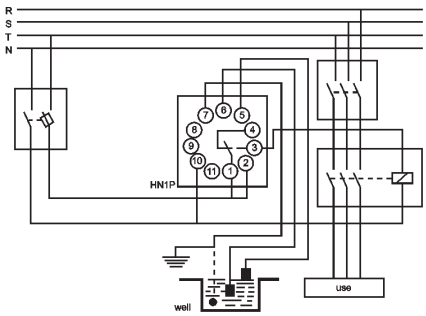
References

References	Width (modules)	Voltage supply	Function
HN1P	70mm (4)	230V-400V AC	well or tank
HN1PLD *	70mm (4)	230V-400V AC	

* High sensitivity long distance

Diagram





Signalling

R (red)	ON (green)	Status
⊗	●	supply
●	●	output

● ON ⊗ OFF ☼ BLINK

HN2P

Double Level Control Relay

Electronic relay for the automatic control of conductive liquids in two different tanks.
Two independent adjustable sensitivities, for well and tank.
Monitoring filling (up) or empting (down).
Both functions combined for monitoring the pumping out of a well and filling of a tank.

Characteristics

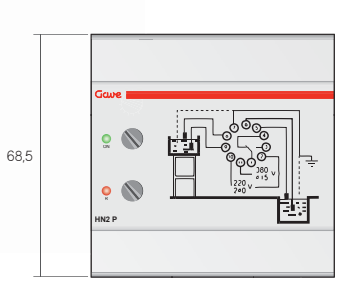
- Plug-in base mounting (11 pin)
- Mounting options: on symmetrical DIN rail
  panel mounting with one screw DIN 963, M4
  panel mounting with two screws and two nuts, M3
- Protection up to 2500V peak (1,2-50 µs) in voltage supply and probes against lightning disturbances on the supply
- Output changeover relay 8A / 240V AC cos φ = 1
- Operating temperature: -10º to + 60ºC

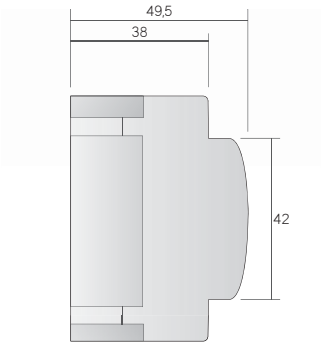
included

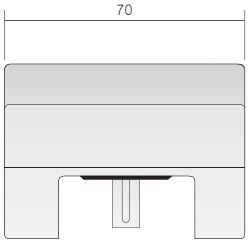
1x 

4x 

Dimensions



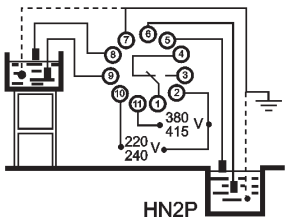


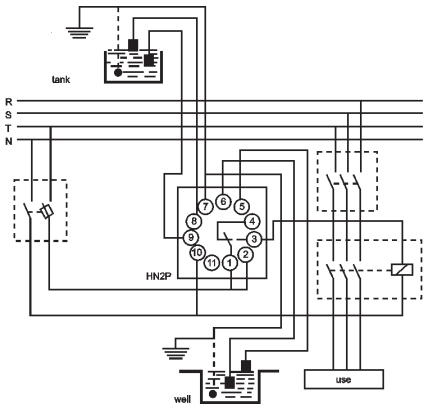


References

References	Width (modules)	Voltage supply	Function
HN2P	70mm (4)	230V-400V AC	well and tank

Diagram





Signalling

R (red)	ON (green)	Status
⊗	●	supply
●	●	output

● ON ⊗ OFF ☼ BLINK

AR01

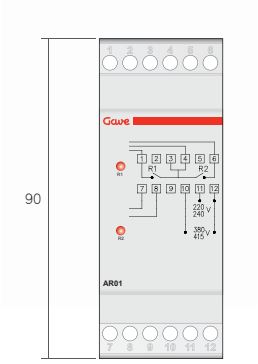
Alternating Relay

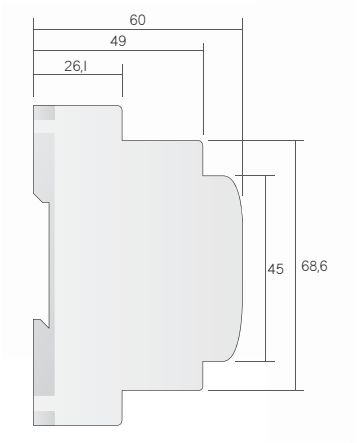
Electronic relay designed to alternate 2 different outputs (pumps, compressors...) controlled by an external signal.
Alternates cyclically between 2 outputs.

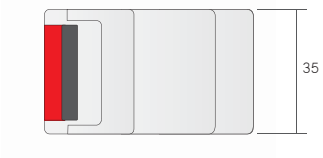
Characteristics

- Real changeover relay to alternate cyclically and to avoid short-cycling
- When the device is receiving no external signal, both changeover contacts will remain open
- Mounting on symmetrical DIN rail
- Output changeover relay 8A / 250V AC cos φ = 1
- Output contacts (1,3,4,6) voltage free
- Operating temperature: -10º to + 60ºC

Dimensions



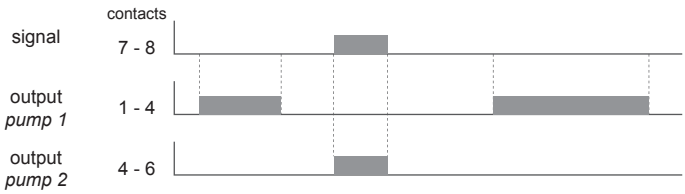




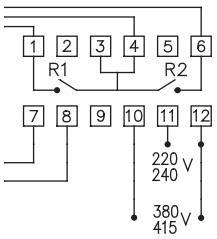
References

References	Width (modules)	Voltage supply
AR01	35mm (2)	220-240V / 380-415 V AC
AR01-24AC	35mm (2)	24 V AC

Diagram



Connection



Signalling

R	Status
●	relay on
⊗	relay off

● ON ⊗ OFF ☼ BLINK

AR02

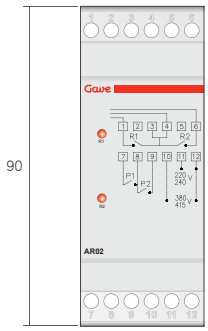
Simultaneous Alternating Relay

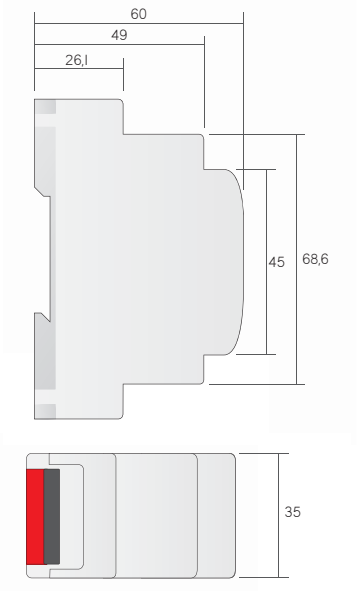
Electronic relay designed to alternate 2 different outputs (pumps, compressors...) controlled by an external signal.
Alternates cyclically between 2 outputs.
Possible operation of both outputs at the same time (simultaneous).

Characteristics

- Real changeover relay to alternate cyclically and to avoid short-cycling
- When the device is receiving no external signal, both changeover contacts will remain open
- Mounting on symmetrical DIN rail
- Output changeover relay 8A / 250V AC cos φ = 1
- Output contacts (1,3,4,6) voltage free
- Operating temperature: -10º to + 60ºC

Dimensions

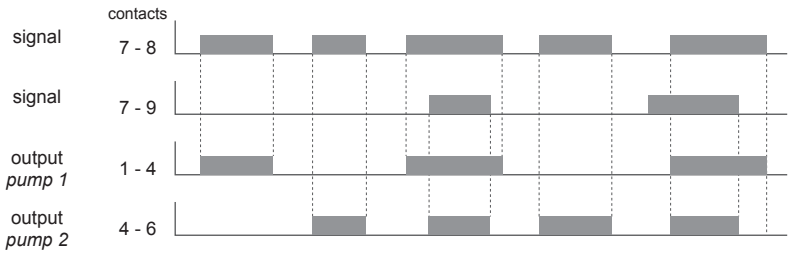




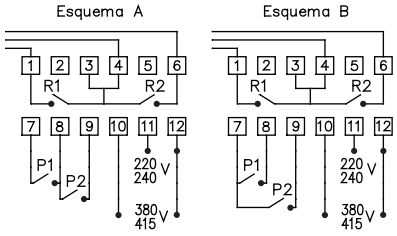
References

References	Width (modules)	Voltage supply
AR02	35mm (2)	220-240V / 380-415 V AC
AR02-24AC	35mm (2)	24 V AC

Diagram



Connection



Signalling

R	Status
●	relay on
⊗	relay off

● ON ⊗ OFF ☼ BLINK

AR03

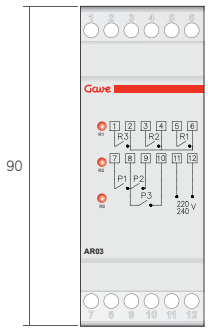
Simultaneous Alternating Relay - 3 outputs

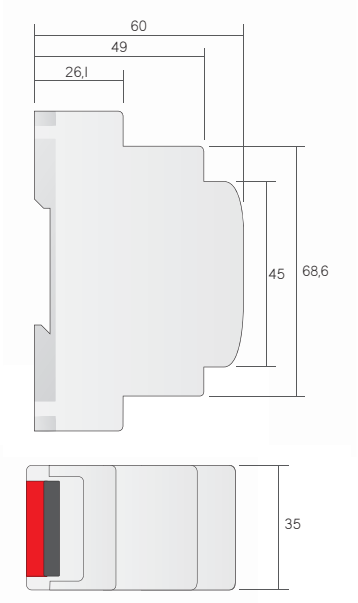
Electronic relay designed to alternate 3 different outputs (pumps, compressors...) controlled by an external signal.
Alternates cyclically between 3 outputs.
Possible operation of all 3 outputs at the same time (simultaneous).

Characteristics

- Real changeover relay to alternate cyclically and to avoid short-cycling
- When the device is receiving no external signal, all changeover contacts will remain open
- Mounting on symmetrical DIN rail
- Output changeover relay 8A / 250V AC cos φ = 1
- Output contacts (1 to 6) voltage free
- Operating temperature: -10º to + 60ºC

Dimensions

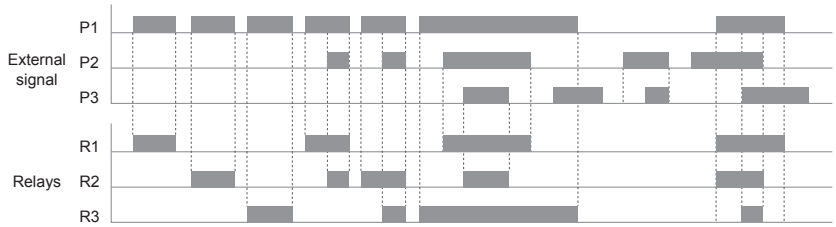




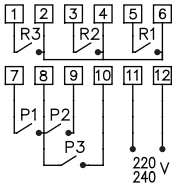
References

References	Width (modules)	Voltage supply
AR03	35mm (2)	220-240V / 380-415 V AC
AR03-24AC	35mm (2)	24 V AC

Diagram



Connection



Signalling

R	Status
●	relay on
☀	stand-by mode (no signal)
⊗	relay off

● ON ⊗ OFF ☀ BLINK

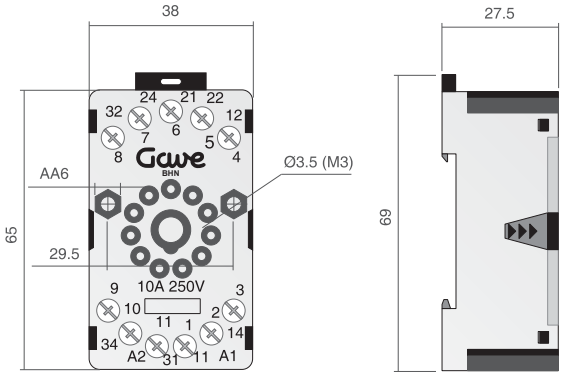
Accesories

Plug-in socket

Characteristics

- 11 pin plug-in relay socket
- Suitable mounting to 35mm rail (EN50022)
- Clear numbering identification with wide label area for code spelling
- Nominal load 10A 250/400V
- Cable clamp capacity: 4 mm2 or 2 x 2,25 mm2
- Max. screw torque 1,2 Nm

Dimensions



Reference

Reference	Description
BHN	11 pin plug-in base

SHNS SHN

Probes

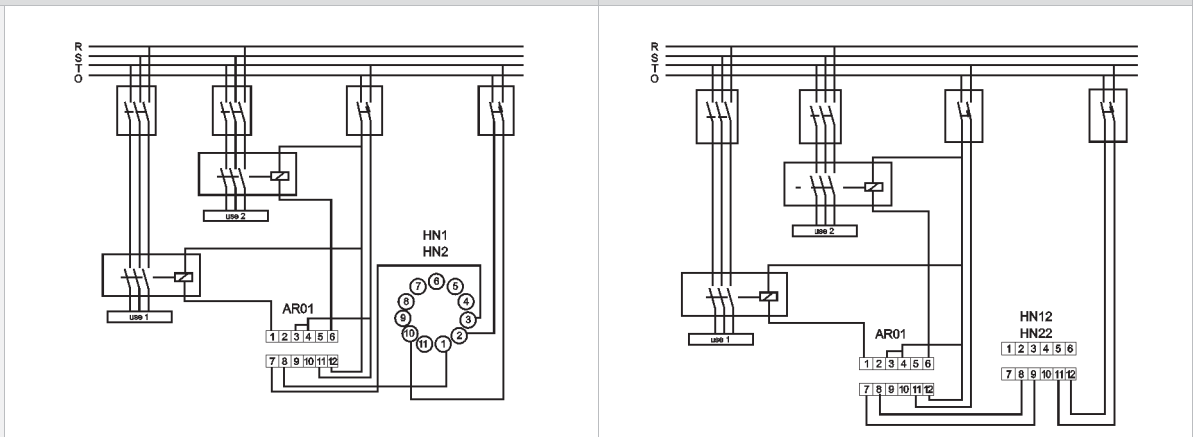
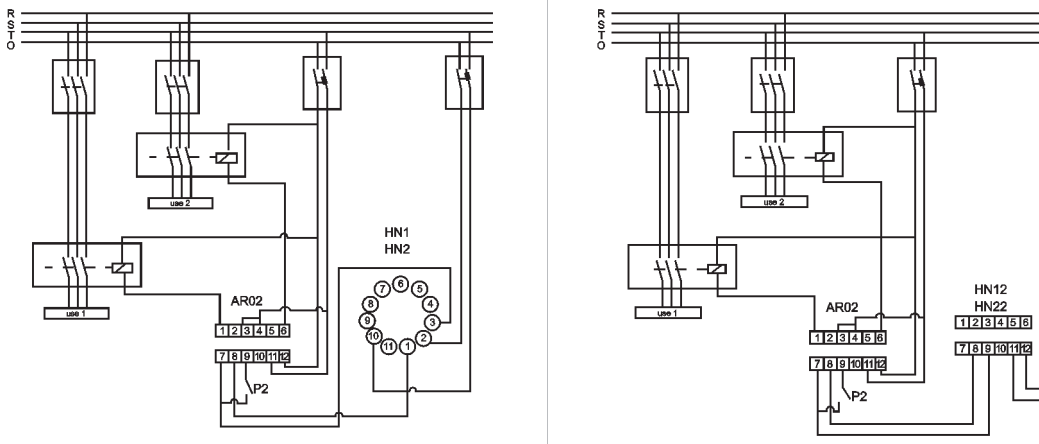
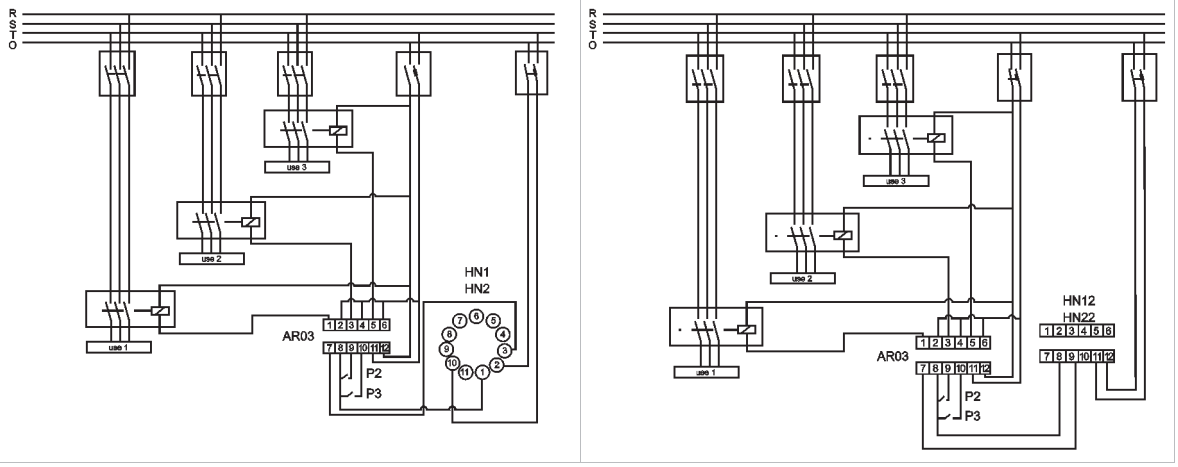
Characteristics

- Conductive electrodes on stainless steel AISI303
- Protection body material PP
- Slotted M4 screw
- Protected cable gland for safe connection

Reference

Reference	Description
SHN	stainless steel probe
SHNS	stainless steel proble with safety cable gland

Alternating Relays with Level Controllers
Connection diagrams

	HN1P / HN2P	HN12 / HN22
AR01		
AR02		
AR03		

Timers

Managing time is an essential need on contemporary world. We require reliable time control on multiple functions that surround our daily live.

We have made simplicity our major advantage on electronic timers. With two unique models we are covering your timing needs.
Our products are multivoltage and multifunctional thus limiting the number of references to be managed while keeping with its functionality and easy setting. Adjustment is always available front face. Furthermore the timer perfectly fits on diferent installation environments due to its modular shape remarkable on its 17,5mm 1 module width.

General characteristics

Direct setting

Frontal direct setting of function, time scale and fine adjustment offer straight reading on timer operation.

LED indication

Indicates relay operational status and blinks to signal elapsed time.

On product information

Wiring , relay characteritstics and timing diagrams located on side of relay.

EMC testing

Reinforced EMC testing conducted on harsh environment conditions

Connecting terminals

Easy access on cage clamp terminals on tightening and release installation operations.

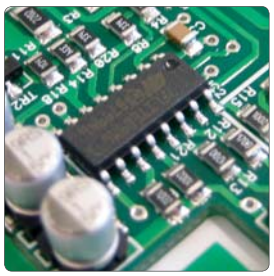
Timers have been developed to withstand harsh conditions following electrical endurance and climatic testing. **EMC** testing has been conducted above standard levels in order to guarantee positive operation on electromagnetic polluted environments safeguarding time control functionality.

Applications

- Lighting controls
- Ventilation
- Access control
- Automation process
- Machinery
- Commercial lights
- Buzzer alarms
- Machinery

Firmware

Large flexibility on control specific requirements by integrating programable EEPROM memory. Customised products to particular market and OEM needs.



Simplicity

Timer rotary potentiometers accessible on the front face, easy setting with direct reading.

Accuracy

Advanced mechanics know-how is applied on frontal rotary switches that are produced with specific plastics particularly resistant to temperature changes. Consequently we minimise setting tolerances thus achieving high accuracy.

Control

Independent Start input contact enlarges number of timer possible operations and associated control functionalities.

Safety

Board insulation distances have been set above standard requirements preventing arcing and increasing operational safety.

Signalling

On/Off led indication on the front face informs about relay status, blinking led indicates elapsed time and forecasts relay changeover operation.

TM01

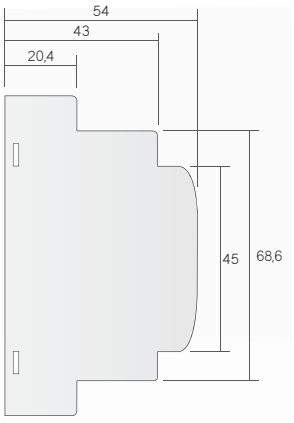
Multifunctional Timer

Multi-voltage and multi-function timer with four basic operational functions and six selectable time ranges by frontal rotary selector.

Characteristics

- Working temperature: -10º + 55ºC
- Supply: 24-230V AC, 50/60Hz - 24V DC
- Power consumption: 1,7W / 3VA
- Output changeover relay AC1: 5A, 250V
  DC1: 5A, 24V
  AC15: 3A, 250V
  DC13: 2A, 24V

Dimensions



Time ranges

1S	from 0,1 sec. to 1 sec.
10S	from 1 sec. to 10 sec.
1M	from 0,1 min. to 1 min.
10M	from 1 min. to 10 min.
1HOUR	from 10 min. to 1 hour
10HOURS	from 1 hour to 10 hours

Assembly

- Mounting on symmetrical DIN rail
- Connection with protected wire clamps

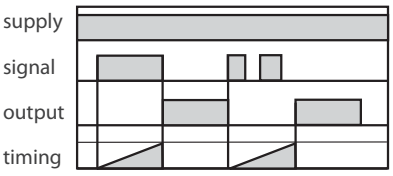
Signalling

- 2 indicating LED for ouput relay and operation status
- Elapsed time indication by blinking LED

References

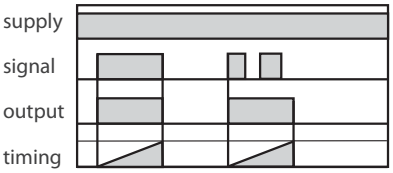
References	Width (modules)	Voltage supply
TM01	17,5mm (1)	24-230V AC / 24V DC
TM01-12DC	17,5mm (1)	12V DC
TM01-DC	17,5mm (1)	127V DC ± 20%

Operational functions



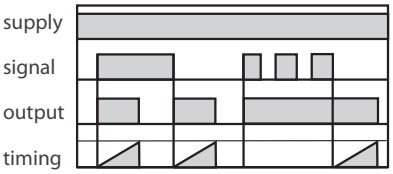
On delay

Supply voltage is on. Set delay time starts when "Start" signal is on. Output relay energizes after the timing period. Reset to zero occurs when disconnecting supply or after a new "Start" connection when the time cycle is finished.



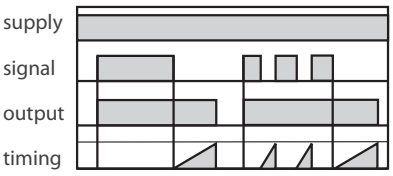
Interval timer

Supply voltage is on. When connecting "Start" the output relay energizes, after the timing period output relay de-energizes. Reset to zero occurs when disconnecting supply or after a new "Start" connection when the time cycle is finished.



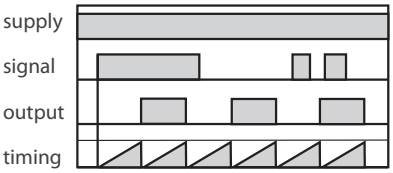
Interval on Make/Break

Supply voltage is on. When making or breaking "Start" output relay energises until set time is reached. Any signal change in "Start" will reset timing to zero.



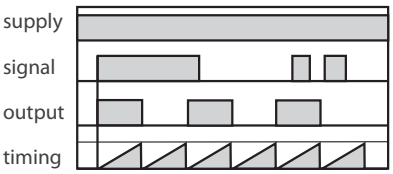
Off Delay

Supply voltage is on. When connecting "Start" output relay energises. When "Start" breaks timing period will start. At the end of timing period output relay will de-energize. When "Start" breaking occurs during timing period timer ill reset timing to zero.



Equal cycling, OFF cycle first

Supply voltage is on. When making "Start" the output remains de-energized during the set timing period. A cyclic mode does continue with energizing and de-energizing periods according to the set time. Timer will reset to zero when supply is removed.



Equal cycling, ON cycle first

Supply voltage is on. When making "Start" the output relay will energize during the set timing period. A cyclic mode does continue with de-energizing and energiznig periods according to the set timing. Timer will reset to zero when supply is removed.

TM02

Cycling Timer

Multi-voltage and multi-function timer with three operating modes by lateral DIP and six time ranges by frontal rotary selector.

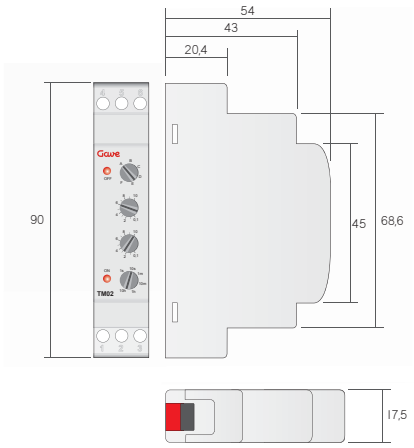
Characteristics

- Working temperature: -10º + 55ºC
- Supply: 24-230V AC, 50/60Hz - 24V DC
- Power consumption: 1,7W / 3VA
- Output changeover relay AC1: 5A, 250V
  DC1: 5A, 24V
  AC15: 3A, 250V
  DC13: 2A, 24V

Time ranges

1S	from 0,1 sec. to 1 sec.
10S	from 1 sec. to 10 sec.
1M	from 0,1 min. to 1 min.
10M	from 1 min. to 10 min.
1HOUR	from 10 min. to 1 hour
10HOURS	from 1 hour to 10 hours

Dimensions



References

References	Width (modules)	Voltage supply
TM02	17,5mm (1)	24-230V AC / 24V DC
TM02-12DC	17,5mm (1)	12V DC

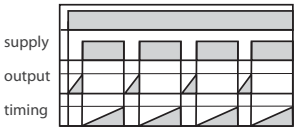
Function Modes

Function A: Asymmetrical re-cycling, OFF cycle first

Function B: Asymmetrical re-cycling, ON cycle first

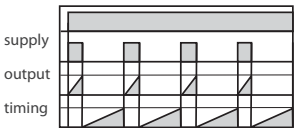
Function C: Asymmetrical cycling, OFF/ON

Operational functions



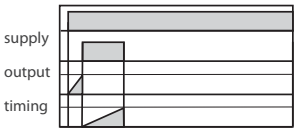
Function A: Asymmetrical re-cycling, OFF cycle first

When supply voltage is on, set delay time (T1) starts. Output relay energizes when reaches T1 then starts the 2nd timing. Output relay (T2) de-energizes after the timing period the cycle re-starts. T1 and T2 are regulated independently. Timer will reset to zero when supply is removed.



Function B: Asymmetrical re-cycling, ON cycle first

When supply voltage is on set delay time starts the 1st timing period, otuput is energized. When the time cycle (T1) is finished output relay T2 energizes and starts the 2nd timing period. When the time cycle (T2) is finished the cycle re-starts. T1 and T2 are regulated independently. Timer will reset to zero when supply is removed.



Function C: Asymmetrical cycling, OFF/ON

When supply voltage is on the 1st timing period (T1) starts. After finishing the first period output relay energizes and the 2nd timing period (T2) starts. After finishing the second period output relay de-energizes until the supply is removed.

TMETR

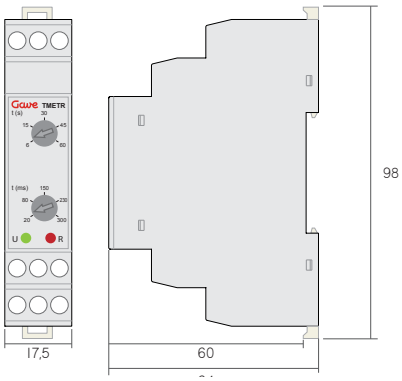
Star Delta timers

Modular star delta timer are an ideal solution on those start up motor applications where we need a modular space saving timer with time adjustment.

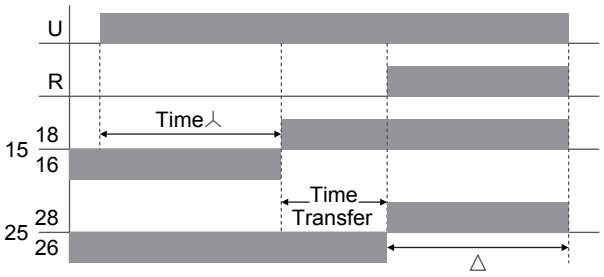
Characteristics

- Star-delta timer
- 2 output relay 1 pole changeover contacts
- Transition delay time adjustable from 20to 300 ms.
- Star time delay adjustable from 6 to 60s
- Led indicator for relay transition
- Energizing at the end of time delay
- Compact width 17,5 mm 1 module
- Mounting on symmetrical DIN rail
- Consumption: 3 VA
- Switching capacity: AC1: 5A / 250V AC15: 3A / 250V
  DC1: 5A / 24V DC13: 2A / 24V

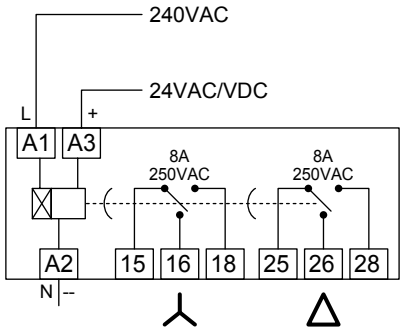
Dimensions



Diagram



Connection



References

References	Width (modules)	Voltage supply
TMETR	17,5mm (1)	230V AC / 24 AC/DC

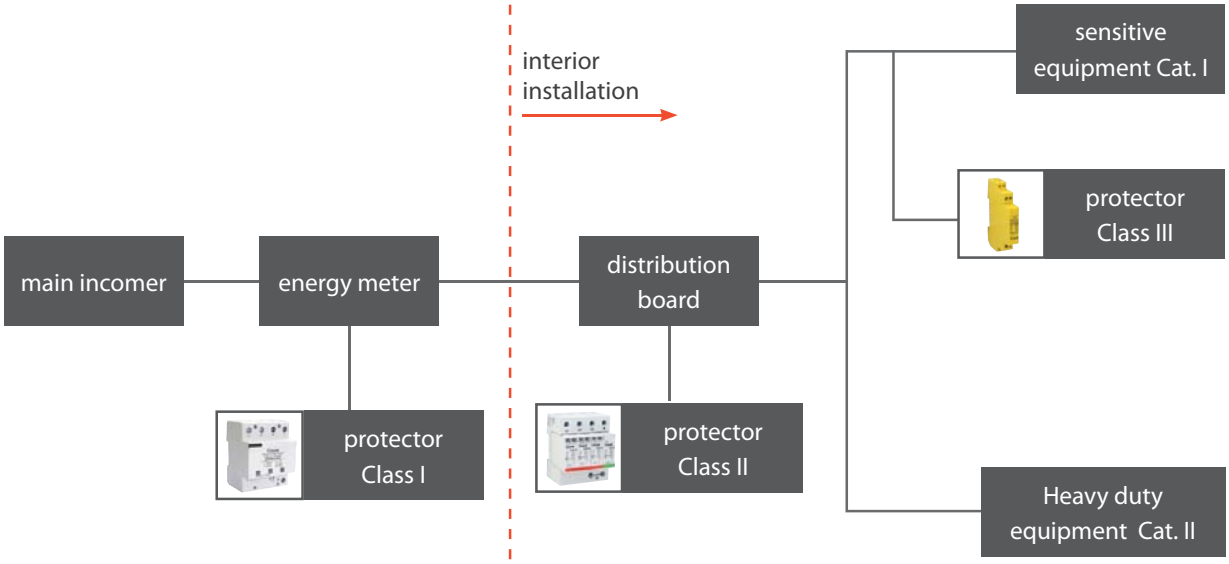
Surge protector devices

Compact surge protector devices (SPD) are developed to meet overvoltage protection needs for low voltage networks. These overvoltages are mainly generated by lightning although also industrial changeovers and network failures.
They provide common/differential protection.

The electrical scheme on PST are based on high energy varistors equipped with thermal disconnector and associated to specific gas discharge tubes GDT.

According to standards

- IEC 61643-1
- EN 61643-11



Type of surge protectors

The AC power surge protectors are split into 3 categories by IEC 61643-1 and EN 61643-11 standards, with the following 3 classes of tests. These different tests depend on the location of the surge protector in the AC network and on the external conditions.

Class I

Type 1 surge protectors are designed to be installed where a direct lightning strike risk is high, especially when the building is equipped with external lightning protection system (LPS or lightning rod). In this situation, EN 61643-11 and IEC 61643-1 standards require the Class I test to be applied to surge protectors : this test is characterized by the injection of 10/350 µs impulse current in order to simulate the direct lightning strike effects.
Therefore these Type 1 surge protectors must be exceptionally powerful to conduct this high energy impulse current.

Class II

Type 2 surge protectors are designed to be installed at the beginning of the installation, in the main switchboard, or close to sensitive terminals, on installations without LPS (lightning rods).
These protectors are tested following the Class II test from IEC61643-11 or EN61643-11standards and based on 8/20 µs impulse current injection.

Class III

In case of very sensitive or remote equipment, secondary stage of surge protectors is required : these low energy SPDs could be Type 2 or Type 3. Type 3 SPDs are tested with a combination waveform (1,2/50 µs - 8/20 µs) following Class III test.

Surge protectors parameters

Uc *Operating voltage*
Is the maximum r.m.s voltage which may be applied continuously to the SPD.

Imax
Discharge current
Applicable to Type 2 SPD, is the maximum impulse current 8/20 µs a surge protector can withstand without destruction .

In *Nominal discharge current*
Is the level of impulse current a surge protector Type 1 or Type 2 can withstand repeatedly (15 surges) without destruction.

Iimp *Impulse current*
Used in Class I test applicable to Type 1 SPDs, is the maximum impulse 10/350 µs current a surge protector can withstand without destruction. This test simulates the effect, on AC power surge protectors, of a direct lightning strike on an installation.

Up *Protection level*
This is the maximum voltage on the surge protector output when subjected to an impulse current equivalent to its nominal discharge current (In). This parameter characterizes the performance of the SPD in limiting the transient overvoltage to protect the equipment.

Protector Advanced Technology

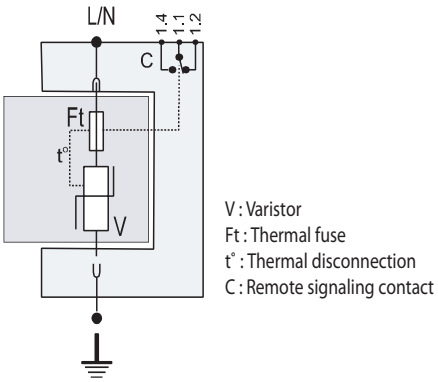
Operating principle

PST surge protectors are based on zinc metal-oxide varistors (MOV), the best compromise between a fast response time (<25 ns) and a high discharge current capacity, which are the main parameters to provide efficient protection.
Surge protection is highly improved by combining varistors with a specific gas discharge tubes (GDT).

Improved performance is specifically attested in;

- protection level (Up)
- life duration (due to the supression of leakage current)
- continuous operation and power quality (no follow current)

Nevertheless the end of life of these varistors must be absolutely monitored thus requiring the systematic use of built-in thermal disconnection devices.



Disconnection devices

In compliance with the standards, the AC power surge protectors are equipped with external and internal disconnection devices in order to provide total safety in case of failure.
2 types of disconnection devices are necessary:

- **Internal thermal** security which will disconnect the surge protector from the AC network in case of thermal runaway. In such a case, the user will be warned about the trouble by an indicator (mechanical or light) in front of the protector and will carry out the replacement of the defective SPD.
- **External electrical** disconnection (fuses or breaker) to disconnect the surge protector from the AC network in case of internal short circuit, e.g. due to an excessive impulse current.

Choosing disconnection devices

Fuses provide a more suitable solution as short circuit protection for SPD

parameters	fuses	circuit breaker
Voltage decrease (Up improvement)	+	
Lightning impulse current behaviour	+	- contacts wear
Icc	+	-
Reduced dimensions	- fuses > 25A	+
Cost	+	-

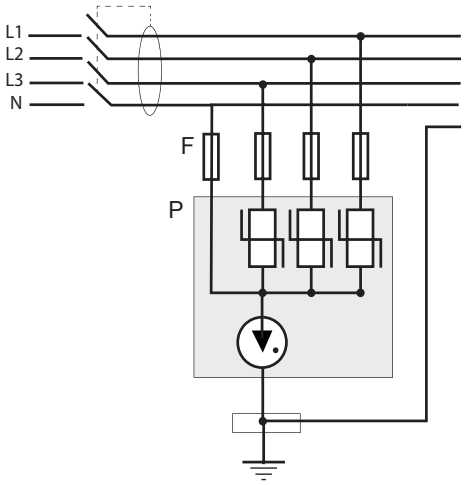
The rating of the external fuses (or breaker) are in relation with the discharge capability of the SPD and the prospective short-circuit current of the installation.

	Class I	Class II	
	15 kA (10/350)	15kA (8/20)	40kA (8/20)
Icc = 300A up to 1kA	25A	16A	16A
Icc = 1kA up to 7kA	50A	16A	25A
Icc = 7kA and above	63A	25-40A	50A

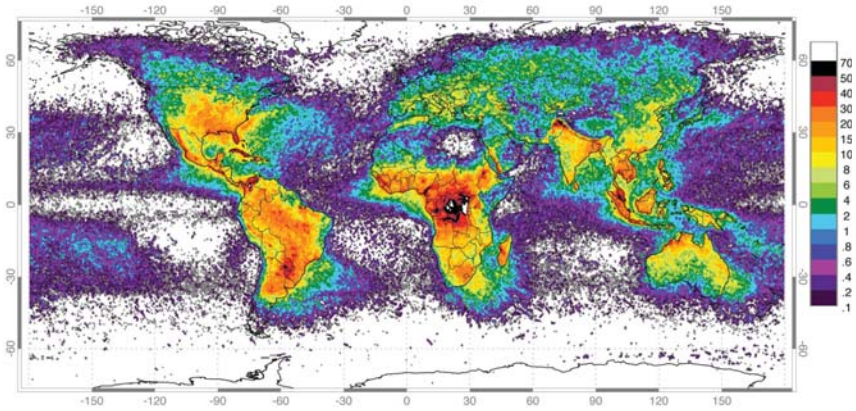
Common and Differential mode protection

Lightning surges occur essentially between active conductors and earth. A live conductor not only refers to the phase conductors but also to the neutral conductor. These overvoltages are protected on Common mode.

Differential overvoltages can occur between live conductors when we are operating on a TT earthing system. It can also appear on TN-S eartingh systems if there is a significant length difference between PE and N cables. The standard IEC 60364 allows combination of protection between phases and neutral (differential mode) and between neutral and ground (common mode) this type of mounting is named "CT2 connection".



World lightning density map (Ng)



Source NASA OTD (4/95-3/00) and LIS (1/98-2/03)

Appliance following IEC 60364

Type of installation

Lightning density (Ng) Keraunic Level (Nk)	 Installation equipped with direct lightning protection system (LPS)	 Connection to overhead AC line	 Connection to underground AC line	 The unavailabilitiy of the electrical network could have consequences on human safety
Ng ≤ 2,5 Nk < 25	**Mandatory (Class I)**	**recommended on sensitive equipment or when reinforced reliability is required.**		**Risk analysis required**
Ng > 2,5 Nk > 25	**Mandatory (Class I)**	**Mandatory (Class II)**		**Mandatory**

Regional/national standards

Typically regional/ national standards defines additional conditions where surge protection will be mandatory or recommended. Representative conditions are:


Public services (street lights, telecoms, police,..)


Farming installation when affecting animal safety.

Emergency systems (emergency lights, security alarms, CCTV,..)


Industrial processes requiring continuity (Food processing, chemical, pharmacy,..)

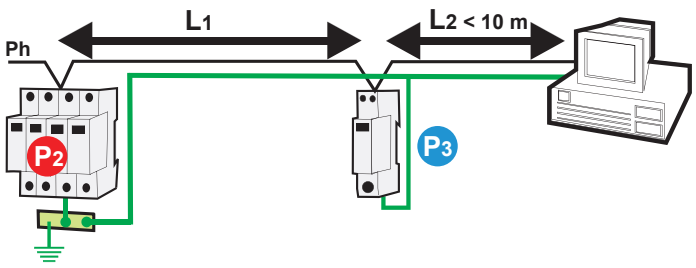
Coordination of Surge Protectors

In order to provide maximum protection efficiency, it is necessary to create a «coordination» diagram, that means installation of a «primary» SPD at the network entrance and a «secondary» close to sensitive equipment.

This association is required in the 2 following cases :

- High sensitivity equipment : Voltage protection level upstream is too high with regards to withstand level capability of protected equipment.
- Long distance (greater than 30 m) of wire between equipment to be protected and primary SPD : Reduction of ringing voltages created during the surge transmission.

Efficient SPD coordination is performed by including between primary and secondary SPDs a minimum length of wire (> 10 m).



P2 : Primary surge protector
P3 : Secondary surge protector
L1 : Length of conductor between surge protector
L2 : Length of conductor between surge protector and installation

→ *Installation rules*

❶ Surge protectors are connected in parallel on the AC network and must be equipped with external fuses for short-circuit protection.

❷ Total length of connection wires to AC network must be lower than 0,5m in order to mantain protection level as the impedance of these connections reduces the protection provided.

❸ Protection wire coming from SPD must be connected to bonding bar. Paralleling protection wire with phases conductors must be avoided.

❹ Type 2 protectors require wires with 4mm2 minimum cross-section. Type 1 require minimum 10mm2.

Class I

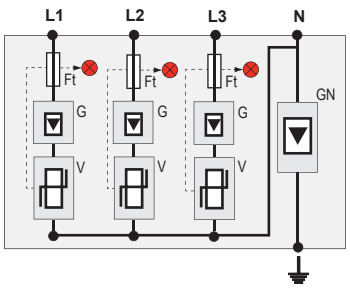
Surge protector devices

The PST4B100 is a compact Class I Surge Protector Device designed to be connected at the entrance of the electrical installation on 3-Phase networks. This device provides efficient protection against direct and indirect effects of lightning phenomena on electrical networks. This protection is specially adequate on those buildings endowed with lightning rods or LPS systems.

This protection is based on combining high discharge capacity MOV varistors with specific GDT providing common and differential mode protection. This technology allows the best performance with no follow current neither leakage current, while achieving an elevated (Up) level of protection.

This SPD is draws attention for its extremely modular compact size, easy to install on DIN rail, and individual visual indicator on each phase.

Electrical scheme

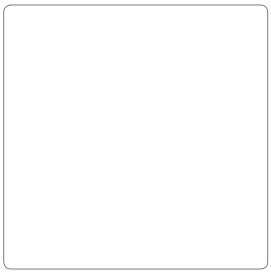


PST4B100

V : High-energy varistor network
G : Heavy duty GDT
GN : Heavy duty N/PE GDT
Ft : Thermal fuse
MI : Disconnection indicator

Electrical characteristics

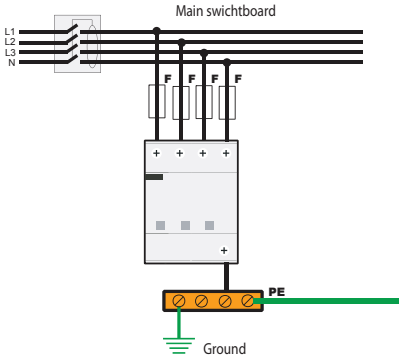
network	V	400 V
modes protection		common and differential
max. operating voltage	Uc	255 Vac
operating current (leakage current at Uc)	Ic	none
discharge currents (15 impulses and 1 max. stand. 8/20 µs)	In / Imax	40 kA / 100 kA
Max. lightning current by pole (1 impulse 10/350 µs)	Iimp	25 kA
total lightning current (1 impulse 10/350 µs)	Itotal	50 kA
protection level (at In)	Up	1.5 kV



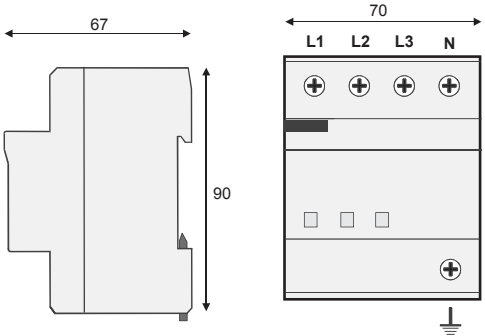
Mechanical characteristics

dimensions	see diagram
Connection	by screw terminals: 6-35 mm^2
Disconnection indicator	red light indicators
Remote signaling of disconnection	none
Mounting	symmetrical rail 35 mm
Operating temperature	-40/ +85° C
Protection class	IP20
Housing material	Thermoplastic UL94-V0
Standards compliance	
IEC 61643-1 International	Low Voltage SPD Test Class I
EN 61643-11 Europe	Low Voltage SPD Test Class I

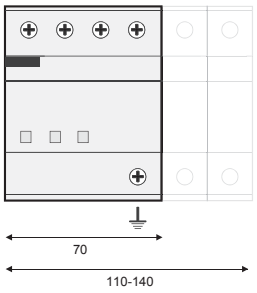
Installation scheme

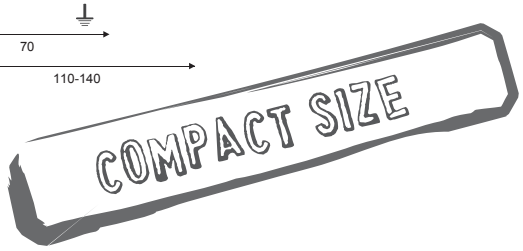


Dimensions



extra compact size
(up to 50% space saving)





Class II
Surge Protector Devices

Surge protector devices are developed to meet overvoltage protection needs transmitted on low voltage networks. These overvoltages are mainly generated by atmospheric lightening although also might occur due to industrial changeovers and network failures.

Surge dischargers provide common/differential protection.

The electrical schemes on PST protectors combines high energy MOV varistor with an specific gas discharge tube GDT thus obtaining high performance protection characteristics.

Surge protectors PST are built with plug-in modules with failure indicator and a monobloc fix DIN rail base which allows an easy and fast replacement on maintenance operations.

According to standards

- IEC 61643-1
- EN 61643-11
- UL1449 ed. 2

General characteristics

Modules easy replacement

Plug-in modules easy and quick to replace at the end of protection life.

Visual indicator

Green colour indicates correct operation and red colour indicates module replacement.

Remote signalling

Operational status on the protection is constantly supervised by floating changeover contact that will activiate if module changes status.

DIN rail mounting

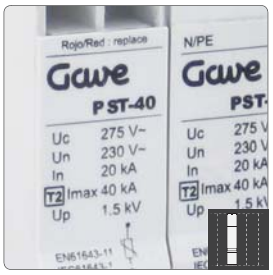
Direct mounting on symmetrical DIN rail acc. to EN 60715

Mechanical coding

Plug-in modules and modular bases are mechanically coded and prevent wrong module replacement.

Marking

Terminals clearly marked for easy wiring. Modules marked with reference and electrical data.



Modular construction

Designed to fit on modular enclosures with frontal 45mm window and 17,5mm. modules.

Class II
Surge protectors

PSTCxx

Gave offers a new surge protector designed to be installed on main switchboards that highlights on its **compact** size (1 single module) and its elevated level of protection

COMPACT SIZE

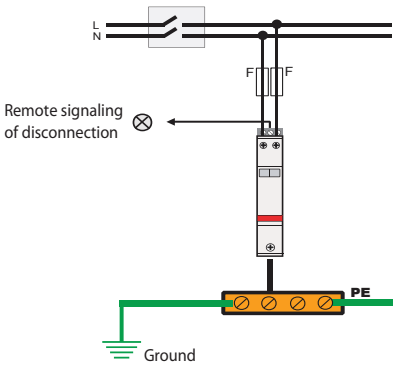
Surge protection device

References	Description	Modules	In	Imax
PSTC15	SPD compact Class II	1	5 kA	15 kA

Replacement modules

References	Description	Modules	In	Imax
PC-15	module phase (MOV) + neutral (GDT)	1	5 kA	15 kA

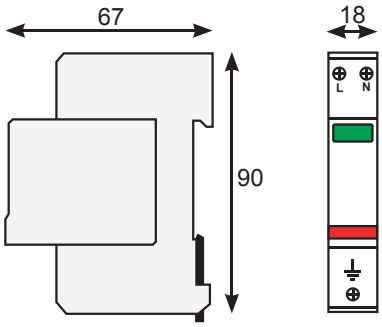
Installation scheme



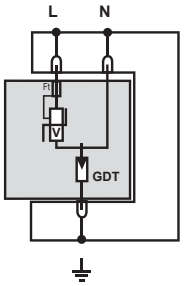
Electrical characteristics

single phase network	V	230
max. operating voltage	Uc	255
follow current	If	none
nominal discharge current *(15 impulses 8/20 µs)*	In	5 kA
maximum discharge current *(max. withstand 8/20 µs)*	Imax	15 kA
protection level (at In)	Up	1,5/0,9 kV
residual voltage at 5 kA		0,9 kV
admissible short-circuit current		10000 A

Dimensions

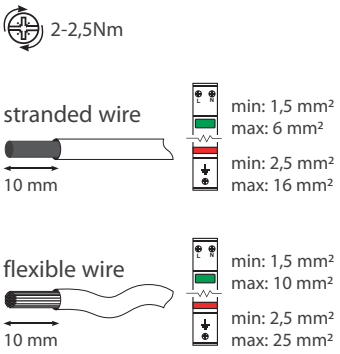


Electrical diagram



V: High energy varistor
GDT: Gas discharge tube
Ft: Thermal fuse

Connection



PST2xx

Gave offers a complete modular Class II range of SPD that distinguishes on its high discharge capacity, plug-in modular cartridges with thermal disconnection visual indicator, and the possibility of remote signalling required on advanced installations

Surge protection device

References	Description	Modules	In	Imax
PST215	SPD Class II	2	5 kA	15 kA
PST240	SPD Class II	4	20 kA	40 kA

Surge protection device with remote signalling

References	Description	Modules	In	Imax
PST240T	SPD Class II + R	2	20 kA	40 kA

Replacement modules

References	Description	Modules	In	Imax
PST-15	Phase module (MOV)		5 kA	15 kA
PST-40	Phase module (MOV)		20 kA	40 kA
PST-N	Neutral (GDT)		20 kA	40 kA

PST4xx

Surge protection device

References	Description	Modules	In	Imax
PST415	SPD Class II	4	5 kA	15 kA
PST440	SPD Class II	4	20 kA	40 kA

Surge protection device with remote signalling

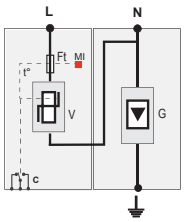
References	Description	Modules	In	Imax
PST440T	SPD Class II + R	4	20 kA	40 kA

Replacement modules

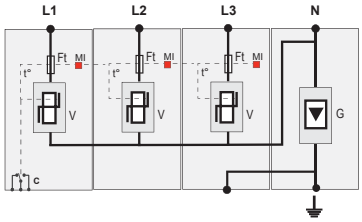
References	Description	Modules	In	Imax
PST-15	Phase module (MOV)			15 kA
PST-40	Phase module (MOV)			40 kA
PST-N	Neutral (GDT)			

Electrical diagram

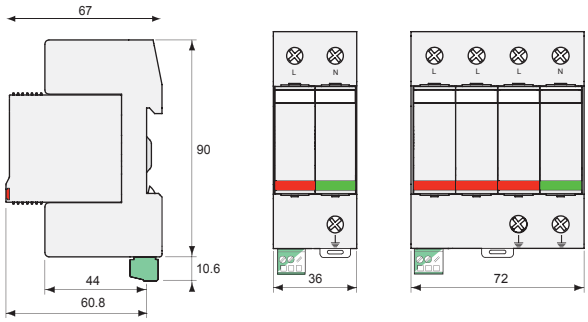
PST2xx



PST4xx



Dimensions

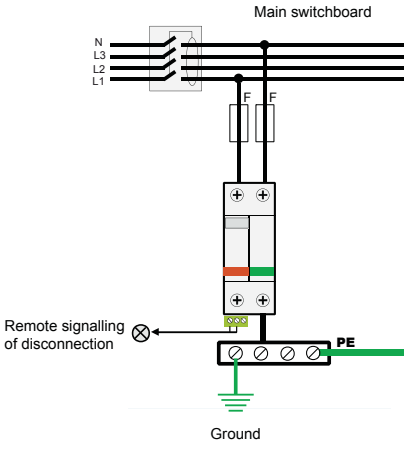


Electrical characteristics

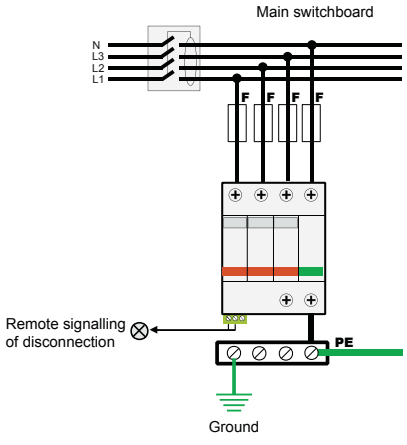
		PST2xx			PST4xx		
		PST215	**PST240**	**PST240T**	**PST415**	**PST440**	**PST440T**
network	V	230	230	230	230/400	230/400	230/400
max. operating voltage.	Uc	275 V~	275 V~	275 V~	275 V~	275 V~	275 V~
follow current	If	none	none	none	none	none	none
nominal discharge current *15 x 8/20 µs impulses*	In	5 kA	20 kA	20 kA	5 kA	20 kA	20 kA
maximum discharge current	Imax	15 kA	40 kA	40 kA	15 kA	40 kA	40 kA
protection level N/PE(at In) Up		1,5 kV	1,5 kV	1,5 kV	1,5 kV	1,5 kV	1,5 kV
protection level L/N (at In) Up		0,9 kV	1,25 kV	1,25 kV	0,9 kV	1,25 kV	1,25 kV
residual voltage at 5kA		0,9 kV	0,9 kV	0,9 kV	0,9 kV	0,9 kV	0,9 kV
protection modes	common	•	•	•	•	•	•
	differential	•	•	•	•	•	•
remote signalling		-	-	•	-	-	•

Installation scheme

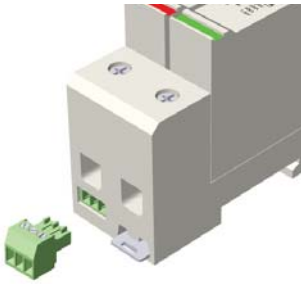
PST2xx

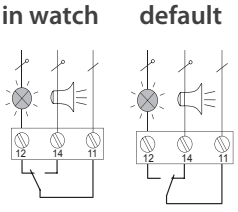


PST4xx



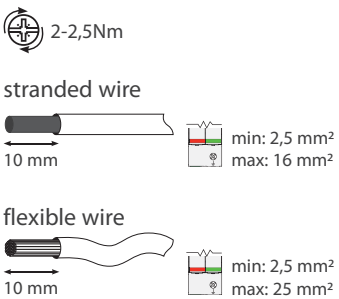
Remote indication





Min: 12 V DC, 10 mA
Max: 250 V AC, 1 A

Connection

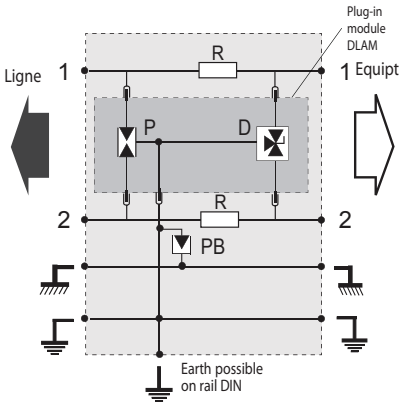


Class III
Surge protectors for telecom and data lines

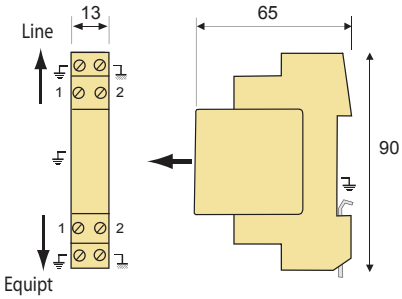
Class III surge protectors are designed to protect, against surge voltages telecom lines, data lines, and automation PLCs and industrial buses. These elements are characterised for their high sensitiveness and the elevated cost that any overvoltages can cause on the equipment to be protected.

DLA protections combine gas discharger tubes and fast clamping diodes in order to provide high discharge current capability and fast operation. These protections are installed on symmetrical DIN rails and are equipped with removable modules for easy maintenance (line continuity in case of plug-in module removal).

Electrical diagram



Dimensions



Electrical characteristics

		DLA-170	DLA-48D3	DLA-12D3	DLA-06D3
Utilisations type		Telephone line	ISDN-T0 48 V line	RS232	RS422 RS485
Configuration		1 pair+shield	1 pair+shield	1 pair+shield	1 pair+shield
Nominal line voltage	Un	150 V	48 V	12 V	6 V
Max. line voltage	Uc	170 V	53 V	15 V	8 V
Max. line current	Imax	300 mA	300 mA	300 mA	300 mA
Protection level	Up	220 V	70 V	30 V	20 V
Nominal discharge current	In	20 kA	20 kA	20 kA	20 kA
Impulse current	Iimp	5 kA	5 kA	5 kA	5 kA
Spare module		DLAM-170	DLAM-48D3	DLAM-12D3	DLAM-06D3

Permanent overvoltage protection PSP-1

MODULTEC

Protection against permanente or temporary overvoltages (TOV) require disconnecting the equipments from the installation. We can not shunt temporary to ground as we are dealing with large time scale overvoltages.

Temporary overvoltages are typically due to neutral fault in the network and specially required on those installations with unstable networks showing regular fluctuations and power cuts.

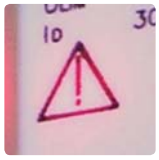
- Width 1 module (17,5 mm)
- Monitoring indication: green LED on
- Permanent overvoltage: warning sign red backlited
- Reset pushbutton

Technical specifications

operating voltage	(U_n)	230V~
switching threshold	(U_{limit})	255-265V~
suitable RCD	($I_{operate}$)	30mA
switch off delay time		5 msg

Green led

Normal operation. Device monitoring.



Red warning sign

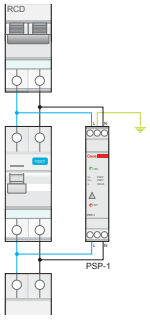
Blinking sign indicates relay disconnection due to permanent overvoltage.

Test/reset pushbutton

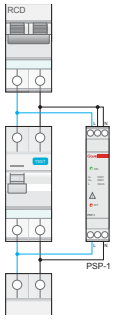
Tripping test pushbutton to check device correct operation.
reset pushbutton after permanent overvoltage disconnection.

Single phase installation diagram

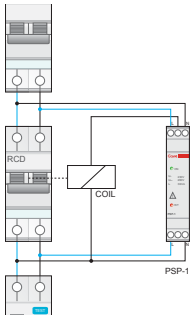
Connection with earth shunting
Single phase 230Vac + Earth
Associated RCD 30 mA



By-pass connection (installations with no earthing)
Single phase 230Vac
Associated RCD 30 mA



Connection with coil release associated to disconnection element: MCB or RCD (preferential on installations without earthing)
Single phase 230Vac
Associated coil release 30mA



Three phase installation

Our range of RF02 is specially suitable on 3Ph (or 3Ph+N) supplies and its operating conditions. You can consult on Control Relays catalogue or use PSP on 3Ph installation when actuating on RCD and/or manual reset/test characteristics is required.

MODUTEC

PSP-3 for three phase networks

Protector PSP-3 does actuate by the means of the output relay on the **shunt trip coil** of the breaking element (MCB or MCCB). Permanent overvoltage protector distinguishes on integrating a voltage free auxiliary contact for external signalling. The protector does also operate on **test** mode.

Signalling

Phase led blinking signals permanent overvoltage, led off signals phase failure.

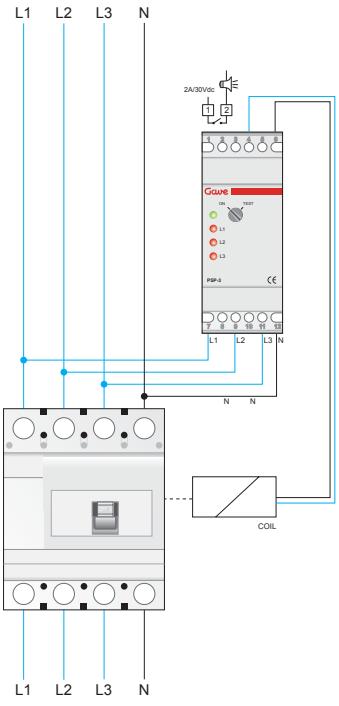
Axuiliary output

The protector has a built in voltage free auxiliary contact for external signalling, alarm, PLC communication,..

Test mode

Selecting test mode by the jeans of a frontal rotary switch the relay will operate on the shunt trip coil while leds will indicate that we are on test mode.

Installation diagram



Signalling

>U Permanent Overvoltage

Permanent overvoltage on phases blinking. Relay and auxiliary contact closed..

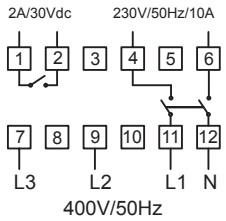
Wrong connection

Neutral wrong connection. Does not distinguish connection between L1,L2 and L3. This condition during an extended period will damage the device. Remake connection.

Technical characteristics

Operating voltage	(U_n)	230V~
tripping voltage tripping time	(U_{limit}) (t)	255-265V~ 3s
tripping voltage tripping time	(U_{limit}) (t)	>265V~ 0,8s

Electrical scheme



Combining protections

Industrial, IT and services facilities face increasing demand on transient and temporary overvoltage protections in order to secure valuable equipments. Installation normative updates are improving equipment protection by writing down new requirements. Gave offers a complete range of combined solutions that warrant flexible installation and easy maintenance.

➜ Flexibility

The protector is installed upon space availability on the panel. Easy to place transient protection close to the earth connection.

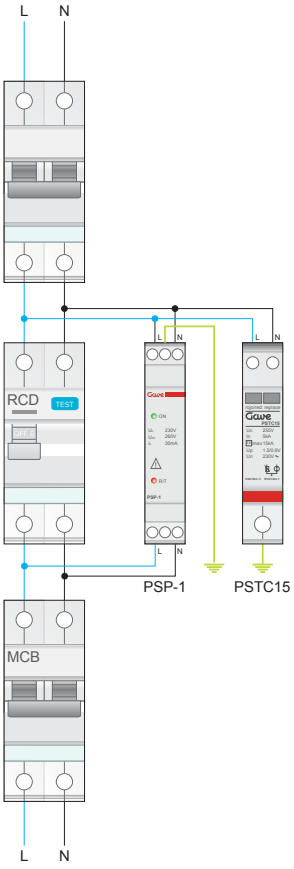
➜ Remote signalling

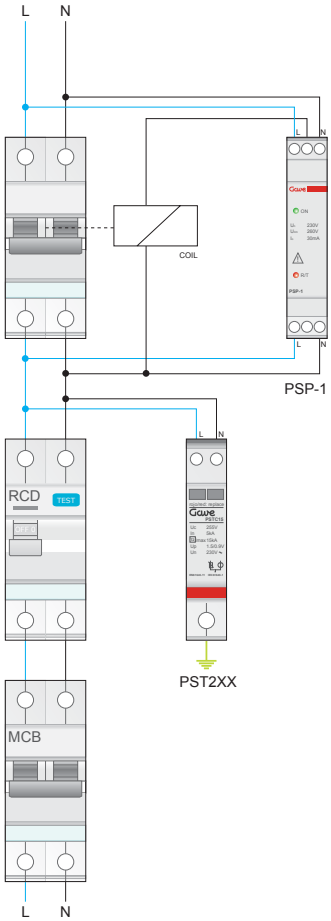
Protectors are equipped with remote signalling. We can distinguish if we have transient or temporary/permanent overvoltage condition.

➜ Maintenance

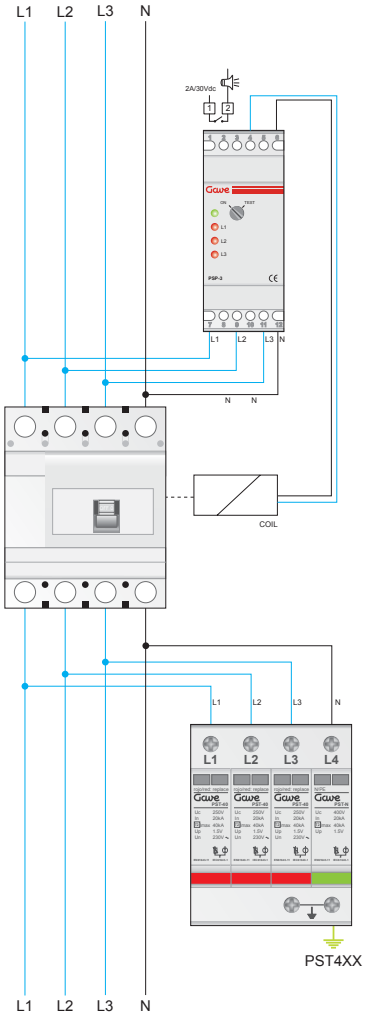
Friendly maintenance. When a transient varistor protection ends its live we only need to replace this phase cartridge remaining other modules operative.

Single phase installation





Three phase installation



Fuse protection

Fuse protection

Fuse protection is an efficient and cost effective solution to protect low voltage equipment against short-circuit destructive consequences and damages incurred under overload conditions.

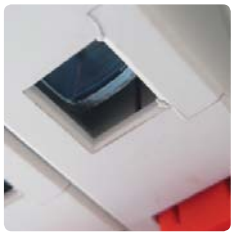
General characteristics

Ageing
Fuse element dedicated alloy makes fuses specially resistant to ageing effects.

Corrosion resistant
All metal parts are surface treated against corrosion.

Indicator
Clear indicator visibility on fuse status. Indicator conductor and spring are corrosion and ageing proof..

IP2X
Protection against direct finger contact on fuseholders and fuse disconnectors. Compact sizes.



→ *Time/current characteristics*

gG characteristic
General purpose cable and conductor protection.

aM characteristic
Motor and switchgear protection. Adapted to the starting current of motors and to the shortcircuit protection.

uR characteristic
Ultrarapid operation for semiconductor protection. such as diodes, thyristors, or AC/DC motor drives. "R" stands for rectifier. High breaking capacities

Fuse links

The fuse link is a component designed to cut off dangerous currents. It is attained by adapting fusible melting strips that divide the arc into several subarcs and cool them by means of the quartz sand. A limitation of the peak current is reached minimising electrodynamical load of the installation and protecting the equipment by limiting thermal let-through current.

Ranges
Cylindrical fuses UTE
Neozed fuses DO
Knife fuses NH

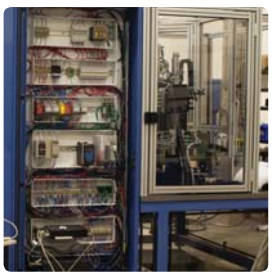
Fuse bases and switch disconnectors

Fuse disconnectors offer safe disconnection and isolation on low voltage circuits while providing fuse protection against overload and shortcircuit conditions. A modular system allows combination of individual components characterising a fast and easy installation.

Ranges
Cylindrical fuseholder disconnectors
Neozed fuse bases
NH Fuse bases
NH Disconnector fuse bases

Applications

- Distribution panels
- Automation equipment
- Control panels
- Motor protection
- Capacitor banks
- Machinery



➜ Protection

Peak current "limitation" minimises considerably the electrodynamic load of the installation and protects the equipment.

➜ Safety

No emission of gas, flames or arcs when clearing any value of overcurrent. Additionally the speed of operation on high short circuit currents limits significantly the flash hazard at the fault location.

➜ Reliability

No moving parts to wear out or become contaminated by dust, oil or corrosion and no nuisance tripping. Fuse replacement ensures protection is restored to its original state of integrity .

➜ Simple

Good selectivity minimises the part of the system effected by operation of protective device. High current limitation makes easy coordination between fuse links and other devices.

gG curve

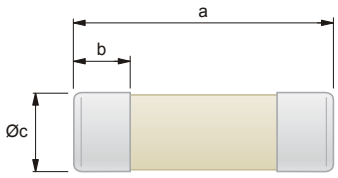
General characteristics

- Security fuses with silver-plated or nickel-plated contacts
- Silver-copper fuse element
- Steatite body with high resistivity to internal pressure
- Breaking capacity:
  - 120 kA - 500 V~
  - 80 kA - 660 V~

According to

- UNE 21103
- VDE 0636
- IEC 60269-2
- NFC63210

Dimensions



size	dimensions	a (mm)	b (mm)	Øc (mm)
00	8.5 x 31.5	31.5	6.3	8.5
0	10.3 x 38	38	9.4	10.3
1	14.3 x 51	51	11.3	14.3
2	22.2 x 58	58	14.7	22.2

8x31 - Size 00

References		In (A)	V	kA	Package
Standard	With fusing indicator				
29F2GL	29F2GLIF	2	400	20	10
29F4GL	29F4GLIF	4	400	20	10
29F6GL	29F6GLIF	6	400	20	10
29F10GL	29F10GLIF	10	400	20	10
29F16GL	29F16GLIF	16	400	20	10
29F20GL	29F20GLIF	20	400	20	10
29F25GL	29F25GLIF	25	400	20	10

10x38 - Size 0

References		In (A)	V	kA	Package
Standard	With fusing indicator				
30F05GL	-	0,5	500	120	10
30F1GL	-	1	500	120	10
30F2GL	30F2GLIF	2	500	120	10
30F4GL	30F4GLIF	4	500	120	10
30F6GL	30F6GLIF	6	500	120	10
30F8GL	30F8GLIF	8	500	120	10
30F10GL	30F10GLIF	10	500	120	10
30F12GL	30F12GLIF	12	500	120	10
30F16GL	30F16GLIF	16	500	120	10
30F20GL	30F20GLIF	20	500	120	10
30F25GL	30F25GLIF	25	500	120	10
30F32GL	30F32GLIF	32	400	120	10

gG curve

14x51 - Size 1

References		In (A)	V	kA	Package
Standard	With fusing indicator				
31F2GL	31F2GLIF	2	690	80	10
31F4GL	31F4GLIF	4	690	80	10
31F6GL	31F6GLIF	6	690	80	10
31F8GL	31F8GLIF	8	690	80	10
31F10GL	31F10GLIF	10	690	80	10
31F12GL	31F12GLIF	12	690	80	10
31F16GL	31F16GLIF	16	690	80	10
31F20GL	31F20GLIF	20	690	80	10
31F25GL	31F25GLIF	25	690	80	10
31F32GL	31F32GLIF	32	500	120	10
31F40GL	31F40GLIF	40	500	120	10
31F50GL	31F50GLIF	50	400	120	10

22x58 - Size 2

References		In (A)	V	kA	Package
Standard	With fusing indicator				
32F16GL	32F16GLIF	16	690	80	10
32F20GL	32F20GLIF	20	690	80	10
32F25GL	32F25GLIF	25	690	80	10
32F32GL	32F32GLIF	32	690	80	10
32F40GL	32F40GLIF	40	690	80	10
32F50GL	32F50GLIF	50	690	80	10
32F63GL	32F63GLIF	63	690	80	10
32F80GL	32F80GLIF	80	500	120	10
32F100GL	32F100GLIF	100	500	120	10
32F125GL	32F125GLIF	125	400	120	10

aM curve

10x38 - Size 0

References		In (A)	V	kA	Package
Standard	With fusing indicator				
30F1AM	-	1	500	120	10
30F2AM	30F2AMIF	2	500	120	10
30F4AM	30F4AMIF	4	500	120	10
30F6AM	30F6AMIF	6	500	120	10
30F8AM	30F8AMIF	8	500	120	10
30F10AM	30F10AMIF	10	500	120	10
30F12AM	30F12AMIF	12	500	120	10
30F16AM	30F16AMIF	16	500	120	10
30F20AM	30F20AMIF	20	500	120	10
30F25AM	30F25AMIF	25	500	120	10
30F32AM	30F32AMIF	32	400	120	10

14x51 - Size 1

References		In (A)	V	kA	Package
Standard	With fusing indicator				
31F2AM	31F2AMIF	2	690	80	10
31F4AM	31F4AMIF	4	690	80	10
31F6AM	31F6AMIF	6	690	80	10
31F8AM	31F8AMIF	8	690	80	10
31F10AM	31F10AMIF	10	690	80	10
31F12AM	31F12AMIF	12	690	80	10
31F16AM	31F16AMIF	16	690	80	10
31F20AM	31F20AMIF	20	690	80	10
31F25AM	31F25AMIF	25	690	80	10
31F32AM	31F32AMIF	32	500	120	10
31F40AM	31F40AMIF	40	500	120	10
31F50AM	31F50AMIF	50	400	120	10

aM curve

22x58 - Size 2

References		In (A)	V	kA	Package
Standard	With fusing indicator				
32F16AM	32F16AMIF	16	690	80	10
32F20AM	32F20AMIF	20	690	80	10
32F25AM	32F25AMIF	25	690	80	10
32F32AM	32F32AMIF	32	690	80	10
32F40AM	32F40AMIF	40	690	80	10
32F50AM	32F50AMIF	50	690	80	10
32F63AM	32F63AMIF	63	690	80	10
32F80AM	32F80AMIF	80	500	120	10
32F100AM	32F100AMIF	100	500	120	10
32F125AM	32F125AMIF	125	400	120	10

Neutral links

References	Size	Package
0NEUTRO	size 0	10
1NEUTRO	size 1	10
2NEUTRO	size 2	10

Neozed fuses

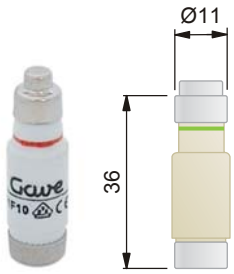
The D0-System, sometimes called NEOZED, is smaller than the DIAZED system, and does have a lower power dissipation, but also a lower rated voltage (400V~).
Care should be taken in all cases to ensure heat dissipation away from the fuse link to the surrounding ambient. In cases of enclosures and tight packing of fuses, a derating might be needed.

General characteristics

- High breaking capacity up to 120 kA at 500 V AC
- Strong limiting capacity of the electro dynamic short circuit effects
- Simple and efficient selectivity

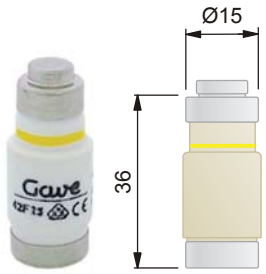
According to

- IEC 60269-1
- IEC 60269-2
- VDE 0680
- VDE -DIN 0636/21
- DIN 43620



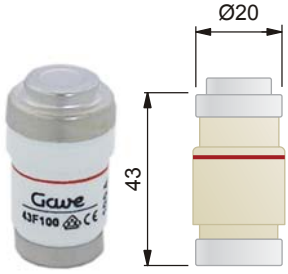
Size D01

References	Type	In (A)	Colour	weight kg/piece	Package
41F2	E 14	2 A	pink	0.006	10
41F4	E 14	4 A	brown	0.006	10
41F6	E 14	6 A	green	0.006	10
41F10	E 14	10 A	red	0.006	10
41F16	E 14	16 A	grey	0.006	10



Size D02

References	Type	In (A)	Colour	weight kg/piece	Package
42F20	E 18	20 A	blue	0.01	10
42F25	E 18	25 A	yellow	0.01	10
42F35	E 18	35 A	black	0.01	10
42F50	E 18	50 A	white	0.01	10
42F63	E 18	63 A	copper	0.01	10



Size D03

References	Type	In (A)	Colour	weight kg/piece	Package
43F80	M 30 x 2	80 A	silver	0.04	10
43F100	M 30 x 2	100 A	red	0.04	10

NH fuses

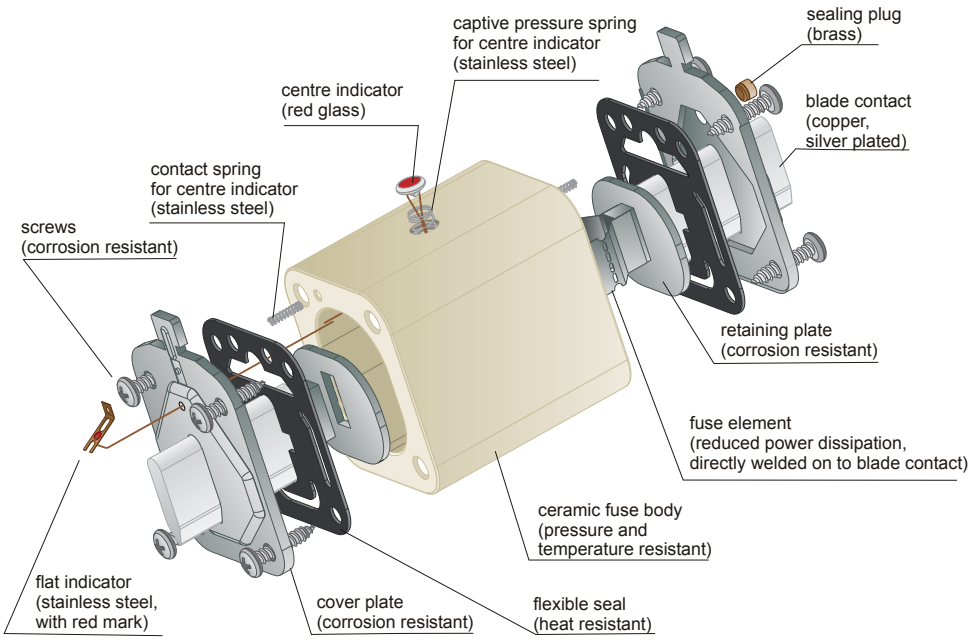
Industrial fuses are designed to protect installations and equipment against overload and short-circuit currents on low voltage electrical circuits.

According to

- IEC 60269-1
- IEC 60269-2
- VDE 0680
- VDE -DIN 0636/21
- DIN 43620

General characteristics

- High breaking capacity up to 120 kA at 500V AC
- Optimal selectivity
- Low power dissipation



With fusing indicator - gG curve

Size 00

References	In (A)	V	kA	Package
66920010	10	500	120	3
66920016	16	500	120	3
66920020	20	500	120	3
66920025	25	500	120	3
66920032	32	500	120	3
66920040	40	500	120	3
66920050	50	500	120	3
66920063	63	500	120	3
66920080	80	500	120	3
66920100	100	500	120	3
66920125	125	500	120	3
66920160	160	500	120	3

10-100A size 000

Size 0

References	In (A)	V	kA	Package
67020016	16	500	120	3
67020020	20	500	120	3
67020025	25	500	120	3
67020032	32	500	120	3
67020040	40	500	120	3
67020050	50	500	120	3
67020063	63	500	120	3
67020080	80	500	120	3
67020100	100	500	120	3
67020125	125	500	120	3
67020160	160	500	120	3

Size 1

References	In (A)	V	kA	Package
67120063	63	500	120	3
67120080	80	500	120	3
67120100	100	500	120	3
67120125	125	500	120	3
67120160	160	500	120	3
67120200	200	500	120	3
67120250	250	500	120	3

Size 2

References	In (A)	V	kA	Package
67220160	160	500	120	3
67220200	200	500	120	3
67220250	250	500	120	3
67220315	315	500	120	3
67220355	355	500	120	3
67220400	400	500	120	3

Size 3

References	In (A)	V	kA	Package
67320315	315	500	120	3
67320400	355	500	120	3
67320425	400	500	120	3
67320500	500	500	120	3
67320630	630	500	120	3

Size 4

References	In (A)	V	kA	Package
67420630	630	500	120	1
67420800	800	500	120	1
67421000	1000	500	120	1
67421200	1250	500	120	1

With fusing indicator - aM curve

Size 00

References	In (A)	V	kA	Package
66930010	10	690	120	3
66930016	16	690	120	3
66930020	20	690	120	3
66930025	25	690	120	3
66930032	32	690	120	3
66930040	40	690	120	3
66930050	50	690	120	3
66930063	63	690	120	3
66930080	80	690	120	3
66930100	100	690	120	3
66930125	125	690	120	3
66930160	160	690	120	3

Size 0

References	In (A)	V	kA	Package
67030016	16	690	120	3
67030020	20	690	120	3
67030025	25	690	120	3
67030032	32	690	120	3
67030040	40	690	120	3
67030050	50	690	120	3
67030063	63	690	120	3
67030080	80	690	120	3
67030100	100	690	120	3
67030125	125	690	120	3
67030160	160	690	120	3

Size 1

References	In (A)	V	kA	Package
67130063	63	690	120	3
67130080	80	690	120	3
67130100	100	690	120	3
67130125	125	690	120	3
67130160	160	690	120	3
67130200	200	690	120	3
67130250	250	690	120	3

Size 2

References	In (A)	V	kA	Package
67230160	160	690	120	3
67230200	200	690	120	3
67230250	250	690	120	3
67230315	315	690	120	3
67230355	355	690	120	3
67230400	400	690	120	3

Size 3

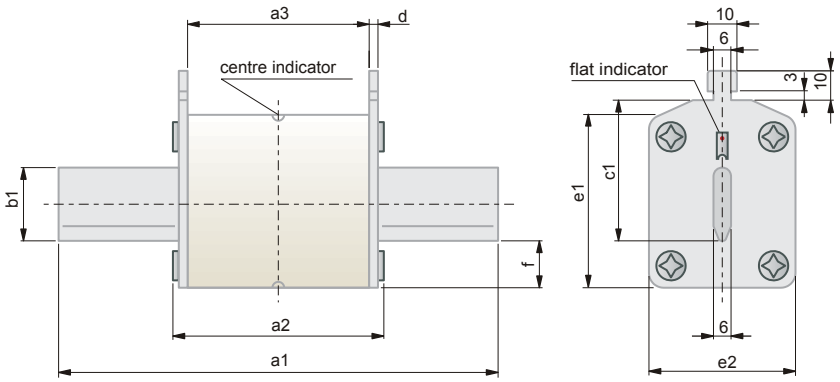
References	In (A)	V	kA	Package
67330315	315	690	120	3
67330400	355	690	120	3
67330500	400	690	120	3
67330630	500	500	120	3
67320630	630	500	120	3

Size 4

References	In (A)	V	kA	Package
67430630	630	500	120	1
67430800	800	500	120	1
67431000	1000	500	120	1
67431200	1250	500	120	1

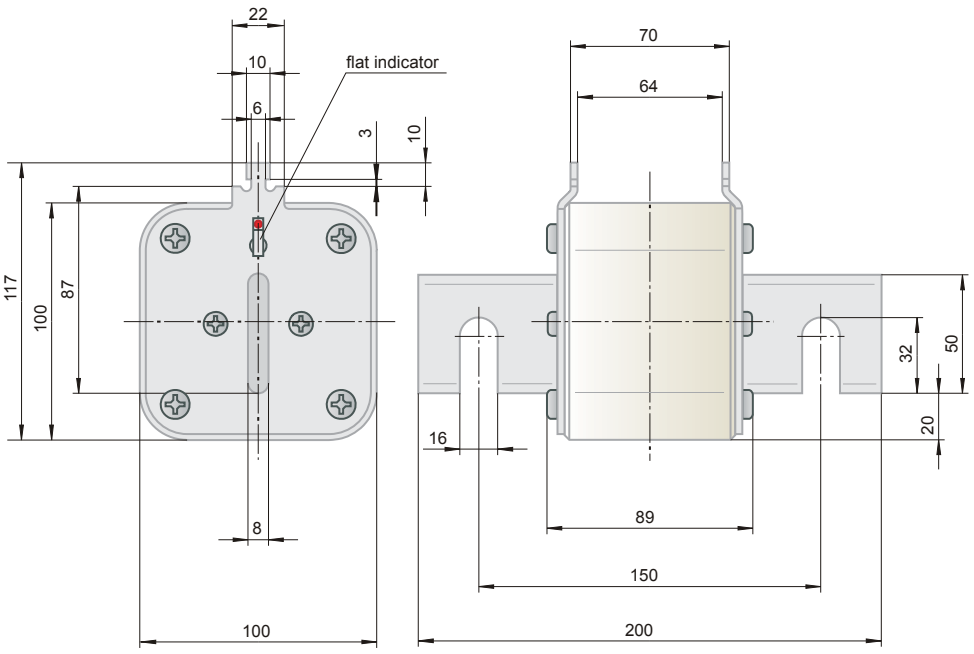
Dimensions

Sizes 00,0,1,2 and 3



Size	A1	A2	A3	B1	C1	D	E1	E2	F
00	78	52	44	15	35	2·5	40	30	8
						2	47		14
0	125	68	62	15	35	2·5	40	30	8
1	135	72	62	15	40	2·5	40	30	8
				20			48	40	12
		73	64	15		2	47	30	14
		72	62	20			53	42	
2	150	72	62	20	48	2·5	48	40	12
				25			59	50	
		74	64	20		2	53	42	14
				25			60	53	
3	150	73	62	25	60	2·8	59	50	13
				32			71	71	17
		74	64	25		2	60	53	14
		73	62	32			75	73	17

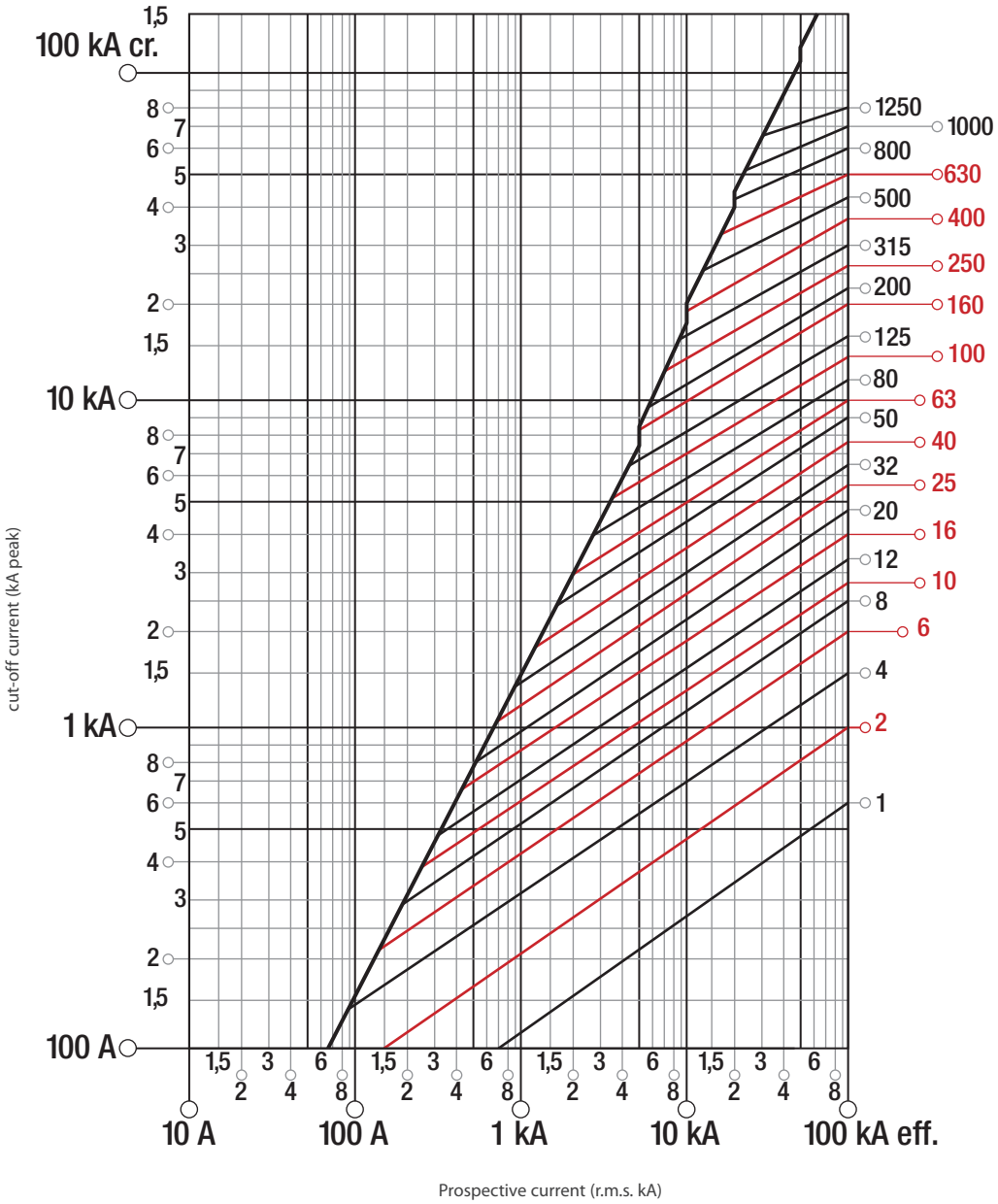
Sizes 4



Fuse charateristics curves

gG fuses

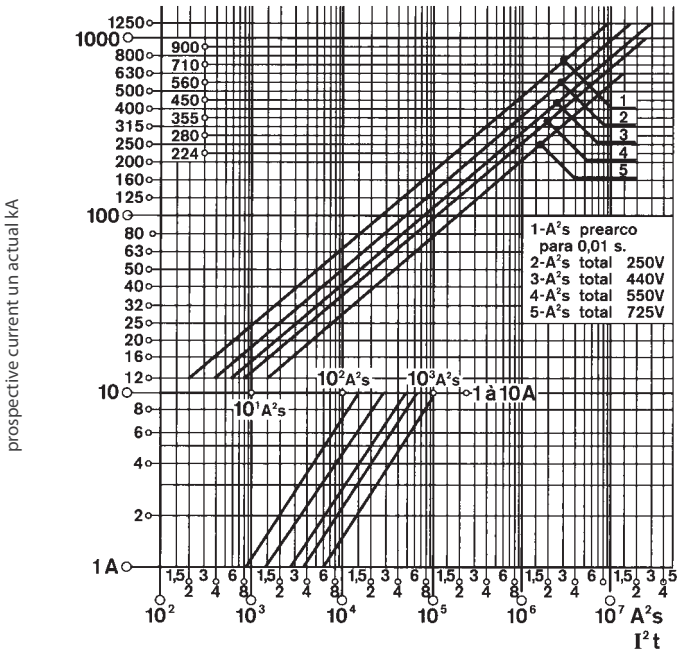
Current cut-off diagram



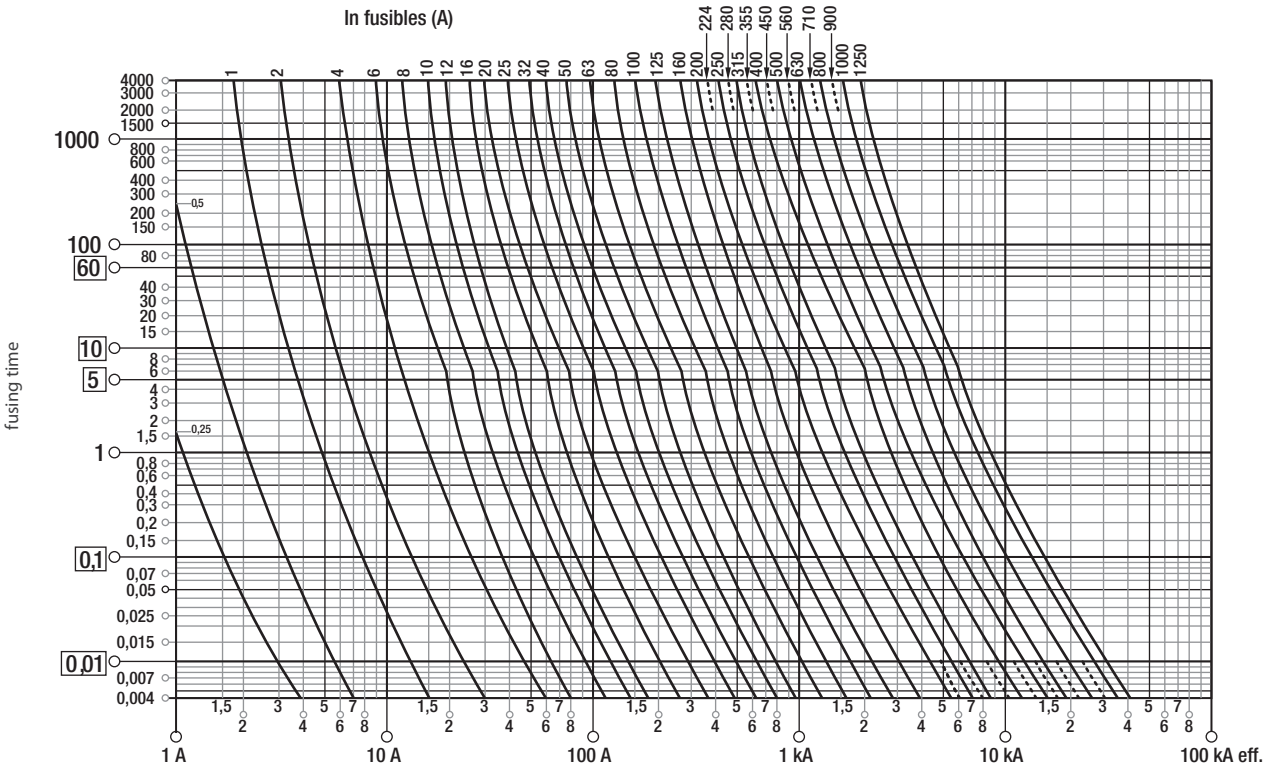
Fuse characteristics curves

gG fuses

Thermal characteristics diagram



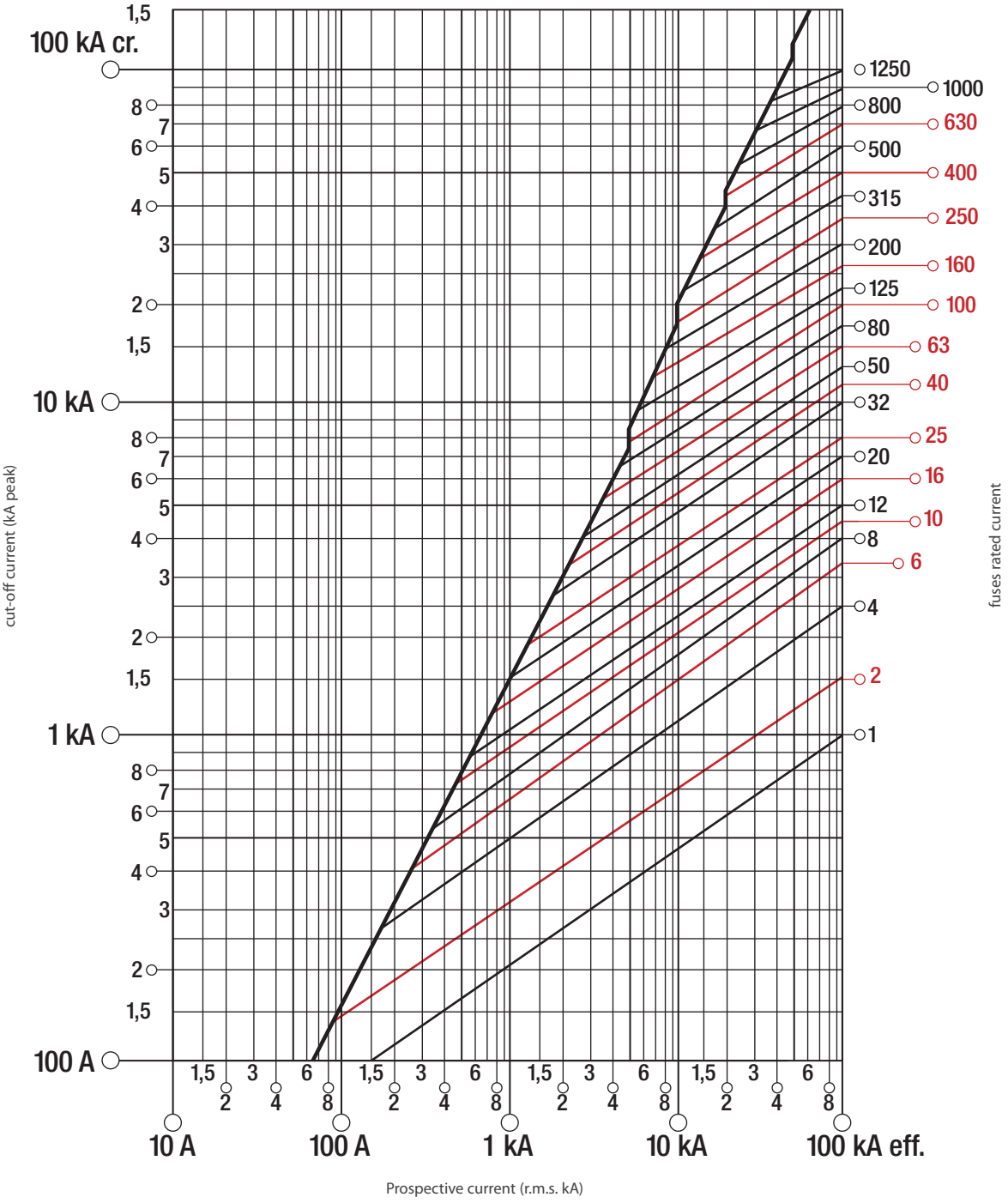
Time/current operating characteristics



Fuse characteristics curves

aM fuses

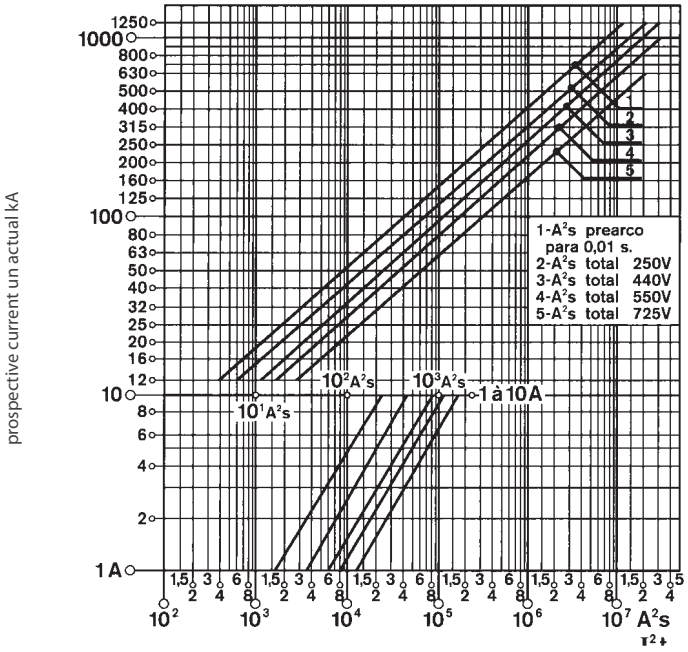
Current cut-off diagram



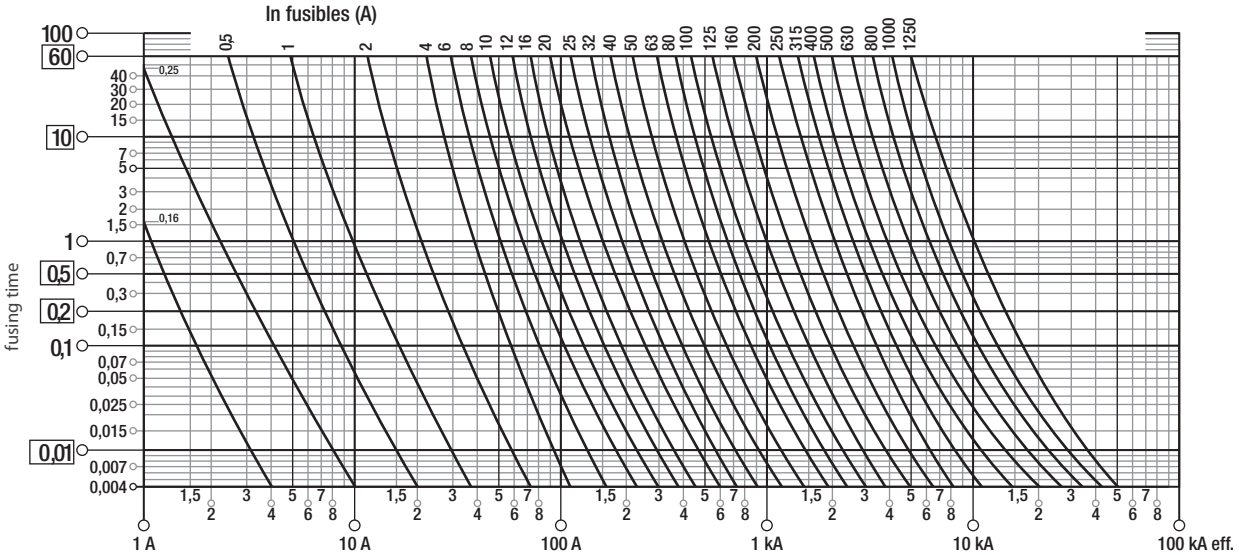
Fuse characteristics curves

aM fuses

Thermal characteristics diagram



Time/current operating characteristics



New AKB range of modular industrial fuseholders

«Designed to guarantee safety disconnection and equipment protection on your low voltage power and control circuits»

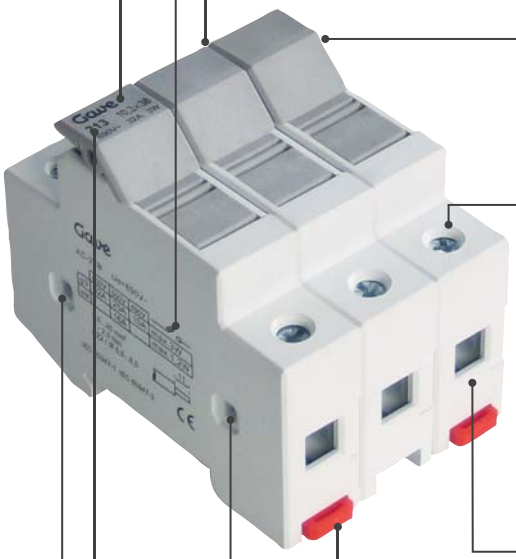
Designed by experience

The new range of modular fuseholders is the outcome of extensive experience on the field of fuse protection. This **complete range** comprises four standard sizes plus a DC model. We have combined modern look with ergonomic **design** and provided the range with **mounting flexibility** using multipole assembly kits.

Modular
All sizes can be installed on 45mm cut out modular distribution panels.

Ergonomic handle
Adapted shape for easy access and operation

Marking
Easy to identify. Reference and basic data visible on front handle. Electrical characteristics on the side.



Pozidrive screws
Strong grip for optimal torque tightening

Assembly kits
Push in clips and pins for multipole assemblies.

Protection degree IP20
Protected against accidental finger contact.

Fixing Clip
Din rail fixing mechanism easy to access and smooth slide on removal operations.

General characteristics

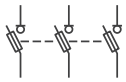
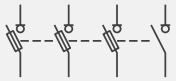
- On load breaking fuse disconnectors.
- Easy and quick DIN rail mounting.
- High insulation voltage rating.
- Resistant to abnormal heat and fire (Glow wire flammability test at 960ºC according to IEC 695-2-1)
- Elevated vibration withstand.
- DIN modular range (45mm cut out)
- Multipole assemblies.
- Contact surfaces silver plated.

According to standards

- IEC 60947-1
- IEC 60947-3

Size 00

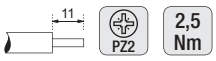
- Modular 45 mm cut out - 1 module (17,5mm) X pole.
- Mounting 35mm DIN rail.
- Simultaneous breaking on multipole versions.
- High temperature resistant plastics.

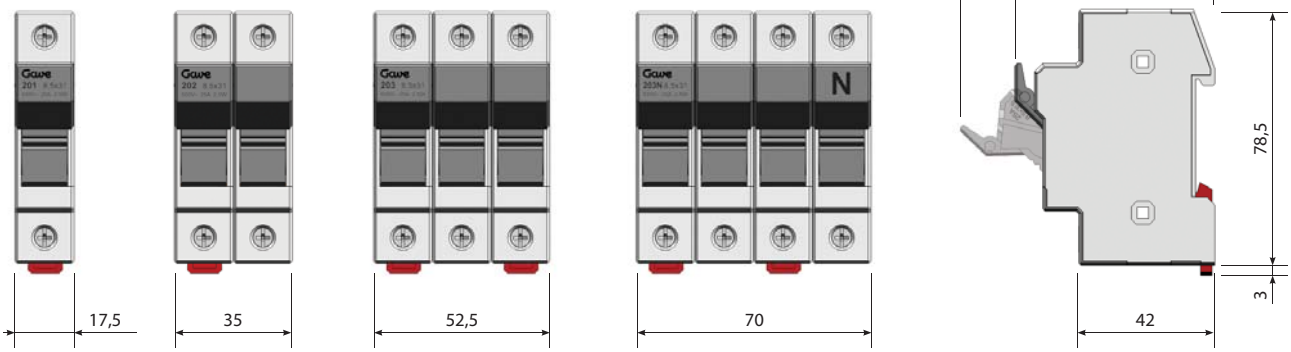
References	Thermal rating	Fuse size	Poles	Modules	Electrical diagram	Package
201	25 A	8,5 x 31,5	1P	1		12
202	25 A	8,5 x 31,5	2P	2		6
203	25 A	8,5 x 31,5	3P	3		4
203N	25 A	8,5 x 31,5	3P+N	4		3

Assembly kits

Reference	Description	Package
21KE	multipolar assembly kit s.00&0 (2 clips + 1 Pin)	12

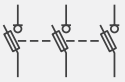
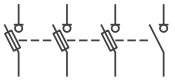
Dimensions





Size 0

- Modular 45 mm cut out - 1 module (17,5mm) X pole.
- Mounting 35mm DIN rail.
- Simultaneous breaking on multipole versions.
- High temperature resistant plastics.

References	Thermal rating	Fuse size	Poles	Modules	Electrical diagram	Package
211	32 A	10 x 38	1P	1		12
211N	32 A	10 x 38	1P+N	2		6
212	32 A	10 x 38	2P	2		6
213	32 A	10 x 38	3P	3		4
213N	32 A	10 x 38	3P+N	4		3

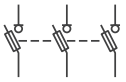
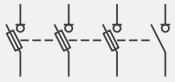
Assembly kits

Reference	Description	Package
21KE	multipolar assembly kit s.00&0 (2 clips + 1 Pin)	12

Dimensions

Size 1

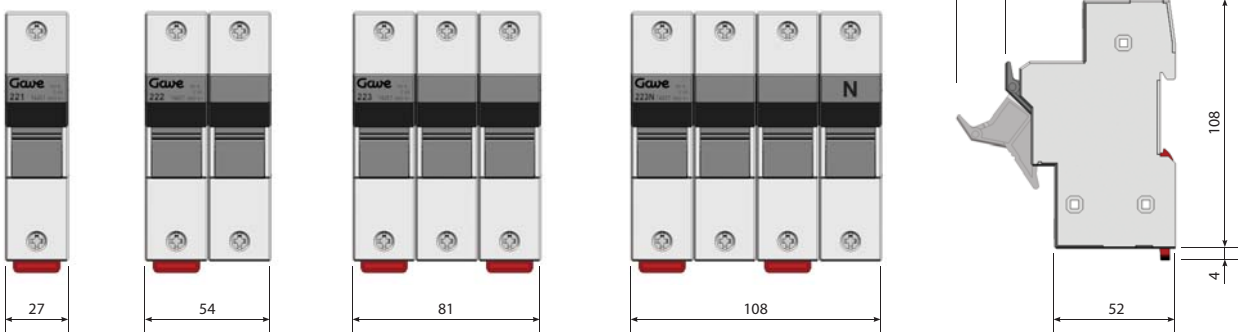
- Modular 45 mm cut out - 1,5 module (27mm) X pole.
- Mounting 35mm DIN rail.
- Simultaneous breaking on multipole versions.
- Ergonomic handle.
- High temperature resistant plastics.

References	Thermal rating	Fuse size	Poles	Modules	Electrical diagram	Package
221	50 A	14 x 51	1P	1		6
222	50 A	14 x 51	2P	2		3
223	50 A	14 x 51	3P	3		2
223N	50 A	14 x 51	3P+N	4		1

Assembly kits

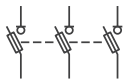
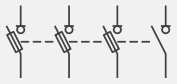
Reference	Description	Package
23KE	multipolar assembly kit s.1&2 (3 clips + 1 Pin)	10

Dimensions



Size 2

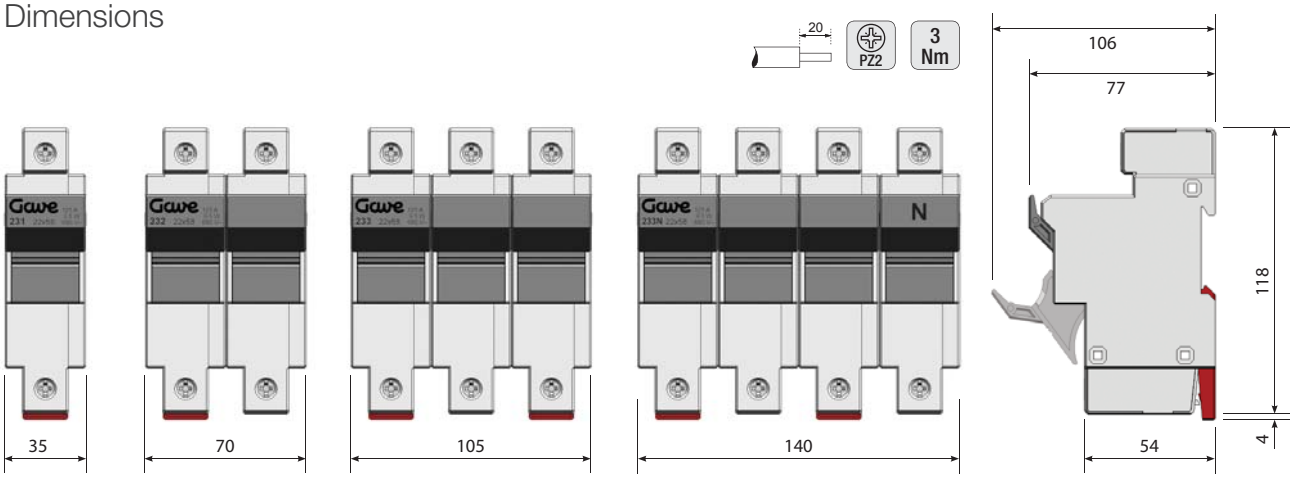
- Modular 45 mm cut out - 2 module (35mm) X pole .
- Mounting 35mm DIN rail.
- Simultaneous breaking on multipole versions.
- Ergonomic handle.
- High temperature resistant plastics.

References	Thermal rating	Fuse size	Poles	Modules	Electrical diagram	Package
231	125 A	22 x 58	1P	1		3
232	125 A	22 x 58	2P	2		2
233	125 A	22 x 58	3P	3		3
233N	125 A	22 x 58	3P+N	4		1

Assembly kits

Reference	Description	Package
23KE	multipolar assembly kit s.1&2 (3 clips + 1 Pin)	10

Dimensions



Photovoltaic installations

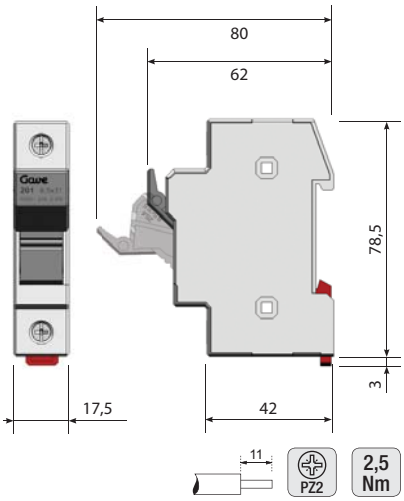
Characteristics

- 1000V cc DC-20B.
- Modular 45 mm cut out - 1 module (17,5mm) X pole.
- Mounting 35mm DIN rail.
- High temperature resistant plastics.
- Elevated insulation characteristics.

According to

- IEC 60947-1
- IEC 60947-3

Dimensions



References	Thermal rating	Fuse size	Poles	Modules	Package
211PV	32 A	10 x 38	1P	1	12

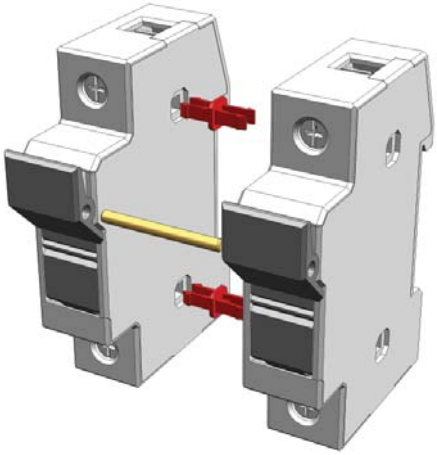
Multipole assemblies

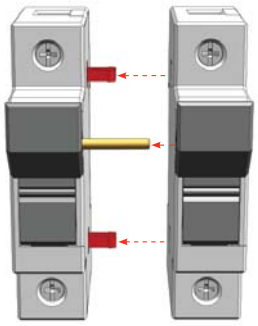
Each bag of kits size 00&0 is sufficient for:

- 12 multipole assemblies.
- 12 two pole assemblies.
- 6 three pole assemblies.
- 4 four pole assemblies.

Each bag of kits size 1&2 is sufficient for:

- 10 multipole assemblies.
- 10 two pole assemblies.
- 5 three pole assemblies.
- 3 four pole assemblies.





	Size 00	Size 0	Size 1	Size 2
nº pins/union	1	1	1	1
nº clips/union	2	2	3	3

Technical data

		Size 00		Size 0 DC		Size 0		Size 1		Size 2	
fuse size		8,5 x 31,5		10 x 38		10 x 38		14 x 51		22 x 58	
rated current	Ith (A)										
	gG 400V	25		32		32		50		125*	
	gG 500V	20		25		25		50		100	
	gG 690V			10		10		25		50	
	aM 400V	-		-		-		50		125*	
	aM 500V	-		16		16		40		100	
	aM 690V	-		-		-		25		50	
rated power dissipation	W										
	gG fuse	2,5		3		3		5		9,5	
	aM fuse	-		1,2		1,2		3		7	
rated impulse withstand voltage	Uimp kV	6		6		6		8		8	
max.operating voltage	Ue V~	400		1000 Vdc		690		690		690	
operating category		AC-22B		DC-20		AC-22B		AC-22B		AC-21B	
wire section		min.	máx	min.	máx	min.	máx	min.	máx	min.	máx
stranded	mm^2	1x1,5	1x25 2x10	1x1,5	1x25 2x10	1x1,5	1x25 2x10	1x1,5	1x35 2x16	1x4	1x50 2x25
flexible	mm^2	1x1,5	1x25 2x10	1x1,5	1x25 2x10	1x1,5	1x25 2x10	1x1,5	1x35 2x16	1x4	1x50 2x25
torque	Nm	2 - 2,5		2 - 2,5		2 - 2,5		2,5 - 3		2,5 - 3	
connection screws / Pz2	Ø	5,5 - 6,5		5,5 - 6,5		5,5 - 6,5		5,5 - 6,5		5,5 - 6,5	
flame Resistant IEC 60695-2-1		960 ºC		960 ºC		960 ºC		960 ºC		960 ºC	

*125A intermitent use (100A continuous use)

Derating table

		Size 00	Size 0	Size 1	Size 2
In / Un 400V~	A	25	32	50	125
In / Un 500V~	A	20	20	40	80
Acc. ambient temperature					
20 º C		1	1	1	1
30 º C		0,95	0,95	0,95	0,95
40 º C		0,90	0,90	0,90	0,90
50 º C		0,80	0,80	0,80	0,80
Acc. number of poles					
1-3 phases		1	1	1	1
4-6 phases		0,8	0,8	0,8	0,8
7-9 phases		0,7	0,7	0,7	0,7
>10 phases		0,6	0,6	0,6	0,6

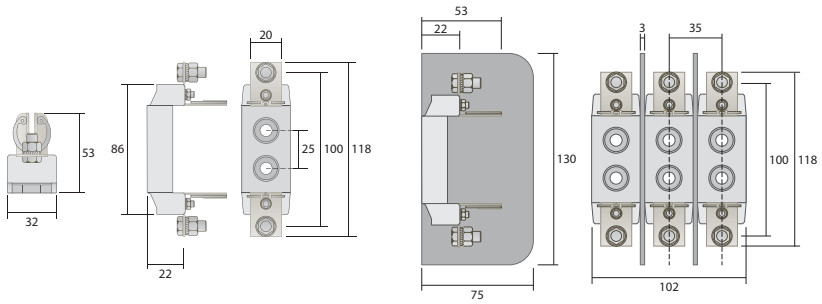
NH fuse bases

- Single-pole and triple-pole AKB-NH fuse base up to 1250A
- Panel fastening
- Screw connection
- Contact clips with elastic springs securing the pressure on the fuse (on size 4, the pressure is secured by screw)
- Polyester base reinforced with fiber glass
- Phases spliter to group single-pole fuse bases
- Strapped clamps for a better connection
- Triple-pole bases supplied with phase spliters

Size 00

References	Fuse size	In (A)	Poles	Package
511	NH00	160 A	1	3
513	NH00	160 A	3	1

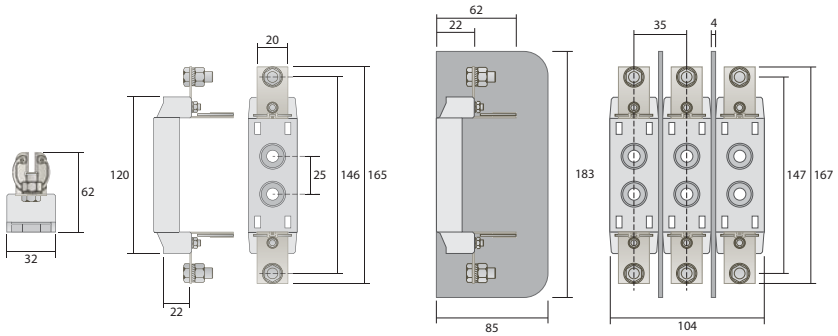
Dimensions



Size 0

References	Fuse size	In (A)	Poles	Package
521	NH0	160 A	1	3
523	NH0	160 A	3	1

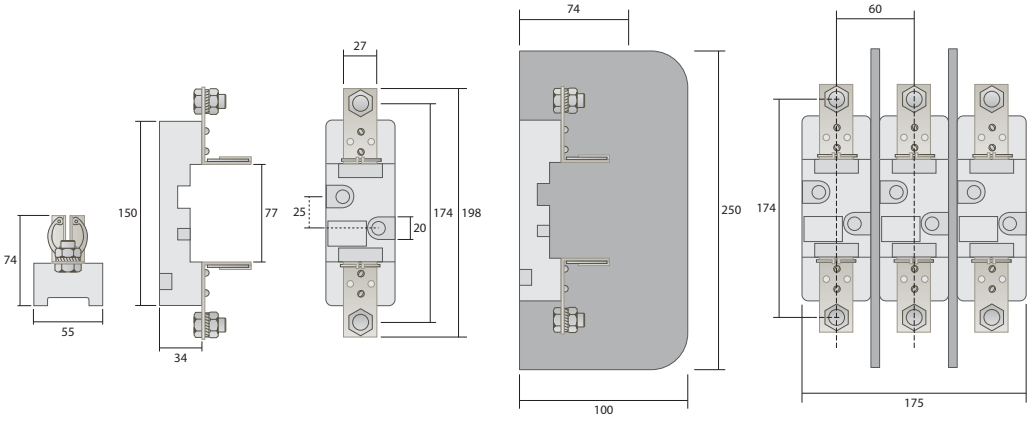
Dimensions



Size 1

References	Fuse size	In (A)	Poles	Package
531	NH1	250 A	1	3
533	NH1	250 A	3	1

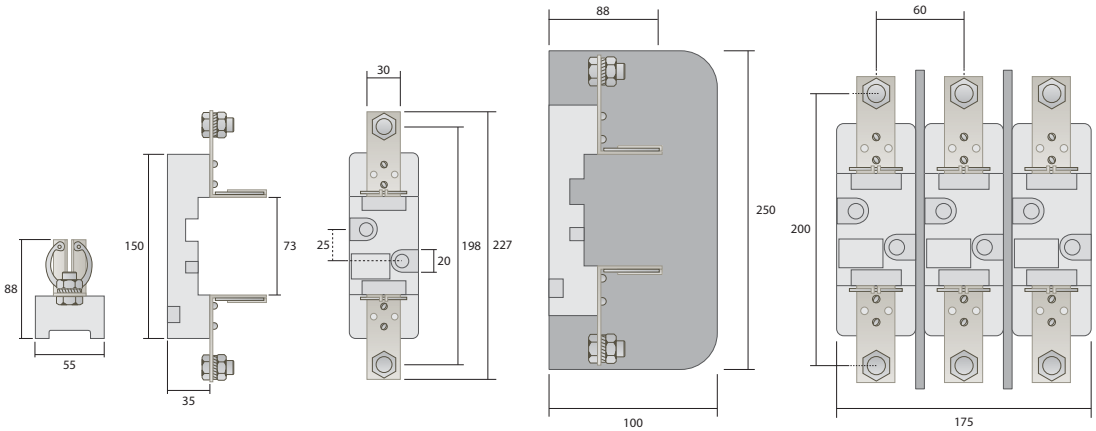
Dimensions



Size 2

References	Fuse size	In (A)	Poles	Package
541	NH2	400 A	1	3
543	NH2	400 A	3	1

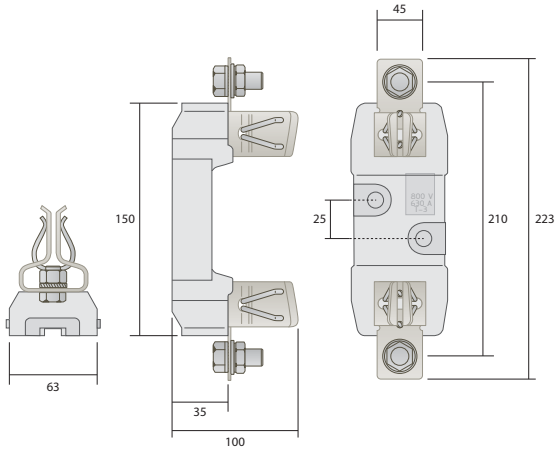
Dimensions



Size 3

References	Fuse size	In (A)	Poles	Package
551	NH3	630 A	1	3
553	NH3	630 A	3	1

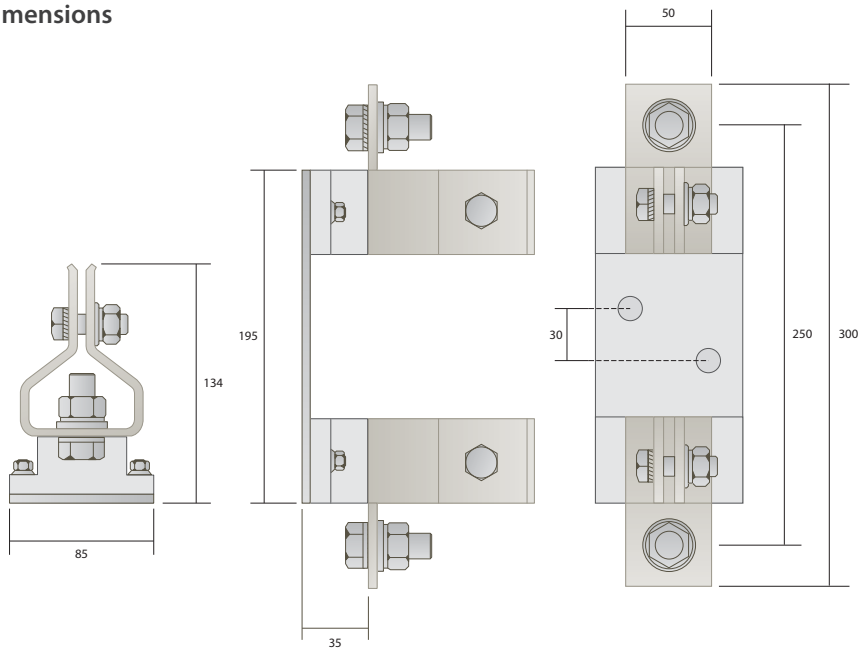
Dimensions



Size 4

References	Fuse size	In (A)	Poles	Package
561	NH4	1250 A	1	1

Dimensions



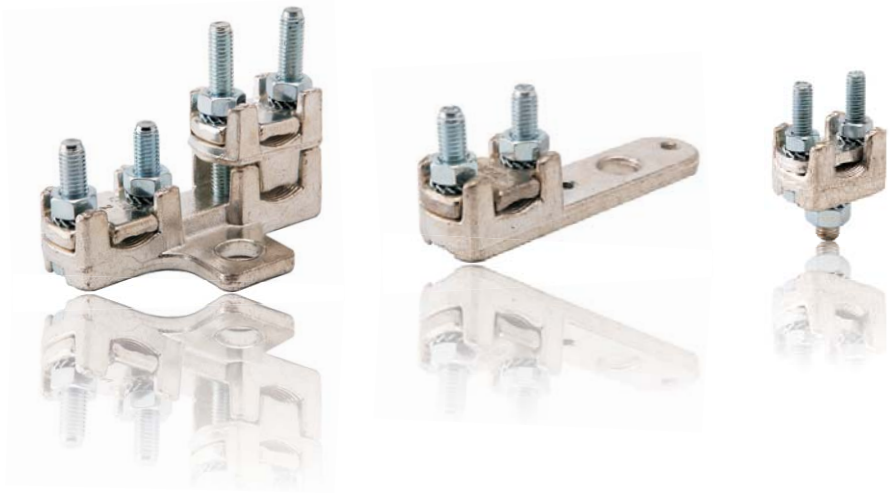
Accessories

Isolating plate

References	Description	Package
51SEP	Plate for NH base size 00	1
52SEP	Plate for NH base size 0	1
53SEP	Plate for NH base size 1-2	1
55SEP	Plate for NH base size 3	1
56SEP	Plate for NH base size 4	1

Extraction Handle

References	Description	Package
64010011	Extraction handle for NH fuse	1



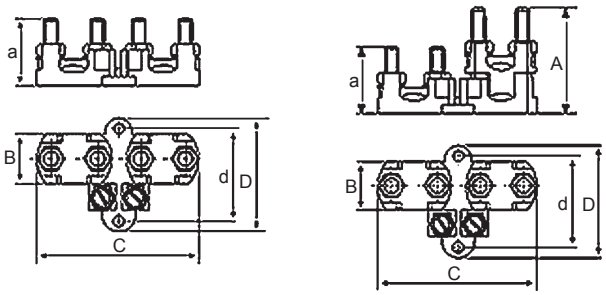
Bimetal clamps

Parallel Bimetal Clamps

- Parallel clamps permit to split and distribute connections on large conducting units.

References	Fuse size	Conn.	Sec. max	Sec. min.	a	A	B	C	D	d	Pack.
5195P.2	00-0	1+1	95	10	35	35	24	80	59	42	1
5195P.3	00-0	1+2	95	10	48	55	24	80	59	42	1
5195P.4	00-0	2+2	95	10	55	55	24	80	59	42	1
53150P.2	1	1+1	150	16	41	41	27	96	63	44	1
53150P.3	1	1+2	150	16	41	66	27	96	63	44	1
53150P.4	1	2+2	150	16	66	66	27	96	63	44	1
54240P.2	2	1+1	240	50	47	47	36	117	71	53	1
54240P.3	2	1+2	240	50	47	97	36	117	71	53	1
54240P.4	2	2+2	240	50	97	97	36	117	71	53	1

Dimensions

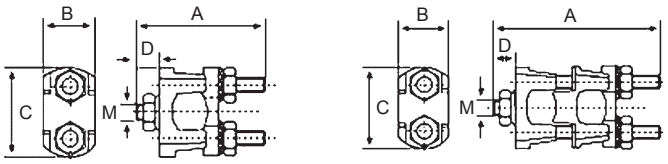


Studded Bimetal Clamps

- These terminals are designed to connect fuse bases (NH) and cooper bars.
- They offer great flexibility on connection from all directions.

References	Fuse size	Conn.	Sec. max	Sec. min.	A	B	C	D	M	Package
5150	00	1	50	6	42	18	27	13	6	1
5150.2	00	2	50	6	48	18	27	13	6	1
5195	00-0	1	95	10	52	24	34	16	8	1
5195.2	00-0	2	95	10	72	24	34	16	8	1
53150	1	1	150	16	58	26	42	17	10	1
53150.2	1	2	150	16	84	26	42	17	10	1
54240	2-3	1	240	50	68	35	53	20	12	1
54240.2	2-3	2	240	50	116	35	53	20	12	1

Dimensions

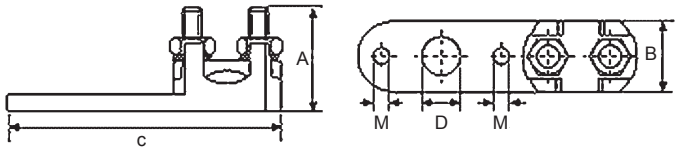


Side Bimetal Clamps

- Allows lateral connections and derivations in all type of electrical assemblies.

References	Fuse size	Conn.	Sec. max	Sec. min.	A	B	C	D	M	Package
5195B	00-0	1	95	10	35	25	94	12	M6	1
53150B	1	1	150	16	41	26	102	12	M6	1

Dimensions



Shovel Bimetal Connection Clamps

- Designed to connect power circuit breakers. Protection caps for safety insulation should be used.

References	Fuse size	Conn.	Sec. max	Sec. min.	A	B	C	D	E	F	Pack.
5150S	00-0	1	50	6	29	19	29	46	5	7,5	1
5150S.2	00-0	2	50	6	34	19	29	46	5	7,5	1
PR50	Protection cap										1

Dimensions

NH fuse switch disconnectors

Gave introduces a new range of NH fuse switch disconnectors characterised by its wide range of size , modularity and scope of accessories.

Functions

NH fuse switch disconnectors are used on low voltage electrical systems that require high protection against shortcircuit while securing on load circuit disconnection and isolation. We can find application on switchboard, distribution systems, OEM,..

According to standards

- IEC/EN 60 947-3
- VDE 0660 / part 100
- IEC/EN 60 269-2-1
- VDE 0636 / part 201

General characteristics

- Five sizes available from 000 to 3 (100A up to 630A).
- Range uniformity and modularity.
- Size 00 and 1 offer single pole, double pole, triple pole and quadruple pole models.
- Mounting options. Size 000 DIN rail or base mounting. Other sizes base mounting or busbar mounting.
- Installation flexibility vertical or horizontal. Sizes 00,1 and 2.
- Self extinguishing halogen free materials.

Locking and sealing devices

Parking position of switch operating cover

Easy direct installation by snapping on to the bus bars

Touch protection IP20 – when fuse link is in test mode IP rating is maintained

New features

Base

Manufactured of strengthened fiber glass, thermically high stable, self extinguishing synthetic material halogen free. Copper contacts are galvanic surface coated. Contact springs are made of stainless steel. Symmetrical switch suitable for bottom / top cable terminal connections.

Cover

The switch operating cover consists of strengthened fiber glass self extinguishing thermoplastic material halogen free. Supplied with large windows which enable label and fuse link indicator to be clearly seen. Ergonomic handle for easy operation.

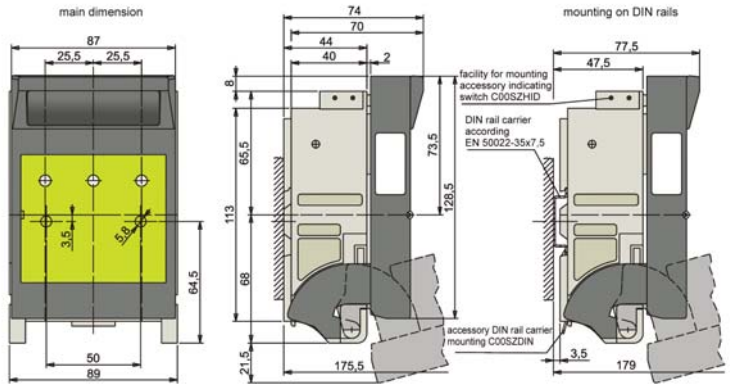
References and dimensions

703

NH 000 fuse switch

References	Thermal rating	Fuse size	Poles	Terminal	Weight
703	100 A	NH 000	3	direct connection terminal 1.5–50 mm2	0,46 kg

Dimensions



711

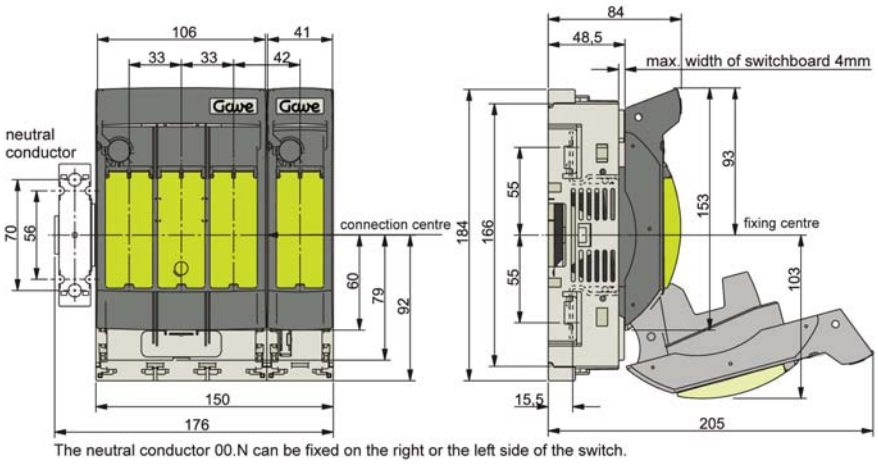
713

714

NH 00 fuse switch

References	Thermal rating	Fuse size	Poles	Terminal	Weight
711	160 A	NH 00	1	screw M8	0,32 kg
713	160 A	NH 00	3	screw M8	0,74 kg
714	160 A	NH 00	4	screw M8	1,04 kg

Dimensions



The neutral conductor 00.N can be fixed on the right or the left side of the switch.

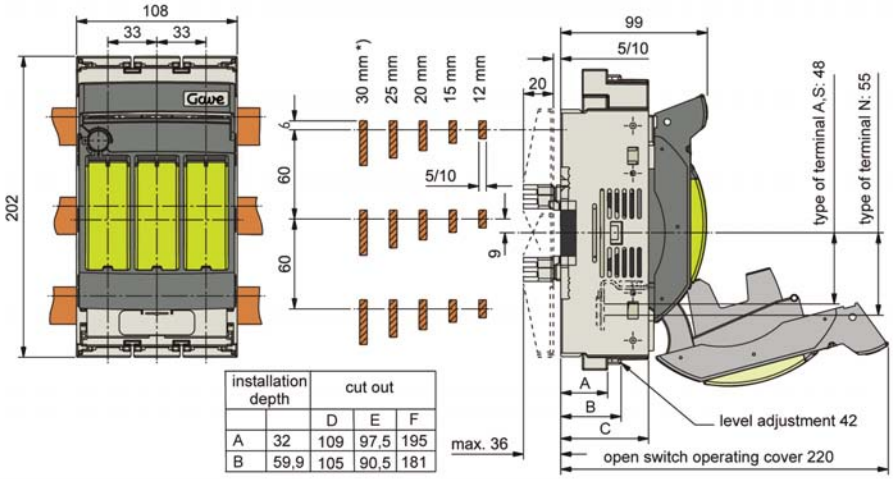
713PC

NH 00 fuse switch

Direct installation on to bus bar systems

References	Thermal rating	Fuse size	Poles	Terminal	Weight
713PC	160 A	NH 00	3	for 60 mm bus bar systems. Screw M8	1,04 kg

Dimensions



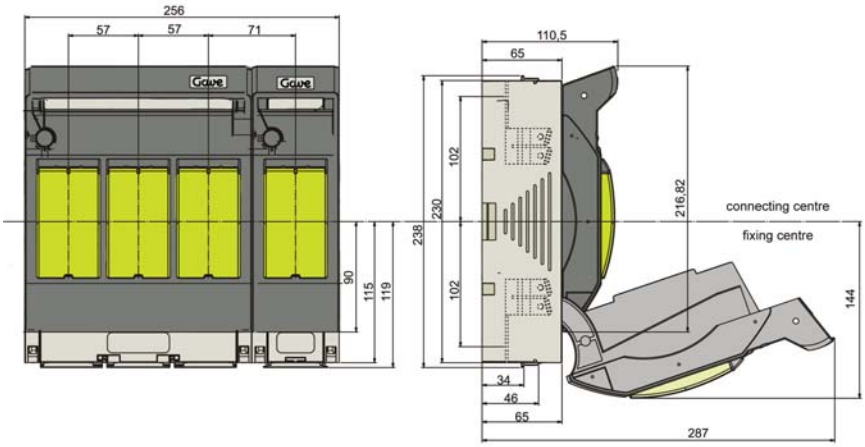
installation depth		cut out		
		D	E	F
A	32	109	97,5	195
B	59,9	105	90,5	181

733

NH 1 fuse switch

References	Thermal rating	Fuse size	Poles	Terminal	Weight
731	250 A	NH 1	1	screw M10	1,00 kg
733	250 A	NH 1	3	screw M10	2,42 kg
734	250 A	NH 1	4	screw M10	3,42 kg

Dimensions



References and dimensions

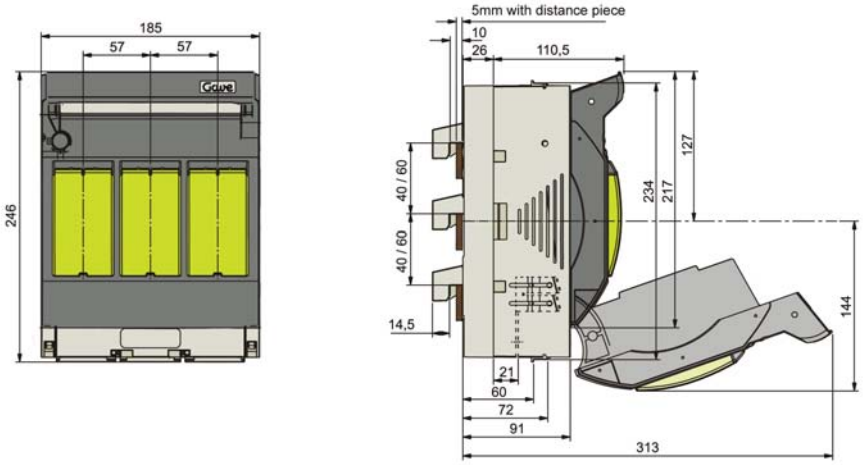
733PC

NH 1 fuse switch

Direct installation on to bus bar systems

References	Thermal rating	Fuse size	Poles	Terminal	Weight
733PC	250 A	NH 1	3	for 40-60 mm bus bar systems. Screw M10	3,12 kg

Dimensions

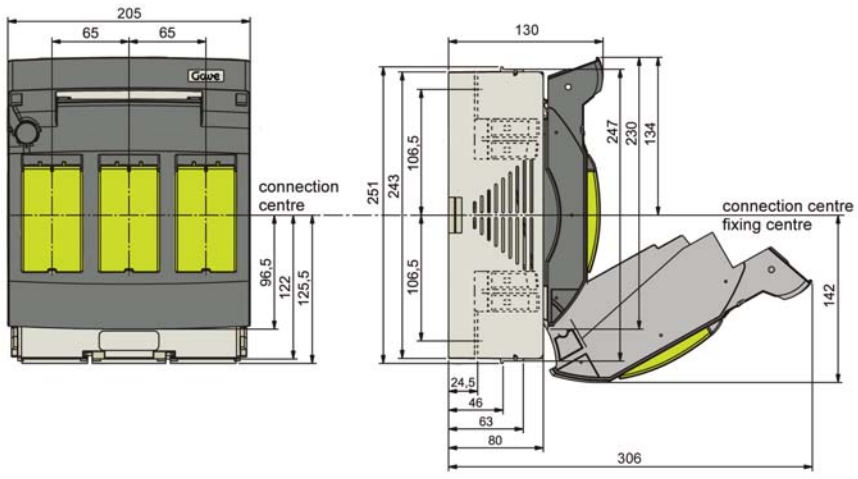


743

NH 2 fuse switch

References	Thermal rating	Fuse size	Poles	Terminal	Weight
743	400 A	NH 2	3	screw M10	3,47 kg

Dimensions



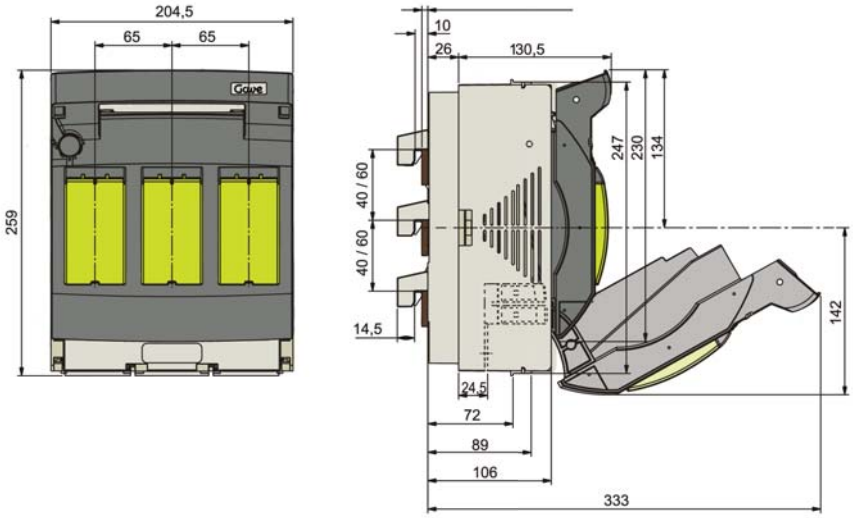
743PC

NH 2 fuse switch

Direct installation on to bus bar systems

References	Thermal rating	Fuse size	Poles	Terminal	Weight
743PC	400 A	NH 2	3	for 40-60 mm bus bar systems. Screw M12	4,50 kg

Dimensions

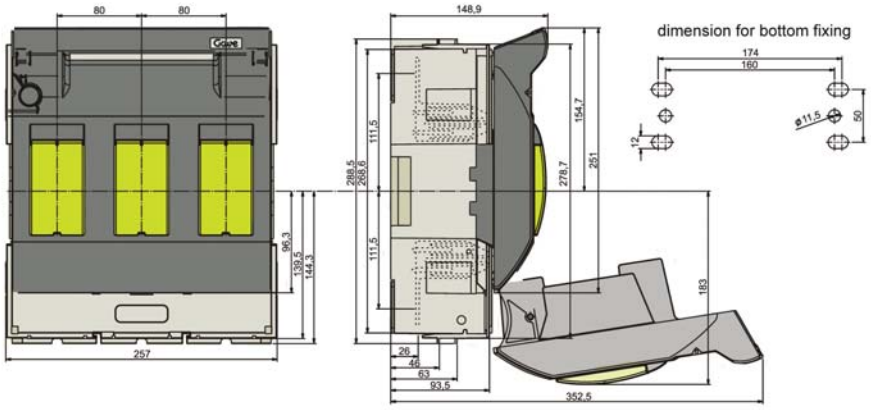


753

NH 3 fuse switch

References	Thermal rating	Fuse size	Poles	Terminal	Weight
753	630 A	NH 3	3	screw M12	4,94 kg

Dimensions



Accessories

Terminal cover

References	Thermal rating	Poles	Switch disconnector	Pieces	Weight
711PROT	160	1	711	2	0,02 kg
713PROT	160	3	713	2	0,04 kg
731PROT	250	1	731	2	0,09 kg
733PROT	250	3	733	2	0,25 kg
743PROT	400	3	743	2	0,22 kg
753PROT	630	3	753	2	0,32 kg

Bus bar touch protection

References	Thermal rating	Poles	Switch disconnector	Pieces	Weight
713PCPROT	160	3	713PC	2	0,05 kg
733PCPROT	250	3	733PC	2	0,13 kg
743PCPROT	400	3	743PC	2	0,22 kg

Cover sealing device

References	Description	Weight
7BLOC	installation set for 711,713,714,731,733,734 and 733PC	0,05 kg

Auxiliary contacts indication

References	Description
	available different models upon request

Technical data

		NH 000	NH 00	NH 1	NH 2	NH 3
conventional free air thermal current with fuse links Ith		100 A	160 A	250 A	400 A	630 A
max. allowed power dissipation of NH-fuse links Pn		7.5 W	12 W	23 W	34 W	48 W
conventional free air thermal curent with solid links Ith		-	200 A	400 A	630 A	780 A
max. allowed power dissipation of solid links Pn		1.2 W	1.2 W	2.6 W	9 W	17,5 W
utilization category	voltage Ue	current Ie				
AC 21 B	690 V	100 A	125 A	200 A	315 A	500 A
AC 21 B	400 V	100 A				
DC 21 B[1)]	440 V	100 A				
AC 23 B	400 V	-	160 A	250 A	400 A	630 A
AC 22 B	500 V	-	160 A	250 A	400 A	630 A
DC 22 B	220 V	-	160 A	250 A		
DC 21 B [1)]	440 V	-	-	-	400 A	
rated operational voltage Ue		690 V	690 V	690 V	690 V	690 V
rated insulation voltage Ui		690 V	1000 V	1000 V	1000 V	1000 V
rated impulse withstand voltage Uimp		6kV	8 kV	12 kV	12 kV	12 kV
rated frequency		50-60 Hz	50-60 Hz	50-60 Hz	50-60 Hz	50-60 Hz
degree of protection		IP20	IP20	IP20	IP20	IP20
pollution degree		3	3	3	3	3
rated duty		uninterrupted duty	uninterrupted duty	uninterrupted duty	uninterrupted duty	uninterrupted duty
rated short-circuit making capacity with solid links Icm		-	6.2 kAsw	8.2 kAsw	10.6 kAsw	18,6 kAsw
rated short-circuit making capacity with fuse links						
	400 V AC	80 kA Ie = 100 A	80 kA Ie = 160 A	80 kA Ie = 200 A	80 kA Ie = 400 A	80 kA Ie = 630 A
	500 V AC	-	80 kA Ie = 160 A	80 kA Ie = 200 A	80 kA Ie = 400 A	80 kA Ie = 630 A
	690 V AC	-	50 kA Ie = 125 A	80 kA Ie = 200 A	80 kA Ie = 315 A	50 kA Ie = 500 A
rated short-time withstand current with solid links Icw		-	4 kA / 1 s	8 kA / 1 s	13 kA / 1 s	18 kA / 1 s
power dissipation Ith without NH-fuse links		9 W	2.3 W	3.5 W	20 W	40 W
power dissipation Ith without solid links		-	3.3 W	8 W	50 W	150 W
cable terminal connections						
standard terminal		direct 1.5-50 mm²	M8	M10	M10	M12
for cable lugs			max. 2 x 70 mm²	2 x 150 mm² Cu 2 x 185 mm² Al	2 x 185 mm² Cu 2 x 240 mm² Al	2 x 240 mm² Cu 2 x 300 mm² Al
for copper bus bars with max. width			20 mm	18 mm	35 mm	40 mm

[1)] All poles in series

Photovoltaic

Photovoltaic switch-disconnectors

Solartec switches are manual operated multipole load break switch disconnectors.
They ensure safe on load opening and closing photovoltaic circuits on small and medium photovoltaic systems.

According to standards

- IEC 60947-3
- EN 60947-3
- IEC 60364-712
- UNE 20460-7-712

General characteristics

- Quick and independent operation mechanism.
- Contacts in series to optimize electrical characteristics.
- External series links mounted from origin.
- Connection by protected cable clamps.
- Silver alloy contacts.
- Contact decks made of selfextinguishing polyester reinforced with glass fiber.
- Switch body degree of protection IP20

Factory assembled contacts in series

Contacts in series to optimise electrical characteristics.

Quick and INDEPENDENT operation mechanism

Released continuous operation, such that the speed and force are independent of the action of the operator (IEC 947-3 §2.12).

Protection degree IP20

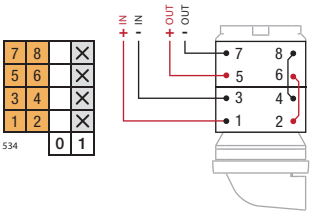
Fingerproof protected cable clamp connection

Technical characteristics

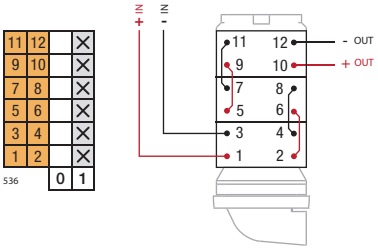
	reference	A-5342PV0	A-5362PV0	A-5382PV0	A-5102PV0
connecting screw		M5	M5	M5	M5
stranded wire	mm²	10 - 25	10 - 25	10 - 25	10 - 25
flexible wire	mm²	10 - 16	10 - 16	10 - 16	10 - 16
impulse voltage	Uimp kV	4	4	4	4
cable cross section	AWG	6	6	6	6
tightening torque	Nm	2,5	2,5	2,5	2,5
load duty category DC-21	voltage V				
	300V	35 A	-	-	-
	400V	-	25 A	-	-
	500V	-	20 A	-	-
	600V	-	15 A	25 A	-
	800V	-	-	10 A	-
	900V	-	-	-	25 A

Standard electrical schemes

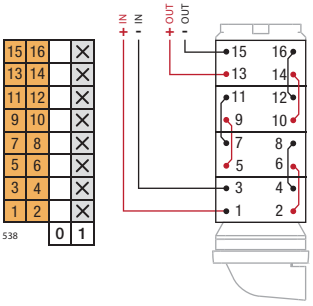
534 4 contacts in series



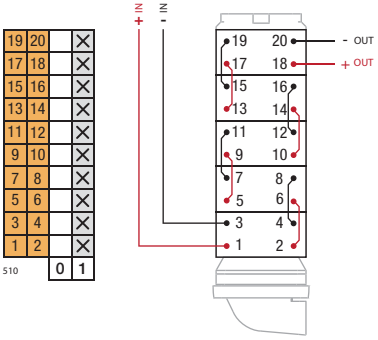
536 6 contacts in series



538 8 contacts in series



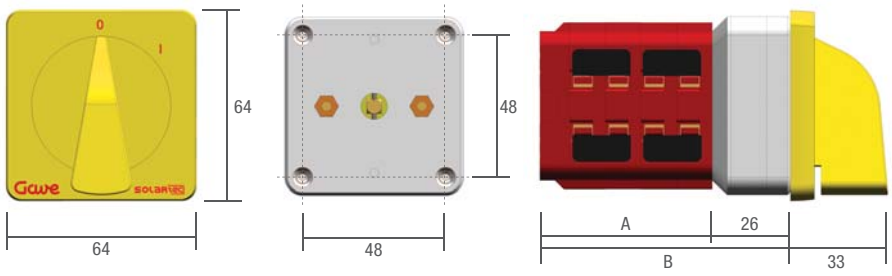
510 10 contacts in series



Dimensions

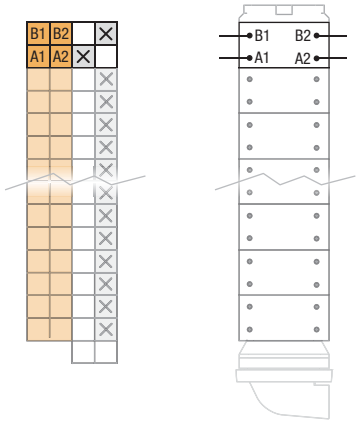
reference	contacts	cells	A	B
A-5342PV0	2+2	2	33,0	60,0
A-5362PV0	3+3	3	45,0	72,0
A-5382PV0	4+4	4	57,0	83,0
A-5102PV0	5+5	5	69,0	95,0

values in mm.



Optional auxiliary contacts

AUXILIARY CONTACTS
Optional



Signalling auxiliary contact mounted from origin.
They can be mounted in all references and they are in white color to differentiate from main contacts.

Indicated on the 3rd digit switch code..

Accesories

Padlockable handle

Characteristics	References
Padlockable operation handle	AK1200523

Mounting plates

Characteristics	Mounting on	References
DIN rail mounting plate	DIN rail	AK0100007
Rear panel mounting plate	Rear panel	AK0000003

Clutches

Characteristics	References
Prolongued shaft plus interlock and rear mounting plate for external operation.	AK174003

Enclosed switch-disconnectors

Photovoltaic generation systems are typically designed with multiple local disconnection points in order to minimise no generation costs during maintenance operations.
IS-PV serie has been designed to offer optimum characteristics on these type of installations.

General characteristics

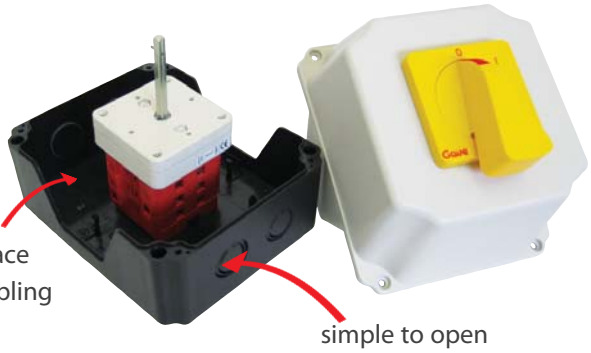
- Original and compact design.
- Enclosure UV resistant.
- Protection degree IP65.
- Base mounting.
- Auxiliary contacts option.

Enclosed switch designated on the last reference digit.

						PV		7
1	2	3	4	5	6	7	8	9

Installation

Simple and fast "plug-in"



interior space for easy cabling

simple to open knockouts

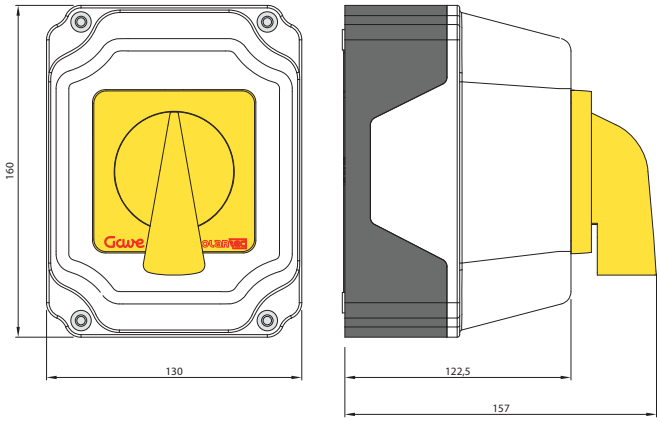
Other options

Padlockable disconnection handle

Indicated on the second digit of the reference

	B					PV		7
1	2	3	4	5	6	7	8	9

Dimensions



High-rating DC switch disconnectors

Serie 55DC switch-disconnectors are manually operated load break switches that provide safety isolation for any low voltage direct current circuit on photovoltaic applications.

According to standards

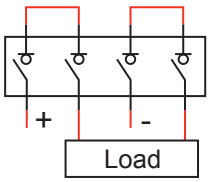
- IEC 60947-3
- EN 60947-3
- VDE 0660-107 (1992)
- IEC 60364-4-410 (Protection to ensure safety against electrical schocks).
- IEC 60364-7-712 .
- DIN VDE 0126

General characteristics

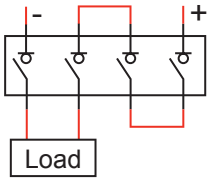
- Fully visible breaking.
- High thermal and dynamic withstand.
- Operational load duty categories DC-21 and DC-22.

Connection

4 poles bottom/bottom



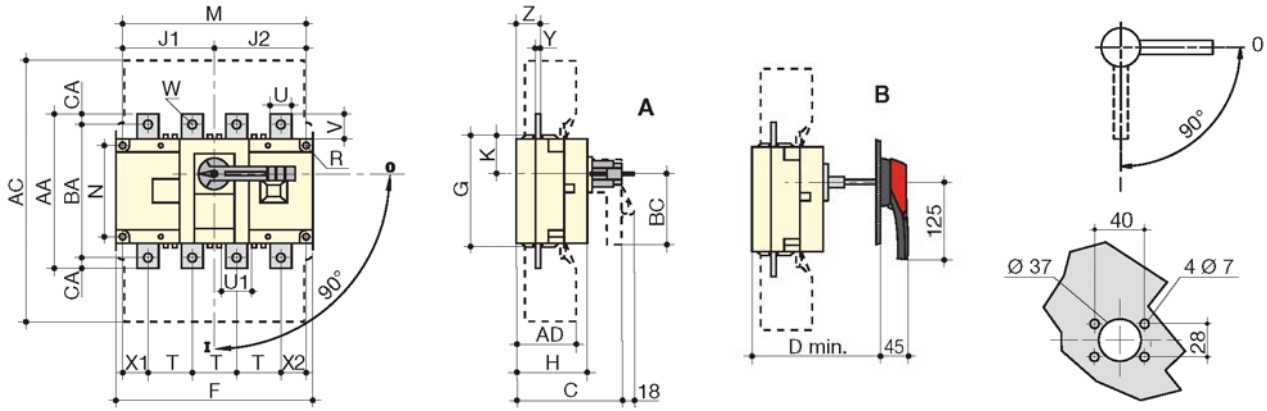
4 poles top/bottom



Technical characteristics and types

	reference	poles	Load duty category DC-22			
			220 V	400 V	600 V	800 V
	55DC4014	4	125A	125 A	80 A	63 A
	55DC4026	4	250 A	250 A	125 A	125 A
	55DC4032	4	315 A	315 A	250 A	250 A

Dimensions



	Overall dimensions		Terminal shrouds			Switch body					
size (A)	*C*	*D min.*	*AC*	*AD*	*F*	*G*	*H*	*J1*	*J2*	*K*	*BC*
125	120	125	235	50	170	93	65	75	75	31,5	80
250	130	135	280	60	230	108	75	105	105	34	115
315	160	165	401	89	290	170	110	135	135	55	115

								Connection terminals							
size (A)	*M*	*N*	*R*	*T*	*U*	*U1*	*V*	*W*	*X1*	*X2*	*Y*	*Z*	*AA*	*BA*	*CA*
125	150	65	5,5	36	20	20,5	25	9	22	20	3,5	20,5	135	115	10
250	210	80	5,5	50	25	20,5	30	11	33	27	3,5	22,5	160	130	15
315	270	140	7	65	32	45,5	37,5	11	37,5	37,5	5	36	235	205	15

Accesories

Direct handle

Characteristics	In	References
Easy mounting with frontal access screw Lockable with padlocks.	125A	26995042
	250 and 315A	26995052

Exterior handle

Characteristics	In	References
Easy to mount from the exterior or the interior of the panel. Material highly resistant against UV and agressive environments. Built-in interlock facility. Padlockable handle.	125 to 315A	1G212118

Prolongued shafts

Characteristics	Lenght	References
Interlocking bit in Zamac material provides high strength Shafts surface treated against corrosion Multiple length choices	200 mm	14001020
	250 mm	14001025
	320 mm	14001032
	500 mm	14001050

Screen protection

Characteristics	In	References
Easy to install Transparent plastic material permits to check connections visually	125A	26984012
	250A	26984020
	315A	26984050

Auxiliary contacts

Characteristics	Function	References
Early break and signalling functions Easy to install "plug-in"	1st contact	26990031
	2nd contact	26990032

Series bridging

Characteristics	In	References
Electrolitic treatment against oxidation Supplied 2 bridges by reference	125A	41DC4014
	250A	41DC4026
	315A	41DC4032

Overvoltage surge protector devices

Photovoltaic installations typically require extended surface areas therefore being particularly exposed to lightning effects and consequences occasioned surges. Damages caused by lightning surges will diminish system performance and shorten equipment live. Using surge protection devices we avoid system failures we take full advantage on the system operation and therefore maximise outcome and profitability.

Function

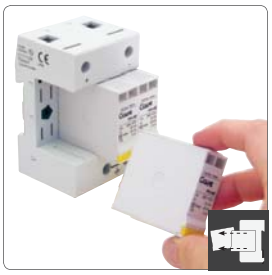
Surge protector devices discharge peak transient overvoltages that travel on the line cable conductors origined by atmosphere lightning.

According to standards

- IEC 61643-1
- EN 61643-11

General characteristics

- Protections Class II and Class I+II
- Modular DIN rail mounting
- Voltages 560VDC and 1000VDC
- High discharge capacity
- Visual indicator on the module
- Replacable module
- Optional remote signalling



Easy to replace modules
Easy replacement of protection module with smooth plug-in system.

Window state indicator
Green colour indicates correct operation and red colour indicates module replacement.

Remote signalling
Remote control on the protection with changeover signalling contact operated when module changes state.

Mechanical coding
Plug-in bases and modules have mechanical coding that prevent from installing the wrong module during replacement operations.

DIN rail mounting
Direct mounting on 35mm. symetrical DIN rail.

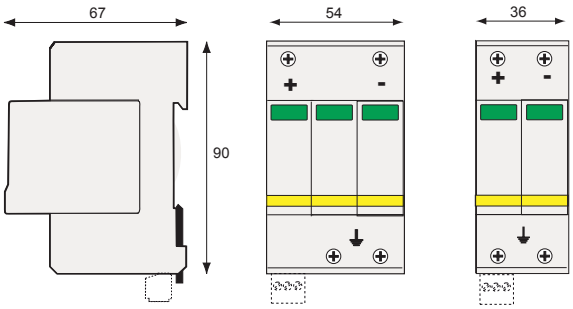
Marking
Terminals marked in order to permit easy wiring. Modules with all relevant information marked and reference easy to identify.

Modular
Designed to fit on modular enclosures with 45 mm front cut out and 17,5 mm module width.

Overvoltage surge protector devices Class II

Surge protection devices Class II are developed to meet overvoltage protection needs for PV photovoltaic networks against atmosphere lightning. These units must be installed in parallel on the DC networks to be protected and provide common and differential modes protection.
The electrical diagram is based on high energy MOVs equipped with specific thermal disconnectors and related failure indicators.

Dimensions

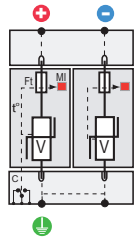


Technical characteristics

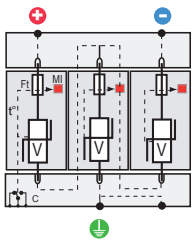
		PST25PV	PST31PV
max. operating voltage category DC-20B	Uc	550VDC	1000VDC
nominal discharge current	In	20 kA	20 kA
maximum discharge current	Imax	40 kA	40 kA
protection level (at In)	Up	2,2 kV	3 kV
remote signalling (add T at the reference)		PST25PVT	PST31PVT

Connection

PST25PV



PST31PV



V : High energy MOV
Ft : Thermal fuse
t° : Thermal disconnection mechanism
C : Contact for remote signal (Option DS50PVS)

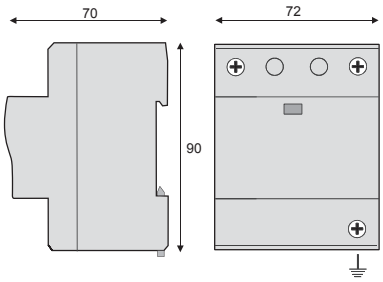
Mechanical characteristics

	PST25PV / PST31PV
connection	by screw terminals: 1,5-10mm2 (L/N) o 2,5-25mm2 (PE)
disconnection indicator	2 mecanichal indicators
mounting	symmetrical rail 35 mm
operating temperature	-40/+85°C
protection degree	IP20
material	termoplastic UL94-V0

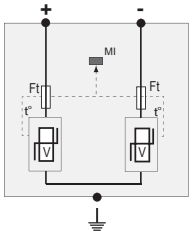
Overvoltage surge protector devices Class I + II

Surge protector devices Class I are recommended at both end of the DC power supply line. Due to its extraordinary high discharge capacity is recommended to be used on installations with elevated risk of direct lightning strikes. The protection is based on high energy MOVs and equipped with specific thermal disconnectors achieving a superior protection level and a lack of follow-up current.

Dimensions



Connection



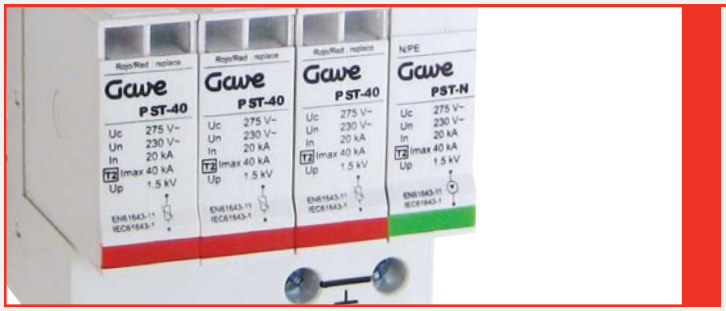
V : High energy MOV
Ft : Thermal fuse
t° : Thermal disconnection mechanism

Technical characteristics

		PST45PV	PST41PV
max. operating voltage category DC-20B	Uc	550VDC	1000VDC
nominal discharge current 15 impulses 8/20 µs	In	40 kA	40 kA
max. lightning current by pole 1 impulse 10/350 µs	limp	12,5 kA	12,5 kA
residual voltage (at limp)	Ures	1.6 kV	1.9 kV
protection level (at In)	Up	1,7 kV	2,4 kV
remote signalling (optional)		output on changeover contact	

related products

Products for alternative current installation



Surge protector devices

- *Class II*
- *Class I + II*

see page 140

Fuse protection

A range of fuse links in a 10x38mm package specifically designed for the protection and isolation of photovoltaic strings. The fuse links are capable of interrupting low overcurrents associated with faulted PV (reverse current, multi-array fault) string arrays.

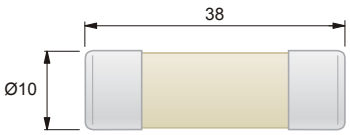
According to

- IEC 60269-1
- IEC 60269-4

Characteristics

- Rated voltage: 1000Vdc
- Amps: 2A, 4A, 6A, 8A, 10A, 12A and 15A
- Rated breaking capacity: 33kA dc
- Min Interrupting Rating:1.3 x In
- Time Constant (L/R): under 1ms

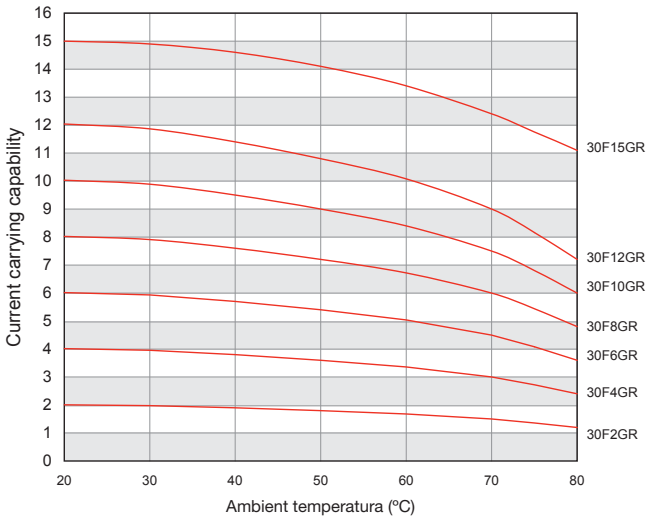
Dimensions



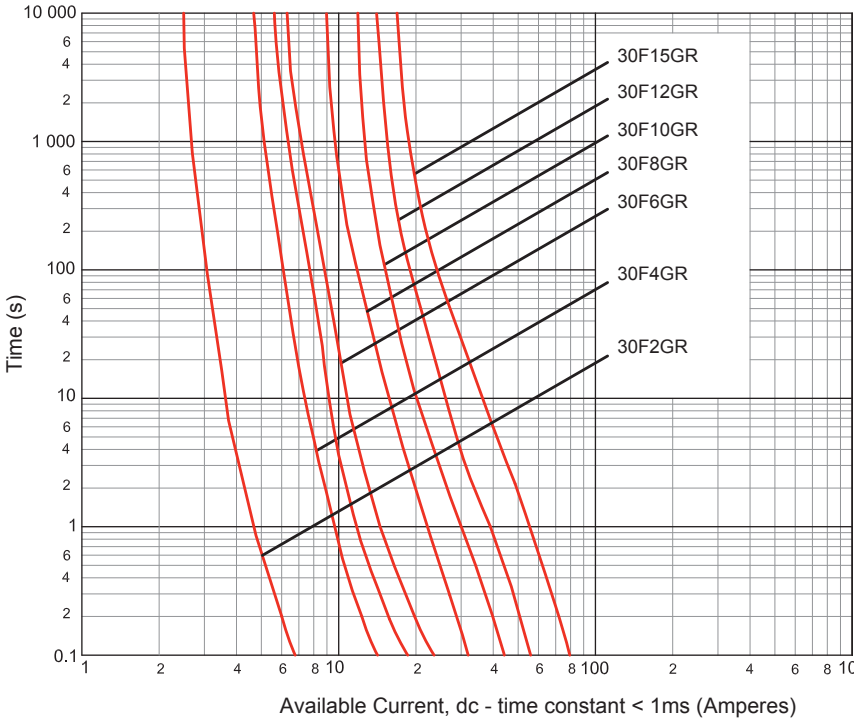
Technical data

Referencia	Current Rating (A)	Energy Integrals I2t (A2s)		Power Loss (W)	
		Pre-Arcing	Total at 1000V	0.8I^n	I^n
30F2GR	2	1.2	3.4	0.6	1.0
30F4GR	4	9.5	26	1.0	1.3
30F6GR	6	30	90	1.1	1.8
30F8GR	8	3	32	1.2	2.1
30F10GR	10	7	70	1.3	2.3
30F12GR	12	12	120	1.5	2.7
30F15GR	15	22	220	1.7	2.9

Temperature derating



Time-current characteristics



Fuseholders

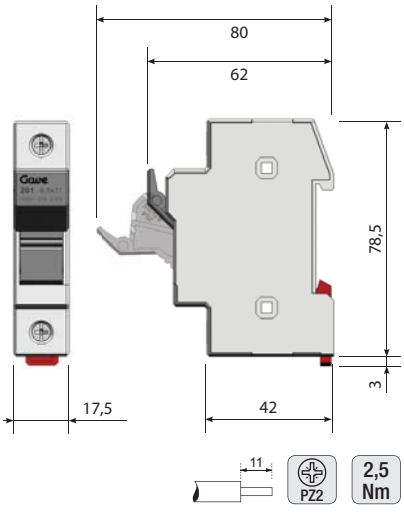
Characteristics

- 1000V cc DC-20B.
- Modular 45 mm cut out - 1 module (17,5mm) X pole.
- Mounting 35mm DIN rail.
- High temperature resistant plastics.
- Elevated insulation characteristics.

According to

- IEC 60947-1
- IEC 60947-3

Dimensions



References	Thermal rating	Fuse size	Poles	Modules	Package
211PV	32 A	10 x 38	1P	1	12

Generator disconnection boxes

Generator disconnection boxes are enclosures where PV arrays are electrically connected and where the isolation function is performed in order to permit maintenance procedures. Overvoltage and overload protection can be located on these boxes if necessary.

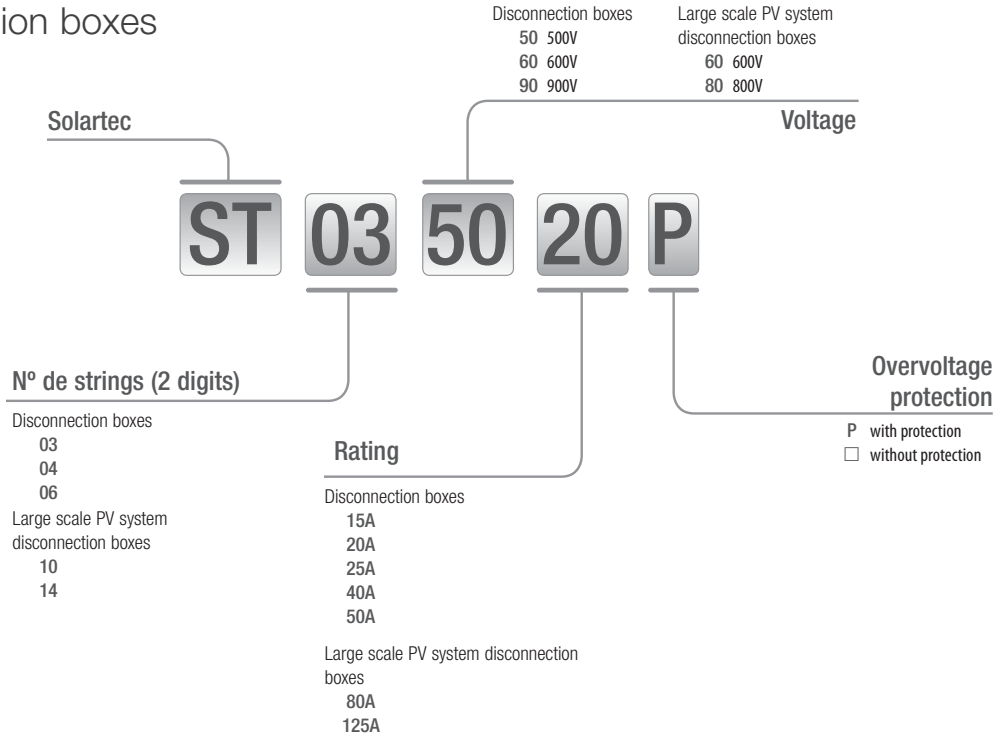
According to standards

- IEC 60634-7-712
- UNE 2460-7-712
- IEC 943-7-3
- IEC 61643-11
- EN 60439-1

General characteristics

- Enclsoures highly resistant to hard weather and environment conditions. Enclosures on GRP material.
- Easy installation and highly accesible on maintenance works.
- Transparent cover for inspection purposes. PC material.
- Load break switches with interlockable exterior handle. Voltages up to 900V.
- Overvoltage protection Class II 1000VDC
- Fuse protection against overloads (10A fuse for standard references).

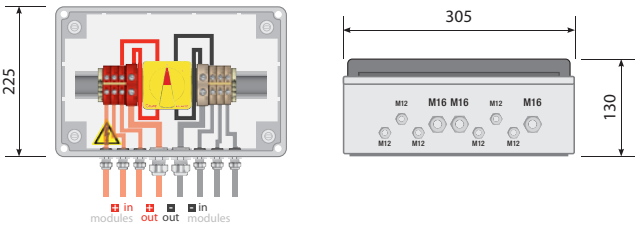
Codes disconnection boxes



3 strings boxes

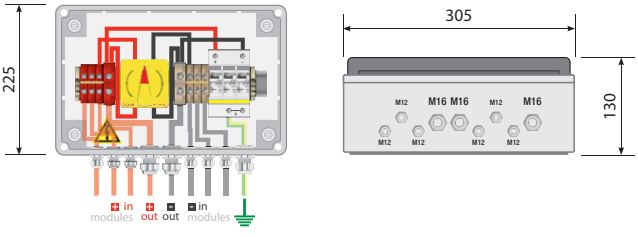
Reference	Strings	V	Isc	Overvoltage protection	Protection degree	Material (housing/cover)
ST039025	3	900	25 A	No	IP65	ABS/PC

Dimensions



Reference	Strings	V	Isc	Overvoltage protection	Protection degree	Material (housing/cover)
ST039025P	3	900	25 A	PST31PV	IP65	ABS/PC

Dimensions

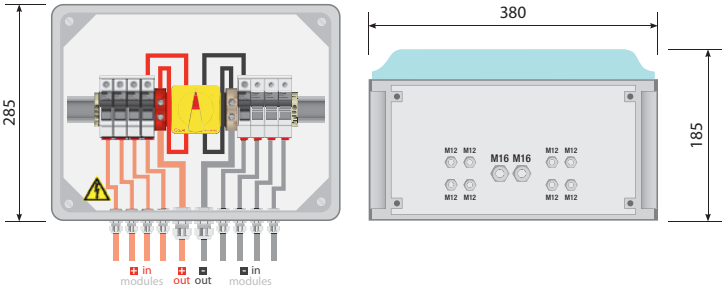


Generator disconnection boxes

4 strings boxes

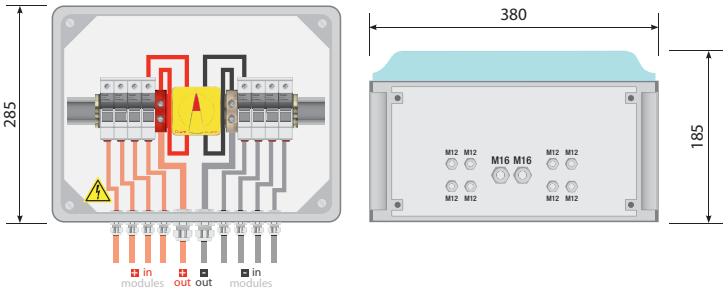
Reference	Strings	V	Isc	Overvoltage protection	Protection degree	Material (housing/cover)
ST046025	4	600	25 A	No	IP55	GRP/PC

Dimensions



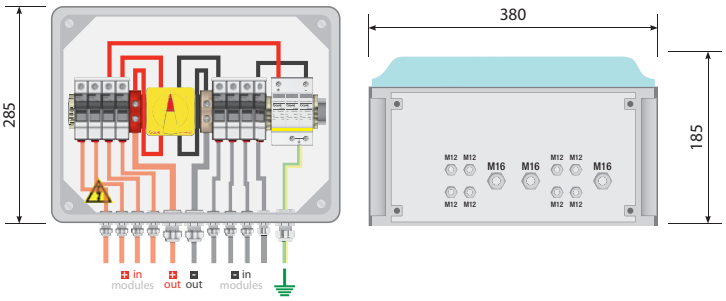
Reference	Strings	V	Isc	Overvoltage protection	Protection degree	Material (housing/cover)
ST049025	4	900	25 A	No	IP55	GRP/PC

Dimensions



Reference	Strings	V	Isc	Overvoltage protection	Protection degree	Material (housing/cover)
ST049025P	4	900	25 A	PST31PV	IP55	GRP/PC

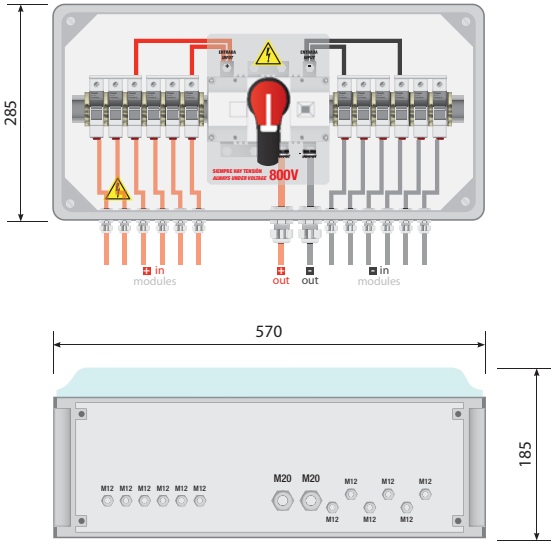
Dimensions



6 strings boxes

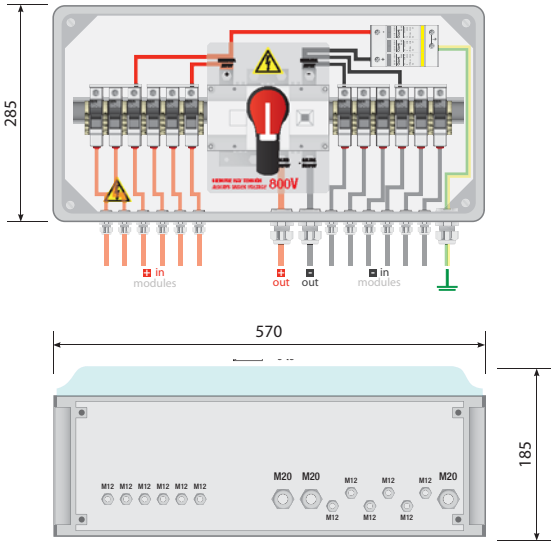
Reference	Strings	V	Isc	Overvoltage protection	Protection degree	Material (housing/cover)
ST068060	6	800	63 A	No	IP55	GRP/PC

Dimensions



Reference	Strings	V	Isc	Overvoltage protection	Protection degree	Material (housing/cover)
ST068060P	6	800	63 A	PST31PV	IP55	GRP/PC

Dimensions



Generator disconnection boxes for solar parks

Generator disconnection boxes for solar parks are large enclosures where PV arrays are electrically connected and where the isolation function is performed in order to permit maintenance procedures. Overvoltage and overload protection can be located on these boxes if necessary.

According to standards

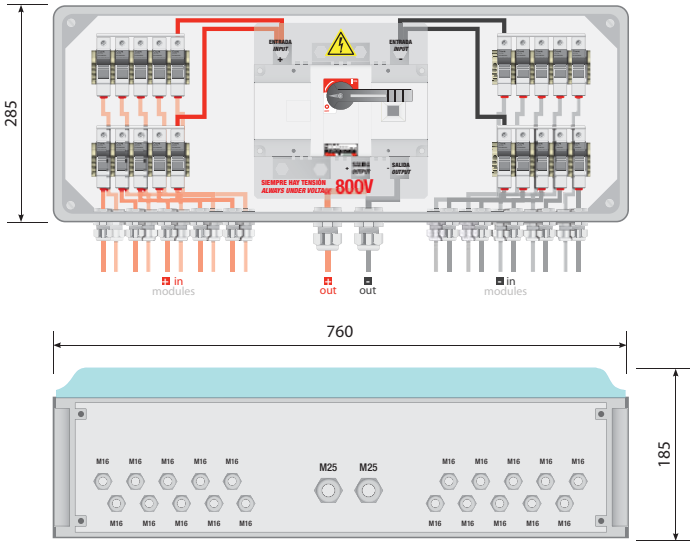
- IEC 60634-7-712
- UNE 2460-7-712
- IEC 943-7-3
- IEC 61643-11
- EN 60439-1

General characteristics

- Enclsoures highly resistant to hard weather and environment conditions. Enclosures on GRP material.
- Easy installation and highly accesible on maintenance works.
- Transparent cover for inspection purposes. PC material.
- Load break switches. Voltages up to 800V.
- Overvoltage protection Class II 1000VDC
- Fuse protection against overloads.

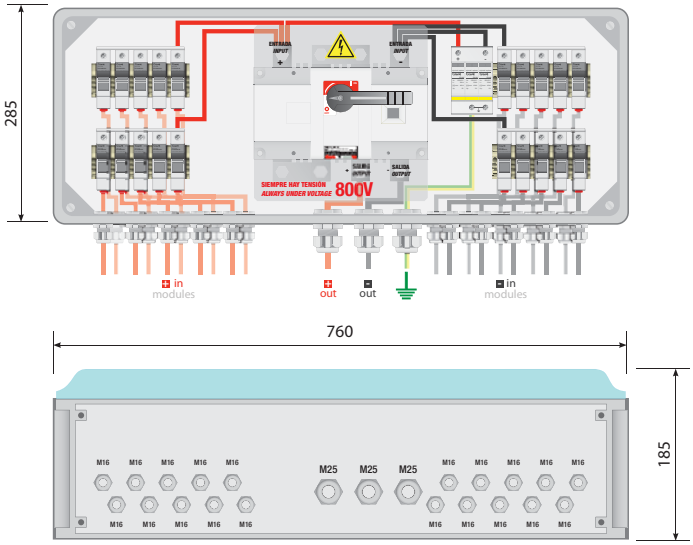
10 strings boxes

Dimensions



Reference	Strings	V	Isc	Overvoltage protection	Protection degree	Material (housing/cover)
ST106080	10	600	80 A	No	IP55	GRP/PC

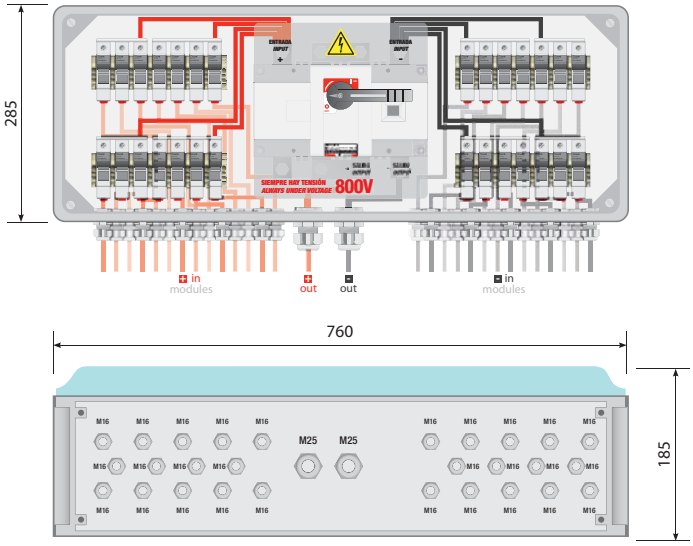
Dimensions



Reference	Strings	V	Isc	Overvoltage protection	Protection degree	Material (housing/cover)
ST106080P	10	600	80 A	PST31PV	IP55	GRP/PC

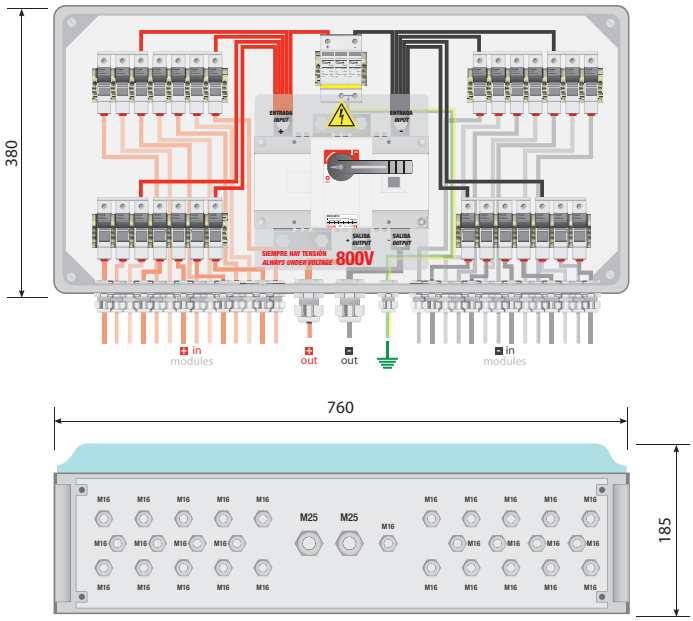
14 strings boxes

Dimensions



Reference	Strings	V	Isc	Overvoltage protection	Protection degree	Material (housing/cover)
ST148012	14	800	125 A	No	IP55	GRP/PC

Dimensions



Reference	Strings	V	Isc	Overvoltage protection	Protection degree	Material (housing/cover)
ST148012P	14	800	125 A	PST31PV	IP55	GRP/PC

Customised equipment

Contact data

Contact person _____

Company _____

Street _____

Postcode/Town _____ Country _____

Telephone _____

Fax _____

E-mail _____

Web _____

Product characteristics

Quantity _____

PV current (Isc): ☐ 15A ☐ 20A ☐ 25A ☐ 40A ☐ 50A ☐ 80A ☐ 125A

Nº strings _____

Maximum voltage ☐ 500V ☐ 600V ☐ 800V ☐ 900V

Exterior handle operation on isolator: ☐ Yes ☐ No

☐ MC connectors

☐ Overvoltage protectors
- ☐ Class II
- ☐ Class I

☐ Fuse protection

Comments: _____

for string monitoring, please contact with technical department.

Contact our technical department on customised solutions

info@solartec.gave.com