

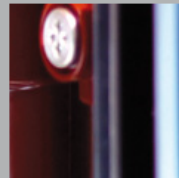
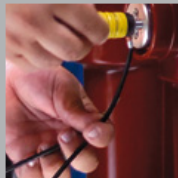
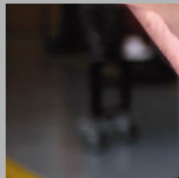
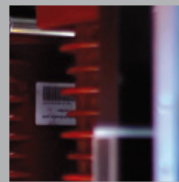
# WL

12÷36 kV



**Medium voltage vacuum circuit breaker**  
**Interruttore di media tensione in vuoto**  
**Disjoncteur de moyenne tension sous vide**

**WL**  
12÷36kV



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# Generalities Generalità Généralités

The **WL** series of medium voltage vacuum circuit-breakers for indoor installation are realized using the separate pole technique.

Each pole has a vacuum interrupter inside which, thanks to a special production process, is built in the resin directly during the cylinder molding stage. This construction technique ensure protection of the vacuum interrupter against impact, dust and condensation.

The operating mechanism is stored energy type and free unlock system, with opening and closing operations independent from the operator.

Remote control is possible thanks to special electrical accessories (geared motor, shunt opening release, etc.)

The operating mechanism, the three poles and the current sensors (if provided) are mounted on a metallic frame without wheels. The device is particularly compact, sturdy and with very low weight.

This circuit-breakers are "sealed for life" pressure systems (IEC 62271-100 and CEI 71-1 Norms).

Gli interruttori di media tensione sottovuoto per interno serie **WL** sono realizzati tramite la tecnica di costruzione a poli separati.

All'interno di ogni polo si trova un'ampolla sottovuoto che, grazie ad un particolare processo produttivo, viene racchiusa all'interno della resina direttamente nella fase di stampaggio del cilindro. Questa tecnica di costruzione assicura la protezione dell'ampolla sottovuoto da urti, polvere e condensazione.

Il comando è ad accumulo di energia, a sgancio libero, con chiusura e apertura indipendenti dall'azione dell'operatore.

Tramite l'applicazione di appositi accessori elettrici (motoriduttore, sganciatore di apertura e di chiusura) vi è la possibilità di comandare a distanza l'interruttore.

Il comando, i tre poli e i sensori di corrente (se previsti) sono montati su un telaio metallico senza ruote. Il dispositivo risulta particolarmente compatto, robusto e di peso ridotto.

Questi interruttori sono sistemi a pressione sigillata per la vita operativa (Norme IEC 62271-100 e CEI 71-1).

Les disjoncteurs de moyenne tension sous vide pour intérieur série **WL** sont réalisés avec une technique de construction à pôles séparés.

Chaque pôle possède à l'intérieur une ampoule sous vide qui, grâce à un processus productif particulier, est incorporée dans la résine directement au cours de la phase de moulage du cylindre. Cette technique de construction assure la protection de l'ampoule sous vide contre les chocs, la poussière et les phénomènes de condensation.

La commande est à accumulation d'énergie, à déclenchement libre, et permet les manœuvres d'ouverture et de fermeture indépendamment de l'action de l'opérateur.

Par le biais de l'application de différents accessoires électriques (moto réducteur, déclencheur d'ouverture et de fermeture), il est possible de commander le disjoncteur à distance.

La commande, les trois pôles et les capteurs de courant (si prévus) sont montés sur un châssis métallique sans roues. La construction est particulièrement compacte, robuste, avec des poids réduits.

Les disjoncteurs sont des systèmes à pression scellée pour toute la vie opérationnelle (Normes IEC 6227-100 et CEI 71-1).





# Employment Impiego Emploi

The **WL** series circuit-breakers are used in all applications for medium voltage secondary distribution and in MV/LV transformers substation in factories, workshop in the industrial sector in general, and in the service sector.

With the optional addition of the self-supplied microprocessor-based over current release, WL circuit-breakers are suitable for use in unmanned MV/LV transformer substation and without auxiliary power supply.

Gli interruttori serie **WL** vengono impiegati in tutte le applicazioni della distribuzione secondaria di media tensione e nelle cabine di trasformazione MT/BT di stabilimenti, officine del settore industriale in genere e del terziario.

Con l'applicazione opzionale dello sganciatore di massima corrente a microprocessore autoalimentato, gli interruttori della serie WL sono abilitati all'impiego in cabine di trasformazione MT/BT non presidiate, e prive di alimentazione ausiliaria.

Les disjoncteurs série **WL** sont utilisés dans toutes les applications de la distribution secondaire de moyenne tension, et dans les cabines de transformation MT/BT des usines, ateliers du secteur industriel en général, et du secteur tertiaire.

Avec l'application facultative du déclencheur de courant maximal à microprocesseur, autoalimenté, les disjoncteurs de la série WL sont convenables pour une utilisation dans les cabines de transformation MT/BT sans opérateur et qui n'ont pas d'alimentation auxiliaire.

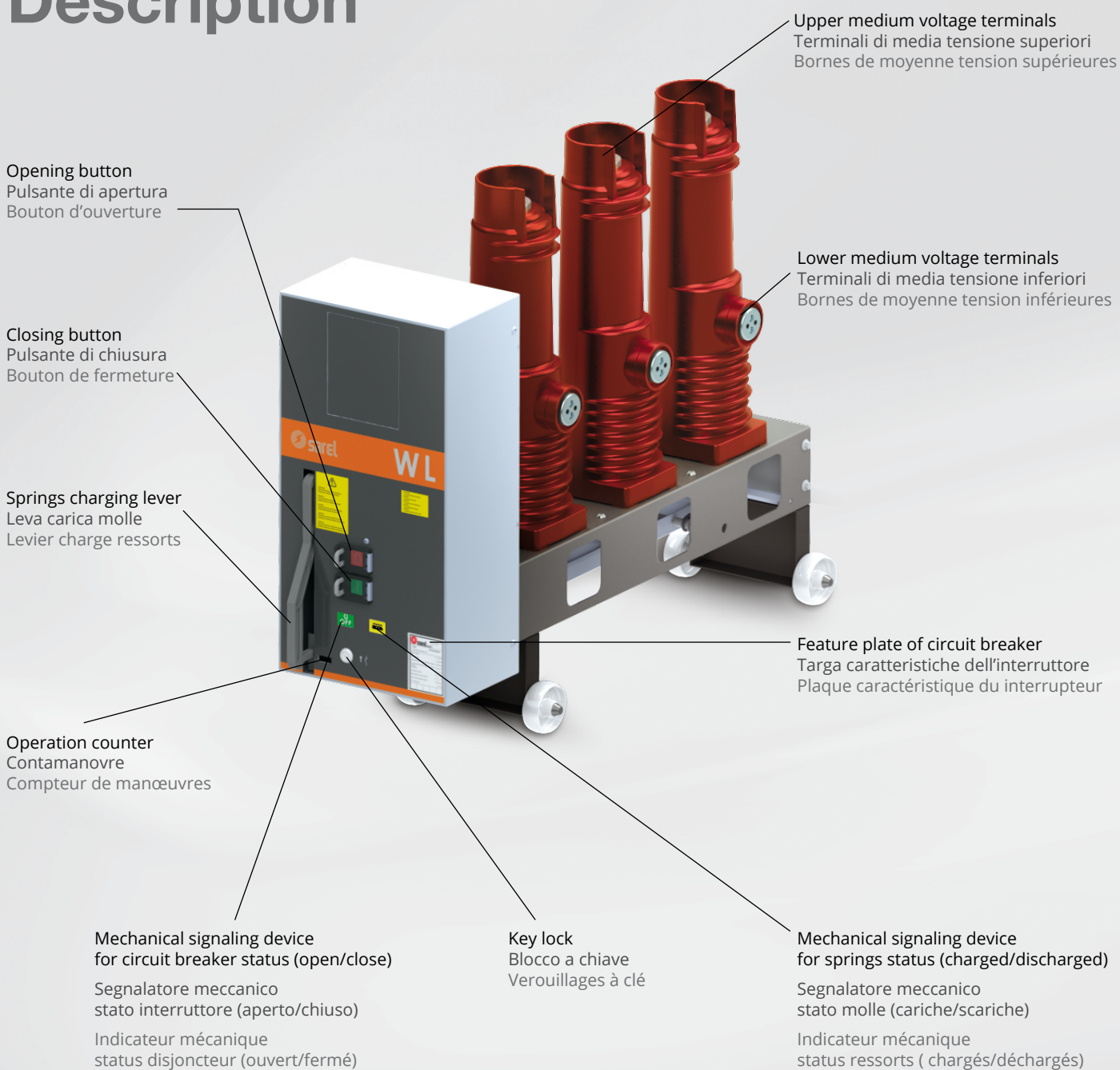




# Description

## Descrizione

## Description





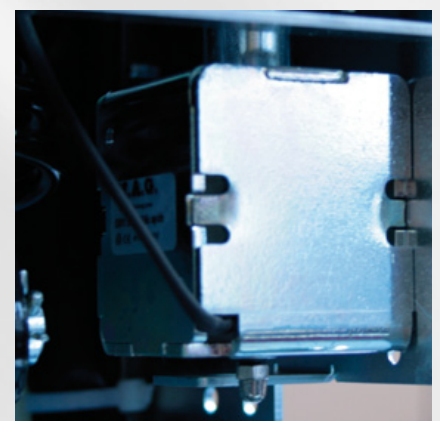


# Accessories Accessori Accessoires

Shunt opening release  
Sganciatore di apertura  
Déclencheur d'ouverture

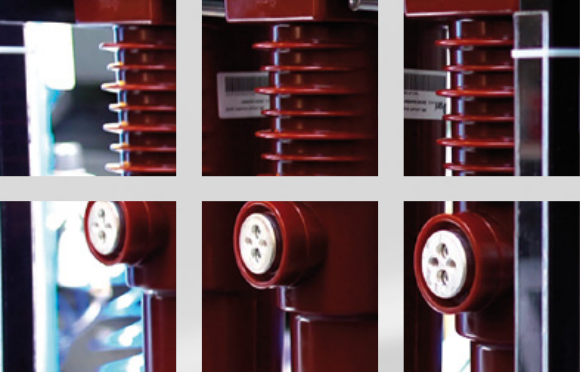


Shunt closing release  
Sganciatore di chiusura  
Déclencheur de fermeture

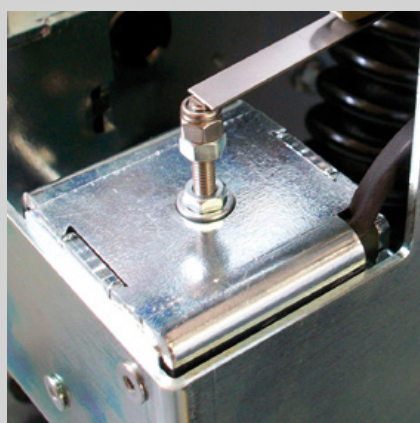


Features   Caratteristiche   Caractéristiques	
Un	24 - 48 - 110 - 220 V -
Un	24 - 48 - 110 - 220 V ~50/60 Hz
Operating limits Limiti di funzionamento Limites de fonctionnement	70 ÷ 110% Un
Power consumption Potenza assorbita Puissance absorbée	120W dc - 120VA ac
Opening time Tempo di apertura Temps d'ouverture	40ms
Minimum pulse duration Durata minima impulso Dureé minimale impulsion	100ms

Features   Caratteristiche   Caractéristiques	
Un	24 - 48 - 110 - 220 V -
Un	24 - 48 - 110 - 220 V ~50/60 Hz
Operating limits Limiti di funzionamento Limites de fonctionnement	85 ÷ 110% Un
Power consumption Potenza assorbita Puissance absorbée	120W dc - 120VA ac
Closing time Tempo di chiusura Temps de fermeture	55ms
Minimum pulse duration Durata minima impulso Dureé minimale impulsion	100ms

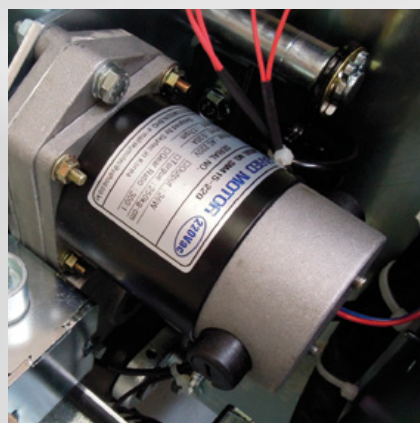


**Undervoltage release**  
**Sganciatore di minima tensione**  
**Déclencheur de minimum tension**



<b>Features   Caratteristiche   Caractéristiques</b>	
Un	<b>24 - 48 - 110 - 220 V –</b>
Un	<b>24 - 48 - 110 - 220 V ~ 50/60 Hz</b>
Operating limits Limiti di funzionamento Limites de fonctionnement	opening   apertura   ouverture <b>35 ÷ 70% Un</b> closing   chiusura   fermeture <b>85 ÷ 110% Un</b>
Inrush power Potenza allo spunto Puissance d'appel	<b>125W dc - 125VA ac</b>
Inrush time Durata dello spunto Dureé de l'appel	<b>0,5s</b>
Holding power Potenza di mantenimento Puissance de maintien	<b>5W dc - 5VA ac</b>
Opening time Tempo di apertura Temps d'ouverture	<b>40ms</b>

**Spring charging motor**  
**Motore carica molle**  
**Moteur charge ressorts**



<b>Features   Caratteristiche   Caractéristiques</b>	
Un	<b>24 - 48 - 110 - 220 V –</b>
Un	<b>24 - 48 - 110 - 220 V ~ 50/60 Hz</b>
Operating limits Limiti di funzionamento Limites de fonctionnement	<b>85 ÷ 110% Un</b>
Inrush power Potenza allo spunto Puissance d'appel	<b>100W dc - 100VA ac</b>
Inrush time Durata dello spunto Dureé de l'appel	<b>0,3s</b>
Rated power Potenza nominale Puissance nominale	<b>70W dc - 70VA ac</b>
Charging time Tempo di carica Temps de charge	<b>4 ÷ 5s</b>





## Protection relay Relè di protezione Relais de protection

Threshold Soglia Seuil	Features Caratteristiche Caractéristiques	Current regulation Regolazione corrente Régulation courant	Timing Temporizzazione Timing	Notes Note Note
51	Normal Inverse1 (IEC "A") Normal Inverse2 Very Inverse (IEC "B") Extremely Inverse (IEC "C") Long Time Inverse Define Time	20 ÷ 200% In in step di 1%	0,01 ÷ 1,00s in step di 0,01s	
50	Define Time	100 ÷ 3000% In in step di 100%	Instantaneous Istantaneo Instantané <60ms	
51N	Normal Inverse1 (IEC "A") Normal Inverse2 Very Inverse (IEC "B") Extremely Inverse (IEC "C") Long Time Inverse Define Time	10 ÷ 80% In in step di 1%	0,01 ÷ 1,00s in step di 0,01s	Minimum 20% In on a phase or 10% In on two phases Minimo 20% In su una fase oppure 10% In su due fasi Minimum 20% In sur une phase ou 10% In sur deux phases
50N	Define Time	100 ÷ 1200% In in step di 100%	Instantaneous Istantaneo Instantané <60ms	

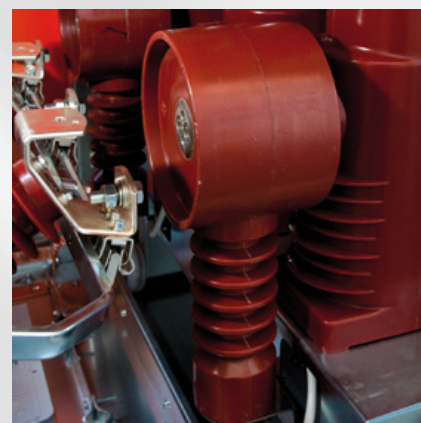


## Current transformer for protection relay TA per relè di protezione Transformateurs de courant pour relais de protection

They provide to the relay the current signal to be elaborated, furthermore they provide the necessary energy to power the relay and the shunt opening release. They can have a primary current of 40A, 80A or 250A.

Forniscono al relè il segnale di corrente da elaborare, inoltre forniscono l'energia necessaria per l'alimentazione del relè stesso nonché dello sganciatore di apertura. Possono avere correnti primarie di 40A, 80A oppure 250A.

Ils fournissent au relais le signal de courant à élaboré, ils fournissent en plus l'énergie nécessaire pour alimenter soit le relais même soit le déclencheur d'ouverture. Ils peuvent avoir une courant primaire de 40A, 80A ou 250A.





# Norms and homologations

## Norme e certificati

## Normes et certificats

The **WL** circuit-breakers comply with the IEC 62271-100, CEI EN 62271-100, CENELEC HD 348 S6, as well as those of the major industrialized countries.

They have undergone the tests below, and ensure service safety and reliability of the equipment in all installations.

### Type tests

Heating, withstand insulation at industrial frequency and atmospheric impulse, short-time and peak withstand current, mechanical life, making and breaking capacity of short circuit currents.

### Individual tests

Insulation with voltage at industrial frequency in the main circuits, insulation of the auxiliary and control circuits, measurement of the main circuit resistance and mechanical and electrical operation.



Gli interruttori **WL** sono conformi alle norme IEC 62271-100, CEI EN 62271-100, CENELEC HD 348 S6, e a quelle dei principali paesi industriali.

Ogni interruttore viene sottoposto alle prove sotto riportate, e garantisce la sicurezza e l'affidabilità dell'apparecchiatura in servizio in ogni impianto.

### Prove di tipo

Riscaldamento, tenuta all'isolamento a frequenza industriale e impulso atmosferico, tenuta alla corrente di breve durata e di picco, durata meccanica, potere di stabilimento e di interruzione delle correnti di corto circuito.

### Prove individuali

Isolamento con tensione a frequenza industriale dei circuiti principali, isolamento dei circuiti ausiliari e di comando, misure della resistenza dei circuiti principali, funzionamento meccanico ed elettrico.



Les disjoncteurs **WL** sont conformes aux normes IEC 62271-100, CEI EN 62271-100, CENELEC HD 348 S6, et aux normes des principaux pays industriels.

Ils ont été soumis aux essais indiqués ci-après, et garantissent la sécurité et la fiabilité de l'appareillage en service dans toutes les installations.

### Essais de type

Réchauffement, tenue à l'isolement à fréquence industrielle et sous choc atmosphérique, tenue au courant de courte durée et de crête, endurance mécanique, pouvoir de fermeture et de coupure des courants de court-circuit.

### Essais individuels

Isolement avec la tension à fréquence industrielle des circuits principaux, isolement des circuits auxiliaires et des circuits de commande, mesure de la résistance des circuits principaux, fonctionnement mécanique et électrique.



# Technical features

## Caratteristiche tecniche

## Caractéristiques techniques



Due to continuous development of building materials and the updating of standards, reported data are not constricting and are subject to our revision.

Considerando l'evoluzione di materiali e norme, quanto riportato nel presente documento si potrà ritenere impegnativo solo dopo nostra conferma.

Etant donné l'évolution des matériels ainsi que des normes, les informations contenues dans le présent document, ne seront considérées comme étant valable qu'après confirmation de notre part.

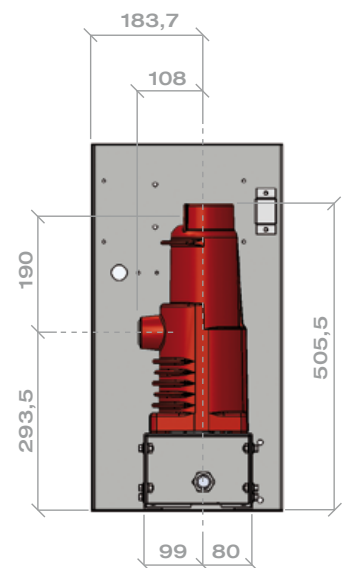
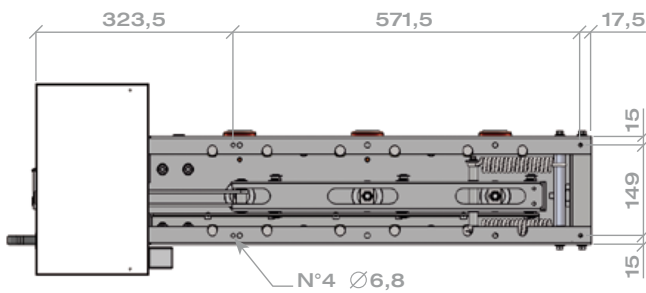
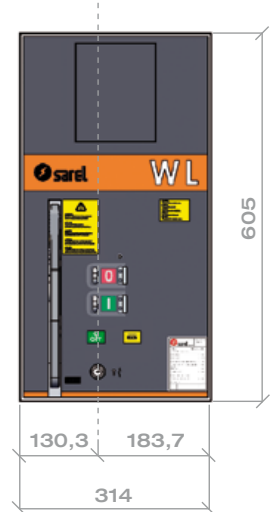
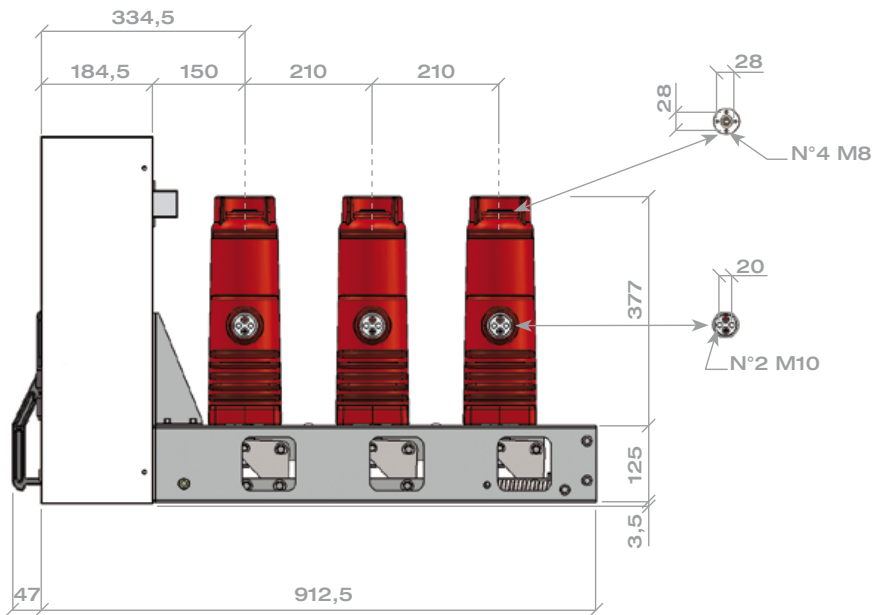


**Electrical features**  
**Caratteristiche elettriche**  
**Caractéristiques électriques**



**WL 24kV medium voltage vacuum circuit breaker**  
**Interruttore di media tensione in vuoto WL 24kV**  
**Disjoncteur de moyenne tension sous vide WL 24kV**

<b>WL</b>					
Rated voltage Tensione nominale Tension nominale		<b>kV</b>	<b>12</b>	<b>24</b>	<b>36</b>
Rated power-frequency withstand voltage 50Hz 1Min (kV r.m.s.) Tensione nominale di tenuta alla frequenza di esercizio 50Hz 1Min (kV eff.) Tension nominale à la fréquence industrielle 50Hz 1Min (kV eff.)	To earth and between phases Verso massa e tra le fasi Vers la terre et entre les phases	<b>kV</b>	<b>28</b>	<b>50</b>	<b>70</b>
	Across the isolating distance Sulla distanza di sezionamento Sur la distance de sectionnement		<b>32</b>	<b>60</b>	<b>80</b>
Rated lightning impulse withstand voltage (peak value) Tensione nominale di tenuta ad impulso atmosferico (valore di picco) Tension nominale de tenue au choc (valeur de crête)	To earth and between phases Verso massa e tra le fasi Vers la terre et entre les phases	<b>kV</b>	<b>75</b>	<b>125</b>	<b>170</b>
	Across the isolating distance Sulla distanza di sezionamento Sur la distance de sectionnement		<b>85</b>	<b>145</b>	<b>195</b>
Rated current Corrente nominale Courant nominale		<b>A</b>	<b>630</b> <b>1250</b>	<b>630</b>	
Short-time withstand current Corrente di breve durata ammissibile Courant de courte durée admissible		<b>kA - s</b>	<b>16 - 3s</b> <b>20 - 3s</b>	<b>20-3s</b>	
Peak value Valore di picco Valeur de crête		<b>kA</b>	<b>40</b> <b>50</b>	<b>50</b>	
Rated short circuit making current Potere di chiusura nominale Pouvoir de fermeture nominale		<b>kA</b>	<b>40</b> <b>50</b>	<b>50</b>	
Breaking capacity Potere di interruzione Pouvoir de coupure	Rated short circuit breaking current Potere di interruzione nominale Pouvoir de coupure nominale	<b>kA</b>	<b>16</b> <b>20</b>	<b>20</b>	
	Cables-charging breaking current Cavi a vuoto Câbles à vide		<b>31.5</b>		
	Single capacitor bank breaking current Batteria singola di condensatori Batterie singulière de condensateurs	<b>A</b>	<b>400</b>		
	Back-to-Back capacitor bank breaking current Batteria multipla di condensatori Batteries multiple de condensateurs		<b>400</b>		
Operating sequence Sequenza operazioni Séquence des opérations		<b>A</b>	<b>0-0,3s-CO-3min-CO</b>		
Altitude Altitudine Hauteur		<b>m</b>	<b>≤1000</b>		
Ambient temperature Temperatura ambiente Température ambiante		<b>°C</b>	<b>-5÷40</b>		

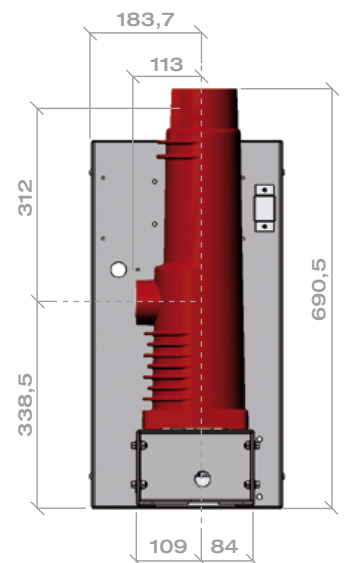
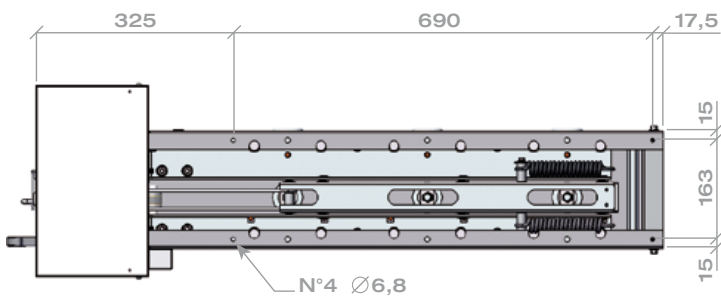
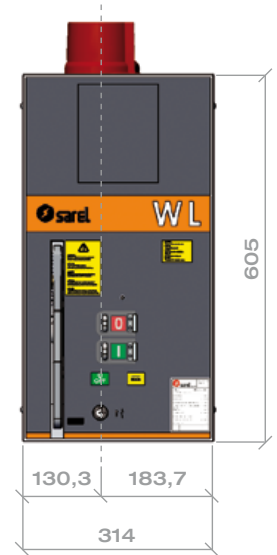
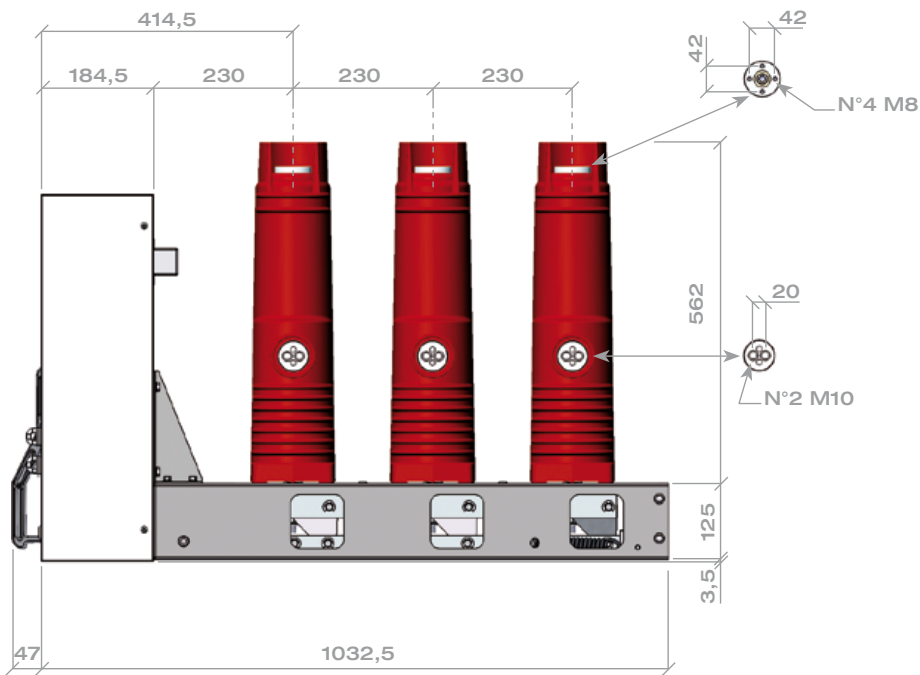




Right side

Lato destro

Cùtè droit

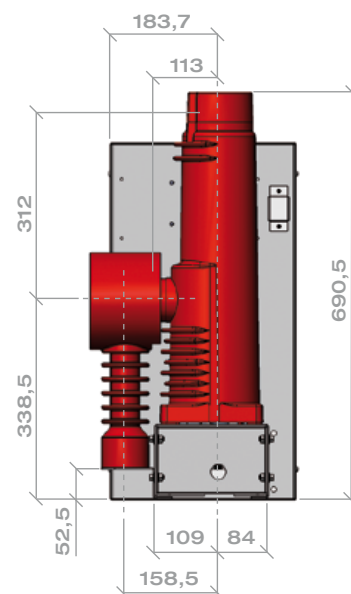
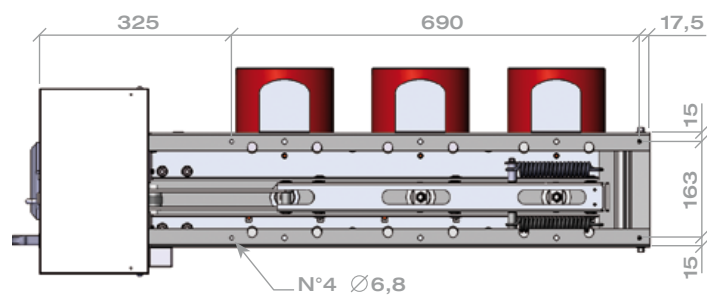
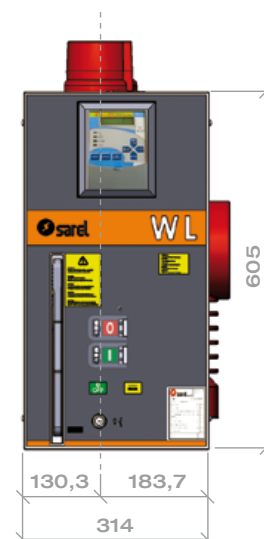
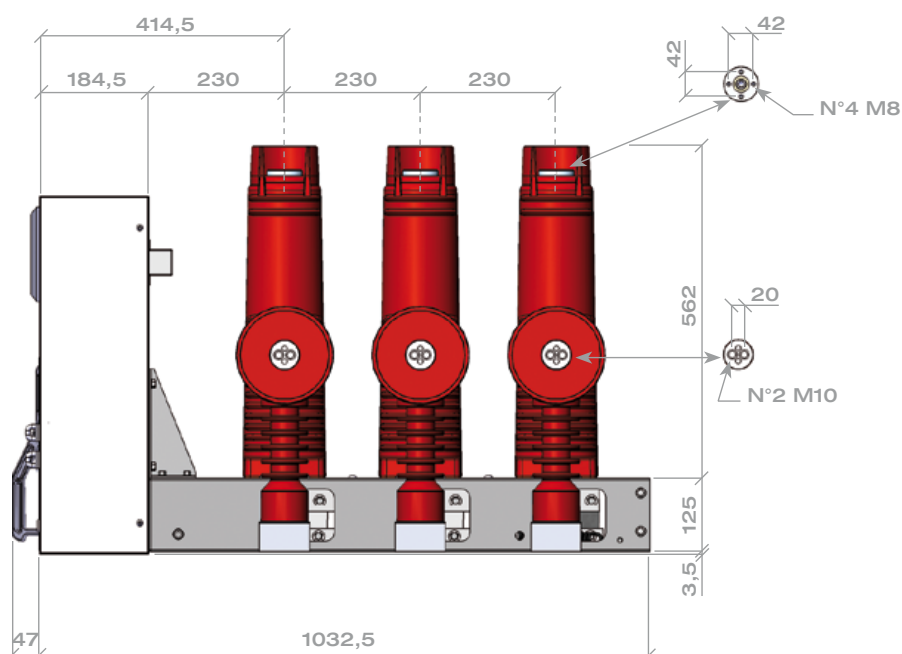




Right side with  
built in current  
transformers

Lato destro  
con TA  
accorpati

Cùtè droit  
avec transformateurs  
de courant intègrès

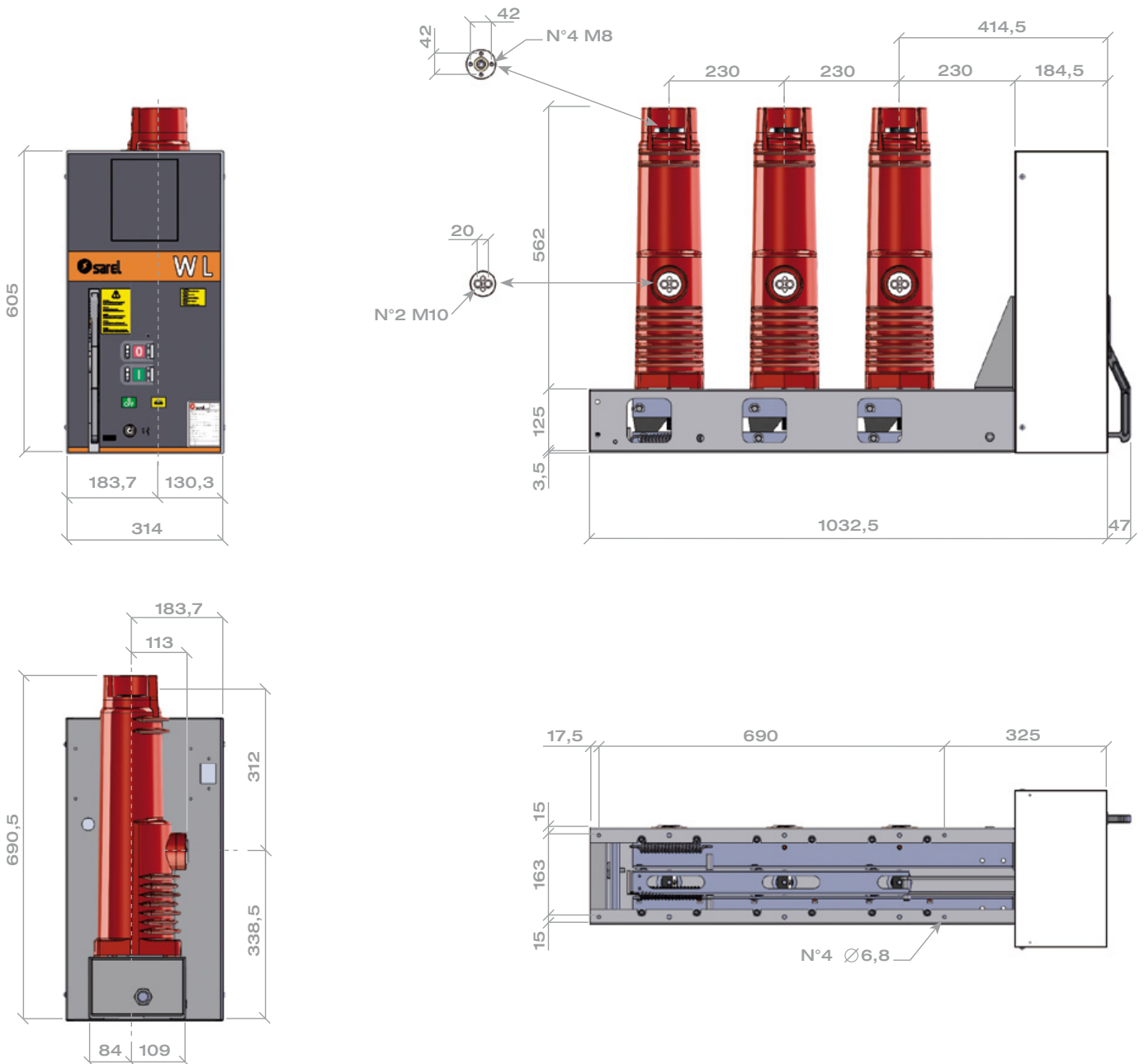




Left side

Lato sinistro

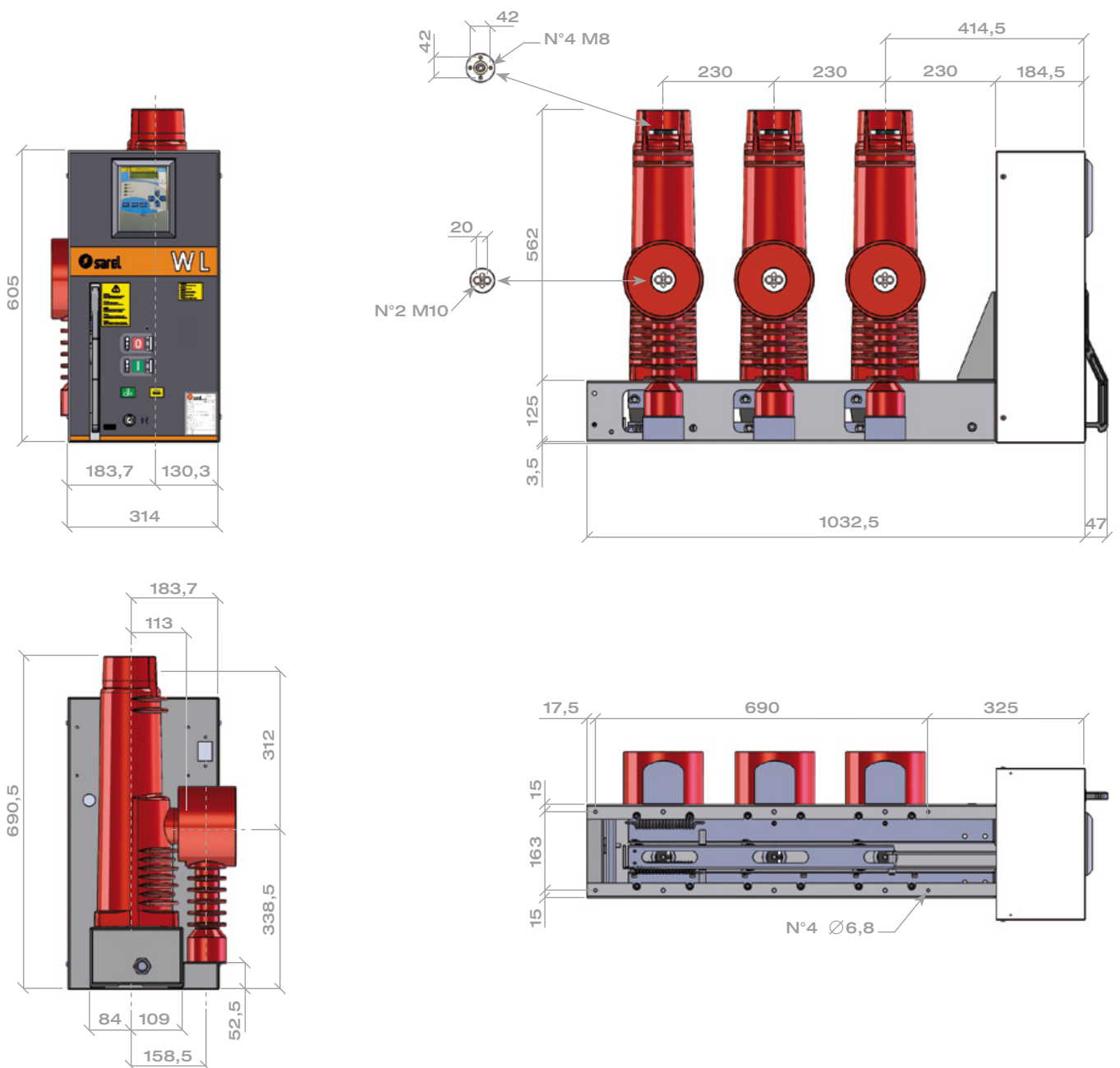
Côté gauche



Left side with  
built in current  
transformers

Lato sinistro  
con TA  
accorpati

Cùtè gauche  
avec transformateurs  
de courant intègrès



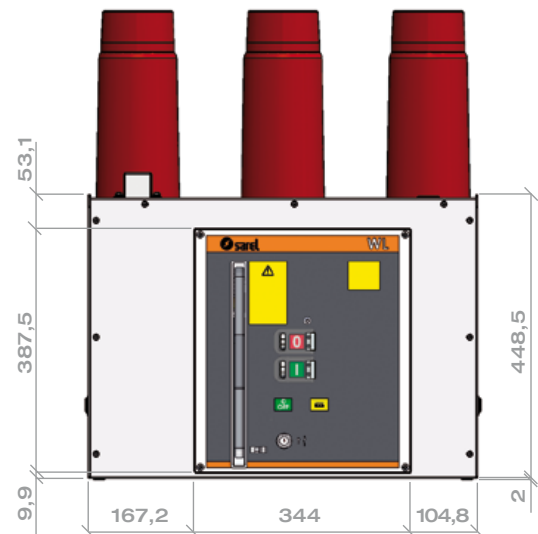
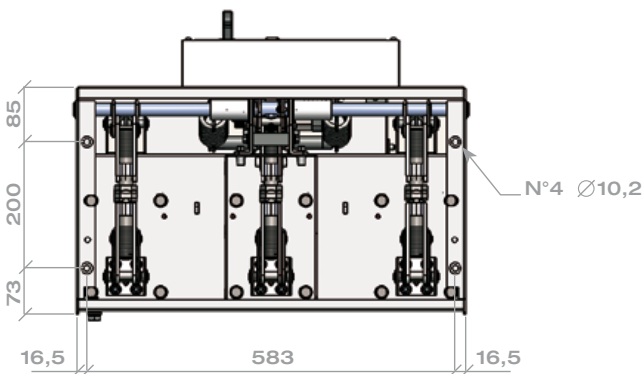
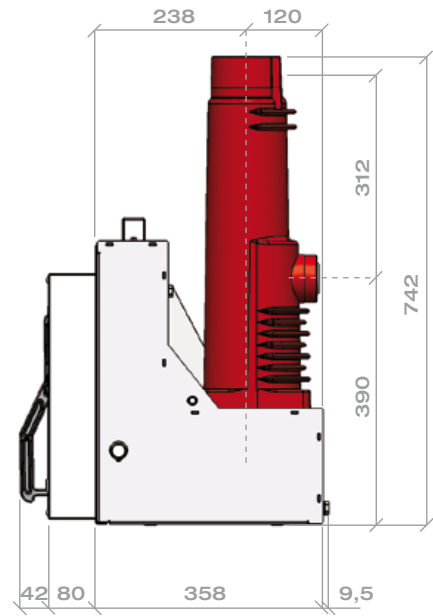
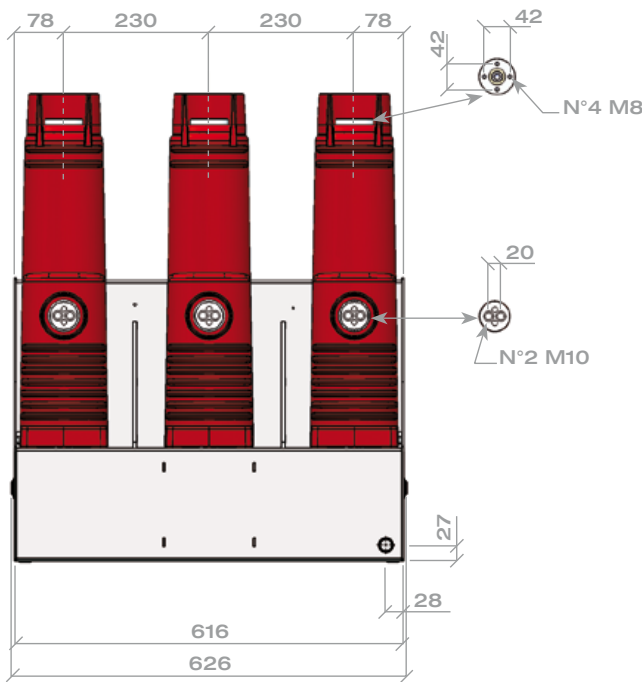


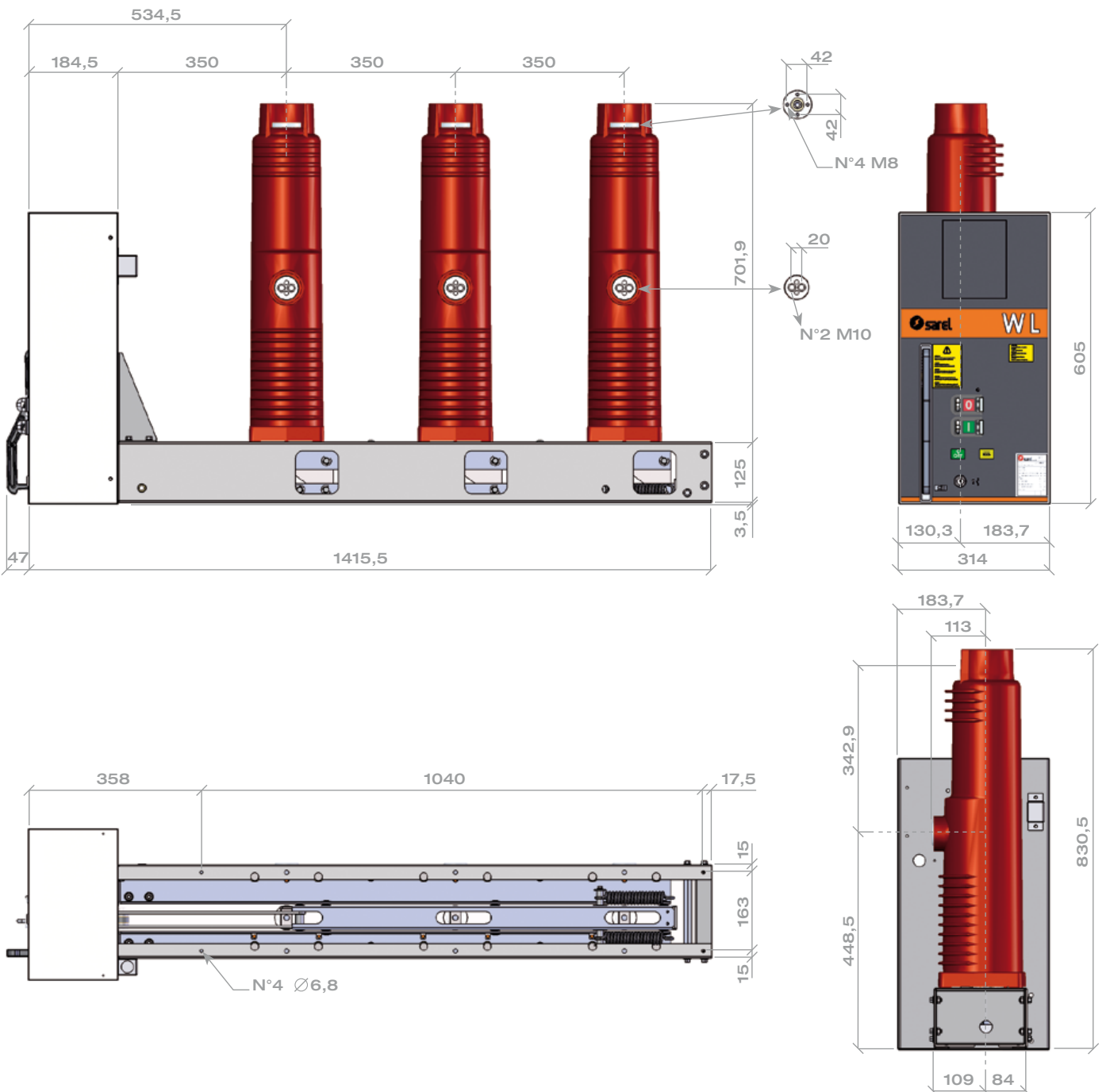


Frontal

Frontale

Frontal



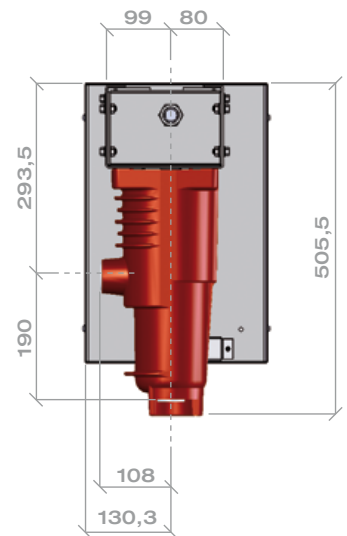
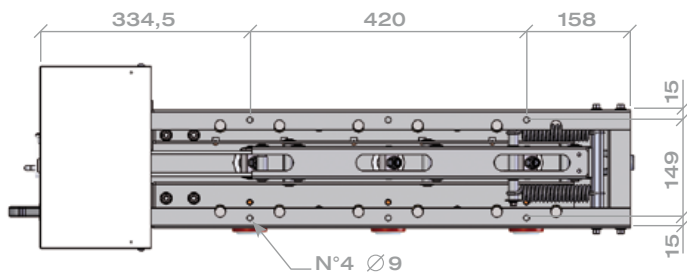
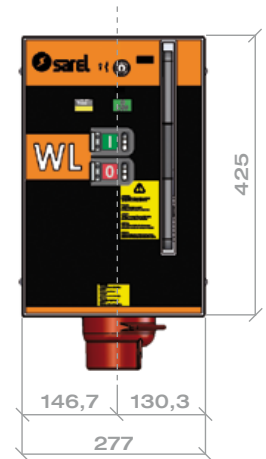
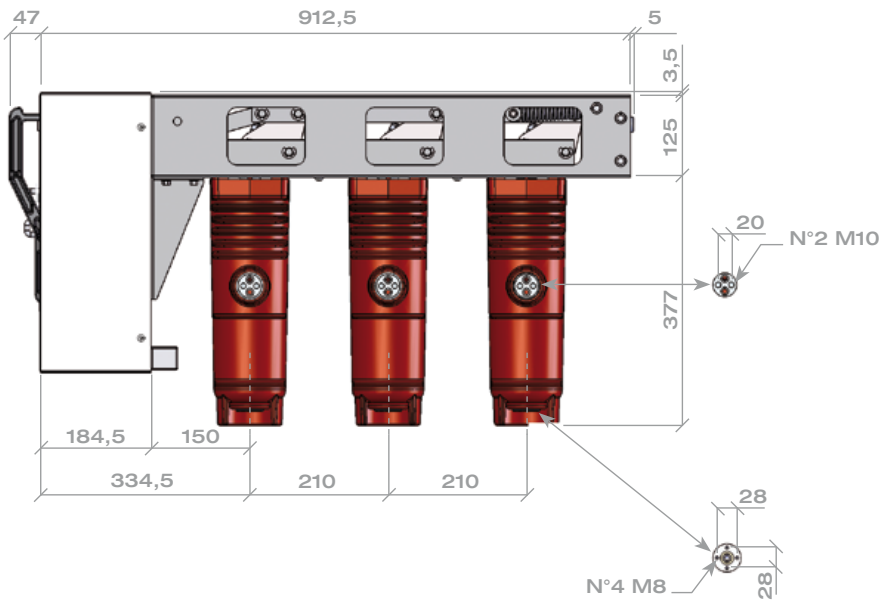




Special  
 reverse  
 configuration

Configurazione  
 speciale  
 rovesciata

Configuration  
 spéciale  
 renversé



## Electric circuit description

- Fig. 1**  
Spring charging motor (see note B)
- Fig. 2A**  
Shunt closing release, ac power
- Fig. 2B**  
Shunt closing release, dc power
- Fig. 3**  
Undervoltage release
- Fig. 4A**  
Shunt opening release, ac power (see note A)
- Fig. 4B**  
Shunt opening release, dc power (see note A)
- Fig. 5**  
Shunt opening release for self-powered relay
- Fig. 6**  
Circuit breaker auxiliary contacts
- Fig. 7**  
Self-powered relay insertion, 2 resin CT and 1 earth fault toroidal CT
- Fig. 8A**  
Self-powered relay insertion, 3 phase toroidal CT
- Fig. 8B**  
Self-powered relay insertion, 3 phase toroidal CT and 1 earth fault toroidal CT
- Fig. 8C**  
Self-powered relay insertion, 2 phase toroidal CT and 1 earth fault toroidal CT

## Note

**(A)**  
The circuit for the supervision of shunt opening release must be used only and exclusively for that function.

**(B)**  
Check the power supply available on the auxiliary circuit to verify if it is adequate to start several closing spring charging motors simultaneously. In order to prevent excessive absorption the closing springs must be charged manually before energizing the auxiliary circuit, or enter individually the circuit breakers and the relative auxiliary circuits.

## Legend

- XC Customer's terminal blocks
- FCM Limit switch of the spring charging motor
- M Spring charging motor
- MC Shunt closing release
- MU Undervoltage release
- M01 Shunt opening release
- MA Self-powered shunt opening release
- XA Circuit breaker auxiliary contacts
- FCS Signalling contacts springs charged/discharged
- XU Signalling contact undervoltage release energized/de-energized

## Descrizione circuiti elettrici

- Fig. 1**  
Motore carica molle (vedi nota B)
- Fig. 2A**  
Sganciatore di chiusura, alimentazione ca
- Fig. 2B**  
Sganciatore di chiusura, alimentazione cc
- Fig. 3**  
Sganciatore di minima tensione
- Fig. 4A**  
Sganciatore di apertura, alimentazione ca (vedi nota A)
- Fig. 4B**  
Sganciatore di apertura, alimentazione cc (vedi nota A)
- Fig. 5**  
Sganciatore di apertura per relè autoalimentato
- Fig. 6**  
Contatti ausiliari disponibili dell'interruttore
- Fig. 7**  
Inserzione relè autoalimentato, 2 TA in resina e 1 toroide omopolare
- Fig. 8A**  
Inserzione relè autoalimentato, 3 toroidi di fase
- Fig. 8B**  
Inserzione relè autoalimentato, 3 toroidi di fase e 1 toroide omopolare
- Fig. 8C**  
Inserzione relè autoalimentato, 2 toroidi di fase e 1 toroide omopolare

## Note

**(A)**  
Il circuito per il controllo della continuità dell'avvolgimento dello sganciatore di apertura deve essere utilizzato solo ed esclusivamente per tale funzione.

**(B)**  
Controllare la potenza disponibile sul circuito ausiliario per verificare la possibilità dell'inserimento contemporaneo di più motori carica molle. Per evitare assorbimenti eccessivi è necessario caricare manualmente le molle prima di alimentare i circuiti ausiliari, oppure inserire singolarmente gli interruttori e i relativi circuiti ausiliari.

## Legenda

- XC Morsetteria cliente
- FCM Contatto di fine corsa motore carica molle di chiusura
- M Motore carica molle
- MC Sganciatore di chiusura
- MU Sganciatore di minima tensione
- M01 Sganciatore di apertura
- MA Sganciatore di apertura autoalimentato
- XA Contatti ausiliari dell'interruttore
- FCS Contatti di fine corsa indicazione molle cariche/scariche
- XU Contatto segnalazione bobina di minima tensione eccitata/diseccitata

## Description circuits électriques

- Fig. 1**  
Moteur charge ressorts (voir note B)
- Fig. 2A**  
Déclencheur de fermeture, alimentation ca
- Fig. 2B**  
Déclencheur de fermeture, alimentation cc
- Fig. 3**  
Déclencheur de minimum tension
- Fig. 4A**  
Déclencheur d'ouverture, alimentation ca (voir note B)
- Fig. 4B**  
Déclencheur d'ouverture, alimentation cc (voir note B)
- Fig. 5**  
Déclencheur d'ouverture pour relais autoalimenté
- Fig. 6**  
Contacts auxiliaires disponibles du disjoncteur
- Fig. 7**  
Insertion relais autoalimenté, 2 TC en résine et 1 tore homopolaire
- Fig. 8A**  
Insertion relais autoalimenté, 3 tores de phase
- Fig. 8B**  
Insertion relais autoalimenté, 2 tores de phase et 1 tore homopolaire
- Fig. 8C**  
Insertion relais autoalimenté, 2 tores de phase et 1 tore homopolaire

## Note

**(A)**  
Le circuit pour le réglage de la continuité de l'enroulement de déclencheur d'ouverture doit être utilisé exclusivement pour cette fonction.

**(B)**  
Contrôler la puissance disponible sur le circuit auxiliaire pour vérifier la possibilité d'insérer plus des moteurs charge ressort contemporainement. Pour éviter l'absorption excessive est nécessaire charger manuellement les ressorts avant d'alimenter les circuits auxiliaires, ou placer séparément chacun disjoncteur et les relatifs circuits auxiliaires.

## Legende

- XC Borne de client
- FCM Contact de fin de course moteur charge ressorts de fermeture
- M Moteur charge ressorts
- MC Déclencheur de fermeture
- MU Déclencheur de minimum tension
- M01 Déclencheur d'ouverture
- MA Déclencheur d'ouverture autoalimenté
- XA Auxiliaires contacts du disjoncteur
- FCS Contacts de fin de course indication ressorts chargés/déchargés
- XU Contact de signalisation déclencheur de minimum tension excités/désexcités

## Represented working conditions

The diagrams are represented in the following conditions :

- Auxiliary circuits not powered
- Circuit breaker in open position
- Undervoltage release activate
- Shunt opening/closing release not tripped
- Closing spring discharged

## Condizioni di funzionamento rappresentate

Gli schemi sono rappresentati nelle seguenti condizioni :

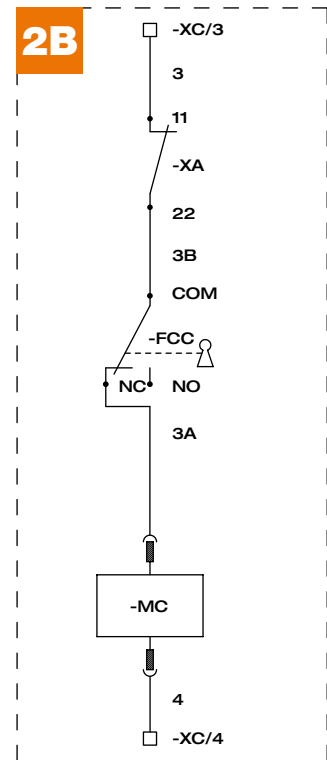
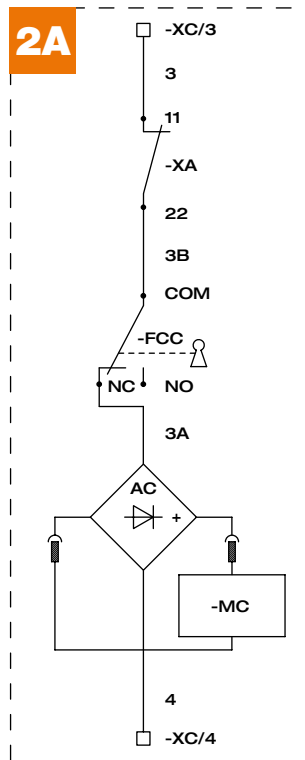
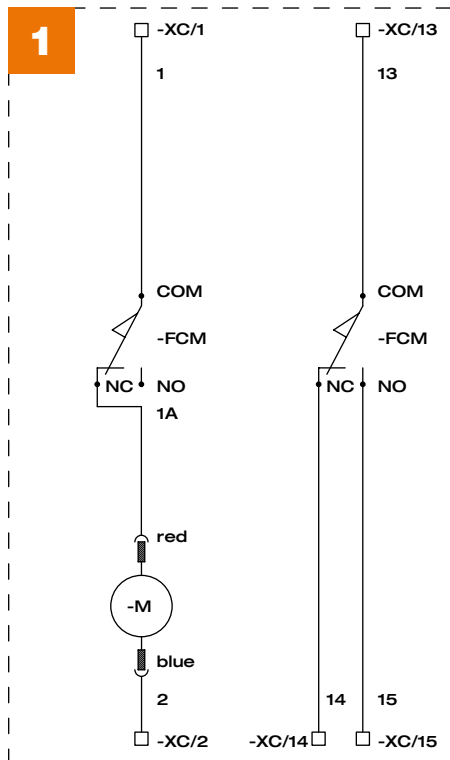
- Circuiti ausiliari non alimentati
- Interruttore aperto
- Sganciatore di minima tensione attivo
- Sganciatori di apertura/chiusura non intervenuti
- Molle di chiusura scariche

## Conditions d'exploitation représentée

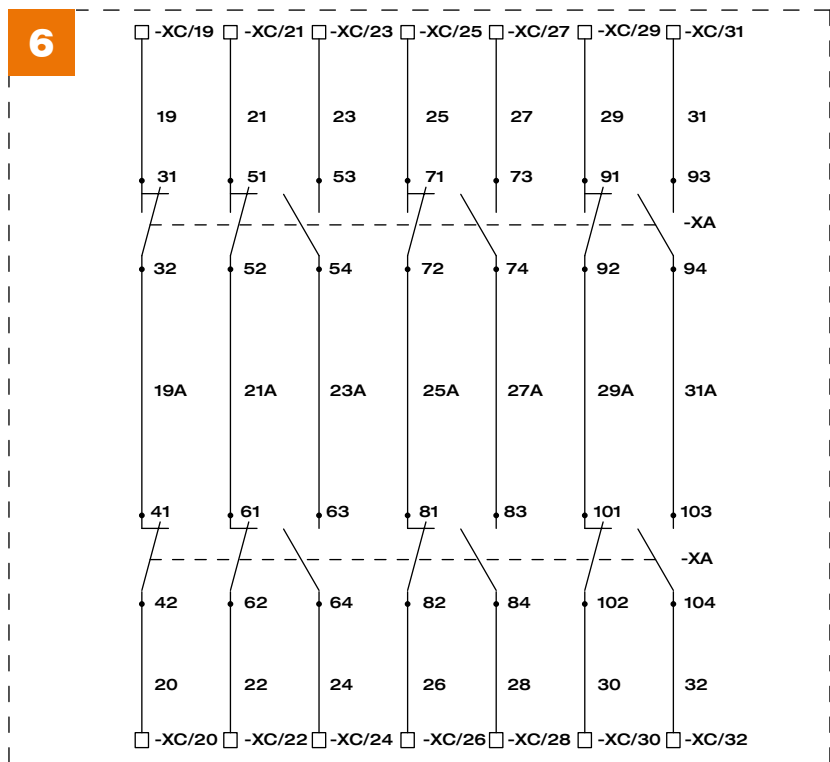
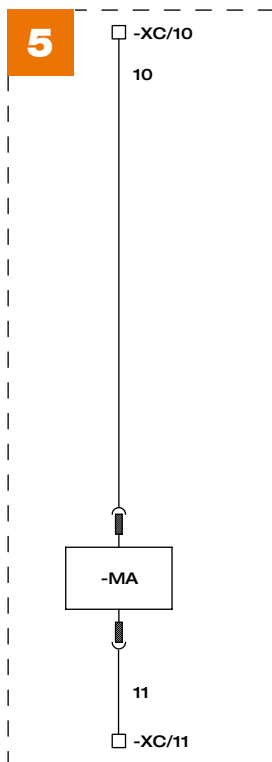
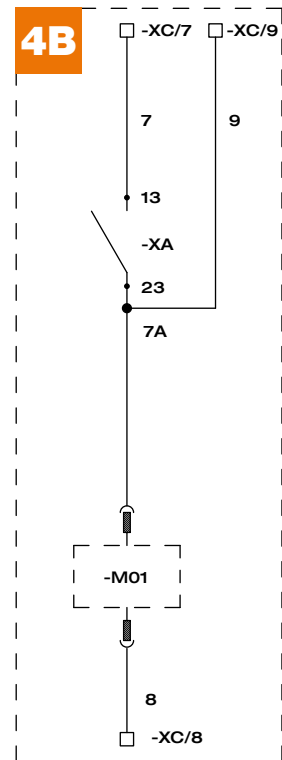
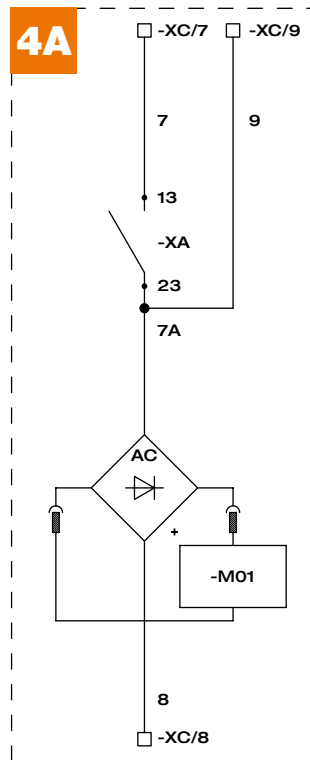
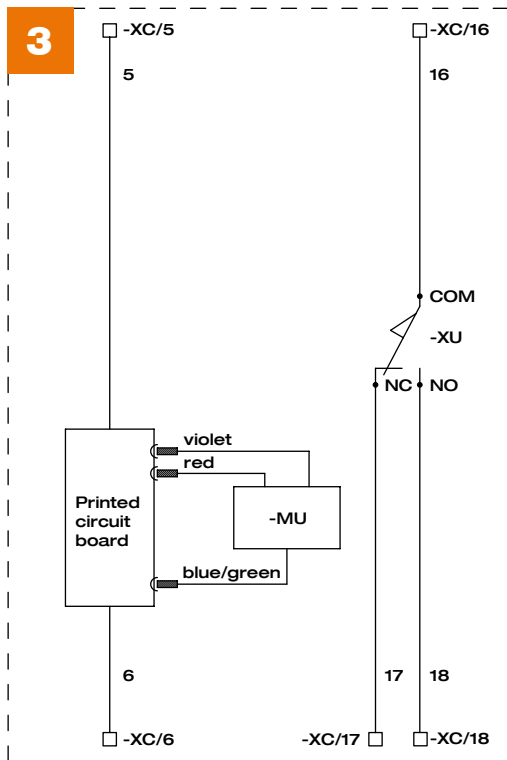
Les schémas sont représentée dans les suivantes condition :

- Circuits auxiliaires non alimentés
- Disjoncteur ouvert
- Déclencheur de minimum tension activé
- Déclencheur d'ouverture/fermeture non intervenues
- Ressorts de fermeture dechargés

Symbol Segno Symbole	Description Descrizione Description	Symbol Segno Symbole	Description Descrizione Description	Symbol Segno Symbole	Description Descrizione Description
□	Terminal block Morsetto Bornes		Spring charge motor Motore caricamolle Moteur chargeur de ressorts		Make contact Contatto di chiusura Contact de fermeture
•	Connection of conductors Connessione di conduttori Raccordement des conducteurs		Operating device Bobina di comando Bobine		Break contact Contatto di apertura Contact d'ouverture
	Position contact Contatto di posizione Contact du position		Fast-on connection Connessione fast-on Connecteur fast-on		Rectifier bridge Ponte raddrizzatore Pont redresseur

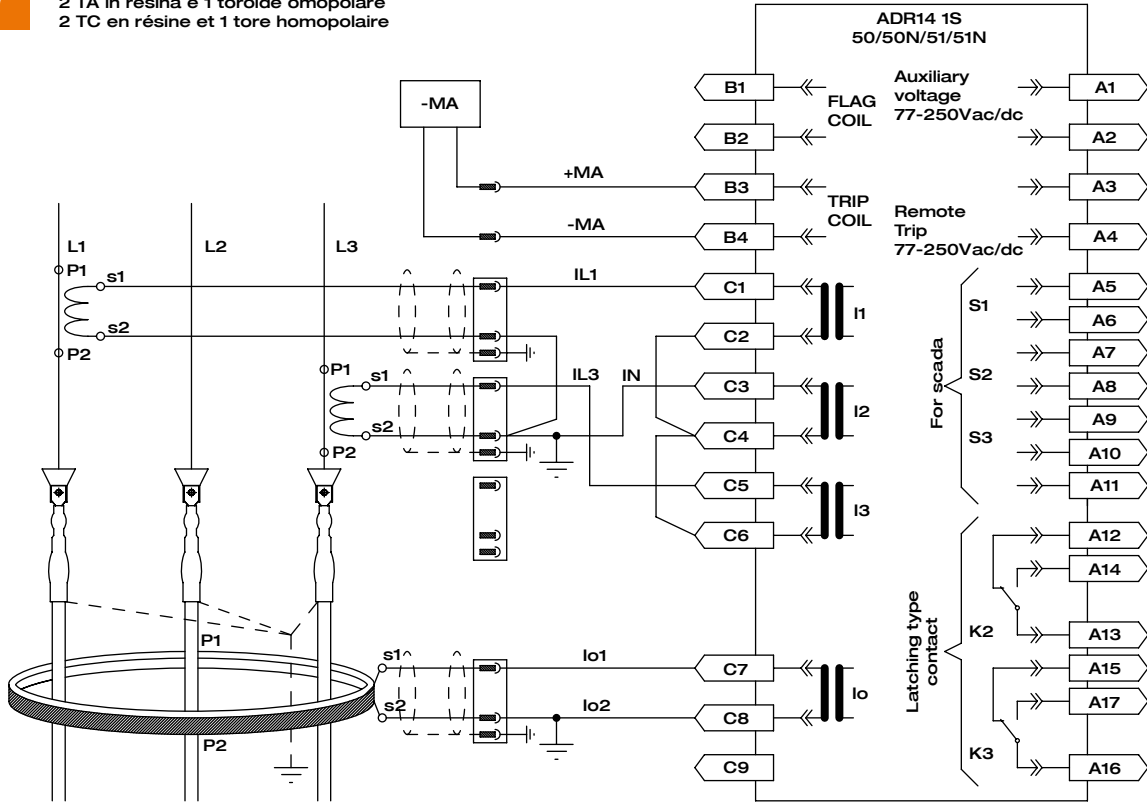






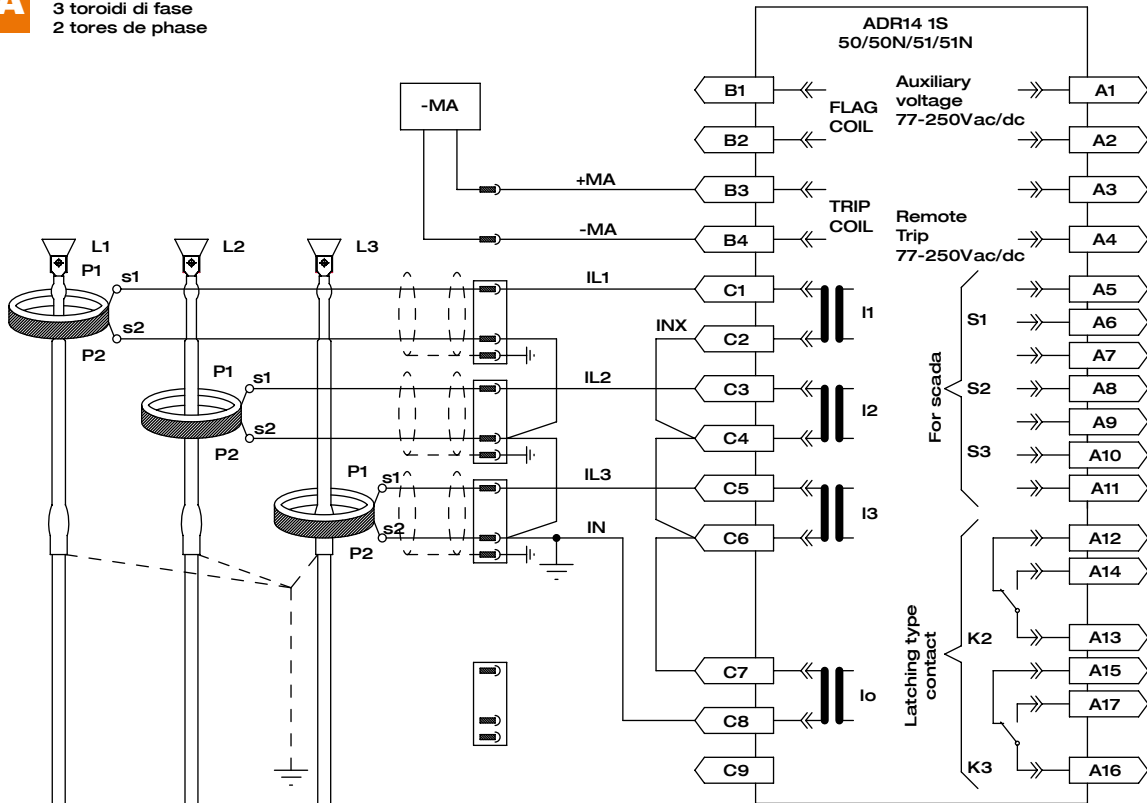
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2 resin CT and 1 earth fault toroidal CT  
 2 TA in resina e 1 toroide omopolare  
 2 TC en résine et 1 tore homopolaire



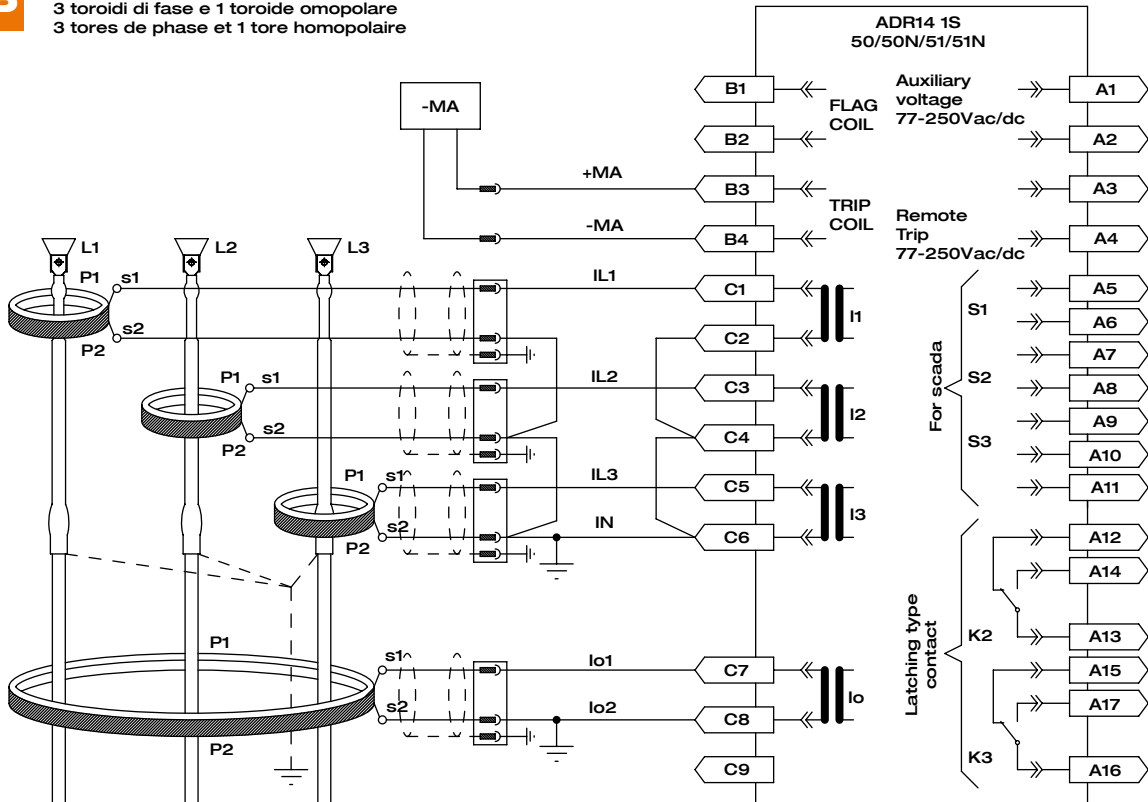
8A

3 phase toroidal CT  
 3 toroidi di fase  
 2 tores de phase



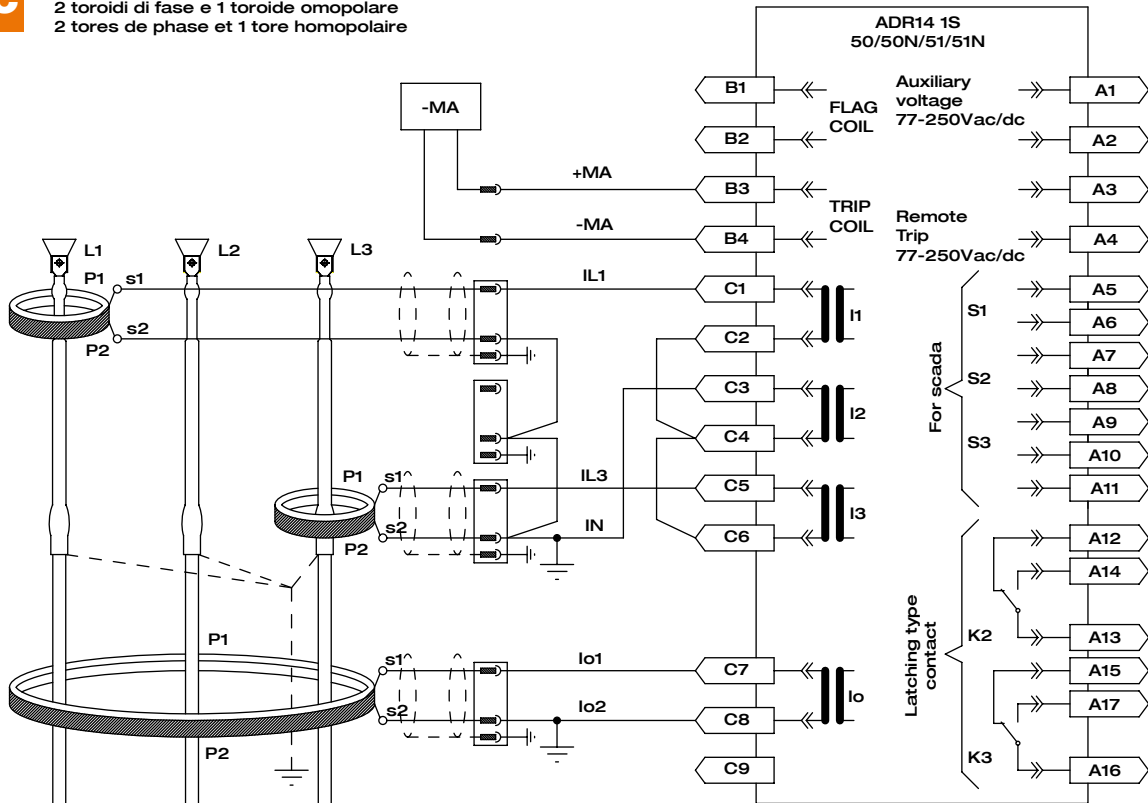
**8B**

3 phase toroidal CT and 1 earth fault toroidal CT  
 3 toroidi di fase e 1 toroide omopolare  
 3 tores de phase et 1 tore homopolaire



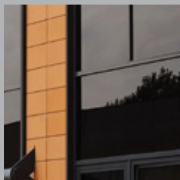
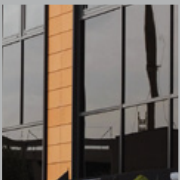
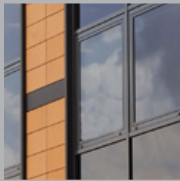
**8C**

2 phase toroidal CT and 1 earth fault toroidal CT  
 2 toroidi di fase e 1 toroide omopolare  
 2 tores de phase et 1 tore homopolaire





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Via del Commercio, 12/14  
26900, Lodi (LO), Italy

Tel. +39 0371 49061  
Fax +39 0371 411422

[info@sarel.it](mailto:info@sarel.it)  
[www.sarel.it](http://www.sarel.it)

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