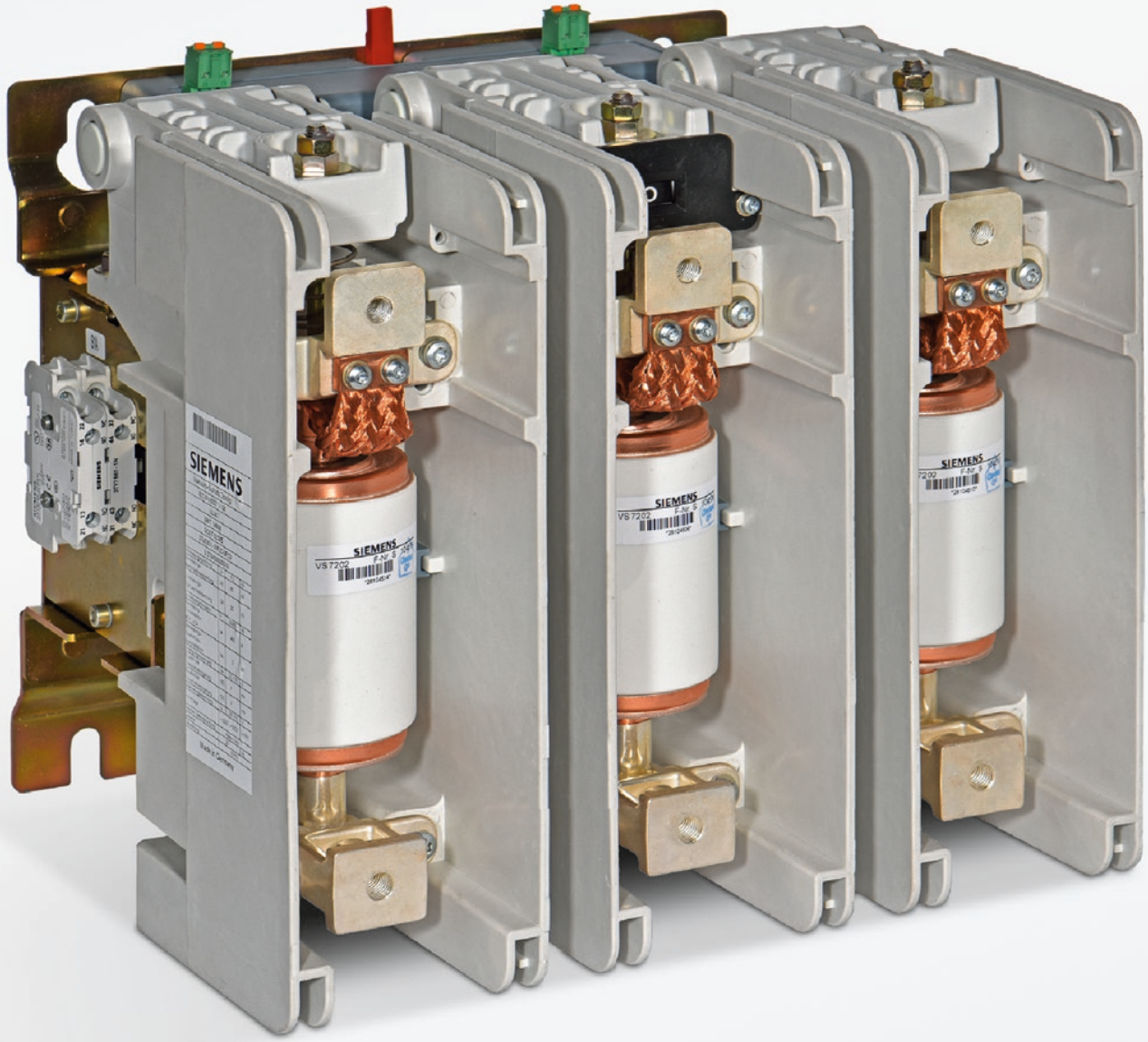
SIEMENS



Catalog
HG 11.23 ·
Edition 2017

3TM Vacuum Contactors

Medium-Voltage Equipment

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3TM
Vacuum Contactors

Medium-Voltage Equipment
Catalog HG 11.23 · 2017

Invalid:
Catalog Extract HG 11.23 · 2016

The products and systems described in this catalog are manufactured and sold according to a certified management system (acc. to ISO 9001, ISO 14001 and BS OHSAS 18001).

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Industrial application: Refinery

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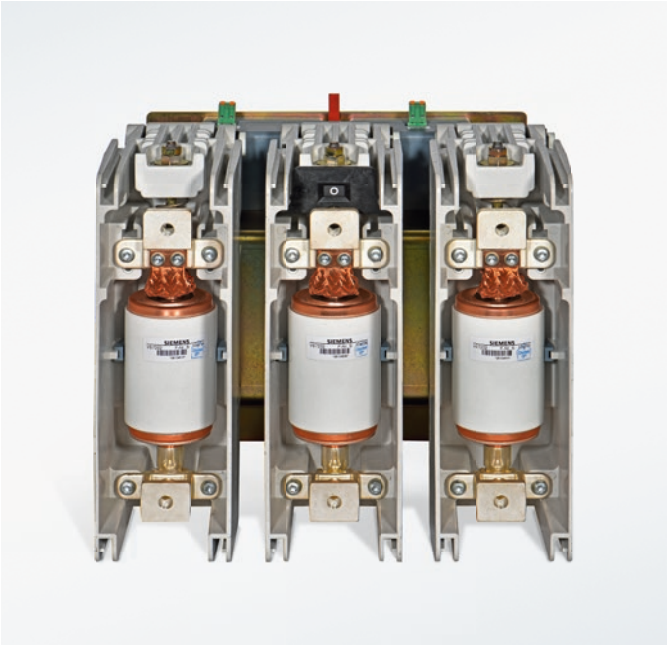
3TM vacuum contactors – the new contactor generation

3TM vacuum contactors are electromechanical, monostable load breaking devices with a limited short-circuit making and breaking capacity. They can be used for high switching rates of up to one million electrical and mechanical operating cycles and unlimited operating time, as well as for fast switching frequencies.

Contactor, front (high-voltage side)



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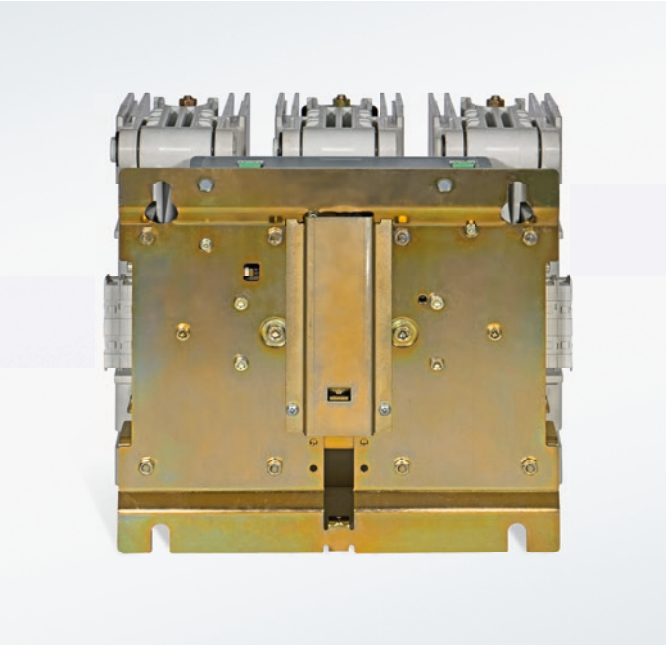
Contactor, rear (fixing side)



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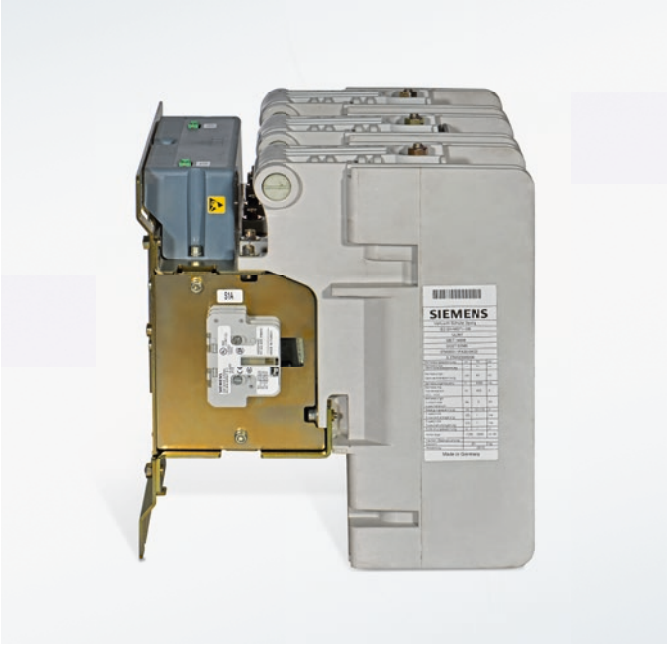
Contactor, side view



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Applications

3TM vacuum contactors are suitable for operational switching of AC circuits of any kind, such as:

- Three-phase motors for reversing, inversing or direct duty (utilization category AC-1 to AC-4)
- Transformers
- Capacitors, also back-to-back
- Reactors
- Resistive consumers.

They are used in conveying and elevator systems, pumping stations, air conditioning systems, as well as in systems for reactive power compensation, on ships, in open-cast mining, in earthquake zones and in railway operation, and can therefore be found in almost every industrial sector.

Switching medium

3TM vacuum contactors make use of vacuum switching technology, which has been proven and fully developed for more than 40 years. Siemens vacuum interrupters operate constantly and reliably throughout their entire service life – without any maintenance.

Design and function

3TM vacuum contactors consist of:

- A high-voltage part, with vacuum interrupters, customer connections and position indicator
- A low-voltage part, with magnetic actuator and control electronics
- Auxiliary switches
- Optionally, a closing latch as well as a manual latch release (emergency off), and a shunt release.

The high-voltage part contains individual, independent pole shells, which can take up the corresponding vacuum interrupters. In this way, various pole-center distances are possible. The vacuum interrupters are operated by a common magnetic actuator, which is characterized by a very low holding power in continuous operation. The auxiliary switches are located at the side of the operating mechanism and are freely accessible from the outside. A mechanical closing latch and corresponding latch release modules can be ordered separately. Remote tripping takes place via an electromagnetic shunt release. The manual mechanic latch release (emergency off) is available for various operating directions.

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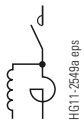
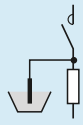
Application, switching of consumers	Symbols	Application examples
Medium-voltage three-phase motors	 HG11-2547b eps	Conveyor and elevator systems, compressors, ventilation and heating
Transformers	 HG11-2548b eps	Ring-main units, industrial system distributions
Reactors	 HG11-2549a eps	Industrial system distributions, DC-link reactors, reactive power compensation systems
Resistive consumers	 HG11-2550b eps	Heating resistors, electric furnaces
Capacitors	 HG11-2551a eps	Reactive power compensation systems, capacitor banks

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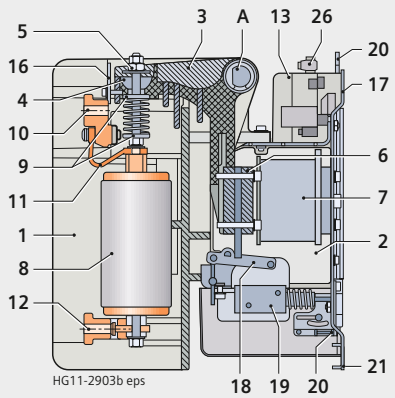
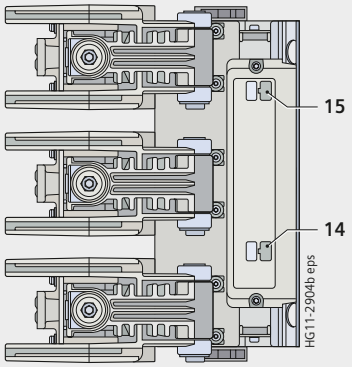
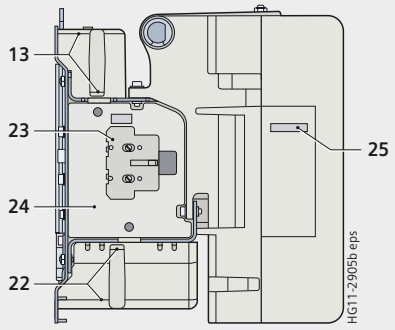


Contactor, side view (right)



Contactor, top view



Contactor, side view (left)

1 Molded-plastic housing (pole shell)
2 Operating mechanism box
3 Drive lever
4 Bearing
5 Guide nut + locknut
6 Magnet armature
7 Magnet system
8 Vacuum interrupter
9 Contact pressure spring
10 Connection, top
11 Flexible connector
12 Connection, bottom
13 Controller
14 Connection for control voltage A1 A2 (incl. supplied plug)
15 Connection for el.magn. release E1 E2 (incl. supplied plug)
16 Position indicator
17 Base plate (fixing)
18 Closing latch
19 Shunt release
20 Manual release (emergency off)
21 Earthing connection
22 Cover for latching
23 Auxiliary switch
24 Side plate with fixing bolts
25 Rating plate
26 Plug A1 A2 (and E1 E2)

Function and mode of operation

The drive lever (3) with the pivot point in A is designed as an angle lever. It represents the kinematic connection between the magnetic actuator and the vacuum interrupters. In case of non-excited magnet, the return springs keep the drive lever in "OPEN" position.

Thus, the drive lever (3) is in its upper position via the bearing (4) of the guide nut (5). In this way, the contacts of the vacuum interrupter (8) are separated from each other, and thus kept in "OPEN" position.

For closing, the magnet system (7) is excited. The magnet armature (6) attached to the drive lever (3) is thus attracted against the force of the two return springs. This releases the vacuum interrupter (8), so that the external air pressure can press the moving contact towards the fixed contact.

The drive lever (3) compresses the contact pressure springs (9), thus generating an additional contact force.

The distance between the bearing (4) and the guide nut (5) in "CLOSED" position is a measure for the wear of the vacuum interrupter.

3TM vacuum contactors can be used for cable or bar connections.

The base plate (17) serves for installation without distortion through the four bolting holes.

Control supply voltage, wide-area coils

3TM vacuum contactors can be optionally operated with DC or AC. The control supply voltage should correspond to the data on the rating plate.

Customer-side modifications are possible considering the standards provided in the operating instructions.

Safety shutdown of the magnetic actuator in case of deviation from the normal closing time

3TM vacuum contactors feature a safety shutdown to protect the magnet coils against non-conforming thermal overload during closing. Within certain limits, impermissible and non-conforming delays in the closing process are thus detected and the devices are protected from damage.

Intermittent periodic duty and rapid operation

3TM vacuum contactors are able to perform fast switching frequencies for a short time.

In case of switching under high current load, longer dead times have to be kept. In this case, please contact your responsible sales partner.

Mechanical closing latch (optionally)

When the 3TM vacuum contactor is closed, the mechanical closing latch (18) is activated. After reaching the latching position, there is an automatic changeover to no-load holding operation. Opening takes place via:

- Electromagnetic latch release (remote tripping via the electromagnetic shunt release) (19), or
- Manual mechanical latch release (20).

When 3TM vacuum contactors are retrofitted (selection B at the 10th position of the order number) with a closing latch or latch release, the following modules must be ordered and installed later:

- Mechanical closing latch with shunt release (19)
- Latch release mechanism to be operated manually with push or pull rod.

Closing and opening delay

3TM vacuum contactors feature a short closing and opening time. (See page 27)

They can also be configured with an additional closing and opening delay for selective operation with other contactors or fuses. Both delays are independent of each other and add to the closing and opening time.

Mounting position

3TM vacuum contactors can be mounted in vertical and horizontal position:

- As fixed-mounted design
- Mounted on a withdrawable part or a truck.

Site altitude

3TM vacuum contactors can be used for various site altitudes.

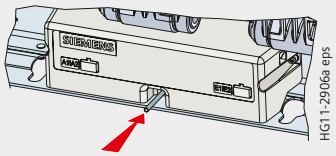
As a standard, 3TM vacuum contactors can be used from –1250 m to +2000 m above sea level.

For higher site altitudes, a configuration is offered from 2000 m to 5000 m.

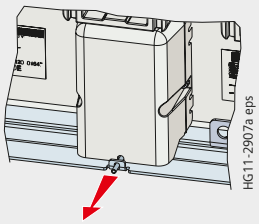
Severe conditions

For very heavy mechanical stress such as earthquakes or extraordinary shock and swinging loads, a special configuration is offered.

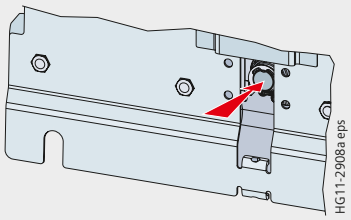
Modes of operation and operating directions: **Mechanical latch release** (emergency off)



Manual latch release with push rod in direction A (10th position of MLFB = F with MLFB supplement J67)

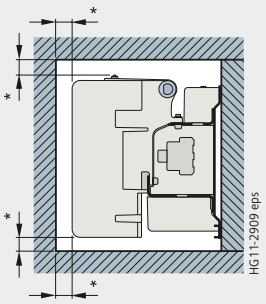


Manual latch release with pull rod in direction B (10th position of MLFB = F with MLFB supplement J68)

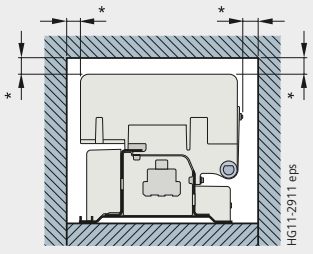


Manual latch release via shunt release (push operation)

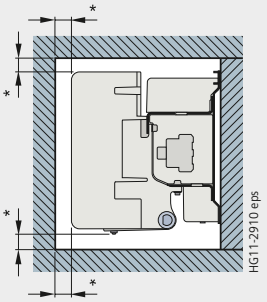
Mounting position



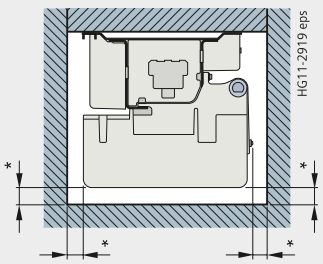
Vertical wall mounting



Horizontally on the back



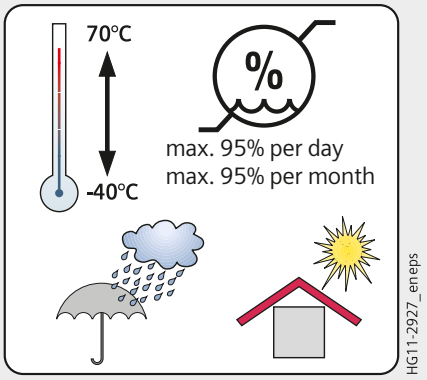
Vertical wall mounting, turned by 180°

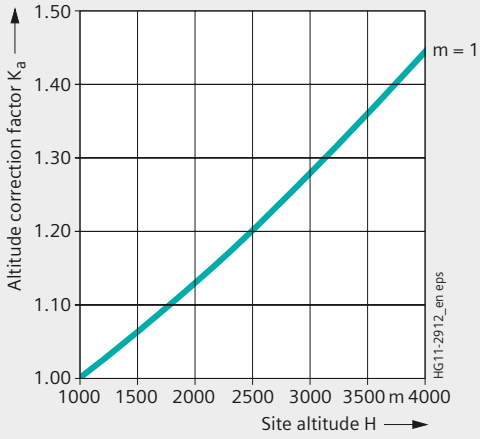


Suspended installation, with reduced parameters

*) Observe the distance to high voltage and to earthed components!

1





Ambient conditions

3TM vacuum contactors are suitable for operational use in the following climatic classes according to IEC 60721:

Climatic ambient conditions:	Class 3K4 [1], Class 3K8H [2]
Biological ambient conditions:	Class 3B1
Mechanical ambient conditions:	Class 3M3
Chemically active substances:	Class 3C2 [3]
Mechanically active substances:	Class 3S2 [4]

1) Maximum of 24-hour mean: +70 °C
2) Up to -40 °C
3) Without appearance of saline fog and simultaneous condensation
4) Restriction: Clean insulation parts

Dielectric strength

The dielectric strength of air insulation decreases with increasing altitude due to low air density. According to IEC 62271-106, the values of the rated lightning impulse withstand voltage and the rated short-duration power-frequency withstand voltage specified for 3TM vacuum contactors apply to a site altitude of 1000 m above sea level. For an altitude above 1000 m, the insulation level must be corrected.

To select the devices, the following applies:

$U \geq U_0 \times K_a$

U Rated withstand voltage under reference atmosphere
U_0 Rated withstand voltage requested for the place of installation
K_a Altitude correction factor according to the opposite diagram

Example:

For a requested rated lightning impulse withstand voltage of 75 kV at an altitude of 2500 m, an insulation level of 90 kV under standard reference atmosphere is required as a minimum:

$90\ kV \geq 75\ kV \times e^{1 \times (2500 - 1000)/8150}$
$\approx 75\ kV \times 1.2$

1

Utilization categories

In IEC 62271-106, vacuum contactors are divided into different utilization categories. The opposite table shows typical applications in accordance with the respective utilization category.

Switching of motors

3TM vacuum contactors are especially suitable for frequent operation of motors. As the chopping currents of the contactors are ≤ 3 A, no impermissibly high overvoltages are produced when accelerated motors are switched during normal operation. However, when high-voltage motors with starting currents of ≤ 600 A are stopped during start-up, switching overvoltages may arise. The magnitude of these overvoltages can be reduced to harmless values by means of special surge limiters.

Switching of transformers

When inductive currents are interrupted, current chopping can produce overvoltages at the contact gap. As the chopping current of the Siemens vacuum contactor is less than 3 A, no dangerous overvoltages are produced when the unloaded transformer is switched off.

Surge protection via limiters

Overvoltages can arise as a consequence of multiple restrikes or by virtual current chopping, e.g. when motors are switched in braked condition or during start-up. Motors with a starting current ≤ 600 A are endangered. Safe protection against overvoltages is ensured by surge limiters. These can be arranged in parallel to the cable sealing ends, preferably in the cable compartment.

Switching of capacitors

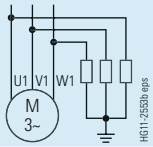
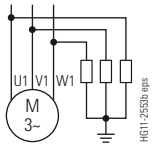
3TM vacuum contactors can interrupt capacitive currents up to 315 A up to the rated voltage of 12 kV without restrikes, and thus without overvoltages.

Short-circuit protection

3TM vacuum contactors are not designed to switch short-circuit currents. Therefore, a short-circuit protection must be provided. The best protection is provided by HV HRC fuses or circuit-breakers.

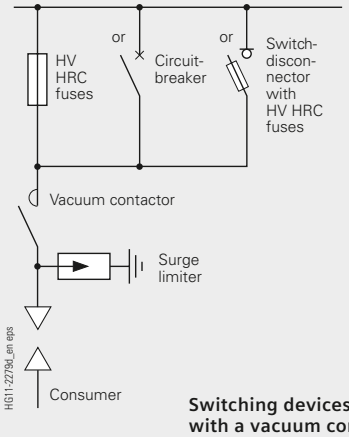
Utilization categories	Typical applications
AC-1	Non-inductive or slightly inductive loads, resistance furnaces
AC-2	Slip-ring motors: Starting, switching off
AC-3	Squirrel-cage motors: Starting, switching off during running
AC-4	Squirrel-cage motors: Starting, plugging [1], reversing [1], inching [2]

1) By plugging or reversing is understood stopping or reversing the motor rapidly by reversing motor primary connections while the motor is running
2) By inching is understood energizing a motor once or repeatedly for short periods to obtain small movements of the driven mechanism

Circuit diagram	Type of duty
	Switching of accelerated motors
	Occasional switching of just accelerated motors in case of fault [1]
	Frequent switching in AC-4 operation [1]

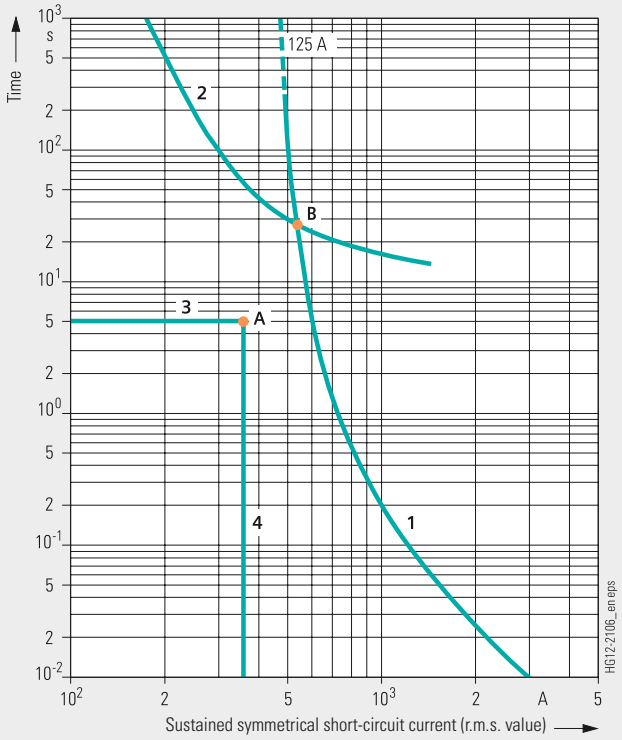
Circuit examples for surge protection of three-phase motors with a starting current ≤ 600 A

1) With surge limiter



Switching devices in combination with a vacuum contactor

1



Example for the coordination of a HV HRC fuse characteristic 125 A with a motor characteristic

1 Characteristic of the HV HRC fuse
2 Characteristic of the time-overcurrent protection
3 Motor starting time
4 Motor starting current

Short-circuit protection via HV HRC fuses

At high short-circuit currents, HV HRC fuses have a current-limiting effect, i.e. the fuse limits the short-circuit current to the let-through current. When selecting the fuses, the type of consumer must be observed, e.g. motor, transformer, capacitor.

The opposite diagram shows an example for the coordination of an HV HRC fuse with a time-overcurrent protection.

Coordinating the components of the motor circuit

- The time-current characteristic must be located on the right of the motor starting current (point A).
- The rated current of the HV HRC fuse-link must exceed the normal current of the motor.
- The current corresponding to the intersection B of the HV HRC fuse-link characteristic and the characteristic of the time-overcurrent protection must be higher than the minimum breaking current of the HV HRC fuse-link.
- If this is not feasible, it must be ensured that overload currents that are smaller than the minimum breaking current of the HV HRC fuse-link are interrupted by the switching device via the striker. This prevents thermal overloading of the HV HRC fuse-link, which would otherwise be destroyed.
- The selected HV HRC fuse-link limits the sustained symmetrical short-circuit current I_k to the let-through current I_D shown in the diagram for the current-limiting characteristics (I_D as a function of I_K for HV HRC fuse-links with different rated currents). The maximum tested let-through current is $I_D = 46$ kA.

Requirements

- It must be ensured that the vacuum contactor cannot open until the fuse has interrupted the overload current. If necessary, the contactor opening time must be extended. 3TM vacuum contactors feature the corresponding setting facility. This does not apply if a mechanical closing latch is used. In this case, the time delay between tripping of the fuse and the latch release signal must be considered by the operator.
- Due to the arising motor starting current, the instant when the motor starts represents the maximum stress for the HV HRC fuse. This stress must neither operate nor predamage the fuse.

Other factors of influence on the stress of the HV HRC fuses are the starting time and the starting frequency of the motors.

Short-circuit protection for "class E2 controllers" according to UL 347/CSA C22.2

For using 3TM vacuum contactors as "class E2 controllers", fuses are specified for short-circuit protection. If two fuse-links are connected in parallel, the symmetrical short-circuit current determined has to be divided by two, and the associated let-through current for one fuse-link must be stated. This value must then be multiplied by two in order to obtain the total let-through current, which must not exceed the permissible value for the vacuum contactor. The parallel connection should ensure that the resistance values in the two branches are almost the same. When the fuses operate, the vacuum contactor must be switched off. A suitable device, actuated by the striker of the HV HRC fuse-link, has to be provided.

Short-circuit protection by circuit-breakers

Consumers for which no suitable fuses are available can also be protected by circuit-breakers. During the longer break time of the circuit-breakers (as a rule, 35 to 60 ms), the symmetrical short-circuit current must not exceed the maximum permissible value.

Overvoltage category

3TM vacuum contactors can be used up to overvoltage category III.

When used in higher categories, surge arresters must be integrated in the control circuits.

Trip-free mechanism

The contacts of the 3TM vacuum contactors are trip-free. In the event of an opening command being given after a closing operation has been initiated, the moving contacts return to the open position and remain there even if the closing command is sustained. This means that the contacts are momentarily in the closed position.

Standards

3TM vacuum contactors correspond to the standards:

- IEC/DIN EN 62271-1
  High-voltage switchgear and controlgear –
  Part 1: Common specifications
- IEC/DIN EN 62271-106
  High-voltage switchgear and controlgear –
  Part 106: Contactors and controllers
- GB/T14808
  High voltage alternating current contactors and contactor-based motor-starters
- UL347, 6th edition
  Medium-Voltage AC Contactors, Controllers, and Control Centers
- CSA C22.2 253-09
- IEC 61000-4-18, EN 61000-6-2, EN 61000-6-4, EN 55011
  Electromagnetic compatibility (EMC)
- DNVGL-CG-0339
  Classification and construction standards for ship technology.

Type approval according to German X-ray regulations

The vacuum interrupters fitted in the switching devices are type-approved in accordance with §8 of the X-ray regulations (RöV = Röntgenverordnung) of the Federal Republic of Germany as interference radiators, and they meet the requirements for interference radiators according to Annex 2 No. 5 of the latest RöV up to the rated voltage specified in the approval document.

Performance in case of voltage dips or reductions of the control supply voltage U_a

3TM vacuum contactors fulfill the requirements concerning voltage dips and reductions with the values requested according to IEC 61000-4-29/08.2000, IEC 61000-4-11.

Mirror contacts

3TM vacuum contactors are equipped with mirror contacts.

Positive opening / Positive driving

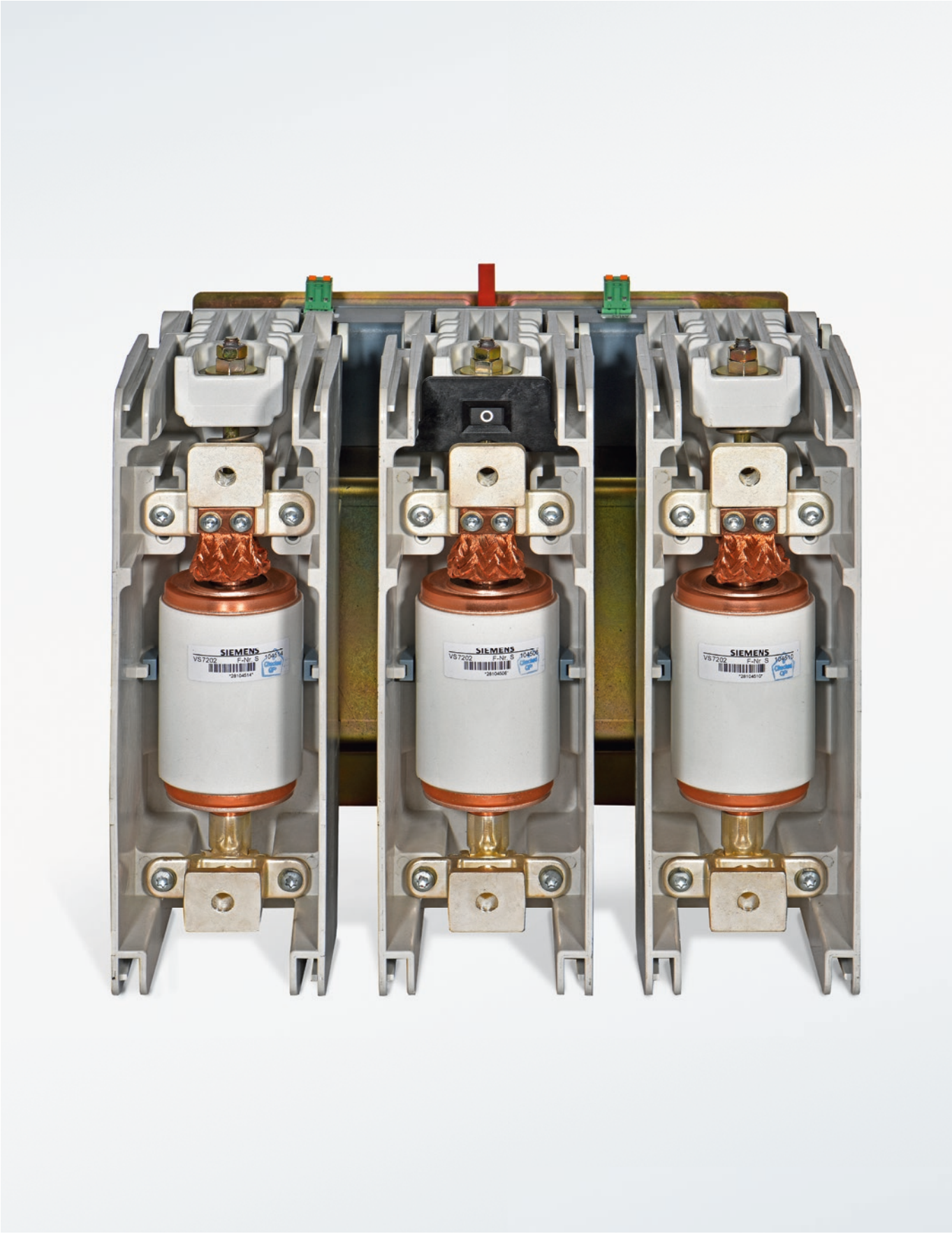
The auxiliary switches are mechanically connected with the operating system and are positively moved and driven (positive opening/closing).

Degree of pollution

3TM vacuum contactors fulfill the conditions according to pollution degree 3.

Degree of protection

3TM vacuum contactors fulfill the degree of protection IP43, except for the main circuit and the connections for which the degree of protection IP00 applies.



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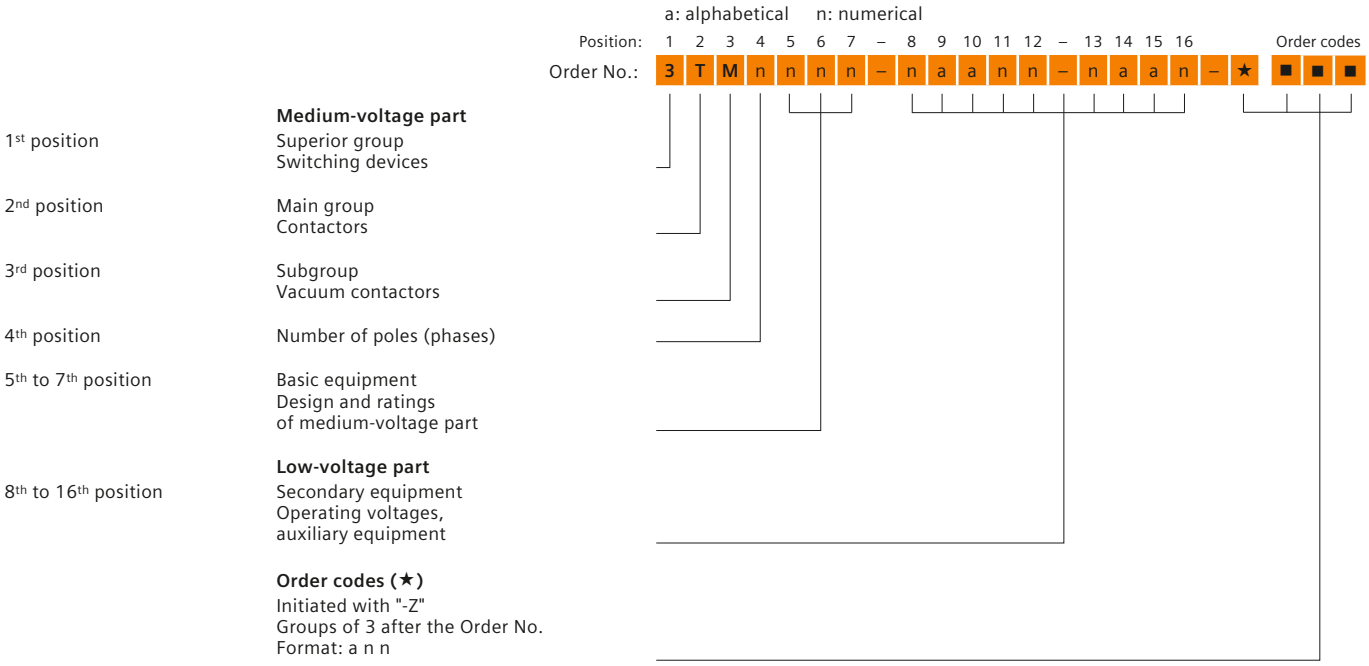
Order number structure

3TM vacuum contactors consist of a medium-voltage and a low-voltage part. The relevant data make up a 16-digit order number. The medium-voltage part covers the main electrical data of the poles. The low-voltage part covers all auxiliary devices which are necessary for operating and controlling the contactor.

Order codes (★)

In case of special versions and additional equipment, "**-Z**" is added to the order number and explained in more detail with a 3-digit order code. Several order codes can be added to the order number in succession and in any sequence. In this context, the suffix "**-Z**" is listed only once. If a requested special version or additional equipment is not in the catalog and can therefore not be ordered via order code, it has to be identified with **Y 9 9** and a clear text specification. The agreement hereto is made directly between your responsible sales partner and the order processing department in the Switchgear Factory Berlin.



Configuration example

In order to simplify the selection of the correct order number for the requested contactor, you will find three configuration examples on page 17 in the chapter "Equipment Selection".

On the foldout page we offer a configuring aid. Here you can fill in the order number you have determined for your contactor. Alternatively you can configure your contactor in our online configurator and order it directly through the Siemens Industry Mall.

Configuration example

In order to simplify the selection of the correct order number for the requested vacuum contactor, you will find three configuration examples below.

Position:	1	2	3	4	5	6	7	–	8	9	10	11	12	–	13	14	15	16		Order codes		
Configuration example Order No.:	3	T	M	3	■	■	■	–	■	■	■	■	■	–	■	■	■	■	–	★	■	■	■
3TM vacuum contactor, three-pole	3	T	M	3																		
Rated voltage U_r = **7.2 kV** (BIL 60 kV / PFWV 20 kV)					1																	
Rated operational current I_e = **400 A**						2																
Rated short-circuit breaking current I_{SC} = **5 kA**							1	–														
Controller version									1													
Operating voltage for magnet system **230 V AC**										Q												
Without closing latch and latch release, not prepared for retrofitting											A											
Pole-center distance **120 mm**												2										
Additional closing delay **0 ms**													0	–								
Additional opening delay **0 ms**															0							
Latch release voltage: without latch release																A						
Auxiliary contacts 4 NO + 4 NC																	C					
Accessories																		0				
Example for Order No.:	3	T	M	3	1	2	1	–	1	Q	A	2	0	–	0	A	C	0				
Order codes:																						

Position:	1	2	3	4	5	6	7	–	8	9	10	11	12	–	13	14	15	16		Order codes		
Configuration example Order No.:	3	T	M	3	■	■	■	–	■	■	■	■	■	–	■	■	■	■	–	★	■	■	■
3TM vacuum contactor, three-pole	3	T	M	3																		
Rated voltage U_r = **12 kV** (BIL 75 kV / PFWV 28 kV)					4																	
Rated operational current I_e = **450 A**						3																
Rated short-circuit breaking current I_{SC} = **5 kA**							1	–														
Controller version									1													
Operating voltage for magnet system **110 V DC**										F												
With closing latch as well as magnetic and mechanical latch release											F											
Pole-center distance **150 mm**												6										
Additional closing delay **0 ms**													0	–								
Additional opening delay **0 ms**															0							
Latch release voltage: **110 V DC**																F						
Auxiliary contacts 6 NO + 6 NC																	D					
Accessories: with tension spring																		0	–	Z	B	3	0
Mechanical latch release with pull rod in direction B																			–	Z	J	6	8
Example for Order No.:	3	T	M	3	4	3	1	–	1	F	F	6	0	–	0	F	D	0	–	Z	B	3	0
Order codes:																					J	6	8

Position:	1	2	3	4	5	6	7	–	8	9	10	11	12	–	13	14	15	16		Order codes		
Configuration example Order No.:	3	T	M	3	■	■	■	–	■	■	■	■	■	–	■	■	■	■	–	★	■	■	■
3TM vacuum contactor, three-pole	3	T	M	3																		
Rated voltage U_r = **7.2 kV** (BIL 60 kV / PFWV 20 kV)					2																	
Rated operational current I_e = **450 A**						3																
Rated short-circuit breaking current I_{SC} = **5 kA**							1	–														
Controller version									1													
Operating voltage for magnet system **230 V AC**										Q												
Without closing latch and latch release, not prepared for retrofitting											A											
Pole-center distance **120 mm**												2										
Additional closing delay **50 ms**													1	–								
Additional opening delay **65 ms**															2							
Latch release voltage: without latch release																A						
Auxiliary contacts 4 NO + 4 NC																	C					
Accessories																		0				
Example for Order No.:	3	T	M	3	2	3	1	–	1	Q	A	2	1	–	2	A	C	0				
Order codes:																						

Equipment Selection

Selection of 3TM vacuum contactors

7.2 kV

50/60 Hz

Position:	1	2	3	4	5	6	7	–	8	9	10	11	12	–	13	14	15	16			Order codes
Order No.:	3	T	M	3	■	■	■	–	■	■	■	■	■	–	■	■	■	■	–	★	■ ■ ■

Rated voltage U_r kV	Rated lightning impulse withstand voltage, to earth U_p kV	Rated lightning impulse withstand voltage, open contact gap U_p kV	Rated short-duration power-frequency withstand voltage, to earth U_d kV	Rated short-duration power-frequency withstand voltage, open contact gap U_d kV	Rated operational current I_e A	Rated short-circuit breaking current I_{sc} kA	Controller																				
										See page 19	See page 19	See page 19	See page 20		See page 20	See page 20	See page 20	See page 20		See page 21	
7.2	60	60	20	20	400	5	*)	3	T	M	3	1	2	1	–	1											
7.2	60	60	20	20	450	5	*)	3	T	M	3	2	3	1	–	1											
7.2	60	60	32	32	450	5	*)	3	T	M	3	3	3	1	–	1											

*) Standard

Please select supplement Y88 when the vacuum contactors are used in connection with back-to-back capacitor banks.

12 kV

50/60 Hz

U_r kV	U_p kV	U_p kV	U_d kV	U_d kV	I_e A	I_{sc} kA																						
12	75	75	28	28	450	5	*)	3	T	M	3	4	3	1	–	1												
12	75	75	42	42	450	5	*)	3	T	M	3	5	3	1	–	1												

*) Standard

Please select supplement Y88 when the vacuum contactors are used in connection with back-to-back capacitor banks.

15 kV [1)]

50/60 Hz

U_r kV	U_p kV	U_p kV	U_d kV	U_d kV	I_e A	I_{sc} kA																						
15	75	75	28	28	250	5	*)	3	T	M	3	6	1	1	–	1												

*) Standard

Please select supplement Y88 when the vacuum contactors are used in connection with back-to-back capacitor banks.

1) Available on request

9th position
Operating voltage for magnet system

Position:	1	2	3	4	5	6	7	–	8	9	10	11	12	–	13	14	15	16		Order codes		
Order No.:	3	T	M	3	■	■	■	–	■	■	■	■	■	–	■	■	■	■	–	★	■	■	■
DC operation with voltage	AC operation with voltage												See page 20	See page 20	See page 20	See page 20	See page 20	See page 20		See page 21			
48 V DC										D													
60 V DC										E													
110 V DC										F													
125 V DC										G													
220 V DC										H													
250 V DC										J													
	100 V AC, 50/60 Hz									L													
	110 V AC, 50/60 Hz									M													
	115 V AC, 50/60 Hz									N													
	120 V AC, 50/60 Hz									P													
	230 V AC, 50/60 Hz									Q													
	240 V AC, 50/60 Hz									R													

10th position
Additional components closing latch and latch release

Without closing latch / latch release, no retrofitting	A
Without closing latch / latch release, prepared for retrofitting	B
Closing latch and magnetic latch release (without manual latch release system)	E
Closing latch, magnetic and mechanical latch release	F

Order codes: J67 [2], J68 [2]

2) J67: Manual latch release with push rod in direction A
J68: Manual latch release with pull rod in direction B
(cf. illustration on page 9)

11th position
Pole-center distance

120 mm	2
150 mm	6
Other pole-center distances possible on request	

Equipment Selection

Secondary equipment

Position:	1	2	3	4	5	6	7	–	8	9	10	11	12	–	13	14	15	16	–	★	Order codes		
Order No.:	3	T	M	3	■	■	■	–	■	■	■	■	■	–	■	■	■	■	–	★	■	■	■

12th position
Additional closing delay [1]

Without	0
50 ms	1

1) Preset

13th position
Additional opening delay [2]

Without	0
65 ms	2
115 ms	3
170 ms	5

2) Preset, only possible without closing latch and latch release

14th position
Latch release voltage

Without	A
24 V DC	B
30 V DC	C
48 V DC	D
60 V DC	E
110 V DC	F
125 V DC	G
220 V DC	H
250 V DC	J
100 V AC	L
110 V AC	M
115 V AC	N
120 V AC	P
230 V AC	Q
240 V AC	R

15th position
Auxiliary contacts [3]

4 NO + 4 NC	C
6 NO + 6 NC	D

3) Please observe external dimensions on page 30

16th position
Accessories

	0

See page 21

Special versions and additional equipment	Position:	1	2	3	4	5	6	7	–	8	9	10	11	12	–	13	14	15	16			Order codes		
	Order No.:	3	T	M	3	■	■	■	–	■	■	■	■	■	–	■	■	■	■	–	★	■	■	■
Options																								
Additional rating plate, loose delivery																				–	Z	B	0	0
Tension spring terminal incl. plug																				–	Z	B	3	0
ANSI type plate: 5 kV (60 kV / 20 kV)																				–	Z	E	3	0
ANSI type plate: 7.65 kV (60 kV / 20 kV)																				–	Z	E	3	1
ANSI type plate: 8.25 kV (75 kV / 20 kV)																				–	Z	E	3	2
Routine test certificate, English																				–	Z	F	2	0
Routine test certificate to orderer																				–	Z	F	2	3
Routine test certificate, German																				–	Z	F	2	4
Customer acceptance test																				–	Z	F	5	0
Mechanical latch release towards A (push)																				–	Z	J	6	7
Mechanical latch release towards B (pull)																				–	Z	J	6	8
Operating instructions in English are enclosed with the product																								
Operating instructions, German																				–	Z	L	0	3
Operating instructions, Russian																				–	Z	L	0	5
Operating instructions, Spanish																				–	Z	L	0	6
Operating instructions, French																				–	Z	L	0	7
Operating instructions, Italian																				–	Z	L	0	8
Operating instructions, Portuguese																				–	Z	L	0	9
Operating instructions, Turkish																				–	Z	L	1	0
Operating instructions, Polish																				–	Z	L	1	1
Special fixed factory setting for site altitudes > +2000 m to + 5000 m above sea level																				–	Z	R	5	7
For heavy stress, high swinging and shock resistance																				–	Z	R	5	8
"UL-Recognized" test mark																				–	Z	Y	4	7
Use of vacuum contactor in connection with back-to-back capacitor banks																				–	Z	Y	8	8
Clear text specifications																				–	Z	Y	9	9

Spare parts and accessories

The order numbers are applicable to contactors of current manufacture. When mounting parts or spare parts are being ordered for an existing vacuum contactor, always quote the type designation, serial number and the year of manufacture of the contactor to be sure to get the correct delivery. This data is given on the rating plate (page 23). Spare parts must only be replaced by instructed personnel.

Spare parts	Remark	Operating voltage	Order No.
Vacuum interrupter*)	3TM31		**3TY5900-0BA1**
	3TM32 and 3TM33		**3TY5 900-0AA0**
	3TM34		**3TY5 900-0CA0**
	3TM35		**3TY5 900-0CA1**
Auxiliary switch	2 NO + 2 NC without wiring (left)		**3TY5 901-0AA0**
	2 NO + 2 NC without wiring (right)		**3TY5 901-0AB0**
	3 NO + 3 NC without wiring (left)		**3TY5 901-0BA0**
	3 NO + 3 NC without wiring (right)		**3TY5 901-0BB0**
Controller		48 – 60 V	**3TY5 902-0AA0**
		110 – 230 V	**3TY5 902-0AA1**
Shunt release	Latching system	24 V DC	**3TY5 903-0AB0**
		30 V DC	**3TY5 903-0AC0**
		48 V DC	**3TY5 903-0AD0**
		60 V DC	**3TY5 903-0AE0**
		110 V DC	**3TY5 903-0AF0**
		125 V DC	**3TY5 903-0AG0**
		220 V DC	**3TY5 903-0AH0**
		250 V DC	**3TY5 903-0AJ0**
		100 V AC	**3TY5 903-0AL0**
		110 V AC	**3TY5 903-0AM0**
		115 V AC	**3TY5 903-0AN0**
		120 V AC	**3TY5 903-0AP0**
		230 V AC	**3TY5 903-0AQ0**
		240 V AC	**3TY5 903-0AR0**

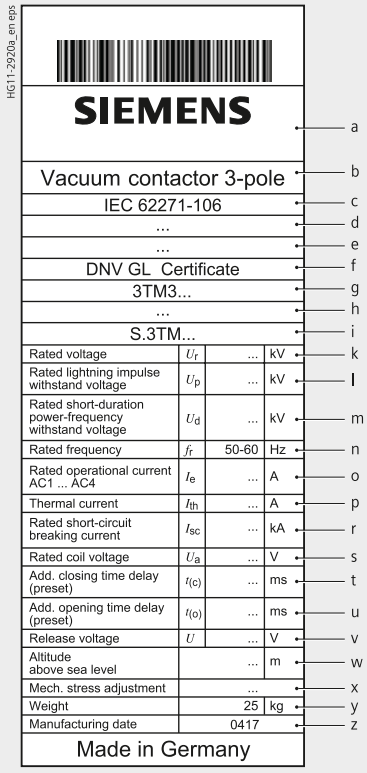
*) Replacement of individual vacuum interrupters is not recommended

Accessories	Remark	Operating voltage	Order No.
Latching system for retrofitting	With shunt release	24 V DC	**3TX5 903-0AB0**
		30 V DC	**3TX5 903-0AC0**
		48 V DC	**3TX5 903-0AD0**
		60 V DC	**3TX5 903-0AE0**
		110 V DC	**3TX5 903-0AF0**
		125 V DC	**3TX5 903-0AG0**
		220 V DC	**3TX5 903-0AH0**
		250 V DC	**3TX5 903-0AJ0**
		100 V AC	**3TX5 903-0AL0**
		110 V AC	**3TX5 903-0AM0**
		115 V AC	**3TX5 903-0AN0**
		120 V AC	**3TX5 903-0AP0**
		230 V AC	**3TX5 903-0AQ0**
		240 V AC	**3TX5 903-0AR0**
Mechanical latch release for latching system [1]	With pull rod (direction B)		**3TX5 904-0AB0**
	With push rod (direction A)		**3TX5 904-0AC0**

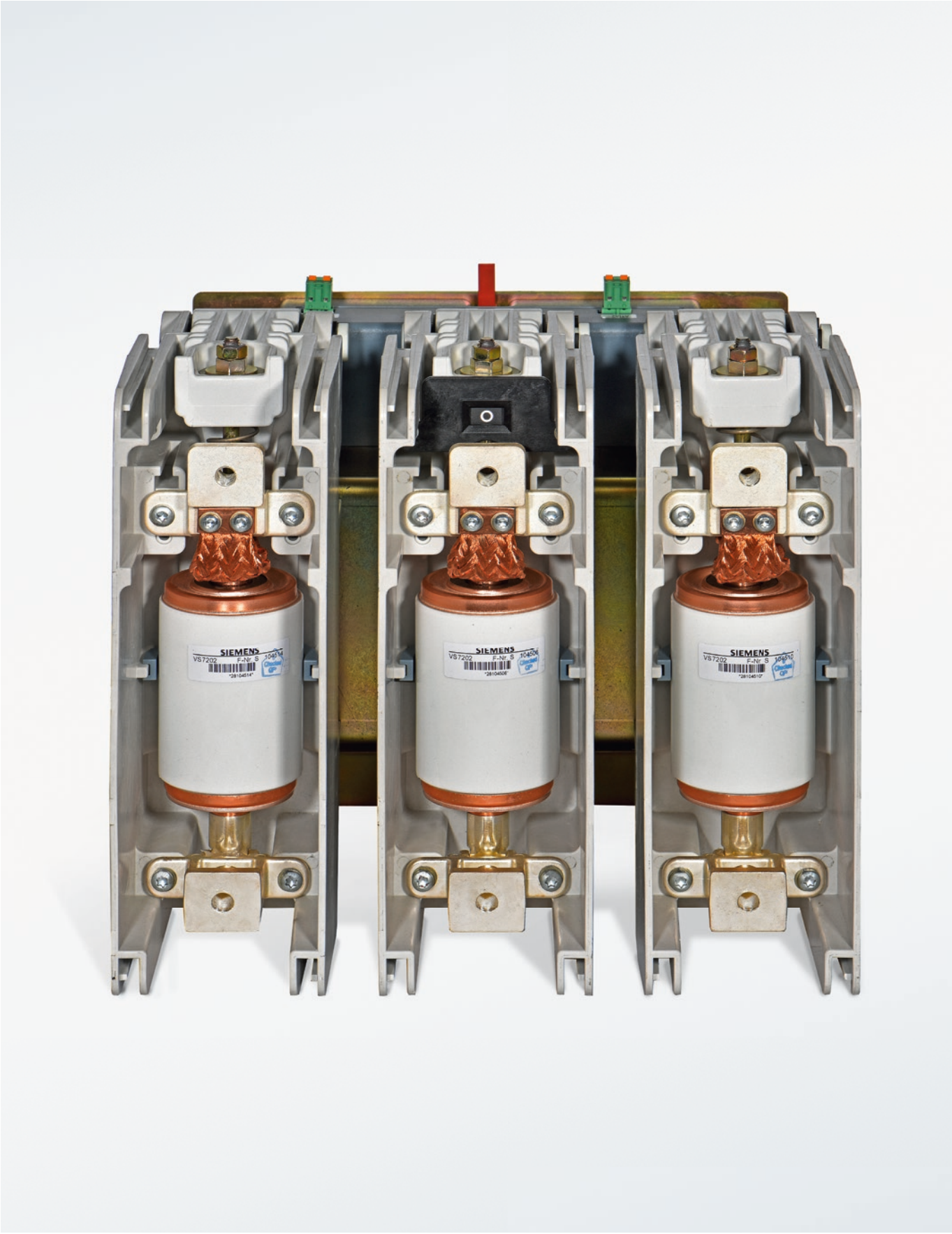
1) See page 9

Rating plate

Data on the rating plate



a Manufacturer
b Type designation
c Classification according to IEC standard
d Classification according to UL standard
e Classification according to other standard
f DNV GL Certificate
g MRPD supplement acc. to mco
h Special versions and additional equipment
i Serial number acc. to mco
k Rated voltage U_r
l Rated lightning impulse withstand voltage U_p
m Rated power-frequency withstand voltage U_d
n Rated frequency f_r
o Rated operational current I_e AC1... AC4
p Thermal current I_{th}
r Rated short-circuit breaking current I_{sc}
s Rated coil voltage U_a
t Additional closing delay $t_{(c)}$
u Additional opening delay $t_{(o)}$
v Latch release voltage U
w Altitude above sea level
x Mechanical stress adjustment
y Weight
z Manufacturing date mmyy



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Contents Page

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3

Medium-voltage part

Order No.	**Rated voltage** U_r kV	**Rated frequency** f_r Hz	**Rated operational current** for ambient air temperatures from -40 to +70 °C I_e A	**Thermal current** for ambient air temperatures from -40 to +70 °C I_{th} A	**Switching capacity** at rated making current I_m kA	**Switching capacity** at rated breaking current I_c kA	**Rated short-circuit breaking current** (limit switching capacity) I_{SC} kA	**Rated short-time withstand current** (r.m.s. value) 1 s [1] I_k kA	**Rated making current** for a back-to-back capacitor bank I_{bi} kA peak	**Rated single capacitor bank breaking current** (rated normal current of capacitor) A	**Contactor class**	**Switching rate** without closing latch Oper. cycles/h	**Mechanical endurance of contactor** without closing latch Oper. cycles	**Electrical endurance (AC-3)** while breaking the rated operational current Oper. cycles	**Rated lightning impulse withstand voltage** to earthed parts and from phase to phase U_p kV	**Rated lightning impulse withstand voltage** across the open contact gap U_p kV	**Rated short-duration power-frequency withstand voltage** to earthed parts and from phase to phase U_d kV	**Rated short-duration power-frequency withstand voltage** across the open contact gap U_d kV	Weight [2] kg	Detailed dimension drawing [3]
3TM31...	7.2	50 to 60	400	315	4	3.2	5	8	–	315	C1	1200	0.25 mio	0.25 mio	60	60	20	20	20-25	S_A7E_142_01900_xxx
3TM32...	7.2	50 to 60	450	450	4.5	3.6	5	8	10	315	C2	1200	1 mio	0.25 mio	60	60	20	20	20-25	S_A7E_142_01900_xxx
3TM33...	7.2	50 to 60	450	450	4.5	3.6	5	8	10	315	C2	1200	1 mio	0.5 mio	60	60	32	32	20-25	S_A7E_142_01900_xxx
3TM34...	12	50 to 60	450	450	4.5	3.6	5	8	10	315	C2	1200	1 mio	0.25 mio	75	75	28	28	20-25	S_A7E_142_01900_xxx
3TM35...	12	50 to 60	450	450	4.5	3.6	5	8	10	315	C2	1200	1 mio	0.5 mio	75	75	42	42	20-25	S_A7E_142_01900_xxx

1) For short-time currents > 1 s, please observe the diagram on page 28
2) Depending on the selected equipment
3) S_A7E_142_01900_xxx with
xxx = 001: without latching and latch release system, pole-center distance 120 mm, 4 NO + 4 NC
xxx = 002: with latching and latch release system, pole-center distance 120 mm, 4 NO + 4 NC
xxx = 011: without latching and latch release system, pole-center distance 150 mm, 4 NO + 4 NC
xxx = 012: with latching and latch release system, pole-center distance 150 mm, 4 NO + 4 NC
xxx = 301: without latching and latch release system, pole-center distance 120 mm, 6 NO + 6 NC
xxx = 301: with latching and latch release system, pole-center distance 120 mm, 6 NO + 6 NC
xxx = 311: without latching and latch release system, pole-center distance 150 mm, 6 NO + 6 NC
xxx = 312: with latching and latch release system, pole-center distance 150 mm, 6 NO + 6 NC

Low-voltage part

Order No.	**Power consumption of the drive solenoid** Holding power	**Voltage range of the drive solenoid** Operating voltage	**Minimum operating time** for the drive solenoid	**Closing time** Lower and upper limit values at room temperature	**Opening time without latching system** Lower and upper limit values at room temperature	**Optionally adjustable additional delay of the closing time**	**Optionally adjustable additional delay of the opening time**	**Opening time with latching system** Lower and upper limit values at room temperature	**Closing latch** Endurance	**Closing latch** Switching rate
	W	V	ms	ms	ms	ms	ms	ms	Oper. cycles	Oper. cycles/h
3TM31...	10 – 20	0.8 to 1.1 U_a	100	36 to 56 [1]	25 to 45 [1]	40 to 60	55 to 75 105 to 125 160 to 180	20 to 40 [1]	200,000	60
3TM32...	10 – 20	0.8 to 1.1 U_a	100	36 to 56 [1]	25 to 45 [1]	40 to 60	55 to 75 105 to 125 160 to 180	20 to 40 [1]	200,000	60
3TM33...	10 – 20	0.8 to 1.1 U_a	100	36 to 56 [1]	25 to 45 [1]	40 to 60	55 to 75 105 to 125 160 to 180	20 to 40 [1]	200,000	60
3TM34...	10 – 20	0.8 to 1.1 U_a	100	36 to 56 [1]	25 to 45 [1]	40 to 60	55 to 75 105 to 125 160 to 180	20 to 40 [1]	200,000	60
3TM35...	10 – 20	0.8 to 1.1 U_a	100	36 to 56 [1]	25 to 45 [1]	40 to 60	55 to 75 105 to 125 160 to 180	20 to 40 [1]	200,000	60

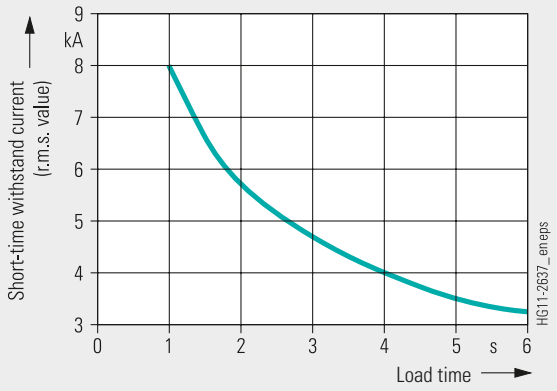
1) At 1.00 U_a

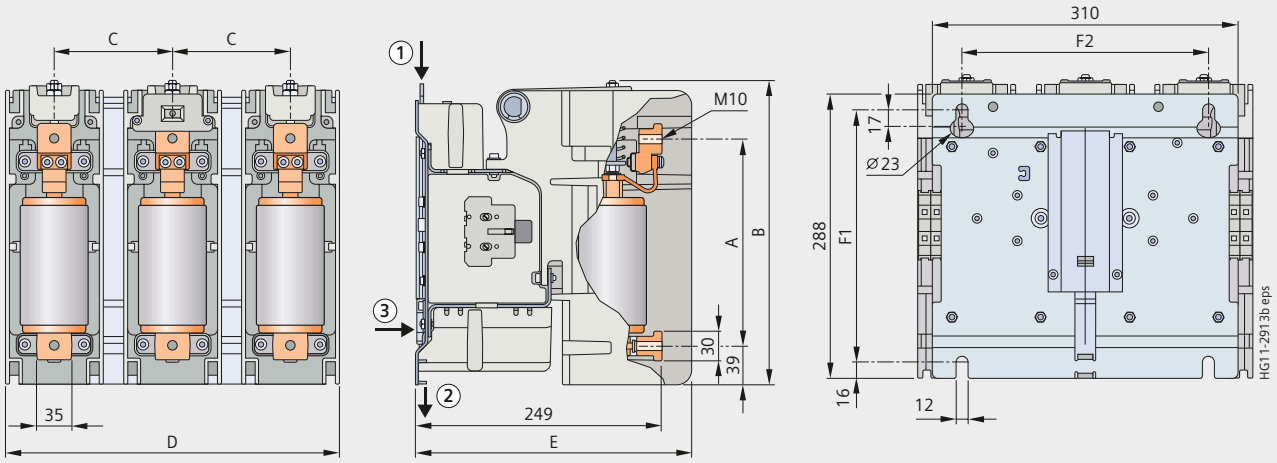
Auxiliary contacts

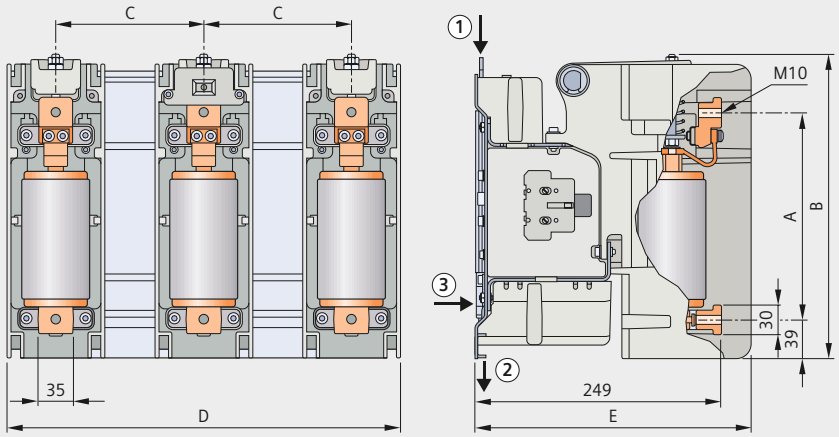
Order No.	Number of auxiliary contacts	Rated continuous current	Rated operational current I_e at rated voltage U_r Utilization category AC-12 for alternating current		Rated operational current I_e at rated voltage U_r Utilization category AC-14 for alternating current	Rated operational current I_e at rated voltage U_r Utilization category AC-15 for alternating current			Rated operational current I_e at rated voltage U_r Utilization category AC-13 for alternating current				Connection cross-sections of the auxiliary contacts acc. to IEC EN 60947-5-1	
			24 V AC	230 V AC	125 V AC	24 V AC	230 V AC	400 V AC	24 V DC	60 V DC	110 V DC	220 V DC	With wire end ferrule	For AWG connections
		I_{th}	I_e	I_e	I_e	I_e	I_e	I_e	I_e	I_e	I_e	I_e		
		A	A	A	A	A	A	A	A	A	A	A	mm²	AWG
3TM31...	4 NO + 4 NC 6 NO + 6 NC	10	10	10	10	10	5.6	3.6	10	5	1.14	0.48	2 x (0.5 – 1.0) 2 x (0.75 – 2.5)	2 x (18 – 12)
3TM32...	4 NO + 4 NC 6 NO + 6 NC	10	10	10	10	10	5.6	3.6	10	5	1.14	0.48	2 x (0.5 – 1.0) 2 x (0.75 – 2.5)	2 x (18 – 12)
3TM33...	4 NO + 4 NC 6 NO + 6 NC	10	10	10	10	10	5.6	3.6	10	5	1.14	0.48	2 x (0.5 – 1.0) 2 x (0.75 – 2.5)	2 x (18 – 12)
3TM34...	4 NO + 4 NC 6 NO + 6 NC	10	10	10	10	10	5.6	3.6	10	5	1.14	0.48	2 x (0.5 – 1.0) 2 x (0.75 – 2.5)	2 x (18 – 12)
3TM35...	4 NO + 4 NC 6 NO + 6 NC	10	10	10	10	10	5.6	3.6	10	5	1.14	0.48	2 x (0.5 – 1.0) 2 x (0.75 – 2.5)	2 x (18 – 12)

3

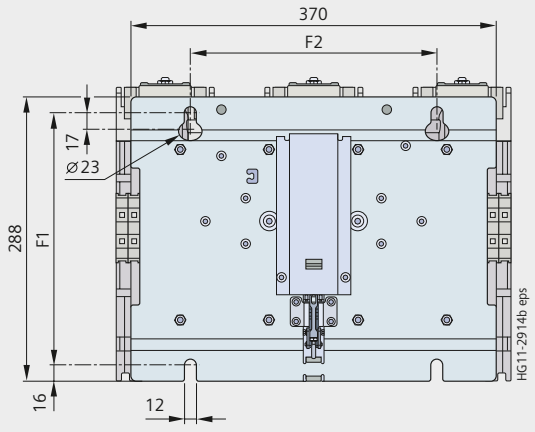
Short-time withstand current / load time characteristic





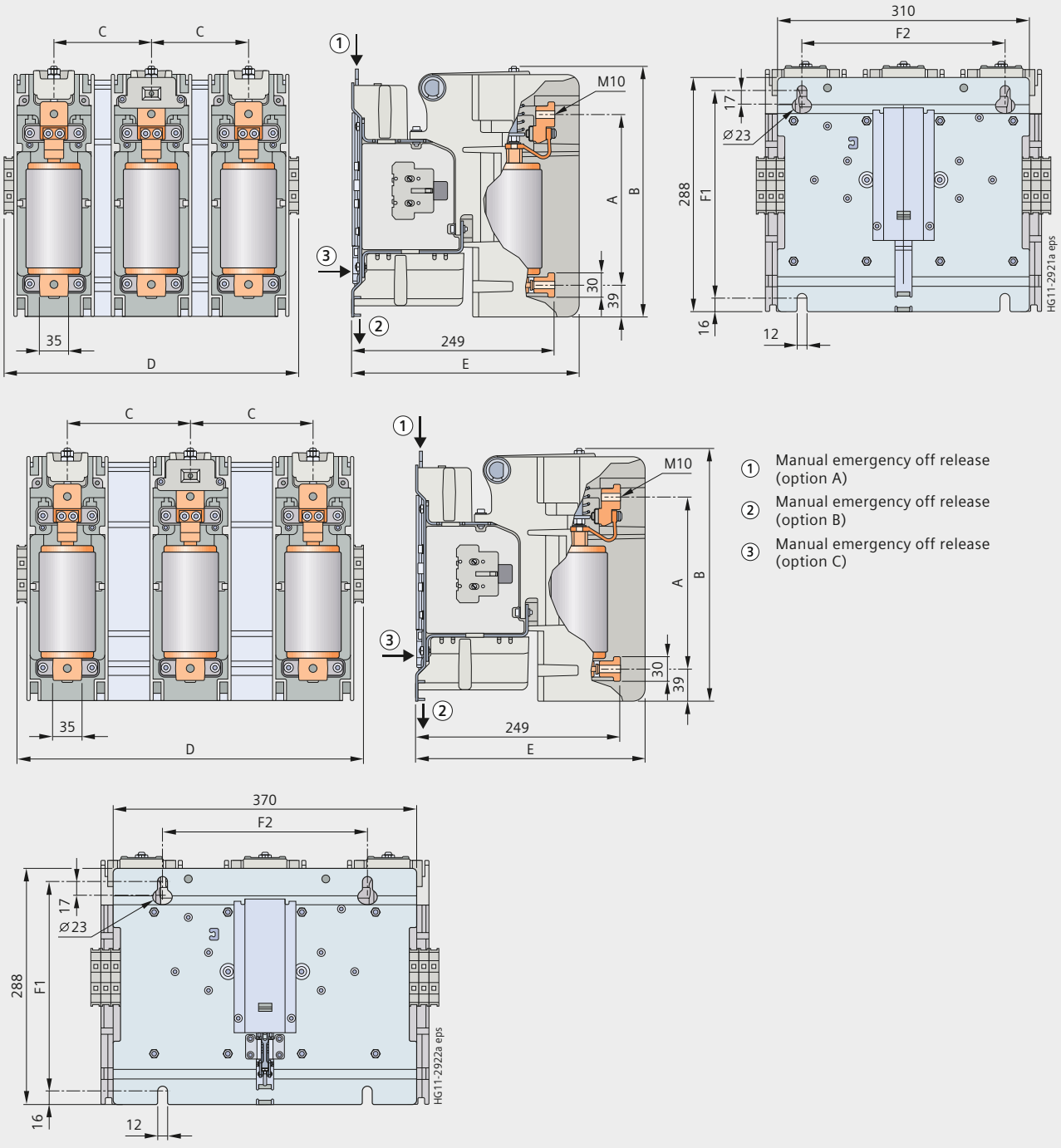


① Manual emergency off release (option A)
② Manual emergency off release (option B)
③ Manual emergency off release (option C)



Dimensions of 3TM vacuum contactor, with auxiliary switches 4 NO / 4 NC

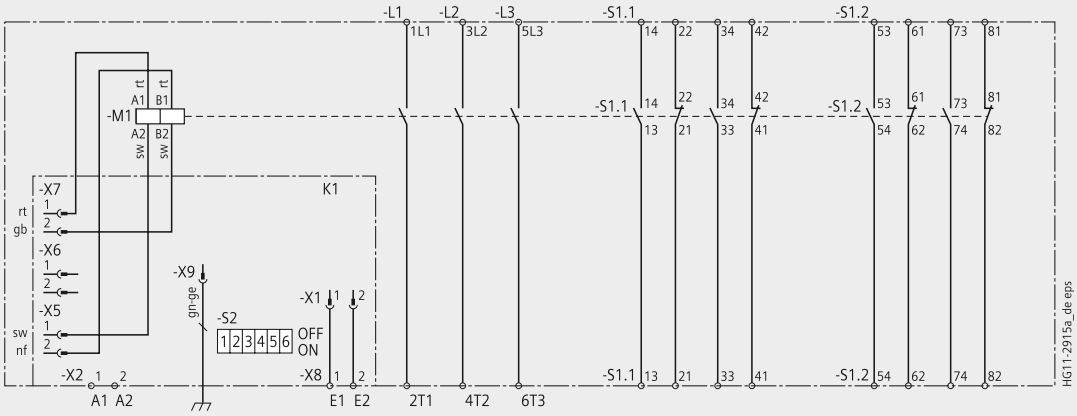
Voltage level kV	3TM 3-pole	Terminal distance	Pole-center distance	Height	Width for 4 NO + 4 NC	Depth	Installation dimensions		Terminal connections	Weight	Rated current
		A	C	B	D	E	F1	F2	Screwed		
		mm	mm	mm	mm	mm	mm	mm		kg	A
7.2 kV – 12 kV	3TM3	210	120	310	340	280	256	250	M10	approx. 20-22	315 - 450
7.2 kV – 12 kV	3TM3	210	150	310	400	280	256	250	M10	approx. 23-25	315 - 450



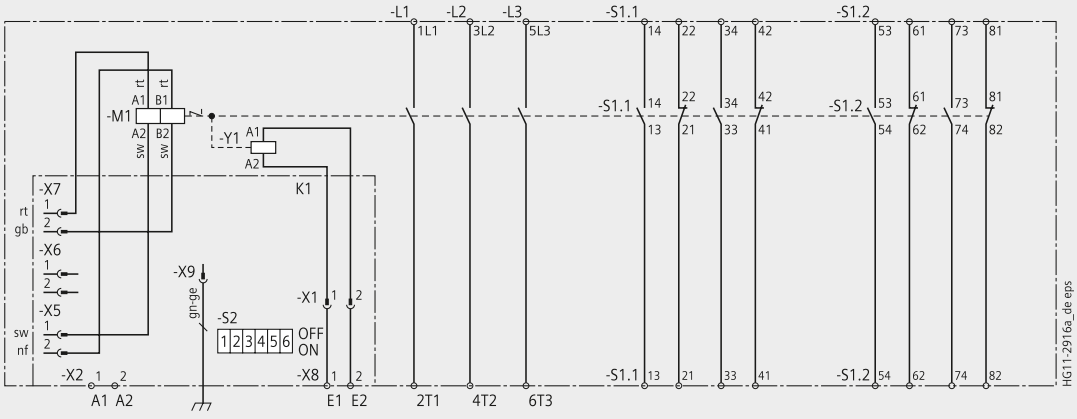
① Manual emergency off release (option A)
② Manual emergency off release (option B)
③ Manual emergency off release (option C)

Dimensions of 3TM vacuum contactor, with auxiliary switches 6 NO / 6 NC

Voltage level kV	3TM 3-pole	Terminal distance	Pole-center distance	Height	Width for 6 NO + 6 NC	Depth	Installation dimensions		Terminal connections	Weight	Rated current
		A	C	B	D	E	F1	F2	Screwed		
		mm	mm	mm	mm	mm	mm	mm		kg	A
7.2 kV – 12 kV	3TM3	210	120	310	362	280	256	250	M10	approx. 20-22	315 - 450
7.2 kV – 12 kV	3TM3	210	150	310	422	280	256	250	M10	approx. 23-25	315 - 450



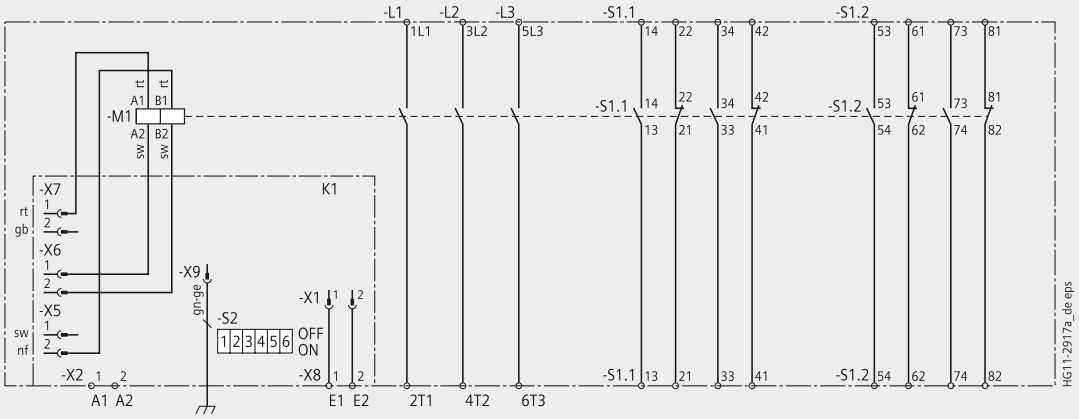
MLFB position					Switching delay		DIP switch -S2					
4	9	10	12	13	CLOSE	OPEN	1	2	3	4	5	6
3	F, G, L, M, N, P	A, B	0	0	without	without	1	0	0	0	0	0
			0	2	without	65 ms	1	0	1	0	0	0
			0	3	without	115 ms	1	0	0	1	0	0
			0	5	without	170 ms	1	0	1	1	0	0
			1	0	50 ms	without	1	1	0	0	0	0
			1	2	50 ms	65 ms	1	1	1	0	0	0
			1	3	50 ms	115 ms	1	1	0	1	0	0
			1	5	50 ms	170 ms	1	1	1	1	0	0
							Vltg.	CLOSED	OPEN	OPEN	n. a.	Latch



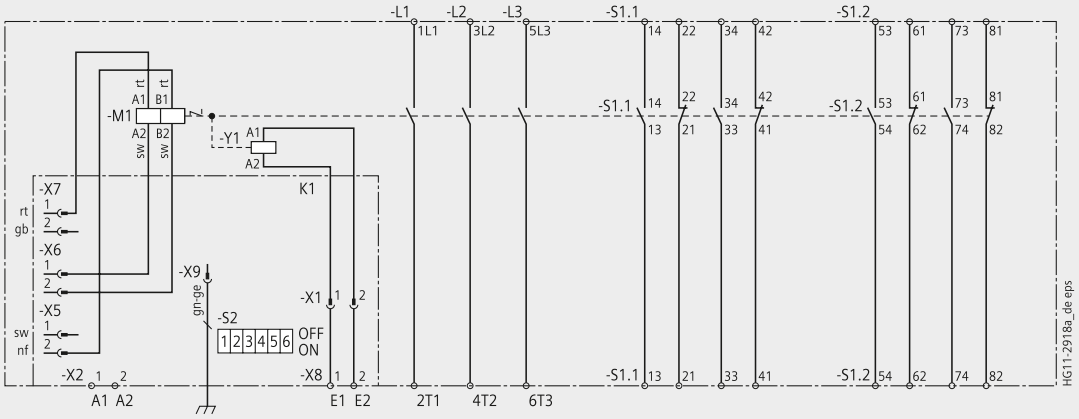
MLFB position				Switching delay		DIP switch -S2					
4	9	10	12	CLOSE	OPEN	1	2	3	4	5	6
3	F, G, L, M, N, P	E, F	0	without	without	1	0	0	0	0	1
			0	without	without	1	0	0	0	0	1
			0	without	without	1	0	0	0	0	1
			0	without	without	1	0	0	0	0	1
			1	50 ms	without	1	1	0	0	0	1
			1	50 ms	without	1	1	0	0	0	1
			1	50 ms	without	1	1	0	0	0	1
			1	50 ms	without	1	1	0	0	0	1
						Vltg.	CLOSED	OPEN	OPEN	n. a.	Latch

Legend

K1	Electronic control unit
M1	Magnetic actuator
Y1	Shunt release
S1.1	Auxiliary switch block, left
S1.2	Auxiliary switch block, right
X1	Internal connector for shunt release
X2	Input A1:A2 for magnetic actuator M1 (control voltage and command)
X5, X6, X7	Internal connectors for drive coils
X8	Command input E1:E2 for shunt release Y1
X9	Internal connector for earthing
S2	Coding switch for control voltage and switching delays
L1, L2, L3	Vacuum interrupters



MLFB position					Switching delay		DIP switch -S2					
4	9	10	12	13	CLOSE	OPEN	1	2	3	4	5	6
3	H, J, Q, R	A, B	0	0	without	without	0	0	0	0	0	0
			0	2	without	65 ms	0	0	1	0	0	0
			0	3	without	115 ms	0	0	0	1	0	0
			0	5	without	170 ms	0	0	1	1	0	0
			1	0	50 ms	without	0	1	0	0	0	0
			1	2	50 ms	65 ms	0	1	1	0	0	0
			1	3	50 ms	115 ms	0	1	0	1	0	0
			1	5	50 ms	170 ms	0	1	1	1	0	0
							Vltg.	CLOSED	OPEN	OPEN	n. a.	Latch



MLFB position				Switching delay		DIP switch -S2					
4	9	10	12	CLOSE	OPEN	1	2	3	4	5	6
3	H, J, Q, R	E, F	0	without	without	0	0	0	0	0	1
			0	without	without	0	0	0	0	0	1
			0	without	without	0	0	0	0	0	1
			0	without	without	0	0	0	0	0	1
			1	50 ms	without	0	1	0	0	0	1
			1	50 ms	without	0	1	0	0	0	1
			1	50 ms	without	0	1	0	0	0	1
			1	50 ms	without	0	1	0	0	0	1
						Vltg.	CLOSED	OPEN	OPEN	n. a.	Latch

Legend

K1	Electronic control unit
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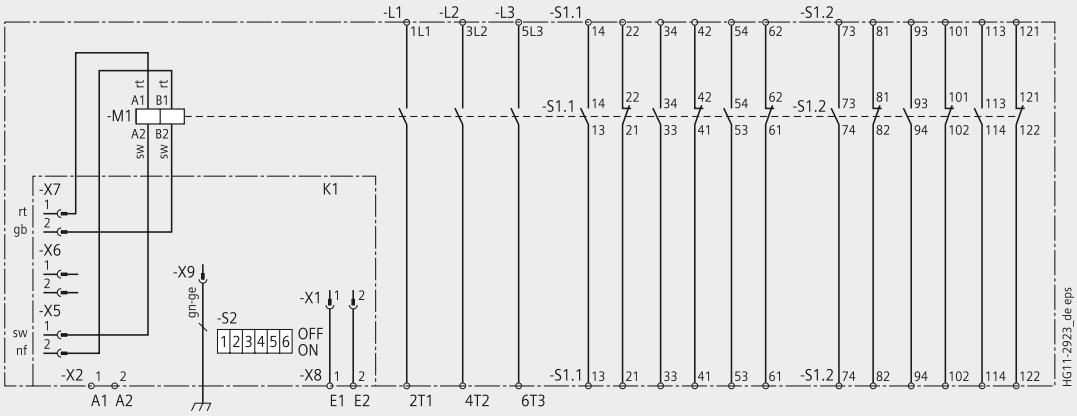
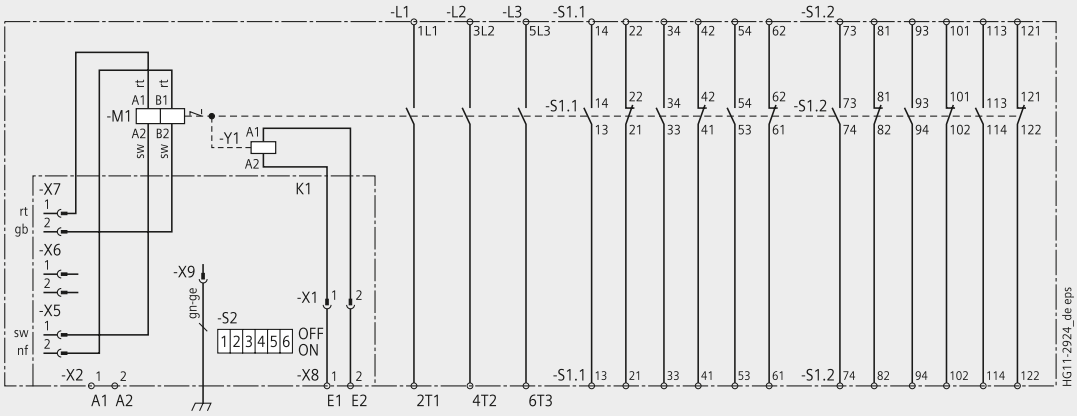


MLFB position					Switching delay		DIP switch -S2					
4	9	10	12	13	CLOSE	OPEN	1	2	3	4	5	6
3	F, G, L, M, N, P	A, B	0	0	without	without	1	0	0	0	0	0
			0	2	without	65 ms	1	0	1	0	0	0
			0	3	without	115 ms	1	0	0	1	0	0
			0	5	without	170 ms	1	0	1	1	0	0
			1	0	50 ms	without	1	1	0	0	0	0
			1	2	50 ms	65 ms	1	1	1	0	0	0
			1	3	50 ms	115 ms	1	1	0	1	0	0
			1	5	50 ms	170 ms	1	1	1	1	0	0
							Vltg.	CLOSED	OPEN	OPEN	n. a.	Latch



MLFB position				Switching delay		DIP switch -S2					
4	9	10	12	CLOSE	OPEN	1	2	3	4	5	6
3	F, G, L, M, N, P	E, F	0	without	without	1	0	0	0	0	1
			0	without	without	1	0	0	0	0	1
			0	without	without	1	0	0	0	0	1
			0	without	without	1	0	0	0	0	1
			1	50 ms	without	1	1	0	0	0	1
			1	50 ms	without	1	1	0	0	0	1
			1	50 ms	without	1	1	0	0	0	1
			1	50 ms	without	1	1	0	0	0	1
						Vltg.	CLOSED	OPEN	OPEN	n. a.	Latch

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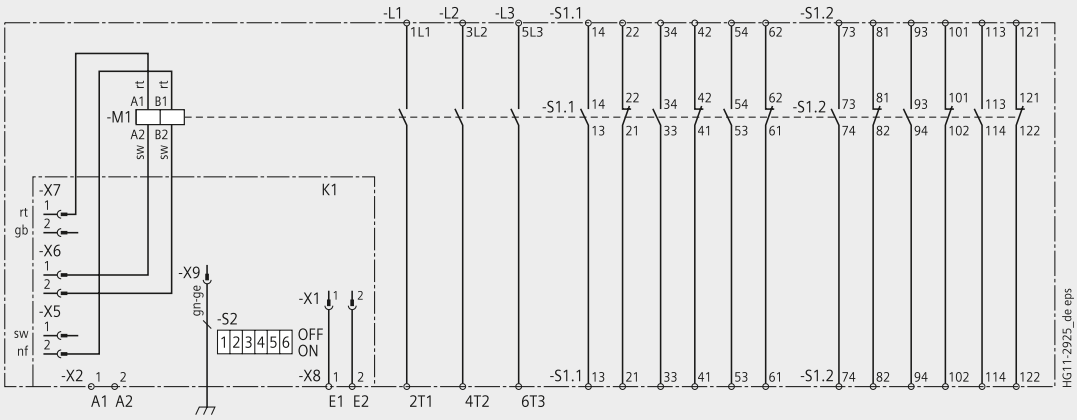
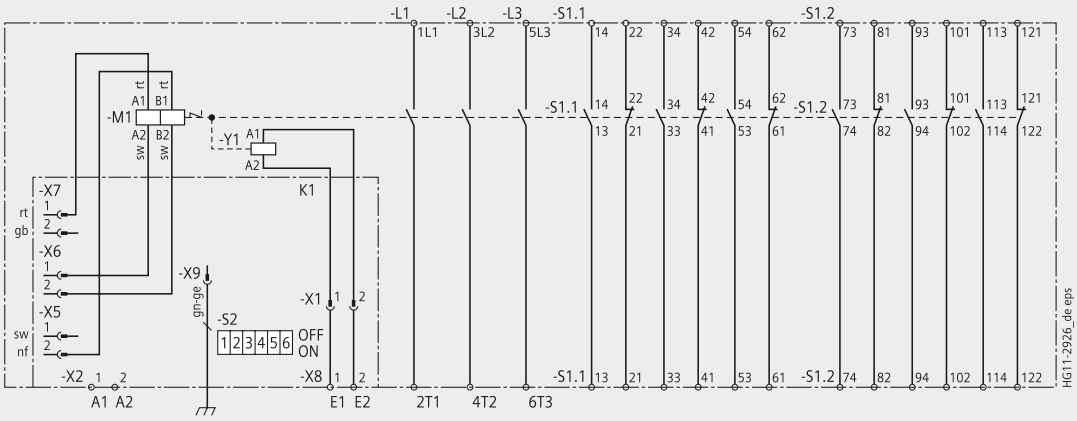


MLFB position					Switching delay		DIP switch -S2					
4	9	10	12	13	CLOSE	OPEN	1	2	3	4	5	6
3	H, J, Q, R	A, B	0	0	without	without	0	0	0	0	0	0
			0	2	without	65 ms	0	0	1	0	0	0
			0	3	without	115 ms	0	0	0	1	0	0
			0	5	without	170 ms	0	0	1	1	0	0
			1	0	50 ms	without	0	1	0	0	0	0
			1	2	50 ms	65 ms	0	1	1	0	0	0
			1	3	50 ms	115 ms	0	1	0	1	0	0
			1	5	50 ms	170 ms	0	1	1	1	0	0
							Vltg.	CLOSED	OPEN	OPEN	n. a.	Latch



MLFB position				Switching delay		DIP switch -S2					
4	9	10	12	CLOSE	OPEN	1	2	3	4	5	6
3	H, J, Q, R	E, F	0	without	without	0	0	0	0	0	1
			0	without	without	0	0	0	0	0	1
			0	without	without	0	0	0	0	0	1
			0	without	without	0	0	0	0	0	1
			1	50 ms	without	0	1	0	0	0	1
			1	50 ms	without	0	1	0	0	0	1
			1	50 ms	without	0	1	0	0	0	1
			1	50 ms	without	0	1	0	0	0	1
						Vltg.	CLOSED	OPEN	OPEN	n. a.	Latch

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S2	Coding switch for control voltage and switching delays
L1, L2, L3	Vacuum interrupters

Transport by truck, rail, airfreight or ship

Packing type	3TM		
	Number	Dimensions Length / width / height mm	Volume m^3
Cardboard box with wooden base	1	600 x 500 x 500	0.150
	2	920 x 640 x 780	0.459
	4 – 8	1120 x 820 x 1130	1.038

Packing weight	Number	Maximum weight kg
	1	35
	2	70
	3	105
	4	125
	5	150
	6	175
	7	200
	8	225

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R-HG11-1180.eps

Switchgear Factory Berlin, Germany

Contents Page

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You prefer to configure your 3TM vacuum contactor on your own?

Please follow the steps for configuration and enter the order number in the configuration aid.
Or use our online configurator on our homepage:

https://mall.industry.siemens.com/mall/en/en/Catalog/Configurators

Instruction for configuration of your 3TM vacuum contactor

1st step: Definition of the primary part

Please specify the following ratings:	Possible options:
Rated voltage (U_r)	U_r: 7.2 kV to 12 kV
Rated lightning impulse withstand voltage (U_p)	U_p: 60 kV to 75 kV
Rated short-duration power-frequency withstand voltage (U_d)	U_d: 20 kV to 75 kV
Rated operational current (I_e)	I_e: up to 450 A
Switching rate	Up to 1200 operating cycles/h
Mechanical endurance of the contactor	Up to 1 million operating cycles

2nd step: Definition of the equipment

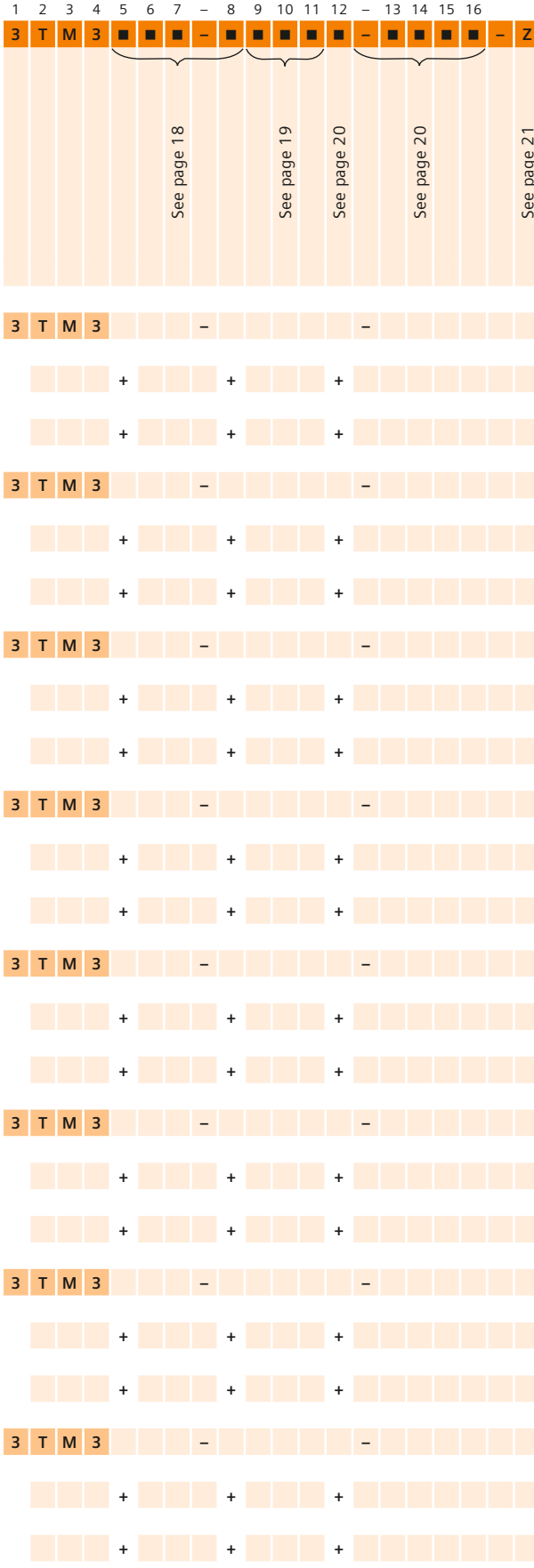
Please specify the following equipment features:	Possible options:
Number of auxiliary contacts	Up to 6 NO + 6 NC
Operating voltage of the magnet coil	Operating voltages from 48 V DC to 240 V AC
Operating voltage of the closing latch	Operating voltages from 24 V DC to 240 V AC
Site altitude	-1500 m below sea level to +5000 m above sea level

3rd step: Do you still have further requirements concerning the equipment?

Your Siemens sales partner will be pleased to support you.

Notes

For configuration of your
3TM vacuum contactors



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