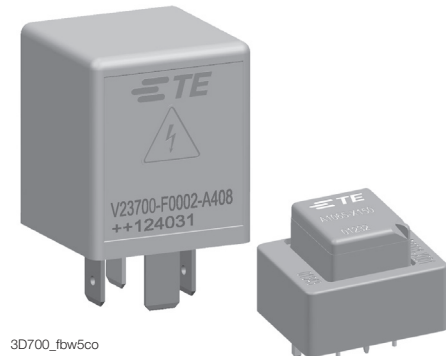


**Mini K HV Precharge Relays**

- Suitable for voltage levels up to 450VDC
- Precharge currents up to 20A
- Limiting break currents up to 20A
- Available with PCB and plug-in terminals

Typical applications

DC high voltage precharge applications in hybrid, full battery electric vehicles and fuel-cell cars.



Contact Data	
Contact arrangement	1 form X (NO DM)
Rated voltage	400VDC
Max. switching voltage <sup>1)</sup> / power	450VDC / 9kW
Limiting switching current <sup>2)</sup>	
normal operation	20A on/0A off: min. 10 <sup>5</sup> ops.
fault break operation <sup>3)</sup>	20A on/20A off: min. 10 ops. <sup>3)4)</sup>
Initial contact voltage drop at 10A	typ. 150mV, max. 300 mV
Operate time at nominal voltage	typ. 2.5ms
Release time <sup>5)</sup>	typ. 1ms
Mechanical endurance	>10 <sup>6</sup> ops.

- 1) Consult TE Connectivity for insulation compatibility with higher voltages.
  - 2) Load circuit: L/R <14µs.
  - 3) After 10 fault break operations relay must be replaced.
  - 4) Test conditions: on-time 100ms, off-time 10s.
  - 5) Valid for recommended 250Ω suppression resistor (PCB version).
- Note: A low resistive suppression device in parallel to the relay coil increases the release time and reduces the lifetime due to increased erosion and / or higher risk of contact tack welding.

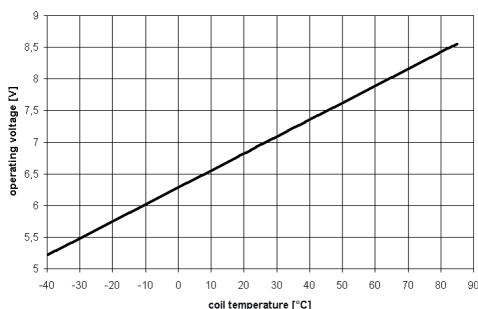
Coil Data	
Nominal voltage	12V
Min./Max. energization duration	max. 2s <sup>6)</sup>
Max. coil temperature	155°C

- 6) Max. continuous activation time is limited and depends on operating conditions. Please contact TE Connectivity for details.

Coil versions					
Coil code	Rated voltage VDC	Operate voltage VDC <sup>7)</sup>	Release voltage VDC <sup>7)</sup>	Coil resistance Ω±10%	Rated coil power W
001	12	6.9	1.2	50	2.9
002 <sup>8)</sup>	12	6.9	1.2	41.6	3.5

- 7) All values are given for coil without pre-energization, at ambient temperature +23°C.
- 8) Coil suppression resistor already included in the relay. No additional suppression component allowed.

Coil operating range



Insulation Data <sup>1)</sup>	
Initial dielectric strength	
between open contacts	2800 VDC/1mA
between contact and coil	2800 VDC/1mA
Insulation resistance after 10 fault break ops. (20A)	
between open contacts	>200MΩ
between contact and coil	>200MΩ
Max. altitude	4000m
Clearance / creepage	
acc. IEC60664-1 (2007) for	over voltage category I, pollution degree 2

Other Data	
EU RoHS/ELV compliance	compliant
Flammability of plastic material	acc. UL94-HB
Ambient temperature range	-40°C to +85°C
Climatic cycling with condensation	
EN ISO 6988	6 cycles, storage 8/16h
Temperature cycling (shock)	
IEC 60068-2-14, Na	10 cycles, -40/+85°C (5°C per min)
Damp heat constant	
IEC 60068-2-3, Ca	56 days, upper air temperature 40°C
Degree of protection PCB version	
IEC 61810	RT III – immersion cleanable
Corrosive gas	
IEC 60068-2-42	10 days
IEC 60068-2-43	10 days
Wide-band noise	
IEC 60068-2-64	10 to 1000Hz, 30.8 m/s <sup>2</sup> 9)
Shock resistance (functional)	
IEC 60068-2-27 (half sine)	11ms, 20g <sup>9)</sup>
Terminal type	PCB and plug-in/QC
Weight	
PCB version:	approx. 17g (0.6oz)
Plug-in version:	approx. 39g (1.4oz)
Solderability (aging 3: 4h/155°C) PCB version	
IEC 60068-2-20, Ta, method 1	hot dip 5s, 215°C
Resistance to soldering heat PCB version	
IEC 60068-2-20, Tb, method 1A	hot dip 10s, 260°C with thermal screen

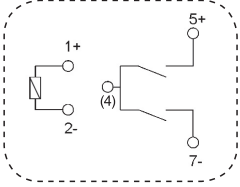
**Note:** Parameters given in <http://relays.te.com/definitions> for preheating and soldering must be observed.

- 9) No change in the switching state >10µs.
- 10) For general storage and processing recommendations please refer to our Application Notes and especially to Storage in the Definitions or at <http://relays.te.com/appnotes/>

**Mini K HV Precharge Relays** (Continued)

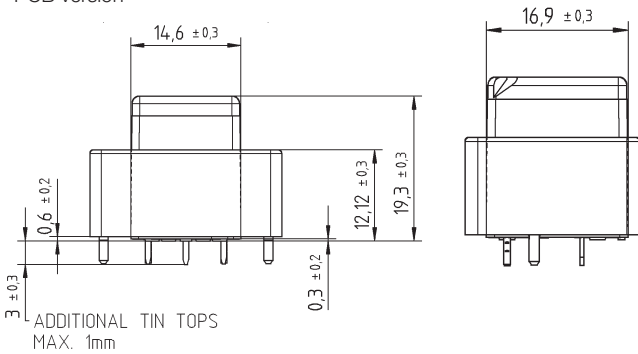
**Terminal Assignment**

1 form X (NO DM)  
PCB version

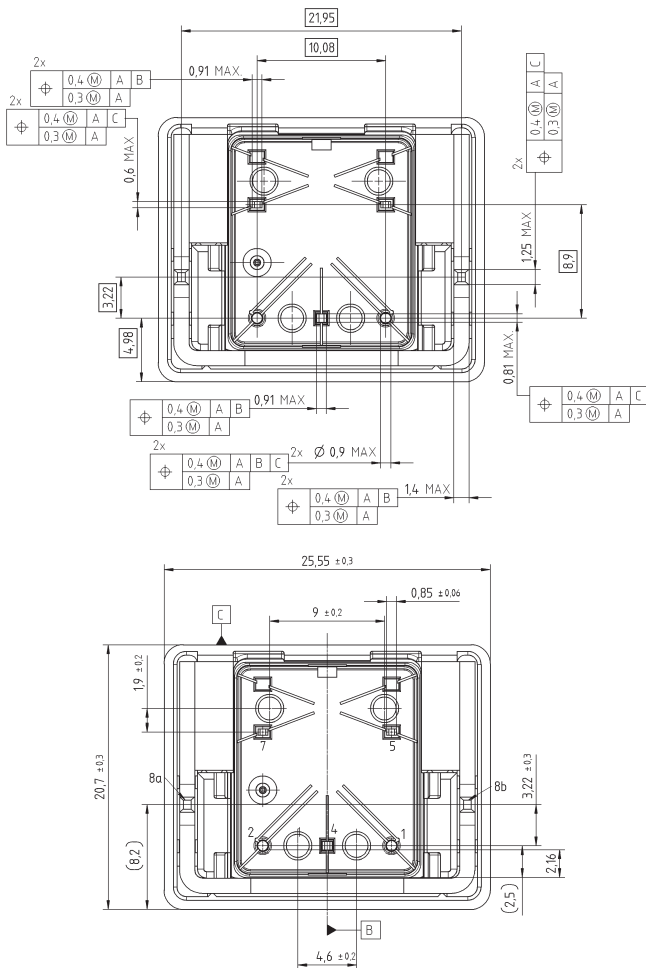


**Dimensions**

PCB version

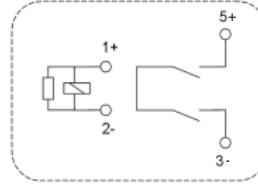


View of the Terminals (bottom view)



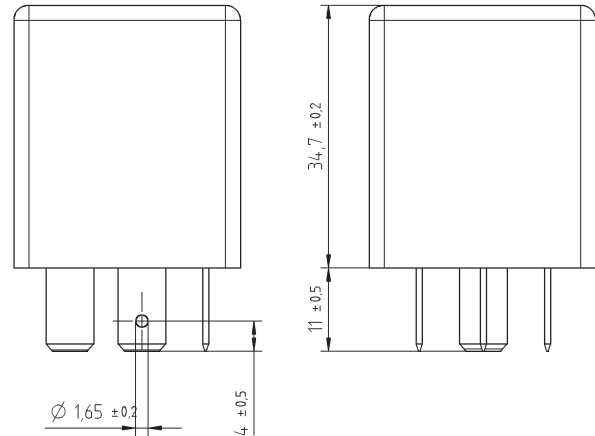
**Terminal Assignment**

1 form X (NO DM) with resistor  
Plug-in version

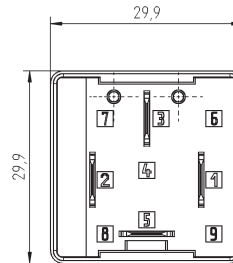


**Dimensions**

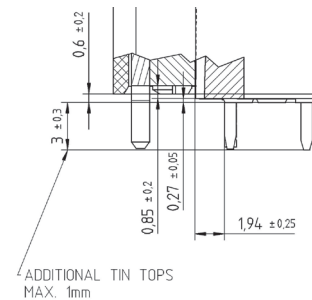
Plug-in version



View of the Terminals (bottom view)



**Detail PCB version: minimum clearance requirements (see note below)**



**Notes regarding PCB-layout and terminal assignment:**

- Pin 4 must not be electrically connected, no solder eye at that pin is allowed, only a drill-hole without via
- Potential assignment of pins:
  - pins 1; 2: low voltage (LV)
  - pins 5; 7; 4(\*): high voltage (HV)
  - pin 8a; 8b: no potential but internally connected
  - (\*) pin 4 is on HV potential in ON-state of relay only.

**Notes regarding clearance and creepage distances:**

- The required clearance and creepage distances between HV and LV potential must be ensured.
- Layout of the PCB has to ensure min. clearance and creepage distances of conducting relay parts and relay terminal 1 and conducting relay parts and terminal 2 respectively. Refer to detail drawing. Minimum distance to neighboring ferruginous parts: 3mm.

**Mini K HV Precharge Relays** (Continued)

**Product code structure**

Typical product code

**V23700 -C 0 001 -A 40 8**

**Type**

**V23700** Mini K HV

**Terminal and enclosure**

**C** PCB

**F**

Plug-in

**Design**

**0** Standard

**Coil**

**001** without parallel resistor

**002**

with parallel resistor

**Contact type**

**A** Standard

**Contact material**

**40** Silver based

**Contact arrangement**

**8** 1 form X (NO DM)

Product code	Terminal/Encl.	Design	Coil	Contact type	Contact mat.	Arrangement	Part number
V23700-C0001-A408	PCB, sealed	Standard	without parallel resistor	Standard	Silver based	1 form X (NO DM)	2-1904058-5
V23700-F0002-A408	Plug-in, QC		with parallel resistor				2-1904058-7