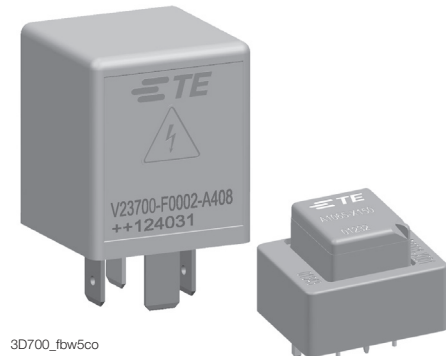


Mini K HV Precharge Relays

- 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 ¹⁾ / power	450VDC / 9kW
Limiting switching current ²⁾	
normal operation	20A on/0A off: min. 10 ⁵ ops.
fault break operation ³⁾	20A on/20A off: min. 10 ops. ³⁾⁴⁾
Initial contact voltage drop at 10A	typ. 150mV, max. 300 mV
Operate time at nominal voltage	typ. 2.5ms
Release time ⁵⁾	typ. 1ms
Mechanical endurance	>10 ⁶ 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.

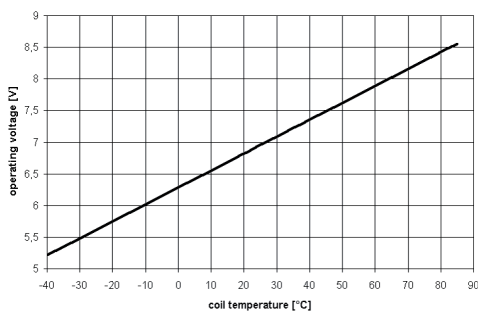
Coil Data	
Nominal voltage	12V
Min./Max. energization duration	max. 2s ⁶⁾
Max. coil temperature	155°C

- 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 ⁷⁾	Release voltage VDC ⁷⁾	Coil resistance Ω±10%	Rated coil power W
001	12	6.9	1.2	50	2.9
002 ⁸⁾	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 ¹⁾	
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 ² 9)
Shock resistance (functional)	
IEC 60068-2-27 (half sine)	11ms, 20g ⁹⁾
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.

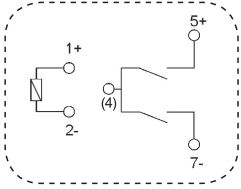
Sealing, IEC 60068-2-17 PCB version	Qc, method 2, 1min/70°C
Storage conditions	according IEC 60068 ¹⁰⁾

- 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)

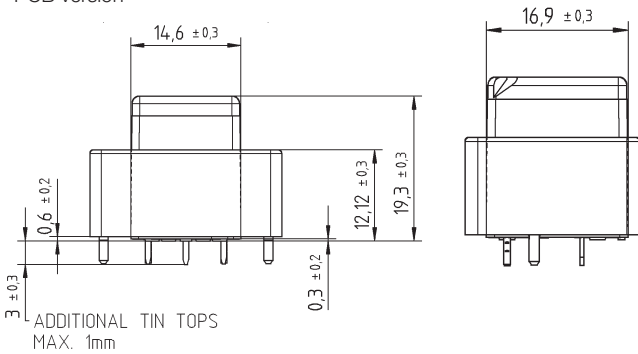
Terminal Assignment

1 form X (NO DM)
PCB version

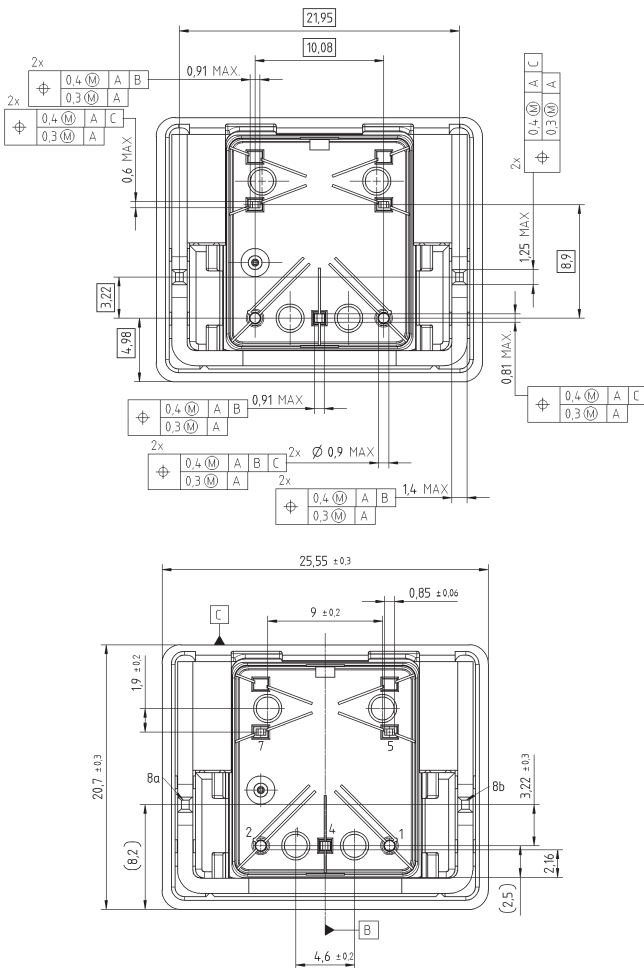


Dimensions

PCB version

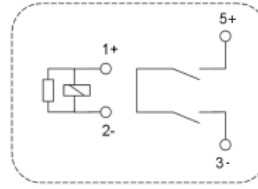


View of the Terminals (bottom view)



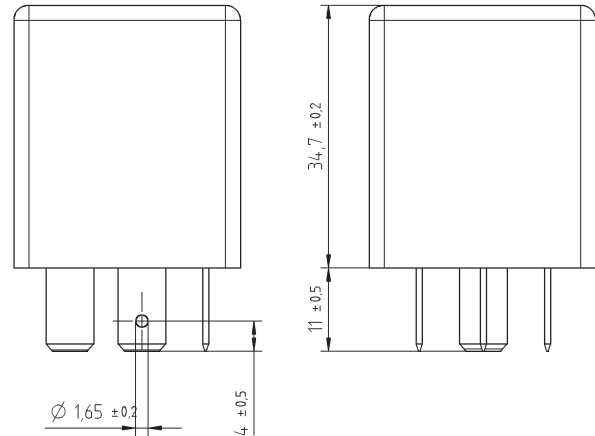
Terminal Assignment

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

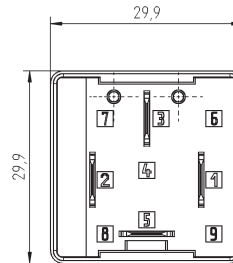


Dimensions

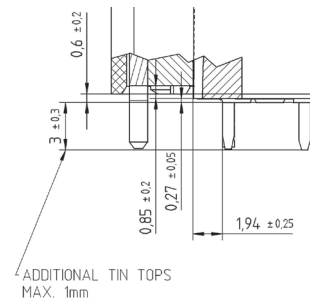
Plug-in version



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