High-voltage contactor

Gas-filled contactor for high-voltage DC-switching

Series/Type: **HVC200A series**

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Version: 06

EPCOS AG is a TDK Group Company.

Product description

The HVC series are specially designed to meet the requirements of high-voltage DC switching applications. The optimized hermetically sealed design exhibits excellent reliability performance against harsh environments. HVC series can be used in a wide range of applications.

Features

- Exceptional electrical and mechanical reliability
- Gas filled and hermetically sealed
- No EMI, no inrush-current phase at start-up
- No polarity of contact terminals
- RoHS compatible

Applications

- Battery charge/discharge systems
- Renewable energy storage systems
- DC high voltage/high current applications
- DC fast charging stations

Characteristics

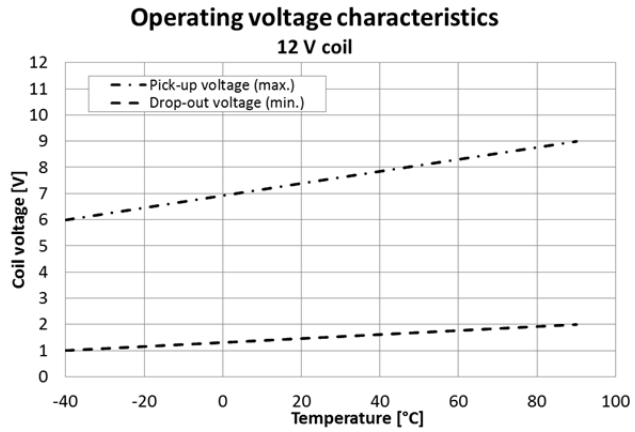
Height × width × depth	94 × 89 × 44		mm
Weight	~ 500		g
Contact material Contact arrangement Internal contact gap	Cu alloy 1A 3.0 (2 × 1.5)		 mm
Recommended connection cable cross section [a)]	> 50		mm²
Coil and auxiliary contact [b)] wires - length - cross section - material	 300 0.5 Cu		 mm mm^2
Auxiliary contact [b)] - voltage - current - resistance	min. 5 50 ---	max. 150 1000 150	 V mA mΩ
Vibration in xyz-axis - shock, 11 ms ½ sine, peak - vibration, sine 100 … 2000 Hz, peak - wideband random vibration, 10 ... 1000 Hz [c)]	 20 20 5		 g g $g_{eff.}$
Operation and storage [d)] - temperature - humidity - air pressure	 −40 ... +85 5 … 85 47 … 106		 °C % kPa
Climatic category (IEC 60068-1)	40/085/21		
Label, black positive	TDK **HVC200A-_ _ _** J_ _ _ 1234567890		 **[type name]** [internal code] [ser. no.]

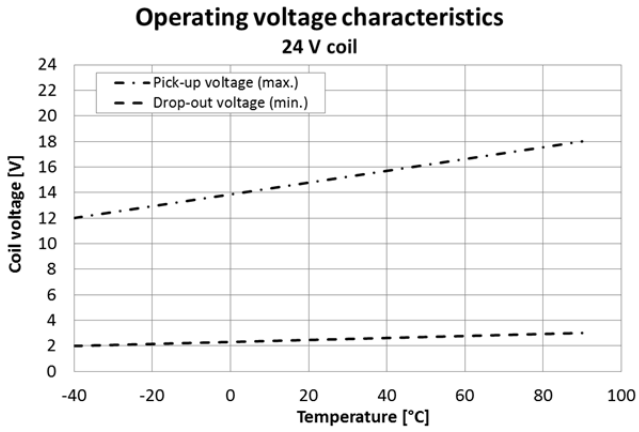
Notes

a) The diameter must be matched to actual current and operation temperature (see: Cautions and warnings, page 7).
b) Optional feature, refer page 6 for order information.
c) Acc. to IEC 60068-2-64
d) Freezing or condensing must be avoided.

Specification [1)]

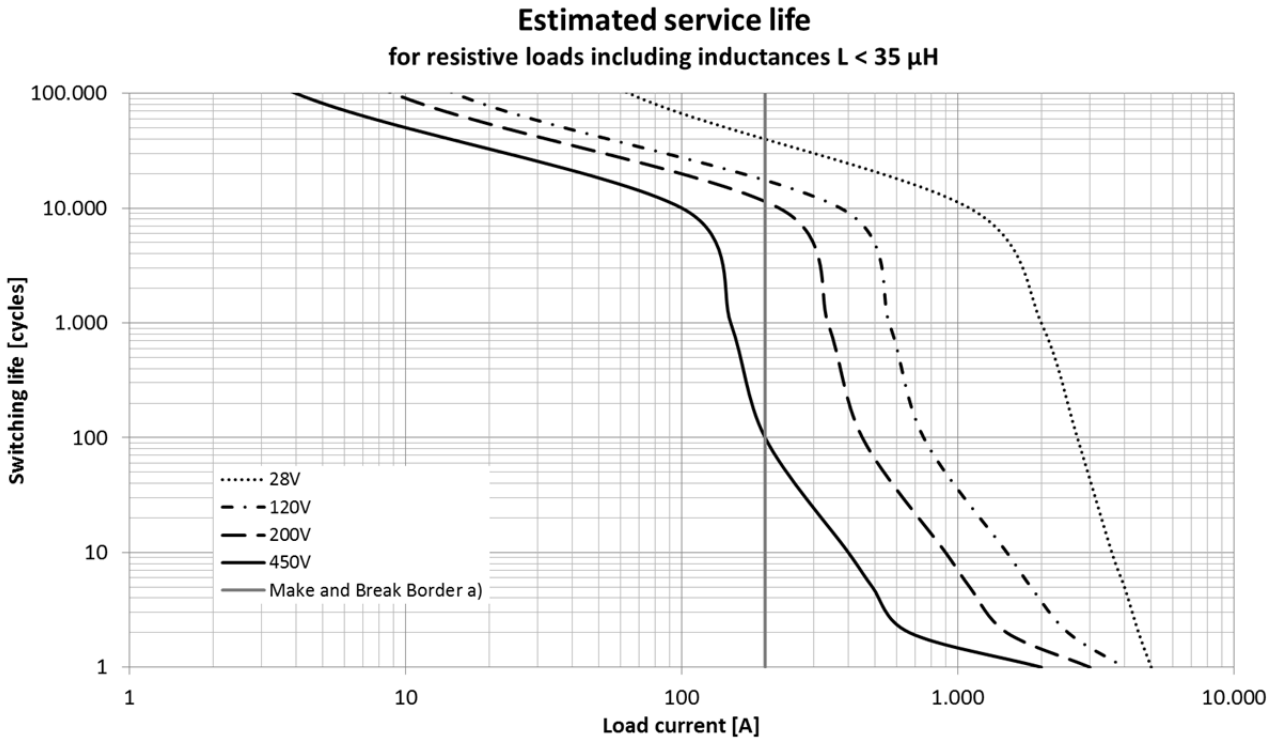
Contact			
Nominal operating voltage	12 … 450		V_{DC}
Nominal operating current	200		A
Temporary overcurrent (10 min)	300		A
Temporary overcurrent (1 min)	400		A
Mechanical life time	1 000 000		switchings
Minimum make and break current	1		A
Maximum cut-off current (1 operation) [2) 3)]	2000		A
Contact resistance typical (> 100 A)	< 0.4		mΩ
Insulation resistance at 500 V (initial) contact to contact / contact to coil	> 1		GΩ
Dielectric strength [4)] contact to contact / contact to coil	> 3800		V_{AC}
Operating time			
make	< 40		ms
break	< 20		ms
Coil [5) 6)]	12 V type	24 V type	
Rated voltage	12	24	V_{DC}
Operating voltage range	9 … 16	18… 32	V_{DC}
Pick-up voltage (max.)	9	18	V_{DC}
Drop-out voltage (min.)	1	2	V_{DC}
Power [7)]	6	6	W
Nominal operating current [7)]	500	250	mA
Minimum holding current	160	80	mA



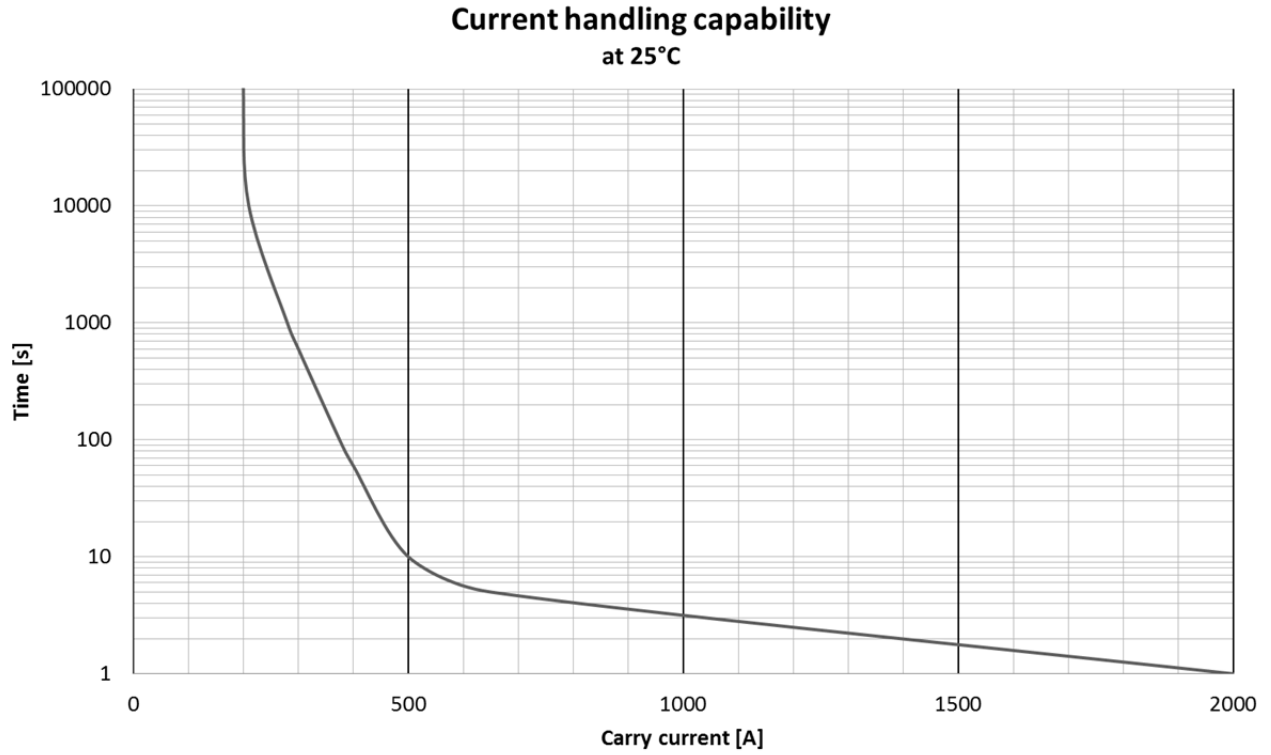


Notes:
1) Specified according to JIS C 5442 (temperature 15 °C to 35 °C, humidity 25% to 85% RH).
2) Tested at 450 V for resistive loads including inductance L < 35 µH.
3) End of life is reached when dielectric strength is < 50 MΩ @ 500 V.
No fire and no explosion will occur after this break. Afterwards, the dielectric strength and insulation resistance may not meet initial data sheet specification.
4) Detection limit 10 mA
5) Ambient temperature at 25 °C.
6) Selectable feature, refer page 7 for order information.
7) Tolerance ±10%

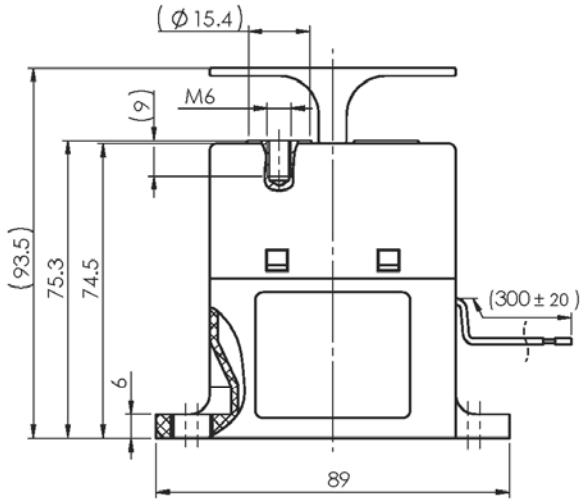
Characteristic diagrams

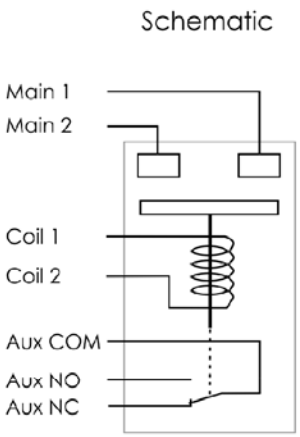


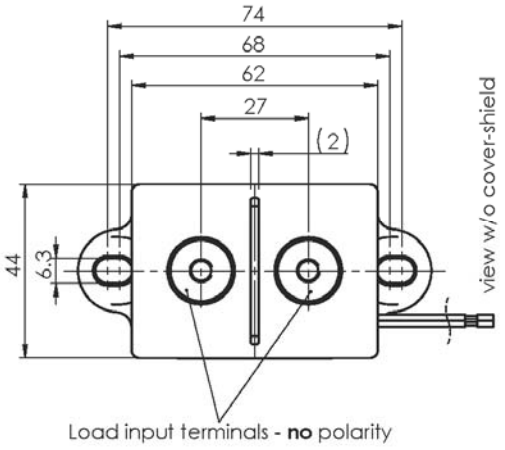
a) Below border make and break operation is permitted. Above break only is permitted.

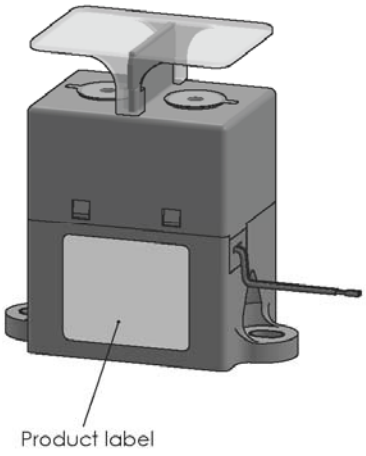


Dimensional drawings in mm









General tolerances:

less than 10:	± 0.3
10 ... 50:	± 0.6
more than 50:	± 1

Note:
Before use, remove protective foil from main contact

Tightening torque of main contacts:
6 ... 8 Nm for M6 screw

The cover over the main contacts is optional. It can be removed and reapplied if needed.

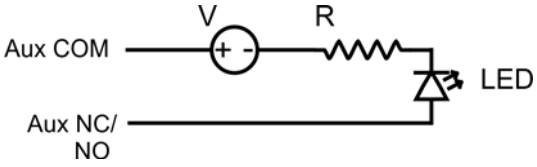
Connection name	Marking
Main 1 terminal	none
Main 2 terminal	none
Coil 1 wire	red
Coil 2 wire	black
Auxiliary contact COM wire (common)	white
Auxiliary contact NC wire (normally closed)	green
Auxiliary contact NO wire (normally open)	blue
Notes: Auxiliary contacts “blue” and “white” are normally open. When the contacts are short and the coil voltage is “0 V”, the part is stuck.	

Type overview

Type names	Ordering codes	Unit per package	Options
HVC200A-12	B88269X1000C011 B88269X1000C101	1 10	12 V coil
HVC200A-24	B88269X1010C011 B88269X1010C101	1 10	24 V coil
HVC200A-12S	B88269X….C011 B88269X….C101	1 10	12 V coil with stuck detection
HVC200A-24S	B88269X….C011 B88269X….C101	1 10	24 V coil with stuck detection

Stuck detection

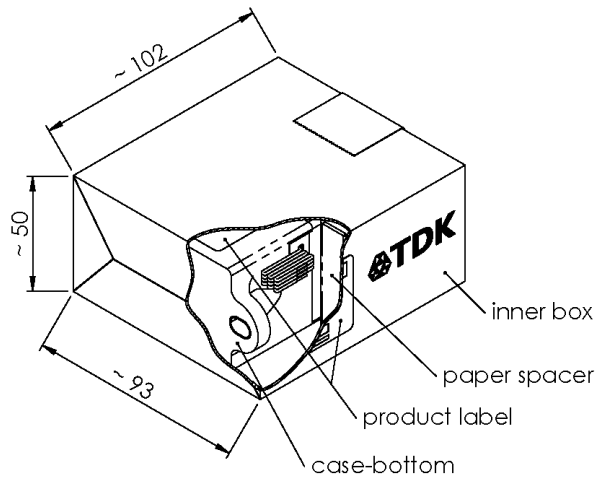
Example circuit for stuck detection using auxiliary contacts:



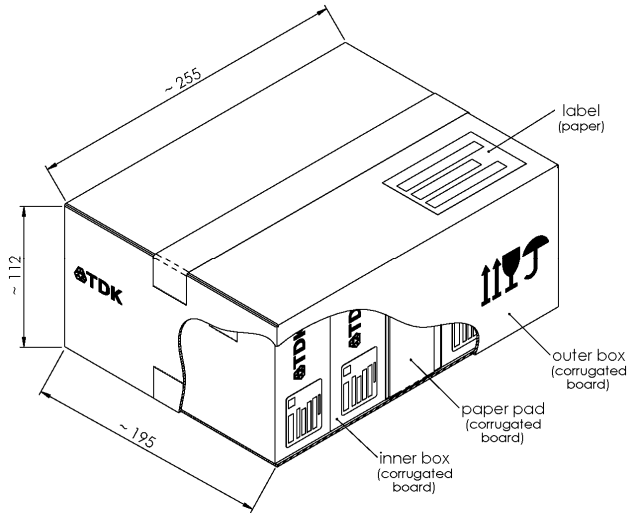
In case the contactor is stuck, the Aux COM and Aux NO wires will be short, hence the circuit is closed and the LED will be on. The AUX COM and AUX NC wires will be have the opposite way: the LED will be off when the contactor is stuck.

Packing units

1 pc. in cardboard box (C011)



10 pcs. in cardboard box (C101)



Cautions and warnings

- Contactors radiate magnetic and electromagnetic fields. Please ensure that other components mounted in close proximity are not affected.
- The lifecycle of the contactor can be influenced by strong magnetic fields. Please ensure that magnetic field sources in close proximity are avoided.
- The contactor shall be mounted in that way, that the contact face side is perpendicular to the direction of the main shock-axis. If this cannot be avoided, the contactor shall be mounted upright standing.
- In order to ensure safe operation the voltage at the connection terminals of the contactor shall not exceed the nominal operating voltage by 10% in the event of a break under load.
- For continuous high current operation it has to be assured by selecting appropriate connection cable cross section or active cooling, that the connection terminals will not reach temperatures higher than 120 °C.
- The coil contacts need to be protected from overvoltage occurring during switch-off. Preferable a varistor has to be installed in parallel. It has to be considered that the overvoltage protection device which is used in parallel to the coil has an influence to the break time. It is recommended to use EPCOS S10K50 varistor (or equivalent).
- The leads to the contactor have to be securely tightened to the terminals (check torque force limits in datasheet). Otherwise current stress may lead to the formation of sparks and heating.
- The contactor shall not be operated without any load. Otherwise the contact resistance may increase.
- Contactor may become hot in case of longer periods of over-current stress (danger of burning).
- Contactors may be used only within their specified values. In case of overload, the component may be destroyed.
- Contactors must be handled with care and must not be dropped.
- Damaged contactors must not be re-used.
- For successful pick-up, the voltage cannot be ramped up slowly. The voltage needs to be applied instantly to at least the maximum pick-up voltage.
- The cover over the main contacts is optional. It can be snapped in after successful attachment of wires or bus bars to the main contacts to prevent accidental touching during assembly or maintenance. The cover can be removed and reapplied.

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