

# High-voltage contactor

Gas-filled contactor for high-voltage DC switching

<b>Series/Type:</b>	<b>HVC500B-12S</b>
<b>Ordering code:</b>	<b>B88269X1190C011</b>
<b>Date:</b>	<b>2018-01-29</b>
<b>Version:</b>	<b>03</b>

### Product description

The HVC series has been especially 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

- 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

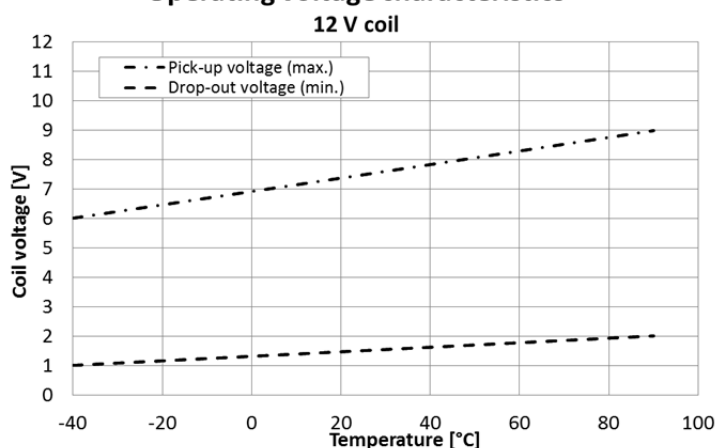
Height × width × depth	94 × 89 × 44	mm
Weight	~ 500	g
Inner contact material	Cu alloy	
Contact arrangement	1A	
Internal contact gap (full disconnection)	3.0 (2 × 1.5)	mm
Recommended connection cable cross section <sup>a)</sup>	> 200	mm <sup>2</sup>
Coil wires		
- length	300	mm
- cross section	0.5	mm <sup>2</sup>
- material	Cu	
Auxiliary contact		
- max. voltage	150	V
- max. current	1000	mA
- max. resistance	150	mΩ
- cross section	0.25	mm <sup>2</sup>
Vibration in closed state, xyz-axis		
- shock, 11 ms ½ sine, peak	20	g
- vibration, sine 100 ... 2000 Hz, peak	20	g
- wideband random vibration, 10 ... 1000 Hz <sup>b)</sup>	5	g <sub>eff</sub>
Operation and storage <sup>c)</sup>		
- temperature	-40 ... +85	°C
- humidity	5 ... 85	%
- air pressure	69 ... 106	kPa
Climatic category (IEC 60068-1)	40/085/21	
Label, black positive	<div><div></div><div><div>HVC500B-12S</div><div>B88269X1190C 11</div><div>1234567890 J</div><div></div><div>Designed in Germany   Made in Malaysia</div></div></div>	<div>[type name]</div> <div>[ordering code]</div> <div>[ser.no.] [internal code]</div> <div>[certifications]</div>
Certifications	UL 60947-4-1 (E491412)	

#### Notes

- <sup>a)</sup> The diameter must be matched to actual current and operation temperature (see: Cautions and warnings, page 7).  
<sup>b)</sup> Acc. to IEC 60068-2-64  
<sup>c)</sup> Freezing or condensing must be avoided.

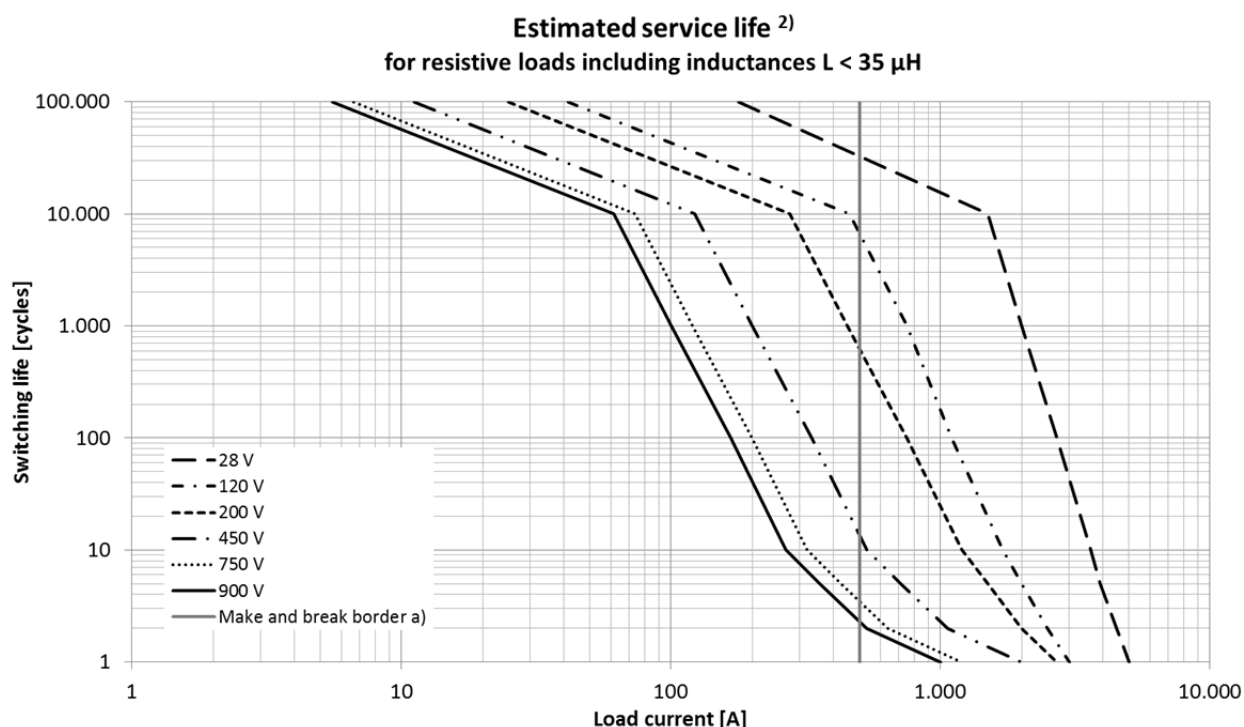
**Specification**

<b>Contact</b>		
Maximum operating voltage	900	$V_{DC}$
Continuous operating current	500	A
Temporary overcurrent (10 min)	600	A
Temporary overcurrent (1 min)	750	A
Mechanical life time <sup>1)</sup>	1 000 000	switchings
Minimum make and break current	1	A
Maximum cut-off current (1 operation) <sup>2) 3) 4)</sup>	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 contact to contact / contact to coil <sup>5)</sup>	> 3800	$V_{AC}$
Operating time		
make	< 35	ms
break	< 15	ms
<b>Coil</b>		
Nominal voltage	12	$V_{DC}$
Operating voltage range	9 ... 16	$V_{DC}$
Pick-up voltage (max.)	9	$V_{DC}$
Drop-out voltage (min.)	1	$V_{DC}$
Power at nominal voltage <sup>6)</sup>	6	W
Resistance	24	Ω
Minimum holding current	160	mA

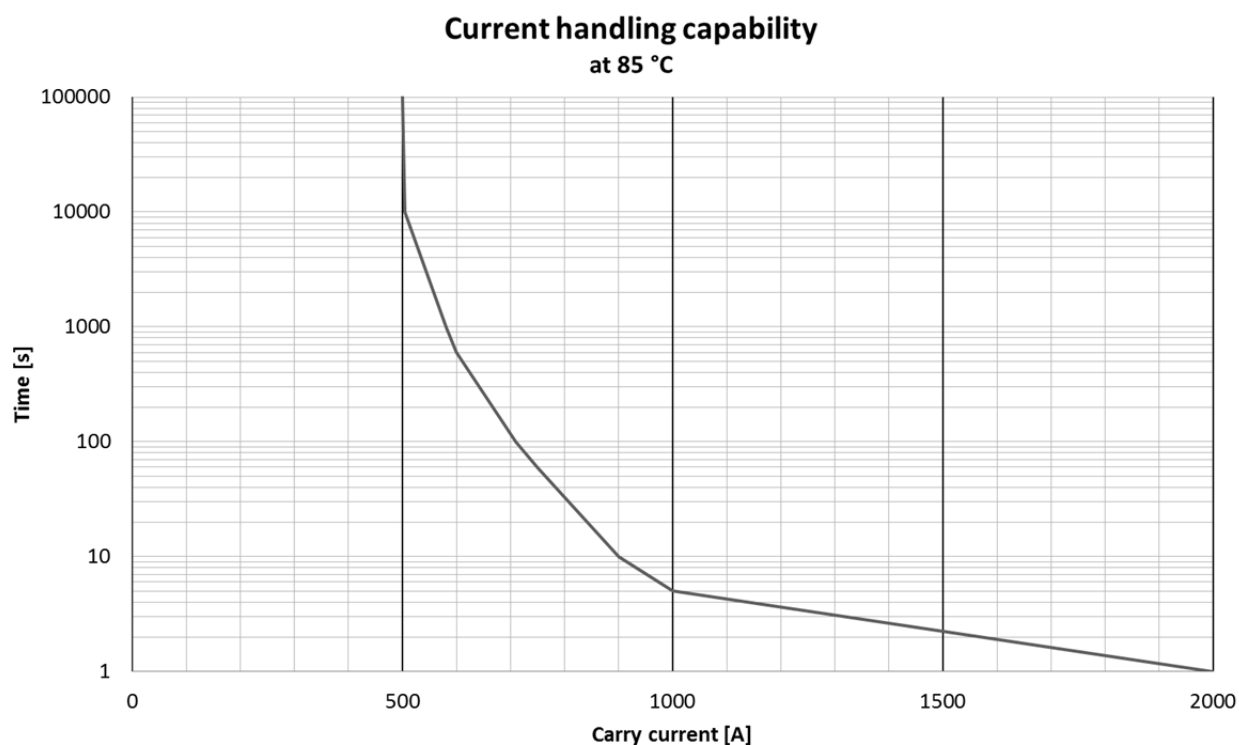
**Operating voltage characteristics**

**Notes:**

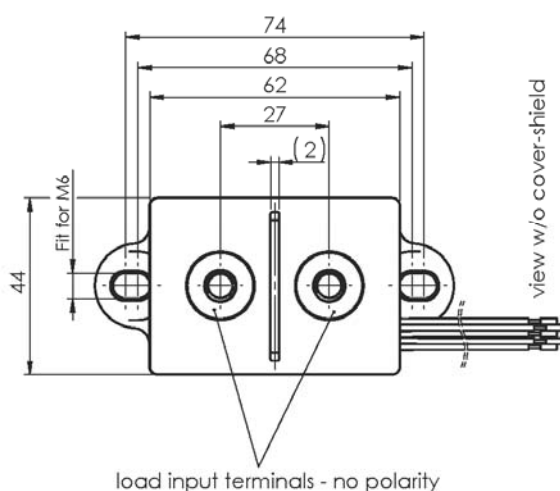
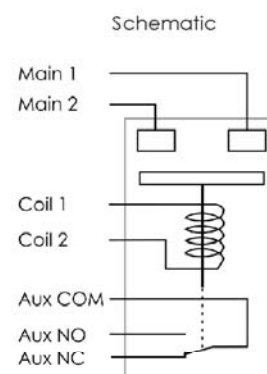
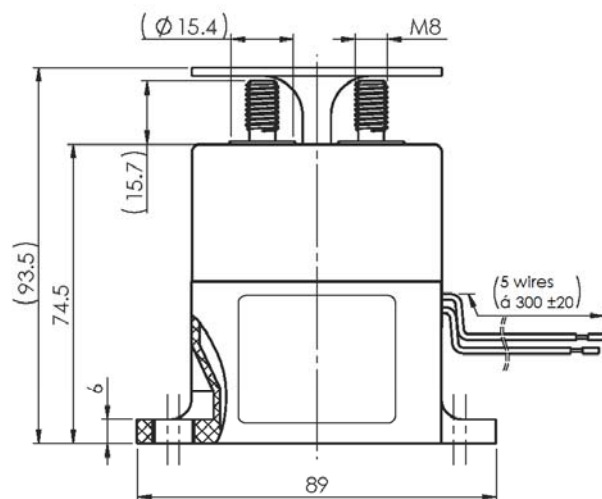
- <sup>1)</sup> Duty cycle 50%, cycle duration 1 s, value represents B10 life time acc. to Weibull analysis.
- <sup>2)</sup> Specified according to JIS C 5442 (temperature 15 °C to 35 °C, humidity 25% to 85% RH).
- <sup>3)</sup> Tested at 450 V for resistive loads including inductance  $L < 35 \mu H$ .  
End of life is reached when insulation resistance is  $< 50 M\Omega$  at 500 V.
- <sup>4)</sup> No fire and no explosion will occur after this break. Afterwards, the dielectric strength and insulation resistance may not meet initial data sheet specification.
- <sup>5)</sup> Detection limit 10 mA
- <sup>6)</sup> Tolerance  $\pm 10\%$

## Characteristics

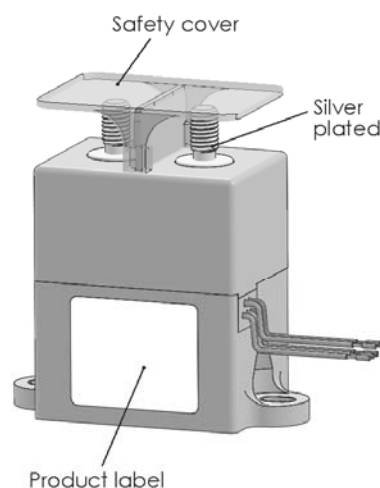


a) Below border make and break operation is permitted, duty cycle 10%, 10 s cycle duration.  
Above break only is permitted, duty cycle 1%, 600 s cycle duration.



**Dimensional drawings in mm**


view w/o cover-shield



General tolerances:  
 less than 10 :  $\pm 0.3$   
 10 ... 50 :  $\pm 0.6$   
 more than 50 :  $\pm 1$

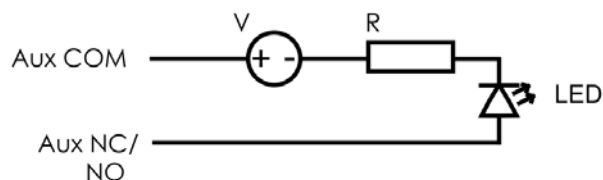
Note:  
 Tightening torque of main contacts:  
 6 ... 8 Nm for M8 nut

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.	

### Stuck detection

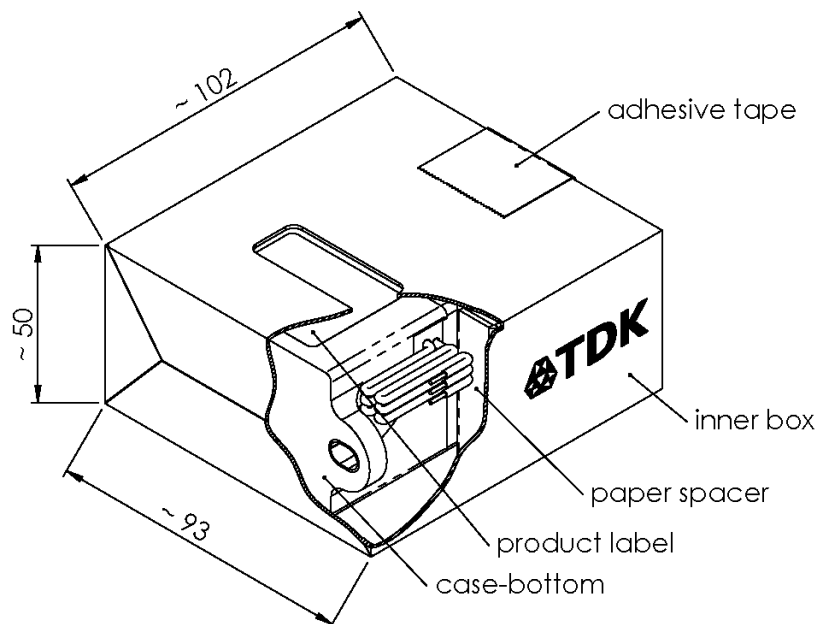
Example circuit for stuck detection using auxiliary contacts:



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 unit

**B88269X1190C 11** = 1 pc. in cardboard box



### Cautions and warnings

- Contactors radiate magnetic and electromagnetic fields. Please ensure that other components mounted in close proximity are not affected.
- The operating life of the contactor can be affected by strong magnetic fields. Please ensure that there are no magnetic field sources in close proximity.
- The contactor must be mounted so that the contact face side is perpendicular to the direction of the main shock-axis. If this is not possible, the contactor must be mounted upright.
- In order to ensure safe operation, the voltage at the connection terminals of the contactor must not exceed the nominal operating voltage by more than 10% in the event of a break under load.
- For continuous high current operation make sure that the connection terminals will not exceed temperatures of 120 °C by selecting an appropriate connection cable cross section or active cooling.
- The coil contacts need to be protected from overvoltage when switching off. Preferably a varistor should be installed in parallel. The overvoltage protection device which is used in parallel to the coil has an influence on the break time. Use of the EPCOS S10K50 varistor (or equivalent) is recommended.
- The leads to the contactor must be securely tightened to the terminals (check torque specification in data sheet), otherwise current stress may generate sparks and heating.
- The contactor must not be operated without any load, as this may increase the contact resistance.
- Contactors may become hot during extended periods of current overload (burn hazard).
- Contactors may be used only within their specified values. Overloading the contactor may destroy the component.
- 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 place after attaching wires or bus bars to the main contacts to prevent accidental touching during assembly or maintenance. The cover can be removed and reinserted.

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