

# HIGH VOLTAGE DC CONTACTORS

## ECPN500B SERIES

UP TO 500AMP

### INTRODUCTION

TE Connectivity (TE)'s ECPN500B series high-voltage DC contactor is designed for control in high voltage environments like battery energy storage systems, solar inverters, and EV charging applications. It can be used in 1500 VDC voltage systems, and the enhanced insulation distance meets the requirement of UL60947-4-1 & IEC60947-4-1 standards. The contacts provided in this series allow bi-directional load and are hermetically sealed with ceramic sealing technology, making them safer and more reliable.



### FEATURES

- Strong short circuit current endurance up to 15KA
- Hermetically sealed with ceramic technology
- Continuous current carrying capacity of upto 500 A
- Enhanced breaking capacity up to 1500 VDC at 2000 A
- Allows bi-directional load
- Dual coil design requiring 5.0W holding power
- Equipped with auxiliary contact
- Compatibility with DC-1 utilization category in IEC60947-4-1

### APPLICATIONS

ECPN500B series contactors can be used for multiple applications including some of the below highlighted

- Battery energy storage systems
- Photovoltaic inverters
- Power conversion system
- Megawatt EV DC charger

### APPROVALS

UL, TUV, CE, CCC



**Note:** Technical data of approved types on request

# High Voltage DC Contactors ECPN500B Series

## MAIN CONTACT DATA

Contact current	500 A
Maximum switching voltage	1500 VDC
Maximum breaking capacity	1500 VDC, 2000A, 1 cycle 1500 VDC, 1000A, 3 cycles
Contact arrangement	1 Form X (SPST-NO-DM)
Initial contact resistance	$\leq 0.2$ mOhm (500 A, after 1 minute)
Operate time maximum (at 23°C)	50 ms
Release time, maximum (at 23°C)	20 ms
Mechanical life	200,000 cycles

## CONTACT RATINGS

Load	Cycles
100A, 1500Vdc, resistive, make/break	8000
250A, 1500Vdc, resistive, make/break	1300
350A, 1500Vdc, resistive, break only, 85°C	650
500A, 1500Vdc, resistive, break only, 85°C	250
350A, 1000Vdc, resistive, break only	1500

### NOTE:

- Only typical rating listed, please refer to make/break curves in next page for more details at different current and voltage.
- Rating under room temperature if not specific mentioned.

## CE DECLARATION (IEC60947-4-1)

Rated Operational Current	Rated Operational Voltage	Utilization Category	Switching Cycles
60 A	1500 VDC	DC-1	6,050

## AUXILIARY CONTACT DATA

Contact Form	1 Form A (SPST-NO)
Contact Current, Max.	2A, 24 VDC
Contact Current, Min.	10mA, 12 VDC

## COIL VERSIONS, DC COIL

Coil Code	Nominal Voltage	Operate Voltage	Release Voltage	Maximum Operate Voltage	Coil Power
A	12 VDC	$\leq 9$ VDC	$\geq 1.2$ VDC	16 VDC	Start: 50 W Hold: 5 W
B	24 VDC	$\leq 18$ VDC	$\geq 2.4$ VDC	32 VDC	Start: 50 W Hold: 5 W

All figures are given for coil without pre-energization, at ambient temperature +23°C, and the coil will be automatically switched to 5W hold status after about 200ms energization with coil power 50W.

## INSULATION DATA

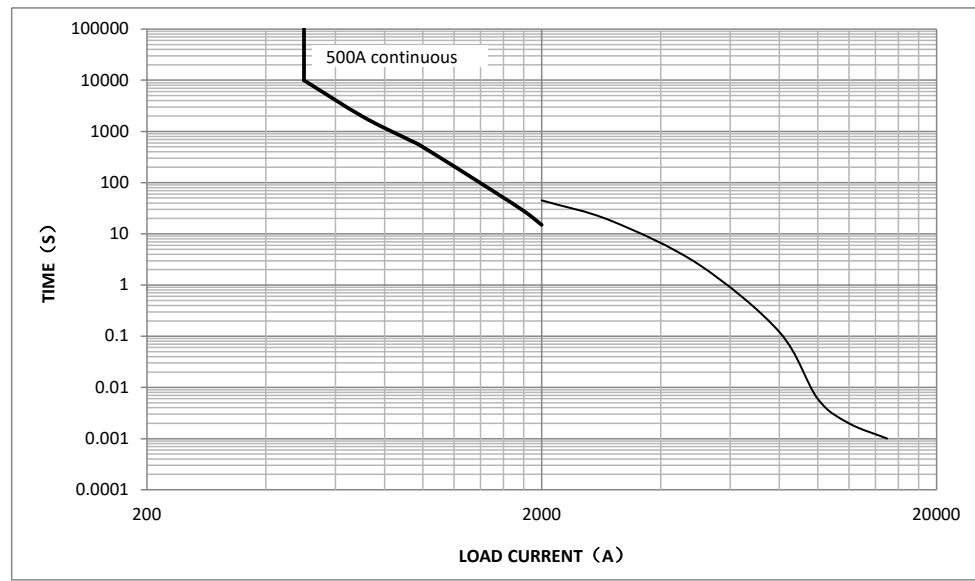
Dielectric Withstand Voltage (leakage current <1mA)	
Between open main contacts	5,400 V <sub>rms</sub>
Between main contact and coil	5,400 V <sub>rms</sub>
Between main contacts and aux contacts	5,400 V <sub>rms</sub>
Between open aux contacts	750 V <sub>rms</sub>
Initial Insulation Resistance @ 1000 VDC	
Between insulated elements	$> 1 \times 10^9 \Omega$

## OTHER DATA

Material compliance	EU RoHS/ELV, China RoHS, REACH, Halogen content refer to the Product Compliance Support Center at <a href="http://www.te.com/customersupport/rohssupportcenter">www.te.com/customersupport/rohssupportcenter</a>
Ambient temperature	-40 °C to 85 °C
Vibration resistance (functional)	Sine, 10-2000Hz, 5G
Shock resistance (functional)	11ms 1/2 Sine, Peak 20G
Terminal type	Screw for contact, wire for coil
Weight	~1135g for female thread version ~1155g for male thread version
Packaging/unit	box/9 pcs.

# High Voltage DC Contactors ECPN500B Series

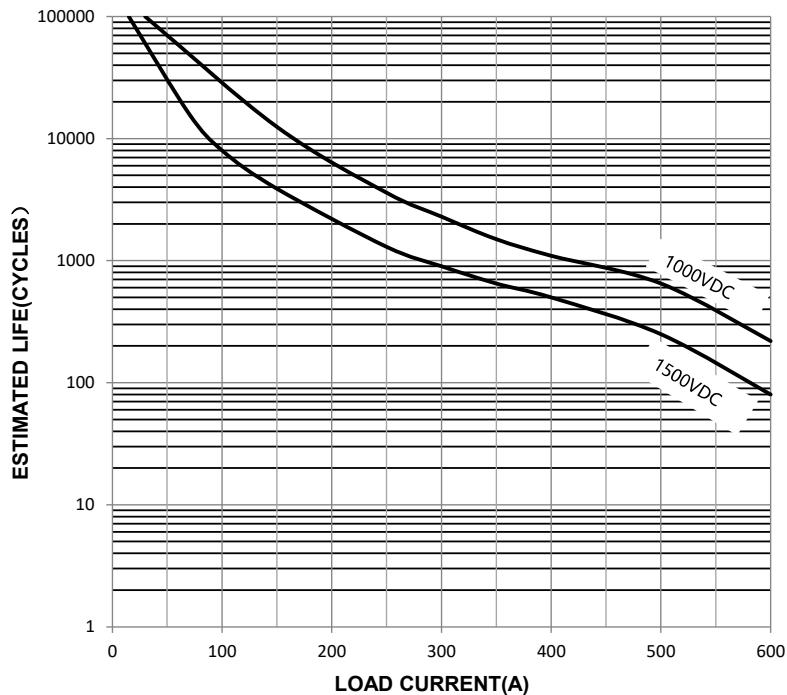
## CURRENT CARRY CAPABILITY CURVE



### NOTE

- Overload current carry endurance. The data is measured at the environment temperature 85°C with cross section area of wire 2\*150mm<sup>2</sup> min.
- Short circuit current endurance The data is measured at the environment temperature 23°C with cross section area of wire 2\*150mm<sup>2</sup> min. Over 2000A load, the judgement criteria of the above reference data is no burning and no explosion.

## ESTIMATED MAKE & BREAK POWER SWITCHING RATINGS



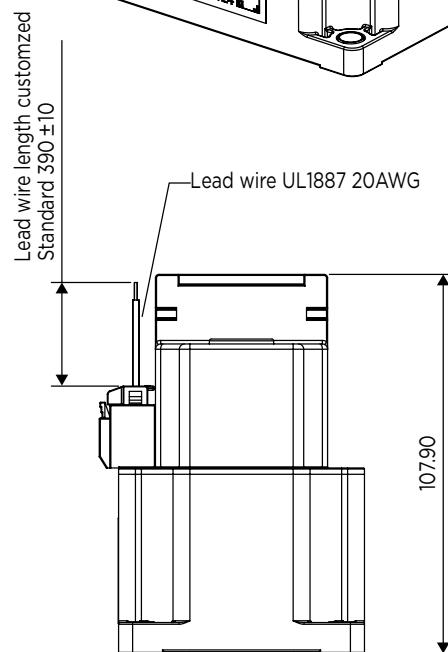
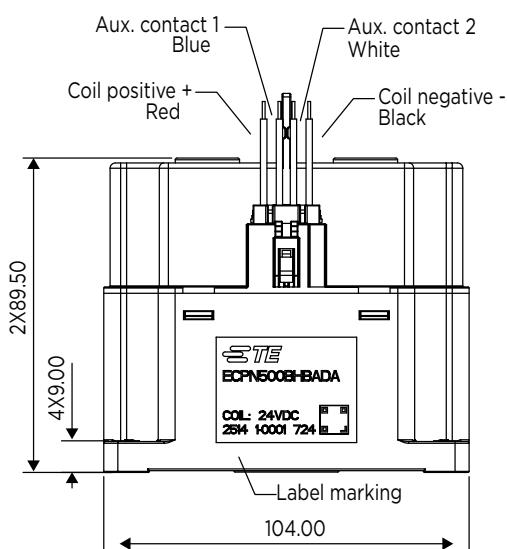
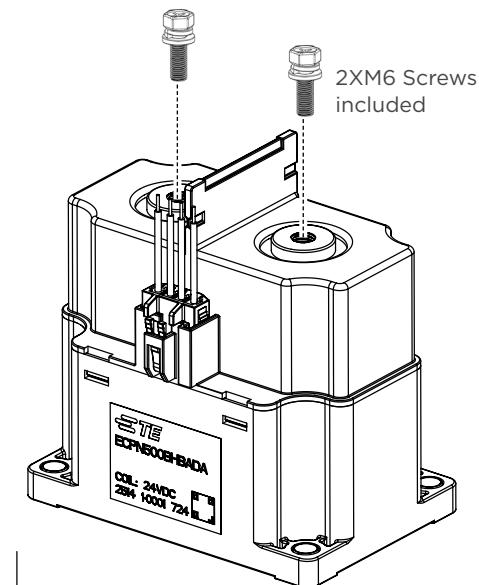
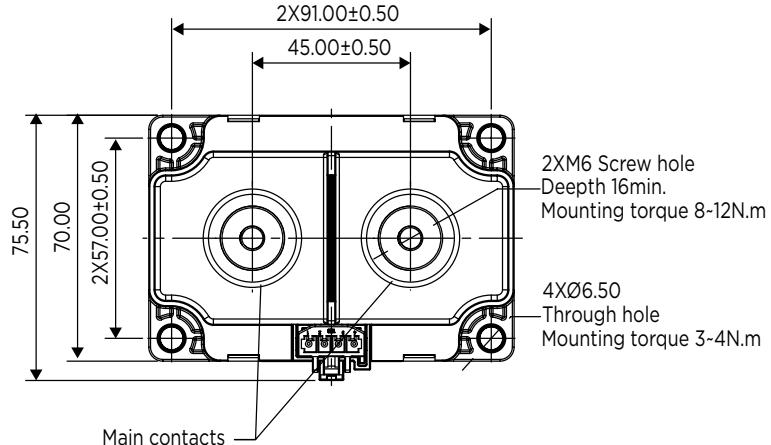
### Notes:

1. The curve was created based on extrapolated data with few typical points, users are recommended to confirm performance in actual application.
2. The typical data were estimated with resistive load, less than 250A were estimated under make and break, 1s on/9s off, over 250A were estimated under break only, 1s on/30-60s off based on IEC60947-4-1 recommendation according to related current level.

# High Voltage DC Contactors ECPN500B Series

## DIMENSIONS (Unit:mm)

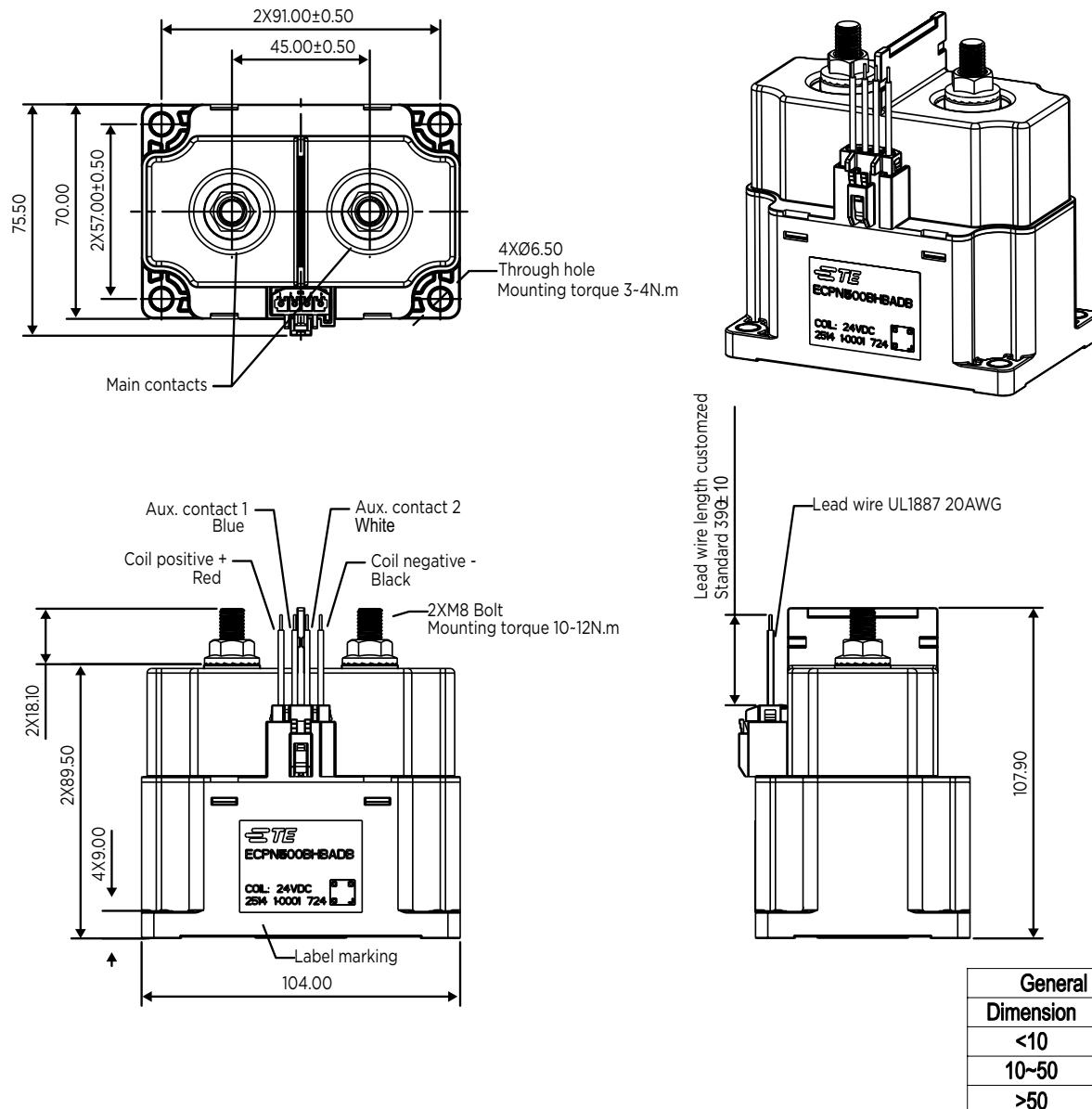
### FEMALE THREAD VERSION



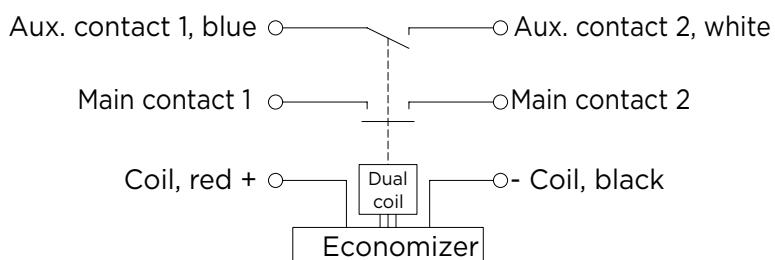
General tolerance	
Dimension	Tolerance
<10	±0.4
10~50	±0.8
>50	±1.2

# High Voltage DC Contactors ECPN500B Series

## MALE THREAD VERSION

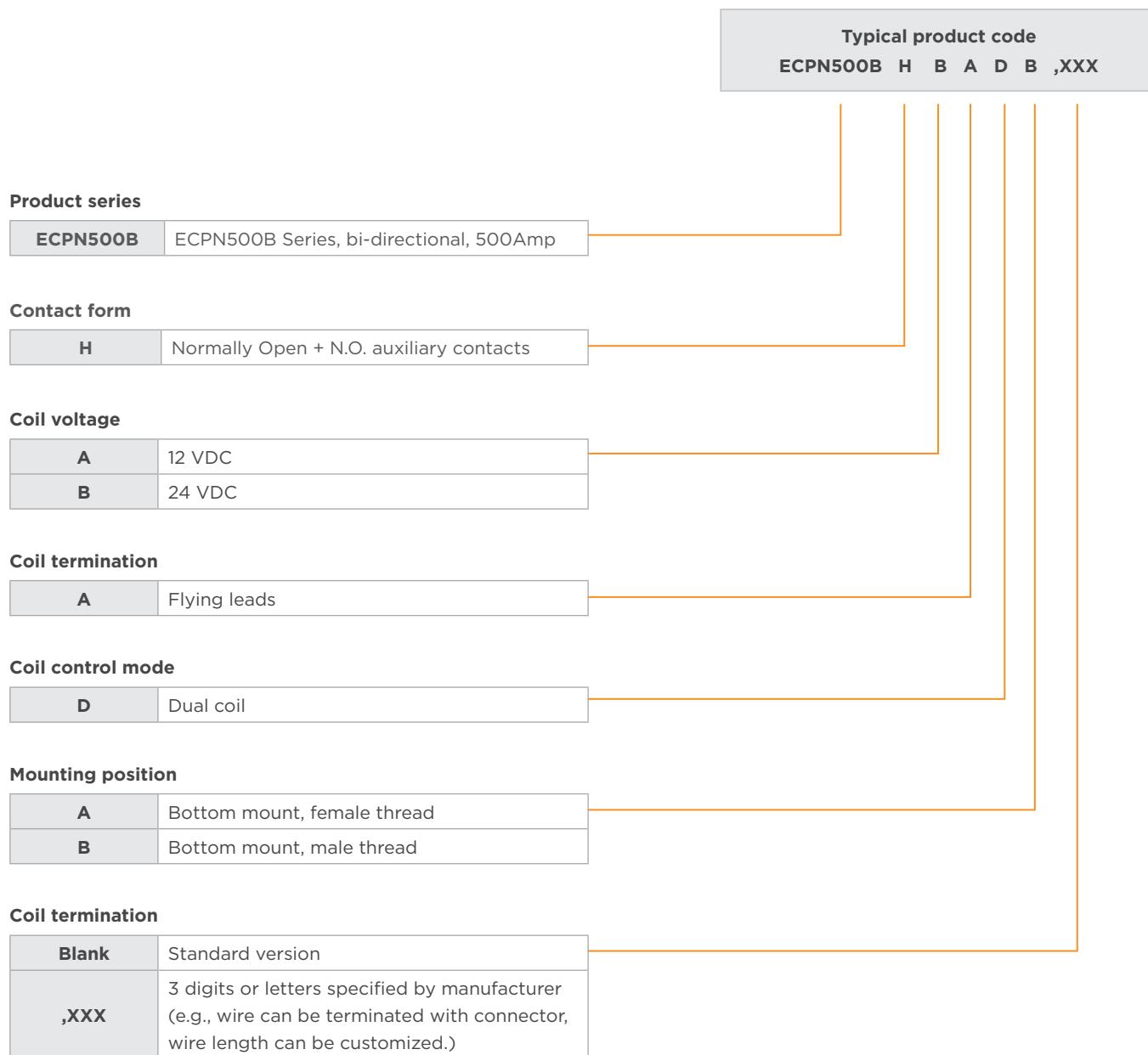


## CIRCUIT DIAGRAM



# High Voltage DC Contactors ECPN500B Series

## PRODUCT CODE STRUCTURE



## PRODUCT INFORMATION

Product code	Contact Form	Mounting Position	Coil	Coil Control Mode	Part Number
ECPN500BHAADA	Normally open, with auxiliary contacts (N.O.)	Bottom mount, female thread	12 VDC	Dual coil	1-2071630-1
ECPN500BHBADA			24 VDC		1-2071630-2
ECPN500BHAADB			12 VDC		2-2071630-1
ECPN500BHBADB			24 VDC		2-2071630-2

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## CAUTIONS

1. Do not use the contactor when contactor is dropped or broken.
2. Avoid mounting the contactor main contact terminals in downward direction, otherwise the contactor performance will not be achieved.
3. There is no polarity difference at the load connection end of this contactor, and no polarity difference at the auxiliary contact connection end. There is a polarity difference at the coil connection end: the red wire is connected to the positive pole of the control power supply, and the black wire is connected to the negative terminal of the control power supply. Please pay attention to the correct installation and use.
4. The nominal value of the contact is the value when the resistive load is applied. In the case of an inductive load (L-load) of  $L/R \geq 1$  ms, take surge absorption measures in parallel with the inductive load. Otherwise the electrical performance cannot be achieved.
5. This contactor has built-in coil suppression reverse electromotive force circuit, so it does not require surge suppression device. When performing this action voltage test, the voltage cannot rise slowly. Please drive the contactor coil through the fast rising (step type power supply mode), otherwise the contactors will not operate.
6. The coil type of this contactor is dual coil, and the coil will be automatically switched to "hold" status after about 0.2 seconds of energization, and the contactor may not operate if energization is less than 0.2 s.
7. It is strictly forbidden to place the contactor in an environment that exceeds the temperature range of the product (-40°C ~ +85°C) for a long time.
8. Please avoid installing near strong magnetic boundaries (around transformers and magnets) and heating objects.
9. In order to prevent loosening, please use the washer correctly when installing the contactor. Screw locking torque of main contact terminals should be 10 N.m-12 N.m for M8 screw. Screw locking torque of contactor bottom mounting should be 3-4 N.m for M5 screw.
10. Please avoid adhering to foreign matter such as grease on the lead end. To maintain the maximum long-term performance, user should select the appropriate connection cable cross section or active cooling to control the temperature.

### Notes:

1. Datasheets and product specification according to IEC 61810-1, EN/IEC60947-4-1, UL60947-4-1 and to be used only together with the 'Definitions' section.
2. Datasheets and product data is subject to the terms of the disclaimer and all chapters of the 'Definitions' section, available at <http://relays.te.com/definitions>.
3. Datasheets, product data, 'Definitions' section, application notes and all specifications are subject to change.

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